ATTACHMENT D.1b

APPENDICES TO THE FINAL INITIAL STUDY/MITIGATED NEGATIVE DECLARATION (ND22-008)

APPENDICES

APPENDIX A

Air Quality Analysis

Air Quality Analysis for the Santa Fe Flores Project San Marcos, California

Prepared for
Santa Fe Flores, LP
P.O. Box 903
Rancho Santa Fe, CA 92067
Contact: Paul Mayer

Prepared by
RECON Environmental, Inc.
3111 Camino del Rio North, Suite 600
San Diego, CA 92108
P 619.308.9333

RECON Number 9865
July 28, 2022

Jessica Fleming
Environmental Specialist
Noise, Air Quality, Greenhouse Gas

TABLE OF CONTENTS

Acronyms and Abbreviations iii
Executive Summary 1
1.0 Introduction 2
2.0 Project Description 2
3.0 Regulatory Framework 5
3.1 Federal Regulations 5
3.2 State Regulations 9
3.3 San Diego Air Pollution Control District 11
4.0 Environmental Setting 12
4.1 Geographic Setting 12
4.2 Climate 12
4.3 Existing Air Quality 13
5.0 Thresholds of Significance 17
6.0 Air Quality Assessment 18
6.1 Construction Emissions 18
6.2 Operation Emissions 20
6.3 Impact Analysis 21
7.0 Conclusions 25
8.0 References Cited 26

FIGURES

1: Regional Location 3
2: Project Location on Aerial Photograph 4
3: Site Plan 6

TABLES

1: Ambient Air Quality Standards 7
2: Summary of Air Quality Measurements Recorded at the Camp Pendleton and Kearny Villa Road Monitoring Stations 13
3: Air Quality Impact Screening Levels 18
4: Summary of Worst-case Construction Emissions 19

TABLE OF CONTENTS (cont.)

TABLES (cont.)

5: Summary of Project Operational Emissions 21
6: CARB Land Use Siting Constraints 25

ATTACHMENTS

1: CalEEMod Output – Project Emissions
2: CalEEMod Output – Indistrial and Commercial Project Emissions

Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
AAQS	Ambient Air Quality Standards
AB	Assembly Bill
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
City	City of San Marcos
CO	carbon monoxide
DPM	diesel particulate matter
FAR	floor area ratio
General Plan	City of San Marcos General Plan
NAAQS	National Ambient Air Quality Standards
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
O_3	oxygen
OEHHA	Office of Environmental Health Hazard Assessment
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less
ppb	parts per billion
ppm	parts per million
project	Santa Fe Flores Project
RAQS	Regional Air Quality Standards
ROG	reactive organic gases
SANDAG	San Diego Association of Governments
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_X	oxides of sulfur
TAC	toxic air contaminants
TCM	Transportation Control Measures
U.S. EPA	U.S. Environmental Protection Agency

Executive Summary

This report evaluates potential local and regional air quality impacts associated with the proposed Santa Fe Flores Project (project), located in the city of San Marcos at 2972 and 2982 South Santa Fe Avenue adjacent to Las Flores Drive. The project would require a General Plan Amendment and Rezone to multi-family residential to allow the development of 50 multi-family residential units.

The primary goal of the San Diego Air Pollution Control District's Regional Air Quality Strategy (RAQS) is to reduce ozone precursor emissions. The northern portion of the project site is designated Light Industrial in the City of San Marcos (City) General Plan and is zoned L-I Light Industrial. The southern portion of the project site is designated Commercial in the City's General Plan and is zoned C Commercial. The project would require a General Plan Amendment and Rezone to multi-family residential. However, project emissions would be less than operational emissions associated with an industrial and commercial project that is consistent with the existing land use and zoning designations. Therefore, the project would not result in an increase in emissions that are not already accounted for in the RAQS. Thus, it can be concluded that the project would not obstruct or conflict with the implementation of the RAQS.

Additionally, as calculated in this analysis, project construction emissions would not exceed the applicable screening level emissions thresholds. These thresholds are designed to provide limits below which project emissions would not significantly change regional air quality. Therefore, as project emissions would be well below these limits, project construction would not result in a cumulatively considerable net increase in emissions of ozone (O_3), particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}), or particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), and impacts would be less than significant. Additionally, construction emissions would be temporary, intermittent, and would cease at the end of project construction.

Long-term emissions of regional air pollutants occur from operational sources. Based on emissions estimates, project operational emissions would not exceed the applicable regional emissions thresholds. Therefore, as project operational emissions would be below these limits, project operation would not result in a cumulatively considerable net increase in emissions of ozone, PM_{10}, or $PM_{2.5}$, and impacts would be less than significant.

Sensitive land uses include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities. The nearest sensitive receptors are the residential uses located 300 feet to the northeast, 100 feet to the southeast, 160 feet to the south, and 115 feet to the southwest. The project is not anticipated to result in a carbon monoxide (CO) hot spot at project area intersections. Construction of the project and associated infrastructure would result in short-term diesel exhaust emissions from on-site, heavy duty equipment. However, given the temporary nature of construction activities and implementation of Best Available Control Technology for Toxics measures, the project would not result in the exposure of sensitive receptors to substantial pollutant concentrations during construction.

The project does not include heavy industrial or agricultural uses that are typically associated with objectionable odors. The project would involve the use of diesel-powered equipment during

construction. Diesel exhaust may occasionally be noticeable at adjacent properties; however, construction activities would be temporary, and the odors would dissipate quickly in an outdoor environment. Therefore, this impact would be less than significant.

1.0 Introduction

The purpose of this report is to assess potential short-term and long-term local and regional air quality impacts resulting from development of the proposed Santa Fe Flores Project (project).

Air pollution affects all southern Californians. Effects can include increased respiratory infections, increased discomfort, missed days from work and school, and increased mortality. Polluted air also damages agriculture and our natural environment.

The state of California is divided geographically into 15 air basins for managing the air resources of the state on a regional basis. Areas within each air basin are considered to share the same air masses and, therefore, are expected to have similar ambient air quality. The project site is located within the San Diego Air Basin (SDAB). The SDAB is currently classified as a federal non-attainment area for ozone, and a state non-attainment area for particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}), particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), and ozone.

Air quality impacts can result from the construction and operation of the project. Construction impacts are short term and result from fugitive dust, equipment exhaust, and indirect effects associated with construction workers and deliveries. Operational impacts can occur on two levels: regional impacts resulting from growth-inducing development, or local hot-spot effects stemming from sensitive receivers being placed close to highly congested roadways. In the case of this project, operational impacts would be primarily due to emissions to the basin from mobile sources associated with vehicular travel along the roadways within the project area.

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

2.0 Project Description

The project is located in the city of San Marcos at 2972 and 2982 South Santa Fe Avenue adjacent to Las Flores Drive on assessor parcel numbers 217-161-1800 and 217-161-1900. Figure 1 shows the regional location. The 2.5-acre project site has been previously graded and is undeveloped, and is currently designated Commercial and Light Industrial in the City General Plan and zoned as Commercial and Light Industrial. Figure 2 shows an aerial photograph of the project site and vicinity.

Project Location

RECON

M:\JOBS5\9865\common_gis\fig1.mxd 03/08/2022 bma

FIGURE 1
Regional Location

Image Source: NearMap (flown January 2022)

Project Boundary

RECON

M:\JOBS5\9865\common_gis\fig2_air.mxd 03/23/2022 bma

FIGURE 2
Project Location on Aerial Photograph

The project would require a General Plan amendment and Rezone to Multifamily Residential to allow the development of 50 multi-family residential units in one building that would be three to four stories in height. The project would also include a 1,000 square-foot roof deck for fitness and leisure, a 1,170 square-foot ground floor leasing and amenity center, and 120 square-foot ground floor fire command center. Vehicle parking would include a total of 107 surface parking spaces and bicycle parking would include a total of 11 lockers or bike storage rooms located on the upper and lower levels. Figure 3 shows the proposed site plan.

3.0 Regulatory Framework

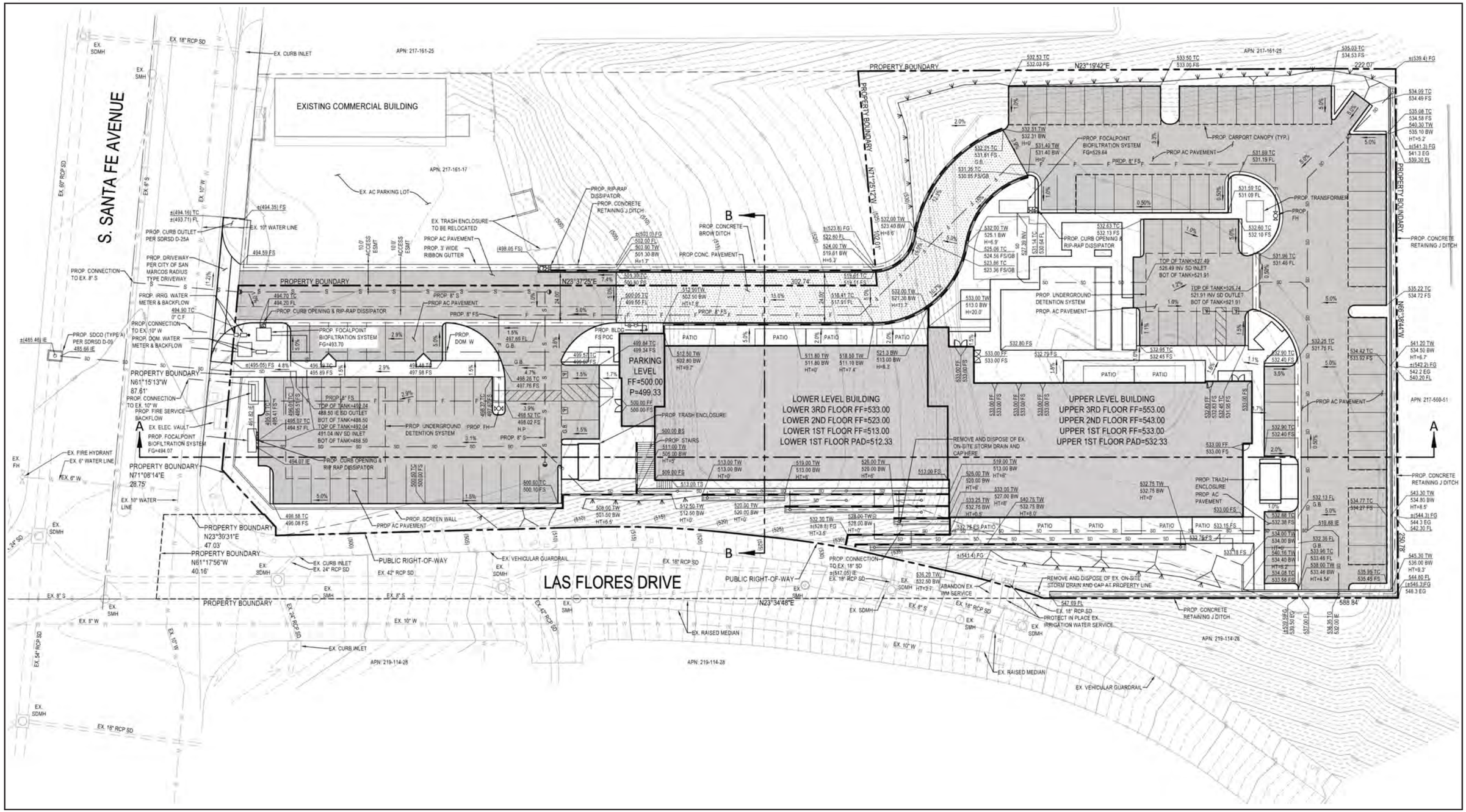
3.1 Federal Regulations

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

Six criteria pollutants of primary concern have been designated: ozone, carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead (Pb), and respirable particulate matter (PM_{10} and $PM_{2.5}$). The primary NAAQS ". . . in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health . . ." and the secondary standards ". . . protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air" (42 USC 7409[b][2]). The primary NAAQS were established, with a margin of safety, considering long-term exposure for the most sensitive groups in the general population (i.e., children, senior citizens, and people with breathing difficulties). The NAAQS are presented in Table 1 (California Air Resources Board [CARB] 2016).

An air basin is designated as either attainment or non-attainment for a particular pollutant. Once a non-attainment area has achieved the AAQS for a particular pollutant, it is re-designated as an attainment area for that pollutant. To be redesignated, the area must meet air quality standards for three consecutive years. After re-designation to attainment, the area is known as a maintenance area and must develop a 10-year plan for continuing to meet and maintain air quality standards, as well as satisfy other requirements of the federal CAA. The SDAB is a non-attainment area for the federal ozone standard.

Map Source: Pasco Laret Suiter & Associates



0 Feet 40

RECON

M:\JOBS5\9865\air\graphics\fig3.afdesign 03/23/22 bma

FIGURE 3
Site Plan

Table 1 Ambient Air Quality Standards						
		California Standards[1]		National Standards[2]		
Pollutant	Averaging Time	Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone[8]	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	–	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.07 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM_{10})[9]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		–		
Fine Particulate Matter ($PM_{2.5}$)[9]	24 Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-dispersive Infrared Photometry	35 ppm (40 mg/m^3)	–	Non-dispersive Infrared Photometry
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	–	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		–	–	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemi-luminescence	100 ppb (188 µg/m^3)	–	Gas Phase Chemi-luminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	–	Ultraviolet Fluorescence; Spectro-photometry (Pararosaniline Method)
	3 Hour	–		–	0.5 ppm (1,300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[11]	–	
	Annual Arithmetic Mean	–		0.030 ppm (for certain areas)[11]	–	
Lead[12,13]	30 Day Average	1.5 µg/m^3	Atomic Absorption	–	–	High Volume Sampler and Atomic Absorption
	Calendar Quarter	–		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	–		0.15 µg/m^3		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chroma-tography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chroma-tography			
See footnotes on next page.						

Table 1
Ambient Air Quality Standards

ppm = parts per million; ppb = parts per billion; µg/m^3 = micrograms per cubic meter; – = not applicable.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SOURCE: CARB 2016.

3.2 State Regulations

3.2.1 Criteria Pollutants

The CARB has developed the California Ambient Air Quality Standards (CAAQS) and generally has set more stringent limits on the criteria pollutants than the NAAQS (see Table 1). In addition to the federal criteria pollutants, the CAAQS also specify standards for visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride (see Table 1).

Similar to the federal CAA, the state classifies as either "attainment" or "non-attainment" areas for each pollutant based on the comparison of measured data with the CAAQS. The SDAB is a non-attainment area for the state ozone standards, the state PM_{10} standard, and the state $PM_{2.5}$ standard.

3.2.2 Toxic Air Contaminants

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

The California air toxics Program establishes the process for the identification and control of TACs and includes provisions to make the public aware of significant toxic exposures and for reducing risk. Additionally, the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987, Connelly Bill) was enacted in 1987 and requires stationary sources to report the types and quantities of certain substances routinely released into the air.

The goals of the Air Toxics "Hot Spots" Act are to collect emission data, to identify facilities having localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce those significant risks to acceptable levels.

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

been previously identified as TACs by the CARB and are listed as carcinogens either under the state's Proposition 65 or under the federal Hazardous Air Pollutants program.

Following the identification of diesel particulate matter (DPM) as a TAC in 1998, CARB has worked on developing strategies and regulations aimed at reducing the risk from DPM. The overall strategy for achieving these reductions is found in the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (CARB 2000).

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

However, transit-oriented, infill, and compact development characterizes many communities located near heavily traveled roadways. This type of development pattern has many benefits, including reducing traffic. To address these issues, in April 2017, CARB published the *Technical Advisory: Strategies to Reduce Air Pollution Exposure Near High Volume Roadways* (Technical Advisory; CARB 2017). The Technical Advisory acknowledges the benefits of transit-oriented infill development, which often occurs adjacent to high-volume roadways, and identifies strategies to reduce exposure, including practices and technologies that reduce traffic emissions, increase dispersion of traffic pollution, and remove pollution from the air. Strategies that reduce traffic emissions include speed reduction mechanisms (e.g., reduced speed limits, speed bumps, roundabouts) and traffic signal management. Strategies that increase the dispersion of traffic emissions include land use designs that promote airflow and pollutant dispersion along street corridors, solid barriers (such as sound walls), and vegetation. Strategies that remove pollution from the air include indoor high efficiency filtration.

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

3.2.3 State Implementation Plan

The State Implementation Plan (SIP) is a collection of documents that set forth the state's strategies for achieving the NAAQS. In California, the SIP is a compilation of new and previously submitted plans, programs (air quality management plans, monitoring, modeling, permitting, etc.), district rules, state regulations, and federal controls. The CARB is the lead agency for all purposes related to the SIP under state law. Local air districts and other agencies, such as the Department of Pesticide Regulation and the Bureau of Automotive Repair, prepare SIP elements and submit them to CARB

for review and approval. The CARB then forwards SIP revisions to the U.S. EPA for approval and publication in the Federal Register. All the items included in the California SIP are listed in the Code of Federal Regulations (CFR) at 40 CFR 52.220.

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

3.2.4 The California Environmental Quality Act

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

3.3 San Diego Air Pollution Control District

The SDAPCD is the agency that regulates air quality in the SDAB. The SDAPCD prepared the Regional Air Quality Strategy (RAQS) in response to the requirements set forth in the California CAA AB 2595 (SDAPCD 1992) and the federal CAA. Motor vehicles are San Diego County's leading source of air pollution (SDAPCD 2013). In addition to these sources, other mobile sources include construction equipment, trains, and airplanes. Reducing mobile source emissions requires the technological improvement of existing mobile sources and the examination of future mobile sources, such as those associated with new or modification projects (e.g., retrofitting older vehicles with cleaner emission technologies). In addition to mobile sources, stationary sources also contribute to air pollution in the SDAB. Stationary sources include gasoline stations, power plants, dry cleaners, and other commercial and industrial uses. Stationary sources of air pollution are regulated by the local air pollution control or management district, in this case the SDAPCD.

The SDAPCD is responsible for preparing and implementing the RAQS. As part of the RAQS, the SDAPCD developed Transportation Control Measures (TCMs) for the air quality plan prepared by the San Diego Association of Governments (SANDAG) in accordance with AB 2595 and adopted by SANDAG on March 27, 1992, as Resolution Number 92-49 and Addendum. The RAQS and TCM set forth the steps needed to accomplish attainment of NAAQS and CAAQS. The required triennial updates of the RAQS and corresponding TCM were adopted in 1995, 1998, 2001, 2004, 2009, and 2016.

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

4.0 Environmental Setting

4.1 Geographic Setting

The project is located in the city of San Marcos, about eight miles east of the Pacific Ocean. The eastern portion of the SDAB is surrounded by mountains to the north, east, and south. These mountains tend to restrict airflow and concentrate pollutants in the valleys and low-lying areas below.

4.2 Climate

The project area, like the rest of San Diego County, has a Mediterranean climate characterized by warm, dry summers and mild winters. The mean annual temperature for the project area is 63 degrees Fahrenheit (°F). The average annual precipitation is 10 inches, falling primarily from November to April. Winter low temperatures in the project area average about 47°F, and summer high temperatures average about 75°F (National Oceanic and Atmospheric Administration 2021).

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

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

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

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

Strong Santa Anas tend to blow pollutants out over the ocean, producing clear days. However, at the onset or during breakdown of these conditions, or if the Santa Ana is weak, local air quality may be adversely affected. In these cases, emissions from the South Coast Air Basin to the north are blown out over the ocean, and low pressure over Baja California draws this pollutant-laden air mass southward. As the high pressure weakens, prevailing northwesterly winds reassert themselves and

send this cloud of contamination ashore in the SDAB. When this event does occur, the combination of transported and locally produced contaminants produce the worst air quality measurements recorded in the basin.

4.3 Existing Air Quality

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

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

The Camp Pendleton monitoring station, located at 21441 West B Street, approximately 12 miles northwest of the project site, is the nearest station to the project site. The Camp Pendleton monitoring station measures ozone (O_3) and nitrogen dioxide (NO_2). The closest station of the project site that measures PM_{10} and $PM_{2.5}$ is the San Diego–Kearny Villa Road monitoring station located at 6125A Kearny Villa Road, approximately 22 miles south of the project site. The San Diego–Kearny Villa Road monitoring station measures ozone, NO_2, PM_{10}, and $PM_{2.5}$. Table 2 provides a summary of measurements collected at the Camp Pendleton and Kearny Villa Road monitoring station for the years 2016 through 2020.

Table 2
Summary of Air Quality Measurements Recorded at the Camp Pendleton and Kearny Villa Road Monitoring Stations

Pollutant/Standard	2016	2017	2018	2019	2020
CAMP PENDLETON MONITORING STATION					
Ozone					
Federal Max 8-hr (ppm)	0.073	0.081	0.068	0.064	0.074
Days 2015 Federal 8-hour Standard Exceeded (0.07 ppm)	4	4	0	0	3
Days 2008 Federal 8-hour Standard Exceeded (0.075 ppm)	0	1	0	0	0
State Max 8-hr (ppm)	0.073	0.082	0.069	0.065	0.074
Days State 8-hour Standard Exceeded (0.07 ppm)	5	5	0	0	3
Max. 1-hour (ppm)	0.083	0.094	0.084	0.075	0.094
Days State 1-hour Standard Exceeded (0.09 ppm)	0	0	0	0	0
Nitrogen Dioxide					
Max 1-hour (ppm)	0.072	0.063	0.048	0.053	0.058
Days State 1-hour Standard Exceeded (0.18 ppm)	0	0	0	0	0
Days Federal 1-hour Standard Exceeded (0.100 ppb)	0	0	0	0	0
Annual Average (ppm)	0.006	0.006	--	0.005	0.006

Table 2 Summary of Air Quality Measurements Recorded at the Camp Pendleton and Kearny Villa Road Monitoring Stations					
Pollutant/Standard	2016	2017	2018	2019	2020
SAN DIEGO – KEARNY VILLA ROAD MONITORING STATION					
Ozone					
Federal Max 8-hr (ppm)	0.075	0.083	0.077	0.075	0.102
Days 2015 Federal 8-hour Standard Exceeded (0.07 ppm)	3	6	5	1	10
Days 2008 Federal 8-hour Standard Exceeded (0.075 ppm)	0	4	1	0	6
State Max 8-hr (ppm)	0.075	0.084	0.077	0.075	0.102
Days State 8-hour Standard Exceeded (0.07 ppm)	3	6	5	1	12
Max. 1-hour (ppm)	0.087	0.097	0.102	0.083	0.123
Days State 1-hour Standard Exceeded (0.09 ppm)	0	2	1	0	2
Nitrogen Dioxide					
Max 1-hour (ppm)	0.053	0.054	0.045	0.046	0.052
Days State 1-hour Standard Exceeded (0.18 ppm)	0	0	0	0	0
Days Federal 1-hour Standard Exceeded (0.100 ppb)	0	0	0	0	0
Annual Average (ppm)	0.009	0.009	0.008	0.008	0.007
PM_{10}*					
Federal Max. Daily ($\mu g/m^3$)	36.0	46.0	38.0	--	--
Measured Days Federal 24-hour Standard Exceeded (150 $\mu g/m^3$)	0	0	0	--	--
Calculated Days Federal 24-hour Standard Exceeded (150 $\mu g/m^3$)	0.0	0.0	0.0	--	--
Federal Annual Average ($\mu g/m^3$)	17.1	17.6	18.4	--	--
State Max. Daily ($\mu g/m^3$)	35.0	47.0	38.0	--	--
Measured Days State 24-hour Standard Exceeded (50 $\mu g/m^3$)	0	0	0	--	--
Calculated Days State 24-hour Standard Exceeded (50 $\mu g/m^3$)	--	0.0	0.0	--	--
State Annual Average ($\mu g/m^3$)	--	17.6	18.4	--	--
$PM_{2.5}$*					
Federal Max. Daily ($\mu g/m^3$)	19.4	27.5	32.2	16.2	47.5
Measured Days Federal 24-hour Standard Exceeded (35 $\mu g/m^3$)	0	0	0	0	2
Calculated Days Federal 24-hour Standard Exceeded (35 $\mu g/m^3$)	0.0	0.0	0.0	0.0	5.8
Federal Annual Average ($\mu g/m^3$)	7.5	7.9	8.3	7.0	8.7
State Max. Daily ($\mu g/m^3$)	20.3	27.5	32.2	15.0	--
State Annual Average ($\mu g/m^3$)	7.8	8.0	8.3	--	--

SOURCE: CARB 2022.

ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter; -- = Not available.

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

4.3.1 Ozone

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

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

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

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

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

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

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

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

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

4.3.2 Carbon Monoxide

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

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

4.3.3 Particulate Matter

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

Health studies have shown a significant association between exposure to particulate matter and premature death in people with heart or lung diseases. Other important effects include aggravation of respiratory and cardiovascular disease, lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems such as heart attacks and irregular heartbeat (U.S. EPA 2021).

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

4.3.3.1 PM_{10}

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

4.3.3.2 $PM_{2.5}$

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

4.3.4 Other Criteria Pollutants

The national and state standards for NO_2, oxides of sulfur (SO_X), and the previous standard for lead are being met in the SDAB, and the latest pollutant trends suggest that these standards will not be

exceeded in the foreseeable future. As discussed above, new standards for these pollutants have been adopted, and new designations for the SDAB will be determined in the future. The SDAB is also in attainment of the state standards for vinyl chloride, hydrogen sulfides, sulfates, and visibility-reducing particulates.

5.0 Thresholds of Significance

Thresholds used to evaluate potential impacts to air quality are based on applicable criteria in the CEQA Guidelines Appendix G. The project would have a significant air quality impact if it would:

1. Obstruct or conflict with the implementation of the RAQS.
2. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
3. Expose sensitive receptors to substantial pollutant concentrations.
4. Result in other emissions such as those leading to odors adversely affecting a substantial number of people.

The City has not adopted air quality significance thresholds. The SDAPCD also does not provide specific numeric thresholds for determining the significance of air quality impacts under CEQA. However, the SDAPCD does specify Air Quality Impact Analysis trigger levels for new or modified stationary sources (SDAPCD Rules 20.1, 20.2, and 20.3). The SDAPCD does not consider these trigger levels to represent adverse air quality impacts, rather, if these trigger levels are exceeded by a project, the SDAPCD requires an air quality analysis to determine if a significant air quality impact would occur. While, these trigger levels do not generally apply to mobile sources or general land development projects, for comparative purposes these levels are used to evaluate the increased emissions that would be discharged to the SDAB if the project were approved. The air quality impact screening levels used in this analysis are shown in Table 3.

Table 3 Air Quality Impact Screening Levels			
	Emission Rate		
Pollutant	Pounds/Hour	Pounds/Day	Tons/Year
NO_X	25	250	40
SO_X	25	250	40
CO	100	550	100
PM_{10}	--	100	15
Lead	--	3.2	0.6
VOC, ROG[1]	--	250	--
$PM_{2.5}$	--	67	10
SOURCE: SDAPCD, Rules 20.1, 20.2, 20.3. [1]ROG threshold based on federal General Conformity *de minimus* levels for ozone precursors.			

6.0 Air Quality Assessment

Construction impacts are short term and result from fugitive dust, equipment exhaust, and indirect effects associated with construction workers and deliveries. Operational impacts can occur on two levels: regional or local. In the case of this project, operational impacts are primarily due to emissions from mobile sources associated with vehicular travel along the roadways within the project area.

Construction and operation air emissions were calculated using California Emissions Estimator Model (CalEEMod) 2020.4.0 (California Air Pollution Control Officers Association [CAPCOA] 2021). The CalEEMod program is a tool used to estimate air emissions resulting from land development projects based on California-specific emission factors. The model estimates mass emissions from two basics sources: construction sources and operational sources (i.e., area, energy, and mobile sources).

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

6.1 Construction Emissions

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

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

Construction-related pollutants result from dust raised during demolition and grading, emissions from construction vehicles, and chemicals used during construction. Fugitive dust emissions vary greatly during construction and are dependent on the amount and type of activity, silt content of the soil, and the weather. Vehicles moving over paved and unpaved surfaces, demolition, excavation, earth movement, grading, and wind erosion from exposed surfaces are all sources of fugitive dust. Construction operations are subject to the requirements established in Regulation 4, Rules 52, 54, and 55, of the SDAPCD's rules and regulations.

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

Primary inputs are the numbers of each piece of equipment and the length of each construction stage. Specific construction phasing and equipment parameters are not available at this time. However, CalEEMod can estimate the required construction equipment when project-specific information is unavailable. The estimates are based on surveys, performed by the South Coast Air Quality Management District and the Sacramento Metropolitan Air Quality Management District, of typical construction projects which provide a basis for scaling equipment needs and schedule with a project's size. Air emission estimates in CalEEMod are based on the duration of construction phases; construction equipment type, quantity, and usage; grading area; season; and ambient temperature, among other parameters. Construction emissions were modeled assuming construction would begin in January 2023 and last for approximately one year, which is the CalEEMod default construction duration for the entered land uses. Assuming construction would begin in January 2023 is conservative, as continued implementation of regulations for off-road equipment, the primary construction emission source, would reduce emissions from these sources over time. Project grading would include the export of 17,250 cubic yards of soil.

Table 4 shows the total projected construction maximum daily emission levels for each criteria pollutant. The CalEEMod output files for construction emissions are contained in Attachment 1.

Table 4
Summary of Maximum Construction Emissions
(pounds per day)

Construction	Pollutant					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Site Preparation	1	14	10	<1	2	1
Grading	2	63	22	<1	15	6
Building Construction	2	15	16	<1	1	1
Paving	1	9	12	<1	1	<1
Architectural Coatings	73	1	2	<1	<1	<1
Maximum Daily Emissions	**73**	**63**	**22**	**<1**	**15**	**6**
Significance Threshold	*250*	*250*	*550*	*250*	*100*	*67*

Standard dust control measures would be implemented as a part of project construction in accordance with SDAPCD rules and regulations. Fugitive dust emissions were calculated using CalEEMod default values and did not take into account the required dust control measures. Thus, the emissions shown in Table 4 are conservative.

For assessing the significance of the air quality emissions resulting during construction of the project, the construction emissions were compared to the screening thresholds shown in Table 4. As shown in Table 4, maximum daily construction emissions associated with the project are projected to be less than the applicable thresholds for all criteria pollutants. Construction related air quality impacts would be less than significant.

6.2 Operation Emissions

Mobile source emissions would originate from traffic generated by the project. Area source emissions would result from the use of natural gas, consumer products, as well as applying architectural coatings and landscaping activities.

Mobile source operational emissions are based on the trip rate, trip length. The project would generate 6 trips per unit for a total of 300 average daily trips (Linscott, Law and Greenspan, Engineers 2022). Default trip distances and default vehicle emission factors for the soonest operational year of 2024 were used.

Area source emissions associated with the project include consumer products, natural gas used in space and water heating, architectural coatings, and landscaping equipment. Hearths (fireplaces) and woodstoves are also a source of area emissions; however, the project would not include hearths or woodstoves. Consumer products are chemically formulated products used by household and institutional consumers, including, but not limited to, detergents, cleaning compounds, polishes, floor finishes, disinfectants, sanitizers, and aerosol paints but not including other paint products, furniture coatings, or architectural coatings. Emissions due to consumer products are calculated using total building area and product emission factors.

For architectural coatings, emissions result from evaporation of solvents contained in surface coatings such as in paints and primers. Emissions are based on the building surface area, architectural coating emission factors, and a reapplication rate of 10 percent of area per year. Landscaping maintenance includes fuel combustion emission from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers as well as air compressors, generators, and pumps. Emission calculations take into account building area, equipment emission factors, and the number of operational days (summer days).

Energy source emissions associated with the project include natural gas used in space and water heating. Emissions are generated from the combustion of natural gas used in space and water heating. Emissions are based on the Residential Appliance Saturation Survey which is a comprehensive energy use assessment that includes the end use for various climate zones in California.

Table 5 provides a summary of the operational emissions generated by the project. CalEEMod output files for project operation are contained in Attachment 1. As shown, project-generated emissions are projected to be less than the screening level thresholds for all criteria pollutants.

Table 5
Summary of Project Operational Emissions
(pounds per day)

Source	Pollutant					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Area Sources	1	<1	4	<1	<1	<1
Energy Sources	<1	<1	<1	<1	<1	<1
Mobile Sources	1	1	8	<1	2	<1
Total	**2**	**1**	**12**	**<1**	**2**	**1**
Significance Threshold	*250*	*250*	*550*	*250*	*100*	*67*
NOTE: Totals may vary due to independent rounding.						

6.3 Impact Analysis

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

The RAQS is the applicable regional air quality plan that sets forth the SDAPCD's strategies for achieving the NAAQS and CAAQS. The SDAB is designated non-attainment for the federal and state ozone standard. Accordingly, the RAQS was developed to identify feasible emission control measures and provide expeditious progress toward attaining the standards for ozone. The two pollutants addressed in the RAQS are ROG and NO_X, which are precursors to the formation of ozone. Projected increases in motor vehicle usage, population, and growth create challenges in controlling emissions and by extension to maintaining and improving air quality. The RAQS, in conjunction with the TCM, were most recently adopted in 2016 as the air quality plan for the region.

The growth projections used by the SDAPCD to develop the RAQS emissions budgets are based on the population, vehicle trends, and land use plans developed in general plans and used by SANDAG in the development of the regional transportation plans and sustainable communities strategy. As such, projects that propose development that is consistent with the growth anticipated by SANDAG's growth projections and/or the general plan would not conflict with the RAQS. In the event that a project would propose development that is less dense than anticipated by the growth projections, the project would likewise be consistent with the RAQS. In the event a project proposes development that is greater than anticipated in the growth projections, further analysis would be warranted to determine if the project would exceed the growth projections used in the RAQS for the specific subregional area.

The northern 1.5-acre portion of the project site is designated Light Industrial in the City's General Plan and is zoned Light Industrial (L-I). The southern 0.8-acre portion of the project site is designated Commercial in the City's General Plan and is zoned Commercial (C). The project would require a General Plan Amendment and Rezone to Multi-Family Residential (R-3-10). The project would not be consistent with the existing land use and zoning designations for the project site; however, this does not imply that the project would be inconsistent with the growth projections assumed in the RAQS.

In order to determine if emissions associated with the project are accounted for in the growth projections assumed in the RAQS, emissions due to operation of a project consistent with the existing land use and zoning designations were calculated and compared to emissions associated with operation of the project. Title 20 – Zoning of the City's Municipal Code establishes allowable floor area ratios (FAR) for each zone. Light Industrial zones have a FAR of 0.6 and Commercial zones have a FAR of 0.7. Under these requirements, should the site be developed with commercial and industrial land uses as allowed under the existing land use and zoning designations, approximately 38,000 square feet of light industrial development and 24,000 square feet of commercial development could be constructed. Table 6 summarizes the emissions associated with an industrial and commercial land use along with the emissions associated with the project. The CalEEMod output files for the project are contained in Attachment 1, and the CalEEMod output files for the industrial and commercial project are contained in Attachment 2.

Table 6
Commercial and Industrial Land Use Operational Emissions
(pounds per day)

Source	Pollutant					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
PROJECT EMISSIONS						
Area Sources	1	<1	4	<1	<1	<1
Energy Sources	<1	<1	<1	<1	<1	<1
Mobile Sources	1	1	8	<1	2	<1
Total	**2**	**1**	**12**	**<1**	**2**	**1**
INDUSTRIAL AND COMMERCIAL PROJECT EMISSIONS						
Area Sources	2	<1	<1	<1	<1	<1
Energy Sources	<1	<1	<1	<1	<1	<1
Mobile Sources	3	3	25	<1	5	1
Total	**4**	**3**	**25**	**<1**	**5**	**1**
NOTE: Totals may vary due to independent rounding.						

As shown, project emissions would be less than operational emissions associated with an industrial and commercial project that is consistent with the existing land use and zoning designations. Therefore, the project would not result in an increase in emissions that are not already accounted for in the RAQS.

Additionally, shown in Tables 4 and 5, project emissions would not exceed the screening level thresholds. Therefore, the project would not result in an increase in emissions that are not already accounted for in the RAQS. The project would not obstruct or conflict with implementation of the RAQS, and impacts would be less than significant.

2. *Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?*

The region is classified as an attainment area for all criterion pollutants except ozone, PM_{10}, and $PM_{2.5}$. The SDAB is a non-attainment area for the 8-hour federal and state ozone standards. Ozone

is not emitted directly, but is a result of atmospheric activity on precursors. NO_X and ROG are known as the chief "precursors" of ozone. These compounds react in the presence of sunlight to produce ozone. $PM_{2.5}$ includes fine particles that are found in smoke and haze, and are emitted from all types of combustion activities (motor vehicles, power plants, wood burning, etc.) and certain industrial processes. PM_{10} includes both fine and coarse dust particles, and sources include crushing or grinding operations and dust from paved or unpaved roads.

As shown in Table 4, project construction would not exceed the applicable regional emissions thresholds. These thresholds are designed to provide limits below which project emissions would not significantly change regional air quality. Therefore, as project construction emissions would be below these limits, project construction would not result in a cumulatively considerable net increase in emissions of ozone, PM_{10}, or $PM_{2.5}$, and impacts would be less than significant.

Long-term emissions of regional air pollutants occur from operational sources. As shown in Table 5, project operation would not exceed the applicable regional emissions thresholds. Therefore, as operational emissions would be below these limits, the project would not result in a cumulatively considerable net increase in emissions of ozone, PM_{10}, or $PM_{2.5}$, and impacts would be less than significant.

3. Would the project expose sensitive receptors to substantial pollutant concentrations?

Sensitive land uses include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities. The nearest sensitive receptors are the residential uses located 300 feet to the northeast, 100 feet to the southeast, 160 feet to the south, and 115 feet to the southwest.

Carbon Monoxide Hot Spots

Localized CO concentration is a direct function of motor vehicle activity at signalized intersections (e.g., idling time and traffic flow conditions), particularly during peak commute hours and meteorological conditions. The SDAB is a CO maintenance area under the federal CAA. This means that SDAB was previously a non-attainment area and is currently implementing a 10-year plan for continuing to meet and maintain air quality standards.

Due to increased requirements for cleaner vehicles, equipment, and fuels, CO levels in the state have dropped substantially. All air basins are attainment or maintenance areas for CO. Therefore, more recent screening procedures based on more current methodologies have been developed. The Sacramento Metropolitan Air Quality Management District developed a screening threshold in 2011, which states that any project involving an intersection experiencing 31,600 vehicles per hour or more will require detailed analysis. In addition, the Bay Area Air Quality Management District developed a screening threshold in 2010 which states that any project involving an intersection experiencing 44,000 vehicles per hour would require detailed analysis. This analysis conservatively assesses potential CO hot spots using the South Coast Air Quality Management District screening threshold of 31,600 vehicles per hour.

As discussed, the project would generate 300 daily trips. Based on the project daily traffic volumes on roadways in the vicinity of the project site (SANDAG 2022), the hourly turning volumes at nearby intersections are projected to be well less than 31,600 vehicles per hour. Therefore, the project is not anticipated to result in a CO hot spot.

Diesel Particulate Matter – Construction

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

Generation of DPM from construction projects typically occurs in a single area for a short period. Construction is anticipated to last for approximately 14 months. The dose to which the receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the Maximally Exposed Individual. The risks estimated for a Maximally Exposed Individual are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 30-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (OEHHA 2015). Thus, if the duration of proposed construction activities near any specific sensitive receptor were one year, the exposure would be 3 percent of the total 30-year exposure period used for health risk calculation. Further, the project would implement construction best management practices and would be conducted in accordance with CARB regulations. Specifically, the project would implement the following Best Available Control Technology for Toxics measures during construction:

- The construction fleet shall use any combination of diesel catalytic converters, diesel oxidation catalysts, diesel particulate filters and/or utilize CARB/U.S. EPA Engine Certification Tier 3 or better, or other equivalent methods approved by the CARB.
- The engine size of construction equipment shall be the minimum size suitable for the required job.
- Construction equipment shall be properly tuned and maintained in accordance with the manufacturer's specifications.
- Per CARB's Airborne Toxic Control Measures 13 (California Code of Regulations Chapter 10 Section 2485), the applicant shall not allow idling time to exceed 5 minutes unless more time is required per engine manufacturers' specifications or for safety reasons.

Therefore, DPM generated by project construction is not expected to create conditions where the probability is greater than 10 in 1 million of contracting cancer for the Maximally Exposed Individual or to generate ground-level concentrations of noncarcinogenic TACs that exceed a Hazard Index greater than 1 for the Maximally Exposed Individual. Additionally, with ongoing implementation of U.S. EPA and CARB requirements for cleaner fuels; off-road diesel engine retrofits; and new, low-emission diesel engine types, the DPM emissions of individual equipment would be substantially reduced. Therefore, project construction would not expose sensitive receptors to substantial pollutant concentration.

Stationary Sources

CARB provides guidance on siting land uses near major emitters or facilities of concern. These facilities include distribution centers, chrome platers, dry cleaners using perchloroethylene, and large gas stations. CARB siting constraints are summarized in Table 7.

The project would not include any of the sources included in Table 7. The project would not construct a stationary source of toxic emissions.

Table 7
CARB Land Use Siting Constraints

Source Category	Recommended Buffer Distances (feet)
Distribution centers (that accommodate more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units per day, or where transport refrigeration unit operations exceed 300 hours per week)	1,000
Chrome platers	1,000
Dry cleaners using perchloroethylene (1 machine)	300
Dry cleaners using perchloroethylene (2 machines)	500
Dry cleaners using perchloroethylene (3 or more machines)	Requires consultation with APCD
Large gas station (3.6 million gallons or more per year)	300
Other gas stations	50

SOURCE: CARB 2005.

4. *Would the project result in other emissions such as those leading to odors adversely affecting a substantial number of people?*

The project does not include heavy industrial or agricultural uses that are typically associated with odor complaints. During construction, diesel equipment may generate some nuisance odors. However, exposure to odors associated with project construction would be short term and temporary in nature. Impacts associated with odors would be less than significant.

7.0 Conclusions

The primary goal of the RAQS is to reduce ozone precursor emissions. The northern portion of the project site is designated Light Industrial in the City's General Plan and is zoned L-I Light Industrial. The southern portion of the project site is designated Commercial in the City's General Plan and is zoned C Commercial. The project would require a General Plan Amendment and Rezone to multi-family residential. However, project emissions would be less than operational emissions associated with an industrial and commercial project that is consistent with the existing land use and zoning designations. Therefore, the project would not result in an increase in emissions that are not already accounted for in the RAQS. Thus, it can be concluded that the project would not obstruct or conflict with the implementation of the RAQS.

As shown in Table 4, project construction emissions would not exceed the applicable regional emissions thresholds. These thresholds are designed to provide limits below which project emissions would not significantly change regional air quality. Therefore, as project construction emissions would be below these limits, project construction would not result in a cumulatively considerable net increase in emissions of ozone, PM_{10}, or $PM_{2.5}$, and impacts would be less than significant. Additionally, construction emissions would be temporary, intermittent, and would cease at the end of project construction.

Long-term emissions of regional air pollutants occur from operational sources. As shown in Table 5, project operational emissions would not exceed the applicable regional emissions thresholds. Therefore, as project operational emissions would be below these limits, project operation would not result in a cumulatively considerable net increase in emissions of ozone, PM_{10}, or $PM_{2.5}$, and impacts would be less than significant.

Sensitive land uses include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities. The nearest sensitive receptors are the residential uses located 300 feet to the northeast, 100 feet to the southeast, 160 feet to the south, and 115 feet to the southwest. The project is not anticipated to result in a CO hot spot at project area intersections. Construction of the project and associated infrastructure would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. However, given the temporary nature of construction activities and implementation of Best Available Control Technology for Toxics measures, the project would not result in the exposure of sensitive receptors to substantial pollutant concentrations during construction.

The project does not include heavy industrial or agricultural uses that are typically associated with objectionable odors. The project would involve the use of diesel-powered construction equipment. Diesel exhaust may be noticeable temporarily at adjacent properties; however, construction activities would be temporary. Therefore, odor impacts would be less than significant.

8.0 References Cited

California Air Pollution Control Officers Association (CAPCOA)

2021 California Emissions Estimator model (CalEEMod). Version 2020.4.0. May 2021.

California Air Resources Board (CARB)

2000 Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles. California Air Resources Board. Stationary Source Division, Mobile Source Control Division. October.

2004 2004 Revisions to the California State Implementation Plan for Carbon Monoxide. Updated Maintenance Plan for Ten Federal Planning Areas. Adopted July 22, 2004.

2005 Air Quality and Land Use Handbook: A Community Health Perspective. California Air Resources Board. April.

2016 Ambient Air Quality Standards. California Air Resources Board. May 4

2017 Technical Advisory: Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways. April 2017.

2022 California Air Quality Data Statistics. Available at http://www.arb.ca.gov/adam/welcome.html. Top 4 Summary and Hourly Listing. Accessed on February 24, 2022.

Linscott, Law, and Greenspan, Engineers, Inc. (LLG)

2022 Existing, Year 2025, and Year 2050 Forecasted Traffic Volumes and Trip Generation Data emailed to RECON by Amelia Giacalone, Senior Transportation Planner, on March 21, 2022.

National Oceanic and Atmospheric Administration (NOAA)

2021 Climate Database – SC ACIS Version 2. Accessed at http://scacis.rcc-acis.org/. Updated May 4, 2021.

Office of Environmental Health Hazard Assessment (OEHHA)

2015 Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments (Guidance Manual), February.

San Diego Air Pollution Control District (SDAPCD)

1992 1991/1992 Regional Air Quality Strategies. Air Pollution Control District. June.

2012 Redesignation Request and Maintenance Plan for the 1997 National Ozone Standard for San Diego County. Adopted December 5, 2012.

2013 Air Quality in San Diego County. 2013 Annual Report.

San Diego Association of Governments (SANDAG)

2021 Transportation Forecast Information Center. Years 2025, 2035, and 2050 Series 14 traffic volumes. Accessed at https://tfic.sandag.org/map.html. November 1, 2021.

U.S. Environmental Protection Agency (U.S. EPA)

2021 U.S. Environmental Protection Agency Website Criteria Air Pollutants. Last updated March 22. https://www.epa.gov/criteria-air-pollutants.

ATTACHMENTS

ATTACHMENT 1

CalEEMod Output – Project Emissions

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

9865 Santa Fe Flores San Marcos

San Diego County APCD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	77.10	1000sqft	1.77	77,101.00	0
Apartments Mid Rise	50.00	Dwelling Unit	0.43	50,000.00	143

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2024
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	539.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 50 units
0.43 acre building footprint
2.2 acres

Construction Phase -

Grading - 17,250 cy export

Architectural Coating - SDAPCD Rule 67.0.1

Vehicle Trips - 6 trips/du weekday trip rates

Woodstoves - No woodstoves or fireplaces

Area Coating - SDAPCD Rule 67.0.1

Trips and VMT -

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Parking	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	150.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	100.00
tblAreaCoating	Area_EF_Parking	250	100
tblAreaCoating	Area_EF_Residential_Exterior	250	150
tblAreaCoating	Area_EF_Residential_Interior	250	100
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	27.50	0.00
tblFireplaces	NumberNoFireplace	5.00	50.00
tblFireplaces	NumberWood	17.50	0.00
tblGrading	MaterialExported	0.00	17,250.00
tblLandUse	LandUseSquareFeet	77,100.00	77,101.00
tblLandUse	LotAcreage	1.32	0.43
tblVehicleTrips	ST_TR	4.91	5.42
tblVehicleTrips	SU_TR	4.09	4.51
tblVehicleTrips	WD_TR	5.44	6.00
tblWoodstoves	NumberCatalytic	2.50	0.00
tblWoodstoves	NumberNoncatalytic	2.50	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

2.0 Emissions Summary

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
2023	72.7714	63.3885	22.0060	0.2365	13.8536	1.0045	14.8581	5.2304	0.9388	6.1692	0.0000	25,850.8061	25,850.8061	1.8422	3.7846	27,024.6586
Maximum	**72.7714**	**63.3885**	**22.0060**	**0.2365**	**13.8536**	**1.0045**	**14.8581**	**5.2304**	**0.9388**	**6.1692**	**0.0000**	**25,850.8061**	**25,850.8061**	**1.8422**	**3.7846**	**27,024.6586**

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					
2023	72.7714	63.3885	22.0060	0.2365	13.8536	1.0045	14.8581	5.2304	0.9388	6.1692	0.0000	25,850.8061	25,850.8061	1.8422	3.7846	27,024.6586
Maximum	**72.7714**	**63.3885**	**22.0060**	**0.2365**	**13.8536**	**1.0045**	**14.8581**	**5.2304**	**0.9388**	**6.1692**	**0.0000**	**25,850.8061**	**25,850.8061**	**1.8422**	**3.7846**	**27,024.6586**

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

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	1.4208	0.0476	4.1312	2.2000e-004		0.0229	0.0229		0.0229	0.0229	0.0000	7.4445	7.4445	7.1700e-003	0.0000	7.6238
Energy	0.0108	0.0919	0.0391	5.9000e-004		7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003		117.2611	117.2611	2.2500e-003	2.1500e-003	117.9579
Mobile	0.8456	0.9520	7.9716	0.0164	1.8032	0.0129	1.8161	0.4804	0.0121	0.4924		1,698.6339	1,698.6339	0.1225	0.0773	1,724.7343
Total	**2.2771**	**1.0914**	**12.1419**	**0.0172**	**1.8032**	**0.0432**	**1.8465**	**0.4804**	**0.0424**	**0.5227**	**0.0000**	**1,823.3395**	**1,823.3395**	**0.1319**	**0.0795**	**1,850.3159**

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	1.4208	0.0476	4.1312	2.2000e-004		0.0229	0.0229		0.0229	0.0229	0.0000	7.4445	7.4445	7.1700e-003	0.0000	7.6238
Energy	0.0108	0.0919	0.0391	5.9000e-004		7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003		117.2611	117.2611	2.2500e-003	2.1500e-003	117.9579
Mobile	0.8456	0.9520	7.9716	0.0164	1.8032	0.0129	1.8161	0.4804	0.0121	0.4924		1,698.6339	1,698.6339	0.1225	0.0773	1,724.7343
Total	**2.2771**	**1.0914**	**12.1419**	**0.0172**	**1.8032**	**0.0432**	**1.8465**	**0.4804**	**0.0424**	**0.5227**	**0.0000**	**1,823.3395**	**1,823.3395**	**0.1319**	**0.0795**	**1,850.3159**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/2/2023	1/4/2023	5	3	
2	Grading	Grading	1/5/2023	1/12/2023	5	6	
3	Building Construction	Building Construction	1/13/2023	11/16/2023	5	220	
4	Paving	Paving	11/17/2023	11/30/2023	5	10	
5	Architectural Coating	Architectural Coating	12/1/2023	12/14/2023	5	10	

Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 6

Acres of Paving: 1.77

Residential Indoor: 101,250; Residential Outdoor: 33,750; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 4,626 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	2,156.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	68.00	18.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.3027	14.2802	9.7820	0.0245		0.5419	0.5419		0.4985	0.4985		2,374.8634	2,374.8634	0.7681		2,394.0654
Total	**1.3027**	**14.2802**	**9.7820**	**0.0245**	**1.5908**	**0.5419**	**2.1326**	**0.1718**	**0.4985**	**0.6703**		**2,374.8634**	**2,374.8634**	**0.7681**		**2,394.0654**

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	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
Worker	0.0237	0.0153	0.1829	5.5000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.3000e-004	0.0178		56.1616	56.1616	1.6900e-003	1.5800e-003	56.6755
Total	**0.0237**	**0.0153**	**0.1829**	**5.5000e-004**	**0.0657**	**3.5000e-004**	**0.0661**	**0.0174**	**3.3000e-004**	**0.0178**		**56.1616**	**56.1616**	**1.6900e-003**	**1.5800e-003**	**56.6755**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.3027	14.2802	9.7820	0.0245		0.5419	0.5419		0.4985	0.4985	0.0000	2,374.8634	2,374.8634	0.7681		2,394.0654
Total	**1.3027**	**14.2802**	**9.7820**	**0.0245**	**1.5908**	**0.5419**	**2.1326**	**0.1718**	**0.4985**	**0.6703**	**0.0000**	**2,374.8634**	**2,374.8634**	**0.7681**		**2,394.0654**

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	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
Worker	0.0237	0.0153	0.1829	5.5000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.3000e-004	0.0178		56.1616	56.1616	1.6900e-003	1.5800e-003	56.6755
Total	**0.0237**	**0.0153**	**0.1829**	**5.5000e-004**	**0.0657**	**3.5000e-004**	**0.0661**	**0.0174**	**3.3000e-004**	**0.0178**		**56.1616**	**56.1616**	**1.6900e-003**	**1.5800e-003**	**56.6755**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2023

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					7.4866	0.0000	7.4866	3.4859	0.0000	3.4859			0.0000			0.0000
Off-Road	1.3330	14.4676	8.7038	0.0206		0.6044	0.6044		0.5560	0.5560		1,995.6147	1,995.6147	0.6454		2,011.7503
Total	**1.3330**	**14.4676**	**8.7038**	**0.0206**	**7.4866**	**0.6044**	**8.0909**	**3.4859**	**0.5560**	**4.0419**		**1,995.6147**	**1,995.6147**	**0.6454**		**2,011.7503**

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	0.7650	48.9018	13.0735	0.2152	6.2848	0.3997	6.6845	1.7227	0.3824	2.1051		23,784.9893	23,784.9893	1.1947	3.7826	24,942.0639
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
Worker	0.0297	0.0191	0.2287	6.9000e-004	0.0822	4.4000e-004	0.0826	0.0218	4.1000e-004	0.0222		70.2020	70.2020	2.1200e-003	1.9800e-003	70.8444
Total	**0.7947**	**48.9209**	**13.3022**	**0.2159**	**6.3670**	**0.4002**	**6.7671**	**1.7445**	**0.3828**	**2.1273**		**23,855.1914**	**23,855.1914**	**1.1968**	**3.7846**	**25,012.9083**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2023

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					7.4866	0.0000	7.4866	3.4859	0.0000	3.4859			0.0000			0.0000
Off-Road	1.3330	14.4676	8.7038	0.0206		0.6044	0.6044		0.5560	0.5560	0.0000	1,995.6147	1,995.6147	0.6454		2,011.7503
Total	**1.3330**	**14.4676**	**8.7038**	**0.0206**	**7.4866**	**0.6044**	**8.0909**	**3.4859**	**0.5560**	**4.0419**	**0.0000**	**1,995.6147**	**1,995.6147**	**0.6454**		**2,011.7503**

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	0.7650	48.9018	13.0735	0.2152	6.2848	0.3997	6.6845	1.7227	0.3824	2.1051		23,784.9893	23,784.9893	1.1947	3.7826	24,942.0639
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
Worker	0.0297	0.0191	0.2287	6.9000e-004	0.0822	4.4000e-004	0.0826	0.0218	4.1000e-004	0.0222		70.2020	70.2020	2.1200e-003	1.9800e-003	70.8444
Total	**0.7947**	**48.9209**	**13.3022**	**0.2159**	**6.3670**	**0.4002**	**6.7671**	**1.7445**	**0.3828**	**2.1273**		**23,855.1914**	**23,855.1914**	**1.1968**	**3.7846**	**25,012.9083**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2023

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	1.7136	13.6239	14.2145	0.0250		0.6136	0.6136		0.5880	0.5880		2,289.5233	2,289.5233	0.4330		2,300.3479
Total	**1.7136**	**13.6239**	**14.2145**	**0.0250**		**0.6136**	**0.6136**		**0.5880**	**0.5880**		**2,289.5233**	**2,289.5233**	**0.4330**		**2,300.3479**

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	0.0000
Vendor	0.0209	0.8041	0.2865	3.6900e-003	0.1219	4.7200e-003	0.1266	0.0351	4.5200e-003	0.0396		398.4502	398.4502	0.0120	0.0578	415.9583
Worker	0.2016	0.1299	1.5549	4.6600e-003	0.5586	3.0000e-003	0.5616	0.1482	2.7700e-003	0.1509		477.3738	477.3738	0.0144	0.0135	481.7421
Total	**0.2225**	**0.9340**	**1.8414**	**8.3500e-003**	**0.6805**	**7.7200e-003**	**0.6882**	**0.1833**	**7.2900e-003**	**0.1905**		**875.8240**	**875.8240**	**0.0264**	**0.0712**	**897.7004**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2023

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	1.7136	13.6239	14.2145	0.0250		0.6136	0.6136		0.5880	0.5880	0.0000	2,289.5233	2,289.5233	0.4330		2,300.3479
Total	**1.7136**	**13.6239**	**14.2145**	**0.0250**		**0.6136**	**0.6136**		**0.5880**	**0.5880**	**0.0000**	**2,289.5233**	**2,289.5233**	**0.4330**		**2,300.3479**

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	0.0000
Vendor	0.0209	0.8041	0.2865	3.6900e-003	0.1219	4.7200e-003	0.1266	0.0351	4.5200e-003	0.0396		398.4502	398.4502	0.0120	0.0578	415.9583
Worker	0.2016	0.1299	1.5549	4.6600e-003	0.5586	3.0000e-003	0.5616	0.1482	2.7700e-003	0.1509		477.3738	477.3738	0.0144	0.0135	481.7421
Total	**0.2225**	**0.9340**	**1.8414**	**8.3500e-003**	**0.6805**	**7.7200e-003**	**0.6882**	**0.1833**	**7.2900e-003**	**0.1905**		**875.8240**	**875.8240**	**0.0264**	**0.0712**	**897.7004**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Paving - 2023

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	0.8802	8.6098	11.6840	0.0179		0.4338	0.4338		0.4003	0.4003		1,709.9926	1,709.9926	0.5420		1,723.5414
Paving	0.4637					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3439**	**8.6098**	**11.6840**	**0.0179**		**0.4338**	**0.4338**		**0.4003**	**0.4003**		**1,709.9926**	**1,709.9926**	**0.5420**		**1,723.5414**

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	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
Worker	0.0445	0.0287	0.3430	1.0300e-003	0.1232	6.6000e-004	0.1239	0.0327	6.1000e-004	0.0333		105.3031	105.3031	3.1800e-003	2.9700e-003	106.2666
Total	**0.0445**	**0.0287**	**0.3430**	**1.0300e-003**	**0.1232**	**6.6000e-004**	**0.1239**	**0.0327**	**6.1000e-004**	**0.0333**		**105.3031**	**105.3031**	**3.1800e-003**	**2.9700e-003**	**106.2666**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Paving - 2023

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	0.8802	8.6098	11.6840	0.0179		0.4338	0.4338		0.4003	0.4003	0.0000	1,709.9926	1,709.9926	0.5420		1,723.5414
Paving	0.4637					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3439**	**8.6098**	**11.6840**	**0.0179**		**0.4338**	**0.4338**		**0.4003**	**0.4003**	**0.0000**	**1,709.9926**	**1,709.9926**	**0.5420**		**1,723.5414**

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	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
Worker	0.0445	0.0287	0.3430	1.0300e-003	0.1232	6.6000e-004	0.1239	0.0327	6.1000e-004	0.0333		105.3031	105.3031	3.1800e-003	2.9700e-003	106.2666
Total	**0.0445**	**0.0287**	**0.3430**	**1.0300e-003**	**0.1232**	**6.6000e-004**	**0.1239**	**0.0327**	**6.1000e-004**	**0.0333**		**105.3031**	**105.3031**	**3.1800e-003**	**2.9700e-003**	**106.2666**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coating - 2023

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	72.5382					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**72.7299**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

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	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
Worker	0.0415	0.0267	0.3201	9.6000e-004	0.1150	6.2000e-004	0.1156	0.0305	5.7000e-004	0.0311		98.2829	98.2829	2.9700e-003	2.7700e-003	99.1822
Total	**0.0415**	**0.0267**	**0.3201**	**9.6000e-004**	**0.1150**	**6.2000e-004**	**0.1156**	**0.0305**	**5.7000e-004**	**0.0311**		**98.2829**	**98.2829**	**2.9700e-003**	**2.7700e-003**	**99.1822**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coating - 2023

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	72.5382					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**72.7299**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

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	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
Worker	0.0415	0.0267	0.3201	9.6000e-004	0.1150	6.2000e-004	0.1156	0.0305	5.7000e-004	0.0311		98.2829	98.2829	2.9700e-003	2.7700e-003	99.1822
Total	**0.0415**	**0.0267**	**0.3201**	**9.6000e-004**	**0.1150**	**6.2000e-004**	**0.1156**	**0.0305**	**5.7000e-004**	**0.0311**		**98.2829**	**98.2829**	**2.9700e-003**	**2.7700e-003**	**99.1822**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.8456	0.9520	7.9716	0.0164	1.8032	0.0129	1.8161	0.4804	0.0121	0.4924		1,698.6339	1,698.6339	0.1225	0.0773	1,724.7343
Unmitigated	0.8456	0.9520	7.9716	0.0164	1.8032	0.0129	1.8161	0.4804	0.0121	0.4924		1,698.6339	1,698.6339	0.1225	0.0773	1,724.7343

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	300.00	271.00	225.50	814,373	814,373
Parking Lot	0.00	0.00	0.00		
Total	300.00	271.00	225.50	814,373	814,373

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
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.557888	0.062607	0.178921	0.119061	0.024112	0.006269	0.008734	0.006266	0.000708	0.000566	0.028949	0.000971	0.004949
Parking Lot	0.557888	0.062607	0.178921	0.119061	0.024112	0.006269	0.008734	0.006266	0.000708	0.000566	0.028949	0.000971	0.004949

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0108	0.0919	0.0391	5.9000e-004		7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003		117.2611	117.2611	2.2500e-003	2.1500e-003	117.9579
NaturalGas Unmitigated	0.0108	0.0919	0.0391	5.9000e-004		7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003		117.2611	117.2611	2.2500e-003	2.1500e-003	117.9579

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	996.719	0.0108	0.0919	0.0391	5.9000e-004		7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003		117.2611	117.2611	2.2500e-003	2.1500e-003	117.9579
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0108**	**0.0919**	**0.0391**	**5.9000e-004**		**7.4300e-003**	**7.4300e-003**		**7.4300e-003**	**7.4300e-003**		**117.2611**	**117.2611**	**2.2500e-003**	**2.1500e-003**	**117.9579**

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	0.996719	0.0108	0.0919	0.0391	5.9000e-004		7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003		117.2611	117.2611	2.2500e-003	2.1500e-003	117.9579
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0108**	**0.0919**	**0.0391**	**5.9000e-004**		**7.4300e-003**	**7.4300e-003**		**7.4300e-003**	**7.4300e-003**		**117.2611**	**117.2611**	**2.2500e-003**	**2.1500e-003**	**117.9579**

6.0 Area Detail

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.4208	0.0476	4.1312	2.2000e-004		0.0229	0.0229		0.0229	0.0229	0.0000	7.4445	7.4445	7.1700e-003	0.0000	7.6238
Unmitigated	1.4208	0.0476	4.1312	2.2000e-004		0.0229	0.0229		0.0229	0.0229	0.0000	7.4445	7.4445	7.1700e-003	0.0000	7.6238

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.1987					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.0973					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	0.1247	0.0476	4.1312	2.2000e-004		0.0229	0.0229		0.0229	0.0229		7.4445	7.4445	7.1700e-003		7.6238
Total	**1.4207**	**0.0476**	**4.1312**	**2.2000e-004**		**0.0229**	**0.0229**		**0.0229**	**0.0229**	**0.0000**	**7.4445**	**7.4445**	**7.1700e-003**	**0.0000**	**7.6238**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.1987					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.0973					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	0.1247	0.0476	4.1312	2.2000e-004		0.0229	0.0229		0.0229	0.0229		7.4445	7.4445	7.1700e-003		7.6238
Total	**1.4207**	**0.0476**	**4.1312**	**2.2000e-004**		**0.0229**	**0.0229**		**0.0229**	**0.0229**	**0.0000**	**7.4445**	**7.4445**	**7.1700e-003**	**0.0000**	**7.6238**

7.0 Water Detail

7.1 Mitigation Measures Water

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

9865 Santa Fe Flores San Marcos

San Diego County APCD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	77.10	1000sqft	1.77	77,101.00	0
Apartments Mid Rise	50.00	Dwelling Unit	0.43	50,000.00	143

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2024
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	539.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 50 units
0.43 acre building footprint
2.2 acres

Construction Phase -

Grading - 17,250 cy export

Architectural Coating - SDAPCD Rule 67.0.1

Vehicle Trips - 6 trips/du weekday trip rates

Woodstoves - No woodstoves or fireplaces

Area Coating - SDAPCD Rule 67.0.1

Trips and VMT -

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Parking	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	150.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	100.00
tblAreaCoating	Area_EF_Parking	250	100
tblAreaCoating	Area_EF_Residential_Exterior	250	150
tblAreaCoating	Area_EF_Residential_Interior	250	100
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	27.50	0.00
tblFireplaces	NumberNoFireplace	5.00	50.00
tblFireplaces	NumberWood	17.50	0.00
tblGrading	MaterialExported	0.00	17,250.00
tblLandUse	LandUseSquareFeet	77,100.00	77,101.00
tblLandUse	LotAcreage	1.32	0.43
tblVehicleTrips	ST_TR	4.91	5.42
tblVehicleTrips	SU_TR	4.09	4.51
tblVehicleTrips	WD_TR	5.44	6.00
tblWoodstoves	NumberCatalytic	2.50	0.00
tblWoodstoves	NumberNoncatalytic	2.50	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

2.0 Emissions Summary

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
2023	72.7682	61.4905	21.8570	0.2363	13.8536	1.0037	14.8573	5.2304	0.9381	6.1685	0.0000	25,831.7992	25,831.7992	1.8450	3.7806	27,004.5360
Maximum	**72.7682**	**61.4905**	**21.8570**	**0.2363**	**13.8536**	**1.0037**	**14.8573**	**5.2304**	**0.9381**	**6.1685**	**0.0000**	**25,831.7992**	**25,831.7992**	**1.8450**	**3.7806**	**27,004.5360**

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					
2023	72.7682	61.4905	21.8570	0.2363	13.8536	1.0037	14.8573	5.2304	0.9381	6.1685	0.0000	25,831.7992	25,831.7992	1.8450	3.7806	27,004.5360
Maximum	**72.7682**	**61.4905**	**21.8570**	**0.2363**	**13.8536**	**1.0037**	**14.8573**	**5.2304**	**0.9381**	**6.1685**	**0.0000**	**25,831.7992**	**25,831.7992**	**1.8450**	**3.7806**	**27,004.5360**

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

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	1.4208	0.0476	4.1312	2.2000e-004		0.0229	0.0229		0.0229	0.0229	0.0000	7.4445	7.4445	7.1700e-003	0.0000	7.6238
Energy	0.0108	0.0919	0.0391	5.9000e-004		7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003		117.2611	117.2611	2.2500e-003	2.1500e-003	117.9579
Mobile	0.8647	0.8784	7.7800	0.0171	1.8032	0.0129	1.8161	0.4804	0.0120	0.4924		1,775.9728	1,775.9728	0.1159	0.0734	1,800.7361
Total	**2.2962**	**1.0179**	**11.9503**	**0.0180**	**1.8032**	**0.0432**	**1.8464**	**0.4804**	**0.0424**	**0.5227**	**0.0000**	**1,900.6783**	**1,900.6783**	**0.1253**	**0.0755**	**1,926.3178**

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	1.4208	0.0476	4.1312	2.2000e-004		0.0229	0.0229		0.0229	0.0229	0.0000	7.4445	7.4445	7.1700e-003	0.0000	7.6238
Energy	0.0108	0.0919	0.0391	5.9000e-004		7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003		117.2611	117.2611	2.2500e-003	2.1500e-003	117.9579
Mobile	0.8647	0.8784	7.7800	0.0171	1.8032	0.0129	1.8161	0.4804	0.0120	0.4924		1,775.9728	1,775.9728	0.1159	0.0734	1,800.7361
Total	**2.2962**	**1.0179**	**11.9503**	**0.0180**	**1.8032**	**0.0432**	**1.8464**	**0.4804**	**0.0424**	**0.5227**	**0.0000**	**1,900.6783**	**1,900.6783**	**0.1253**	**0.0755**	**1,926.3178**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/2/2023	1/4/2023	5	3	
2	Grading	Grading	1/5/2023	1/12/2023	5	6	
3	Building Construction	Building Construction	1/13/2023	11/16/2023	5	220	
4	Paving	Paving	11/17/2023	11/30/2023	5	10	
5	Architectural Coating	Architectural Coating	12/1/2023	12/14/2023	5	10	

Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 6

Acres of Paving: 1.77

Residential Indoor: 101,250; Residential Outdoor: 33,750; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 4,626 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	2,156.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	68.00	18.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.3027	14.2802	9.7820	0.0245		0.5419	0.5419		0.4985	0.4985		2,374.8634	2,374.8634	0.7681		2,394.0654
Total	**1.3027**	**14.2802**	**9.7820**	**0.0245**	**1.5908**	**0.5419**	**2.1326**	**0.1718**	**0.4985**	**0.6703**		**2,374.8634**	**2,374.8634**	**0.7681**		**2,394.0654**

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	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
Worker	0.0219	0.0136	0.1925	5.8000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.3000e-004	0.0178		59.4283	59.4283	1.5900e-003	1.4600e-003	59.9041
Total	**0.0219**	**0.0136**	**0.1925**	**5.8000e-004**	**0.0657**	**3.5000e-004**	**0.0661**	**0.0174**	**3.3000e-004**	**0.0178**		**59.4283**	**59.4283**	**1.5900e-003**	**1.4600e-003**	**59.9041**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.3027	14.2802	9.7820	0.0245		0.5419	0.5419		0.4985	0.4985	0.0000	2,374.8634	2,374.8634	0.7681		2,394.0654
Total	**1.3027**	**14.2802**	**9.7820**	**0.0245**	**1.5908**	**0.5419**	**2.1326**	**0.1718**	**0.4985**	**0.6703**	**0.0000**	**2,374.8634**	**2,374.8634**	**0.7681**		**2,394.0654**

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	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
Worker	0.0219	0.0136	0.1925	5.8000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.3000e-004	0.0178		59.4283	59.4283	1.5900e-003	1.4600e-003	59.9041
Total	**0.0219**	**0.0136**	**0.1925**	**5.8000e-004**	**0.0657**	**3.5000e-004**	**0.0661**	**0.0174**	**3.3000e-004**	**0.0178**		**59.4283**	**59.4283**	**1.5900e-003**	**1.4600e-003**	**59.9041**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2023

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					7.4866	0.0000	7.4866	3.4859	0.0000	3.4859			0.0000			0.0000
Off-Road	1.3330	14.4676	8.7038	0.0206		0.6044	0.6044		0.5560	0.5560		1,995.6147	1,995.6147	0.6454		2,011.7503
Total	**1.3330**	**14.4676**	**8.7038**	**0.0206**	**7.4866**	**0.6044**	**8.0909**	**3.4859**	**0.5560**	**4.0419**		**1,995.6147**	**1,995.6147**	**0.6454**		**2,011.7503**

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	0.8138	47.0059	12.9126	0.2150	6.2848	0.3989	6.6838	1.7227	0.3817	2.1044		23,761.8991	23,761.8991	1.1975	3.7788	24,917.9056
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
Worker	0.0274	0.0170	0.2406	7.3000e-004	0.0822	4.4000e-004	0.0826	0.0218	4.1000e-004	0.0222		74.2854	74.2854	1.9900e-003	1.8300e-003	74.8801
Total	**0.8411**	**47.0229**	**13.1532**	**0.2157**	**6.3670**	**0.3994**	**6.7664**	**1.7445**	**0.3821**	**2.1266**		**23,836.1844**	**23,836.1844**	**1.1995**	**3.7806**	**24,992.7857**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2023

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					7.4866	0.0000	7.4866	3.4859	0.0000	3.4859			0.0000			0.0000
Off-Road	1.3330	14.4676	8.7038	0.0206		0.6044	0.6044		0.5560	0.5560	0.0000	1,995.6147	1,995.6147	0.6454		2,011.7503
Total	**1.3330**	**14.4676**	**8.7038**	**0.0206**	**7.4866**	**0.6044**	**8.0909**	**3.4859**	**0.5560**	**4.0419**	**0.0000**	**1,995.6147**	**1,995.6147**	**0.6454**		**2,011.7503**

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	0.8138	47.0059	12.9126	0.2150	6.2848	0.3989	6.6838	1.7227	0.3817	2.1044		23,761.8991	23,761.8991	1.1975	3.7788	24,917.9056
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
Worker	0.0274	0.0170	0.2406	7.3000e-004	0.0822	4.4000e-004	0.0826	0.0218	4.1000e-004	0.0222		74.2854	74.2854	1.9900e-003	1.8300e-003	74.8801
Total	**0.8411**	**47.0229**	**13.1532**	**0.2157**	**6.3670**	**0.3994**	**6.7664**	**1.7445**	**0.3821**	**2.1266**		**23,836.1844**	**23,836.1844**	**1.1995**	**3.7806**	**24,992.7857**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2023

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	1.7136	13.6239	14.2145	0.0250		0.6136	0.6136		0.5880	0.5880		2,289.5233	2,289.5233	0.4330		2,300.3479
Total	**1.7136**	**13.6239**	**14.2145**	**0.0250**		**0.6136**	**0.6136**		**0.5880**	**0.5880**		**2,289.5233**	**2,289.5233**	**0.4330**		**2,300.3479**

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	0.0000
Vendor	0.0215	0.7716	0.2781	3.6900e-003	0.1219	4.7000e-003	0.1266	0.0351	4.5000e-003	0.0396		397.8845	397.8845	0.0121	0.0576	415.3540
Worker	0.1860	0.1155	1.6363	4.9400e-003	0.5586	3.0000e-003	0.5616	0.1482	2.7700e-003	0.1509		505.1404	505.1404	0.0135	0.0124	509.1845
Total	**0.2075**	**0.8871**	**1.9144**	**8.6300e-003**	**0.6805**	**7.7000e-003**	**0.6882**	**0.1833**	**7.2700e-003**	**0.1905**		**903.0249**	**903.0249**	**0.0256**	**0.0701**	**924.5385**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2023

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	1.7136	13.6239	14.2145	0.0250		0.6136	0.6136		0.5880	0.5880	0.0000	2,289.5233	2,289.5233	0.4330		2,300.3479
Total	**1.7136**	**13.6239**	**14.2145**	**0.0250**		**0.6136**	**0.6136**		**0.5880**	**0.5880**	**0.0000**	**2,289.5233**	**2,289.5233**	**0.4330**		**2,300.3479**

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	0.0000
Vendor	0.0215	0.7716	0.2781	3.6900e-003	0.1219	4.7000e-003	0.1266	0.0351	4.5000e-003	0.0396		397.8845	397.8845	0.0121	0.0576	415.3540
Worker	0.1860	0.1155	1.6363	4.9400e-003	0.5586	3.0000e-003	0.5616	0.1482	2.7700e-003	0.1509		505.1404	505.1404	0.0135	0.0124	509.1845
Total	**0.2075**	**0.8871**	**1.9144**	**8.6300e-003**	**0.6805**	**7.7000e-003**	**0.6882**	**0.1833**	**7.2700e-003**	**0.1905**		**903.0249**	**903.0249**	**0.0256**	**0.0701**	**924.5385**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Paving - 2023

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	0.8802	8.6098	11.6840	0.0179		0.4338	0.4338		0.4003	0.4003		1,709.9926	1,709.9926	0.5420		1,723.5414
Paving	0.4637					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3439**	**8.6098**	**11.6840**	**0.0179**		**0.4338**	**0.4338**		**0.4003**	**0.4003**		**1,709.9926**	**1,709.9926**	**0.5420**		**1,723.5414**

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	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
Worker	0.0410	0.0255	0.3610	1.0900e-003	0.1232	6.6000e-004	0.1239	0.0327	6.1000e-004	0.0333		111.4280	111.4280	2.9800e-003	2.7400e-003	112.3201
Total	**0.0410**	**0.0255**	**0.3610**	**1.0900e-003**	**0.1232**	**6.6000e-004**	**0.1239**	**0.0327**	**6.1000e-004**	**0.0333**		**111.4280**	**111.4280**	**2.9800e-003**	**2.7400e-003**	**112.3201**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Paving - 2023

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	0.8802	8.6098	11.6840	0.0179		0.4338	0.4338		0.4003	0.4003	0.0000	1,709.9926	1,709.9926	0.5420		1,723.5414
Paving	0.4637					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3439**	**8.6098**	**11.6840**	**0.0179**		**0.4338**	**0.4338**		**0.4003**	**0.4003**	**0.0000**	**1,709.9926**	**1,709.9926**	**0.5420**		**1,723.5414**

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	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
Worker	0.0410	0.0255	0.3610	1.0900e-003	0.1232	6.6000e-004	0.1239	0.0327	6.1000e-004	0.0333		111.4280	111.4280	2.9800e-003	2.7400e-003	112.3201
Total	**0.0410**	**0.0255**	**0.3610**	**1.0900e-003**	**0.1232**	**6.6000e-004**	**0.1239**	**0.0327**	**6.1000e-004**	**0.0333**		**111.4280**	**111.4280**	**2.9800e-003**	**2.7400e-003**	**112.3201**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coating - 2023

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	72.5382					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**72.7299**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

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	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
Worker	0.0383	0.0238	0.3369	1.0200e-003	0.1150	6.2000e-004	0.1156	0.0305	5.7000e-004	0.0311		103.9995	103.9995	2.7800e-003	2.5600e-003	104.8321
Total	**0.0383**	**0.0238**	**0.3369**	**1.0200e-003**	**0.1150**	**6.2000e-004**	**0.1156**	**0.0305**	**5.7000e-004**	**0.0311**		**103.9995**	**103.9995**	**2.7800e-003**	**2.5600e-003**	**104.8321**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coating - 2023

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	72.5382					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**72.7299**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

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	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
Worker	0.0383	0.0238	0.3369	1.0200e-003	0.1150	6.2000e-004	0.1156	0.0305	5.7000e-004	0.0311		103.9995	103.9995	2.7800e-003	2.5600e-003	104.8321
Total	**0.0383**	**0.0238**	**0.3369**	**1.0200e-003**	**0.1150**	**6.2000e-004**	**0.1156**	**0.0305**	**5.7000e-004**	**0.0311**		**103.9995**	**103.9995**	**2.7800e-003**	**2.5600e-003**	**104.8321**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.8647	0.8784	7.7800	0.0171	1.8032	0.0129	1.8161	0.4804	0.0120	0.4924		1,775.9728	1,775.9728	0.1159	0.0734	1,800.7361
Unmitigated	0.8647	0.8784	7.7800	0.0171	1.8032	0.0129	1.8161	0.4804	0.0120	0.4924		1,775.9728	1,775.9728	0.1159	0.0734	1,800.7361

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	300.00	271.00	225.50	814,373	814,373
Parking Lot	0.00	0.00	0.00		
Total	300.00	271.00	225.50	814,373	814,373

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
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.557888	0.062607	0.178921	0.119061	0.024112	0.006269	0.008734	0.006266	0.000708	0.000566	0.028949	0.000971	0.004949
Parking Lot	0.557888	0.062607	0.178921	0.119061	0.024112	0.006269	0.008734	0.006266	0.000708	0.000566	0.028949	0.000971	0.004949

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0108	0.0919	0.0391	5.9000e-004		7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003		117.2611	117.2611	2.2500e-003	2.1500e-003	117.9579
NaturalGas Unmitigated	0.0108	0.0919	0.0391	5.9000e-004		7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003		117.2611	117.2611	2.2500e-003	2.1500e-003	117.9579

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	996.719	0.0108	0.0919	0.0391	5.9000e-004		7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003		117.2611	117.2611	2.2500e-003	2.1500e-003	117.9579
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0108**	**0.0919**	**0.0391**	**5.9000e-004**		**7.4300e-003**	**7.4300e-003**		**7.4300e-003**	**7.4300e-003**		**117.2611**	**117.2611**	**2.2500e-003**	**2.1500e-003**	**117.9579**

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	0.996719	0.0108	0.0919	0.0391	5.9000e-004		7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003		117.2611	117.2611	2.2500e-003	2.1500e-003	117.9579
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0108**	**0.0919**	**0.0391**	**5.9000e-004**		**7.4300e-003**	**7.4300e-003**		**7.4300e-003**	**7.4300e-003**		**117.2611**	**117.2611**	**2.2500e-003**	**2.1500e-003**	**117.9579**

6.0 Area Detail

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.4208	0.0476	4.1312	2.2000e-004		0.0229	0.0229		0.0229	0.0229	0.0000	7.4445	7.4445	7.1700e-003	0.0000	7.6238
Unmitigated	1.4208	0.0476	4.1312	2.2000e-004		0.0229	0.0229		0.0229	0.0229	0.0000	7.4445	7.4445	7.1700e-003	0.0000	7.6238

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.1987					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.0973					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	0.1247	0.0476	4.1312	2.2000e-004		0.0229	0.0229		0.0229	0.0229		7.4445	7.4445	7.1700e-003		7.6238
Total	**1.4207**	**0.0476**	**4.1312**	**2.2000e-004**		**0.0229**	**0.0229**		**0.0229**	**0.0229**	**0.0000**	**7.4445**	**7.4445**	**7.1700e-003**	**0.0000**	**7.6238**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.1987					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.0973					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	0.1247	0.0476	4.1312	2.2000e-004		0.0229	0.0229		0.0229	0.0229		7.4445	7.4445	7.1700e-003		7.6238
Total	**1.4207**	**0.0476**	**4.1312**	**2.2000e-004**		**0.0229**	**0.0229**		**0.0229**	**0.0229**	**0.0000**	**7.4445**	**7.4445**	**7.1700e-003**	**0.0000**	**7.6238**

7.0 Water Detail

7.1 Mitigation Measures Water

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

9865 Santa Fe Flores San Marcos

San Diego County APCD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	77.10	1000sqft	1.77	77,101.00	0
Apartments Mid Rise	50.00	Dwelling Unit	0.43	50,000.00	143

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2024
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	539.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 50 units
0.43 acre building footprint
2.2 acres

Construction Phase -

Grading - 17,250 cy export

Architectural Coating - SDAPCD Rule 67.0.1

Vehicle Trips - 6 trips/du weekday trip rates

Woodstoves - No woodstoves or fireplaces

Area Coating - SDAPCD Rule 67.0.1

Trips and VMT -

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Parking	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	150.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	100.00
tblAreaCoating	Area_EF_Parking	250	100
tblAreaCoating	Area_EF_Residential_Exterior	250	150
tblAreaCoating	Area_EF_Residential_Interior	250	100
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	27.50	0.00
tblFireplaces	NumberNoFireplace	5.00	50.00
tblFireplaces	NumberWood	17.50	0.00
tblGrading	MaterialExported	0.00	17,250.00
tblLandUse	LandUseSquareFeet	77,100.00	77,101.00
tblLandUse	LotAcreage	1.32	0.43
tblVehicleTrips	ST_TR	4.91	5.42
tblVehicleTrips	SU_TR	4.09	4.51
tblVehicleTrips	WD_TR	5.44	6.00
tblWoodstoves	NumberCatalytic	2.50	0.00
tblWoodstoves	NumberNoncatalytic	2.50	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

2.0 Emissions Summary

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
2023	0.5903	1.8616	1.9170	4.5400e-003	0.1179	0.0747	0.1926	0.0359	0.0714	0.1073	0.0000	399.8534	399.8534	0.0544	0.0174	406.4005
Maximum	**0.5903**	**1.8616**	**1.9170**	**4.5400e-003**	**0.1179**	**0.0747**	**0.1926**	**0.0359**	**0.0714**	**0.1073**	**0.0000**	**399.8534**	**399.8534**	**0.0544**	**0.0174**	**406.4005**

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					
2023	0.5903	1.8616	1.9170	4.5400e-003	0.1179	0.0747	0.1926	0.0359	0.0714	0.1073	0.0000	399.8531	399.8531	0.0544	0.0174	406.4002
Maximum	**0.5903**	**1.8616**	**1.9170**	**4.5400e-003**	**0.1179**	**0.0747**	**0.1926**	**0.0359**	**0.0714**	**0.1073**	**0.0000**	**399.8531**	**399.8531**	**0.0544**	**0.0174**	**406.4002**

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

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	1-2-2023	4-1-2023	0.6693	0.6693
2	4-2-2023	7-1-2023	0.5340	0.5340
3	7-2-2023	9-30-2023	0.5340	0.5340
		Highest	0.6693	0.6693

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	0.2478	4.2800e-003	0.3718	2.0000e-005		2.0600e-003	2.0600e-003		2.0600e-003	2.0600e-003	0.0000	0.6078	0.6078	5.9000e-004	0.0000	0.6225
Energy	1.9600e-003	0.0168	7.1300e-003	1.1000e-004		1.3600e-003	1.3600e-003		1.3600e-003	1.3600e-003	0.0000	73.0519	73.0519	3.6500e-003	7.5000e-004	73.3676
Mobile	0.1436	0.1629	1.3522	2.8500e-003	0.3046	2.2300e-003	0.3069	0.0813	2.0800e-003	0.0834	0.0000	268.1350	268.1350	0.0189	0.0120	272.1864
Waste						0.0000	0.0000		0.0000	0.0000	4.6688	0.0000	4.6688	0.2759	0.0000	11.5667
Water						0.0000	0.0000		0.0000	0.0000	1.0335	15.9783	17.0118	0.1071	2.6200e-003	20.4722
Total	**0.3933**	**0.1839**	**1.7311**	**2.9800e-003**	**0.3046**	**5.6500e-003**	**0.3103**	**0.0813**	**5.5000e-003**	**0.0868**	**5.7023**	**357.7730**	**363.4753**	**0.4062**	**0.0154**	**378.2154**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.2478	4.2800e-003	0.3718	2.0000e-005		2.0600e-003	2.0600e-003		2.0600e-003	2.0600e-003	0.0000	0.6078	0.6078	5.9000e-004	0.0000	0.6225
Energy	1.9600e-003	0.0168	7.1300e-003	1.1000e-004		1.3600e-003	1.3600e-003		1.3600e-003	1.3600e-003	0.0000	73.0519	73.0519	3.6500e-003	7.5000e-004	73.3676
Mobile	0.1436	0.1629	1.3522	2.8500e-003	0.3046	2.2300e-003	0.3069	0.0813	2.0800e-003	0.0834	0.0000	268.1350	268.1350	0.0189	0.0120	272.1864
Waste						0.0000	0.0000		0.0000	0.0000	4.6688	0.0000	4.6688	0.2759	0.0000	11.5667
Water						0.0000	0.0000		0.0000	0.0000	1.0335	15.9783	17.0118	0.1071	2.6200e-003	20.4722
Total	**0.3933**	**0.1839**	**1.7311**	**2.9800e-003**	**0.3046**	**5.6500e-003**	**0.3103**	**0.0813**	**5.5000e-003**	**0.0868**	**5.7023**	**357.7730**	**363.4753**	**0.4062**	**0.0154**	**378.2154**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/2/2023	1/4/2023	5	3	
2	Grading	Grading	1/5/2023	1/12/2023	5	6	
3	Building Construction	Building Construction	1/13/2023	11/16/2023	5	220	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4	Paving	Paving	11/17/2023	11/30/2023	5	10	
5	Architectural Coating	Architectural Coating	12/1/2023	12/14/2023	5	10	

Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 6

Acres of Paving: 1.77

Residential Indoor: 101,250; Residential Outdoor: 33,750; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 4,626 (Architectural Coating – sqft)

OffRoad Equipment

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

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	2,156.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	68.00	18.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2023

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					2.3900e-003	0.0000	2.3900e-003	2.6000e-004	0.0000	2.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.9500e-003	0.0214	0.0147	4.0000e-005		8.1000e-004	8.1000e-004		7.5000e-004	7.5000e-004	0.0000	3.2317	3.2317	1.0500e-003	0.0000	3.2578
Total	**1.9500e-003**	**0.0214**	**0.0147**	**4.0000e-005**	**2.3900e-003**	**8.1000e-004**	**3.2000e-003**	**2.6000e-004**	**7.5000e-004**	**1.0100e-003**	**0.0000**	**3.2317**	**3.2317**	**1.0500e-003**	**0.0000**	**3.2578**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2023

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	3.0000e-005	2.0000e-005	2.7000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0771	0.0771	0.0000	0.0000	0.0778
Total	**3.0000e-005**	**2.0000e-005**	**2.7000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0771**	**0.0771**	**0.0000**	**0.0000**	**0.0778**

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					2.3900e-003	0.0000	2.3900e-003	2.6000e-004	0.0000	2.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.9500e-003	0.0214	0.0147	4.0000e-005		8.1000e-004	8.1000e-004		7.5000e-004	7.5000e-004	0.0000	3.2317	3.2317	1.0500e-003	0.0000	3.2578
Total	**1.9500e-003**	**0.0214**	**0.0147**	**4.0000e-005**	**2.3900e-003**	**8.1000e-004**	**3.2000e-003**	**2.6000e-004**	**7.5000e-004**	**1.0100e-003**	**0.0000**	**3.2317**	**3.2317**	**1.0500e-003**	**0.0000**	**3.2578**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2023

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	3.0000e-005	2.0000e-005	2.7000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0771	0.0771	0.0000	0.0000	0.0778
Total	**3.0000e-005**	**2.0000e-005**	**2.7000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0771**	**0.0771**	**0.0000**	**0.0000**	**0.0778**

3.3 Grading - 2023

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					0.0225	0.0000	0.0225	0.0105	0.0000	0.0105	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.0000e-003	0.0434	0.0261	6.0000e-005		1.8100e-003	1.8100e-003		1.6700e-003	1.6700e-003	0.0000	5.4312	5.4312	1.7600e-003	0.0000	5.4751
Total	**4.0000e-003**	**0.0434**	**0.0261**	**6.0000e-005**	**0.0225**	**1.8100e-003**	**0.0243**	**0.0105**	**1.6700e-003**	**0.0121**	**0.0000**	**5.4312**	**5.4312**	**1.7600e-003**	**0.0000**	**5.4751**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2023

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	2.3800e-003	0.1463	0.0389	6.5000e-004	0.0185	1.2000e-003	0.0197	5.0700e-003	1.1500e-003	6.2200e-003	0.0000	64.6957	64.6957	3.2600e-003	0.0103	67.8431
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	8.0000e-005	6.0000e-005	6.9000e-004	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	7.0000e-005	0.0000	0.1928	0.1928	1.0000e-005	1.0000e-005	0.1945
Total	**2.4600e-003**	**0.1464**	**0.0396**	**6.5000e-004**	**0.0187**	**1.2000e-003**	**0.0199**	**5.1300e-003**	**1.1500e-003**	**6.2900e-003**	**0.0000**	**64.8884**	**64.8884**	**3.2700e-003**	**0.0103**	**68.0376**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0225	0.0000	0.0225	0.0105	0.0000	0.0105	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.0000e-003	0.0434	0.0261	6.0000e-005		1.8100e-003	1.8100e-003		1.6700e-003	1.6700e-003	0.0000	5.4312	5.4312	1.7600e-003	0.0000	5.4751
Total	**4.0000e-003**	**0.0434**	**0.0261**	**6.0000e-005**	**0.0225**	**1.8100e-003**	**0.0243**	**0.0105**	**1.6700e-003**	**0.0121**	**0.0000**	**5.4312**	**5.4312**	**1.7600e-003**	**0.0000**	**5.4751**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2023

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	2.3800e-003	0.1463	0.0389	6.5000e-004	0.0185	1.2000e-003	0.0197	5.0700e-003	1.1500e-003	6.2200e-003	0.0000	64.6957	64.6957	3.2600e-003	0.0103	67.8431
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	8.0000e-005	6.0000e-005	6.9000e-004	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	7.0000e-005	0.0000	0.1928	0.1928	1.0000e-005	1.0000e-005	0.1945
Total	**2.4600e-003**	**0.1464**	**0.0396**	**6.5000e-004**	**0.0187**	**1.2000e-003**	**0.0199**	**5.1300e-003**	**1.1500e-003**	**6.2900e-003**	**0.0000**	**64.8884**	**64.8884**	**3.2700e-003**	**0.0103**	**68.0376**

3.4 Building Construction - 2023

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	0.1885	1.4986	1.5636	2.7500e-003		0.0675	0.0675		0.0647	0.0647	0.0000	228.4723	228.4723	0.0432	0.0000	229.5525
Total	**0.1885**	**1.4986**	**1.5636**	**2.7500e-003**		**0.0675**	**0.0675**		**0.0647**	**0.0647**	**0.0000**	**228.4723**	**228.4723**	**0.0432**	**0.0000**	**229.5525**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2023

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	2.3200e-003	0.0879	0.0310	4.1000e-004	0.0132	5.2000e-004	0.0137	3.8000e-003	5.0000e-004	4.2900e-003	0.0000	39.7288	39.7288	1.2000e-003	5.7600e-003	41.4743
Worker	0.0202	0.0140	0.1709	5.2000e-004	0.0600	3.3000e-004	0.0603	0.0159	3.0000e-004	0.0162	0.0000	48.0594	48.0594	1.4100e-003	1.3200e-003	48.4892
Total	**0.0226**	**0.1019**	**0.2019**	**9.3000e-004**	**0.0731**	**8.5000e-004**	**0.0740**	**0.0197**	**8.0000e-004**	**0.0205**	**0.0000**	**87.7881**	**87.7881**	**2.6100e-003**	**7.0800e-003**	**89.9635**

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	0.1885	1.4986	1.5636	2.7500e-003		0.0675	0.0675		0.0647	0.0647	0.0000	228.4720	228.4720	0.0432	0.0000	229.5522
Total	**0.1885**	**1.4986**	**1.5636**	**2.7500e-003**		**0.0675**	**0.0675**		**0.0647**	**0.0647**	**0.0000**	**228.4720**	**228.4720**	**0.0432**	**0.0000**	**229.5522**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2023

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	2.3200e-003	0.0879	0.0310	4.1000e-004	0.0132	5.2000e-004	0.0137	3.8000e-003	5.0000e-004	4.2900e-003	0.0000	39.7288	39.7288	1.2000e-003	5.7600e-003	41.4743
Worker	0.0202	0.0140	0.1709	5.2000e-004	0.0600	3.3000e-004	0.0603	0.0159	3.0000e-004	0.0162	0.0000	48.0594	48.0594	1.4100e-003	1.3200e-003	48.4892
Total	**0.0226**	**0.1019**	**0.2019**	**9.3000e-004**	**0.0731**	**8.5000e-004**	**0.0740**	**0.0197**	**8.0000e-004**	**0.0205**	**0.0000**	**87.7881**	**87.7881**	**2.6100e-003**	**7.0800e-003**	**89.9635**

3.5 Paving - 2023

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	4.4000e-003	0.0431	0.0584	9.0000e-005		2.1700e-003	2.1700e-003		2.0000e-003	2.0000e-003	0.0000	7.7564	7.7564	2.4600e-003	0.0000	7.8179
Paving	2.3200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.7200e-003**	**0.0431**	**0.0584**	**9.0000e-005**		**2.1700e-003**	**2.1700e-003**		**2.0000e-003**	**2.0000e-003**	**0.0000**	**7.7564**	**7.7564**	**2.4600e-003**	**0.0000**	**7.8179**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Paving - 2023

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	2.0000e-004	1.4000e-004	1.7100e-003	1.0000e-005	6.0000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4819	0.4819	1.0000e-005	1.0000e-005	0.4862
Total	**2.0000e-004**	**1.4000e-004**	**1.7100e-003**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**6.0000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.4819**	**0.4819**	**1.0000e-005**	**1.0000e-005**	**0.4862**

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	4.4000e-003	0.0431	0.0584	9.0000e-005		2.1700e-003	2.1700e-003		2.0000e-003	2.0000e-003	0.0000	7.7564	7.7564	2.4600e-003	0.0000	7.8178
Paving	2.3200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.7200e-003**	**0.0431**	**0.0584**	**9.0000e-005**		**2.1700e-003**	**2.1700e-003**		**2.0000e-003**	**2.0000e-003**	**0.0000**	**7.7564**	**7.7564**	**2.4600e-003**	**0.0000**	**7.8178**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Paving - 2023

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	2.0000e-004	1.4000e-004	1.7100e-003	1.0000e-005	6.0000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4819	0.4819	1.0000e-005	1.0000e-005	0.4862
Total	**2.0000e-004**	**1.4000e-004**	**1.7100e-003**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**6.0000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.4819**	**0.4819**	**1.0000e-005**	**1.0000e-005**	**0.4862**

3.6 Architectural Coating - 2023

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	0.3627					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.6000e-004	6.5100e-003	9.0600e-003	1.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	1.2766	1.2766	8.0000e-005	0.0000	1.2785
Total	**0.3637**	**6.5100e-003**	**9.0600e-003**	**1.0000e-005**		**3.5000e-004**	**3.5000e-004**		**3.5000e-004**	**3.5000e-004**	**0.0000**	**1.2766**	**1.2766**	**8.0000e-005**	**0.0000**	**1.2785**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	1.3000e-004	1.6000e-003	0.0000	5.6000e-004	0.0000	5.6000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4498	0.4498	1.0000e-005	1.0000e-005	0.4538
Total	**1.9000e-004**	**1.3000e-004**	**1.6000e-003**	**0.0000**	**5.6000e-004**	**0.0000**	**5.6000e-004**	**1.5000e-004**	**0.0000**	**1.5000e-004**	**0.0000**	**0.4498**	**0.4498**	**1.0000e-005**	**1.0000e-005**	**0.4538**

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	0.3627					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.6000e-004	6.5100e-003	9.0600e-003	1.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	1.2766	1.2766	8.0000e-005	0.0000	1.2785
Total	**0.3637**	**6.5100e-003**	**9.0600e-003**	**1.0000e-005**		**3.5000e-004**	**3.5000e-004**		**3.5000e-004**	**3.5000e-004**	**0.0000**	**1.2766**	**1.2766**	**8.0000e-005**	**0.0000**	**1.2785**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	1.3000e-004	1.6000e-003	0.0000	5.6000e-004	0.0000	5.6000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4498	0.4498	1.0000e-005	1.0000e-005	0.4538
Total	**1.9000e-004**	**1.3000e-004**	**1.6000e-003**	**0.0000**	**5.6000e-004**	**0.0000**	**5.6000e-004**	**1.5000e-004**	**0.0000**	**1.5000e-004**	**0.0000**	**0.4498**	**0.4498**	**1.0000e-005**	**1.0000e-005**	**0.4538**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive 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	0.1436	0.1629	1.3522	2.8500e-003	0.3046	2.2300e-003	0.3069	0.0813	2.0800e-003	0.0834	0.0000	268.1350	268.1350	0.0189	0.0120	272.1864
Unmitigated	0.1436	0.1629	1.3522	2.8500e-003	0.3046	2.2300e-003	0.3069	0.0813	2.0800e-003	0.0834	0.0000	268.1350	268.1350	0.0189	0.0120	272.1864

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	300.00	271.00	225.50	814,373	814,373
Parking Lot	0.00	0.00	0.00		
Total	300.00	271.00	225.50	814,373	814,373

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
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.557888	0.062607	0.178921	0.119061	0.024112	0.006269	0.008734	0.006266	0.000708	0.000566	0.028949	0.000971	0.004949
Parking Lot	0.557888	0.062607	0.178921	0.119061	0.024112	0.006269	0.008734	0.006266	0.000708	0.000566	0.028949	0.000971	0.004949

5.0 Energy Detail

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	53.6380	53.6380	3.2800e-003	4.0000e-004	53.8383
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	53.6380	53.6380	3.2800e-003	4.0000e-004	53.8383
NaturalGas Mitigated	1.9600e-003	0.0168	7.1300e-003	1.1000e-004		1.3600e-003	1.3600e-003		1.3600e-003	1.3600e-003	0.0000	19.4139	19.4139	3.7000e-004	3.6000e-004	19.5293
NaturalGas Unmitigated	1.9600e-003	0.0168	7.1300e-003	1.1000e-004		1.3600e-003	1.3600e-003		1.3600e-003	1.3600e-003	0.0000	19.4139	19.4139	3.7000e-004	3.6000e-004	19.5293

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	363803	1.9600e-003	0.0168	7.1300e-003	1.1000e-004		1.3600e-003	1.3600e-003		1.3600e-003	1.3600e-003	0.0000	19.4139	19.4139	3.7000e-004	3.6000e-004	19.5293
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.9600e-003**	**0.0168**	**7.1300e-003**	**1.1000e-004**		**1.3600e-003**	**1.3600e-003**		**1.3600e-003**	**1.3600e-003**	**0.0000**	**19.4139**	**19.4139**	**3.7000e-004**	**3.6000e-004**	**19.5293**

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	363803	1.9600e-003	0.0168	7.1300e-003	1.1000e-004		1.3600e-003	1.3600e-003		1.3600e-003	1.3600e-003	0.0000	19.4139	19.4139	3.7000e-004	3.6000e-004	19.5293
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.9600e-003**	**0.0168**	**7.1300e-003**	**1.1000e-004**		**1.3600e-003**	**1.3600e-003**		**1.3600e-003**	**1.3600e-003**	**0.0000**	**19.4139**	**19.4139**	**3.7000e-004**	**3.6000e-004**	**19.5293**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	192007	47.0284	2.8700e-003	3.5000e-004	47.2041
Parking Lot	26985.3	6.6095	4.0000e-004	5.0000e-005	6.6342
Total		**53.6380**	**3.2700e-003**	**4.0000e-004**	**53.8383**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	192007	47.0284	2.8700e-003	3.5000e-004	47.2041
Parking Lot	26985.3	6.6095	4.0000e-004	5.0000e-005	6.6342
Total		**53.6380**	**3.2700e-003**	**4.0000e-004**	**53.8383**

6.0 Area Detail

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2478	4.2800e-003	0.3718	2.0000e-005		2.0600e-003	2.0600e-003		2.0600e-003	2.0600e-003	0.0000	0.6078	0.6078	5.9000e-004	0.0000	0.6225
Unmitigated	0.2478	4.2800e-003	0.3718	2.0000e-005		2.0600e-003	2.0600e-003		2.0600e-003	2.0600e-003	0.0000	0.6078	0.6078	5.9000e-004	0.0000	0.6225

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.0363					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2003					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	0.0112	4.2800e-003	0.3718	2.0000e-005		2.0600e-003	2.0600e-003		2.0600e-003	2.0600e-003	0.0000	0.6078	0.6078	5.9000e-004	0.0000	0.6225
Total	**0.2478**	**4.2800e-003**	**0.3718**	**2.0000e-005**		**2.0600e-003**	**2.0600e-003**		**2.0600e-003**	**2.0600e-003**	**0.0000**	**0.6078**	**0.6078**	**5.9000e-004**	**0.0000**	**0.6225**

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.0363					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2003					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	0.0112	4.2800e-003	0.3718	2.0000e-005		2.0600e-003	2.0600e-003		2.0600e-003	2.0600e-003	0.0000	0.6078	0.6078	5.9000e-004	0.0000	0.6225
Total	**0.2478**	**4.2800e-003**	**0.3718**	**2.0000e-005**		**2.0600e-003**	**2.0600e-003**		**2.0600e-003**	**2.0600e-003**	**0.0000**	**0.6078**	**0.6078**	**5.9000e-004**	**0.0000**	**0.6225**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	17.0118	0.1071	2.6200e-003	20.4722
Unmitigated	17.0118	0.1071	2.6200e-003	20.4722

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	3.2577 / 2.05377	17.0118	0.1071	2.6200e-003	20.4722
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**17.0118**	**0.1071**	**2.6200e-003**	**20.4722**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	3.2577 / 2.05377	17.0118	0.1071	2.6200e-003	20.4722
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**17.0118**	**0.1071**	**2.6200e-003**	**20.4722**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	4.6688	0.2759	0.0000	11.5667
Unmitigated	4.6688	0.2759	0.0000	11.5667

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	23	4.6688	0.2759	0.0000	11.5667
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**4.6688**	**0.2759**	**0.0000**	**11.5667**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	23	4.6688	0.2759	0.0000	11.5667
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**4.6688**	**0.2759**	**0.0000**	**11.5667**

9.0 Operational Offroad

9865 Santa Fe Flores San Marcos - San Diego County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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

ATTACHMENT 2

CalEEMod Output – Industrial and Commercial Project Emissions

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Santa Fe Residential - Existing Designations

San Diego County APCD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	38.00	1000sqft	1.47	38,000.00	0
Strip Mall	24.00	1000sqft	0.80	24,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2024
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	539.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 1.47 acres LI, 0.8 acre C

Construction Phase -

Architectural Coating - SDAPCD Rule 67.0.1

Vehicle Trips - SANDAG trip rates

Area Coating - SDAPCD Rule 67.0.1

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	150.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	100.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	150

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblAreaCoating	Area_EF_Nonresidential_Interior	250	100
tblLandUse	LotAcreage	0.87	1.47
tblLandUse	LotAcreage	0.55	0.80
tblVehicleTrips	ST_TR	1.99	3.21
tblVehicleTrips	ST_TR	42.04	37.94
tblVehicleTrips	SU_TR	5.00	8.06
tblVehicleTrips	SU_TR	20.43	18.44
tblVehicleTrips	WD_TR	4.96	8.00
tblVehicleTrips	WD_TR	44.32	40.00

2.0 Emissions Summary

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
2023	64.8647	14.4867	14.9224	0.0287	7.1647	0.6173	7.7695	3.4465	0.5915	4.0029	0.0000	2,679.3694	2,679.3694	0.7698	0.0368	2,701.4625
Maximum	**64.8647**	**14.4867**	**14.9224**	**0.0287**	**7.1647**	**0.6173**	**7.7695**	**3.4465**	**0.5915**	**4.0029**	**0.0000**	**2,679.3694**	**2,679.3694**	**0.7698**	**0.0368**	**2,701.4625**

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					
2023	64.8647	14.4867	14.9224	0.0287	7.1647	0.6173	7.7695	3.4465	0.5915	4.0029	0.0000	2,679.3694	2,679.3694	0.7698	0.0368	2,701.4625
Maximum	**64.8647**	**14.4867**	**14.9224**	**0.0287**	**7.1647**	**0.6173**	**7.7695**	**3.4465**	**0.5915**	**4.0029**	**0.0000**	**2,679.3694**	**2,679.3694**	**0.7698**	**0.0368**	**2,701.4625**

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

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	1.5045	6.0000e-005	6.3200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0136	0.0136	4.0000e-005		0.0145
Energy	0.0145	0.1319	0.1108	7.9000e-004		0.0100	0.0100		0.0100	0.0100		158.2724	158.2724	3.0300e-003	2.9000e-003	159.2129
Mobile	2.9376	2.9118	24.5493	0.0460	4.9946	0.0375	5.0321	1.3305	0.0349	1.3654		4,767.1643	4,767.1643	0.3947	0.2400	4,848.5349
Total	**4.4567**	**3.0437**	**24.6664**	**0.0468**	**4.9946**	**0.0475**	**5.0421**	**1.3305**	**0.0450**	**1.3755**		**4,925.4502**	**4,925.4502**	**0.3977**	**0.2429**	**5,007.7623**

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	1.5045	6.0000e-005	6.3200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0136	0.0136	4.0000e-005		0.0145
Energy	0.0145	0.1319	0.1108	7.9000e-004		0.0100	0.0100		0.0100	0.0100		158.2724	158.2724	3.0300e-003	2.9000e-003	159.2129
Mobile	2.9376	2.9118	24.5493	0.0460	4.9946	0.0375	5.0321	1.3305	0.0349	1.3654		4,767.1643	4,767.1643	0.3947	0.2400	4,848.5349
Total	**4.4567**	**3.0437**	**24.6664**	**0.0468**	**4.9946**	**0.0475**	**5.0421**	**1.3305**	**0.0450**	**1.3755**		**4,925.4502**	**4,925.4502**	**0.3977**	**0.2429**	**5,007.7623**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/2/2023	1/4/2023	5	3	
2	Grading	Grading	1/5/2023	1/12/2023	5	6	
3	Building Construction	Building Construction	1/13/2023	11/16/2023	5	220	
4	Paving	Paving	11/17/2023	11/30/2023	5	10	
5	Architectural Coating	Architectural Coating	12/1/2023	12/14/2023	5	10	

Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 6

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 93,000; Non-Residential Outdoor: 31,000; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	187	0.41

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Site Preparation	Graders	1	8.00	187	0.41
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Scrapers	1	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45

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
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	24.00	10.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.3027	14.2802	9.7820	0.0245		0.5419	0.5419		0.4985	0.4985		2,374.8634	2,374.8634	0.7681		2,394.0654
Total	**1.3027**	**14.2802**	**9.7820**	**0.0245**	**1.5908**	**0.5419**	**2.1326**	**0.1718**	**0.4985**	**0.6703**		**2,374.8634**	**2,374.8634**	**0.7681**		**2,394.0654**

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	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
Worker	0.0237	0.0153	0.1829	5.5000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.3000e-004	0.0178		56.1616	56.1616	1.6900e-003	1.5800e-003	56.6755
Total	**0.0237**	**0.0153**	**0.1829**	**5.5000e-004**	**0.0657**	**3.5000e-004**	**0.0661**	**0.0174**	**3.3000e-004**	**0.0178**		**56.1616**	**56.1616**	**1.6900e-003**	**1.5800e-003**	**56.6755**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.3027	14.2802	9.7820	0.0245		0.5419	0.5419		0.4985	0.4985	0.0000	2,374.8634	2,374.8634	0.7681		2,394.0654
Total	**1.3027**	**14.2802**	**9.7820**	**0.0245**	**1.5908**	**0.5419**	**2.1326**	**0.1718**	**0.4985**	**0.6703**	**0.0000**	**2,374.8634**	**2,374.8634**	**0.7681**		**2,394.0654**

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	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
Worker	0.0237	0.0153	0.1829	5.5000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.3000e-004	0.0178		56.1616	56.1616	1.6900e-003	1.5800e-003	56.6755
Total	**0.0237**	**0.0153**	**0.1829**	**5.5000e-004**	**0.0657**	**3.5000e-004**	**0.0661**	**0.0174**	**3.3000e-004**	**0.0178**		**56.1616**	**56.1616**	**1.6900e-003**	**1.5800e-003**	**56.6755**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2023

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					7.0826	0.0000	7.0826	3.4247	0.0000	3.4247			0.0000			0.0000
Off-Road	1.3330	14.4676	8.7038	0.0206		0.6044	0.6044		0.5560	0.5560		1,995.6147	1,995.6147	0.6454		2,011.7503
Total	**1.3330**	**14.4676**	**8.7038**	**0.0206**	**7.0826**	**0.6044**	**7.6869**	**3.4247**	**0.5560**	**3.9807**		**1,995.6147**	**1,995.6147**	**0.6454**		**2,011.7503**

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	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
Worker	0.0297	0.0191	0.2287	6.9000e-004	0.0822	4.4000e-004	0.0826	0.0218	4.1000e-004	0.0222		70.2020	70.2020	2.1200e-003	1.9800e-003	70.8444
Total	**0.0297**	**0.0191**	**0.2287**	**6.9000e-004**	**0.0822**	**4.4000e-004**	**0.0826**	**0.0218**	**4.1000e-004**	**0.0222**		**70.2020**	**70.2020**	**2.1200e-003**	**1.9800e-003**	**70.8444**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2023

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					7.0826	0.0000	7.0826	3.4247	0.0000	3.4247			0.0000			0.0000
Off-Road	1.3330	14.4676	8.7038	0.0206		0.6044	0.6044		0.5560	0.5560	0.0000	1,995.6147	1,995.6147	0.6454		2,011.7503
Total	**1.3330**	**14.4676**	**8.7038**	**0.0206**	**7.0826**	**0.6044**	**7.6869**	**3.4247**	**0.5560**	**3.9807**	**0.0000**	**1,995.6147**	**1,995.6147**	**0.6454**		**2,011.7503**

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	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
Worker	0.0297	0.0191	0.2287	6.9000e-004	0.0822	4.4000e-004	0.0826	0.0218	4.1000e-004	0.0222		70.2020	70.2020	2.1200e-003	1.9800e-003	70.8444
Total	**0.0297**	**0.0191**	**0.2287**	**6.9000e-004**	**0.0822**	**4.4000e-004**	**0.0826**	**0.0218**	**4.1000e-004**	**0.0222**		**70.2020**	**70.2020**	**2.1200e-003**	**1.9800e-003**	**70.8444**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2023

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	1.7136	13.6239	14.2145	0.0250		0.6136	0.6136		0.5880	0.5880		2,289.5233	2,289.5233	0.4330		2,300.3479
Total	**1.7136**	**13.6239**	**14.2145**	**0.0250**		**0.6136**	**0.6136**		**0.5880**	**0.5880**		**2,289.5233**	**2,289.5233**	**0.4330**		**2,300.3479**

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	0.0000
Vendor	0.0116	0.4467	0.1592	2.0500e-003	0.0677	2.6200e-003	0.0704	0.0195	2.5100e-003	0.0220		221.3612	221.3612	6.6700e-003	0.0321	231.0880
Worker	0.0712	0.0458	0.5488	1.6500e-003	0.1972	1.0600e-003	0.1982	0.0523	9.8000e-004	0.0533		168.4849	168.4849	5.0800e-003	4.7500e-003	170.0266
Total	**0.0828**	**0.4926**	**0.7079**	**3.7000e-003**	**0.2649**	**3.6800e-003**	**0.2686**	**0.0718**	**3.4900e-003**	**0.0753**		**389.8461**	**389.8461**	**0.0118**	**0.0368**	**401.1146**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2023

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	1.7136	13.6239	14.2145	0.0250		0.6136	0.6136		0.5880	0.5880	0.0000	2,289.5233	2,289.5233	0.4330		2,300.3479
Total	**1.7136**	**13.6239**	**14.2145**	**0.0250**		**0.6136**	**0.6136**		**0.5880**	**0.5880**	**0.0000**	**2,289.5233**	**2,289.5233**	**0.4330**		**2,300.3479**

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	0.0000
Vendor	0.0116	0.4467	0.1592	2.0500e-003	0.0677	2.6200e-003	0.0704	0.0195	2.5100e-003	0.0220		221.3612	221.3612	6.6700e-003	0.0321	231.0880
Worker	0.0712	0.0458	0.5488	1.6500e-003	0.1972	1.0600e-003	0.1982	0.0523	9.8000e-004	0.0533		168.4849	168.4849	5.0800e-003	4.7500e-003	170.0266
Total	**0.0828**	**0.4926**	**0.7079**	**3.7000e-003**	**0.2649**	**3.6800e-003**	**0.2686**	**0.0718**	**3.4900e-003**	**0.0753**		**389.8461**	**389.8461**	**0.0118**	**0.0368**	**401.1146**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Paving - 2023

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	0.8802	8.6098	11.6840	0.0179		0.4338	0.4338		0.4003	0.4003		1,709.9926	1,709.9926	0.5420		1,723.5414
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8802**	**8.6098**	**11.6840**	**0.0179**		**0.4338**	**0.4338**		**0.4003**	**0.4003**		**1,709.9926**	**1,709.9926**	**0.5420**		**1,723.5414**

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	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
Worker	0.0445	0.0287	0.3430	1.0300e-003	0.1232	6.6000e-004	0.1239	0.0327	6.1000e-004	0.0333		105.3031	105.3031	3.1800e-003	2.9700e-003	106.2666
Total	**0.0445**	**0.0287**	**0.3430**	**1.0300e-003**	**0.1232**	**6.6000e-004**	**0.1239**	**0.0327**	**6.1000e-004**	**0.0333**		**105.3031**	**105.3031**	**3.1800e-003**	**2.9700e-003**	**106.2666**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Paving - 2023

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	0.8802	8.6098	11.6840	0.0179		0.4338	0.4338		0.4003	0.4003	0.0000	1,709.9926	1,709.9926	0.5420		1,723.5414
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8802**	**8.6098**	**11.6840**	**0.0179**		**0.4338**	**0.4338**		**0.4003**	**0.4003**	**0.0000**	**1,709.9926**	**1,709.9926**	**0.5420**		**1,723.5414**

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	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
Worker	0.0445	0.0287	0.3430	1.0300e-003	0.1232	6.6000e-004	0.1239	0.0327	6.1000e-004	0.0333		105.3031	105.3031	3.1800e-003	2.9700e-003	106.2666
Total	**0.0445**	**0.0287**	**0.3430**	**1.0300e-003**	**0.1232**	**6.6000e-004**	**0.1239**	**0.0327**	**6.1000e-004**	**0.0333**		**105.3031**	**105.3031**	**3.1800e-003**	**2.9700e-003**	**106.2666**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coating - 2023

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	64.6583					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**64.8499**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

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	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
Worker	0.0148	9.5500e-003	0.1143	3.4000e-004	0.0411	2.2000e-004	0.0413	0.0109	2.0000e-004	0.0111		35.1010	35.1010	1.0600e-003	9.9000e-004	35.4222
Total	**0.0148**	**9.5500e-003**	**0.1143**	**3.4000e-004**	**0.0411**	**2.2000e-004**	**0.0413**	**0.0109**	**2.0000e-004**	**0.0111**		**35.1010**	**35.1010**	**1.0600e-003**	**9.9000e-004**	**35.4222**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coating - 2023

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	64.6583					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**64.8499**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

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	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
Worker	0.0148	9.5500e-003	0.1143	3.4000e-004	0.0411	2.2000e-004	0.0413	0.0109	2.0000e-004	0.0111		35.1010	35.1010	1.0600e-003	9.9000e-004	35.4222
Total	**0.0148**	**9.5500e-003**	**0.1143**	**3.4000e-004**	**0.0411**	**2.2000e-004**	**0.0413**	**0.0109**	**2.0000e-004**	**0.0111**		**35.1010**	**35.1010**	**1.0600e-003**	**9.9000e-004**	**35.4222**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.9376	2.9118	24.5493	0.0460	4.9946	0.0375	5.0321	1.3305	0.0349	1.3654		4,767.1643	4,767.1643	0.3947	0.2400	4,848.5349
Unmitigated	2.9376	2.9118	24.5493	0.0460	4.9946	0.0375	5.0321	1.3305	0.0349	1.3654		4,767.1643	4,767.1643	0.3947	0.2400	4,848.5349

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	304.00	121.98	306.28	812,567	812,567
Strip Mall	960.00	910.56	442.56	1,353,715	1,353,715
Total	1,264.00	1,032.54	748.84	2,166,282	2,166,282

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.557888	0.062607	0.178921	0.119061	0.024112	0.006269	0.008734	0.006266	0.000708	0.000566	0.028949	0.000971	0.004949
Strip Mall	0.557888	0.062607	0.178921	0.119061	0.024112	0.006269	0.008734	0.006266	0.000708	0.000566	0.028949	0.000971	0.004949

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0145	0.1319	0.1108	7.9000e-004		0.0100	0.0100		0.0100	0.0100		158.2724	158.2724	3.0300e-003	2.9000e-003	159.2129
NaturalGas Unmitigated	0.0145	0.1319	0.1108	7.9000e-004		0.0100	0.0100		0.0100	0.0100		158.2724	158.2724	3.0300e-003	2.9000e-003	159.2129

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1199.34	0.0129	0.1176	0.0988	7.1000e-004		8.9400e-003	8.9400e-003		8.9400e-003	8.9400e-003		141.0991	141.0991	2.7000e-003	2.5900e-003	141.9376
Strip Mall	145.973	1.5700e-003	0.0143	0.0120	9.0000e-005		1.0900e-003	1.0900e-003		1.0900e-003	1.0900e-003		17.1733	17.1733	3.3000e-004	3.1000e-004	17.2753
Total		**0.0145**	**0.1319**	**0.1108**	**8.0000e-004**		**0.0100**	**0.0100**		**0.0100**	**0.0100**		**158.2724**	**158.2724**	**3.0300e-003**	**2.9000e-003**	**159.2129**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1.19934	0.0129	0.1176	0.0988	7.1000e-004		8.9400e-003	8.9400e-003		8.9400e-003	8.9400e-003		141.0991	141.0991	2.7000e-003	2.5900e-003	141.9376
Strip Mall	0.145973	1.5700e-003	0.0143	0.0120	9.0000e-005		1.0900e-003	1.0900e-003		1.0900e-003	1.0900e-003		17.1733	17.1733	3.3000e-004	3.1000e-004	17.2753
Total		**0.0145**	**0.1319**	**0.1108**	**8.0000e-004**		**0.0100**	**0.0100**		**0.0100**	**0.0100**		**158.2724**	**158.2724**	**3.0300e-003**	**2.9000e-003**	**159.2129**

6.0 Area Detail

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.5045	6.0000e-005	6.3200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0136	0.0136	4.0000e-005		0.0145
Unmitigated	1.5045	6.0000e-005	6.3200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0136	0.0136	4.0000e-005		0.0145

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	0.1772					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.3268					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.8000e-004	6.0000e-005	6.3200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0136	0.0136	4.0000e-005		0.0145
Total	**1.5045**	**6.0000e-005**	**6.3200e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**0.0136**	**0.0136**	**4.0000e-005**		**0.0145**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.1772					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.3268					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.8000e-004	6.0000e-005	6.3200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0136	0.0136	4.0000e-005		0.0145
Total	**1.5045**	**6.0000e-005**	**6.3200e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**0.0136**	**0.0136**	**4.0000e-005**		**0.0145**

7.0 Water Detail

7.1 Mitigation Measures Water

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Santa Fe Residential - Existing Designations

San Diego County APCD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	38.00	1000sqft	1.47	38,000.00	0
Strip Mall	24.00	1000sqft	0.80	24,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2024
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	539.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 1.47 acres LI, 0.8 acre C

Construction Phase -

Architectural Coating - SDAPCD Rule 67.0.1

Vehicle Trips - SANDAG trip rates

Area Coating - SDAPCD Rule 67.0.1

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	150.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	100.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	150

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblAreaCoating	Area_EF_Nonresidential_Interior	250	100
tblLandUse	LotAcreage	0.87	1.47
tblLandUse	LotAcreage	0.55	0.80
tblVehicleTrips	ST_TR	1.99	3.21
tblVehicleTrips	ST_TR	42.04	37.94
tblVehicleTrips	SU_TR	5.00	8.06
tblVehicleTrips	SU_TR	20.43	18.44
tblVehicleTrips	WD_TR	4.96	8.00
tblVehicleTrips	WD_TR	44.32	40.00

2.0 Emissions Summary

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
2023	64.8636	14.4846	14.9465	0.0288	7.1647	0.6173	7.7695	3.4465	0.5915	4.0029	0.0000	2,688.8551	2,688.8551	0.7697	0.0364	2,710.8123
Maximum	**64.8636**	**14.4846**	**14.9465**	**0.0288**	**7.1647**	**0.6173**	**7.7695**	**3.4465**	**0.5915**	**4.0029**	**0.0000**	**2,688.8551**	**2,688.8551**	**0.7697**	**0.0364**	**2,710.8123**

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					
2023	64.8636	14.4846	14.9465	0.0288	7.1647	0.6173	7.7695	3.4465	0.5915	4.0029	0.0000	2,688.8551	2,688.8551	0.7697	0.0364	2,710.8123
Maximum	**64.8636**	**14.4846**	**14.9465**	**0.0288**	**7.1647**	**0.6173**	**7.7695**	**3.4465**	**0.5915**	**4.0029**	**0.0000**	**2,688.8551**	**2,688.8551**	**0.7697**	**0.0364**	**2,710.8123**

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

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	1.5045	6.0000e-005	6.3200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0136	0.0136	4.0000e-005		0.0145
Energy	0.0145	0.1319	0.1108	7.9000e-004		0.0100	0.0100		0.0100	0.0100		158.2724	158.2724	3.0300e-003	2.9000e-003	159.2129
Mobile	3.0364	2.6813	23.4849	0.0481	4.9946	0.0375	5.0321	1.3305	0.0349	1.3654		4,980.2169	4,980.2169	0.3675	0.2269	5,057.0286
Total	**4.5554**	**2.8132**	**23.6020**	**0.0489**	**4.9946**	**0.0475**	**5.0421**	**1.3305**	**0.0450**	**1.3754**		**5,138.5028**	**5,138.5028**	**0.3706**	**0.2298**	**5,216.2559**

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	1.5045	6.0000e-005	6.3200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0136	0.0136	4.0000e-005		0.0145
Energy	0.0145	0.1319	0.1108	7.9000e-004		0.0100	0.0100		0.0100	0.0100		158.2724	158.2724	3.0300e-003	2.9000e-003	159.2129
Mobile	3.0364	2.6813	23.4849	0.0481	4.9946	0.0375	5.0321	1.3305	0.0349	1.3654		4,980.2169	4,980.2169	0.3675	0.2269	5,057.0286
Total	**4.5554**	**2.8132**	**23.6020**	**0.0489**	**4.9946**	**0.0475**	**5.0421**	**1.3305**	**0.0450**	**1.3754**		**5,138.5028**	**5,138.5028**	**0.3706**	**0.2298**	**5,216.2559**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/2/2023	1/4/2023	5	3	
2	Grading	Grading	1/5/2023	1/12/2023	5	6	
3	Building Construction	Building Construction	1/13/2023	11/16/2023	5	220	
4	Paving	Paving	11/17/2023	11/30/2023	5	10	
5	Architectural Coating	Architectural Coating	12/1/2023	12/14/2023	5	10	

Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 6

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 93,000; Non-Residential Outdoor: 31,000; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	187	0.41

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Site Preparation	Graders	1	8.00	187	0.41
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Scrapers	1	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45

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
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	24.00	10.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.3027	14.2802	9.7820	0.0245		0.5419	0.5419		0.4985	0.4985		2,374.8634	2,374.8634	0.7681		2,394.0654
Total	**1.3027**	**14.2802**	**9.7820**	**0.0245**	**1.5908**	**0.5419**	**2.1326**	**0.1718**	**0.4985**	**0.6703**		**2,374.8634**	**2,374.8634**	**0.7681**		**2,394.0654**

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	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
Worker	0.0219	0.0136	0.1925	5.8000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.3000e-004	0.0178		59.4283	59.4283	1.5900e-003	1.4600e-003	59.9041
Total	**0.0219**	**0.0136**	**0.1925**	**5.8000e-004**	**0.0657**	**3.5000e-004**	**0.0661**	**0.0174**	**3.3000e-004**	**0.0178**		**59.4283**	**59.4283**	**1.5900e-003**	**1.4600e-003**	**59.9041**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.3027	14.2802	9.7820	0.0245		0.5419	0.5419		0.4985	0.4985	0.0000	2,374.8634	2,374.8634	0.7681		2,394.0654
Total	**1.3027**	**14.2802**	**9.7820**	**0.0245**	**1.5908**	**0.5419**	**2.1326**	**0.1718**	**0.4985**	**0.6703**	**0.0000**	**2,374.8634**	**2,374.8634**	**0.7681**		**2,394.0654**

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	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
Worker	0.0219	0.0136	0.1925	5.8000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.3000e-004	0.0178		59.4283	59.4283	1.5900e-003	1.4600e-003	59.9041
Total	**0.0219**	**0.0136**	**0.1925**	**5.8000e-004**	**0.0657**	**3.5000e-004**	**0.0661**	**0.0174**	**3.3000e-004**	**0.0178**		**59.4283**	**59.4283**	**1.5900e-003**	**1.4600e-003**	**59.9041**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2023

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					7.0826	0.0000	7.0826	3.4247	0.0000	3.4247			0.0000			0.0000
Off-Road	1.3330	14.4676	8.7038	0.0206		0.6044	0.6044		0.5560	0.5560		1,995.6147	1,995.6147	0.6454		2,011.7503
Total	**1.3330**	**14.4676**	**8.7038**	**0.0206**	**7.0826**	**0.6044**	**7.6869**	**3.4247**	**0.5560**	**3.9807**		**1,995.6147**	**1,995.6147**	**0.6454**		**2,011.7503**

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	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
Worker	0.0274	0.0170	0.2406	7.3000e-004	0.0822	4.4000e-004	0.0826	0.0218	4.1000e-004	0.0222		74.2854	74.2854	1.9900e-003	1.8300e-003	74.8801
Total	**0.0274**	**0.0170**	**0.2406**	**7.3000e-004**	**0.0822**	**4.4000e-004**	**0.0826**	**0.0218**	**4.1000e-004**	**0.0222**		**74.2854**	**74.2854**	**1.9900e-003**	**1.8300e-003**	**74.8801**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2023

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					7.0826	0.0000	7.0826	3.4247	0.0000	3.4247			0.0000			0.0000
Off-Road	1.3330	14.4676	8.7038	0.0206		0.6044	0.6044		0.5560	0.5560	0.0000	1,995.6147	1,995.6147	0.6454		2,011.7503
Total	**1.3330**	**14.4676**	**8.7038**	**0.0206**	**7.0826**	**0.6044**	**7.6869**	**3.4247**	**0.5560**	**3.9807**	**0.0000**	**1,995.6147**	**1,995.6147**	**0.6454**		**2,011.7503**

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	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
Worker	0.0274	0.0170	0.2406	7.3000e-004	0.0822	4.4000e-004	0.0826	0.0218	4.1000e-004	0.0222		74.2854	74.2854	1.9900e-003	1.8300e-003	74.8801
Total	**0.0274**	**0.0170**	**0.2406**	**7.3000e-004**	**0.0822**	**4.4000e-004**	**0.0826**	**0.0218**	**4.1000e-004**	**0.0222**		**74.2854**	**74.2854**	**1.9900e-003**	**1.8300e-003**	**74.8801**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2023

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	1.7136	13.6239	14.2145	0.0250		0.6136	0.6136		0.5880	0.5880		2,289.5233	2,289.5233	0.4330		2,300.3479
Total	**1.7136**	**13.6239**	**14.2145**	**0.0250**		**0.6136**	**0.6136**		**0.5880**	**0.5880**		**2,289.5233**	**2,289.5233**	**0.4330**		**2,300.3479**

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	0.0000
Vendor	0.0119	0.4287	0.1545	2.0500e-003	0.0677	2.6100e-003	0.0703	0.0195	2.5000e-003	0.0220		221.0470	221.0470	6.7000e-003	0.0320	230.7522
Worker	0.0656	0.0408	0.5775	1.7400e-003	0.1972	1.0600e-003	0.1982	0.0523	9.8000e-004	0.0533		178.2849	178.2849	4.7700e-003	4.3900e-003	179.7122
Total	**0.0776**	**0.4694**	**0.7320**	**3.7900e-003**	**0.2649**	**3.6700e-003**	**0.2686**	**0.0718**	**3.4800e-003**	**0.0753**		**399.3318**	**399.3318**	**0.0115**	**0.0364**	**410.4644**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2023

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	1.7136	13.6239	14.2145	0.0250		0.6136	0.6136		0.5880	0.5880	0.0000	2,289.5233	2,289.5233	0.4330		2,300.3479
Total	**1.7136**	**13.6239**	**14.2145**	**0.0250**		**0.6136**	**0.6136**		**0.5880**	**0.5880**	**0.0000**	**2,289.5233**	**2,289.5233**	**0.4330**		**2,300.3479**

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	0.0000
Vendor	0.0119	0.4287	0.1545	2.0500e-003	0.0677	2.6100e-003	0.0703	0.0195	2.5000e-003	0.0220		221.0470	221.0470	6.7000e-003	0.0320	230.7522
Worker	0.0656	0.0408	0.5775	1.7400e-003	0.1972	1.0600e-003	0.1982	0.0523	9.8000e-004	0.0533		178.2849	178.2849	4.7700e-003	4.3900e-003	179.7122
Total	**0.0776**	**0.4694**	**0.7320**	**3.7900e-003**	**0.2649**	**3.6700e-003**	**0.2686**	**0.0718**	**3.4800e-003**	**0.0753**		**399.3318**	**399.3318**	**0.0115**	**0.0364**	**410.4644**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Paving - 2023

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	0.8802	8.6098	11.6840	0.0179		0.4338	0.4338		0.4003	0.4003		1,709.9926	1,709.9926	0.5420		1,723.5414
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8802**	**8.6098**	**11.6840**	**0.0179**		**0.4338**	**0.4338**		**0.4003**	**0.4003**		**1,709.9926**	**1,709.9926**	**0.5420**		**1,723.5414**

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	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
Worker	0.0410	0.0255	0.3610	1.0900e-003	0.1232	6.6000e-004	0.1239	0.0327	6.1000e-004	0.0333		111.4280	111.4280	2.9800e-003	2.7400e-003	112.3201
Total	**0.0410**	**0.0255**	**0.3610**	**1.0900e-003**	**0.1232**	**6.6000e-004**	**0.1239**	**0.0327**	**6.1000e-004**	**0.0333**		**111.4280**	**111.4280**	**2.9800e-003**	**2.7400e-003**	**112.3201**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Paving - 2023

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	0.8802	8.6098	11.6840	0.0179		0.4338	0.4338		0.4003	0.4003	0.0000	1,709.9926	1,709.9926	0.5420		1,723.5414
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8802**	**8.6098**	**11.6840**	**0.0179**		**0.4338**	**0.4338**		**0.4003**	**0.4003**	**0.0000**	**1,709.9926**	**1,709.9926**	**0.5420**		**1,723.5414**

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	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
Worker	0.0410	0.0255	0.3610	1.0900e-003	0.1232	6.6000e-004	0.1239	0.0327	6.1000e-004	0.0333		111.4280	111.4280	2.9800e-003	2.7400e-003	112.3201
Total	**0.0410**	**0.0255**	**0.3610**	**1.0900e-003**	**0.1232**	**6.6000e-004**	**0.1239**	**0.0327**	**6.1000e-004**	**0.0333**		**111.4280**	**111.4280**	**2.9800e-003**	**2.7400e-003**	**112.3201**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coating - 2023

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	64.6583					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**64.8499**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

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	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
Worker	0.0137	8.4900e-003	0.1203	3.6000e-004	0.0411	2.2000e-004	0.0413	0.0109	2.0000e-004	0.0111		37.1427	37.1427	9.9000e-004	9.1000e-004	37.4400
Total	**0.0137**	**8.4900e-003**	**0.1203**	**3.6000e-004**	**0.0411**	**2.2000e-004**	**0.0413**	**0.0109**	**2.0000e-004**	**0.0111**		**37.1427**	**37.1427**	**9.9000e-004**	**9.1000e-004**	**37.4400**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coating - 2023

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	64.6583					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**64.8499**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

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	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
Worker	0.0137	8.4900e-003	0.1203	3.6000e-004	0.0411	2.2000e-004	0.0413	0.0109	2.0000e-004	0.0111		37.1427	37.1427	9.9000e-004	9.1000e-004	37.4400
Total	**0.0137**	**8.4900e-003**	**0.1203**	**3.6000e-004**	**0.0411**	**2.2000e-004**	**0.0413**	**0.0109**	**2.0000e-004**	**0.0111**		**37.1427**	**37.1427**	**9.9000e-004**	**9.1000e-004**	**37.4400**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.0364	2.6813	23.4849	0.0481	4.9946	0.0375	5.0321	1.3305	0.0349	1.3654		4,980.2169	4,980.2169	0.3675	0.2269	5,057.0286
Unmitigated	3.0364	2.6813	23.4849	0.0481	4.9946	0.0375	5.0321	1.3305	0.0349	1.3654		4,980.2169	4,980.2169	0.3675	0.2269	5,057.0286

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	304.00	121.98	306.28	812,567	812,567
Strip Mall	960.00	910.56	442.56	1,353,715	1,353,715
Total	1,264.00	1,032.54	748.84	2,166,282	2,166,282

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.557888	0.062607	0.178921	0.119061	0.024112	0.006269	0.008734	0.006266	0.000708	0.000566	0.028949	0.000971	0.004949
Strip Mall	0.557888	0.062607	0.178921	0.119061	0.024112	0.006269	0.008734	0.006266	0.000708	0.000566	0.028949	0.000971	0.004949

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0145	0.1319	0.1108	7.9000e-004		0.0100	0.0100		0.0100	0.0100		158.2724	158.2724	3.0300e-003	2.9000e-003	159.2129
NaturalGas Unmitigated	0.0145	0.1319	0.1108	7.9000e-004		0.0100	0.0100		0.0100	0.0100		158.2724	158.2724	3.0300e-003	2.9000e-003	159.2129

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1199.34	0.0129	0.1176	0.0988	7.1000e-004		8.9400e-003	8.9400e-003		8.9400e-003	8.9400e-003		141.0991	141.0991	2.7000e-003	2.5900e-003	141.9376
Strip Mall	145.973	1.5700e-003	0.0143	0.0120	9.0000e-005		1.0900e-003	1.0900e-003		1.0900e-003	1.0900e-003		17.1733	17.1733	3.3000e-004	3.1000e-004	17.2753
Total		**0.0145**	**0.1319**	**0.1108**	**8.0000e-004**		**0.0100**	**0.0100**		**0.0100**	**0.0100**		**158.2724**	**158.2724**	**3.0300e-003**	**2.9000e-003**	**159.2129**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1.19934	0.0129	0.1176	0.0988	7.1000e-004		8.9400e-003	8.9400e-003		8.9400e-003	8.9400e-003		141.0991	141.0991	2.7000e-003	2.5900e-003	141.9376
Strip Mall	0.145973	1.5700e-003	0.0143	0.0120	9.0000e-005		1.0900e-003	1.0900e-003		1.0900e-003	1.0900e-003		17.1733	17.1733	3.3000e-004	3.1000e-004	17.2753
Total		**0.0145**	**0.1319**	**0.1108**	**8.0000e-004**		**0.0100**	**0.0100**		**0.0100**	**0.0100**		**158.2724**	**158.2724**	**3.0300e-003**	**2.9000e-003**	**159.2129**

6.0 Area Detail

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.5045	6.0000e-005	6.3200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0136	0.0136	4.0000e-005		0.0145
Unmitigated	1.5045	6.0000e-005	6.3200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0136	0.0136	4.0000e-005		0.0145

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	0.1772					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.3268					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.8000e-004	6.0000e-005	6.3200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0136	0.0136	4.0000e-005		0.0145
Total	**1.5045**	**6.0000e-005**	**6.3200e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**0.0136**	**0.0136**	**4.0000e-005**		**0.0145**

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.1772					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.3268					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.8000e-004	6.0000e-005	6.3200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0136	0.0136	4.0000e-005		0.0145
Total	**1.5045**	**6.0000e-005**	**6.3200e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**0.0136**	**0.0136**	**4.0000e-005**		**0.0145**

7.0 Water Detail

7.1 Mitigation Measures Water

Santa Fe Residential - Existing Designations - San Diego County APCD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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

APPENDIX B

Biological Resources Report

RECON

An Employee-Owned Company

November 29, ~~March 22,~~ 2022

Mr. Paul Mayer
Manager & General Partner
Santa Fe Flores LP
P.O. Box 903
Rancho Santa Fe, CA 92067

Reference: Biological Resources Report for the Santa Fe Flores Project (RECON Number 9865)

Dear Mr. Mayer:

This report summarizes the biological resources survey and results, assessment for potential impacts on biological resources, and proposed avoidance measures for the Santa Fe Flores project (project).

Summary

RECON Environmental, Inc. (RECON), on behalf of the City of San Marcos (City) Development Services Department Planning Division, has prepared this biological resources report for the proposed Santa Fe Flores project (project). RECON conducted a biological survey on March 3, 2022, and determined that the project had one sensitive plant species, decumbent goldenbush (*Isocoma menziesii* var. *decumbens*), on-site and has the potential to support migratory and nesting birds, including Cooper's hawk (*Accipiter cooperii*). Avoidance measures to prevent potential impacts associated with project construction is to conduct pre-construction nesting bird surveys.

1.0 Introduction, Project Description, Location, and Setting

This report describes the results of the biological resources survey for the project conducted by RECON biologist Jade Woll on March 3, 2022. The proposed project is located east of North Las Flores Drive, in San Marcos, California, north of South Santa Fe Avenue and east of State Route 78 (Figure 1). The biological study area (BSA) occurs within assessor's parcel numbers 217-161-18 and 217-161-19, and is located in Los Vallecitos de San Marcos Land Grant, of the U.S. Geological Survey (USGS) 7.5-minute topographic map, San Marcos (Figure 2; USGS 1996). The proposed project is located within a developed area, surrounded by residential and commercial properties on all sides of the project (Figure 3). A 2.5-acre BSA, including all areas to be potentially impacted, were evaluated to determine the current condition of the biological resources present within the project (see Attachment 1: Current Site Photographs, and Figures 2 and 3). The BSA is outside of and situated approximately 1,500 feet south of the North San Diego County Multiple Species Conservation preserve lands known as Plan Pre-Approved Mitigation Area (Figure 4).

The 2.5-acre project site is undeveloped and is currently designated Commercial and Light Industrial in the City General Plan and zoned as Commercial and Light Industrial. The project would be located on a previously graded site and require a General Plan Amendment and Rezone to Multi-family Residential to allow the development of 50 multi-family residential units that would be three to four stories. The project would also include a 1,000-square-foot roof deck for fitness and leisure, a 1,170-square-foot ground floor leasing and amenity center, and a 120-square-foot ground floor fire command center. Vehicle parking would include a total of 107 surface parking spaces and bicycle parking would include a total of 11 lockers or bike storage rooms located on the upper and lower levels.

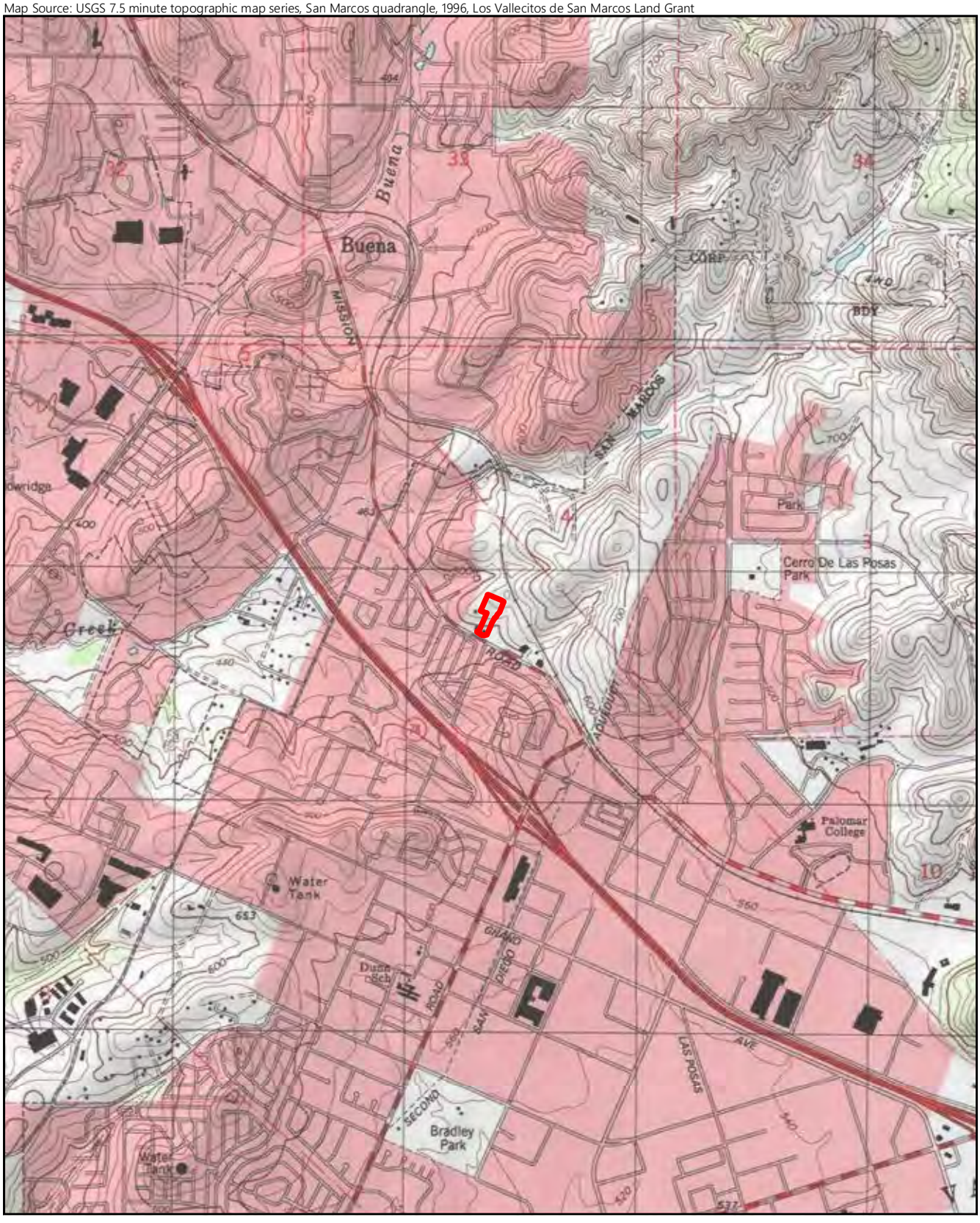
Project Location

RECON

M:\JOBS5\9865\common_gis\fig1.mxd 03/08/2022 bma

FIGURE 1
Regional Location

Map Source: USGS 7.5 minute topographic map series, San Marcos quadrangle, 1996, Los Vallecitos de San Marcos Land Grant



Biological Study Area

RECON

M:\JOBS5\9865\common_gis\fig2_bio.mxd 03/21/2022 bma

FIGURE 2
Biological Study Area on USGS Map

Image Source: NearMap (flown January 2022)

Biological Study Area

RECON

M:\JOBS5\9865\common_gis\fig3_bio.mxd 03/21/2022 bma

FIGURE 3
Biological Study Area on Aerial Photograph

Image Source: NearMap (flown January 2022)

Biological Study Area

0 Feet 500

North San Diego County MSCP

Outside Pre-Approved Mitigation Area (PAMA)

FIGURE 4
Biological Study Area
in Relation to MSCP Preserve Area

RECON

M:\JOBS5\9865\common_gis\fig4_bio.mxd 03/08/2022 bma

2.0 Regional Context

The City is in the process of preparing a Subarea Plan under the Multiple Habitat Conservation Program (MHCP). The MHCP is a habitat conservation plan for the seven jurisdictional areas within the northern subregion of San Diego County, including San Marcos (San Diego Association of Governments [SANDAG] 2003). Under the MHCP, the City prepared a draft Natural Community Conservation Plan (draft Subarea Plan) that addresses land conservation issues (City of San Marcos 2001). This draft City of San Marcos Subarea Plan identifies a series of focused planning areas (FPAs) within which some lands will be dedicated for preservation of native habitats. These areas contain both "hard line" areas, which will ultimately be preserved as open space, and "soft line" areas, which will include both development and open space to be determined through the planning process. This biological resources report has been prepared according to the guidelines set forth in the MHCP (SANDAG 2003).

3.0 Habitats/Vegetation Communities

Two vegetation communities/land cover types were identified within the BSA: disturbed land and urban/developed. The acreages of each vegetation community/land cover type within the BSA are presented in Table 1 and depicted in Figure 5. Under the MHCP, environmentally sensitive lands are categorized into different habitat groups of sensitivity. Group A consists of wetland/riparian habitats, which are considered the most sensitive of habitats. Upland vegetation communities that are classified as Group B (rare uplands), Group C (coastal sage scrub), Group D (chaparral), and Group E (annual [non-native] grasslands) are considered sensitive by the MHCP. Group F (other lands), which includes disturbed lands, is not considered sensitive (SANDAG 2003).

Table 1
Vegetation Communities/Land Cover Types within the BSA

Type or Community (Holland Code as modified by Oberbauer)	MHCP Group	Total (acres)
Disturbed Land (11300)	F	2.2
Urban/Developed (12000)	--*	0.3
TOTAL		**2.5**

*No MHCP assigned group.

Disturbed Habitat. Disturbed habitat consists of areas that may have been disturbed by human activity, and no longer function as a native vegetation community. Vegetation in such areas is typically dominated by opportunistic non-native species but may also contain a substantial portion of bare ground. Disturbed habitat can also include areas that have been previously graded, repeatedly cleared for fuel management, and/or experience repeated use (e.g., off-road vehicle trails and construction staging sites) (Oberbauer et al. 2008).

Disturbed habitat occurs within the majority of the BSA and includes areas that have been disturbed through frequent off-roading activity. The area is comprised of non-native herbaceous cover mixed with non-native grasses, with dominant species such as crimson fountain grass (*Pennisetum setaceum*), telegraph weed (*Heterotheca grandiflora*), mustard (*Brassica* sp.), Russian thistle (*Salsola tragus*), and bristly ox-tongue (*Helminthotheca echioides*). Some native vegetation was identified throughout the disturbed habitat, such as California buckwheat (*Eriogonum fasciculatum*), mule fat (*Baccharis salicifolia* ssp. *salicifolia*), coyote bush (*Baccharis pilularis*), coastal goldenbush (*Isocoma menziesii*), and decumbent goldenbush (*Isocoma menziesii* var. *decumbens)* but these individual species were too few and widespread to form a distinct native habitat. (see Figure 5). The disturbed lands on-site are classified by the MHCP as Group F. Impacts to Group F habitat types would not be considered significant and would not require mitigation.

Image Source: NearMap (flown January 2022)

0 Feet 100

Biological Study Area

Common Name, Latin Name

Decumbent Goldenbush (*Isocoma menziezii decumbens*)

Vegetation Community

Disturbed Land

Urban/Developed

RECON

M:\JOBS5\9865\common_gis\fig5_bio.mxd 03/10/2022 bma

FIGURE 5

Existing Biological Resources

Urban/Developed Land. Urban/developed areas consist of any land that has been constructed upon, containing permanent or semi-permanent structures, pavement or hardscape, or landscaped areas that are regularly maintained and/or irrigated (Oberbauer et al. 2008).

Urban/developed land occurs along the eastern edge of the BSA and consists of ornamental vegetation along the sidewalk (see Figure 5).

4.0 Special-Status Species

Prior to conducting field surveys, a review of publicly available data was conducted to determine the potential for special-status species to occur within the BSA. The review included data provided by U.S. Fish and Wildlife Service (USFWS) (USFWS 2022), California Natural Diversity Data Base (CNDDB; CDFW 2022a), and California Native Plant Society (CNPS 2021). During the field survey, habitats were assessed for their potential to support special-status species and all incidentally observed species were recorded. No focused special-status species surveys were conducted. All plant and wildlife species observed during the general survey are presented in Attachments 2 and 3, respectively. Plant or wildlife species are considered special status if they are: (1) covered or listed as a narrow endemic under the MHCP (SANDAG 2003); (2) listed by state or federal agencies as threatened or endangered or are proposed for listing; (3) included on CNPS California Rare Plant Ranks 1, 2, 3, or 4 (CNPS 2021); or (4) considered rare, endangered, or threatened by local conservation organizations or specialists (Reiser 2001).

4.1 Special Status Plant Species

One special status plant species, decumbent goldenbush (*Isocoma menziesii* var. *decumbens)*, was observed within the BSA (see Figure 5). No other sensitive plants are anticipated to occur due to high levels of disturbance within the project boundary (e.g., off-roading activity, prevalence of non-native species). A comprehensive list of sensitive plant species with potential for occurrence within the BSA based on the records search results is presented in Attachment 4, and includes those species with potential for occurrence based on species range and habitat conditions (CDFW 2022b; CDFW 2022c).

Decumbent Goldenbush. Decumbent goldenbush is a CRPR 1B.2 species (CNPS 2021). This species was observed on-site and has high potential to occur due to the disturbed nature of the site and suitable soils present.

4.2 Special Status Wildlife Species

No special status wildlife species were observed within the BSA; however, one special status wildlife species, Cooper's hawk (*Accipiter cooperii*), has a moderate potential to occur on-site. A comprehensive list of sensitive wildlife species with potential for occurrence within the BSA based on the records search results is presented in Attachment 5, and includes those species with potential for occurrence based on species range and habitat conditions (CDFW 2022a; CDFW 2022d; USFWS 2022).

Cooper's Hawk (Nesting). The Cooper's hawk is a CDFW watch list species (nesting) and a MHCP-covered species (CDFW 2022a; SANDAG 2003). This species has a moderate potential to occur due the presence of suitable trees for nesting within the disturbed land and urban/developed within the BSA. No individuals or active nests were observed within the BSA at the time of the survey.

Nesting/Migratory Birds. The project also has potential to support migratory and nesting birds within the entire BSA. Under Section 3503 of the California Fish and Game Code (CFGC), it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.

Section 3503.5 of the CFGC prohibits take, possession, or destruction of any birds in the orders Falconiformes (raptors) or Strigiformes (owls), or of their nests and eggs.

5.0 Jurisdictional Wetlands and Waterways

A formal wetland delineation was not conducted; however, no potential jurisdictional wetlands or waters were observed within the BSA.

6.0 Other Unique Features/Resources

Though it is reasonable to assume that urban-adapted species may occur locally within the project impact area, the site as a whole does not function as a wildlife movement corridor and there is no indication that the site supports any wildlife nursery sites. The proposed project area is outside any City FPAs and biological core and linkage areas (BCLA); therefore, there are no impacts anticipated to wildlife movement corridors, wildlife nursery sites, FPAs or a BCLA.

7.0 Significance of Project Impacts and Proposed Mitigation

This section describes project impacts and recommended avoidance and mitigation measures based on the County's MHCP (SANDAG 2003).

7.1 Vegetation Community Impacts and Proposed Mitigation

The project would cause direct permanent impacts to 2.0 acres of disturbed land and 0.3 acre of urban/developed (Table 2; Figure 6). Impacts to disturbed land and urban/developed are not considered significant and, therefore, no mitigation would be required.

Table 2
Habitat/Vegetation Communities, Impacts, and Mitigation

Habitat/ Vegetation Community	Existing On-site (acres)[1]	Permanent Impacts (acres)[1]	Mitigation Ratio	Mitigation Required (acres)
Disturbed Land (Group F)	2.2	2.0	0:1	0.00
Urban/Developed (--[2])	0.3	0.3	n/a[3]	n/a[3]
TOTAL	2.5	2.3	-	0.00

[1]Rounded to nearest tenth of an acre. Any discrepancies in totals are due to rounding.
[2]No MHCP assigned group.
[3]N/A = not applicable

7.2 Sensitive Plant Species

One sensitive plant species, decumbent goldenbush, was detected on-site; however, there are no other sensitive plant species that have a moderate or high potential to occur within the BSA. Suitable habitat for decumbent goldenbush within the project impact area is of marginal quality due to heavy disturbance, and comprises a small fraction of the habitat available to this species both at a local level (within the City) and on a regional scale. Therefore, the impacts that would occur to sensitive plants would be less than significant and no mitigation would be required.

Image Source: NearMap (flown January 2022)

Biological Study Area

Impact Footprint

Common Name, Latin Name

Decumbent Goldenbush
(*Isocoma menziezii decumbens*)

Vegetation Community

Disturbed Land

Urban/Developed

0 Feet 100

RECON

M:\JOBS5\9865\common_gis\fig6_bio.mxd 03/17/2022 bma

FIGURE 6
Impacts to Biological Resources

7.3 Sensitive Wildlife Species

Migratory and Nesting Birds. Direct impacts to migratory and nesting birds, including Cooper's hawk, could result from the accidental destruction of nests through removal of disturbed land, if construction were to occur during the general bird breeding season (between March and September; SANDAG 2003). Therefore, avoidance measures, which will be implemented during construction, are discussed below and are expected to prevent direct impacts to migratory and nesting birds, including Cooper's hawk.

AM-BIO-1: If construction initiation occurs between March and September, a pre-construction nesting bird and raptor survey of the project impact area shall be completed by a qualified biologist prior to vegetation removal. The pre-construction survey shall be conducted within 10 calendar days prior to the start of construction activities (including removal of vegetation). If any active nests are detected, the area will be flagged and mapped along with a buffer as recommended by the qualified biologist. The buffer area(s) established by the qualified biologist will be avoided until the nesting cycle is complete or it is determined that the nest is no longer active. The qualified biologist shall be a person familiar with bird breeding behavior and capable of identifying the bird species of San Diego County by sight and sound and determining alterations of behavior as a result of human interaction. Buffers will be based on species-appropriate buffers and/or local topography and line of sight, species behavior and tolerance to disturbance, and existing disturbance levels, as determined appropriate by the qualified biologist.

7.4 Jurisdictional Wetlands and Waterways

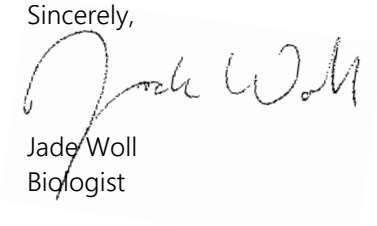
No potential jurisdictional wetlands or waters were observed on-site. Therefore, there are no anticipated impacts to any jurisdictional wetlands or waterways and no mitigation would be required.

7.5 Wildlife Movement and Nursery Sites

Though it is reasonable to assume that urban-adapted species may occur locally within the impact footprint, the site as a whole does not function as a wildlife movement corridor and there is no indication that the site supports any wildlife nursery sites. Therefore, the project will not result in any impact to wildlife movement or nursery sites and no mitigation would be required.

If you have any questions regarding this letter report or the biological resources present on the site, please do not hesitate to contact me at 619-308-9333 x117 or jwoll@reconenvironmental.com.

Sincerely,



Jade Woll
Biologist

Reviewed By:

Cailin Lyons, Biology Group Director

JCW:sh

8.0 References Cited

American Society of Mammalogists
2020 Mammalian Species (online). http://www.mammalsociety.org/publications/mammalian-species. July

Baldwin, B.G., S. Boyd, B.J. Ertter, R.W. Patterson, T.J. Rosatti, D.H. Wilken, eds.
2002 Jepson Online Interchange. http://ucjeps.berkeley.edu/cgi-bin/get_cpn.pl?7749. Accessed November 7, 2002.

Bradley, R.D., L.K. Ammerman, R.J. Baker, L.C. Bradley, J.A. Cook, R.C. Dowler, C. Jones, D.J. Schimdly, F.B. Stangl Jr., R.A. Van Den Bussche, and B. Wursig
2014 Revised Checklist of North American Mammals North of Mexico. Occasional Papers, Museum of Texas Tech University No. 327. October

Brenzel, K. N.
2001 *Sunset Western Garden Book*. Sunset Publishing. Menlo Park, California.

California Department of Fish and Wildlife (CDFW)
2022a Special Animals. Natural Diversity Database. Department of Fish and Wildlife. July.

2022b Special Vascular Plants, Bryophytes, and Lichens List. Natural Diversity Database. Department of Fish and Wildlife. July.

2022c State and Federally Listed Endangered, Threatened, and Rare Plants of California. July.

2022d State & Federally Listed Endangered & Threatened Animals of California. July.

California Native Plant Society (CNPS)
2021 Rare Plant Program. Inventory of Rare and Endangered Plants of California (online edition, v8-03). Sacramento, CA. Accessed in July. Available at http://www.rareplants.cnps.org.

Chesser, R. T., S. M. Billerman, K. J. Burns, C. Cicero, J. L. Dunn, B. E. Hernández-Baños, A. W. Kratter, I. J. Lovette, N. A. Mason, P. C. Rasmussen, J. V. Remsen, Jr., D. F. Stotz, and K. Winker
2021 Check-list of North American Birds (online). American Ornithological Society. http://checklist.aou.org/taxa.

Crother, B. I., Ronald M. Bonett, Jeff Boundy, Frank T. Burbrink, Kevin de Queiroz, Darrel R. Frost, Richard Highton, John B. Iverson, Elizabeth L. Jockusch, Fred Kraus, Kenneth L. Krysko, , Adam D. Leaché, Emilly Moriarty Lemmon, Roy W. McDiarmid, Joseph R. Mendelson III, Peter A. Meylan, Tod W. Reeder, Sara Ruane, and Michael E. Seidel
2017 *Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, with Comments Regarding Confidence in our Understanding,* Eighth Edition. Society for the Study of Amphibians and Reptiles Herpetological Circular No. 43.

Eriksen, Clyde, and Denton Belk
1999 *Fairy Shrimp of California's Puddles, Pools, and Playas.* Mad River Press, Eureka.

Evans, Arthur V.
2008 *Field Guide to Insects and Spiders of North America.* Sterling Publishing Company, New York.

Harvey, M. J., J. S. Altenbach, and T. L. Best
2011 *Bats of the United States and Canada*. The Johns Hopkins University Press, Baltimore.

Jennings, M. R., and M. P. Hayes
1994 Amphibian and Reptile Species of Special Concern in California. Final report submitted to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA. Contract number 8023.

Jepson Flora Project (eds.)
2020 Jepson eFlora, http://ucjeps.berkeley.edu/IJM.html.

Nature Festivals of San Diego County
2002 Checklist of Butterflies of San Diego County. Professional review by David Faulkner of the San Diego Natural History Museum and Dr. John Brown of the Smithsonian Institute. Revised September. http://www.sdnhm.org/science/entomology/projects/checklist-of-butterflies-of-san-diego-county/.

NatureServe
2021 NatureServe Explorer. www.natureserve.org.

Oberbauer, T., M. Kelly, and J. Buegge
2008 *Draft Vegetation Communities of San Diego County*. Based on "Preliminary Descriptions of the Terrestrial Natural Communities of California," Robert F. Holland, Ph.D., October 1986. March.

Page, L. M., H. Espinosa-Pérez, L. T. Findley, C. R. Gilbert, R. N. Lea, N. E. Mandrak, R. L. Mayden, and J. S. Nelson
2013 Common and scientific names of fishes from the United States, Canada, and Mexico, 7th edition. American Fisheries Society, Special Publication 34, Bethesda, Maryland.

Rebman, J. P., and M. G. Simpson
2014 Checklist of the Vascular Plants of San Diego County, 5th edition. San Diego Natural History Museum.

Reiser, C.H.
2001 Rare Plants of San Diego County. Aquafir Press. July

San Diego, County of
2010 Guidelines for Determining Significance. Biological Resources, Land Use and Environment Group. Department of Planning and Land Use. Department of Public Works. Fourth Revision. September 15.

San Diego Association of Governments (SANDAG)
2003 Final MHCP Plan. Prepared for the Multiple Habitat Conservation Program for the Cities of Carlsbad, Encinitas, Escondido, San Marcos, Solana Beach, and Vista. Volumes I, II, and III. March.

San Marcos, City of
2001 Natural Community Conservation Plan for the City of San Marcos. Agency review draft, May.

Tremor, Scott, D. Stokes, W. Spencer, J. Diffendorfer, H. Thomas, S. Chivers, and P. Unitt, eds.
2017 San Diego County Mammal Atlas. San Diego Natural History Museum.

Unitt, P. A.
2004 *San Diego County Bird Atlas*. San Diego Natural History Museum, Ibis, San Diego

United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS)
2021 The PLANTS Database. National Plant Data Team, Greensboro, North Carolina, USA. Accessed from http://plants.usda.gov.

U.S. Fish and Wildlife Service (USFWS)
2022 Species Observation Database.

U.S. Geological Survey (USGS)
1996 7.5 minute topographic map series, San Marcos quadrangle, Los Vallecitos de San Marcos Land Grant.

Western Bat Working Group (WBWG)
2017 Western Bat Species (species accounts). http://wbwg.org/western-bat-species/.

9.0 Preparers and Persons/Organizations Contacted

Cailin Lyons, RECON Environmental, Inc., Biology Project Director
Jade Woll, RECON Environmental, Inc., Biologist
Benjamin Arp, RECON Environmental, Inc., GIS Analyst
Stacey Higgins, RECON Environmental, Inc., Senior Production Specialist

10.0 Attachments

1. Current Site Photographs
2. Plants Species Observed
3. Wildlife Species Observed
4. Sensitive Plant Species with the Potential to Occur
5. Sensitive Wildlife Species with the Potential to Occur

ATTACHMENTS

ATTACHMENT 1

Current Site Photographs

PHOTOGRAPH 1
View of Project Site Looking Southeast

PHOTOGRAPH 2
View of Project Site Looking Northwest

PHOTOGRAPH 3
View of Project Site Looking Southwest

PHOTOGRAPH 4
View of Project Site Looking Southeast

ATTACHMENT 2

Plant Species Observed

Attachment 2 Plant Species Observed			
Scientific Name	Common Name	Habitat	Origin
ANGIOSPERMS: MONOCOTS			
ARECACEAE	PALM FAMILY		
Washingtonia robusta	Mexican fan palm	DL	I
POACEAE (GRAMINEAE)	GRASS FAMILY		
Avena sp.	oats	DL	I
Bromus diandrus	ripgut grass	DL	I
Bromus rubens [=*Bromus madritensis* ssp. *rubens*]	red brome	DL	I
Festuca perennis [=*Lolium multiflorum* and *Lolium perenne*]	rye grass	DL	I
Hordeum murinum	wall barley	DL	I
Pennisetum setaceum	crimson fountain grass	DL	I
ANGIOSPERMS: EUDICOTS			
AIZOACEAE	FIG-MARIGOLD FAMILY		
Carpobrotus edulis	freeway iceplant	DL	I
ANACARDIACEAE	SUMAC OR CASHEW FAMILY		
Searsia [=Rhus] lancea	African sumac	UD	I
APIACEAE (UMBELLIFERAE)	CARROT FAMILY		
Foeniculum vulgare	fennel	DL	I
ASTERACEAE	SUNFLOWER FAMILY		
Baccharis pilularis	chaparral broom, coyote brush	DL	N
Baccharis salicifolia ssp. *salicifolia*	mule fat, seep-willow	DL	N
Cynara cardunculus ssp. *flavescens*	cardoon, artichoke thistle	DL	I
Dittrichia graveolens	stinkwort	DL	I
Hedypnois cretica	Crete weed	DL	I
Helminthotheca [=*Picris*] *echioides*	bristly ox-tongue	DL	I
Heterotheca grandiflora	telegraph weed	DL	N
Isocoma menziesii	coastal goldenbush	DL	N
Isocoma menziesii var. *decumbens*	decumbent goldenbush	DL	N
BRASSICACEAE (CRUCIFERAE)	MUSTARD FAMILY		
Brassica sp.	mustard	DL	I

Attachment 2 Plant Species Observed			
Scientific Name	Common Name	Habitat	Origin
Brassica rapa	turnip, field mustard	DL	I
CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**		
Lonicera japonica	Japanese honeysuckle	UD	I
CHENOPODIACEAE	**GOOSEFOOT FAMILY**		
Salsola tragus	Russian thistle, tumbleweed	DL	I
CONVOLVULACEAE	**MORNING-GLORY FAMILY**		
Calystegia macrostegia	morning-glory	DL	N
EUPHORBIACEAE	**SPURGE FAMILY**		
Euphorbia peplus	petty spurge	DL	I
FABACEAE (LEGUMINOSAE)	**LEGUME FAMILY**		
Acmispon glaber [=*Lotus scoparius*]	deerweed, California broom	DL	N
Astragalus trichopodus var. *lonchus*	ocean locoweed	DL	N
Medicago polymorpha	California burclover	DL	I
Melilotus albus	white sweetclover	DL	I
GERANIACEAE	**GERANIUM FAMILY**		
Erodium botrys	long-beak filaree	DL	I
Erodium moschatum	greenstem filaree	DL	I
MALVACEAE	**MALLOW FAMILY**		
Malva neglecta	common mallow, cheeses	DL	I
OXALIDACEAE	**OXALIS FAMILY**		
Oxalis pes-caprae	Bermuda buttercup	DL	I
POLYGONACEAE	**BUCKWHEAT FAMILY**		
Polygonum aviculare	Prostrate knotweed	DL	I
SCROPHULARIACEAE	**FIGWORT FAMILY**		
Myoporum parvifolium	slender myoporum	UD	I
VERBENACEAE	**VERVAIN FAMILY**		
Lantana montevidensis	trailing lantana	UD	I

Attachment 2 Plant Species Observed			
Scientific Name	Common Name	Habitat	Origin

Notes: Scientific and common names were primarily derived from Jepson eFlora (Jepson Flora Project 2020). In instances where common names were not provided in this resource, common names were obtained from Rebman and Simpson (2014). Additional common names were obtained from the USDA maintained database (USDA 2021) or the *Sunset Western Garden Book* (Brenzel 2001) for ornamental/horticultural plants. Common names denoted with * are from County of San Diego 2010.

HABITATS

DL = Disturbed Land
UD = Urban/Developed

ORIGIN

N = Native to locality
I = Introduced species from outside locality

ATTACHMENT 3

Wildlife Species Detected

Attachment 3 Wildlife Species Observed				
Scientific Name	Common Name	Occupied Habitat	On-Site Abundance/ Seasonality (Birds Only)	Evidence of Occurrence
		INVERTEBRATES		
PIERIDAE	WHITES & SULPHURS			
Pieris rapae	cabbage white (I)	DL		O
		BIRDS		
ACCIPITRIDAE	HAWKS, KITES, & EAGLES			
Buteo lineatus	red-shouldered hawk	FO	F/ Y	O
COLUMBIDAE	PIGEONS & DOVES			
Zenaida macroura	mourning dove	FO	C/ Y	O
TROCHILIDAE	HUMMINGBIRDS			
Calypte anna	Anna's hummingbird	DL	C/ Y	O
CORVIDAE	CROWS, JAYS, & MAGPIES			
Corvus brachyrhynchos	American crow	FO	C/ Y	O
AEGITHALIDAE	BUSHTIT			
Psaltriparus minimus	bushtit	UD	C/ Y	V
Melozone [=*Pipilo*] *crissalis*	California towhee	DL	C/ Y	O
		MAMMALS		
SCIURIDAE	SQUIRRELS & CHIPMUNKS			
Otopermophilus [=*Spermophilus*] *beecheyi*	California ground squirrel	DL		B
CANIDAE	CANIDS			
Canis latrans	coyote	DL		S

(I) = Introduced species

NOTE: Zoological nomenclature for invertebrates is in accordance with the NatureServe 2021 and Evans 2008; for fish with NatureServe 2021; for reptiles and amphibians with Crother et. al (2017); for birds with Chesser et al. 2021; for mammals with Bradley et al. (2014), American Society of Mammalogists 2021.

Attachment 3 Wildlife Species Observed				
Scientific Name	Common Name	Occupied Habitat	On-Site Abundance/ Seasonality (Birds Only)	Evidence of Occurrence

HABITATS

DL = Disturbed land
FO = Flying overhead
UD = Urban/developed

EVIDENCE OF OCCURRENCE

B = Burrow
O = Observed
S = Scat
V = Vocalization

ABUNDANCE

C = Common to abundant; almost always encountered in proper habitat, usually in moderate to large numbers
F = Fairly common; usually encountered in proper habitat, generally not in large numbers

SEASONALITY (birds only)

Y = Year-round resident; probable breeder on-site or in vicinity

ATTACHMENT 4

Sensitive Plant Species with the Potential to Occur

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur							
Scientific Name Common Name	Sensitivity Code & Status			Habitat Preference/ Requirements	Detected On-Site Yes/No	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
	State/ Federal Status	CNPS Rank	County of San Diego				
ANGIOSPERMS: DICOTS							
APIACEAE **CARROT FAMILY**							
Eryngium aristulatum var. *parishii* San Diego button-celery	SE/FE	1B.1	--	Biennial/perennial herb; vernal pools, mesic areas of coastal sage scrub and grasslands, blooms April–June; elevation less than 2,000 feet. Known from San Diego and Riverside counties. Additional populations occur in Baja California, Mexico.	No	U	Unlikely to occur due to lack of vernal pools, mesic areas of coastal sage scrub, and grasslands. This species has been documented within a 1-mile radius of the survey area (CDFW 2022b).
ASTERACEAE **SUNFLOWER FAMILY**							
Isocoma menziesii var. *decumbens* decumbent goldenbush	–/–	1B.2	--	Perennial shrub; chaparral, coastal sage scrub; sandy soils, often in disturbed areas; blooms April–November; elevation less than 500 feet.	Yes	H	This species was **observed** on-site.

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur							
Scientific Name Common Name	Sensitivity Code & Status State/ Federal Status	 CNPS Rank	 County of San Diego	Habitat Preference/ Requirements	Detected On-Site Yes/No	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
ANGIOSPERMS: MONOCOTS							
THEMIDACEAE BRODIAEA FAMILY							
Brodiaea filifolia thread-leaved brodiaea [=thread-leaf brodiaea]	SE/FT	1B.1	--	Perennial herb (bulbiferous); cismontane woodland, coastal sage scrub, playas, valley and foothill grassland, vernal pools; often clay soils; blooms March–June; elevation 80-3,675 feet. California endemic. Known from San Diego, Riverside, Orange, Los Angeles, and San Bernardino counties.	No	U	Unlikely to occur due to lack of cismontane woodland, coastal sage scrub, playas, valley and foothill grassland, and vernal pools. Additionally, the survey was conducted during the time of this species blooming period and no flowering individuals or vegetative stems/stalks were observed at the time of survey. This species has been documented within a 1-mile radius of the survey area (CDFW 2022b).
Brodiaea orcuttii Orcutt's brodiaea	–/–	1B.1	--	Perennial herb (bulbiferous); closed cone coniferous forest, chaparral, meadows and seeps, valley and foothill grassland, vernal pools; mesic, clay soil; blooms May–July; elevation less than 5,600 feet.	No	U	Unlikely to occur due to lack of closed cone coniferous forest, chaparral, meadows and seeps, valley and foothill grassland, and vernal pools. This species has been documented within a 1-mile radius of the survey area (CDFW 2022b).

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur							
	Sensitivity Code & Status						
Scientific Name Common Name	State/ Federal Status	CNPS Rank	County of San Diego	Habitat Preference/ Requirements	Detected On-Site Yes/No	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential

FEDERAL CANDIDATES AND LISTED PLANTS

FE = Federally listed endangered

FT = Federally listed threatened

STATE LISTED PLANTS

SE = State listed endangered

CALIFORNIA NATIVE PLANT SOCIETY (CNPS): CALIFORNIA RARE PLANT RANKS (CRPR)

1B = Species rare, threatened, or endangered in California and elsewhere. These species are eligible for state listing.

.1 = Species seriously threatened in California (over 80% of occurrences threatened; high degree and immediacy of threat).

.2 = Species fairly threatened in California (20-80% occurrences threatened; moderate degree and immediacy of threat).

POTENTIAL TO OCCUR ON-SITE

U = Unexpected

ATTACHMENT 5

Sensitive Wildlife Species with the Potential to Occur

Attachment 5 Sensitive Wildlife Species Occurring or with the Potential to Occur						
Common Name/ Scientific Name	Sensitivity Code & Status State/Federal Status	 County of San Diego	Habitat Preference/ Requirements	Detected On-Site? Yes/No	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
INVERTEBRATES						
BRANCHINECTIDAE FAIRY SHRIMP						
San Diego fairy shrimp *Branchinecta sandiegonensis*	FT	MHCP	Vernal pools.	No	U	Not expected to occur. No vernal pools or other depressions containing wetland or vernal pool plant species characteristic of vernal habitat were observed.
BIRDS						
ACCIPITRIDAE HAWKS, KITES, & EAGLES						
Cooper's hawk (nesting) *Accipiter cooperii*	WL/-	MHCP	Mature forest, open woodlands, wood edges, river groves. Parks and residential areas.	No	M	Moderate potential to nest within the survey area due to the presence of suitable trees for nesting.
POLIOPTILIDAE GNATCATCHERS						
Coastal California gnatcatcher *Polioptila californica californica*	SSC/FT	MHCP	Coastal sage scrub, maritime succulent scrub. Resident.	No	U	Not expected to occur due to the lack of coastal sage scrub, and maritime succulent scrub. This species has been documented within a 1-mile radius of the survey area (CDFW 2022b).

Attachment 5 Sensitive Wildlife Species Occurring or with the Potential to Occur						
Common Name/ Scientific Name	Sensitivity Code & Status State/Federal Status	 County of San Diego	Habitat Preference/ Requirements	Detected On-Site? Yes/No	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
PASSERELLIDAE NEW WORLD PASSERINES						
Southern California rufous-crowned sparrow *Aimophila ruficeps canescens*	WL/-	MHCP	Coastal sage scrub, chaparral, grassland. Resident.	No	U	Not expected to occur due to the lack of coastal sage scrub, chaparral, and grassland. This species has been documented within a 1-mile radius of the survey area (CDFW 2022b).
MAMMALS						
MUSTELIDAE WEASELS, OTTERS, & BADGERS						
American badger *Taxidea taxus*	SSC/-	--	Grasslands, Sonoran desert scrub.	No	U	Not expected to occur in the survey area due to the high level of disturbance and lack of suitable habitat. This species has been documented within a 1-mile radius of the survey area (CDFW 2022a).

Attachment 5 Sensitive Wildlife Species Occurring or with the Potential to Occur						
Common Name/ Scientific Name	Sensitivity Code & Status		Habitat Preference/ Requirements	Detected On-Site? Yes/No	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
	State/Federal Status	County of San Diego				

(I) = Introduced species

NOTE: Zoological nomenclature for invertebrates is in accordance with the NatureServe 2021 and Evans 2008; for fish with NatureServe 2021; for reptiles and amphibians with Crother et. al (2017); for birds with Chesser et al. 2021; for mammals with Bradley et al. (2014), American Society of Mammalogists 2021. Determination of the potential occurrence for listed, sensitive, or noteworthy species is based upon known ranges and habitat preferences for species follows Eriksen and Belk 1999, Nature Festivals of San Diego County 2002, Evans 2008, Page et al. 2013, Jennings and Hayes 1994, Unitt 2004, Tremor et. al. 2017, Western Bat Working Group 2017, and Harvey et al. 2011. Listing status is based on California Department of Fish and Wildlife, Natural Diversity Database (CDFW) 2022d and the County of San Diego MHCP (SANDAG 2003).

STATUS CODES

Listed/Proposed

FT = Listed as threatened by the federal government

Other

SSC = California Department of Fish and Wildlife species of special concern
WL = California Department of Fish and Wildlife watch list species
MHCP = Multiple Habitat Conservation Program covered species

Potential to Occur On-Site

M = Medium
U = Unexpected

APPENDIX C

Cultural Resources Survey

Cultural Resources Survey for the Santa Fe Flores Project San Marcos, California

Prepared for

Santa Fe Flores, LP
P.O. Box 903
Rancho Santa Fe, CA 92067
Contact: Paul Mayer

Prepared by

RECON Environmental, Inc.
3111 Camino del Rio North, Suite 600
San Diego, CA 92108
P 619.308.9333

RECON Number 9865
March 22, 2022

Nathanial Yerka, Project Archaeologist/Author

Carmen Zepeda-Herman, M.A., RPA, Principal Investigator

NATIONAL ARCHAEOLOGICAL DATA BASE INFORMATION

Author:	Nathanial Yerka, Project Archaeologist Carmen Zepeda-Herman, M.A., RPA, Principal Investigator
Consulting Firm:	RECON Environmental, Inc. 3111 Camino del Rio North, Suite 600 San Diego, CA 92108
Report Date:	March 21, 2022
Report Title:	Cultural Resources Survey for the Santa Fe Flores Project, San Marcos, California
Submitted to:	Mr. Paul Mayer
Prepared for:	Santa Fe Flores, LP P.O. Box 903 Rancho Santa Fe, CA 92067
Project Number:	RECON Number 9865
USGS Quadrangle Map:	7.5-minute, San Marcos
Acres:	2.5
Keywords:	Negative archaeological survey; San Marcos quadrangle

RECON Environmental, Inc. (RECON) conducted a cultural resources inventory for the proposed Santa Fe Flores Project. The survey covered the entire 2.5 acres of the project located at 2972 and 2982 South Santa Fe Avenue (Assessor's Parcel Numbers 217-161-1800 and 217-161-1900).

The cultural resources survey took place on March 10, 2022, using a survey interval of approximately seven meters across the property. The RECON archaeologist was accompanied by a Luiseño representative from Saving Sacred Sites.

No significant prehistoric or historic cultural resources were found during the survey of the project area. No prehistoric or historic cultural resources were mapped on or immediately adjacent to the property in the record search files. Therefore, the proposed project will have no impact on known prehistoric or historic cultural resources. However, the possibility exists for buried prehistoric archaeological deposits on-site. Because of this factor, RECON recommends that all ground-disturbing activities for the project be monitored by a qualified archaeological monitor and Native American monitors representing the Luiseño community.

TABLE OF CONTENTS

Acronyms and Abbreviations iii
Summary 1
1.0 Introduction 2
2.0 Natural Setting 2
3.0 Cultural Setting 6
3.1 Paleoindian Period 6
3.2 Archaic Period 6
3.3 Late Prehistoric Period 7
3.4 Ethnohistory 8
3.5 Spanish Period 9
3.6 Mexican Period 10
3.7 American Period 10
3.8 City of San Marcos 11
4.0 Background Research 11
5.0 Methods 14
6.0 Report of Findings 14
7.0 Management Considerations 18
8.0 Certification and Project Staff 19
9.0 References Cited 19

FIGURES

1: Regional Location 3
2: Project Location on USGS Map 4
3: Project Location on Aerial Photograph 5

TABLES

1: Cultural Resources within One Mile of the Project 12

TABLE OF CONTENTS (cont.)

PHOTOGRAPHS

1: Overview of Project Area from the Southeast Corner, Looking North 15
2: Two Granite Boulders Checked for Cultural Manipulation, Looking North-Northeast..... 15
3: Overview of Project Area from Northern Terrace on Eastern Boundary, Looking Southwest 16
4: Overview of Manufactured Drainage Area on Northern Terrace, Looking South..... 16
5: Overview of Southern Terrace Showing a Portion of OHV Disturbance, Looking South 17
6: Episodic Rubbish Dumping on Northern Terrace, Looking West-Northwest..... 17

ATTACHMENT

1: Native American Heritage Request Letter

CONFIDENTIAL ATTACHMENT (Under Separate Cover)

1: Records Search: Historical Resources with Primary and Trinomial Designations; Reports; Historic Addresses

Acronyms and Abbreviations

C.E.	Common Era
CEQA	California Environmental Quality Act
CRHR	California Register of Historical Resources
NAHC	Native American Heritage Commission
project	Santa Fe Flores Project
RECON	RECON Environmental, Inc.

Summary

RECON Environmental conducted a cultural resources inventory, in accordance with the California Environmental Quality Act (CEQA) and the California Register of Historical Resources for the proposed Santa Fe Flores Project (project). The survey covered the entire 2.5-acre parcel located at 2972 and 2982 South Santa Fe Avenue adjacent to Las Flores Drive on assessor parcel numbers 217-161-1800 and 217-161-1900. The project is located on a previously graded area and requires a General Plan Amendment and Rezone to Multi-family Residential to allow the development of 50 multi-family residential units that would be three to four stories in height. The project would also include a 1,000-square-foot roof deck for fitness and leisure, a 1,170-square-foot ground floor leasing and amenity center, and 120 square-foot ground floor fire command center. Vehicle parking would include a total of 107 surface parking spaces and bicycle parking would include a total of 11 lockers or bike storage rooms located on the upper and lower levels.

RECON requested a records search at the South Coastal Information Center, San Diego State University. The search radius was one mile. No prehistoric or historic cultural resources are recorded on or adjacent to the project area. A total of 31 cultural resources have been documented within one mile of the project boundary, including 9 prehistoric period resources and 22 historic period resources. In addition, there are 19 historic addresses listed within the one-mile search radius.

The cultural resources survey took place on March 10, 2022, using a survey interval of approximately seven meters across the property. The RECON archaeologist was accompanied by a Luiseño representative from Saving Sacred Sites. No significant prehistoric or historic cultural resources were found during the survey of the project area. The project will have no impact on known prehistoric or historic cultural resources. However, the possibility exists for the buried prehistoric archaeological deposits to exist on-site. Because of this factor, RECON recommends that all ground-disturbing activities for the project be monitored by a qualified archaeological monitor and Native American monitors representing the Luiseño community.

1.0 Introduction

The Santa Fe Flores project (project) is located in the city of San Marcos at 2972 and 2982 South Santa Fe Avenue adjacent to Las Flores Drive on Assessor Parcel Numbers 217-161-1800 and 217-161-1900 (Figure 1). The 2.5-acre project area is undeveloped and is currently designated Commercial and Light Industrial in the City of San Marcos (City) General Plan and zoned as Commercial and Light Industrial. The project is located on a previously graded site and requires a General Plan Amendment and Rezone to Multi-family Residential to allow the development of 50 multi-family residential units that would be three to four stories in height. The project would also include a 1,000-square-foot roof deck for fitness and leisure, a 1,170-square-foot ground floor leasing and amenity center, and 120-square-foot ground floor fire command center. Vehicle parking would include a total of 107 surface parking spaces and bicycle parking would include a total of 11 lockers or bike storage rooms located on the upper and lower levels.

The project area is in an unsectioned portion of the Los Vallecitos de San Marcos land grant, of the U.S. Geological Survey 7.5-minute topographic map, San Marcos quadrangle (Figure 2; U.S. Geological Survey 1996). The project area is currently undeveloped land. It is surrounded on the west and north by industrial development, to the east by multi-family residential development, and to the south by single-family residential development (Figure 3).

2.0 Natural Setting

The project area is dominated by disturbed habitat which includes areas that have been disturbed through frequent off-roading activity. The project area is comprised of non-native herbaceous cover mixed with non-native grasses. A smaller portion of the project area consists of urban/developed land which features landscaping that receives routine maintenance and irrigation; this area occurs along the eastern boundary of the project area and consists of ornamental vegetation. Elevation of the project area ranges between approximately 495 feet above mean sea level in the south and 550 above mean sea level to the north.

Soils within the project area consist of Diablo clay on the northern portion and Huerhuero loam on the southern portion (U.S. Department of Agriculture 1973). The Diablo clay series with 9 to 15 percent slopes occurs on strong slopes and ranges from 26 to 37 inches in depth over rock. The Huerhuero loam soil series is loam soils developed in sandy marine sediments and have slopes ranging from 2 to 9 percent. In a representative profile the surface layer is brown and pale brown, strongly acid to medium acid loam. The upper subsoil is brown moderately alkaline clay. Below this is brown mildly alkaline clay loam and sandy loam (U.S. Department of Agriculture 1973).

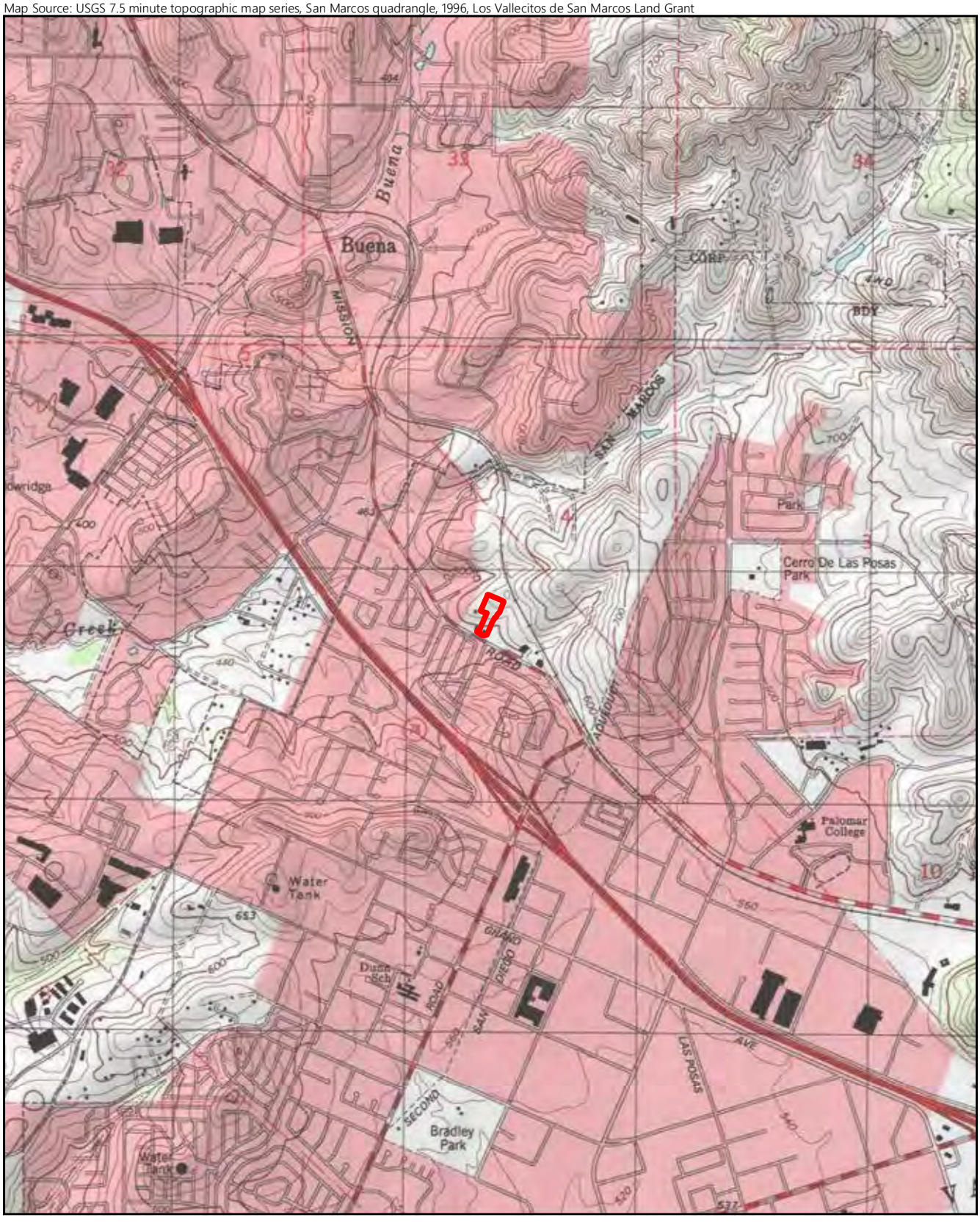
Project Location

RECON

M:\JOBS5\9865\common_gis\fig1.mxd 03/08/2022 bma

FIGURE 1
Regional Location

Map Source: USGS 7.5 minute topographic map series, San Marcos quadrangle, 1996, Los Vallecitos de San Marcos Land Grant



Project Boundary

RECON

M:\JOBS5\9865\common_gis\fig2_USGS.mxd 03/21/2022 bma

FIGURE 2
Project Location on USGS Map

Image Source: NearMap (flown January 2022)

Project Boundary

RECON

M:\JOBS5\9865\common_gis\fig3_aerial.mxd 03/21/2022 bma

FIGURE 3
Project Location on Aerial Photograph

3.0 Cultural Setting

3.1 Paleoindian Period

The Paleoindian Period in northern San Diego County is most closely associated with the San Dieguito Complex, as identified by Malcolm Rogers (1938, 1939, 1945) and Claude N. Warren (1961, 1964, 1966, 1967). The San Dieguito Complex includes the Lake Mohave sites, Death Valley I sites, and Playa I and II sites according to Warren (1967) and represents a generalized hunting tradition (Moratto 2004). The San Dieguito Complex can be found in all of San Diego County, parts of Riverside County, north through the Mohave Desert, east through western Arizona, and south into northern Baja California and northern Sonora (Rogers 1966). The San Dieguito Complex assemblage is dominated by finely made scraping and chopping tools, such as well-made scraper planes, choppers, scraping tools, crescentics, elongated bifacial knives, and leaf-shaped projectile points. These tools were often made of fine-grained, slate-green felsite, or fine-grained basalt. Projectile points consist of Lake Mojave and Silver Lake types along with non-diagnostic leaf-shaped points. Evidence of seed grinding technology (manos and metates) is scarce. San Dieguito sites in the desert are typically found around dry Pleistocene playas (Moratto 2004). Site locations and assemblages suggest a subsistence emphasis on lacustrine resources and big game hunting.

3.2 Archaic Period

The Archaic Period in northern San Diego County is represented by the Pauma Complex, a local manifestation of the widespread Millingstone Horizon (Wallace 1955). The Millingstone Horizon has been identified throughout coastal southern and central California and includes La Jolla Complex of the San Diego region and the Pauma Complex in the foothills of San Diego and Riverside counties. These have very similar assemblages and are thought to be different environmental adaptations of the same culture (True 1958). A similar assemblage has been identified in the Cajon Pass area of Riverside County and is referred to as the Sayles Complex (Kowta 1969). This is thought to be transitional between the Pinto Complex of the Mojave Desert and the Millingstone Horizon of the coast (Kowta 1969:1).

The Pauma Complex assemblage suggests a generalized subsistence focus with an emphasis on hard seeds. This emphasis is indicated by the appearance of numerous slab and basin metates and the adoption of a mixed cobble/core-based tool assemblage composed primarily of crudely made choppers, scrapers, and cobble hammerstones.

Pauma Complex sites are typically found on terraces or ridges above a water source such as a stream. They often do not have discernible midden development, but they may have subsurface deposits. While they typically have numerous portable metates and manos, they lack bedrock milling, and mortars and pestles (True and Waugh 1981:101-102).

Major technological change within the Archaic Period in San Diego County appears to have been limited mainly to the introduction of large side-notched and Elko series projectile points. There seems to have been some reorientation in settlement from coastal to inland settings during the latter

portion of this period in northern San Diego County. This settlement shift appears to have occurred around 4,000 years ago and is thought to relate to the final phases of Holocene sea level rise and the resulting siltation of coastal lagoons. Prior to this time, the lagoons had been highly productive sources of shellfish for La Jollan people (Gallegos 1987; Warren et al. 1993).

3.3 Late Prehistoric Period

Near the coast and in the Peninsular Mountains beginning approximately 1,500 years ago, patterns began to emerge that suggest the ethnohistoric Kumeyaay. The Late Prehistoric Period is characterized by higher population densities and elaborations in social, political, and technological systems. Economic systems diversified and intensified during this period, with the continued elaboration of trade networks, the use of shell-bead currency, and the appearance of more labor-intensive but effective technological innovations. The late prehistoric archaeology of the San Diego coast and foothills is characterized by the Cuyamaca Complex. The Cuyamaca Complex is described by the presence of steatite arrow shaft straighteners, steatite pendants, steatite comales (heating stones), Tizon Brownware pottery, ceramic figurines reminiscent of Hohokam styles, ceramic "Yuman bow pipes," ceramic rattles, miniature pottery, various cobble-based tools (e.g., scrapers, choppers, hammerstones), bone awls, manos and metates, mortars and pestles, and Desert Side-notched (more common) and Cottonwood Series projectile points (True 1970).

Other parts of northern San Diego County are also represented by the San Luis Rey Complex (Meighan 1954; True et al. 1974). First described by Meighan (1954) and based on excavations at Pala some 16 miles north-northeast of the study area, San Luis Rey I sites are associated with bedrock milling features and often have recognizable midden soils. The artifact assemblage includes manos and metates, Cottonwood Triangular, and less frequently Desert Side-notched type projectile points, drills, bifacially flaked knives, bone awls, occasional steatite arrow shaft straighteners, and bone and shell ornaments (True and Waugh 1981:87). The Cottonwood Triangular and Desert Side-notched points are both smaller than earlier types, suggesting the introduction of bow-and-arrow technology into the region.

San Luis Rey II consists of the same assemblage with the addition of Tizon Brownware ceramics, red and black pictographs, cremation remains in urns, and historic materials such as glass beads and metal objects. True (1966) demonstrated that the San Luis Rey Complex almost certainly represents the ancestors of the Luiseño.

Meighan argued that ceramics, probably introduced into north San Diego County from the south, appeared around 1750 Common Era (C.E.) and were a product of indigenous diffusion that appeared at about the same time or slightly earlier than the Spanish arrival. In contrast, True et al. (1974) suggested that pottery may have appeared as early as 1200 to 1600 C.E. Later, Griset (1996) obtained 22 accelerator mass spectrometry dates from residue on pottery sherds, and she reviewed and recalibrated a number of others. Griset found four dates earlier than 800 C.E. The earliest pottery date in San Diego County according to Griset's study was from Ystagua at 549 C.E. (1996:251-253). However, Griset's data suggest that pottery was not common in San Diego County until about 1400 C.E. (1996:262). The earliest date for Tizon Brownware in the San Diego region is not long after the advent of Lower Colorado Buff Ware, which was dated as early as 430 C.E. in the vicinity of Blythe (Hildebrand 2003:258-259).

3.4 Ethnohistory

The study area falls along the border of the Luiseño and Kumeyaay tribal territories (ASM Affiliates, Inc. 2014), which can be described as a line following Agua Hedionda Creek, extending northeasterly inland towards Lake Henshaw, north into Riverside County, and west through San Juan Capistrano to the coast (Bean and Shipek 1978). The Kumeyaay historically occupied the area south of Agua Hedionda into what is now Baja California, Mexico, and east into the Imperial Valley. Spanish explorers and missionaries noted that this geopolitical boundary was not static but rather fluid and dynamic (Luomala 1978:593). Because of this fluidity, the San Marcos area could have been inhabited by either the Luiseño or the Kumeyaay during the late Prehistoric and Ethnohistoric periods (ASM Affiliates, Inc. 2014). Work by Gallegos (Gallegos et al. 2002) and Comeau (Comeau et al. 2012) has attributed nearby archaeological resources to the Luiseño. This evidence supports Sparkman's (1908) attribution of the area to the Luiseños.

The Luiseño are the most southwesterly of the Shoshonean or Uto-Aztecan speakers. Historically, the Luiseño social structure was the clan triblet. The triblet was composed of patrilineally related people who were politically and economically autonomous from neighboring triblets. Unlike other Takic-speaking tribes that surrounded them, the Luiseño do not appear to have been organized into exogamous moieties, but may have been loosely divided into mountain-oriented groups and ocean-oriented groups (Bean and Shipek 1978). One or more clans would have resided together in a village (Oxendine 1980). A hereditary village chief held a position that controlled economic, religious, and warfare powers (Bean and Shipek 1978). The chief had an assistant and an advisory council of shamans and ritual specialists. These positions were also hereditary, with successors being selected from the advisor's lineage.

Luiseño settlement systems have been carefully reconstructed on the basis of extensive ethnographic and ethnohistoric research (Bean and Shipek 1978; Kroeber 1925; Sparkman 1908; Strong 1929; White 1963). A Luiseño clan controlled one, or possibly more, specified territories, called rancherias. White (1963) suggests that the average inland rancheria had a territory of approximately 30 square miles. He suggested that the Luiseño settlement system consisted of a series of villages or rancherias located on terraces above a valley bottom watercourse (e.g., the San Luis Rey River). Villages were usually located in defensible locations in sheltered canyons or coves, or on the sides of slopes in warm thermal zones, near reliable water sources. The rancheria owned territory in a contiguous strip leading from the valley bottom to upland areas. This vertical pattern of rancheria territory facilitated gathering plant foods through the year. In early spring, tubers and berries first ripened along the watercourse below the rancheria. As spring turned to summer, chaparral plants near the rancheria became ripe. Later, those at a higher elevation above the rancheria ripened. In fall, people moved temporarily to higher elevations (e.g., Palomar Mountain) for the acorn harvest (White 1963).

A wide variety of plants growing in the various biotic communities between the coast and mountains were utilized by the Luiseño, including acorns, annual grasses, seeds, yucca, sage, chia, lemonade berry, manzanita, and other wild greens and fruits (Kroeber 1925) These resources become available at different times of the year, prompting moves to different campsites. In addition to plant-associated moves, trips to coastal camps to exploit marine resources such as shellfish, fish, and marine mammals would take place.

According to most ethnographic accounts, acorns were considered the most important food source (Bean and Shipek 1978). Since acorns mature at differing rates between groves, and even within individual groves, movement from place to place would have been necessary to be able to effectively harvest the annual acorn crop. Acorns could be harvested in one of two ways, either gathered from the ground after they had fallen or knocked off the tree with long sticks. After harvesting, acorns could either be processed into meal or stored for winter. Acorns had to be dry to be stored to prevent spoilage. Acorns to be processed were first shelled, then worked lightly with a pestle, and winnowed to remove the thin seed covering. Next, acorns were pounded to a fine flower and leached to remove the tannins. After this, acorn flour was ready to be cooked.

Baskets, both coiled and twined, were used in gathering, preparation, and storage of food (Bean and Shipek 1978). Basket size and shape depended on its use. Pottery vessels were used for cooking and storage. Pottery was made using the paddle and anvil technique, and was seldom decorated (Bean and Shipek 1978). Nets and pouches made of cordage and animal skins were used for carrying food and tools.

Animal resources used by the Luiseño included most of the mammals occurring in their territory, except for predator animals and tree squirrels (Bean and Shipek 1978). Reptiles were also avoided as a food source. Birds hunted included quail, ducks, and doves. Larger animals were hunted with the bow and arrow, while smaller game was caught using nets, deadfalls, slings, and throwing sticks. Game drives were also used for hunting rabbits and deer. Coastal marine animals exploited included sea mammals, fish, crustaceans, and mollusks (Bean and Shipek 1978). Basketry fish traps, seines, dip nets, bone, and shell hooks were used. Dugout and light balsa canoes were used for near-shore ocean fishing (Bean and Shipek 1978).

3.5 Spanish Period

The Spanish Period in Alta California (1769–1821) represents a time of European exploration and settlement. Military and religious contingents established the San Diego Presidio and the San Diego Mission in 1769, San Carlos Borromeo (Carmel) in 1770, and San Gabriel Arcangel in 1771. The opening of the mission system created the need to link Alta California with Sonora, Mexico. Juan Bautista de Anza of Tubac was commissioned to open up a road across the Colorado Desert to San Gabriel and on to Monterey. Mission San Luis Rey de Francia, the closest mission to the project, was founded on June 13, 1798 by Padre Fermin Lasuén. Two sub-missions, San Antonio de Pala Asistencia and Las Flores Estancia, were established in the early 1800s to support Mission San Luis Rey. The project is on the western end of Los Vallecitos de San Marcos Rancho, which was run by Mission San Luis Rey for cattle grazing.

The Spanish mission system used forced Native American labor to produce goods and provide services needed for European settlement. The mission system also introduced horses, cattle, sheep, and agricultural goods and implements as well as new construction methods and architectural styles. Also, with the arrival of the Spanish came devastating epidemics and very high death rates. According to available mission records, the worst year was 1806 when a measles epidemic spread through southern California. An estimated 33.5 percent of the Indian population along the coast died (Cook 1976:424).

3.6 Mexican Period

The Mexican Period (1821–1848) retained many of the Spanish institutions and laws. While Spanish and Mexican settlement was focused on coastal Alta California, exploration of inland areas continued, often during the course of pursuing neophytes that had run away from the missions. In 1824, Santiago Arguello, an officer of the San Diego Presidio "discovered" San Felipe Valley, which opened the route through present day Warner Springs and Riverside and on to the San Gabriel Mission. This route, which became known as the Sonora Road, soon became the official Mexican mail route (Gudde and Bright 2004; Lawton 1976:58).

The missions were secularized in 1834, opening vast tracts of former mission lands for private use and settlement. Los Vallecitos de San Marcos Rancho was granted to Don José Maria Alvarado in 1834 (Pourade 1969). Cattle ranching dominated the southern California economy, and the hide and tallow trade with New England merchant ships increased during the early part of the Mexican Period. Native American communities continued to decline, particularly those close to the coast. However, some Native Americans found jobs as *vaqueros*, laborers, gardeners, and housekeepers (Rolle 1998:57).

3.7 American Period

The signing of the treaty of Guadalupe Hidalgo in 1848, which signaled the end of the Mexican–American War, gave Alta California, the northern three-quarters of Arizona, New Mexico, a greatly enlarged Texas, and southern parts of Colorado, Nevada, and Utah to the United States (Rolle 1998:91). The treaty guaranteed citizenship to former Mexican citizens if they chose to stay in the new lands of the United States and it promised to respect their property. Native Americans had been granted Mexican citizenship in 1821 but the Americans never recognized their legal claims to U.S. citizenship, to property rights, or to other civil rights. In 1850, California was admitted to the Union as a free state (Phillips 1996:60-61).

On January 24, 1848, gold was discovered by John W. Marshall at Sutter's Fort in the central Sierra Nevada foothills. Sutter and Marshall did their best to keep it a secret, but the news of the discovery was published on March 15 in the *San Francisco Californian* newspaper. The subsequent Gold Rush launched an immigrant tide, which engulfed many of the Spanish and Mexican cultural traditions and eliminated many remaining vestiges of Native American culture. Many Mexican *ranchos* were overrun by forty-niners or dissolved in land claim disputes (Rolle 1998). Native American *Rancherias* were supposedly recognized by the American government in the terms of the Treaty of Guadalupe Hidalgo but not in reality.

The homestead system and the railroad encouraged American settlement in California after the Civil War, but settlement was slow in southern California. Most communities and ranches in northern San Diego and southern Riverside counties were not established until the land booms of the 1880s following completion of the Santa Fe and Southern Pacific railroads linking San Diego, Riverside, and San Bernardino with the East.

3.8 City of San Marcos

By the late 1850s, part of Los Vallecitos de San Marcos had been sold to Cave Couts, who primarily used the parcels to raise livestock. The remainder of the grant, sold to Lorenzo Soto by Jose Alvarado's widow, Lugarda Osuna, was patented by the U.S. Land Commission in 1883 (Carrol 1975:40). Major Gustavus French Merriam soon after established the first permanent European settlement in the North Twin Oaks Valley. On the 160-acre homestead, Merriam began wine and honey production (City of San Marcos 2010).

Not long after Major Merriam's settlement, German and Dutch immigrants began moving into the area in the early 1880s. By 1883, John H. Barham founded the first town in the area, just few miles south of the Merriam's settlement. Named "Barham Township," the new town site had a post office, a blacksmith, a feed store, and a weekly newspaper by 1884. The San Marcos Land Company purchased nearly all of the San Marcos land formerly owned by the Couts family in 1887, dividing the land into planned community tracts, establishing the town of San Marcos (City of San Marcos 2010). The arrival of the Santa Fe Railroad brought more people to the San Marcos area, but its siting outside the town forced the community to move the town center to present-day Mission Road and Pico Avenue. By the mid-1900s, dairies and poultry production became critical to the area's economic development (City of San Marcos 2010).

San Marcos saw another period of rapid growth after 1956 when it established a water connection with the Colorado River water supply. With more water came more opportunities for small businesses. Through the 1960s, the city slowly gained new residents but by the 1970s, San Marcos became the third fastest-growing city in the state with a population of 17,479. During the 1980s, San Marcos almost doubled its population to 33,800. Growth has continued to boom in San Marcos bringing the city's present population to 83,781 (City of San Marcos 2010).

4.0 Background Research

RECON requested a records search at the South Coastal Information Center, San Diego State University, which is a member of the California Historical Resources Information System. The search radius was one mile. No prehistoric or historic cultural resources are recorded on or adjacent to the project area. A total of 31 cultural resources have been documented within one mile of the project boundaries (Confidential Attachment 1; Table 1), including 9 prehistoric period resources and 22 historic period resources. In addition, there are 19 historic addresses listed within the one-mile search radius. A summary of the available site data appears in Table 1.

Table 1 Cultural Resources within One Mile of the Project				
Primary #	Trinomial	Age	Site Type	Recording Events
P-37-005584	CA-SDI-005584	Prehistoric	Lithic scatter; Bedrock milling feature	1977 (Randy Franklin)
P-37-005633	CA-SDI-005633	Prehistoric	Lithic scatter; Ceramic scatter; Bedrock milling feature; Burials; Habitation debris; Other - shell	1977 (Randy Franklin); 2002, 2007 (Delman James, Rich Bark, Brian Glenn, Jerry Sabio, Ted Cooley, Ogden Environmental Services, Inc.)
P-37-008813	CA-SDI-008813	Prehistoric	Lithic scatter; Bedrock milling feature	1981 (Linda Roth)
P-37-008814	CA-SDI-008814	Historic	Trash scatter; Other - burned residence	1981 (Linda Roth)
P-37-008815	CA-SDI-008815	Prehistoric	Lithic scatter	1981 (Linda Roth)
P-37-011663	CA-SDI-011663	Prehistoric	Lithic scatter	1990 (Scott Crull, Ken Smith, Palomar College)
P-37-013009	CA-SDI-013009	Prehistoric	Lithic scatter; Bedrock milling feature	1993 (B. Glenn, C. Schultze, K. Collins, Ogden Environmental Services, Inc.)
P-37-018186		Historic	Single-family property	1999 (P.S. Preservation Services)
P-37-018187		Historic	1-3 Story commercial building	1999 (P.S. Preservation Services)
P-37-018188		Historic	1-3 Story commercial building	1999 (P.S. Preservation Services)
P-37-018189		Historic	Industrial building	1999 (P.S. Preservation Services)
P-37-018190		Historic	Industrial building	1999 (P.S. Preservation Services)
P-37-018191		Historic	Industrial building	1999 (P.S. Preservation Services)
P-37-018192		Historic	1-3 Story commercial building; Single-family property	1999 (P.S. Preservation Services)
P-37-018193		Historic	Single-family property	1999 (P.S. Preservation Services)
P-37-018194		Historic	Single-family property	1999 (P.S. Preservation Services)
P-37-018195		Historic	Single-family property	1999 (P.S. Preservation Services)
P-37-018196		Historic	Single-family property	1999 (P.S. Preservation Services)
P-37-018197		Historic	Single-family property	1999 (P.S. Preservation Services)
P-37-018198		Historic	1-3 Story commercial building	1999 (P.S. Preservation Services)
P-37-018199		Historic	Industrial building	1999 (P.S. Preservation Services)
P-37-018200		Historic	Single-family property	1999 (P.S. Preservation Services)
P-37-018201		Historic	Single-family property	1999 (P.S. Preservation Services)
P-37-018202		Historic	Single-family property	1999 (P.S. Preservation Services)

Table 1 Cultural Resources within One Mile of the Project				
Primary #	Trinomial	Age	Site Type	Recording Events
P-37-025309	CA-SDI-016787	Prehistoric	Lithic scatter	2003 (Gallegos & Associates)
P-37-030664	CA-SDI-019476	Prehistoric	Lithic scatter	1994 (R. Carrico, D. James, and A. Pigniolo, Ogden Environmental Services, Inc.); 2009 (CalTrans District 11)
P-37-033557		Historic	Roads; Highway	2013 (Larry Tift, ASM Affiliates, Inc.); 2015 (Kent Manchen, Matt DeCarlo, ASM Affiliates, Inc.); 2017 (Haley Chateene, PanGIS); 2017 (A. Foglia, K. Keckeisen, PanGIS, Inc.); 2018 (Sarah Stringer-Bowsher, ASM Affiliates, Inc.)
P-37-036868		Historic	Dam	2016 (Lucas Piek, ASM Affiliates)
P-37-036869		Historic	Dam	2016 (Lucas Piek, ASM Affiliates)
P-37-036870		Prehistoric	Isolate - flake	2016 (Lucas Piek, ASM Affiliates)
P-37-038298		Historic	Single-family property	2019 (Terri Jacquemain, CRM Tech)

Fifty-eight cultural resources studies have been conducted within one mile of the project. One cultural resource investigation appears to have included the project area: Archaeological Survey for the Proposed Widening of South Santa Fe Avenue, Vista, California, conducted in 1974.

A letter was sent to the Native American Heritage Commission (NAHC) in Sacramento on February 11, 2022, requesting a search of their Sacred Lands File (Attachment 1). No response from the NAHC has been received as of the writing of this report.

Historic aerial photographs and topographic maps by Nationwide Environmental Title Research, LLC available online (at http://www.historicaerials.com) were inspected to identify any previous uses of the property. Aerial photographs from 1938, 1947, and 1953 show the project in agriculture. The 1938 and 1953 aerial photographs exhibit the parcels in fallow agriculture where the 1947 shows the central portion planted possibly with trees. All three aerials support that the agriculture originates from the adjacent property to the west which is supported by the 1949 topographic map. A 1964 aerial photograph shows building development in both parcels with ancillary structures supporting the northern parcel. Both parcels now have independent entrances to their properties off of what would be present-day South Santa Fe Avenue in the south and North Las Flores Drive to the north. The buildings and supporting structures on the parcel to the north were removed between 1989 and 1990. The building on the southern parcel was removed between 2005 and 2009. Also during this time, the present-day alignment for North Las Flores Drive was installed along with the generally west-facing bank of ornamental vegetation which dominates the eastern project boundary. A west-northwest by east-southeast alignment of K-Rails were added to the southern edge of the upper/northern terrace of the northern parcel between 2016 and 2018. Also installed in the upper/northern terrace during this time is an assumed drainage depression with stormwater manhole, culvert, and corrugated vertically placed metal pipe (Nationwide Environmental Title Research, LLC 2022).

5.0 Methods

The project area was surveyed by RECON archaeologist Nathanial Yerka on March 10, 2022. Mr. Yerka was accompanied by Native American monitor Vi'i Sialo'i of Saving Sacred Sites. Mr. Yerka served as project archaeologist and author and Carmen Zepeda-Herman served as principal investigator. Ms. Zepeda-Herman is a member of the Register of Professional Archaeologists and meets the Secretary of the Interior's Standards for Archaeology and Historic Preservation. The primary goal of this survey was to determine (1) if there are previously unrecorded cultural resources present, and if so, document the resources' locations and what they consist of, and (2) to update conditions of previously recorded cultural resources. The project area was inspected for evidence of archaeological materials such as debris, flaked and ground stone tools, ceramics, milling features, and human remains. Photographs were taken to document the environmental setting and general conditions.

6.0 Report of Findings

The survey did not identify any prehistoric artifacts or features, or any potentially significant historic artifacts or features.

The field inspection was conducted on foot, in conditions of high clouds, strong daylight, and cool temperatures. Survey transect intervals were approximately seven meters, spaced across the property. The project area is terraced into three generally flat steps with steep south-southwest-facing slopes. The entire surface of both parcels is disturbed. The southern parcel has a high amount of import gravel that link the area as a possible supporting parking area to the business adjacent to the west, with entry/exit to both the business improved parking area, as well as North Las Flores Drive (Photograph 1). Imported topping mulch is placed along a shallow berm that abuts the sidewalk of South Santa Fe Avenue and swings northeast to a manufactured slope with irrigated ornamental vegetation that supports Las Flores Drive. Near the top of the first/lower terrace are two granite imported boulders (Photograph 2). Near the eastern manufactured bank is an installed concrete stormwater culvert. At the southern edge of the second/upper terrace is a west-northwest by east-southeast alignment of K-Rails (Photograph 3). Also on this terrace is a central manufactured depression that is assumed to aid for drainage with stormwater manhole, culvert, and corrugated vertically placed metal pipe (Photograph 4). A significant amount of rodent disturbance occurs along the western boundary; back dirt was checked for cultural material. There is current project area ground surface disturbance in the form of off-highway vehicle and bicycle activity (Photograph 5; see also Photographs 1 and 3). The project area also exhibits a fair amount of modern rubbish, mostly in the form of broken consumer bottle glass, as well as episodic dumping of furniture (Photograph 6) and dimensional lumber.

PHOTOGRAPH 1
Overview of Project Area from the Southeast Corner, Looking North

PHOTOGRAPH 2
Two Granite Boulders Checked for Cultural Manipulation,
Looking North-Northeast

PHOTOGRAPH 3
Overview of Project Area from Northern Terrace on Eastern Boundary,
Looking Southwest

PHOTOGRAPH 4
Overview of Manufactured Drainage Area on Northern Terrace,
Looking South

PHOTOGRAPH 5
Overview of Southern Terrace Showing a Portion of OHV Disturbance, Looking South

PHOTOGRAPH 6
Episodic Rubbish Dumping on Northern Terrace, Looking West-Northwest

7.0 Management Considerations

The key consideration for the management of cultural resources within the CEQA framework is their eligibility for inclusion on the California Register of Historical Resources (CRHR). A resource must satisfy one or more of the qualifying criteria in order to be considered eligible for listing. In order to be eligible for listing in the CRHR, a resource must satisfy at least one of the following four criteria:

1) It is associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States.

2) It is associated with the lives of persons important to local, California, or national history.

3) It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values.

4) It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

Cultural and historical resources eligible for listing in the CRHR must meet one of the criteria of significance described above and retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. For the purposes of eligibility for CRHR, integrity is defined as "the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance" (California Office of Historic Preservation 2005:67).

No significant prehistoric or historic cultural resources were found during the survey of the project area. No prehistoric or historic cultural resources were mapped on or immediately adjacent to the property in the record search files. Therefore, the project will have no impact on known prehistoric or historic cultural resources. However, it appears probable that soil has been dumped on a significant portion of the parcel, obscuring the original ground. Also, the project is in an area of alluvial deposition adjacent to San Marcos Creek. Because of these factors, the possibility exists for buried prehistoric archaeological deposits on-site. RECON recommends that all ground-disturbing activities for the project be monitored by a qualified archaeological monitor and a Native American monitor representing the Luiseño community. If archaeological materials are identified during construction activities, work in the immediate area shall cease and an archaeologist meeting the City of San Marcos Qualifications Standards for Archaeology must evaluate the find. If the discovery proves to be significant under CEQA, a data recovery program shall be implemented. If human remains are found, construction shall halt in the immediate area and procedures set forth in California Public Resources Code Section 5097.98 and State health and Safety Code Section 7050.5 shall be followed. After completion of monitoring, a final report with the monitoring methods and results shall be prepared and submitted to the City.

8.0 Certification and Project Staff

This report was prepared in compliance with the CEQA (Section 21083.2 of the Statutes and Appendix K of the Guidelines) and with policies and procedures of the City of San Marcos. To the best of my knowledge, the statements and information contained in this report are accurate.

Nathanial Yerka
Project Archaeologist/Author

Carmen Zepeda-Herman, M.A., RPA
Principal Investigator

The following individuals participated in the field tasks or preparation of this report.

Carmen Zepeda-Herman	Principal Investigator
Nathanial Yerka	Project Archaeologist/Author
Vi'i Sialo'i	Luiseño Native American Monitor
Benjamin Arp	GIS Specialist
Jennifer Gutierrez	Production Specialist

9.0 References Cited

ASM Affiliates, Inc.
2014 Cultural Resources Study for the Mulberry Drive Development Project, San Marcos. Manuscript on file at the South Coastal Information Center, San Diego State University.

Bean, Lowell, and Florence C. Shipek
1978 Luiseño. In *California,* edited by Robert F. Heizer. Handbook of North American Indians, vol. 8, William G. Sturtevant, general editor. Smithsonian Institution, Washington, DC.

California Office of Historic Preservation
2005 *Technical Assistance Series #10: California State Law and Historic Preservation: Statues, Regulations and Administrative Policies Regarding Historic Preservation and Protection of Cultural and Historical Resources*. Sacramento.

Carrol, William
1975 *San Marcos: A Brief History*. Coda Productions, San Marcos, California.

Comeau, Brad, Micah Hale, and Mark Becker
2012 Cultural Resources Survey Report for the Palomar Station Project, San Marcos, San Diego County, California. ASM Affiliates, Inc. Manuscript on file at the South Coastal Information Center, San Diego State University.

Cook, Shelburne F.
1976 *The Population of the California Indians, 1769-1970*. University of California Press, Berkeley.

Gallegos, D. R.
1987 A Review and Synthesis of Environmental and Cultural Material for the Batiquitos Lagoon Region. In *San Dieguito–La Jolla: Chronology and Controversy, edited by Dennis R. Gallegos*. San Diego County Archaeological Society Research Papers 1:23-34.

Gallegos, D.R., M. Guerrero, J. Flenniken, and T. Stopes
2002 Data Recovery Program for Packbell Site CA-SDI-5633, San Marcos, California. Gallegos and Associates, Carlsbad, CA. Manuscript on file at the South Coastal Information Center, San Diego State University.

Griset, Suzanne
1996 *Southern California Brown Ware*. Ph.D. Dissertation, Department of Anthropology, University of California, Davis.

Gudde, Erwin G., and William Bright
2004 *California Place Names: The Origin and Etymology of Current Geographical Names*. University of California Press, Berkeley.

Hildebrand, John
2003 Ceramics Excavated from the Lower Colorado River Region by the North Baja Pipeline Project. In *A View Across the Cultural Landscape of the Lower Colorado Desert: Cultural Resource Investigations for the North Baja Pipeline* Project edited by James H. Cleland and Rebecca McCorkle Apple, pp. 245-260. Document on file with the Southeast Information Center, Imperial Valley College Desert Museum, Ocotillo, California.

Kowta, Makoto
1969 The Sayles Complex: A Late Milling Stone Assemblage from Cajon Pass and the Ecological Implications of Its Scraper Planes. University of California Publications in *Anthropology* 6.

Kroeber, A. L.
1925 *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78. Smithsonian Institution, Washington.

Lawton, Harry W.
1976 History and Ethnohistory of the Yuha Desert (1769-1865). In *Background to Prehistory of the Yuha Desert Region,* edited by Philip J. Wilke, pp. 43-72. Ballena Press, Ramona, California.

Luomala, Katharine
1978 Tipai-Ipai. In *California,* edited by Robert F. Heizer. Handbook of North American Indians, vol. 8, William G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Meighan, Clement W.
1954 A Late Complex in Southern California Prehistory. *Southwestern Journal of Anthropology* 10:215-227.

Moratto, Michael
2004 *California Archaeology*. Reprint, Coyote Press, Salinas, California.

Nationwide Environmental Title Research, LLC
2022 Historic photographs of the survey area inspected at historicaerials.com. Accessed on March 10, 2022.

Oxendine, Joan
1980 The Luiseno Girls Ceremony. *Journal of California and Great Basin Anthropology* 2 (1)37-50.

Phillips, George H.
1996 *The Enduring Struggle: Indians in California History*. MTL, Inc., Sparks, Nevada.

Pourade, Richard F.
1969 *Historic Ranchos of San Diego*. A Copley Book, Union-Tribune Publishing, San Diego.

Rogers, Malcolm J.
1938 Archaeological and Geological Investigations of the Culture Levels in an Old Channel of San Dieguito Valley. *Carnegie Institution of Washington Yearbook* 37:344-45.

1939 *Early Lithic Industries of the Lower Basin of the Colorado River and Adjacent Desert Areas*. San Diego Museum of Man Papers 3.

1945 An Outline of Yuman Prehistory. *Southwestern Journal of Anthropology* 1(2):167-198. Albuquerque.

1966 *Ancient Hunters of the Far West,* edited by Richard F. Pourade. Union-Tribune. San Diego, California.

Rolle, Andrew
1998 *California: A History*. Harlan Davidson, Wheeling, Illinois.

San Marcos, City of
2010 *History*. Available at http://www.ci.san-marcos.ca.us/index.aspx?page=139. Accessed on January 27, 2015.

Sparkman, Philip S.
1908 The Culture of the Luiseño Indians. *University of California Publications in American Archaeology and Ethnology* 8(4):187-234.

Strong, William
1929 Aboriginal Society in Southern California. *University of California Publications in American Archeology and Ethnology* 26:1-358.

True, D.L.
1958 An Early Complex in San Diego County, California. *American Antiquity* 23(3):255-263.

1966 *Archaeological Differentiation of Shoshonean and Yuman Speaking Groups in Southern California*. Doctoral dissertation, University of California, Los Angeles. University Microfilms, Ann Arbor, Michigan.

1970 *Investigation of a Late Prehistoric Complex in Cuyamaca Rancho State Park, San Diego County, California*. Department of Anthropology Publications, University of California, Los Angeles.

True, D. L., and G. Waugh
1981 Archaeological Investigations in Northern San Diego County, California: Frey Creek. *Journal of California and Great Basin Anthropology* 3(1):84-115.

True, D. L., C. W. Meighan, and H. Crew
1974 *Archaeological Investigations at Molpa, San Diego County, California*. University of California Press, Berkeley, California.

U.S. Department of Agriculture
1973 Soil Survey, San Diego Area, California. Edited by Roy H. Bowman. Soil Conservation Service and Forest Service. December.

U.S. Geological Survey (USGS)
1996 7.5-minute topographic map series, San Marcos Quadrangle, Los Vallecitos de San Marcos Land Grant.

Wallace, William J.
1955 A Suggested Chronology for Southern California Coastal Archaeology. *Southwestern Journal of Anthropology*, Vol. 11, No. 3 (Autumn, 1955), pp. 214-230. University of New Mexico.

Warren, Claude N.
1961 The San Dieguito Complex and Its Place in California Prehistory. *Archaeological Survey Annual Report* (1960-1961). Department of Anthropology and Sociology, University of California, Los Angeles.

1964 *Cultural Change and Continuity on the San Diego Coast*. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Los Angeles.

1966 The San Dieguito Type Site: M. J. Rogers 1938 Excavation on the San Dieguito River. *San Diego Museum of Man Papers* 5.

1967 The San Dieguito Complex: A Review and Hypothesis. *American Antiquity* 32(2):168-185. Society for American Archaeology, Salt Lake City.

Warren, Claude N., Gretchen Siegler, and Frank Dittmer
1993 Paleoindian and Early Archaic Periods in *Historic Properties Background Study* by Brian F. Mooney and Associates. Document on file with the City of San Diego Clean Water Program.

White, Raymond
1963 Luiseno Social Organization. *University of California Publications in American Archaeology and Ethnology* 48(2):91-194.

ATTACHMENT 1

Native American Heritage Commission Request Letter

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
915 Capitol Mall, RM 364
Sacramento, CA 95814
(916) 653-4082
(916) 657-5390 – Fax
nahc@pacbell.net

Information Below is Required for a Sacred Lands File Search

Project: Santa Fe Flores

County: San Diego County

USGS Quadrangle

Name: San Marcos

Township: **Range:** **Section(s):** unsectioned Los Vallecitos de San Marcos

Contact Information

Company/Firm/Agency: RECON Environmental, Inc.

Contact: Carmen Zepeda-Herman

Street Address: 3111 Camino del Rio North, Suite 600

City: San Diego **ZIP:**92108

Phone: 619-308-9333

Fax: Click here to enter text.

Email: czepeda@reconenvironmental.com

Project Description:

The project proposes to construct multifamily housing within vacant parcels equaling 2.23 acres.

CONFIDENTIAL ATTACHMENT

Not for Public Review

APPENDIX D

Geotechnical Report

July 1, 2020

Paul Mayer
P.O. Box 903
Rancho Santa Fe, California

Project No. 19-2118C

Dear Mr. Mayer

Attached herewith is the Limited Geotechnical Investigation report prepared for the proposed San Marcos Residences Project to be located at 2972 South Santa Fe Avenue, San Marcos, California.

We appreciate this opportunity to provide geotechnical services for this project. If you have questions or comments concerning this report, please contact us at your convenience.

Respectfully submitted,
GHOSTRIDER, INC.

Jerry L. Michal
Senior Geotechnical Engineer

Distribution: Mr. Paul Mayer

LIMITED GEOTECHNICAL INVESTIGATION
SAN MARCOS RESIDENCES PROJECT
2972 SOUTH SANTA FE AVENUE
SAN MARCOS, CALIFORNIA
PREPARED FOR
MR. PAUL MAYER

INTRODUCTION

On May 6, 2020, a limited geotechnical investigation was performed by this firm for the proposed three-story accessory San Marcos Residences project to be located at 2972 South Santa Fe Avenue, San Marcos, California. The purposes of this investigation were to explore and evaluate the geotechnical engineering conditions at the subject site and to provide appropriate geotechnical engineering recommendations for design of foundation support and below grade walls, as well as recommendations for construction of the proposed development.

The location of the site is depicted on the Index Map (Enclosure A-1). Aerial imagery was used as a base map for our Site Plan (Enclosure A-2).

The results of our investigation, together with our conclusions and recommendations, are presented in this report.

SCOPE OF SERVICES

The scope of services provided during this limited geotechnical investigation included the following:

- A field reconnaissance of the site and surrounding area
- Logging and sampling of exploratory borings for testing and evaluation
- Laboratory testing on selected samples
- Evaluation of the geotechnical engineering/geologic data to develop site-specific recommendations for site grading and foundation design.
- Preparation of this limited report summarizing our findings, professional opinions and recommendations for the geotechnical aspects of project design and construction

PROJECT CONSIDERATIONS

Information furnished to this office indicates that the site is planned to be developed to include a 3-story multi-family residential structure with one to two (2) underground levels of parking. Light to moderate foundation loads are expected. Additional details were not provided during preparation of this report.

The final project grading and foundation plans should be reviewed by the geotechnical engineer.

SITE DESCRIPTION

The subject site is located at 2972 South Santa Fe Avenue in the City of San Marcos, California. The property, San Diego County Assessor's Parcel Number 217611900, is currently undeveloped and is about 0.8 acres in size. The highest elevation on the subject site is about 530 MSL in the northeast corner and the lowest is about 495 MSL in the southwest corner. The site is situated in northwest quarter of projected Section 20, Range 3 West, Township 11 South, San Bernardino Principal Meridian, at latitude 33.157418 ° north, longitude 117.200068 ° west.

FIELD INVESTIGATION

The soil conditions underlying the subject site were explored by means two (2) Hollow Stem Auger (HSA) exploratory borings (B-1 and B-2) drilled to a maximum depth of about 51 feet below ground surface (bgs) using a limited access rig, and three (3) hand augering borings (B-3 through B-5) drilled to depths of about 5 to 15 feet bgs. Samples were obtained with Modified California (MC) Split Spoon and Standard Penetration Tests (SPT) at intervals between 2.5 and 5 feet. The approximate locations of our exploratory borings are indicated on Enclosure A-2.

Continuous logs of the subsurface conditions, as encountered within the exploratory borings, were recorded at the time of drilling by a representative of this firm. Both relatively undisturbed and bulk

samples of typical soil types obtained were returned to the laboratory in sealed containers for testing and evaluation.

The exploratory boring logs, together with the in-place density data, are presented in Appendix B.

The exploratory borings were backfilled with excavated soils using reasonable effort to restore the areas to their initial condition prior to leaving the site, but they were not compacted to a relative compaction of 90 percent or greater. In an area as small and deep as a boring, consolidation and subsidence of soil backfill may occur over time causing a depression. The client is advised to observe exploratory boring areas occasionally and, when needed, backfill noted depressions.

LABORATORY INVESTIGATION

Included in the laboratory testing program were field dry density and moisture content tests on relatively undisturbed samples. The results are included on the exploratory boring logs. Sieve analysis and Atterberg limits were performed for classification purposes. Direct shear testing was performed for material strength evaluation and consolidation testing was performed to estimate amount of settlement of the cohesive materials. Preliminary corrosivity testing was performed by Project X Corrosion Engineering of Murrieta.

Laboratory test results appear in Appendix C. Soil classifications provided in our geotechnical investigation are in general accordance with the Unified Soil Classification System (USCS).

FAULTING AND GROUND RUPTURE

The site does not lie within an Alquist-Priolo (AP) Special Studies zone.

As with most of southern California, the subject site is situated in an area of active and potentially active faults. Active faults present several potential risks to structures, the most common of which

are strong ground shaking, dynamic densification, liquefaction, mass wasting, and surface rupture at the fault plane. The following four factors are the principal determinants of seismic risk at a given location:

- Distance to seismogenically capable faults.
- The maximum or "characteristic" magnitude earthquake for a capable fault.
- Seismic recurrence interval, in turn related to tectonic slip rates.
- Nature of earth materials underlying the site.

Based upon proximity to regionally significant, active faults, ground shaking is considered to be the primary hazard most likely to affect the site. Characteristics of the major active fault zones selected for inclusion in analysis of strong ground shaking are listed in the following table. Numerous significant fault zones are located at distances exceeding 40 kilometers from the site, as shown in Enclosure A-6, but greater distances, lower slip rates, and/or lesser maximum magnitudes indicate much lower risk to the site from the latter fault zones than those listed below.

Fault Zone[1,3,5]	Distance from Site (km)	Fault Length (km)[1,2]	Slip Rate (mm/yr)[1]	Reference Earthquake $M_{(Max)}$4	Fault Type[1]
Elsinore [Julian] (rl-ss)	26.9	75	3±1	7.3	A
Elsinore [Temecula] (rl-ss)	26.9	52	2.5±2	7.5	A
Rose Canyon [Del Mar] (rl-ss)	19.5	70	1.5±0.5	7.2	B
Rose Canyon (Oceanside) (rl-ss)	18.4	70	1.5±0.5	7.2	B
Newport Inglewood [Offshore] (rl-ss)	21.5	150	1.5±0.5	7.0	B
San Andreas [Coachella Segment] (rl-ss)	139	96	25.0±5.0	7.2	A

1. **California Department of Conservation, Geological Survey**, 2007 (Appendix A), *California Fault Parameters for the National Seismic Hazard Maps and Working Group on California Earthquake Probabilities*, CGS Special Report 203A, USGS Open File Report 2007-1437A.
2. **U.S. Department of the Interior, Geological Survey, 2008**, website: *2008 National Seismic Hazards Maps – Source Parameters*,.
3. **Southern California Earthquake Data Center**, website: *Significant Earthquakes and Faults*, http://scedc.caltech.edu/significant/fault-index.html
4. **U.S. Department of the Interior, Geological Survey, BSSC2014 (Scenario Catalog)**, website: https://earthquake.usgs.gov/scenarios/catalog/bssc2014/
5. Fault Geometry: (ss) strike slip; (r) reverse; (n) normal; (rl) right lateral; (ll) left lateral; (O) oblique; (45 N) direction.

REGIONAL GEOLOGIC SETTING

The subject site is situated in the Peninsular Ranges Geomorphic Province, one of eleven such provinces recognized in the California Geological Survey Note 36. The geomorphic provinces are topographic-geologic groupings of convenience based primarily on landforms, characteristic lithologies, and late-Cenozoic structural and geomorphic history. The northern portion of the Peninsular Ranges province encompasses southwestern California west of the Imperial-Coachella

Valley trough including the California coast and Santa Catalina and San Clemente Islands, and south of the major portion of the Transverse Ranges geomorphic province, which includes the Santa Monica, San Gabriel, and San Bernardino mountains. Most of the Peninsular Ranges province lies outside California, continuing south to include the Baja California Peninsula.

The province is characterized by youthful, steeply sloped, northwest-trending elongated ranges and intervening valleys whose general northwesterly trend is terminated abruptly on the north by the east-west grain of the Transverse Ranges. Average elevations across the province rise slowly to the east, culminating in generally abrupt escarpments and steep slopes near the eastern margin. Near the northern edge of the province lie several anomalously flat and low basins that stretch from the San Bernardino region to western Los Angeles. These basins generally result from fault junctures and tectonic interaction with the adjacent Transverse Ranges.

Structurally, the bulk of the Peninsular Ranges are composed of a number of relatively stable crustal blocks bounded by active strike-slip faults of the San Andreas transform system. Although some folding and minor faulting has occurred within the blocks, intense structural deformation and earthquake activity are generally restricted to block margins.

The province contains a diverse array of metamorphic, sedimentary, volcanic, and intrusive igneous rocks. Near the coastline, younger rocks include thick sequences of marine and non-marine clastic and pelitic sedimentary rocks of Mesozoic and Tertiary age, ranging from claystones to conglomerate. Inland, the province is dominated by large masses of chronologically correlative, granitic rock of varying composition belonging to the Southern California batholith. In general, metamorphic rocks of this province, which are found in close association with batholithic basement rocks, represent highly-altered host rocks for magmatic emplacement of the batholith during the Mesozoic Era.

The subject site is located in the San Diego coastal plain. The area of the subject site is underlain by Tertiary marine and non-marine, clastic sedimentary bedrock, which overlies crystalline basement

rock of the Southern California Batholith. A regional geology map (Ken and Tan, 2007) indicates the project site is located on the Eocene Santiago Formation, as shown in the Enclosure A-3.

SUBSURFACE SOIL CONDITIONS

Native soils consisting mainly of sandy clay and lean clay (CL) were observed during the field exploration at the proposed project site to the maximum explored depth of 50 ½ feet. Generally, clayey soils were grayish to dark brown in color, moist, and stiff to very stiff in consistency. Our exploratory logs are provided in Appendix B.

2019 CALIFORNIA BUILDING CODE - SEISMIC PARAMETERS

Based on the geologic setting and anticipated earthwork for construction of the proposed project, the soils underlying the site are classified as Site Class "D, stiff soil profile", according to the 2019 California Building Code (CBC). The seismic parameters according to the 2019 CBC are summarized in the following table.

2019 CBC - Seismic Parameters	
Mapped Spectral Acceleration Parameters	$S_s = 0.901$ and $S_1 = 0..331$
Site Coefficients	$F_a = 1.14$ and $F_v = 1.969$
Adjusted Maximum Considered Earthquake Spectral Response Parameters	$S_{MS} = 1.027$ and $S_{M1} = 0.652$
Design Spectral Acceleration Parameters	$S_{DS} = 0.685$ and $S_{D1} = 0.434$
Peak Ground Acceleration	$PGA_M = 0.471$
Seismic Design Category	D

GROUNDWATER

No groundwater was encountered within any hand auger boring to the maximum explored depth of 50 ½ feet. There are no water wells in the close vicinity of the project site from the State of California Department of Water Resources, Water Data Library. The nearest water well for which information was available through this water library, was well No. Station 331103N1171048W001, which is located about 8 miles southeast of the site. Groundwater information from this well indicated groundwater elevation was about 628 MSL in 1987, just 9 feet below ground surface at the subject site.

An inquiry to Geotracker located a report for a property within 200 feet east to the project site, as shown in Enclosure A-9. A total of 23 relevant water wells were installed between 2005 and 2016 and groundwater was encountered ad depths between 10 and 36 feet below ground surface at the site.

Based on these data, a design groundwater level is adopted at 10 feet below ground surface.

LIQUEFACTION POTENTIAL

The subject site does not lie within a zone of potential, seismically induced seismically-induced liquefaction (Enclosure A-5). Based on the type of soil, mapped shallow depth to bedrock, and groundwater depth greater than 50 feet, liquefaction is not considered to be a geologic constraint.

LANDSLIDES AND SLOPE STABILITY

There was no visual evidence of landslides on or near the subject property noted during the field investigation. There are no mapped landslides on or near the subject site as shown in Enclosure A-4. Landslides are not considered to be a geologic constraint at the subject site.

FLOODING POTENTIAL

According to FEMA, the subject site is within flood hazard zone "X" (2019), which is defined here as an area outside of the 0.2% annual flood risk zone, as presented in Enclosure A-7. Flooding is not considered to be a geologic constraint at the subject site.

Seiching:

Seiching is the oscillation of an enclosed body of water, usually due to strong groundshaking following a seismic event. Seiching can affect lakes, water towers, swimming pools. There were no enclosed bodies of water observed in close enough proximity to affect the project site. Seiching should not be considered to be a geologic constraint at this site.

Tsunamis:

Tsunamis are not considered to be a geologic hazard at the subject site due to its elevation and inland location.

EXPANSION POTENTIAL

A sample of the near surface soils was tested and indicated an Expansion Index (EI) of 155 which indicates a very high expansion potential. Specialized construction procedures to specifically resist expansive soil forces are anticipated for this site. Requirements for reinforcing steel to satisfy structural criteria are not affected by this recommendation. Additional evaluation of soils for expansion potential should be conducted by the geotechnical engineer during the grading operation.

CHEMICAL/CORROSIVITY TESTING

A selected sample of material was delivered to Project X Corosion Engineers for preliminary corrosivity analysis. Laboratory testing consisted of pH, resistivity, chlorides and sulfates. The results of the laboratory tests appear in Appendix C.

The result from the resistivity test indicates a "very corrosive" condition to ferrous metals. Specific corrosion control measures, such as coating of the pipe with non-corrosive material or alternative non-metallic pipe material, are considered necessary.

Results of the soluble sulfate testing indicate a Class S2 (or "severe") anticipated exposure to sulfate attack. Based on the criteria from Table 19.3.2.1 of the American Concrete Institute Manual of Concrete Practice (2014), special measures, such as specific cement types or water-cement ratios, are considered necessary for this Class S2 exposure to sulfate attack.

The soluble chloride content of the soils tested indicates is considered "corrosive" to reinforcing steel. The results should be considered in combination with the soluble chloride content of the hardened concrete in determining the effect of chloride on the corrosion of reinforcing steel.

Ghostrider, Inc. does not practice corrosion engineering. If further information concerning the corrosion characteristics, or interpretation of the results submitted herein, is required, then a competent corrosion engineer could be consulted.

CONCLUSIONS

On the basis of our field and laboratory investigations, it is the opinion of this firm that the proposed development is feasible from geotechnical engineering and engineering geologic standpoints, provided the recommendations contained in this report are implemented during grading and construction.

Moderate to severe seismic shaking can be expected at the site. There are no known active faults on or trending toward the subject site; the site does not lie within an Alquist-Priolo Special Studies zone.

Groundwater was not encountered within any of our exploratory borings at the site. Groundwater data from nearby wells indicate levels can be up to 10 feet below ground surface and this value is adopted for design. Liquefaction is not considered to be a potential hazard to the site.

Landslides are not considered to be a geologic constraint on the subject site. Temporary excavations are anticipated to conform to local and State codes with regard to the subsurface materials present at the site.

Materials encountered during this investigation were found to be highly expansive. Specialized construction procedures to specifically resist expansive soil forces are required to be implemented at the site with additional testing during grading.

Based upon our field investigation and test data, it is our opinion that for the proposed structure, deep foundations are an adequate option to support the proposed 3-story structure with one to two (2) underground levels due to the existence of highly compressive soils. The proposed structure can be also supported on a mat foundation following proper site development grading/excavation and if designed to accommodate total and differential settlement, as discussed in this report.

The final project grading and foundation plans should be reviewed by the geotechnical engineer.

FOUNDATION RECOMMENDATIONS

Based on a review of the conceptual plans, the proposed development is feasible from a geotechnical standpoint, provided that the recommendations presented in this report are implemented.

Deep foundations are an adequate option to support the proposed 3-story structure with one to two (2) underground levels. Foundation loads are not available at the time of preparing this report. Considering the subsurface conditions and anticipated large column loads, it is recommended the use of deep foundations consisting of grouped 24-inch diameter auger displacement piles (ACD). Driven piles are not recommended due to noise and vibration which may disturb surrounding neighbors during pile driving. We recommend 24-inch-diameter ACD piles to be tipped in the very dense layer found at a depth of approximately 50 feet below existing ground surface or deeper. Recommendations for allowable pile loads, settlements, and pile lengths are provided in the following subsections.

AXIAL CAPACITY

Pile axial resistance has been determined for 24-inch-diemeter ACD piles. Two different pile cut-off elevations have been considered to represent the portion of the structures with one basement level and (approximately 10 feet below existing ground surface) and the portion of the structure with two basement levels (approximately 20 feet below existing ground surface). The ultimate axial capacities with no factor of safety applied are presented in Enclosure A-8a. The allowable downward axial capacities have considered a factor of safety of 2 and are presented in Enclosure A-8b. Pile capacities shown in Enclosures A-8a and A-8b are for dead-plus-live load capacities; a one-third increase may be used for wind or seismic loads. The allowable upward axial capacities have considered a factor of safety of 3 and are presented in Enclosure A-8c. Uplift due to wind or seismic loading may use a reduced factor of safety of 2. The capacities presented in this report are based on the strength of the soils; the compressive and tensile strengths of the pile sections should be checked to verify the structural capacity of the piles.

LATERAL CAPACITY

The lateral capacity of the recommended piles was evaluated using the computer program LPILE v2016 (Ensoft, 2016) for head deflections of 0.25, 0.5 and 1 inches and for fixed head and free head conditions. Lateral capacities are summarized in the table below and shall be reviewed by the structural engineer to confirm the structural capacity of the pile.

Lateral Capacity of 24-inch ACD Single Pile				
Pile Head Condition	**Pile Head Deflection (inch)**	**Max. Shear (kips)**	**Max. Moment (kip-ft)**	**Depth to Max. Moment (feet)**
Free	0.25	14	68	8.4
	0.5	20	108	9.6
	1.0	27	172	10.8
Fixed	0.25	29	172	0.0
	0.5	41	271	0.0
	1.0	57	427	0.0

For grouped piles, the lateral pile capacity can be reduced based on a p-multiplier of 0.55, assuming a 3 by 3 pile group arrangement and a pile center-to-center spacing of 3D (where D is the pile diameter). In case piles are spaced at a center to center spacing of 7D or greater, no reduction in lateral pile capacity is needed and a single pile system can be used.

PILE SETTLEMENT

The amount of settlement estimated for the pile foundation is less than ½ inch. Once foundation details are completed, details should be provided to the geotechnical engineer for additional settlement estimates.

MAT FOUNDATIONS

The proposed structure can be supported on a mat foundation following proper site development grading/excavation and designed to accommodate total and differential settlement, as discussed in this report.

Subgrade Reaction

The modulus of subgrade reaction concept is used in the design of the mat foundations and slabs-on-grade. This modulus is not an intrinsic property of the soil as depends on the dimensions and stiffness of the slab and the stress level. The mat slab foundation should be designed for bending moments using a value of 200 pounds per cubic inch (pci) for the normalized modulus of subgrade reaction coefficient K_{v1} (namely, corresponding to a 1-foot square bearing plate). Following Terzaghi (1955), the subgrade reaction coefficient, K_v, can be defined as:

$$K_v = K_{v1} * [(m + 0.5)/1.5m] * [(B+1)/2B]^2$$

where "B" is the width of the foundation measured in feet, and "m" is the ratio of length over width of a rectangular foundation.

The flat concrete slab of the mat system should, at a minimum, have continuous two-way reinforcing at the top and the bottom and be designed by the project structural engineer.

Bearing Capacity and Settlement

An allowable bearing pressure of 1,000 psf may be used for design. The allowable bearing pressure may be increased by one-third for short term wind or seismic loads. The expected total post-construction settlement of the mat slab is expected to be on the order of 2 inches. The differential settlement is expected to be less than one half of the total settlement.

Lateral Resistance

Resistance to lateral loads can be provided by friction developed between the bottom of foundation and the supporting soil, and by the passive soil pressure developed on the face of the footing. For design purposes, an allowable passive resist of 300 pounds per cubic foot (pcf) and a coefficient of friction of 0.40 may be used for lateral sliding resistance of foundation.

CONSTRUCTION RECOMMENDATIONS

GENERAL SITE GRADING:

It is imperative that no clearing and/or grading operations be performed without the presence of a representative of the geotechnical engineer. An on-site, pre-job meeting with the developer, the contractor and the geotechnical engineer should occur prior to all grading-related operations. Operations undertaken at the site without the geotechnical engineer present may result in exclusions of affected areas from the final compaction report for the project.

Grading of the subject site should be performed, at a minimum, in accordance with these recommendations and with applicable portions of the current California Building Code (CBC). The following recommendations are presented for your assistance in establishing proper grading criteria.

INITIAL SITE PREPARATION:

All areas to be graded should be stripped or cleaned of significant vegetation and other deleterious materials. Deleterious materials include slabs, trees, vegetation, trash, and demolition debris. These materials should be removed from the site for disposal. The cleaned soils may be reused as properly compacted fill. Rocks or similar irreducible material with a maximum dimension greater than 8 inches should not be used in compacted fills. If encountered, existing utility lines should be traced, removed and rerouted from areas to be graded.

MINIMUM MANDATORY REMOVAL AND RECOMPACTION OF EXISTING SOILS:

The field exploration indicated the site is underlain by native soils generally consisting stiff to very stiff clays. These soils are considered potentially compressible. The preliminary plans indicated that a portion of the building would have one and two basement levels at about 10 to 20 feet below the exiting grade.

Based on these considerations, we recommend the following removals for the different foundation systems:

- Structures supported on pile foundation do not require removal of soils if prepared following recommendations on this report
- Structures supported on mat foundations or slabs on grade require removal of at least 2 feet of soil below the bottom of the footing. The areas should extend at least 3 feet laterally beyond the footing lines. For general areas (excluding the unit footprint), surface improvements such as sidewalks and exterior flatwork, removal and recompaction should be a minimum of 1 feet below existing grade.

The open excavation bottoms observed by our engineer/ geologist to verify and document in writing that all undocumented fill is removed prior to refilling with properly tested and documented compacted fill. The removed and cleaned soils are not suitable to be reused as compacted fill material due to the cohesive material content. Import fill sources should be observed and tested prior to hauling onto the site to evaluate the suitability for use. Imported fill materials should consist of granular soil with less than 35 percent passing the No. 200 sieve based on ASTM D1140 and an EI less than 20 based on ASTM D489.

Further subexcavation may be necessary depending on the conditions of the underlying soils. The actual depth of removal should be determined at the time of grading by the project geotechnical engineer/geologist. The determination will be based on soil conditions exposed within the excavations. At minimum, any undocumented fill, topsoil or other unsuitable materials should be removed and replaced with properly compacted fill.

In-place density tests may be taken in the removal bottom areas where appropriate to provide data to help support and document the engineer/geologist's decision.

EXCAVATION ADJACENT TO EXISTING STRUCTURES:

Removal and recompaction of the soils adjacent to existing structures may result in unacceptable distress by the removal of bearing and lateral support. The following precautionary measures should be utilized during proposed subexcavation/recompaction operations to reduce the potential for distress to existing adjacent structures.

During compacted fill mat construction for the proposed structure, the excavation and replacement of soils adjacent to any existing structures should be accomplished in the shortest period of time possible. Sufficient forces and equipment should be available to accomplish any removal and replacement of soils adjacent to existing structures within one 8-hour working day. The excavation should not be performed during periods of rain or threat of rain. During the excavation operation, the moisture content of the soils near existing structures should be monitored. If excessive moisture contents or excessively dry soils are encountered, the geotechnical engineer should be notified immediately.

The actual excavation and recompaction of soils near existing structures should be performed in alternating sections. A checkerboard-type (A-B) system should be utilized by initially removing and recompacting every other square and thereupon going back and removing and recompacting the remaining squares. The width of these excavations is usually equal to the blade or bucket size of the available equipment but should not exceed 6 feet.

PREPARATION OF FILL AREAS:

Prior to placing fill, and after the mandatory subexcavation operation, the surfaces of all areas to receive fill should be scarified and moisture treated to a depth of 6 inches or more. The soils should be brought to near optimum moisture content and compacted to a minimum relative compaction of 90 percent in accordance with ASTM D1557.

PREPARATION OF FOOTING AREAS:

All footings should rest upon at least 2 feet of properly compacted fill material. In areas where the

required thickness of compacted fill is not accomplished by the mandatory removal operation, the footing areas should be overexcavated to a depth of 12 inches or more below the lowest proposed footing base grade. The required overexcavation should extend at least 3 feet laterally beyond the footing lines, where reasonably possible. In instances where the 3-foot lateral overexcavation may not be accomplished, this firm should be contacted to evaluate the effect. The bottom of this excavation should then be scarified, and moisture treated to a depth of at least 6 inches, brought to near optimum moisture content and compacted to a minimum of 90 percent relative compaction in accordance with ASTM D1557 prior to refilling the excavation to the required grade as properly compacted fill.

All footing excavations should be observed by a representative of the project geotechnical engineer to verify that they have been excavated into compacted fill prior to placement of forms, reinforcement, or concrete. The excavations should be trimmed neat, level, and square. All loose, sloughed or moisture-softened soils should be removed from the excavations prior to placing of concrete. Excavated soils derived from the footing and/or utility trenches should not be placed in building slab-on-grade areas or exterior concrete flatwork areas unless the soils are brought to near optimum moisture content and compacted to at least 90 percent of the maximum dry density.

COMPACTED FILLS:

The on-site soils are not considered suitable for reuse as compacted fill. Import fill should be inorganic, non-expansive granular soils free from rocks or lumps greater than 6 inches in maximum dimension. The contractor shall notify the geotechnical engineer of import sources sufficiently ahead of their use so that the sources can be observed and approved as to the physical characteristic of the import material. For all import material, the contractor shall also submit current verified reports from a recognized analytical laboratory indicating that the import has a "not applicable" potential for sulfate attack based upon current American Concrete Institute (ACI) criteria and is "mildly corrosive" to ferrous metal and copper. The reports shall be accompanied by a written statement from the contractor that the laboratory test results are representative of all import material that will be brought to the job.

Fill should be spread in near-horizontal layers, approximately 8 inches thick. Thicker lifts may be approved by the geotechnical engineer if testing indicates that the grading procedures are adequate to achieve the required compaction. Each lift should be spread evenly, thoroughly mixed during spreading to attain uniformity of the material and moisture in each layer, brought to near optimum moisture content and compacted to a minimum relative compaction of 90 percent in accordance with ASTM D1557.

TEMPORARY EXCAVATION AND SHORING

Excavations for construction of basement levels are anticipated to be as deep as 10 feet below existing grade to the front of the proposed building and 20 feet to the back of the building. The contractor is responsible for excavation safety, and all excavations should comply with the current California and Federal Occupational Safety and Health Administration (CALOSHA) requirements (29 CFR-Part 1926, Subpart P), as applicable. Temporary slopes, up to 20 feet high, may be cut at a gradient of 3/4H:1V (horizontal:vertical) with the bottom 4 feet is permitted to be cut vertically.

If sloping or benching is not practical due to space constraints, temporary shoring may be used. Vertical temporary excavations deeper than 5 feet should be shored. No surcharge loads should be permitted within a horizontal distance equal to the height of cut or 5 feet, whichever is greater from the top of the excavation, unless the shoring is designed for surcharge loading. All shoring should comply with OSHA regulations and 29 CFR Part 1926 guidelines and be observed and deemed safe by the designated competent person on site. The designated competent person should observe all excavations to determine the safety prior to excavation.

For design of cantilevered temporary shoring, where the surface of the backfill is level, it can be assumed that drained soils will exert a lateral pressure equal to that developed by a fluid with a density of 37 pcf. Surcharge loads from equipment or stockpiled material should be kept behind the top of the temporary excavations a horizontal distance of at least twice the depth of the excavation, or the shoring should be designed for the additional pressure. Foundation and traffic loads from adjacent

areas should also be added to the lateral earth pressures.

For design of temporary rigid shoring such as braced shoring or trench shields in sandy soils, we recommend the use of a rectangular lateral pressure of 24H psf, where H is the height of the shoring in feet. In addition, 46 percent of any surcharge load should be included as a uniform rectangular loading on the shoring. For traffic loads no larger than highway trucks, the surcharge may be taken as a uniform lateral pressure of 100 psf. Other surcharge loads may be evaluated by Ghostrider on a case-by-case basis.

Surface drainage should be controlled and prevented from running down the temporary excavations or down the face of the shoring. Ponding water should not be allowed within the excavation.

To provide adequate support, concrete slabs-on-grade should bear on a minimum of 24 inches of compacted soil. The final pad surfaces should be rolled to provide smooth, dense surfaces. Concrete slabs-on-grade should be a minimum of 4 inches in thickness and should consist of at least No. 3 reinforcing bars spaced at 16 inches on center each way. Additional reinforcement may be required by the structural engineer.

Slabs to receive moisture-sensitive coverings should be provided with a moisture vapor retarder/barrier. We recommend that a vapor retarder/barrier be designed and constructed according to the American Concrete Institute 302.1R, Concrete Floor and Slab Construction, which addresses moisture vapor retarder/barrier construction. At a minimum, the vapor retarder/barrier should comply with ASTM E1745 and have a nominal thickness of at least 10 mils. The vapor retarder/barrier should be properly sealed, per the manufacturer's recommendations, and protected from punctures and other damage. Per the Portland Cement Association (www.cement.org/tech/cct_con_vapor_retarders.asp), for slabs with vapor-sensitive coverings, a layer of dry, granular material (sand) should be placed under the vapor retarder/barrier. For slabs in humidity-controlled areas, a layer of dry, granular material (sand) should be placed above the vapor retarder/barrier.

EXCAVATIONS:

The soils encountered within our exploratory borings are generally classified as a Type "A" soil in accordance with the CAL/OSHA excavation standards. Unless specifically evaluated by our engineering geologist, all the trench excavations should be performed following the recommendation of CAL/OSHA (State of California, 2013) for Type "A" soil. Based upon a soil classification of Type "A", the temporary excavations should not be inclined steeper than ¾ horizontal to 1 vertical for maximum trench depth of less than 20 feet. For trench excavations deeper than 20 feet or for conditions that differ from those described for Type "A" in the CAL/OSHA excavation standards, this firm should be contacted.

BASEMENT WALLS:

Basement walls below grade must be designed to resist at-rest earth pressures. Where the grade is level behind the walls, this pressure corresponds to a triangular distribution of lateral earth pressure equivalent to that developed by a fluid with a density of 46 pcf. This earth pressure assumes that all walls are constructed with a properly designed drainage system to prevent buildup of hydrostatic pressures behind the wall. Any surcharge loadings such as heavy crane loads, stockpiled materials or traffic shall be added to this pressure.

Basement walls should also be designed for seismic earth pressure. Basement walls should be designed to resist, an active pressure combined with a seismic increment of lateral active earth pressure. To compute this, a horizontal acceleration coefficient k_h of 0.16g based on one-half of two-third of PGA_M is used. The combination of active static and seismic lateral earth pressure is equivalent to a fluid with a density of 37 pcf. Therefore, a seismic increment of 12 pcf may be used for design of seismic earth pressure.

Lateral earth pressures recommended in this report assume that adequate drainage is provided behind the walls to prevent the buildup of hydrostatic pressures. Basement wall should have backdrains to adequately prevent the buildup of hydrostatic pressure behind the walls.

POTENTIAL EROSION AND DRAINAGE:

The potential for erosion should be mitigated by proper drainage design. The site should be graded so that surface water flows away from structures at a minimum gradient of 5 percent for a minimum distance of 10 feet from structures. Impervious surfaces within 10 feet of structures should be sloped a minimum of 2 percent away from structures. Water should not be allowed to flow over graded areas or natural areas so as to cause erosion. Graded areas should be planted or otherwise protected from erosion by wind or water.

Water should not be permitted to collect or pond in yard areas. This water will either seep into the ground (loosening the soils) or will overflow onto the slope. Once erosion is started, it is difficult to control, and severe damage can occur quickly.

Homes should be provided with roof drains, gutters, and downspouts connected to subsurface pipes. Roof water should not be allowed to discharge onto the ground surface without collecting into surface drains and pipes. Water should not be allowed to collect against foundations or retaining walls. These walls are typically built to withstand the effects of normal soil moisture and may require subsurface drains to collect and transfer excessive water away from the structures.

All drainage devices should be checked at least twice per year to ensure that they are not blocked. All blockages should be cleared.

Drains at the top of slopes should not allow water to overflow onto the slope.

Terrace drains and brow ditches on slopes or at the tops of slopes are designed to carry runoff water to an appropriate discharge point. These drains should be checked at least twice per year and cleaned of any accumulation of dirt and other debris. Water that backs up in surface drains will overflow and seep into the slope, creating instability.

Loose soil or debris should not be left on slopes. Loose soils soak up water more readily than compacted fill and will often slide downslope. This material may clog terrace drains and may cause additional slope damage.

Slopes should not be over-irrigated. Naturally, ground cover will require some moisture during the hot summer months, but during the wet season, irrigation can cause heavy ground cover to move, which not only destroys the cover, but also may begin slope surface erosion. Heavy ground cover can cause surface sloughing when saturated due to the increased weight and weakening of the near surface soil.

Irrigation systems should not be left running on or near a slope, particularly during the rainy season.

Swales that have been graded around the home or on the lot should not be blocked. These swales are typically constructed to provide drainage toward the driveways, street or other positive outlet.

SLOPE SETBACK:

As per section 1808.7.2 of the 2019 CBC, which references Figure 1808.7.1 of the 2019 CBC, the distance between the face of the footing from the face of descending slopes should be at least the smaller of H/3 and 40 feet, where H is the height of the slope. The distance between the face of the structure and the toe of ascending slopes should be the smaller of 15 feet and H/2. Footings should be deepened as necessary to meet this requirement.

SLOPE CONSTRUCTION:

Slopes for the project should be inclined at 2H:1V or shallower. Fill slopes should be overfilled during construction and then cut back to expose fully compacted soil. A suitable alternative would be to compact the slopes during construction and then roll the final slopes to provide dense, erosion-resistant surfaces.

Where fills are to be placed against existing slopes steeper than 5(h):1(v), and the depth of fill exceeds 5 feet, the existing slopes should be benched into competent bedrock or native materials to provide a series of level benches to seat the fill and to remove potential undocumented fill. The benches should be a minimum of 4 feet in width, constructed at approximately 4-foot vertical intervals. In addition, a shear key should be constructed across the toe of slopes. The shear key should be a minimum of 10 feet wide and should penetrate a minimum of 2 feet beneath the toe of the slope into competent bedrock or native materials.

SLOPE PROTECTION:

Inasmuch as the on-site materials are susceptible to erosion by wind and running water, it is our recommendation that the slopes at the project be planted as soon as possible after completion, where possible. The use of succulent ground covers, such as iceplant or sedum, is not recommended. If watering is necessary to sustain plant growth on slopes, then the watering operation should be monitored to assure proper operation of the water system and to prevent over watering.

Measures should be provided to prevent surface water from flowing over slope faces.

Rodent infestation can also be a serious issue with respect to slope stability. Rodent tunneling and burrowing alters the strength of the soil and can allow water to infiltrate the soil, resulting in slope failure. Rodent burrows can also provide direct access for surface water to the slope face, causing surficial slope "blowouts". Although a maintenance issue, we recommend that measures be taken to prevent rodent infestation in slopes.

FOUNDATION PLAN REVIEW

It is recommended that we review the foundation plans for the proposed structure as they become available. The purpose of this review is to determine if these plans have been prepared in accordance with the recommendations contained in this report. This review will also provide us an opportunity to submit additional recommendations as conditions warrant.

GRADING PLAN REVIEW

The project civil engineer should review this report, incorporate critical information on to the grading plan and reference this geotechnical study, by company name, project number and report date, on the grading plan. Final grading plans should be reviewed by us when they become available to address the suitability of our grading recommendations with respect to the proposed development.

CONSTRUCTION OBSERVATION:

All grading operations, including site clearing and stripping, should be observed by a representative of the geotechnical engineer. The geotechnical engineer's field representative will be present to provide observation and field testing and will not supervise or direct any of the actual work of the contractor, his employees or agents. Neither the presence of the geotechnical engineer's field representative nor the observations and testing by the geotechnical engineer shall excuse the contractor in any way for defects discovered in his work. It is understood that the geotechnical engineer will not be responsible for job or site safety on this project, which will be the sole responsibility of the contractor.

LIMITATIONS

Ghostrider, Inc. has striven to perform our services within the limits prescribed by our client, and in a manner consistent with the usual thoroughness and competence of reputable geotechnical engineers and engineering geologists practicing under similar circumstances. No other representation, express or implied, and no warranty or guarantee is included or intended by virtue of the services performed or reports, opinion, documents, or otherwise supplied.

This report reflects the testing conducted on the site as the site existed during the investigation, which is the subject of this report. However, changes in the conditions of a property can occur with the passage of time, due to natural processes or the works of man on this or adjacent properties. Changes in applicable or appropriate standards may also occur whether as a result of legislation, application or the broadening of knowledge. Therefore, this report is indicative of only those conditions tested at

the time of the subject investigation, and the findings of this report may be invalidated fully or partially by changes outside of the control of Ghostrider, Inc. This report is therefore subject to review and should not be relied upon after a period of one year.

The conclusions and recommendations in this report are based upon observations performed and data collected at separate locations, and interpolation between these locations, carried out for the project and the scope of services described. It is assumed and expected that the conditions between locations observed and/or sampled are similar to those encountered at the individual locations where observation and sampling was performed. However, conditions between these locations may vary significantly. Should conditions that appear different than those described herein be encountered in the field by the client or any firm performing services for the client or the client's assign, this firm should be contacted immediately in order that we might evaluate their effect.

If this report or portions thereof are provided to contractors or included in specifications, it should be understood by all parties that they are provided for information only and should be used as such.

The report and its contents resulting from this investigation are not intended or represented to be suitable for reuse on extensions or modifications of the project, or for use on any other project.

CLOSURE

We appreciate this opportunity to be of service and trust this report provides the information desired at this time. Should questions arise, please do not hesitate to contact this office.

Respectfully submitted,

GHOSTRIDER, INC.

Jerry L. Michal, GE 2515
Geotechnical Engineer

REFERENCES

American Concrete Institute, 2014, Building Code Requirements for Structural Concrete (ACI 318-14), Commentary on Building Code Requirements for Structural Concrete (ACI 318R-14), American Concrete Institute

California Building Code (CBC), California Code of Regulations, Title 24, Part 2, Volume 2 of 2, California Building Standards Commission, Sacramento, California, 2019.

California Department of Conservation, Geological Survey, 2008, Kennedy, M.P., and Tan, S.S., Geologic Map of the Oceanside 30' x 60' Quadrangle, California, Regional Geologic Map Series, Scale: 1:100,000.

California Department of Water Resources, Interactive Web Site, http://www.water.ca.gov/waterdatalibrary/groundwater/

California Department of Water Resources, Control Board, Geotracker Website, https://geotracker.waterboards.ca.gov

Coduto, Donald P., 2001, Foundation Design, Principles and Practices 2nd Edition, Prentice-Hall.

Coduto, Donald P., et.al., 2011, Geotechnical Engineering Principles and Practices, 2nd edition, Pearson.

Das, Braja, M., 2007, Principles of Foundation Engineering, 6th edition, Thomson.

Day, R. W., 2012, Geotechnical Engineer's Portable Handbook, Second Edition, McGraw-Hill, New York

Ensoft, 2019, LPile Software

Harden, D.R., 1997, California Geology: Prentice Hall.

SEAOC/OSHPD Seismic Design Maps, https://seismicmaps.org/

Terzaghi, K., "Evaluation of Coefficients of Subgrade Reaction", Journal of Geotechnique, Vol. 5, 1955.

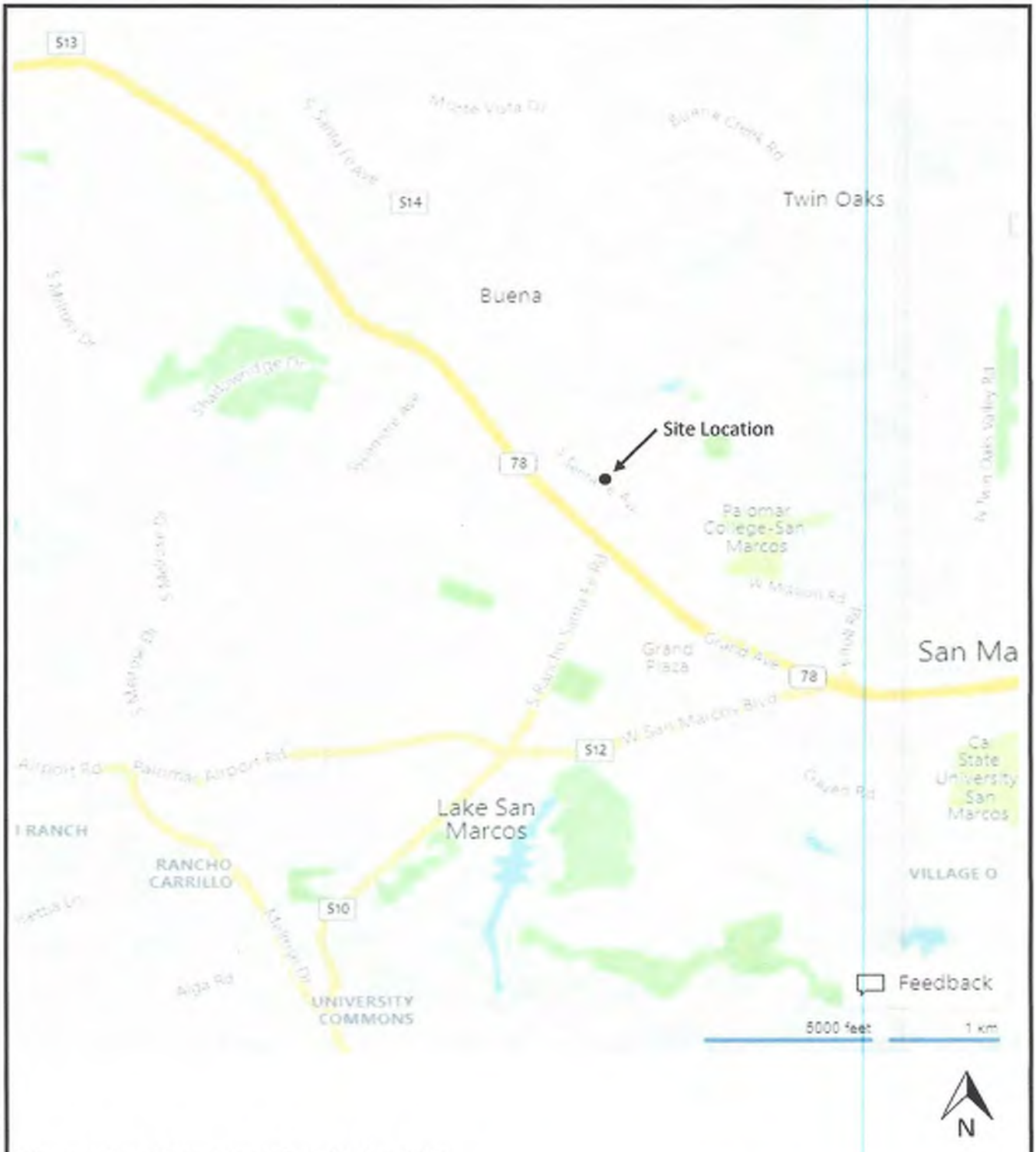
U.S. Department of Homeland Security, Federal Emergency Management Administration, 2012, Flood Insurance Rate Map 06073C0787H, Scale 1:6,000.

U.S. Department of the Interior, Geological Survey, 2019, Landslide Inventory Hazard Program, ESRI. https://www.usgs.gov/news/landslide-risks-highlighted-new-online-tool

This Page Intentionally Left Blank

Appendix A

Maps and Pile Calculations



Reference: Bing Maps, Microsoft 2020, Here 2020

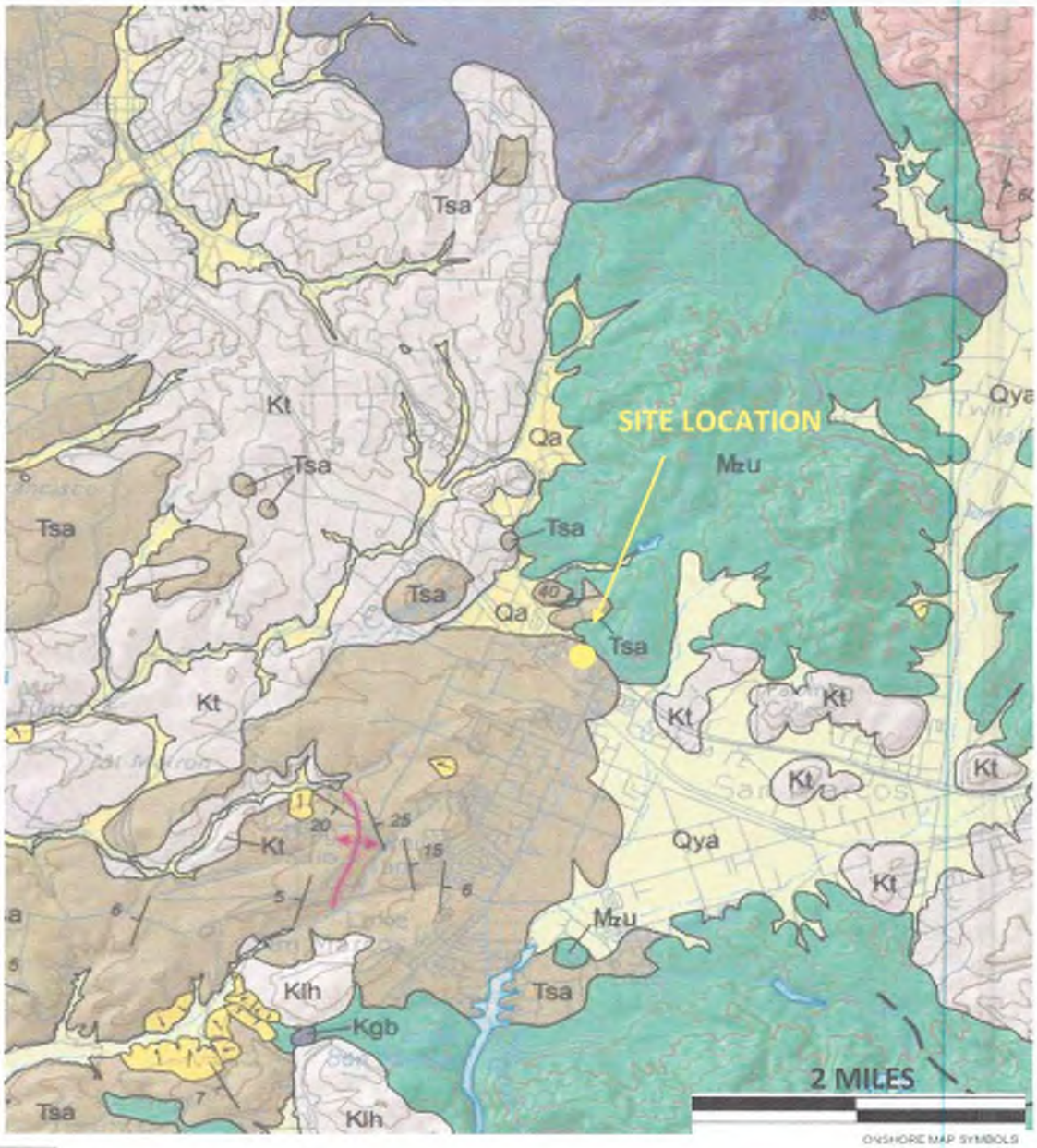
Date:	Index Map	GHOSTRIDER	Figure
5/29/2020	South Santa Fe Ave.		A-1
Drawn By:	San Marcos, CA 92069		
L.B.			

Appx. Boring Location

N

Reference: Bing Maps, Microsoft 2020, Here 2020

Date:	Boring Locations	GHOSTRIDER	Figure
5/29/2020	South Santa Fe Ave.		A-2
Drawn By:	San Marcos, CA 92069		
L.B.			



Kt — Tonalite, undivided (mid-Cretaceous)

Mzu — Metasedimentary and metavolcanic rocks, undivided (Mesozoic)

Qya — Young alluvial flood-plain deposits (Holocene and late Pleistocene)

Tsa — Santiago Formation (middle Eocene)

Qa — Alluvial flood-plain deposits (late Holocene)

ONSHORE MAP SYMBOLS

Reference: Oceanside 30'x60' Quadrangle, Kennedy and Tan, 2007

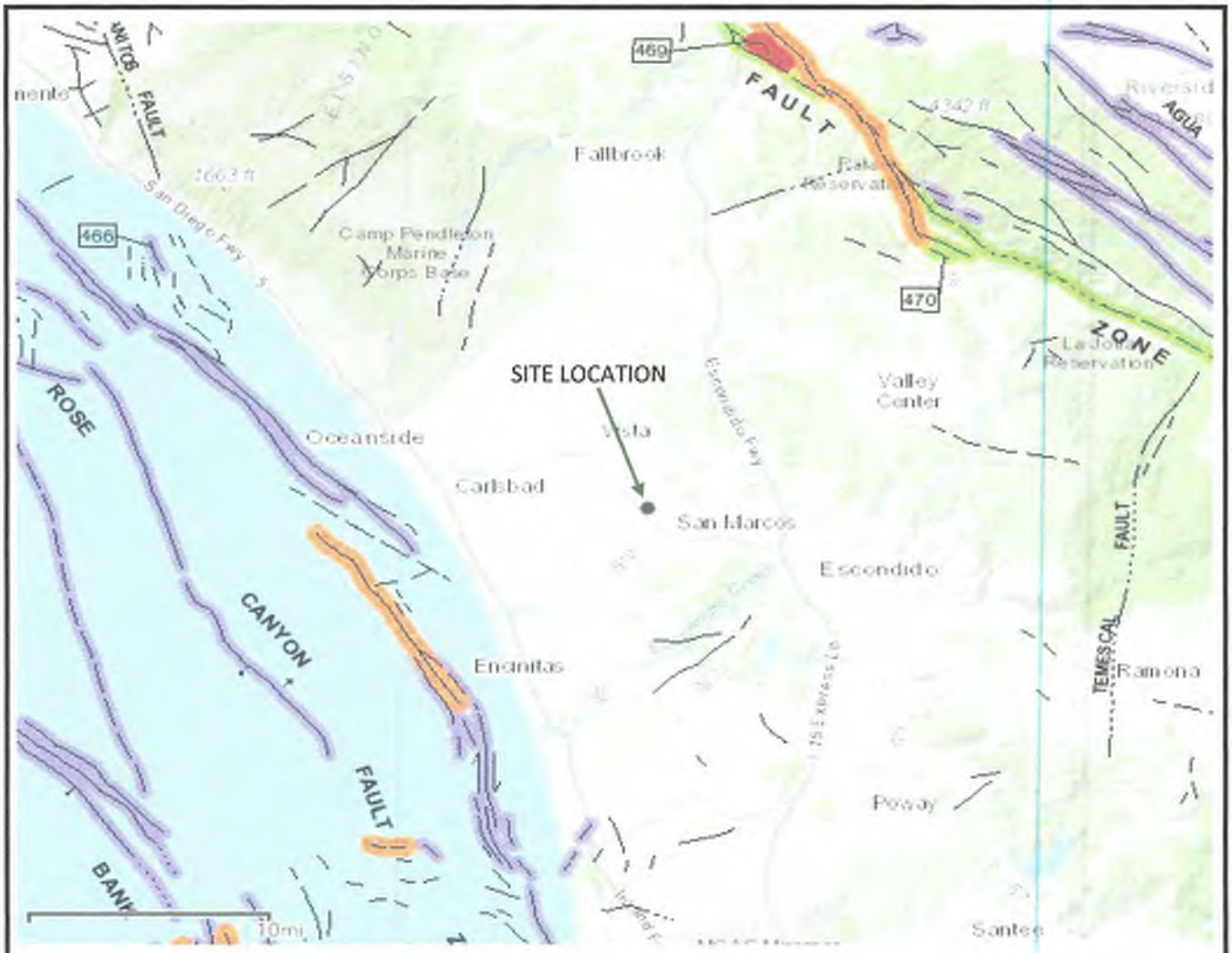
Date:	Geologic Map	GHOSTRIDER	Figure
5/29/2020	South Santa Fe Ave.		A-3
Drawn By:	San Marcos, CA 92069		
L.B.			

Reference: USGS U.S. Landslide Inventory Hazard Program, ESRI, HERE

Date:	Landslide Hazards	GHOSTRIDER	Figure
5/29/2020	South Santa Fe Ave.		A-4
Drawn By:	San Marcos, CA 92069		
L.B.			

Reference: Google Earth, Google 2019, SD County, SANDAG, LUEG-GIS, National Earthquake Hazards Reduction Program

Date:	Liquefaction Hazards	GHOSTRIDER	Figure
5/29/2020	South Santa Fe Ave.		A-5
Drawn By:	San Marcos, CA 92069		
L.B.			

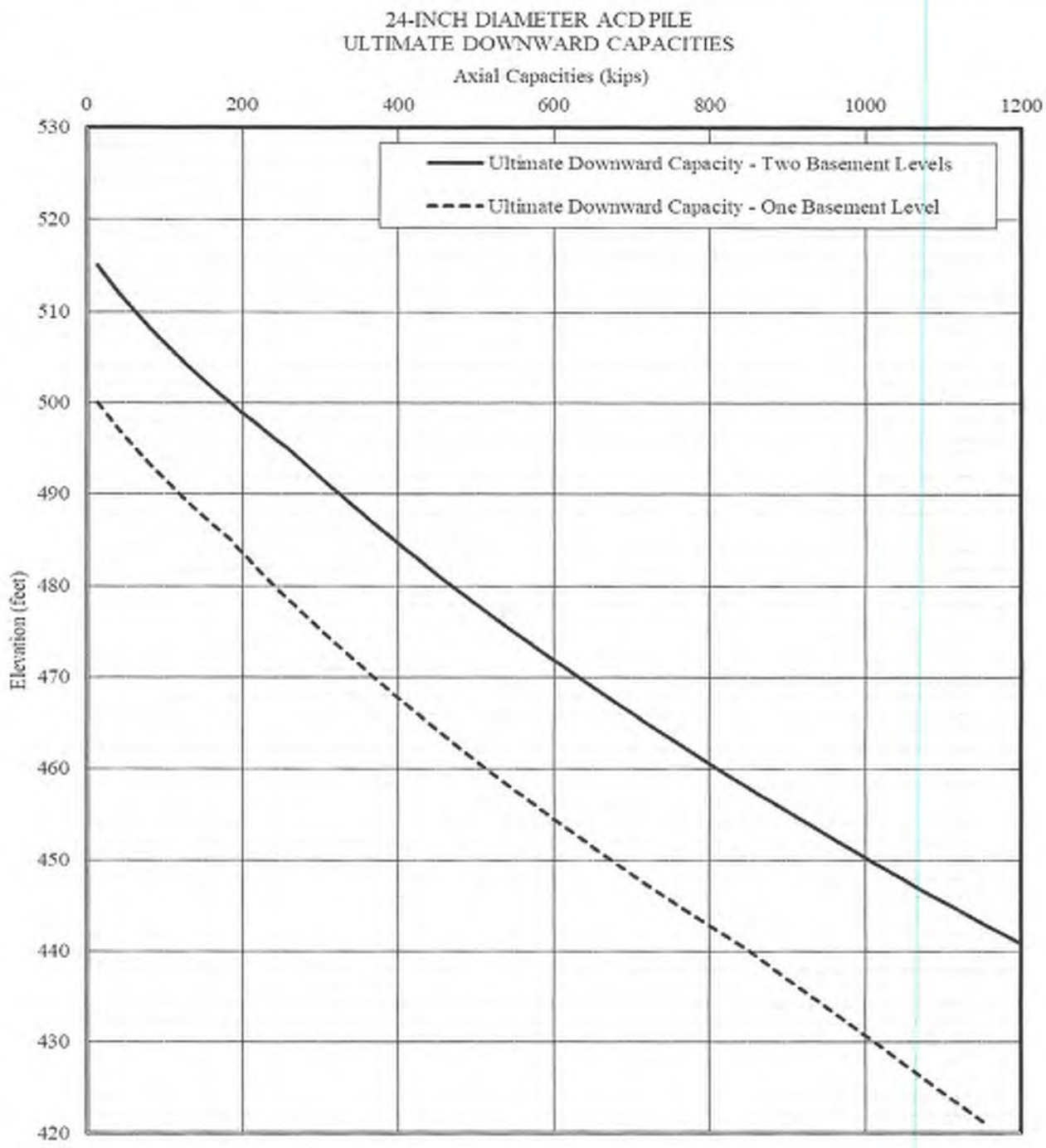


Reference: Esri, HERE, USGS, NGA, USDA, California Geologic Survey, Fault Activity Map

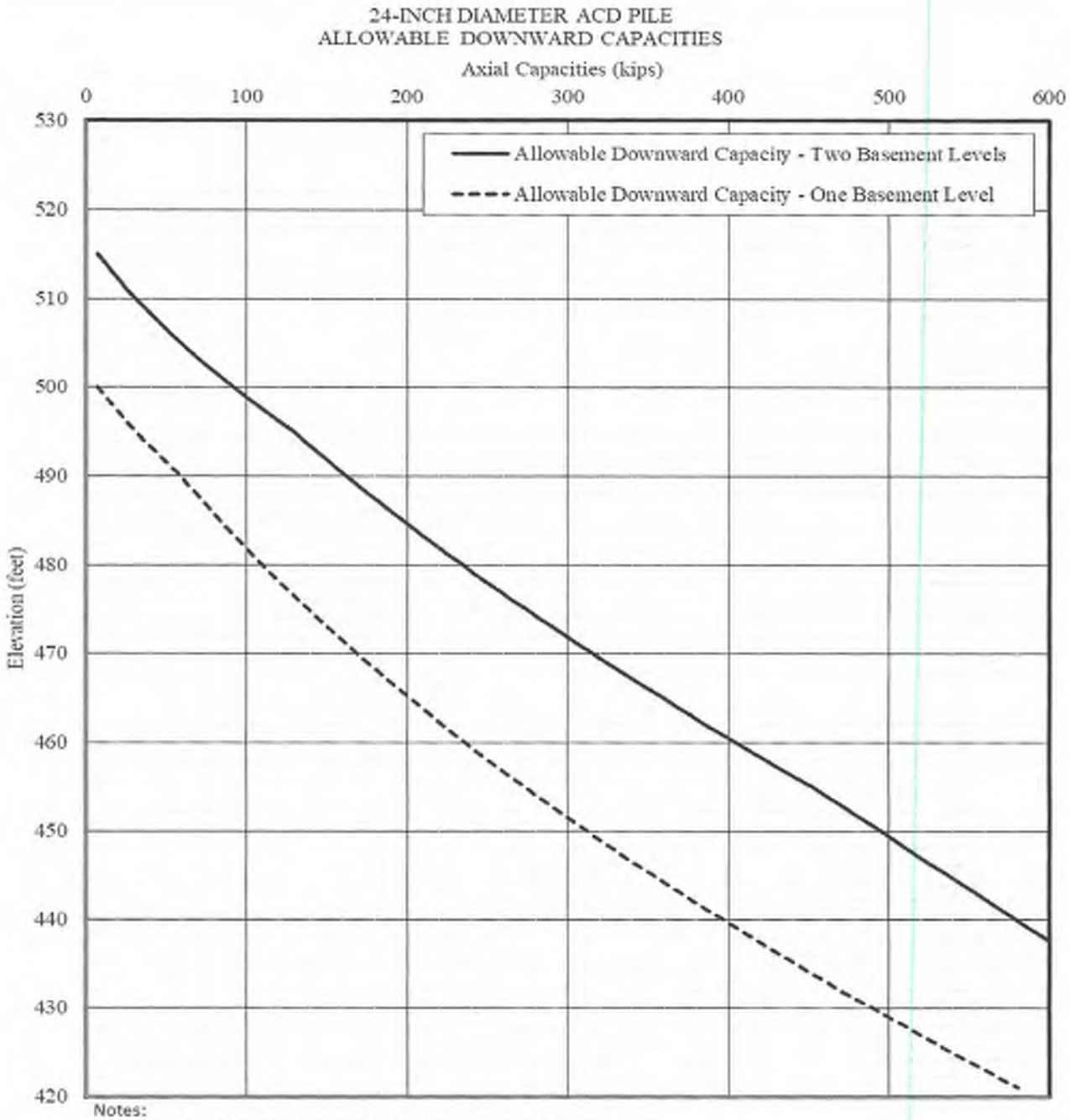
Date:	Fault Zones	GHOSTRIDER	Figure
6/25/2020	South Santa Fe Ave.		A-6
Drawn By:	San Marcos, CA 92069		
L.B.			

Reference: FEMA Flood Map Service Center

Date:	FEMA Flood Zone	GHOSTRIDER	Figure
6/28/2020	South Santa Fe Ave.		A-7
Drawn By:	San Marcos, CA 92069		
L.B.			

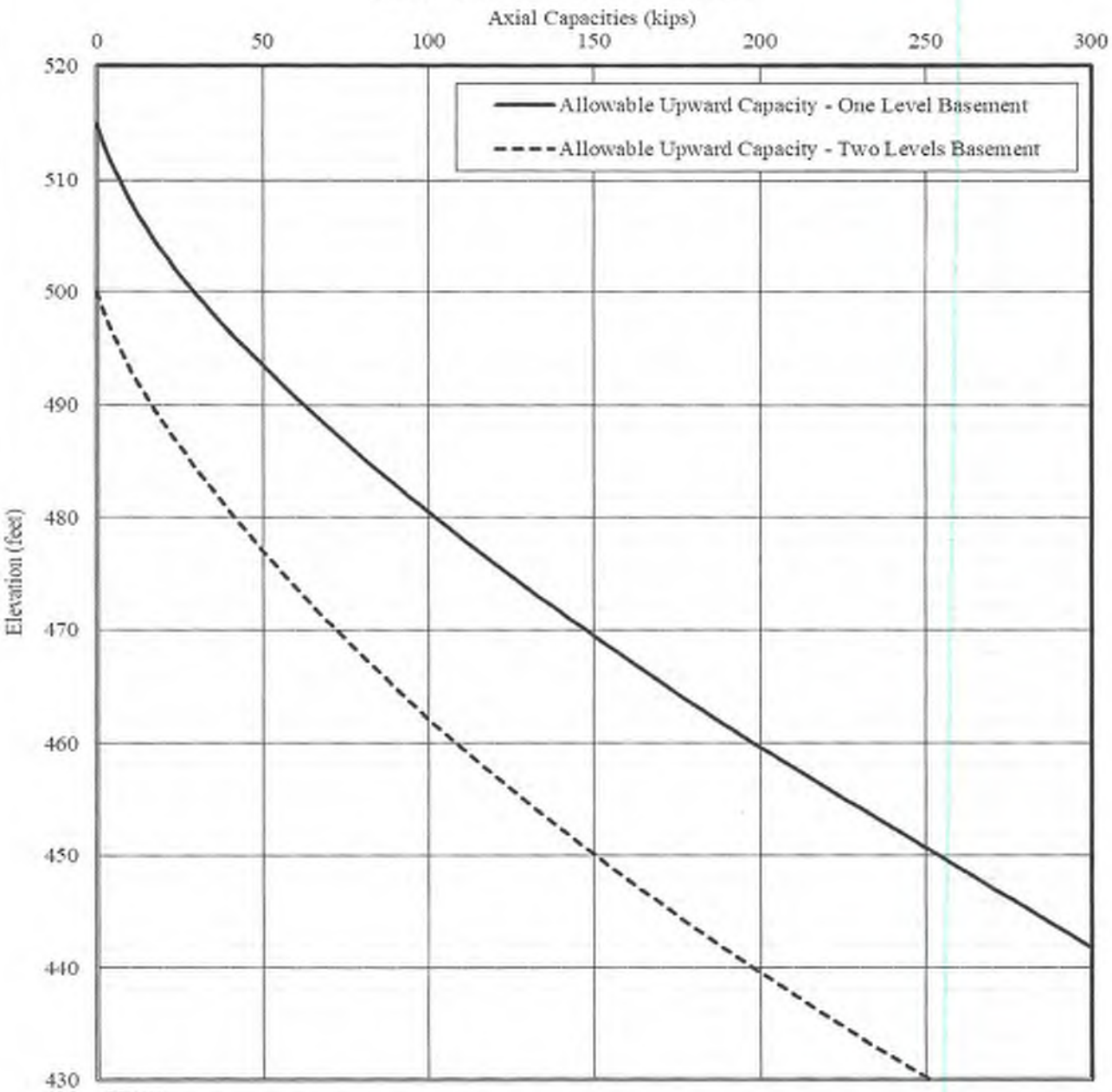


Date:	Ultimate Downward Axial Pile Capacity		Figure
6/28/2020	South Santa Fe Ave.	GHOSTRIDER	A-8a
Drawn By:	San Marcos, CA 92069		
L.B.			



Notes:
1) Allowable pile capacities are calcualted using a Factor of Safety of 2
2) Capacities are based on the strength of the soils
3) Compressive and tensile strengths of the pile section should be checked to verify the structural capacities.

Date:	Allowable Downward Axial Pile Capacity	GHOSTRIDER	Figure
6/28/2020	South Santa Fe Ave.		A-8b
Drawn By:	San Marcos, CA 92069		
L.B.			



Notes:
1) Allowable pile capacities are calcualted using a Factor of Safety of 3
2) Capacities are based on the strength of the soils
3) Compressive and tensile strengths of the pile section should be checked to verify the structural capacities.

Date:	Allowable Upward Axial Pile Capacity	GHOSTRIDER	Figure
6/28/2020	South Santa Fe Ave.		A-8c
Drawn By:	San Marcos, CA 92069		
L.B.			

Reference: California Geotracker, Google Maps

Date:	Geotracer Borings and LUST site	GHOSTRIDER	Figure
6/13/2020	South Santa Fe Ave.		A-9
Drawn By:	San Marcos, CA 92069		
L.B.			

Appendix B

Exploratory Logs

SUBSURFACE EXPLORATION LEGEND

UNIFIED SOIL CLASSIFICATION SYSTEM Visual-Manual Procedure (ASTM D2488)					CONSISTENCY / RELATIVE DENSITY
MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES	CRITERIA
Coarse-Grained Soils* More than 50 % Retained on No. 200 Sieve	Gravels 50 % or more of Coarse Fraction Retained on No. 4 Sieve	Clean Gravels	GW	Well Graded Gravels and Gravel-Sand Mixtures, Little or no Fines	Reference: 'Foundation Engineering', Peck, Hanson, Thornburn, 2nd Edition.
			GP	Poorly Graded Gravels and Gravel-Sand Mixtures, Little or no Fines	Standard Penetration Test Granular Soils
		Gravels with Fines	GM	Silty Gravels, Gravel-Sand-Silt Mixtures**	Penetration Resistance, N, (Blows / Foot) / Relative Density
			GC	Clayey Gravel, Gravel-Sand-Clay Mixtures**	0 - 4 Very Loose
	Sands More than 50 % of Coarse Fraction Passes No. 4 Sieve	Clean Sands	SW	Well Graded Sands and Gravely Sands, Little or no Fines	4 - 10 Loose
			SP	Poorly Graded Sands and Gravely Sands, Little or no Fines	10 - 30 Medium
		Sands with Fines	SM	Silty Sands, Sand-Silt Mixtures**	30 - 50 Dense
			SC	Clayey Sands, Sand-Clay Mixtures**	> 50 Very Dense
Fine-Grained Soils* 50 % or more Passes No. 200 Sieve	Silts and Clays Liquid Limit 50 % or less		ML	Inorganic Silts, Sandy Silts, Rock Flour	Standard Penetration Test Cohesive Soils
			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays	Penetration Resistance, N, (Blows / Foot) / Consistency / Unconfined Compressive Strength, (Tons / Sq. Ft.)
			OL	Organic Silts and Organic silty Clays of Low Plasticity	< 2 Very Soft < 0.25
	Silts and Clays Liquid Limits Greater than 50 %		MH	Inorganic Silts, Micaceous or Diatomaceous silts, Plastic Silts	2 - 4 Soft 0.25 - 0.5
			CH	Inorganic Clays of High Plasticity, Fat Clays	4 - 8 Medium 0.5 - 1.0
			OH	Organic Clays of Medium to High Plasticity	8 - 15 Stiff 1.0 - 2.0
					15 - 30 Very Stiff 2.0 - 4.0
					> 30 Hard > 4.0
Highly Organic Soils			PT	Peat, Muck, or Other Highly Organic Soils	

* Based on material passing the 3-inch sieve.

** More than 12% passing the No. 200 sieve: 5% to 12% passing No. 200 sieve requires use of duel symbols (i.e., SP-SM GP-GM, SP-SC, GP-GC, etc.); Border line classifications are designated as CH/CL, GM/SM, SP/SW, etc.

U.S. Standard Sieve Size 12" 3" 3/4" #4 #10 #40 #200

Unified Soil Classification Designation	Boulders	Cobbles	Gravel		Sand			Silt and Clay
			Coarse	Fine	Coarse	Medium	Fine	

Moisture Condition		Material Quantity		Other Symbols
Dry	Absence of moisture, dusty, dry to the touch.	Trace	< 5 %	C - Core Sample
		Slightly	5 - 12%	S - SPT Sample
Moist	Dump but no visible moisture.	Little	12 - 25%	B - Bulk Sample
Wet	Visible free water, usually below the water table.	Some	25 - 50 %	CK - Chunk Sample
				R - Ring Sample
				N - Nuclear Gauge Test
				∇ - Water Table

Date:	Simplified USCS Soils Classification Chart	ETERNIA	Figure
3/26/2019			B-1
Drawn By:			
L.B.			

GHOSTRIDER

SUBSURFACE EXPLORATION LOG
BORING NO. 1

Project Name:	San Marcos Apts.	Date: 5/6/2020	Logged By: D.J. / Gostrider
Type of Rig:	Drill Rig	Drive Wt.: 140 lbs.	Elevation: From Surface
Drill Hole Dia.:	6"	Drop: 30"	Depth of Boring (ft.): 50.5

Depth (ft.)	Sample Type	No. of Blows per 6"	Soil Classification	Dry Density (lb/ft3)	Moisture Content (%)	Lithology	Groundwater	Description
			SC					**0'-3' - Dark Brown Clayey Sand with Gravel, Moist, Loose**
0.0								
2.5								
5.0	R	5,13,15	CL	97.4	16.0			Yellowish Brown Sandy Clay, Moist, Stiff
7.5	R	7,12,17	CL	100.3	25.3			Grayish Brown Clay, Moist, Stiff
10.0	R	4,15,29	CL	102.6	21.4			Grayish Brown Sandy Clay, Moist, Very Stiff
12.5								
15.0	R	10,20,32	CL	100.7	23.7			Yellowish Brown Sandy Clay, Moist, Very Stiff
17.5								
20.0	R	10,19,18	CL	100.5	23.0			Dark Brown Clay with Yellowish Streaking, Moist, Very Stiff
22.5								
25.0	R	11,23,44	CL	102.3	23.4			Light Grayish Brown Sandy Clay, Moist, Very Stiff
27.5								
30.0	S	10,20,39	CL		23.7			Grayish Brown Clay with Sand, Moist, Very Stiff
32.5								
35.0	S	9,17,24	CL		21.4			Grayish Brown Clay with Sand, Moist, Very Stiff
37.5								
40.0	S	9,24,34	CL		18.0			Grayish Brown Clay with Sand, Moist, Very Stiff
42.5								
45.0	S	10,21,31	CL		20.8			Greenish Brown Sandy Clay, Moist, Very Stiff
47.5								
50.0	S	18,50,-	CL		24.8			Greenish Brown Sandy Clay, Moist, Hard
52.5								Hole Refusal at 51', Backfilled with Slurry

S - SPT Sample R - Ring Sample B - Bulk Sample D - Disturbed Sample

GHOSTRIDER

SUBSURFACE EXPLORATION LOG
BORING NO. 2

Project Name: San Marcos Devlop. Date: 5/6/2020 Project No.:
Type of Rig: Drill Rig Drive Wt.: 140 lbs. Logged By: D.J. / Ghostrider
Drill Hole Dia.: 6" Drop: 30" Elevation: From Surface
Depth of Boring (ft.): 20.5'

Depth (ft.)	Sample Type	No. of Blows per 6"	Soil Classification	Dry Density (lb/ft3)	Moisture Content (%)	Lithology	Groundwater	Description
			SC					**0'-3' - Dark Brown Clayey Sand with Gravel, Moist, Loose**
1								
2								
3	R	2,3,6	CL	96.5	25.0			Yellowish Brown Sandy Clay, Moist, Stiff
4								
5								
6	R	14,20,26	CL	112.2	16.8			Yellowish Brown Sandy Clay, Moist, Very Stiff
7								
8								
9								
10	B	7,13,19	CL		17.7			Olive Green Brown Sandy Clay, Moist, Stiff
11								
12								
13								
14								
15	R	9,21,22	CL	107.9	19.3			OliveGreen Brown Sandy Clay, Moist, Very Stiff
16								
17								
18								
19								
20	B	9,17,23	CL		18.4			Olive Reddish Brown Sandy Clay, Moist, Very Stiff
21								Hole Abandoned at 20' - Backfilled with Cuttings
22								

S - SPT Sample R - Ring Sample B - Bulk Sample D - Disturbed Sample

SUBSURFACE EXPLORATION LOG
BORING NO. 3

Project Name: San Marcos Devlop. Date: 5/6/2020
Type of Rig: Drill Rig Drive Wt.:
Drill Hole Dia.: 6" Drop:

Project No.:
Logged By: D.J. / Ghostrider
Elevation: From Surface
Depth of Boring (ft.): 20.5'

Depth (ft.)	Sample Type	No. of Blows per 6"	Soil Classification	Dry Density (lb/ft3)	Moisture Content (%)	Lithology	Groundwater	Description
			SC					**0'-3' - Dark Brown Clayey Sand with Gravel, Moist, Loose**
1								
2								
3	R	6,6,7	SC	103.8	20.6			Dark Brown Clayey Sand with Grave, Moist, Loose
4								4'-5.5' - Dark Brown Sandy Clay, Moist, Loose
5	R	4,6,10	CL	115.6	12.8			Dark Brown Sandy Clay, Moist Loose
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								

S - SPT Sample R - Ring Sample B - Bulk Sample D - Disturbed Sample

GHOSTRIDER

SUBSURFACE EXPLORATION LOG
BORING NO. 4

Project Name: San Marcos Devlop. Date: 5/10/2020 Logged By: L.B. / Ghostrider
Type of Rig: Hand Auger Drive Wt.: N/A Elevation: From Surface
Drill Hole Dia.: 3" Drop: N/A Depth of Boring (ft.): 15'

Depth (ft.)	Sample Type	No. of Blows per 6"	Soil Classification	Dry Density (lb/ft3)	Moisture Content (%)	Lithology	Groundwater	Description
			SC					**0'-4.5' - Dark Brown Clayey Sand with Gravel, Moist, Loose**
3	R	N/A	SC	110.5	13.1			Dark Brown Clayey Sand with Gravel, Moist, Loose
6	R	N/A	CL	101.5	15.7			Gryaish Brown Sandy Clay, Moist, Dense
10	R	N/A	CL	103.5	20.1			Yellowish Brown Clay with Sand, Moist, Stiff
15	R	N/A	CL	100.1	22.3			Yellowish Brown Sandy Clay, Moist, Very Stiff Hole Abandoned at 15', Backfilled with Cuttings

S - SPT Sample R - Ring Sample B - Bulk Sample D - Disturbed Sample

GHOSTRIDER

SUBSURFACE EXPLORATION LOG
BORING NO. 5

Project Name: San Marcos Devlop. Date: 5/10/2020 Logged By: L.B. / Ghostrider
Type of Rig: Hand Auger Drive Wt.: N/A Elevation: From Surface
Drill Hole Dia.: 3" Drop: N/A Depth of Boring (ft.): 15'

Depth (ft.)	Sample Type	No. of Blows per 6"	Soil Classification	Dry Density (lb/ft3)	Moisture Content (%)	Lithology	Groundwater	Description
			SC					**0'-6' - Dark Brown Clayey Sand with Gravel, Moist, Loose**
1								
2								
3	R	N/A	SC	109.9	10.1			Dark Brown Clayey Sand with Gravel, Moist, Loose
4								
5	R	N/A	SC	110.3	13.5			Dark Brown Clayey Sand, Moist, Loose
6								
7								
8								
9								
10	R	N/A	CL	100.1	20.0			Yellowish Brown Sandy Clay, Moist, Stiff
11								Hole Abandoned at 10.5', Backfilled with Cuttings
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								

S - SPT Sample R - Ring Sample B - Bulk Sample D - Disturbed Sample

Appendix B

Exploratory Logs

Appendix C

Laboratory Testing

Dry Density and Moisture Content

Date Tested: 5/20/2020

Boring #	Sample #	Depth (ft)	Dry Density (pcf)	Moisture Content (%)	Description
B-1	2	5'	97.4	16.0%	Yellowish Brown Sandy Clay
B-1	3	7.5'	100.3	25.3%	Grayish Brown Clay
B-1	4	10'	102.6	21.4%	Grayish Brown Sandy Clay
B-1	5	15'	100.7	23.7%	Yellowish Brown Sandy Clay
B-1	6	20'	100.5	23.0%	Dark Brown Clay with Yellowish Streaks
B-1	7	25'	102.3	23.4%	Light Gray Brown Sandy Clay
B-2	1	3'	96.5	25.0%	Yellowish Brown Clay with Sand
B-2	2	6'	112.2	16.8%	Yellowish Brown Sandy Clay
B-2	4	15'	107.9	19.3%	Olive Green Brown Clay with Sand
B-3	1	2.5'	103.8	20.6%	Dark Brown Clayey Sand with Gravel
B-3	2	5'	115.6	12.8%	Dark Brown Sandy Clay

Performed in General Accordance with ASTM D7263 B and D2216

GHOSTRIDER	Project Name	FIGURE
TECH: L.B.	Santa Fe Apartments	C-1
DATE: 11-Jun-20		

Dry Density and Moisture Content

Date Tested: 5/20/2020

Boring #	Sample #	Depth (ft)	Dry Density (pcf)	Moisture Content (%)	Description
B-4	1	3'	110.5	13.1%	Dark Brown Clayey Sand with Gravel
B-4	2	6'	101.5	15.7%	Grayish Brown Sandy Clay
B-4	3	10'	103.5	20.1%	Yellowish Brown Clay with Sand
B-4	4	15'	100.1	22.3%	Yellowish Brown Sandy Clay
B-5	1	2.5'	109.9	10.1%	Dark Brown Clayey Sand with Gravel
B-5	2	5'	110.3	13.5%	Dark Brown Clayey Sand
B-5	3	10'	100.1	20.0%	Yellowish Brown Sandy Clay

Performed in General Accordance with ASTM D7263 B and D2216

GHOSTRIDER	Project Name	FIGURE
TECH: L.B.	Santa Fe Apartments	C-2
DATE: 11-Jun-20		

Materials Finer than No. 200 Sieve

Date Tested	5/15/2020	5/15/2020	5/15/2020	5/15/2020	5/15/2020	5/15/2020
Boring No	B-1	B-1	B-1	B-1	B-1	B-1
Sample No.	2	3	4	5	6	7
Depth, ft.	5'	7.5'	10'	15'	20'	25'
Dry Weight before wash, g	94.1	127.4	122.5	114.9	147.2	104.5
Dry Weight After Wash, g	29.3	3.9	16.5	18.5	61.8	21.5
Weight Loss, No. 200, g	64.8	123.5	106	96.4	85.4	83
Passing No. 200, %	68.9	96.9	86.5	83.9	58.0	79.4
Sample Description	Yellowish Brown Sandy Clay	Grayish Brown Clay	Grayish Brown Sandy Clay	Yellowish Brown Sandy Clay	Dark Brown Clay with Yellowish Streaks	Light Gray Brown Sandy Clay

Date Tested	5/15/2020	5/15/2020	5/15/2020			
Boring No	B-1	B-1	B-1			
Sample No.	9	10	11			
Depth, ft.	35'	40'	45'			
Dry Weight before wash, g	163.3	145.3	233.6			
Dry Weight After Wash, g	12.4	10.6	40.2			
Weight Loss, No. 200, g	150.9	134.7	193.4			
Passing No. 200, %	92.4	92.7	82.8			
Sample Description	Grayish Brown Clay with Sand	Grayish Brown Clay with Sand	Greenish Brown Sandy Clay			

TEST PERFORMED IN ACCORDANCE WITH ASTM D 1140

GHOSTRIDER	**Project Name**	FIGURE
Tech: LB	**Santa Fe Apartments**	**C-3**
DATE: 6/11/2020		

Materials Finer than No. 200 Sieve

Date Tested	5/16/2020	5/16/2020	5/16/2020	5/16/2020	5/16/2020	
Boring No	B-2	B-2	B-2	B-2	B-2	
Sample No.	1	2	3	4	5	
Depth, ft.	3'	6'	10'	15'	20'	
Dry Weight before wash, g	156.5	97.4	159.5	145	185.8	
Dry Weight After Wash, g	14.3	9.9	5.1	5.2	22.7	
Weight Loss, No. 200, g	142.2	87.5	154.4	139.8	163.1	
Passing No. 200, %	90.9	89.8	96.8	96.4	87.8	
Sample Description	Yellowish Brown Clay with Sand	Yellowish Brown Sandy Clay	Olive Green Brown Clay with Sand	Olive Green Brown Clay with Sand	Olive Reddish Brown Sandy Clay	

Date Tested	5/16/2020	5/16/2020				
Boring No	B-3	B-3				
Sample No.	1	2				
Depth, ft.	2.5'	5'				
Dry Weight before wash, g	161.9	144.3				
Dry Weight After Wash, g	82.4	54.9				
Weight Loss, No. 200, g	79.5	89.4				
Passing No. 200, %	49.1	62.0				
Sample Description	Dark Brown Clayey Sand with Gravel	Dark Brown Sandy Clay				

TEST PERFORMED IN ACCORDANCE WITH ASTM D 1140

GHOSTRIDER	Project Name	FIGURE
Tech: AE	Santa Fe Apartments	C-4
DATE: 6/11/2020		

Materials Finer than No. 200 Sieve

Date Tested	5/16/2020	5/16/2020	5/16/2020	5/16/2020		
Boring No	B-4	B-4	B-4	B-4		
Sample No.	1	2	3	4		
Depth, ft.	3'	6'	10'	15'		
Dry Weight before wash, g	210.3	185.9	191.5	203.5		
Dry Weight After Wash, g	120.5	21.1	15.9	26.7		
Weight Loss, No. 200, g	89.8	164.8	175.6	176.8		
Passing No. 200, %	42.7	88.6	91.7	86.9		
Sample Description	Dark Brown Clayey Sand w/ Gravel	Grayish Brown Sandy Clay	Yellowish Brown Clay with Sand	Yellowish Brown Sandy Clay		

Date Tested	5/16/2020	5/16/2020	5/16/2020			
Boring No	B-5	B-5	B-5			
Sample No.	1	2	3			
Depth, ft.	2.5'	5'	10'			
Dry Weight before wash, g	265.5	220.1	189.3			
Dry Weight After Wash, g	193.5	131.5	21.3			
Weight Loss, No. 200, g	72	88.6	168			
Passing No. 200, %	27.1	40.3	88.7			
Sample Description	Dark Brown Clayey Sand w/ Gravel	Dark Brown Clayey Sand	Yellowish Brown Sandy Clay			

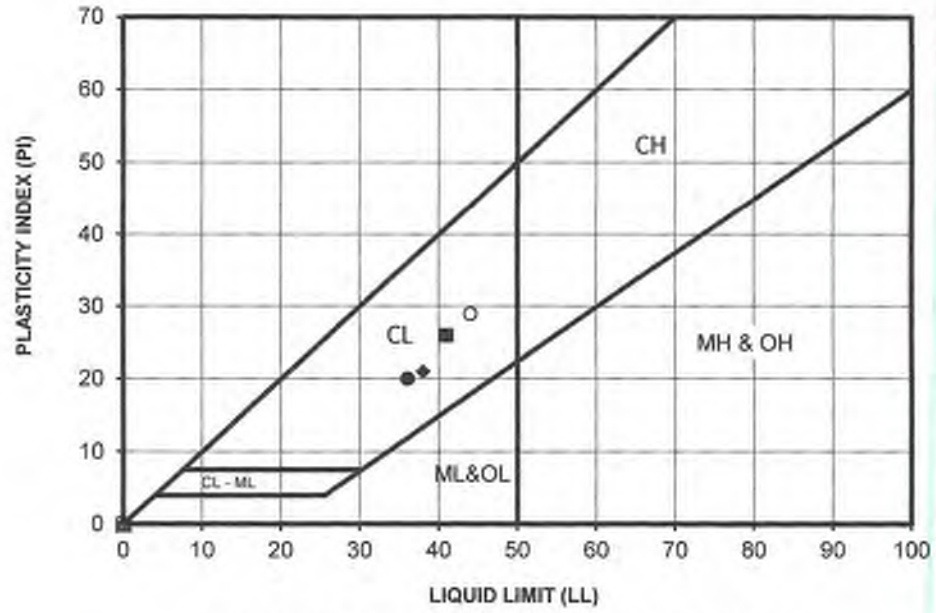
TEST PERFORMED IN ACCORDANCE WITH ASTM D 1140

GHOSTRIDER	Project Name	FIGURE
Tech: AE	Santa Fe Apartments	C-5
DATE: 6/11/2020		

ATTERBERG LIMITS TEST RESULTS

Date Tested : 5/17/2020

SYMBOL	SAMPLE NAME	DEPTH (ft)	LL	PL	PI	USCS CLASSIFICATION (Minus No. 40 Sieve Fraction)	USCS Entire Sample
●	B-1	5'	36	16	20	CL	CL
■	B-1	20'	41	15	26	CL	CL
◆	B-3	2.5'	38	17	21	CL	CL
○	B-4	15'	44	15	29	CL	CL
□							
△							
+							
◇							



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

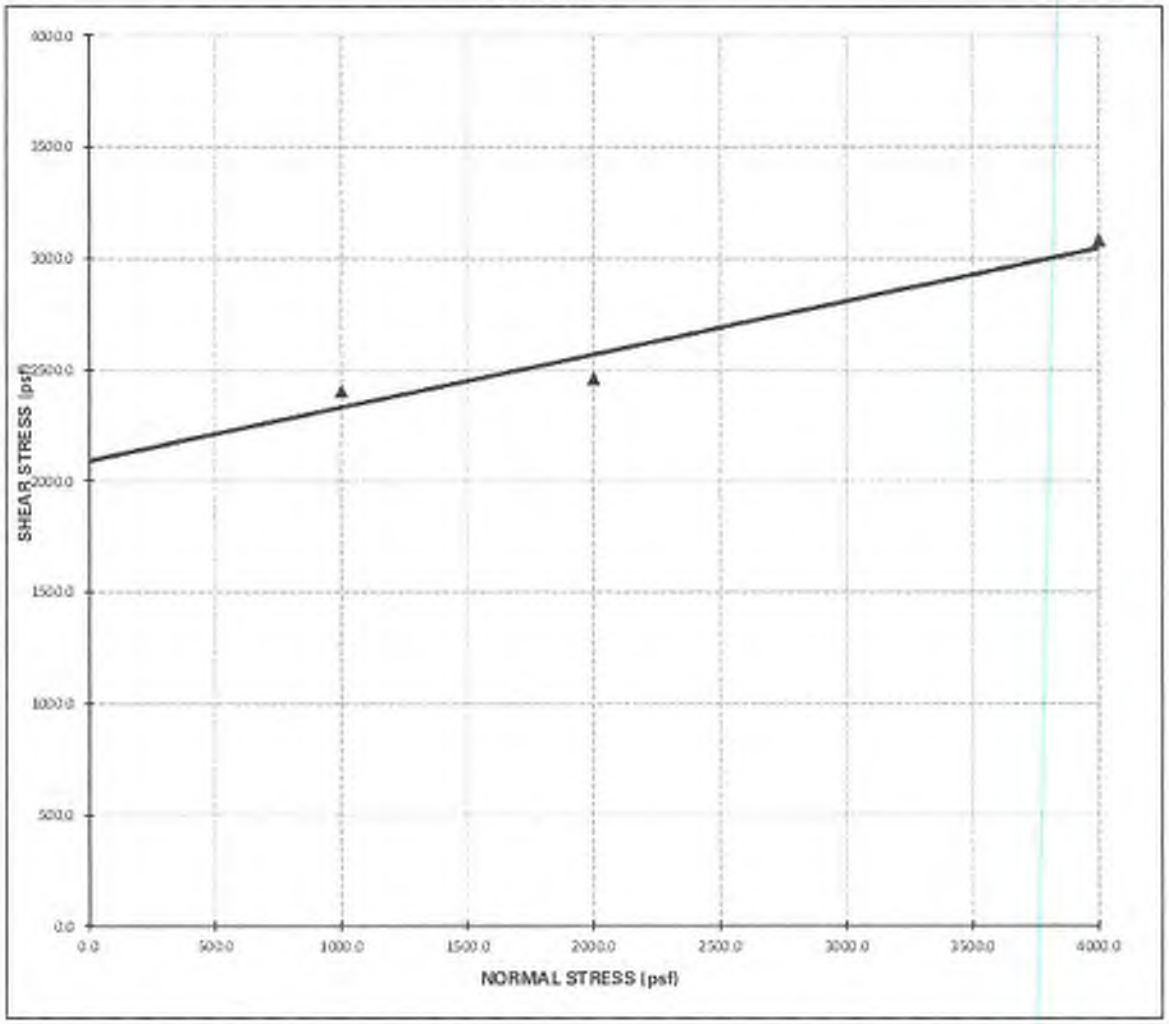
GHOSTRIDER	Project Name:	FIGURE
TECH:L.B.	Santa Fe Apartments	C-6
28-Jun-20		

GEOTEK

DIRECT SHEAR TEST

Project Name:	2972 Santa Fe, San Marcos	***Sample Location:***	B-1 @ 6
Project Number:	19-2118C	***Date Tested:***	6/8/2020

PEAK VALUE



Shear Strength: Φ = 13.5 ° C = 2088.00 psf

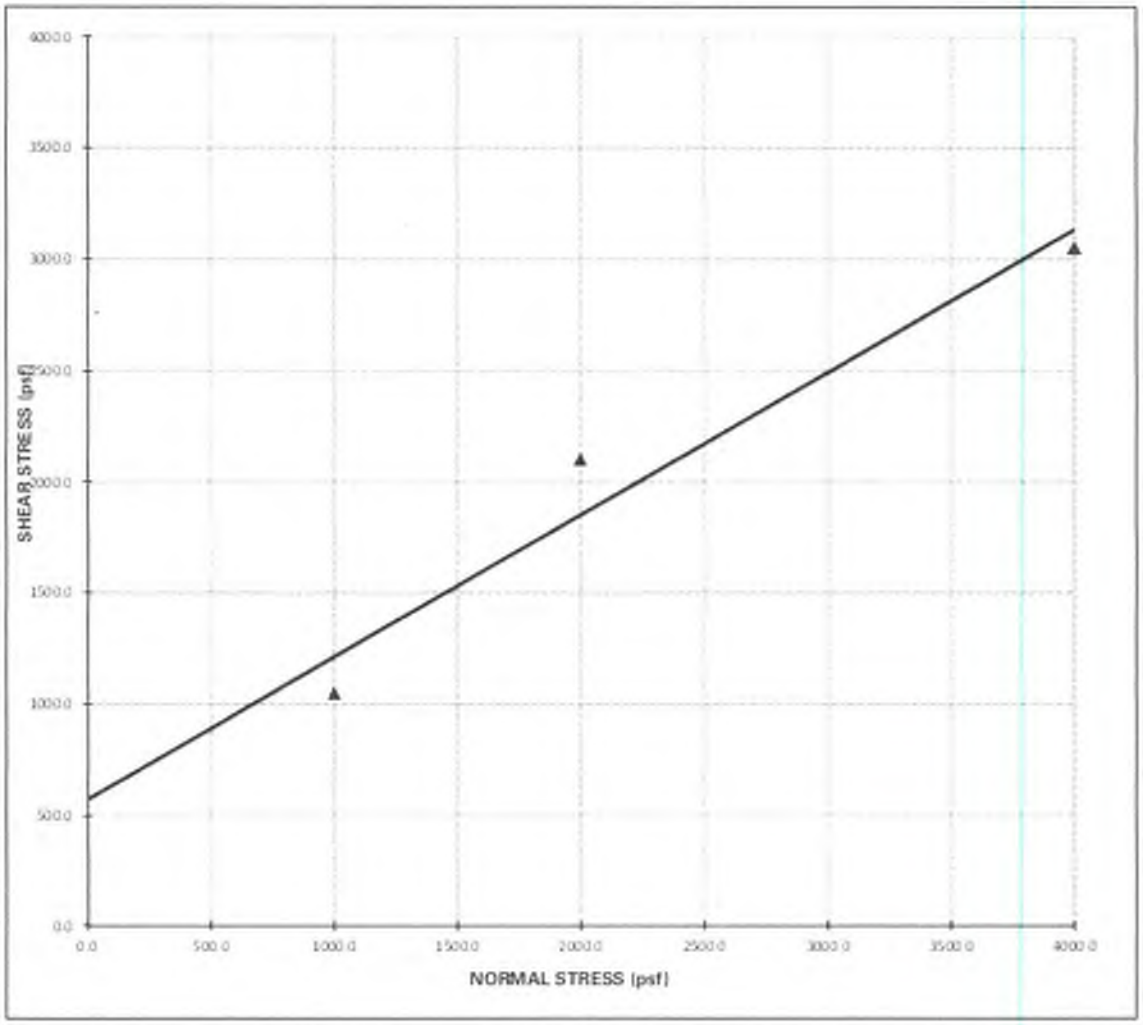
Notes: 1 - The soil specimens sheared were "undisturbed" ring samples.
2 - The above reflect direct shear strength at saturated conditions.
3 - The tests were run at a shear rate of 0.035 in/min.

GEOTEK

DIRECT SHEAR TEST

Ultimate Value

Project Name:	2972 Santa Fe, San Marcos	***Sample Location:***	B-1 @ 6
Project Number:	19-2118C	***Date Tested:***	6/8/2020



Shear Strength: Φ = **32.6** ° **C = 570.00 psf**

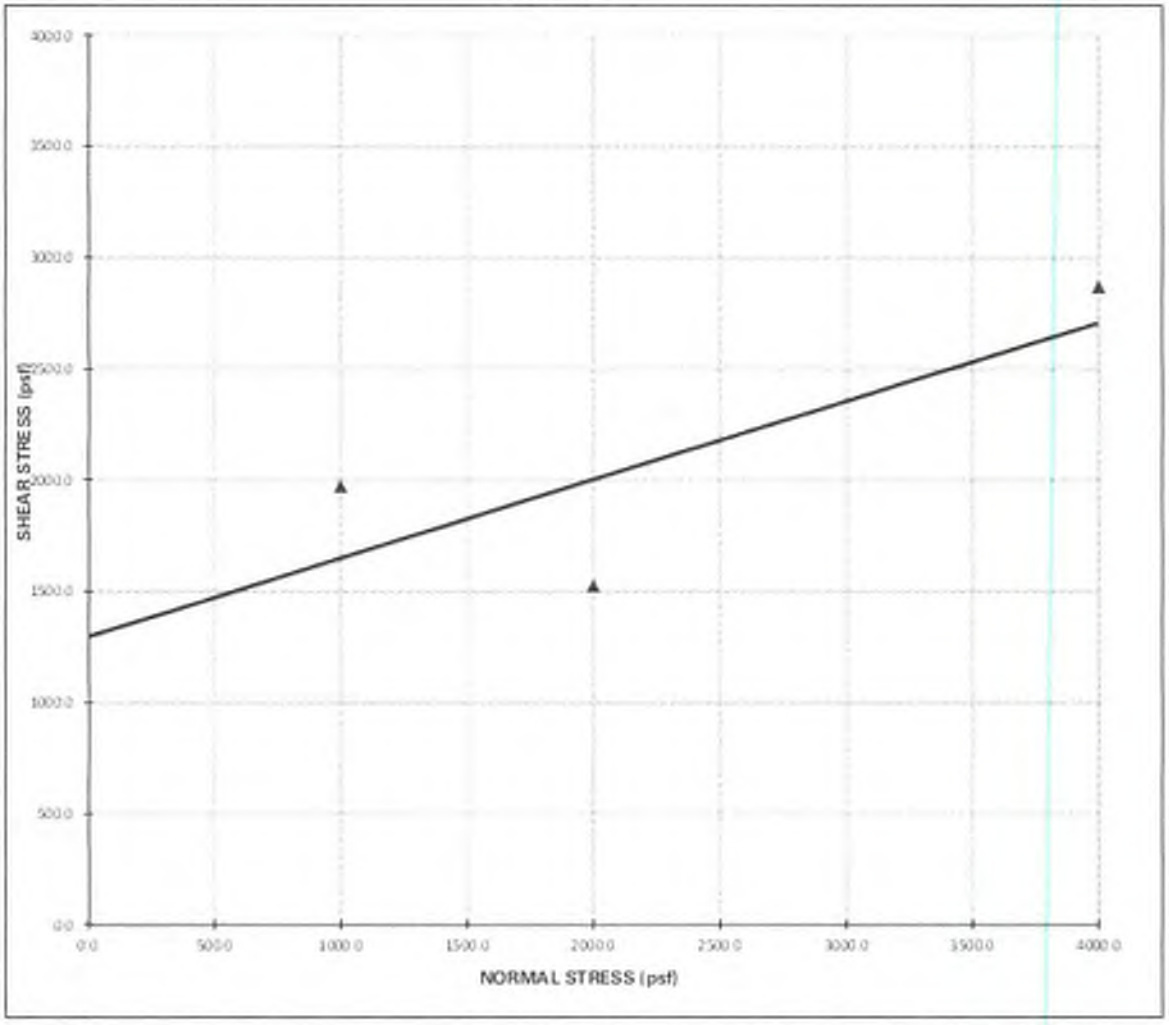
Notes: 1 - The soil specimens sheared were "undisturbed" ring samples.
2 - The above reflect direct shear strength at saturated conditions.
3 - The tests were run at a shear rate of 0.035 in/min.

GEOTEK

DIRECT SHEAR TEST

Project Name:	2972 Santa Fe, San Marcos	*Sample Location:*	B-4 @ 15
Project Number:	19-2118C	*Date Tested:*	6/8/2020

Peak Value



Shear Strength: Φ = 19.4 ° C = 1296.00 psf

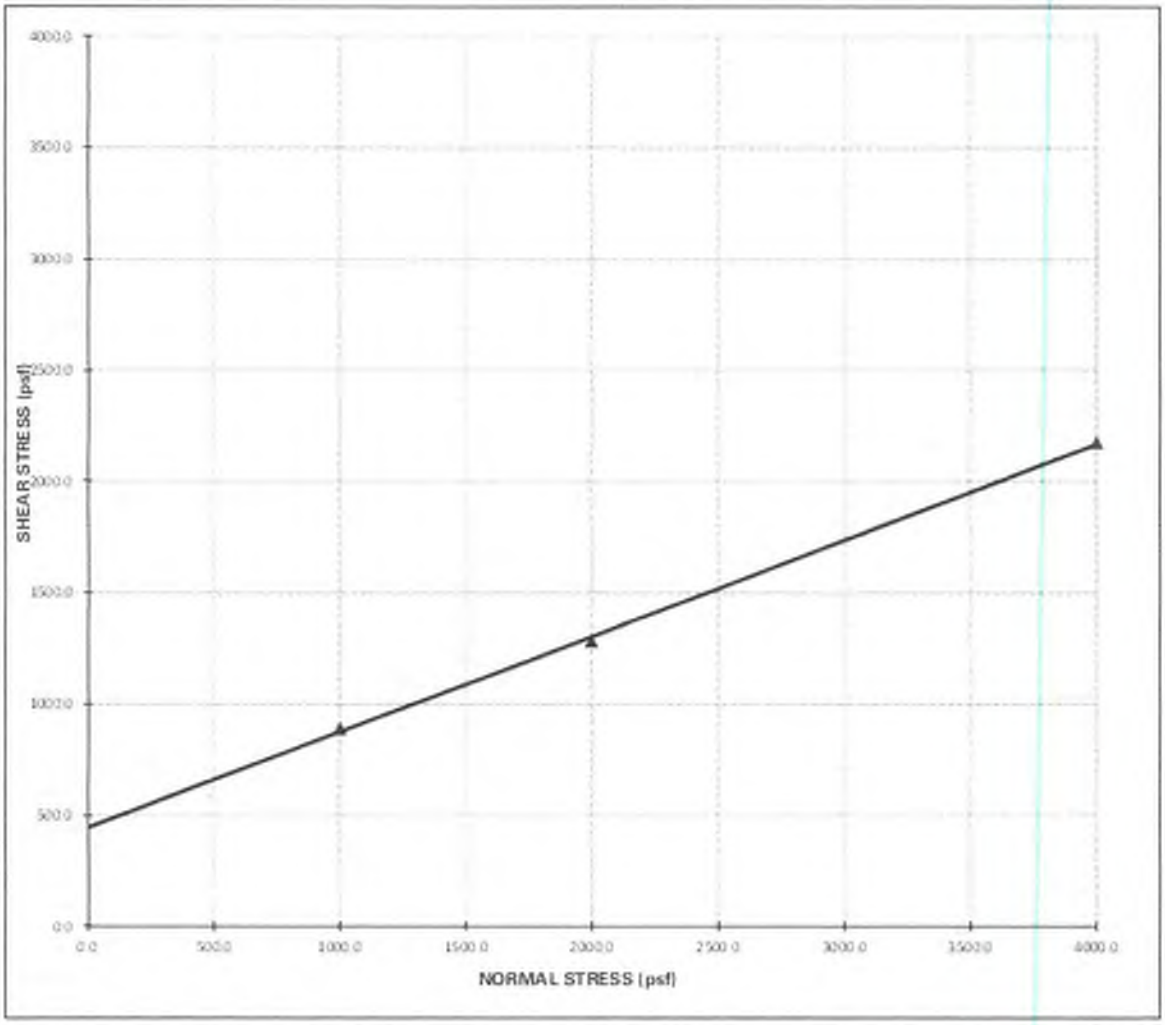
Notes:
1 - The soil specimens sheared were "undisturbed" ring samples.
2 - The above reflect direct shear strength at saturated conditions.
3 - The tests were run at a shear rate of 0.035 in/min.

GEOTEK

DIRECT SHEAR TEST

Ultimate Value

Project Name:	2972 Santa Fe, San Marcos	***Sample Location:***	B-4 @ 15
Project Number:	19-2118C	***Date Tested:***	6/8/2020



Shear Strength: Φ = 23.3 ° C = 444.00 psf

Notes:
1 - The soil specimens sheared were "undisturbed" ring samples.
2 - The above reflect direct shear strength at saturated conditions.
3 - The tests were run at a shear rate of 0.035 in/min.

Expansion Index (ASTM D4829)

Location	Sample No.	Depth (ft)	Sample Description
B-1	Bulk	3'-8'	Yellowish Brown Clay with Sand

Density Determination	Trial #1	Trial #2
Weight Compacted Sample and Rin	724.7	
Weight of Ring	367.4	
Net Weight of Sample	357.3	
Wet Density, pcf	108.3	
Dry Density, pcf	94.3	

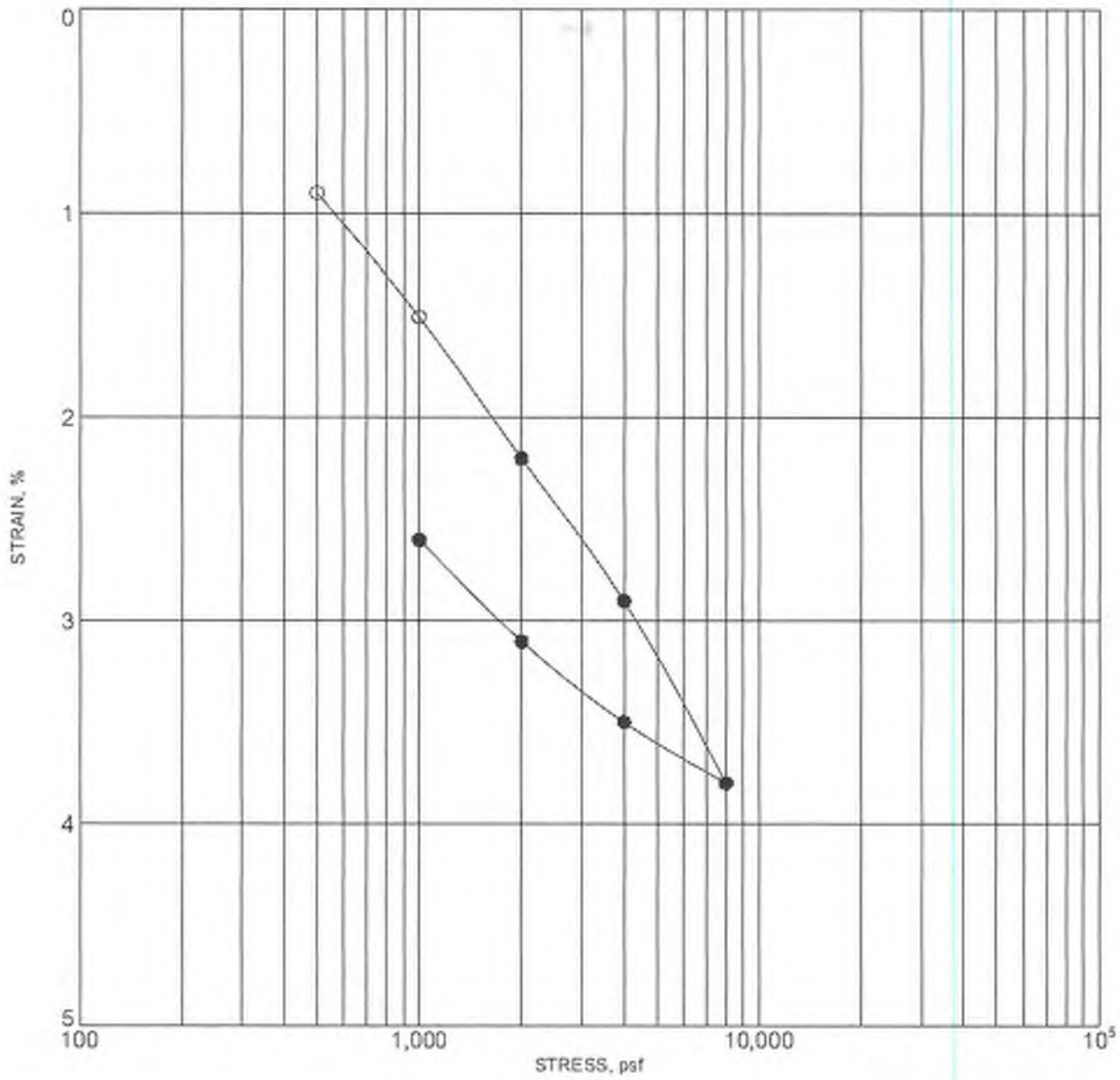
Moisture Determination		
Wet Weight of Sample, g	200.8	
Dry Weight of Sample, g	174.9	
Moisture Content, %	14.8%	

Expansion Index	154	
Corrected Expansion Index	**155**	**(VERY HIGH)**
% Saturation	50.8	

Expansion Readings			
DATE	TIME	READING	
5/20/2020	7:00 AM	0.1475	
5/20/2020	7:10 AM	0.1474	<< Add Water
5/22/2020	9:00 AM	0.3011	<< Final

Moisture Content after Test	
Wet+Ring	797.7
Dry	311.2
	38.3%

GHOSTRIDER		Project Name	FIGURE
	TECH: L.B.	Santa Fe Apartments	C-11
	DATE: 6/28/2020		

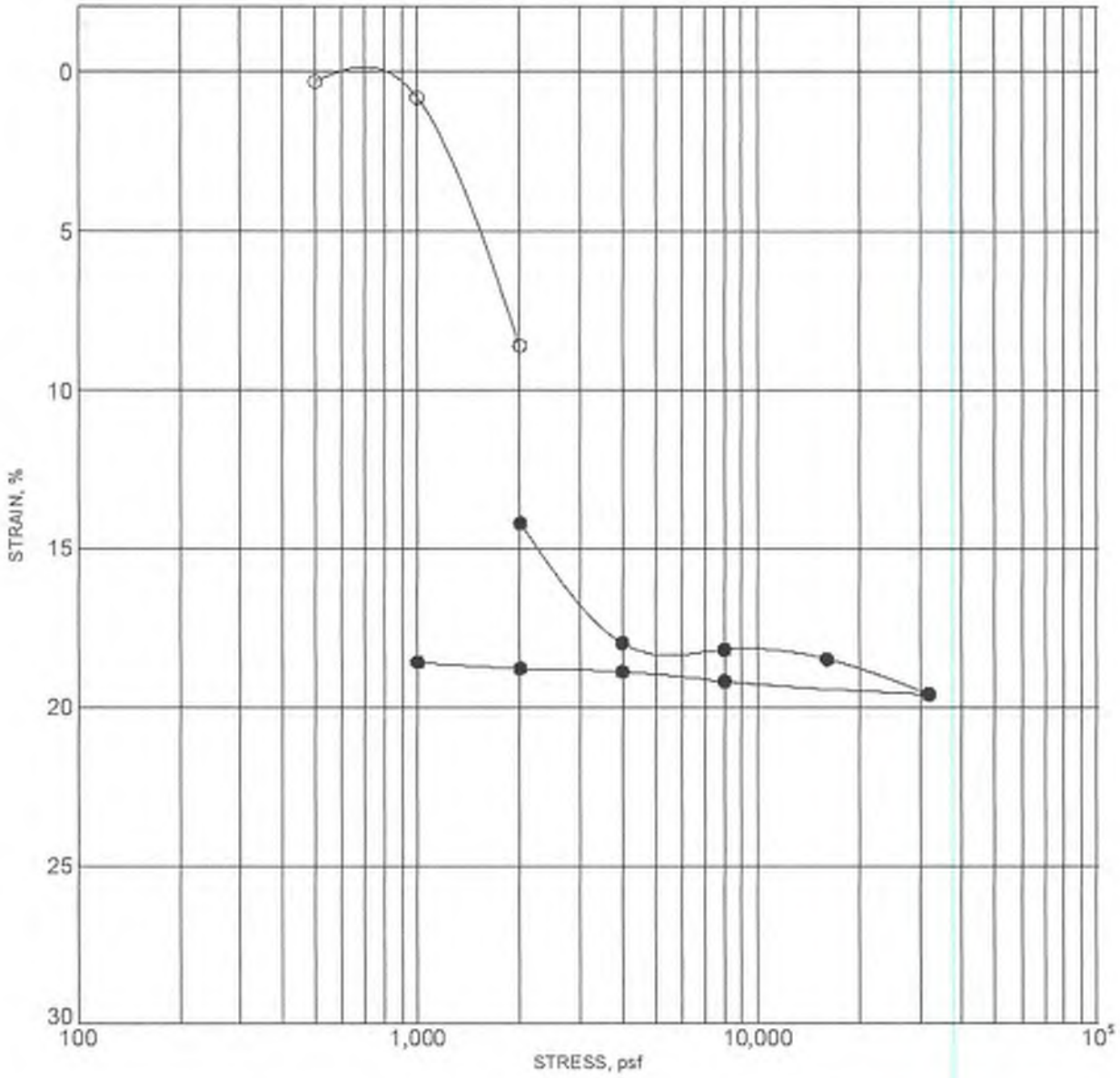


BORING NO. :	B-1	DEPTH (ft) :	6.0-7.5
DESCRIPTION :	SANDY CLAY (CL)		

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	21	106.43	97	0.569

NOTE: SOLID CIRCLES INDICATE READINGS AFTER ADDITION OF WATER

CONSOLIDATION TEST RESULTS



BORING NO. :	B-4	DEPTH (ft) :	20.0-21.5
DESCRIPTION :	SANDY CLAY (CL)		

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	23	99.89	93	0.650
FINAL				

NOTE: SOLID CIRCLES INDICATE READINGS AFTER ADDITION OF WATER

CONSOLIDATION TEST RESULTS

Converse Consultants Santa Fe Apartments C-13

Project No. 20-81-188-01 Drawing No.

Soil Analysis Lab Results

Client: Ghostrider
Job Name: Santa Fe Apts
Client Job Number: 19-2118C
Project X Job Number:
S200602A June 4, 2020

	Method	ASTM D4327		ASTM D4327		ASTM G187		ASTM G51
Bore# / Description	**Depth**	**Sulfates** SO_4^{2-}		**Chlorides** Cl^-		**Resistivity** As Rec'd	Minimum	**pH**
	(ft)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(Ohm-cm)	(Ohm-cm)	
B-1, S-3	7.5	8,941.6	0.8942	625.2	0.0625	1,005	302	5.10

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
Chemical Analysis performed on 1:3 Soil-To-Water extract

Appendix D

USDA – Natural Resources Conservation Service – Soil Resource Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Diego County Area, California

SANTA FE APARTMENTS

June 28, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface 2
How Soil Surveys Are Made 5
Soil Map 8
Soil Map (Santa Fe Apartments) 9
Legend 10
Map Unit Legend (Santa Fe Apartments) 11
Map Unit Descriptions (Santa Fe Apartments) 11
San Diego County Area, California 13
AwC—Auld clay, 5 to 9 percent slopes 13
AwD—Auld clay, 9 to 15 percent slopes 14
AyE—Auld stony clay, 9 to 30 percent slopes 15
DaC—Diablo clay, 2 to 9 percent slopes 16
DaD—Diablo clay, 9 to 15 percent slopes, warm MAAT 18
HrC—Huerhuero loam, 2 to 9 percent slopes 19
LeD—Las Flores loamy fine sand, 9 to 15 percent slopes 20
References 23

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Santa Fe Apartments)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 14, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 24, 2020—Feb 12, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Santa Fe Apartments)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AwC	Auld clay, 5 to 9 percent slopes	7.0	4.6%
AwD	Auld clay, 9 to 15 percent slopes	22.9	15.0%
AyE	Auld stony clay, 9 to 30 percent slopes	8.8	5.7%
DaC	Diablo clay, 2 to 9 percent slopes	16.1	10.5%
DaD	Diablo clay, 9 to 15 percent slopes, warm MAAT	35.4	23.2%
HrC	Huerhuero loam, 2 to 9 percent slopes	37.9	24.8%
LeD	Las Flores loamy fine sand, 9 to 15 percent slopes	24.8	16.2%
Totals for Area of Interest		**152.9**	**100.0%**

Map Unit Descriptions (Santa Fe Apartments)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a

given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series.* Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Diego County Area, California

AwC—Auld clay, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: hb87
Elevation: 300 to 2,700 feet
Mean annual precipitation: 14 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 330 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Auld and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Auld

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics

Typical profile

H1 - 0 to 54 inches: clay
H2 - 54 to 59 inches: weathered bedrock

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: 40 to 59 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: CLAYEY (1975) (R019XD001CA)
Hydric soil rating: No

Minor Components

Las posas
Percent of map unit: 5 percent
Hydric soil rating: No

Diablo
Percent of map unit: 5 percent
Hydric soil rating: No

Huerhuero
Percent of map unit: 3 percent
Hydric soil rating: No

San maguel
Percent of map unit: 2 percent
Hydric soil rating: No

AwD—Auld clay, 9 to 15 percent slopes

Map Unit Setting
National map unit symbol: hb88
Elevation: 300 to 2,700 feet
Mean annual precipitation: 14 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 330 days
Farmland classification: Not prime farmland

Map Unit Composition
Auld and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Auld

Setting
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics

Typical profile
H1 - 0 to 54 inches: clay
H2 - 54 to 59 inches: weathered bedrock

Properties and qualities
Slope: 9 to 15 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Natural drainage class: Well drained

Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: CLAYEY (1975) (R019XD001CA)
Hydric soil rating: No

Minor Components

Las posas

Percent of map unit: 5 percent
Hydric soil rating: No

Huerhuero

Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: No

AyE—Auld stony clay, 9 to 30 percent slopes

Map Unit Setting

National map unit symbol: hb89
Elevation: 300 to 2,700 feet
Mean annual precipitation: 14 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 330 days
Farmland classification: Not prime farmland

Map Unit Composition

Auld and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Auld

Setting

Landform: Hillslopes

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics

Typical profile

H1 - 0 to 30 inches: stony clay
H2 - 30 to 59 inches: weathered bedrock

Properties and qualities

Slope: 9 to 30 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: CLAYEY (1975) (R019XD001CA)
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 10 percent
Hydric soil rating: No

San maguel

Percent of map unit: 5 percent
Hydric soil rating: No

DaC—Diablo clay, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hbb8
Elevation: 30 to 3,000 feet
Mean annual precipitation: 12 to 35 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 200 to 320 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Diablo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Diablo

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous sandstone and shale

Typical profile

H1 - 0 to 15 inches: clay
H2 - 15 to 32 inches: clay, silty clay loam
H2 - 15 to 32 inches: weathered bedrock
H3 - 32 to 36 inches:

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: 24 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Altamont

Percent of map unit: 10 percent
Hydric soil rating: No

Linne

Percent of map unit: 3 percent
Hydric soil rating: No

Olivenhain

Percent of map unit: 2 percent
Hydric soil rating: No

DaD—Diablo clay, 9 to 15 percent slopes, warm MAAT

Map Unit Setting

National map unit symbol: 2w63f
Elevation: 110 to 910 feet
Mean annual precipitation: 11 to 21 inches
Mean annual air temperature: 58 to 64 degrees F
Frost-free period: 290 to 365 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Diablo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Diablo

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from calcareous shale

Typical profile

A - 0 to 15 inches: clay
Bkss1 - 15 to 28 inches: clay
Bkss2 - 28 to 40 inches: clay loam
Cr - 40 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 39 to 79 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: CLAYEY (1975) (R019XD001CA)
Hydric soil rating: No

Minor Components

Altamont

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Linne

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Olephant

Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

HrC—Huerhuero loam, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hbcm
Elevation: 1,100 feet
Mean annual precipitation: 12 to 20 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Huerhuero and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Huerhuero

Setting

Landform: Marine terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 12 inches: loam
H2 - 12 to 55 inches: clay loam, clay
H2 - 12 to 55 inches: stratified sand to sandy loam
H3 - 55 to 72 inches:

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: CLAYPAN (1975) (R019XD061CA)
Hydric soil rating: No

Minor Components

Stockpen

Percent of map unit: 5 percent
Hydric soil rating: No

Las flores

Percent of map unit: 5 percent
Hydric soil rating: No

Olivenhain

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed, ponded

Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

LeD—Las Flores loamy fine sand, 9 to 15 percent slopes

Map Unit Setting

National map unit symbol: hbdb

Elevation: 700 feet
Mean annual precipitation: 12 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 300 to 340 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Las flores and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Las Flores

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from siliceous calcareous sandstone

Typical profile

H1 - 0 to 16 inches: loamy fine sand
H2 - 16 to 28 inches: sandy clay, clay
H2 - 16 to 28 inches: sandy clay, clay
H3 - 28 to 38 inches: loamy coarse sand
H3 - 28 to 38 inches: weathered bedrock
H4 - 38 to 48 inches:
H5 - 48 to 52 inches:

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: About 16 inches to abrupt textural change; About 16 inches to natric; 40 to 60 inches to paralithic bedrock
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: CLAYPAN (1975) (R019XD061CA)
Hydric soil rating: No

Minor Components

Huerhuero

Percent of map unit: 5 percent
Hydric soil rating: No

Diablo

Percent of map unit: 5 percent
Hydric soil rating: No

Linne

Percent of map unit: 5 percent
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX E

CAP Checklist

CLIMATE ACTION PLAN CONSISTENCY REVIEW CHECKLIST

INTRODUCTION

The City of San Marcos (City) adopted an updated Climate Action Plan (CAP) in December, 2020. The CAP outlines strategies and measures that the City will undertake to achieve its proportional share of State greenhouse gas (GHG) emissions reduction targets. The purpose of the CAP Consistency Checklist (Checklist), in conjunction with the CAP, is to provide a streamlined review process for all proposed development projects that are subject to discretionary review and/or trigger environmental review pursuant to the California Environmental Quality Act (CEQA).

Analysis of GHG emissions and potential climate change impacts from new development is required under CEQA. The City's CAP is a qualified greenhouse gas (GHG) emissions reduction plan in accordance with State 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 a CAP.

The purpose of this Checklist is to implement GHG reduction measures from the CAP that apply to new discretionary development projects. New development would demonstrate consistency with relevant CAP strategies and would not conflict with the City's ability to achieve the identified GHG reduction targets through implementation of applicable measures. Projects that are consistent with the CAP, as determined through the use of this Checklist, may rely on the CAP for the cumulative impact 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.

This Checklist may be updated periodically to incorporate new GHG reduction techniques or to comply with later amendments to the CAP or local, State, or federal law. Comprehensive updates to this Checklist will be coordinated with each CAP update. Administrative updates to the Checklist may occur regularly, as necessary for the purpose of keeping the Checklist up-to-date and implementable. Updates to the CAP Checklist associated with an update to the City's CAP would also require City Council approval and shall comply with CEQA.

APPLICABILITY AND PROCEDURES

This Checklist is required only for discretionary projects[1] that are subject to and not exempt from CEQA. Projects that are exempt from CEQA are deemed to be consistent with the City's CAP, and no further review is necessary, with the exception of a Class 32 "In-Fill Development Projects" categorical exemption (State CEQA Guidelines Section 15332), for which projects are required to demonstrate consistency with the CAP through this Checklist.

General procedures for Checklist compliance and review are described below. Specific guidance is also provided under each of the questions under Steps 1 and 2 of the Checklist.

- The City's Development Services - Planning Division reviews development applications and makes determinations regarding environmental review requirements under CEQA.
- The specific applicable requirements outlined in the Checklist shall be required as conditions of project approval.
- The project must provide written documentation and supporting evidence that demonstrate how the proposed project would implement each applicable Checklist requirement described herein to the satisfaction of the Planning Division.
- If a question in the Checklist is deemed not applicable (N/A) to a project, written documentation and evidence supporting that conclusion shall be provided to the satisfaction of the Planning Division. Each Checklist question provides the scenario(s) where checking N/A may be acceptable. If a measure is deemed not applicable for reasons other than those outlined in each question, supporting evidence will need to be provided and would be subject to Planning Division approval. A project may be determined to be inconsistent with the CAP if the N/A response is deemed to be not supported by credible evidence.
- Development projects requiring discretionary review that cannot demonstrate consistency with the CAP using this Checklist shall prepare a separate, project-level GHG analysis as part of the CEQA document prepared for the project.

[1] In this context, a project is any action that meets the definition of a "Project" in Section 15378 of the State CEQA Guidelines.

Application Information

Contact Information

Project No. and Name: GPA21-0008, R21-0004, & MFSDP21-0002 Santa Fe Flores LP

Property Address and APN: 2972 and 2982 South Santa Fe Avenue/APNs 217-161-1800 and 217-161-1900

Applicant Name and Co.: RJ Realty Investors/Santa Fe Flores LP, Contact: Paul Mayer

Contact Phone: 858-888-2488 Contact Email: pm@pemcor.net

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

Consultant Name: Jessica Fleming Contact Phone: 619-308-9333 x177

Company Name: RECON Environmental Contact Email: jfleming@reconenvironmental.com

Project Information

1. What is the size of the project site (acres)? 2.5 acres (2.2 acres net)

2. Identify all applicable proposed land uses:

   ☐ Residential (indicate # of single-family dwelling units):

   ☑ Residential (indicate # of multi-family dwelling units): 50 units

   ☐ Commercial (indicate total square footage):

   ☐ Industrial (indicate total square footage):

   ☐ Other (describe):

3. Provide a description of the project proposed. This description should match the basic project description used for the CEQA document. The description may be attached to the Checklist if there are space constraints.

The proposed project would request a Density Bonus and develop the approximately 2.5-acre (2.2-acre net) previously graded project site with 50 multi-family dwelling units (22.4 dwelling units/acre), a 1,000-square-foot roof deck, a 1,170-square-foot ground floor leasing and amenity center, an 800-square-foot tot lot, and 120-square-foot ground floor fire command center. Total project square footage would equate to 58,693 square feet. Out of the 50 dwelling units, 5 units would be dedicated affordable units. The units would include a mix of studios, 1 bed/1 bath, and 2 bed/2 bath. The project would include 250 square feet of private open space for each ground floor unit and 55-63 square feet of private open space for upper floor units. In addition, 125 cubic feet of storage located in each of the 45 carports and locker storage is proposed as part of the project. The discretionary approvals necessary for the project include a Multi-Family Site Development Plan. The apartment building would reach a maximum height of 62 feet. In conjunction with the Density Bonus, and due to the site topography, the project requests a concession to allow for the proposed building to exceed the three-story, 95-foot height limit of the R-3-10 zone. The project also proposes a General Plan Amendment (GPA) to amend the existing land use designation of Commercial (217-161-1900) and Light Industrial (217-161-1800) to Medium Density Residential 2 (MDR2) (217-161-1800 and 217-161-1900) and a Rezone from Commercial (C) (217-161-1900) and Light Industrial (L-I) (217-161-1800) to Multi-Family Residential (R-3-10) (217-161-1800 and 217-161-1900).

STEP 1: LAND USE CONSISTENCY

The first step in this section evaluates a project's GHG emissions consistent with the City's *Guidance to Demonstrating Consistency with the City of San Marcos Climate Action Plan: For Discretionary Projects Subject to CEQA* (Guidance Document). New discretionary development projects subject to CEQA review that emit fewer than 500 metric tons of carbon dioxide equivalent ($MTCO_2e$) annually would not contribute considerably to cumulative climate change impacts as stated in the City's Guidance Document, and therefore, would be considered consistent with the CAP and associated emissions projections.

For projects that are subject to CAP consistency review, the next step in determining consistency 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 an explanation and supporting documentation for your answer)		**Yes**	**No**
1.	The size and type of projects listed below would emit fewer than 500 $MTCO_2e$ per year. Based on this threshold, does the proposed project exceed these characteristics? ▪ Single Family Housing: 36 dwelling units ▪ Multi-Family Housing: 55 dwelling units ▪ Office: 43,000 square feet ▪ Commercial Space: 20,000 square feet ▪ Regional Shopping Center: 18,000 square feet ▪ Hotel: 37 rooms ▪ Restaurant (Sit-Down): 6,500 square feet ▪ Restaurant (Drive-Thru, High Turnover): 2,400 square feet ▪ General Light Industrial: 58,000 square feet ▪ University: 263 students ▪ Mixed-Use: See *Guidance to Demonstrating Consistency* memorandum for methods to estimate mixed-use development thresholds ▪ Other: For project types not listed in this section the need for GHG analysis and mitigation will be made on a project-specific basis, considering the 500 $MTCO_2e$ per year screening threshold. If **"Yes",** proceed to Question 2 of Step 1. If **"No",** in accordance with the City's CAP screening criteria, the project's GHG impact is less than significant and is not subject to the measures of the CAP.	☐	☑
2.	Is the proposed project consistent with the City's existing General Plan land use designation? If **"Yes"**, proceed to Step 2. If **"No"**, proceed to Question 3 of Step 1	☐	☐
3.	For projects not consistent with the existing General Plan land use designation, does the project include a General Plan Amendment that would generate GHG emissions equal to or less than estimated emissions generated under the existing designation? If **"Yes"**, proceed to Step 2 and provide estimated project emissions under both existing and proposed designation(s) for comparison. If **"No"**, the project's GHG impact is potentially significant, and a GHG analysis must be prepared in accordance with the City's Guidance Document and applicable CEQA guidelines. The project must incorporate each of the measures identified in Step 2 to mitigate cumulative GHG emissions impacts, along with other mitigation measures as necessary based on a project specific GHG analysis.. Proceed and complete a project specific GHG analysis, and Step 2 of the Checklist.	☐	☐

STEP 2: CAP MEASURES CONSISTENCY

The second step of CAP consistency review is to evaluate a project's consistency with the applicable strategies and measures of the CAP. Each Checklist item is associated with a specific GHG reduction measure in the City's CAP. "N/A" should only be checked based on the direction provided in each Checklist Item question. All projects for which the measure is applicable must demonstrate that they would implement measures consistent with the Checklist Item, or fully substantiate how the item would be infeasible for project implementation. "N/A" responses are subject to Planning Division review and approval. If "No" is provided as a response to a question, the project would be determined to be inconsistent with the CAP and result in a significant GHG impact.

Step 2: CAP Measures Consistency			
Checklist Item (Check the appropriate box and provide an explanation for your answer. Please use additional sheets if necessary)	**Yes**	**No**	**N/A**
Project Design			
1. Electric Vehicle Charging Stations (Measure T-2) Multi-Family Residential and Non-Residential: Will the project install electric vehicle charging stations (Level 2 or better) in at least five percent of the total parking spaces provided on-site? Check "N/A" if the project is a single-family residential project or would not provide any parking.	☐	☐	☐
Please substantiate how the project satisfies question 1: _____ _____ _____ _____			
2. Bicycle Infrastructure (Measure T-8) Residential and Non-Residential Projects: If the following conditions are met, would the project pay its fair-share contribution to bicycle infrastructure improvements? ☐ Intersection or roadway segment improvements are proposed as part of the project and, ☐ The City's General Plan Mobility Element identifies bicycle infrastructure improvements at any intersection(s) or roadway segment(s) that would be improved as part of the project. Check "N/A" if the conditions above would not be met.	☐	☐	☐
Please substantiate how the project satisfies question 2: _____ _____ _____ _____			

Step 2: CAP Measures Consistency			
Checklist Item (Check the appropriate box and provide an explanation for your answer. Please use additional sheets if necessary)	**Yes**	**No**	**N/A**
3. Transportation Demand Management (Measure T-9) Multi-Family Residential and Non-Residential: Will the project develop and implement a TDM plan that includes, at a minimum, all of the TDM strategies listed below? ☐ Provide discounted monthly transit pass or provide at least 25 percent transit fare subsidy to residents/employees. ☐ Provide designated car-share, carpool, vanpool, and/or park-and-ride parking spaces.[2] ☐ Provide pedestrian connections between all internal uses and to all existing or planned external streets around the project site(s). ☐ Provide secure bicycle parking spaces or bicycle racks, showers, and clothes lockers. ☐ Encourage telecommuting for employees (allow one telecommute day per week or compressed work weeks) or provide a telecommute work center with common office space and equipment available to residents. *-or-* Would the project implement and monitor for four (4) years a TDM program that demonstrates an alternative transportation (i.e. carpool, public transit, bicycle, walk, telecommute) mode share of at least 29 percent [3] for all residents? Check "N/A" if the project is a single-family residential project or is not subject to the City's TDM Ordinance.	☐	☐	☐
Please state which measure option the project for which the project would comply and substantiate how the project satisfies question 3: _____ _____ _____ _____ _____			

[2] The designated number of car-share, carpool, vanpool, and/or park-and-ride parking spaces provided at a rate equal to or greater than CALGreen minimum requirements.

[3] Measure T-10 requires projects to increase alternative mode share by seven percent. The baseline mode share for alternative transportation (i.e. carpool, public transit, bicycle, walk, and telecommute) is 22 percent based on 2010 Census Data.

Step 2: CAP Measures Consistency			
Checklist Item (Check the appropriate box and provide an explanation for your answer. Please use additional sheets if necessary)	**Yes**	**No**	**N/A**
4. Reduce Parking Near Transit (Measure T-12) Multi-Family Residential: If located within a half-mile of a major transit stop[4], would the project provide at least 27 percent fewer parking spaces than required for the same use based on the City's municipal code parking requirements? Check "N/A" if the project is a single-family residential or non-residential project.	☐	☐	☐
Please substantiate how the project satisfies question 4: _____ _____ _____ _____ _____ _____			
5. Water Heaters (Measure E-1) Residential: Will the project install one of, or a combination of, the following water heater types in place of natural gas water heaters? ☐ Electric heat pump water heater ☐ Instantaneous electric water heater ☐ Electric tank ☐ Solar water heater with heat pump water heater backup ☐ Solar water heater with electric tank backup Check "N/A" if the project is a non-residential project.	☐	☐	☐
Please substantiate how the project satisfies question 5: _____ _____ _____ _____ _____ _____			

[4] Major transit stop is defined as a bus or light-rail station with fixed service and 10-minute minimum headways during peak hours. Project applicants should confirm with City staff if the project site would fall within this proximity tot a major transit stop.

Step 2: CAP Measures Consistency			
Checklist Item (Check the appropriate box and provide an explanation for your answer. Please use additional sheets if necessary)	**Yes**	**No**	**N/A**
6. Photovoltaic Installation (Measure E-2) Non-Residential: Will the project install photovoltaic systems with a minimum capacity of two watts per square foot of gross floor area? Check "N/A" if the project is a residential project or if installation of on-site photovoltaic would be infeasible.	☐	☐	☐
Please substantiate how the project satisfies question 6: _____ _____ _____ _____ _____			
7. Landscaping Water Use (Measure W-1) Residential and Non-Residential: Will the project comply with the City's Water Efficient Landscape Ordinance?[5] Check "N/A" if the project is not proposing any landscaping or is not subject to the City's Water Efficient Landscape Ordinance.	☐	☐	☐
Please substantiate how the project satisfies question 7: _____ _____ _____ _____ _____ _____			

[5] City of San Marcos Landscape Manual: https://www.san-marcos.net/home/showdocument?id=13984

Step 2: CAP Measures Consistency			
Checklist Item (Check the appropriate box and provide an explanation for your answer. Please use additional sheets if necessary)	**Yes**	**No**	**N/A**
8. Urban Tree Canopy (Measure C-2) Single-Family Residential: Will the project plant a minimum of one tree per single-family residential unit? *-or-* Multi-Family Residential and Non-Residential: If the project is providing more than 10 parking spaces, will the project plant at least one tree per five parking spaces provided? Check "N/A" if planting the required number of trees on-site would be infeasible.	☐	☐	☐

Please substantiate how the project satisfies question 8:

_____

_____

_____

_____

_____

_____

APPENDIX F

Storm Water Quality Management Plan (SWQMP)

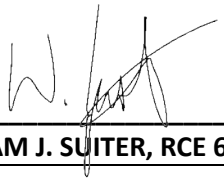
CITY OF SAN MARCOS

PRIORITY DEVELOPMENT PROJECT (PDP)
STORM WATER QUALITY MANAGEMENT PLAN (SWQMP)
FOR
SAN MARCOS RESIDENCES

2972 & 2982 S SANTA FE AVENUE
SAN MARCOS, CA 92069

ASSESSOR'S PARCEL NUMBER(S):
217-161-18 & 217-161-19

ENGINEER OF WORK:



WILLIAM J. SUITER, RCE 68964

PREPARED FOR:

SANTA FE FLORES LP
P.O. BOX 903
RANCHO SANTA FE, CA 92067
(858) 888-2488

PDP SWQMP PREPARED BY:

PASCO LARET SUITER & ASSOCIATES
27127 CALLE ARROYO, SUITE 1904
SAN JUAN CAPISTRANO, CA 92675
(949) 661-6695

DATE OF SWQMP:

OCTOBER 2021
REVISED: MARCH 2022
REVISED: APRIL 2022

GRADING PLANS PREPARED BY:

PASCO LARET SUITER & ASSOCIATES
27127 CALLE ARROYO, SUITE 1904
SAN JUAN CAPISTRANO, CA 92675
(949) 661-6695

Page intentionally left blank

TABLE OF CONTENTS

TABLE OF CONTENTS 3
ACRONYMS 4
PDP SWQMP PREPARER'S CERTIFICATION PAGE 5
PDP SWQMP PROJECT OWNER'S CERTIFICATION PAGE 7
SUBMITTAL RECORD 9
PROJECT VICINITY MAP 10
FORM I-1 APPLICABILITY OF STORM WATER BMP REQUIREMENTS 11
FORM I-2 PROJECT TYPE DETERMINATION CHECKLIST 13
FORM I-3B SITE INFORMATION CHECKLIST FOR PDPS 15
FORM I-4 SOURCE CONTROL BMP CHECKLIST FOR ALL DEVELOPMENT PROJECTS 25
FORM I-5 SITE DESIGN BMP CHECKLIST FOR ALL DEVELOPMENT PROJECTS 27
FORM I-6 SUMMARY OF PDP STRUCTURAL BMPS 29
ATTACHMENT 1 BACKUP FOR PDP POLLUTANT CONTROL BMPS 35
ATTACHMENT 2 BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES 37
ATTACHMENT 3 STRUCTURAL BMP MAINTENANCE INFORMATION 39
ATTACHMENT 4 COPY OF PLAN SHEETS WITH PERMANENT STORM WATER BMPS 41

ACRONYMS

APN	Assessor's Parcel Number
BMP	Best Management Practice
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWQMP	Storm Water Quality Management Plan

PDP SWQMP PREPARER'S CERTIFICATION PAGE

Project Name: San Marcos Residences
Permit Application Number: [Insert Permit Application Number]

PREPARER'S CERTIFICATION

I hereby declare that I am the Engineer in Responsible Charge of design of storm water best management practices (BMPs) for this project, and that I have exercised responsible charge over the design of the BMPs as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the PDP requirements of the City of San Marcos BMP Design Manual, which is a design manual for compliance with local City of San Marcos and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2015-0100) requirements for storm water management.

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 BMP Design Manual. 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 BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by the City Engineer is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

_____
Engineer of Work's Signature, PE Number & Expiration Date

W. Justin Suiter
Print Name

Pasco Laret Suiter & Associates
Company

_____
Date

Engineer's Seal:

Page intentionally blank

PDP SWQMP PROJECT OWNER'S CERTIFICATION PAGE

Project Name: San Marcos Residences
Permit Application Number: [Insert Permit Application Number]

PROJECT OWNER'S CERTIFICATION

This PDP SWQMP has been prepared for Santa Fe Flores, LP by Pasco Laret Suiter & Associates. The PDP SWQMP is intended to comply with the PDP requirements of the City of San Marcos BMP Design Manual, which is a design manual for compliance with local City of San Marcos and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2015-0100) requirements for storm water management.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan. Once the undersigned transfers its interests in the property, its successor-in-interest shall bear the aforementioned responsibility to implement the best management practices (BMPs) described within this plan, including ensuring on-going operation and maintenance of structural BMPs. A signed copy of this document shall be available on the subject property into perpetuity.

_____
Project Owner's Signature

Paul Mayer_____
Print Name

Santa Fe Flores LP_____
Company

_____
Date

Page intentionally blank

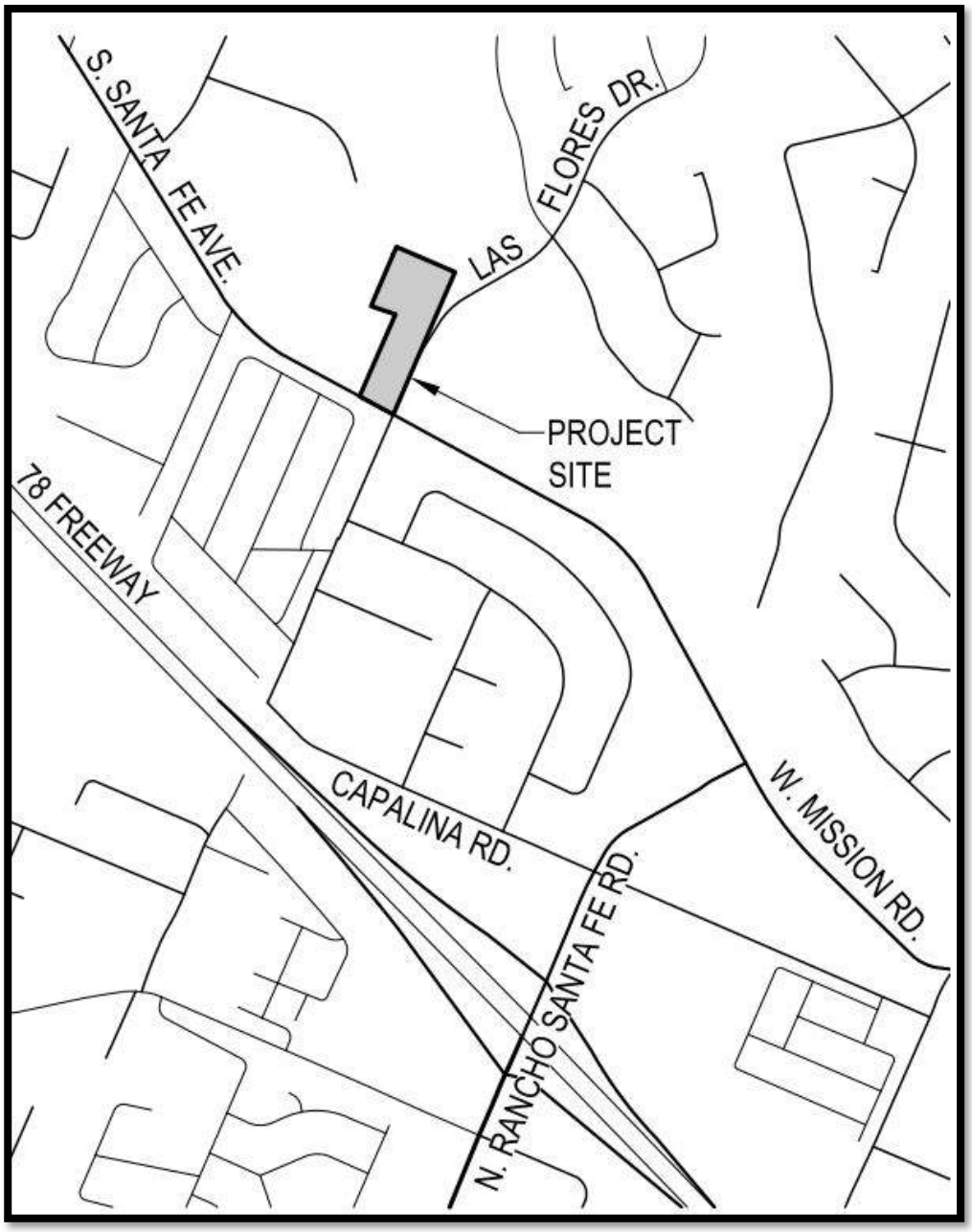
SUBMITTAL RECORD

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 column 4 summarize the changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments behind this page.

Submittal Number	Date	Project Status	Summary of Changes
1	October 2021	☑Preliminary Design / Planning/ CEQA ☐ Final Design	Initial Submittal
2	March 2022	☑Preliminary Design / Planning/ CEQA ☐ Final Design	Resubmittal to address City comments
3	April 2022	☑ Preliminary Design / Planning/ CEQA ☐ Final Design	Resubmittal to address City comments
4		☐ Preliminary Design / Planning/ CEQA ☐ Final Design	

PROJECT VICINITY MAP

Project Name: San Marcos Residences
Permit Application Number: [Insert Permit Application Number]



FORM I-1 APPLICABILITY OF STORM WATER BMP REQUIREMENTS

Applicability of Storm Water Best Management Practices (BMP) Requirements **(Storm Water Intake Form for all Development Permit Applications)** **For detailed information please visit:** **http://www.san-marcos.net/departments/development-services/stormwater/development-planning**	**Form I-1** [March 15, 2016]

Project Identification	
Project Name: San Marcos Residences	
Description: Proposed 54-unit multifamily development with parking lots, access drive, outdoor garden area, miscellaneous hardscape and landscaping.	
Permit Application Number (if applicable):	Date: 10/21/2021
Project Address: 2972/2982 South Santa Fe Avenue	

Determination of Requirements

This form is required as part of the City's application process. The purpose of this form is to identify potential land development planning storm water requirements that apply to development projects.

Development projects are defined as construction, rehabilitation, redevelopment, or reconstruction of any public or private projects. In addition, the identification of a development project, as it relates to storm water regulations, would truly apply to development and redevelopment activities that have the potential to contact storm water and contribute a source of pollutants, or reduce the natural absorption and infiltration abilities of the land.

To access the BMP Design Manual, Storm Water Quality Management Plan (SWQMP) templates, and other pertinent information related to this program please refer to:
http://www.san-marcos.net/departments/development-services/stormwater/development-planning

Please answer each of the following steps below, starting with Step 1 and progressing through each step until reaching "Stop".

Step	Answer	Progression
Step 1: Based on the above, Is the project a "development project" (See definition above)? See Section 1.3 of the BMP Design Manual for further guidance if necessary.	☑ Yes	Go to Step 2.
	☐ No	Permanent BMP requirements do not apply. No SWQMP will be required. Provide brief discussion below. **STOP.**
Discussion / justification if the project is not a "development project" (e.g., the project includes *only* interior remodels within an existing building):		
Step 2: Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? **To answer this item, complete Form I-2, Project Type Determination. See Section 1.4 of the BMP Design Manual *in its entirety* for guidance.** **In addition to Section 1.4, please refer to the City's SWQMP Submittal Requirements form.**	☐ Standard Project	Only Standard Project requirements apply, including Standard Project SWQMP. **STOP.**
	☑ PDP	Standard and PDP requirements apply, including PDP SWQMP. **Go to Step 3 on the following page.**
	☐ Exception to PDP definitions	Standard Project requirements apply, and any additional requirements specific to the type of project. Provide discussion and list any additional requirements below. Prepare Standard Project SWQMP. **STOP.**

Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:

Form I-1 Page 2, Form Date: March 15, 2016		
Step 3 (PDPs only). Please answer the list of questions in this section to determine if hydromodification requirements reply to the proposed PDP. Does the project:		
Step 3a. Discharge storm water runoff directly to the Pacific Ocean?	☐ Yes	**STOP**. Hydromodification requirements do not apply.
	☑ No	Continue to Step 3b.
Step 3b. Discharge storm water runoff directly to an enclosed embayment, not within protected areas?	☐ Yes	**STOP**. Hydromodification requirements do not apply.
	☑ No	Continue to Step 3c.
Step 3c. Discharge storm water runoff directly to a water storage reservoir or lake, below spillway or normal operating level?	☐ Yes	**STOP**. Hydromodification requirements do not apply.
	☑ No	Continue to Step 3d.
Step 3d. Discharge storm water runoff directly to an area identified in WMAA?	☐ Yes	**STOP**. Hydromodification requirements do not apply.
	☑ No	Hydromodification requirements apply to the project. Go to Step 4.
Discussion / justification if hydromodification control requirements do not apply:		

Step 4 (PDPs subject to hydromodification control requirements only). Does protection of critical coarse sediment yield areas apply based on review of WMAA Potential Critical Coarse Sediment Yield Area Map? See Section 6.2 of the BMP Design Manual 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.

FORM I-2 PROJECT TYPE DETERMINATION CHECKLIST

Project Type Determination Checklist			Form I-2 [March 15, 2016]
Project Information			
Project Name/Description: San Marcos Residences			
Permit Application Number (if applicable):			Date:10/21/2021
Project Address: 2972/2982 South Santa Fe Avenue			
Project Type Determination: Standard Project or Priority Development Project (PDP)			
The project is (select one): ☑ New Development ☐ Redevelopment			
The total proposed newly created or replaced impervious area is: 70,628 ft^2 (1.62) acres			
Is the project in any of the following categories, (a) through (f)?			
Yes ☑	No ☐	(a)	New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☐	No ☐	(b)	Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site 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 ☐	(c)	New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses: (i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812). (ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater. (iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce. (iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

Form I-2 Page 2, Form Date: March 15, 2016			
Yes ☐	No ☐	(d)	New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging 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). *Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See BMP Design Manual Section 1.4.2 for additional guidance.*
Yes ☐	No ☐	(e)	New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses: (i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539. (ii) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.
Yes ☐	No ☐	(f)	New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. *Note: See BMP Design Manual Section 1.4.2 for additional guidance.*

Does the project meet the definition of one or more of the Priority Development Project categories (a) through (f) listed above?

☐ No – the project is <u>not</u> a Priority Development Project (Standard Project).

☑ Yes – the project is a Priority Development Project (PDP).

The following is for redevelopment PDPs only:

The area of existing (pre-project) impervious area at the project site is: _____ ft^2 (A)

The total proposed newly created or replaced impervious area is _____ ft^2 (B)

Percent impervious surface created or replaced (B/A)*100: _____%

The percent impervious surface created or replaced is (select one based on the above calculation):

☐ less than or equal to fifty percent (50%) – only new impervious areas are considered PDP

OR

☐ greater than fifty percent (50%) – the entire project site is a PDP

FORM I-3B SITE INFORMATION CHECKLIST FOR PDPS

Site Information Checklist For PDPs	Form I-3B (PDPs) [March 15, 2016]
Project Summary Information	
Project Name	San Marcos Residences
Project Address	2972 & 2982 South Santa Fe Avenue San Marcos, CA 92069
Assessor's Parcel Number(s) (APN(s))	217-161-18 & 217-161-19
Permit Application Number	
Project Hydrologic Unit	Select One: ☐ Santa Margarita 902 ☐ San Luis Rey 903 ☑ Carlsbad 904 ☐ San Dieguito 905 ☐ Penasquitos 906 ☐ San Diego 907 ☐ Pueblo San Diego 908 ☐ Sweetwater 909 ☐ Otay 910 ☐ Tijuana 911
Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	Agua Hedionda (904.2)
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	2.23 Acres (97,036 Square Feet)
Area to be Disturbed by the Project (Project Area)	2.06 Acres (89,554 Square Feet)
Project Proposed Impervious Area (subset of Project Area)	1.62 Acres (70,628 Square Feet)
Project Proposed Pervious Area (subset of Project Area)	0.43 Acres (18,926 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	

Form I-3B Page 2 of 10, Form Date: March 15, 2016
Description of Existing Site Condition
Current Status of the Site (select all that apply): ☐ Existing development ☐ Previously graded but not built out ☐ Demolition completed without new construction ☐ Agricultural or other non-impervious use ☑ Vacant, undeveloped/natural Description / Additional Information: Project site partially graded and storm drain improvements installed during construction of Las Flores abutment along the east side of the project site.
Existing Land Cover Includes (select all that apply): ☑ Vegetative Cover ☑ Non-Vegetated Pervious Areas ☑ Impervious Areas Description / Additional Information:
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:

Description of Existing Site Drainage Patterns

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) Is runoff from offsite conveyed through the site? if yes, quantify 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 any existing storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels; and
(4) Identify all discharge locations from the existing project site along with a summary of 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.

Describe existing site drainage patterns (Refer to the "Preliminary Hydrology Study for San Marcos Residences" prepared by Pasco Laret Suiter & Associates dated October 2021.):

The site is surrounded by residential homes to the north, east and south, and industrial offices to the west. The site is primarily undeveloped with a shared access driveway at the property's southerly boundary. The driveway also provides access to the adjacent commercial property's parking lot and commercial building. The southern portion of the site is relatively flat while the central portion slopes up to an elevated pad at the north end of the site. Las Flores Drive along the property's eastern boundary has approximately a 15-20% grade upward to the north to allow vehicle access over the railroad tracks north of the property. Elevations across the site range from a high of approximately 546 feet in the northeast corner of the property to a low of approximately 494.50 feet at the southwest corner of the property. The existing site is divided into four drainage basins:

The first drainage basin consists of the northerly half graded pad where runoff flows overland and into an existing storm drain inlet structure in the center of the pad. Captured runoff exits the site through an existing 18" RCP at the easterly boundary and into the public storm drain system within Las Flores Drive.

The second drainage basin is a similar, but much smaller, sump condition into a storm drain inlet structure exists just southerly of the north half sump condition mentioned above. Captured runoff also exits the site through a separate 18" RCP at the easterly boundary and into the public storm drain system within Las Flores Drive where it confluences with the north half pad runoff. Pipe flows continue to travel southerly down Las Flores Drive before combining with flows from a 54" RCP and 24" RCP. Combined pipe flows are then diverted to the west along South Santa Fe Avenue through a 60" RCP.

The third drainage basin consists of the southern half of the site where runoff generated from the adjacent liquor store property and the project site combines to surface flow southerly. Surface runoff exits the drainage basin through the existing shared access driveway on South Santa Fe Avenue then into the public street's curb and gutter and flows northerly approximately 100' before being captured by an existing curb inlet structure. Captured runoff is diverted across South Santa Fe Avenue through an 18" RCP storm drain pipe and into a 60" RCP that continues flowing westerly.

The fourth drainage basin is located along the west edge of Drainage Basin E1 north half pad, a small area of existing graded slopes that surface flows to the west and onto the adjacent property.

Description of Proposed Site Development

Project Description / Proposed Land Use and/or Activities:
General Plan Amendment and Rezone from Commercial and Light Industrial to Multifamily Residential to allow 54 dwelling units on a 2.23 acre site. To achieve proposed density, applicant intends to utilize State density bonus law allowances.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):

The project proposes to develop the existing vacant property and construct a new multi-family residential building with approximately 54 dwelling units, at-grade parking lots, access drives, hardscape and landscape, and associated improvements including proprietary biofiltration storm water devices that meet the requirements for pollutant control and an underground storm water storage facilities to comply with hydromodification management flow control and to mitigate the 100-year storm event peak discharge rate.

List/describe proposed pervious features of the project (e.g., landscape areas):

Proposed pervious features include landscape areas.

Does the project include grading and changes to site topography?
☑ Yes
☐ No

Description / Additional Information:

The project site will be graded to create pads suitable for the construction of structures, improvements and associated underground utilities.

Description of Proposed Site Drainage Patterns

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 or 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.

Describe proposed site drainage patterns (refer to "Preliminary Hydrology Study for San Marcos Residences" prepared by Pasco Laret Suiter & Associates dated October 2021.):
The proposed site is divided into five drainage basins:

The first drainage basin consists of the proposed site's upper level building, north parking lot area and a portion of existing public ROW hillside area that drains into the project site at the northeast corner of the property. Surface runoff will sheet flow southwesterly across the parking area, through a curb opening and into a proprietary biofiltration system. Treated flows and peak flows will enter the private storm drain pipe system then divert pipe flows to an underground storm water storage facility before exiting the project site through an existing 18" RCP storm drain pipe that flows out into the public storm drain system in Las Flores Drive.

The second drainage basin consists of the proposed site's lower level building, south parking lot area, and access road. Surface runoff will sheet flow southerly down the access road, across the parking area then through curb openings into one of two proprietary biofiltration systems. Treated flows and peak flows will enter the private storm drain pipe system then divert pipe flows to an underground storm water storage facility before exiting the project site through a new 18" RCP storm drain pipe and connect to the existing 60" RCP storm drain pipe in South Santa Fe Avenue.

The third drainage basin consists of the adjacent property's existing commercial building, existing parking area and existing undeveloped hillside to the west of the project site. A new concrete ditch is proposed along the project site's westerly boundary along the new access road and a new ribbon gutter along the existing parking area to capture off-site runoff without comingling with on-site runoff and divert the surface flows out onto South Santa Fe Avenue as in the existing condition.

The fourth drainage basin consists of the existing hillside area at the northwest corner of the site. Storm water runoff will surface flow westerly and onto the adjacent property as in the existing condition.

The fifth drainage basin consists of the existing public right-of-way hillside area at the northeast corner of the project site. A new concrete ditch is proposed along the project's easterly boundary to capture off-site runoff from the hillside without comingling with on-site runoff and diverts the surface flow to an underground storm drain piping system to confluence with runoff from Drainage Basin 1. Pipe flows will combine with the first drainage basin pipe flows (downstream of its BMP systems) and exit the site through an existing 18" RCP storm drain pipe that flows out into the public storm drain system in Las Flores Drive.

Form I-3B Page 6 of 10, Form Date: March 15, 2016

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

Description / Additional Information:

Identification and Narrative of Receiving Water and Pollutants of Concern

Describe flow path of storm water from the project site discharge location(s), through urban storm conveyance systems as applicable, to receiving creeks, rivers, and lagoons as applicable, and ultimate discharge to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable):
Storm water runoff that leaves the project site enters the existing 60" RCP in South Santa Fe Avenue then diverts flow westerly approximately 600' down South Santa Fe Avenue then heads southerly approximately 400' down Community drive before entering an unlined vegetated channel/stream. Runoff continues to travel westerly downstream through the Agua Hedionda Hydrologic Area eventually outlets into the Agua Hedionda Lagoon and the Pacific Ocean.

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
Agua Hedionda Creek	Pesticides, Fecal Indicator Bacteria, Pesticides, Metals/Metalloids, Nutrients, Salinity, Toxicity, Miscellaneous	Riparian Habitat Degradation, Hydromodification Impacts
Agua Hedionda Lagoon	Toxicity	

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 expected from the project site based on all proposed use(s) of the site (see BMP Design Manual Appendix B.6):

Pollutant	Not Applicable to the Project Site	Expected from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment		X	X
Nutrients		X	X
Heavy Metals			
Organic Compounds			
Trash & Debris		X	X
Oxygen Demanding Substances		X	
Oil & Grease		X	
Bacteria & Viruses		Potential	X
Pesticides		X	

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):

Critical Coarse Sediment Yield Areas*

***This Section only required if hydromodification management requirements apply**

Based on the maps provided within the WMAA, do potential critical coarse sediment yield areas exist within the project drainage boundaries?

☐ Yes

☑ No, No critical coarse sediment yield areas to be protected based on WMAA maps

If yes, have any of the optional analyses presented in Section 6.2 of the BMP Design Manual been performed?

☐ 6.2.1 Verification of Geomorphic Landscape Units (GLUs) Onsite

☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment

☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite

☑ No optional analyses performed, the project will avoid critical coarse sediment yield areas identified based on WMAA maps

If optional analyses were performed, what is the final result?

☑ No critical coarse sediment yield areas to be protected based on verification of GLUs onsite

☐ Critical coarse sediment yield areas exist but additional analysis has determined that protection is not required. Documentation attached in Attachment 2.b of the SWQMP.

☐ Critical coarse sediment yield areas exist and require protection. The project will implement management measures described in Sections 6.2.4 and 6.2.5 as applicable, and the areas are identified on the SWQMP Exhibit.

Discussion / Additional Information:

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.

There are two (2) POCs for the project, POC-1 and POC-2. POC-1 is located near the center of the property's eastern property boundary and POC-2 is located along near the center of the property's southern property boundary.

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:

Discussion / Additional Information: (optional)

Form I-3B Page 10 of 10, Form Date: March 15, 2016
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. N/A
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.

FORM I-4 SOURCE CONTROL BMP CHECKLIST FOR ALL DEVELOPMENT PROJECTS

Source Control BMP Checklist for All Development Projects (Standard Projects and Priority Development Projects)	Form I-4 [March 15, 2016]

Project Identification

Project Name: San Marcos Residences

Permit Application Number

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 Model BMP Design Manual 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 Model 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:			
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:			
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:			

Form I-4 Page 2 of 2, Form Date: March 15, 2016			
Source Control Requirement	**Applied?**		
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:			
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 and Equipment Cleaning	☐ 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
Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above.			

FORM I-5 SITE DESIGN BMP CHECKLIST FOR ALL DEVELOPMENT PROJECTS

Site Design BMP Checklist for All Development Projects (Standard Projects and Priority Development Projects)	Form I-5 [March 15, 2016]

Project Identification

Project Name: San Marcos Residences

Permit Application Number

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 Model BMP Design Manual 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 Model 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.

Site Design Requirement	Applied?		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	☐ Yes	☐ No	☑ N/A
Discussion / justification if SD-1 not implemented:			
SD-2 Conserve Natural Areas, Soils, and Vegetation	☐ Yes	☑ No	☐ N/A
Discussion / justification if SD-2 not implemented:			
SD-3 Minimize Impervious Area	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-3 not implemented:			
SD-4 Minimize Soil Compaction	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-4 not implemented:			
SD-5 Impervious Area Dispersion	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-5 not implemented:			

Form I-5 Page 2 of 2, Form Date: March 15, 2016			
Site Design Requirement	**Applied?**		
SD-6 Runoff Collection	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-6 not implemented:			
SD-7 Landscaping with Native or Drought Tolerant Species	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	☐ Yes	☑ No	☐ N/A
Discussion / justification if SD-8 not implemented:			

FORM I-6 SUMMARY OF PDP STRUCTURAL BMPS

Summary of PDP Structural BMPs	Form I-6 (PDPs) [March 15, 2016]
Project Identification	
Project Name: San Marcos Residences	
Permit Application Number	
PDP Structural BMPs	
All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual). 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 local jurisdiction at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record to certify construction of the structural BMPs (see Section 1.12 of the BMP Design Manual). PDP structural BMPs must be maintained into perpetuity, and the local jurisdiction must confirm the maintenance (see Section 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. **DMAs 1-3/ BMPs 1-3** Step 1A: The DMA is not self-mitigating, de minimis, or self-retaining. Step 1B: There are no site design BMPs proposed for the project for which the runoff factor can be adjusted. Step 2: Harvest and use is not feasible. Refer to Attachment 1c. Step 3: Pursuant to the geotechnical report and Worksheet C.4-1, infiltration is not feasible. Step 4: Proprietary Biofiltration BMPs (BF-3) have been selected and sized per the design criteria to meet pollutant control requirements and an underground storm water storage facility has been selected and sized per the design criteria to meet hydromodification management flow control requirements and to mitigate the project site's 100-year peak flows **DMAs 4-6** According to section 5.2.1 of the BMP Design Manual for the City of San Marcos, these DMAs qualify as self-mitigating since the vegetation in the landscaped area is native and/or non-native/ non-invasive drought tolerant species that do not require regular application of fertilizers and pesticides, soils are	

<table>
<tr><th colspan="2">Form I-6 Page 3 of X (Copy as many as needed) Form Date: March 15, 2016</th></tr>
<tr><td colspan="2">Undisturbed native topsoil, or disturbes soils that have been amended and aerated, impervious area within the self-mitigated area is only hydraulically connected to a brow ditch and not any other impervious areas, and the self-mitigating areas are hydraulically separated from DMAs that contain permanent pollutant control BMPs.</td></tr>
<tr><td colspan="2">Structural BMP Summary Information
(Copy this page as needed to provide information for each individual proposed structural BMP)</td></tr>
<tr><td>Structural BMP ID No. 1</td><td>DMA Nos: 1</td></tr>
<tr><td colspan="2">Construction Plan Sheet No.</td></tr>
<tr><td colspan="2">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)
☐ Biofiltration with Nutrient Sensitive Media Design (BF-2)
☑ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F
☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below)
☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below)
☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below)
☐ Detention pond or vault for hydromodification management
☐ Other (describe in discussion section below)</td></tr>
<tr><td colspan="2">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)</td></tr>
<tr><td>Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)</td><td>William J. Suiter, RCE 68964
Pasco Laret Suiter & Associates
1911 San Diego Avenue, Suite 100
San Diego, CA 92110</td></tr>
<tr><td>Who will be the final owner of this BMP?</td><td>Santa Fe Flores LP</td></tr>
<tr><td>Who will maintain this BMP into perpetuity?</td><td>Santa Fe Flores LP</td></tr>
<tr><td>What is the funding mechanism for maintenance?</td><td>Santa Fe Flores LP</td></tr>
</table>

Form I-6 Page 3 of X (Copy as many as needed) Form Date: March 15, 2016	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. 2	DMA Nos: 2
Construction Plan Sheet No.	
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) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☑ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ 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 forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	William J. Suiter, RCE 68964 Pasco Laret Suiter & Associates 1911 San Diego Avenue, Suite 100 San Diego, CA 92110
Who will be the final owner of this BMP?	Santa Fe Flores LP
Who will maintain this BMP into perpetuity?	Santa Fe Flores LP
What is the funding mechanism for maintenance?	Santa Fe Flores LP

Form I-6 Page 3 of X (Copy as many as needed) Form Date: March 15, 2016	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. 3	DMA Nos: 3
Construction Plan Sheet No.	
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) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☑ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ 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 forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	William J. Suiter, RCE 68964 Pasco Laret Suiter & Associates 1911 San Diego Avenue, Suite 100 San Diego, CA 92110
Who will be the final owner of this BMP?	Santa Fe Flores LP
Who will maintain this BMP into perpetuity?	Santa Fe Flores LP
What is the funding mechanism for maintenance?	Santa Fe Flores LP

Form I-6 Page 3 of X (Copy as many as needed) Form Date: March 15, 2016	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. 10	DMA Nos: 1
Construction Plan Sheet No.	
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) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☑ 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 forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	William J. Suiter, RCE 68964 Pasco Laret Suiter & Associates 1911 San Diego Avenue, Suite 100 San Diego, CA 92110
Who will be the final owner of this BMP?	Santa Fe Flores LP
Who will maintain this BMP into perpetuity?	Santa Fe Flores LP
What is the funding mechanism for maintenance?	Santa Fe Flores LP

Form I-6 Page 3 of X (Copy as many as needed) Form Date: March 15, 2016	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. 11	DMA Nos: 2-3
Construction Plan Sheet No.	
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) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☑ 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 forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	William J. Suiter, RCE 68964 Pasco Laret Suiter & Associates 1911 San Diego Avenue, Suite 100 San Diego, CA 92110
Who will be the final owner of this BMP?	Santa Fe Flores LP
Who will maintain this BMP into perpetuity?	Santa Fe Flores LP
What is the funding mechanism for maintenance?	Santa Fe Flores LP

ATTACHMENT 1 BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist on the back of this Attachment cover sheet.	☑ 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	☑ Included

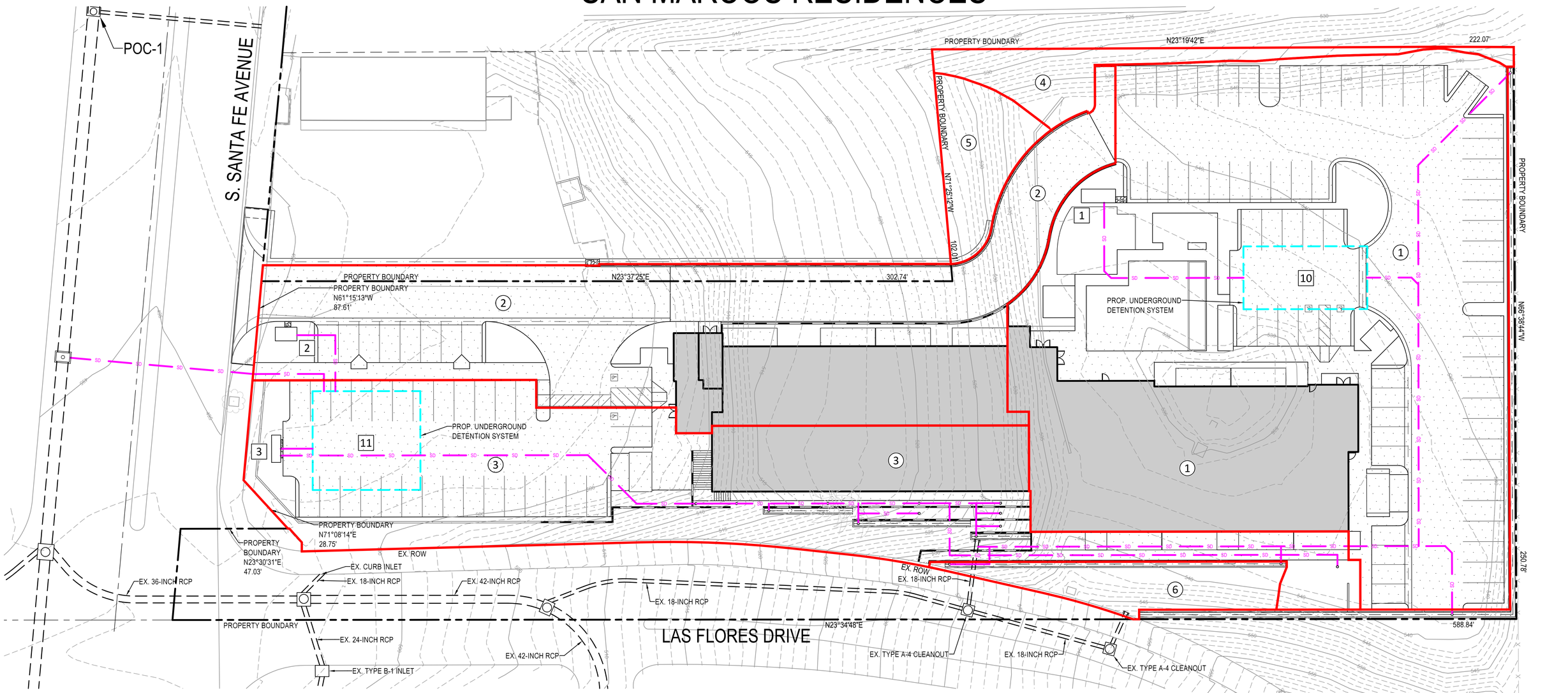
Use this checklist to ensure the required information has been included on the DMA Exhibit:

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 demolition
- ☐ 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)

DMA EXHIBIT

SAN MARCOS RESIDENCES



DMA SUMMARY

DRAINAGE MANAGEMENT AREA (DMA)	TOTAL AREA (SF/AC)	TOTAL IMPV. AREA (SF/AC)	TOTAL PERV. AREA (SF/AC)	DMA TYPE	BMP TYPE	BMP NAME	BMP SIZE PROVIDED
1	43,998/ 1.01	34,828/ 0.800	9,170/ 0.211	DRAINS TO BMP	PROPRIETARY BIOFILTRATION (BF-3)	1	90 SF
				DRAINS TO BMP	DETENTION VAULT	10	H: 5.58' W: 27.56' L: 54.23'
2	22,743/ 0.522	20,908/ 0.480	1,835/ 0.042	DRAINS TO BMP	PROPRIETARY BIOFILTRATION (BF-3)	2	57 SF
3	23,845/ 0.547	16,781/ 0.385	7,064/ 0.162	DRAINS TO BMP	PROPRIETARY BIOFILTRATION (BF-3)	3	48 SF
2 3	46,588/ 1.070	37,689/ 0.865	8,899/ 0.204	DRAINS TO BMP	DETENTION VAULT	11	H: 3.54' W: 43.31' L: 47.20'
4	2,470/ 0.057	0/ 0.00	2,470/ 0.057	SELF MITIGATING	-		-
5	2,306/ 0.053	0/ 0.00	2,306/ 0.053	SELF MITIGATING	-		-
6	2,522/ 0.058	374/ 0.009	2,148/ 0.049	SELF MITIGATING	-		-

AREA CALCULATIONS

TOTAL SITE AREA: 97,036 SF (2.228 AC)
AREA DISTURBED BY PROJECT: 90,586 SF (2.080 AC)

EXISTING IMPERVIOUS AREA: 859 SF (0.020 AC)
PROPOSED IMPERVIOUS AREA: 72,891 SF (1.673 AC)
INCREASE IMPERVIOUS AREA: 72,032 SF (1.654 AC)

SOIL TYPE INFORMATION

SOIL: TYPE C & D HYDROLOGIC SOILS PER OBSERVED ONSITE SUBSURFACE SOIL CONDITIONS PROVIDED IN THE LIMITED GEOTECHNICAL INVESTIGATION PREPARED BY GHOSRIDER, INC.

GROUNDWATER INFORMATION

GROUNDWATER NOT ENCOUNTERED IN ANY OF THE BORINGS CONDUCTED BY GHOSTRIDER, INC., ACCORDING TO THE LIMITED GEOTECHNICAL INVESTIGATION PREPARED BY GHOSTRIDER, INC. CONCLUSION IN REPORT STATES "NO GROUNDWATER WAS ENCOUNTERED WITHIN ANY HAND AUGER BORING TO THE MAXIMUM EXPLORED DEPTH OF 50½ FEET".

TREATMENT CONTROL BMPS

PROPRIETARY BIOFILTRATION BF-3

POTENTIAL POLLUTANT SOURCE AREAS

TRASH DUMPESTERS, ROOFS, PARKING LOTS, LANDSCAPING, RESTAURANT(S), WATER FEATURES, AND OUTDOOR STORAGE AREAS.

SOURCE CONTROLS

SC-1: PREVENTION OF ILLICIT DISCHARGES INTO THE MS4
SC-2: STORM DRAIN STENCILING OR SIGNAGE
SC-5: PROTECT TRASH STORAGE AREAS FROM RAINFALL, RUN-ON, RUNOFF, AND WIND DISPERSAL
SC-6: ADDITIONAL BMPS BASED ON POTENTIAL SOURCES ON RUNOFF POLLUTANTS

LEGEND

PROPERTY LINE
RIGHT-OF-WAY
CENTER LINE OF ROAD
DMA BOUNDARY
EXISTING STORM DRAIN LINE
PROPOSED STORM DRAIN LINE
PROPOSED UNDERGROUND R-TANK DETENTION SYSTEM
LIMITS OF PROP. BUILDING
LIMITS OF PROP. CONCRETE PAVEMENT
DMA AREA #
BMP #

SCALE: 1" = 20'

20 10 0 20 40 60

DMA EXHIBIT
SAN MARCOS RESIDENCES
CITY OF SAN MARCOS

PASCO LARET SUITER & ASSOCIATES
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

SAVE DATE: 02/28/22 ~ PLOT DATE: 02/28/22 ~ FILE NAME: J:\ACTIVE JOBS\3527 MAYER-SOUTH SANTA FE AVE\CIVIL\REPORTS\WQMP\Attachments\Attachment 1 - Backup for BMPs\Att 1a - DMA Exhibit\3527-WQMP-DMA Exhibit.dwg

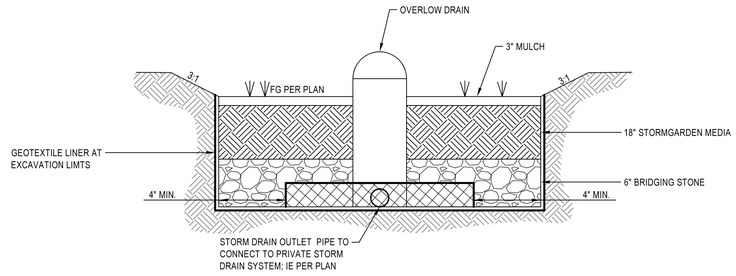
DMA EXHIBIT

SAN MARCOS RESIDENCES

StormGarden Biofilttration System
San Marcos Residences
3/1/2022

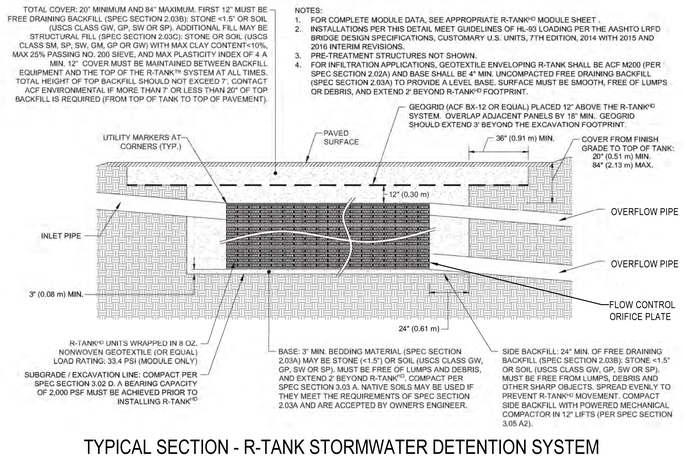
DMA	BMP type	DMA AREA (SF)	Total DMA AREA (acres)	REQ flow for dma (cfs)	StormGarden Filter Bed Size (SF)	StormGarden System Flow Rate (cfs)
1	StormGarden Boxless BioFiltration	43,998	1.01		70	0.226
2	StormGarden Boxless BioFiltration	22,743	0.52		41	0.132
3	StormGarden Boxless BioFiltration	23,845	0.55		34	0.110
Totals					**145**	

NOTES:
1. StormGarden loading rate at 145"/HR is 1.45 GPM/SF of Filter Bed.
2. The StormGarden width and length can be customized to any size and shape conceivable because it is a boxless system and indpendent of a concrete form.



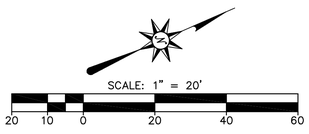
TYPICAL SECTION - STORMGARDEN BIOFILTRATION SYSTEM

SCALE: NOT TO SCALE



TYPICAL SECTION - R-TANK STORMWATER DETENTION SYSTEM

SCALE: NOT TO SCALE



DMA EXHIBIT
SAN MARCOS RESIDENCES
CITY OF SAN MARCOS

PASCO LARET SUITER & ASSOCIATES
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

SAVE DATE: ---- ~ PLOT DATE: 04/28/22 ~ FILE NAME: J:\ACTIVE JOBS\3527 MAYER-SOUTH SANTA FE AVE\CIVIL\REPORTS\WQMP\Attachments\Attachment 1 - Backup for BMPs\Att 1a - DMA Exhibit\3527-WQMP-DMA Exhibit.dwg

ATTACHMENT 1c

Harvest and Use Feasibility Screening	**Worksksheet B.3-1**

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.

Toilet/Urinal Flushing

(9.3 gal/person-day) x (0.13368 cuft/gal) x (1.5 days) = 1.86 cuft/person-36hr

Assume (2 people per 1-bed/1bath unit x 23 units) x (1.86 cuft/person-36 hr) = 85.56 cuft/36hr

(3 people per 2-bed/2-bath unit x 27 units) x (1.86 cuft/person-36hr) = 150.66 cuft/36hr

Total Toilet/Urinal Flushing= 85.56 + 150.66 = 236 cuft/36hr

Landscape Irrigation

(0.43 ac irrigated) x (390 gal/ac-36hr) x (0.13368 cuft/gal) = 23 cuft/36hr

Total = 236 cuft + 23 cuft = 259 cuft

3. Calculate the DCV using worksheet B-2.1.

DCV = 3,912 cuft

3a. Is the 36-hour demand greater than or equal to the DCV?	3b. Is the 36-hour demand greater than 0.25DCV but less than the full DCV?	3c. Is the 36-hour demand less than 0.25DCV?
Yes / ∨ No	Yes / ∨ No	∨ 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.

ATTACHMENT 1d

October 18, 2021 CTE Job No. 10-16426G

Mr. Paul Mayer
P.O. Box 903
Rancho Santa Fe, California
Phone: (858) 888-2488 Via Email: pm@pemcor.net

Subject: Site Percolation Testing and Infiltration Feasibility Evaluation
Proposed S. Santa Fe Multi-Family Housing Development
2927 S. Santa Fe Avenue
San Marcos, California

References: At End of Document – Appendix A

Mr. Mayer:

In accordance with your request and our proposal No. G-5522 dated August 30, 2021, CTE, Inc. has performed percolation testing at the site and provides an evaluation of the infiltration characteristics and feasibility for the proposed project located at the subject site. This report presents the accumulated field and laboratory data collected and provides preliminary conclusions and recommendations regarding the site's suitability for design and development of stormwater infiltration BMP devices.

Our evaluation of the site's infiltration characteristics and feasibility was performed in general accordance with the guidelines set forth in the *City of San Marcos BMP design Manual (Updated February 2016).*

Based on our geotechnical analysis of the accumulated data and information, and in consideration of the potential for geotechnical hazards associated with onsite infiltration, CTE has determined that infiltration in any amount at the site is not feasible and should not be allowed. Any/all basins for storage of stormwater runoff should be lined with an impermeable liner and piped offsite via a suitable discharge outlet.

1.0 SITE DESCRIPTION & PERCOLATION TESTING

1.1 Site Description

The subject site is located at 2927 S. Santa Fe Avenue. The proposed development is bounded by S. Santa Fe Avenue to the southwest, N. Las Flores Drive to the east, and commercial structures to the north and west.

The subject site generally descends to the southwest with approximate elevations ranging from a high of 540 feet above mean sea level (msl) at the northeast end of the site, to a low of 495 feet above msl at the southern end of the site. The site currently consists of three undeveloped terraced building pads that are separated by an approximately 10-foot-tall 2:1 (horizontal distance: vertical distance) slope.

1.2 Field Exploration

Due to the sloping nature of the site, and in consideration of the proposed multi-story structures that are planned to be terraced into the sloping site, CTE determined that the southern-lower area of the site is the only potential suitable/feasible area for development of infiltration BMP devices. As such, our percolation testing was only performed in this area.

Two percolation test borings were excavated on September 30, 2021 using a Diedrich D50 truck-mounted drill rig equipped with eight-inch diameter hollow-stem augers to depths of five feet below the existing ground surface. The test holes were excavated such that the percolation testing was performed at or near the anticipated bottom elevation of proposed infiltration basin/s.

Groundwater was not encountered in either of the percolation test excavations. In addition, groundwater was not encountered in any of the previous subsurface explorations (extending to a maximum depth of approximately 51.5 feet below existing ground surface) performed by Ghostrider, Inc., as referenced in their Limited Geotechnical Investigation Report, dated July 1st, 2020.

1.3 Site-Specific Geologic and Soil Information

Reference to the published regional geologic map, *Geologic Map of the Oceanside 30'x60' Quadrangle, Kennedy & Tan, 2007*, indicates that the site is underlain by Tertiary-age Santiago Formation (May Symbol: Tsa). However, during our subsurface field explorations within the southern-lower portion of the site, young alluvial deposits were encountered at the surface and extended to the maximum explored depth of 5 feet bgs. As observed in the exploratory excavations, the encountered alluvial materials consist of stiff to very stiff, dark brown, moist, Sandy Clay (CL) with some gravel. Detailed logs of the percolation test borings are provided in the attached Appendix C.

1.4 Percolation Test Methods

Percolation testing was performed on October 1st, 2021, subsequent to a twenty-hour presoak period, and in general accordance with applicable regional standards outlined in the *Riverside County – Low Impact Development BMP Design Handbook (09/2011)*. The percolation rate test results are presented in the following section in Table 2.2 and are included in Appendix B.

2.0 CALCULATED INFILTRATION RATE

As per the regionally accepted methods outlined in the *Riverside County – Low Impact Development BMP Design Handbook (09/2011),* percolation test rates are to be converted to infiltration rates using the Porchet Method. The intent of calculating the converted infiltration rate is to take into account bias inherent in percolation test borehole sidewall infiltration that would not occur at a basin bottom where such sidewalls may not present.

The infiltration rate (I_t) is derived by the equation:

$$I_t = \frac{\Delta H\, \pi r^2\, 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Given the measured percolation rates, the calculated infiltration rates are presented with and without a Factor of Safety applied in Table 2.2 below. A completed C.4-1 Worksheet is included in Appendix D. The civil engineer of record should determine an appropriate factor of safety to be applied via completion of Worksheet D.5-1 provided in Appendix D of the *City of San Marcos BMP design Manual (Updated February 2016).* However, CTE does not recommend using a factor of safety of less than 2.0.

TABLE 2.0
RESULTS OF PERCOLATION TESTING WITH FACTOR OF SAFETY APPLIED

Test Location	Test Depth (inches)	Procedure	Geologic Unit	Percolation Rate (inches per hour)	Infiltration Rate (inches per hour)	Infiltration Rate with FOS of 2 Applied (inches per hour)
P-1	60	Non-Sandy	Qya	1.250	0.052	0.026
P-2	60	Non-Sandy	Qya	1.250	0.052	0.026

NOTES Water level was measured from a fixed point at the top of the hole.
Weather was sunny during percolation testing.
Qya = Quaternary Young Alluvial Deposits
The test holes were eight inches in diameter.

3.0 CONCLUSIONS

The percolation testing and converted infiltration rates indicate that partial infiltration at the site appears feasible, however, based on the sloping nature of the site, the planned development, the presence of high to very high expansion potential soils, the fine-grained nature of the encountered soils, and the potential for lateral migration of infiltration water into relatively close proximity public right-of-way and utility trenches, it is CTE opinion that the site is not considered suitable for infiltration in any amount. Any/all basins for storage of stormwater runoff should be lined with an impermeable liner and piped offsite via a suitable discharge outlet.

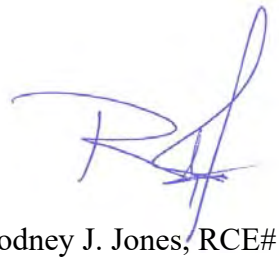
4.0 LIMITATIONS

CTE's conclusions and recommendations are based on an analysis of the observed conditions in the explored locations,the data collected and our evaluation of potential geotechnical hazards related to onsite infiltration.

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

Respectfully submitted,

CONSTRUCTION TESTING & ENGINEERING, INC.



Rodney J. Jones, RCE# 84232
Senior Engineer

Attachments:

Figure 1 Percolation Test Location Map

Appendix A References
Appendix B Percolation Test Data and Infiltration Rate Conversion Calculations
Appendix C Percolation Test Boring Logs
Appendix D Laboratory Test Results
Appendix E Worksheet C.4-1

40' 0 20' 40'

LEGEND

P-2 APPROXIMATE PERC TEST LOCATION

Qya QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSITS

Tsa TERTIARY SANTIAGO FORMATION

APPROXIMATE GEOLOGIC CONTACT

CTE A Universal Engineering Sciences Company — Construction Testing & Engineering, Inc.
Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

GEOLOGIC/PERC TEST LOCATION MAP
S. SANTA FE MULTI-FAMILY HOUSING DEVELOPMENT
2927 S. SANTA FE AVENUE
SAN MARCOS, CALIFORNIA

SCALE:	DATE:
1"=40'	10/21
CTE JOB NO.: 10-16426G	FIGURE: 1

S:\Projects\10-16426G (S. Santa Fe Ave Perc Testing)\Figure 1.dwg

APPENDIX A

REFERENCES

1. Ghostrider, Inc., Limited Geotechnical Investigation, 2972 South Santa Fe Avenue, San Marcos, Project No. 19-2118C, dated July 1, 2020.

2. Kennedy, M.P. and Tan, S.S., 2007, "Geologic Map of the Oceanside 30' x 60' Quadrangle, California", California Geological Survey, Map No. 2.

3. Riverside County, Revised 9/2011, "Design Handbook for Low Impact Development BMPs"".

4. City of San Marcos, February 2016, "BMP Design Manual For Permanent Site Design, Storm Water Treatment and Hydromodification Management"

APPENDIX B

PERCOLATION TEST DATA AND INFILTRATION RATE CONVERSION CALCULATIONS

Project: **S. SANTA FE MULTI-FAMILY HOUSING**

Project No.: **10-16426G** Tables P-1

Percolation Field Data and Calculated Rates

P-1 **Total Depth:** **60 inches**

Time	Test Interval Time (minutes)	Test Refill Depth /Inches	Water Level Initial/Start Depth /Inches	Water Level End/Final Depth /Inches	Incremental Water Level Change (inches)	Percolation Rate inches/minute	Percolation Rate inches/hour
7:25:00	Initial	None	12.88	initial	-		
7:55:00	30	12	12.88	14.63	1.75	0.058	3.500
8:25:00	30	12.75	12.00	14.13	2.13	0.071	4.250
8:55:00	30	12.875	12.75	14.13	1.38	0.046	2.750
9:25:00	30	12.125	12.88	14.00	1.13	0.038	2.250
9:55:00	30	13.75	12.13	13.75	1.63	0.054	3.250
10:25:00	30	11.625	13.75	14.63	0.88	0.029	1.750
10:55:00	30	13	11.63	13.00	1.38	0.046	2.750
11:25:00	30	13.875	13.00	13.88	0.88	0.029	1.750
11:55:00	30	12.625	13.88	14.50	0.63	0.021	1.250
12:25:00	30	13.375	12.63	13.38	0.75	0.025	1.500
12:55:00	30	13.5	13.38	14.00	0.63	0.021	1.250
13:25:00	30	NO	13.50	14.13	0.63	0.021	1.250

P-2 **Total Depth:** **60 inches**

Time	Test Interval Time (minutes)	Test Refill Depth /Inches	Water Level Initial/Start Depth /Inches	Water Level End/Final Depth /Inches	Incremental Water Level Change (inches)	Percolation Rate inches/minute	Percolation Rate inches/hour
7:25:00	Initial	None	11.50	initial	-		
7:55:00	30	12.25	11.50	15.13	3.625	0.121	7.250
8:25:00	30	12.125	12.25	15.63	3.375	0.113	6.750
8:55:00	30	12.5	12.13	15.13	3.000	0.100	6.000
9:25:00	30	12	12.50	15.50	3.000	0.100	6.000
9:55:00	30	10	12.00	15.75	3.750	0.125	7.500
10:25:00	30	11.125	10.00	14.13	4.125	0.138	8.250
10:55:00	30	13.625	11.13	13.63	2.500	0.083	5.000
11:25:00	30	12.625	13.63	14.63	1.000	0.033	2.000
11:55:00	30	13.625	12.63	13.63	1.000	0.033	2.000
12:25:00	30	12.75	13.63	14.25	0.625	0.021	1.250
12:55:00	30	13.5	12.75	13.50	0.750	0.025	1.500
13:25:00	30	NO	13.50	14.13	0.625	0.021	1.250

Percolation Rate Conversion P-1

		Inches
Time Interval,	Δt =	30
Final Depth of Water,	D_f =	14.13
Test Hole Radius,	r =	4
Initial Depth to Water,	D_0 =	13.50
Total Depth of Test Hole,	D_T =	60

H_o =	46.5	in
H_f =	45.875	in
$\Delta H = \Delta D$ =	0.625	in
H_{avg} =	46.1875	in
I_t =	0.052	in/hr

Percolation Rate Conversion P-2

		Inches
Time Interval,	Δt =	30
Final Depth of Water,	D_f =	14.13
Test Hole Radius,	r =	4
Initial Depth to Water,	D_0 =	13.50
Total Depth of Test Hole,	D_T =	60

H_o =	46.5	in
H_f =	45.875	in
$\Delta H = \Delta D$ =	0.625	in
H_{avg} =	46.1875	in
I_t =	0.052	in/hr

TABLE

RESULTS OF PERCOLATION TESTING WITH 2.0 FACTOR OF SAFETY APPLIED

Test Location	Test Depth (inches)	Procedure	Soil Type* (USCS Classification)	Percolation Rate (inches per hour)	Infiltration Rate (inches per hour)	Infiltration Rate with FOS of 2 Applied (inches per hour)
P-1	60	Non-Sandy	Qya	1.250	0.052	0.026
P-2	60	Non-Sandy	Qya	1.250	0.052	0.026

APPENDIX C

PERCOLATION TEST BORING LOGS

A Universal Engineering Sciences Company

Construction Testing & Engineering, Inc.

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

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

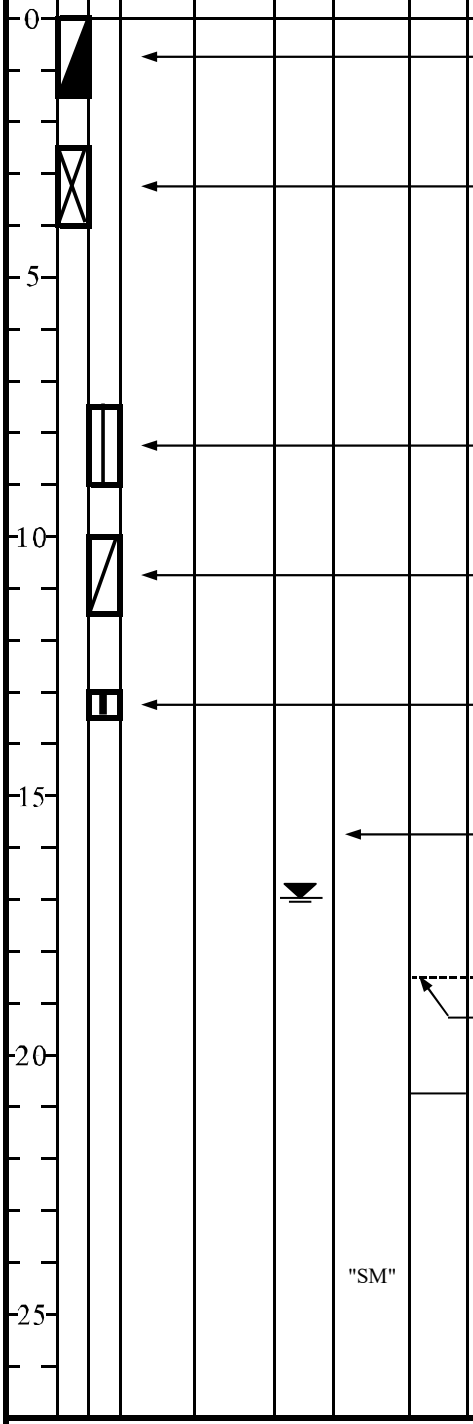
FIGURE: BL1

A Universal Engineering Sciences Company
Construction Testing & Engineering, Inc.
Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

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

BORING LEGEND

Depth (Feet) | Sample: Bulk / Driven Type | Blows/Foot | Dry Density (pcf) | Moisture (%) | U.S.C.S. Symbol | Graphic Log | DESCRIPTION | Laboratory Tests



Block or Chunk Sample

Bulk Sample

Standard Penetration Test

Modified Split-Barrel Drive Sampler (Cal Sampler)

Thin Walled Army Corp. of Engineers Sample

Groundwater Table

Soil Type or Classification Change

? ? ? ? ? ? ?

Formation Change [(Approximate boundaries queried (?)]

Quotes are placed around classifications where the soils exist in situ as bedrock

FIGURE: BL2

A Universal Engineering Sciences Company

Construction Testing & Engineering, Inc.

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

PROJECT:	S. SANTA FE MULTI-FAMILY HOUSING DE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-16426G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	9/30/2021
LOGGED BY:	DJT	SAMPLE METHOD:	SPT	ELEVATION:	~497 FEET

BORING: P-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		**QUATERNARY YOUNG ALLUVIAL DEPOSITS:** Very stiff, slightly moist, dark brown, sandy CLAY with gravel.	
		▮	5 8 9						GS
5								Total Depth: 5' No Groundwater Encountered Backfilled with Soil Cuttings	
10									
15									
20									
25									

A Universal Engineering Sciences Company

Construction Testing & Engineering, Inc.

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

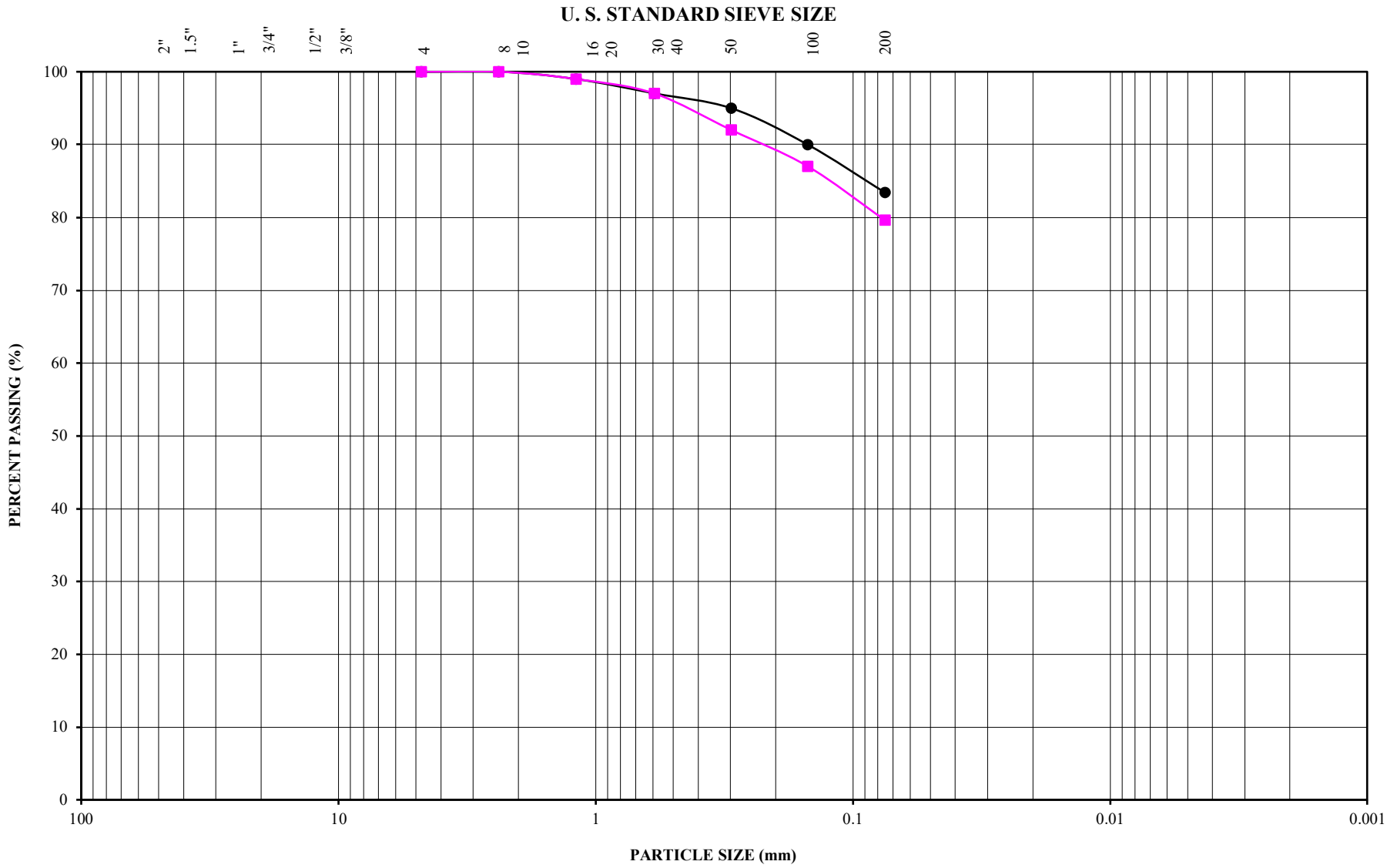
PROJECT:	S. SANTA FE MULTI-FAMILY HOUSING DE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-16426G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	9/30/2021
LOGGED BY:	DJT	SAMPLE METHOD:	SPT	ELEVATION:	~497 FEET

BORING: P-2

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						CL		**QUATERNARY YOUNG ALLUVIAL DEPOSITS:** Very stiff, slightly moist, dark brown, sandy CLAY with gravel.	
			4 8 8						GS
5								Total Depth: 5' No Groundwater Encountered Backfilled with Soil Cuttings	
10									
15									
20									
25									

APPENDIX D

LABORATORY TEST RESULTS



PARTICLE SIZE ANALYSIS

A Universal Engineering Sciences Company

Construction Testing & Engineering, Inc.

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

Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
P-1	4-5	●			CL
P-2	4-5	■			CL
CTE JOB NUMBER:		10-16426G		FIGURE:	C-1

APPENDIX E

C.4-1 WORKSHEET

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition		Worksheet C.4-1	
Part 1 - Full Infiltration Feasibility Screening Criteria **Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?**			
Criteria	Screening Question	**Yes**	**No**
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: N/A 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.	N/A	
Provide basis: N/A Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Worksheet C.4-1 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.	N/A	
Provide basis: N/A 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.	N/A	
Provide basis: N/A 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		

*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 City Engineer to substantiate findings.

Worksheet C.4-1 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X

Provide basis:

Refer to CTE's "Site Percolation Testing and Infiltration Feasibility Evaluation" letter report, dated October 18, 2021, CTE Job No. 10-16426G.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Provide basis:

Refer to CTE's "Site Percolation Testing and Infiltration Feasibility Evaluation" letter report, dated October 18, 2021, CTE Job No. 10-16426G.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	N/A	
Provide basis: N/A Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	N/A	
Provide basis: N/A Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 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.**	CTE concludes that the site is in a "no infiltration" conditions.	

*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

ATTACHMENT 1e

3527 San Marcos Residences
2/15/2022

Appendix B: Stormwater Pollutant Control Hydrologic Calculations and Sizing Methods

Worksheet B.2-1. DCV

DMA-1

Design Capture Volume		Worksheet B-2.1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.7	inches
2	Area tributary to BMP (s)	A=	1.01	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1) * See calculation below	C=	0.73	unitless
4	Street trees volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction (1 cubic foot=7.48 gallons)	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	1882	cubic-feet

	Area (sq ft)	Runoff Factor	A x RF	Weighted RF
Impervious	34,828	0.9	31,345	
Pervious	9,170	0.1	917	
Total	43,998		32,262	0.73

DMA-2

Design Capture Volume		Worksheet B-2.1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.7	inches
2	Area tributary to BMP (s)	A=	0.52	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1) * See calculation below	C=	0.84	unitless
4	Street trees volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction (1 cubic foot=7.48 gallons)	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	1108	cubic-feet

	Area (sq ft)	Runoff Factor	A x RF	Weighted RF
Impervious	20,908	0.9	18,817	
Pervious	1,835	0.1	184	
Total	22,743		19,001	0.84

3527 San Marcos Residences
2/15/2022

Appendix B: Stormwater Pollutant Control Hydrologic Calculations and Sizing Methods

Worksheet B.2-1. DCV

DMA-3

Design Capture Volume		**Worksheet B-2.1**		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.7	inches
2	Area tributary to BMP (s)	A=	0.55	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1) * See calculation below	C=	0.66	unitless
4	Street trees volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction (1 cubic foot=7.48 gallons)	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	922	cubic-feet

	Area (sq ft)	Runoff Factor	A x RF	Weighted RF
Impervious	16,781	0.9	15,103	
Pervious	7,064	0.1	706	
Total	23,845		15,809	0.66

3527 San Marcos Residences
2/28/2022

Appendix B: Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods

Worksheet B.6-1: Flow-Thru Design Flows

DMA-1

Flow-thru Design Flows		Worksheet B.6-1		
4	DCV requiring flow-thru	$DCV_{flow\text{-}thru}$	1882	cubic-feet
6	Design rainfall intensity	i=	0.20	in/hr
7	Area tributary to BMP (s)	A=	1.01	acres
8	Area-weighted runoff factor (estimate using Appendix B.2)	C=	0.73	unitless
9	Calculate Flow Rate = (C x i x A)	Q=	0.15	cfs
		1.5Q=	0.222	cfs

DMA-2

Flow-thru Design Flows		Worksheet B.6-1		
4	DCV requiring flow-thru	$DCV_{flow\text{-}thru}$	1108	cubic-feet
6	Design rainfall intensity	i=	0.20	in/hr
7	Area tributary to BMP (s)	A=	0.52	acres
8	Area-weighted runoff factor (estimate using Appendix B.2)	C=	0.84	unitless
9	Calculate Flow Rate = (C x i x A)	Q=	0.09	cfs
		1.5Q=	0.131	cfs

DMA-3

Flow-thru Design Flows		Worksheet B.6-1		
4	DCV requiring flow-thru	$DCV_{flow\text{-}thru}$	922	cubic-feet
6	Design rainfall intensity	i=	0.20	in/hr
7	Area tributary to BMP (s)	A=	0.55	acres
8	Area-weighted runoff factor (estimate using Appendix B.2)	C=	0.66	unitless
9	Calculate Flow Rate = (C x i x A)	Q=	0.07	cfs
		1.5Q=	0.109	cfs

StormGarden Biofilttration System
San Marcos Residences
3/1/2022

DMA	BMP type	DMA AREA (SF)	Total DMA AREA (acres)	REQ flow for dma (cfs)	StormGarden Filter Bed Size (SF)	StormGarden System Flow Rate (cfs)
1	StormGarden Boxless BioFiltration	43,998	1.01		70	0.226
2	StormGarden Boxless BioFiltration	22,743	0.52		41	0.132
3	StormGarden Boxless BioFiltration	23,845	0.55		34	0.110
Totals					***145***	

NOTES:

1. StormGarden loading rate at 145"/HR is 1.45 GPM/SF of Filter Bed.
2. The StormGarden width and length can be customized to any size and shape conceivable because it is a boxless system and indpendent of a concrete form.

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.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 2a	Hydromodification Management Exhibit (Required)	☑ Included See Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet.
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, including Structural BMP Drawdown Calculations and Overflow Design Summary (Required) 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

Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

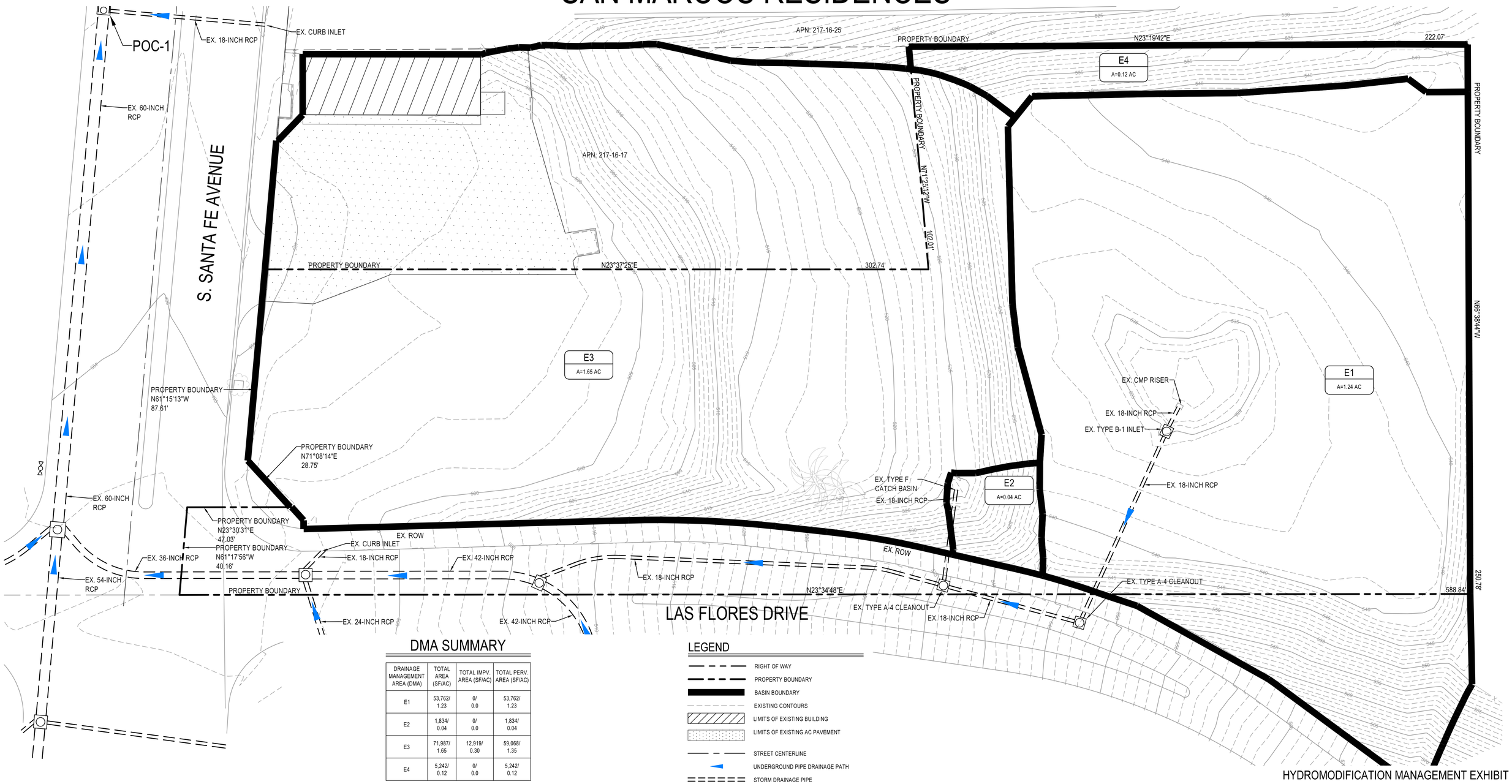
The Hydromodification Management Exhibit must identify:

- ☐ Underlying hydrologic soil group
- ☐ Approximate depth to groundwater
- ☐ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- ☐ Critical coarse sediment yield areas to be protected
- ☐ Existing topography
- ☐ Existing and proposed site drainage network and connections to drainage offsite
- ☐ Proposed grading
- ☐ Proposed impervious features
- ☐ Proposed design features and surface treatments used to minimize imperviousness
- ☐ Point(s) of Compliance (POC) for Hydromodification Management
- ☐ Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
- ☐ Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)

HYDROMODIFICATION MANAGEMENT EXHIBIT

PRE-PROJECT CONDITIONS

SAN MARCOS RESIDENCES



DMA SUMMARY

DRAINAGE MANAGEMENT AREA (DMA)	TOTAL AREA (SF/AC)	TOTAL IMPV. AREA (SF/AC)	TOTAL PERV. AREA (SF/AC)
E1	53,762/ 1.23	0/ 0.0	53,762/ 1.23
E2	1,834/ 0.04	0/ 0.0	1,834/ 0.04
E3	71,987/ 1.65	12,919/ 0.30	59,068/ 1.35
E4	5,242/ 0.12	0/ 0.0	5,242/ 0.12

LEGEND

- RIGHT OF WAY
- PROPERTY BOUNDARY
- BASIN BOUNDARY
- EXISTING CONTOURS
- LIMITS OF EXISTING BUILDING
- LIMITS OF EXISTING AC PAVEMENT
- STREET CENTERLINE
- UNDERGROUND PIPE DRAINAGE PATH
- STORM DRAINAGE PIPE
- DMA ID / DMA AREA (AC) — DMA REFERENCE CALLOUT

SCALE: 1" = 20'

20 10 0 20 40 60

HYDROMODIFICATION MANAGEMENT EXHIBIT
PRE-PROJECT CONDITIONS
SAN MARCOS RESIDENCES
CITY OF SAN MARCOS

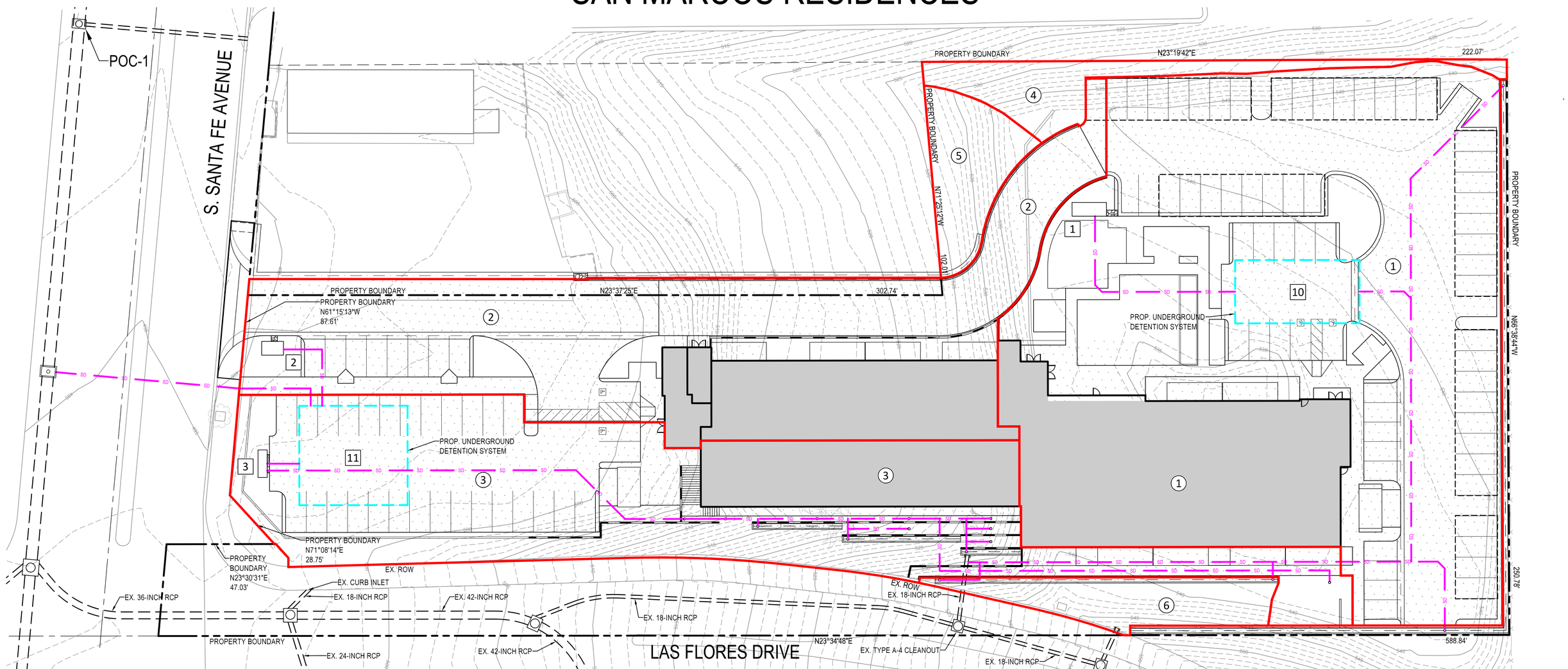
PASCO LARET SUITER & ASSOCIATES
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

SAVE DATE: 10/18/21 ~ PLOT DATE: 10/18/21 ~ FILE NAME: J:\ACTIVE JOBS\3527 MAYER-SOUTH SANTA FE AVE\CIVIL\REPORTS\WQMP\Attachments\Attachment 2 - Backup for Hydromodification Control Measures\Att 2a - Hydromod Exhibit\3527-WQMP-Hydromod Exhibit, Pre Project.dwg

HYDROMODIFICATION MANAGEMENT EXHIBIT

POST-PROJECT CONDITIONS

SAN MARCOS RESIDENCES



DMA SUMMARY

DRAINAGE MANAGEMENT AREA (DMA)	TOTAL AREA (SF/AC)	TOTAL IMPV. AREA (SF/AC)	TOTAL PERV. AREA (SF/AC)	DMA TYPE	BMP TYPE	BMP NAME	BMP SIZE PROVIDED
1	43,998/ 1.01	34,828/ 0.800	9,170/ 0.211	DRAINS TO BMP	PROPRIETARY BIOFILTRATION (BF-3)	1	110 SF
				DRAINS TO BMP	DETENTION VAULT	10	H: 5.58' W: 27.56' L: 54.23'
2	22,743/ 0.522	20,908/ 0.480	1,835/ 0.042	DRAINS TO BMP	PROPRIETARY BIOFILTRATION (BF-3)	2	56 SF
3	23,845/ 0.547	16,781/ 0.385	7,064/ 0.162	DRAINS TO BMP	PROPRIETARY BIOFILTRATION (BF-3)	3	44 SF
2 3	46,588/ 1.070	37,689/ 0.865	8,899/ 0.204	DRAINS TO BMP	DETENTION VAULT	11	H: 3.54' W: 43.31' L: 47.20'
4	2,470/ 0.057	0/ 0.00	2,470/ 0.057	SELF MITIGATING	-		-
5	2,306/ 0.053	0/ 0.00	2,306/ 0.053	SELF MITIGATING	-		-
6	2,522/ 0.058	374/ 0.009	2,148/ 0.049	SELF MITIGATING	-		-

AREA CALCULATIONS

TOTAL SITE AREA: 97,036 SF (2.228 AC)
AREA DISTURBED BY PROJECT: 90,586 SF (2.080 AC)

EXISTING IMPERVIOUS AREA: 859 SF (0.020 AC)
PROPOSED IMPERVIOUS AREA: 72,891 SF (1.673 AC)
INCREASE IMPERVIOUS AREA: 72,032 SF (1.654 AC)

SOIL TYPE INFORMATION

SOIL: TYPE C & D HYDROLOGIC SOILS PER OBSERVED ONSITE SUBSURFACE SOIL CONDITIONS PROVIDED IN THE LIMITED GEOTECHNICAL INVESTIGATION PREPARED BY GHOSRIDER, INC.

GROUNDWATER INFORMATION

GROUNDWATER NOT ENCOUNTERED IN ANY OF THE BORINGS CONDUCTED BY GHOSTRIDER, INC., ACCORDING TO THE LIMITED GEOTECHNICAL INVESTIGATION PREPARED BY GHOSTRIDER, INC. CONCLUSION IN REPORT STATES "NO GROUNDWATER WAS ENCOUNTERED WITHIN ANY HAND AUGER BORING TO THE MAXIMUM EXPLORED DEPTH OF 50½ FEET".

TREATMENT CONTROL BMPS

PROPRIETARY BIOFILTRATION BF-3

POTENTIAL POLLUTANT SOURCE AREAS

TRASH DUMPESTERS, ROOFS, PARKING LOTS, LANDSCAPING, RESTAURANT(S), WATER FEATURES, AND OUTDOOR STORAGE AREAS.

SOURCE CONTROLS

SC-1: PREVENTION OF ILLICIT DISCHARGES INTO THE MS4
SC-2: STORM DRAIN STENCILING OR SIGNAGE
SC-5: PROTECT TRASH STORAGE AREAS FROM RAINFALL, RUN-ON, RUNOFF, AND WIND DISPERSAL
SC-6: ADDITIONAL BMPS BASED ON POTENTIAL SOURCES ON RUNOFF POLLUTANTS

LEGEND

PROPERTY LINE
RIGHT-OF-WAY
CENTER LINE OF ROAD
DMA BOUNDARY
EXISTING STORM DRAIN LINE
PROPOSED STORM DRAIN LINE
PROPOSED UNDERGROUND R-TANK DETENTION SYSTEM
LIMITS OF PROP. BUILDING
LIMITS OF PROP. CONCRETE PAVEMENT
DMA AREA #
BMP #

SCALE: 1" = 20'

HYDROMODIFICATION MANAGEMENT EXHIBIT
POST-PROJECT CONDITIONS
SAN MARCOS RESIDENCES
CITY OF SAN MARCOS

PASCO LARET SUITER & ASSOCIATES
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

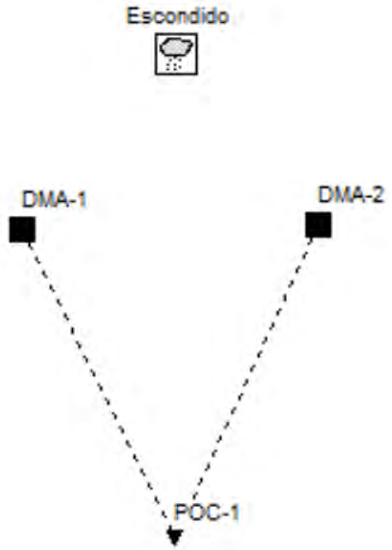
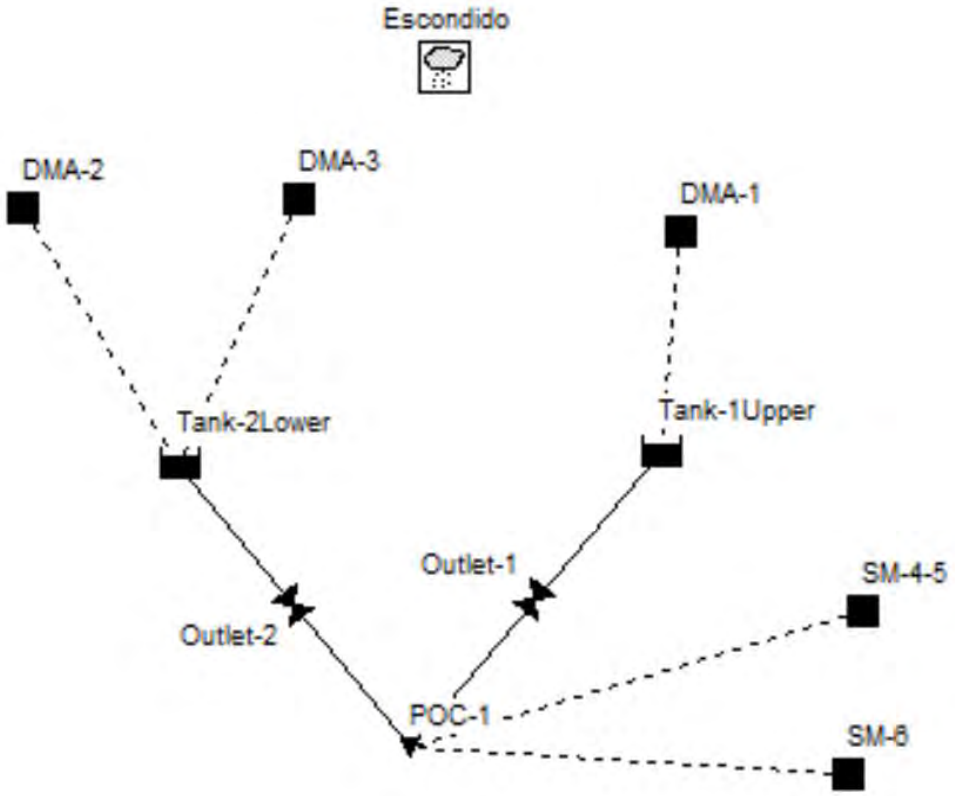
SAVE DATE: 02/15/22 ~ PLOT DATE: 02/28/22 ~ FILE NAME: J:\ACTIVE JOBS\3527 MAYER-SOUTH SANTA FE AVE\CIVIL\REPORTS\WQMP\Attachments\Attachment 2 - Backup for Hydromodification Control Measures\Att 2a - Hydromod Exhibits\3527-WQMP-Hydromod Exhibit, Post Project.dwg

ATTACHMENT 2b

Potential Critical Coarse Sediment Yield Areas, Regional San Diego County Watersheds
Source:Project Clean Water
File Name: WMAA Mapping Data from Attachment C 2018_0906.zip
Date: 10/19/18 (Last Updated)
Legend
Creek
Yes
PROJECT SITE
N33°09'34.56"
W117°12'31.68"
W117°12'5.76"
W117°11'39.84"
N33°09'8.64"
Google Earth
Image Landsat / Copernicus
N
1000 ft

ATTACHMENT 2d

SWMM MODEL SCHEMATICS

PRE-PROJECT MODEL	POST-PROJECT MODEL
	

3527 South Santa Fe
3/2/2022

POC-1
SWMM INPUT

PRE-PROJECT

DMA	Basin	Area (ac)	Width (Area/Flow Length) (ft)	% Slope	% Impervious	% "B" Soils	% "C" Soils	% "D" Soils	Weighted Infiltration (in/hr):	Weighted Suction Head (in):	Weighted Initial Deficit:	N-perv
1		1.1	290	8.0%	0%	0%	100%	0%	0.100	6.000	0.320	0.080
2		1.12	143	13.0%	0%	0%	46%	55%	0.059	7.635	0.325	0.080
	Total:	**2.22**										

POST-PROJECT

DMA	BMP	Area (ac)	Width (Area/Flow Length) (ft)	% Impervious	% Slope	% "B" Soils	% "C" Soils	% "D" Soils	Weighted Infiltration (in/hr):	Weighted Suction Head (in):	Weighted Initial Deficit:	N-perv
1	Tank-1	1.010	936	79%	5.0%	0%	100%	0%	0.075	6.000	0.320	0.06
2	Tank-2	0.522	758	92%	10.0%	0%	46%	54%	0.045	7.620	0.325	0.06
3	Tank-2	0.547	794	70%	7.0%	0%	33%	67%	0.037	8.010	0.327	0.06
SM-4 and 5	NA	0.110	165	0%	50.0%	0%	100%	0%	0.075	6.000	0.320	0.08
SM-6	NA	0.058	126	15%	50.0%	0%	100%	0%	0.075	6.000	0.320	0.08
	Total:	**2.25**										

Infiltration:		
C:	0.1	in/hr
D:	0.025	in/hr

Suction Head:		
C:	6	in
D:	9	in

Initial Deficit	
C:	0.32
D:	0.33

POC-1

```
[TITLE]
;;Project Title/Notes
3527 South Santa Fe
Pre-Development Condition

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           09/24/1964
START_TIME           13:00:00
REPORT_START_DATE    09/24/1964
REPORT_START_TIME    13:00:00
END_DATE             05/23/2008
END_TIME             22:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.557
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .06    .08    .11    .15    .17    .19    .19    .18    .15    .11    .08    .06
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
```

POC-1

```
;;-------------- --------- ------ ------ ----------
Escondido        INTENSITY 1:00     1.0      TIMESERIES Escondido

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
DMA-2            Escondido        POC-1            1.12     0        143      13       0
DMA-1            Escondido        POC-1            1.1      0        290      8        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-2            0.012      0.08       0.05       0.1        25         OUTLET
DMA-1            0.012      0.08       0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DMA-2            7.635      0.059      0.325
DMA-1            6          0.1        0.32

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC-1            0          FREE                        NO

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Escondido        FILE "J:\ACTIVE JOBS\3527 MAYER-SOUTH SANTA FE AVE\CIVIL\REPORTS\WQMP\SWMM\Rain Data\escondido\escondido1.dat"

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            -33.882            5151.408

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
```

POC-1

```
[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-2            662.783            6679.992
DMA-1            -758.346           6657.435

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Escondido        -9.075             7491.454
```

POC-1

```
[TITLE]
;;Project Title/Notes
3527 South Santa Fe
Post-Project Condition

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           09/24/1964
START_TIME           13:00:00
REPORT_START_DATE    09/24/1964
REPORT_START_TIME    13:00:00
END_DATE             05/23/2008
END_TIME             22:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.557
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .06    .08    .11    .15    .17    .19    .19    .18    .15    .11    .08    .06
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
```

POC-1

```
;;-------------- --------- ------ ------ ----------
Escondido        INTENSITY 1:00     1.0      TIMESERIES Escondido

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
DMA-2            Escondido        Tank-2Lower      0.522    92       758      10       0
DMA-1            Escondido        Tank-1Upper      1.01     79       936      5        0
SM-4-5           Escondido        POC-1            0.11     0        165      50       0
DMA-3            Escondido        Tank-2Lower      0.547    70       794      7        0
SM-6             Escondido        POC-1            0.058    15       126      50       0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-2            0.012      0.06       0.05       0.1        25         OUTLET
DMA-1            0.012      0.06       0.05       0.1        25         OUTLET
SM-4-5           0.012      0.08       0.05       0.1        25         OUTLET
DMA-3            0.012      0.06       0.05       0.1        25         OUTLET
SM-6             0.012      0.08       0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DMA-2            7.62       0.045      0.325
DMA-1            6          0.075      0.32
SM-4-5           6          0.075      0.32
DMA-3            8.01       0.037      0.327
SM-6             6          0.075      0.32

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC-1            0          FREE                        NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi      Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- -------- -------- -------- --------
Tank-1Upper      0        5.58       0          TABULAR    Tank1Upper                   0        0
Tank-2Lower      0        3.54       0          TABULAR    Tank-2Lower                  0        0

[OUTLETS]
;;Name           From Node        To Node          Offset     Type            QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- --------------- ---------------- ---------- --------
Outlet-1         Tank-1Upper      POC-1            0          TABULAR/DEPTH   OUTLET-1                    NO
Outlet-2         Tank-2Lower      POC-1            0          TABULAR/DEPTH   OUTLET-2                    NO

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
OUTLET-1         Rating     0          0
```

POC-1

```
OUTLET-1                  0.2       0.01
OUTLET-1                  0.4       0.01
OUTLET-1                  0.6       0.02
OUTLET-1                  0.8       0.02
OUTLET-1                  1         0.02
OUTLET-1                  1.2       0.02
OUTLET-1                  1.4       0.02
OUTLET-1                  1.6       0.03
OUTLET-1                  1.8       0.03
OUTLET-1                  2         0.03
OUTLET-1                  2.2       0.03
OUTLET-1                  2.4       0.03
OUTLET-1                  2.6       0.03
OUTLET-1                  2.8       0.04
OUTLET-1                  3         0.04
OUTLET-1                  3.2       0.04
OUTLET-1                  3.4       0.04
OUTLET-1                  3.6       0.04
OUTLET-1                  3.8       0.04
OUTLET-1                  4         0.04
OUTLET-1                  4.2       0.04
OUTLET-1                  4.4       0.04
OUTLET-1                  4.6       0.05
OUTLET-1                  4.8       0.05
OUTLET-1                  5         0.05
OUTLET-1                  5.2       0.87
OUTLET-1                  5.4       3.61
OUTLET-1                  5.58      7
;
OUTLET-2         Rating   0         0
OUTLET-2                  0.1       0.01
OUTLET-2                  0.2       0.01
OUTLET-2                  0.3       0.01
OUTLET-2                  0.4       0.01
OUTLET-2                  0.5       0.01
OUTLET-2                  0.6       0.02
OUTLET-2                  0.7       0.02
OUTLET-2                  0.8       0.02
OUTLET-2                  0.9       0.02
OUTLET-2                  1         0.02
OUTLET-2                  1.1       0.02
OUTLET-2                  1.2       0.02
OUTLET-2                  1.3       0.02
OUTLET-2                  1.4       0.02
OUTLET-2                  1.5       0.03
OUTLET-2                  1.6       0.03
OUTLET-2                  1.7       0.03
OUTLET-2                  1.8       0.03
OUTLET-2                  1.9       0.03
OUTLET-2                  2         0.03
OUTLET-2                  2.1       0.03
```

POC-1

```
OUTLET-2                    2.2         0.03
OUTLET-2                    2.3         0.03
OUTLET-2                    2.4         0.03
OUTLET-2                    2.5         0.03
OUTLET-2                    2.6         0.03
OUTLET-2                    2.7         0.03
OUTLET-2                    2.8         0.04
OUTLET-2                    2.9         0.04
OUTLET-2                    3           0.04
OUTLET-2                    3.1         0.37
OUTLET-2                    3.2         1.51
OUTLET-2                    3.3         3.08
OUTLET-2                    3.4         4.99
OUTLET-2                    3.5         5.66
OUTLET-2                    3.54        5.69
;
Tank1Upper       Storage    0           1520
Tank1Upper                  5.58        1520
;
Tank-2Lower      Storage    0           1995
Tank-2Lower                 3.54        1995

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Escondido        FILE "J:\ACTIVE JOBS\3527 MAYER-SOUTH SANTA FE AVE\CIVIL\REPORTS\WQMP\SWMM\Rain Data\escondido\escondido1.dat"

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            198.110            4329.947
Tank-1Upper      1409.511           5738.859
Tank-2Lower      -921.120           5673.022

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
```

POC-1

```
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-2            -1671.662          6910.758
DMA-1            1501.683           6805.419
SM-4-5           2380.183           4981.105
DMA-3            -341.754           6950.261
SM-6             2311.363           4206.877

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Escondido        392.092            7571.018
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)
--------------------------------------------------------------

3527 South Santa Fe
Pre-Development Condition


***********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
***********************************************************

***************
Analysis Options
***************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Starting Date ............ 09/24/1964 13:00:00
Ending Date .............. 05/23/2008 22:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00


*************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
*************************     ---------       -------
Total Precipitation ......       113.057       611.120
Evaporation Loss .........         1.623         8.773
Infiltration Loss ........       101.158       546.802
Surface Runoff ...........        11.234        60.723
Final Storage ............         0.000         0.000
Continuity Error (%) .....        -0.847


*************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......        11.234         3.661
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........        11.234         3.661
Flooding Loss ............         0.000         0.000
```

```
  Evaporation Loss .........         0.000         0.000
  Exfiltration Loss ........         0.000         0.000
  Initial Stored Volume ....         0.000         0.000
  Final Stored Volume ......         0.000         0.000
  Continuity Error (%) .....         0.000


  **************************
  Subcatchment Runoff Summary
  **************************

  ---------------------------------------------------------------------------------------------------------------------------
                           Total      Total      Total      Total     Imperv       Perv      Total       Total     Peak  Runoff
                          Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff      Runoff   Runoff   Coeff
  Subcatchment                in         in         in         in         in         in         in    10^6 gal      CFS
  ---------------------------------------------------------------------------------------------------------------------------
  DMA-2                   611.12       0.00      11.07     537.38       0.00      69.00      69.00        2.10     0.88   0.113
  DMA-1                   611.12       0.00       6.43     556.40       0.00      52.29      52.29        1.56     0.82   0.086


  Analysis begun on:  Wed Mar  2 11:57:09 2022
  Analysis ended on:  Wed Mar  2 11:57:39 2022
  Total elapsed time: 00:00:30
```

```
  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)
  --------------------------------------------------------------

  3527 South Santa Fe
  Post-Project Condition


  ***********************************************************
  NOTE: The summary statistics displayed in this report are
  based on results found at every computational time step,
  not just on results from each reporting time step.
  ***********************************************************

  ****************
  Analysis Options
  ****************
  Flow Units ............... CFS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Infiltration Method ...... GREEN_AMPT
  Flow Routing Method ...... KINWAVE
  Starting Date ............ 09/24/1964 13:00:00
  Ending Date .............. 05/23/2008 22:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 01:00:00
  Wet Time Step ............ 00:15:00
  Dry Time Step ............ 04:00:00
  Routing Time Step ........ 60.00 sec


  *************************        Volume         Depth
  Runoff Quantity Continuity     acre-feet        inches
  *************************     ---------       -------
  Total Precipitation ......       114.432       611.120
  Evaporation Loss .........        11.688        62.417
  Infiltration Loss ........        25.406       135.682
  Surface Runoff ...........        79.431       424.198
  Final Storage ............         0.005         0.025
  Continuity Error (%) .....        -1.833


  *************************        Volume        Volume
  Flow Routing Continuity        acre-feet      10^6 gal
  *************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......        79.431        25.884
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
```

```
External Inflow .....          0.000        0.000
External Outflow .....        79.418       25.880
Flooding Loss .....            0.000        0.000
Evaporation Loss .....         0.000        0.000
Exfiltration Loss .....        0.000        0.000
Initial Stored Volume ....     0.000        0.000
Final Stored Volume .....      0.007        0.002
Continuity Error (%) .....     0.007
```

```
*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.
```

```
************************
Routing Time Step Summary
************************
Minimum Time Step           :    59.00 sec
Average Time Step           :    60.00 sec
Maximum Time Step           :    60.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00
```

```
**************************
Subcatchment Runoff Summary
**************************
```

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
DMA-2	611.12	0.00	75.02	40.19	499.47	8.58	508.05	7.20	0.45	0.831
DMA-1	611.12	0.00	65.42	114.54	428.12	13.73	441.85	12.12	0.84	0.723
SM-4-5	611.12	0.00	6.89	545.59	0.00	65.06	65.06	0.19	0.08	0.106
DMA-3	611.12	0.00	60.78	148.60	380.17	34.04	414.20	6.15	0.46	0.678
SM-6	611.12	0.00	17.37	463.93	82.01	55.52	137.52	0.22	0.05	0.225

```
******************
Node Depth Summary
******************
```

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
POC-1	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
Tank-1Upper	STORAGE	0.05	5.15	5.15	11059 08:02	5.15
Tank-2Lower	STORAGE	0.05	3.15	3.15	10332 03:23	3.15

```
******************
Node Inflow Summary
******************

-----------------------------------------------------------------------------------------------
                                 Maximum  Maximum                  Lateral       Total        Flow
                                 Lateral    Total  Time of Max      Inflow      Inflow     Balance
                                  Inflow   Inflow   Occurrence      Volume      Volume       Error
Node                 Type           CFS      CFS  days hr:min    10^6 gal    10^6 gal     Percent
-----------------------------------------------------------------------------------------------
POC-1                OUTFALL       0.13     1.47  11059  08:01       0.411        25.9       0.000
Tank-1Upper          STORAGE       0.84     0.84  10332  03:16        12.1        12.1       0.007
Tank-2Lower          STORAGE       0.89     0.89  10332  03:31        13.4        13.4       0.007


*********************
Node Flooding Summary
*********************

No nodes were flooded.


**********************
Storage Volume Summary
**********************

-----------------------------------------------------------------------------------------------
                       Average     Avg  Evap Exfil       Maximum     Max    Time of Max    Maximum
                        Volume    Pcnt  Pcnt  Pcnt        Volume    Pcnt     Occurrence    Outflow
Storage Unit         1000 ft3    Full  Loss  Loss      1000 ft3    Full    days hr:min        CFS
-----------------------------------------------------------------------------------------------
Tank-1Upper             0.082       1     0     0         7.826      92    11059  08:01       0.66
Tank-2Lower             0.103       1     0     0         6.278      89    10332  03:21       0.90


***********************
Outfall Loading Summary
***********************

-------------------------------------------------------------
                       Flow       Avg       Max       Total
                       Freq      Flow      Flow      Volume
Outfall Node           Pcnt       CFS       CFS    10^6 gal
-------------------------------------------------------------
POC-1                 10.97      0.02      1.47      25.878
-------------------------------------------------------------
System                10.97      0.02      1.47      25.878


*******************
Link Flow Summary
*******************
```

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
Outlet-1	DUMMY	0.66	11059	08:02			
Outlet-2	DUMMY	0.90	10332	03:23			

****
Conduit Surcharge Summary
****

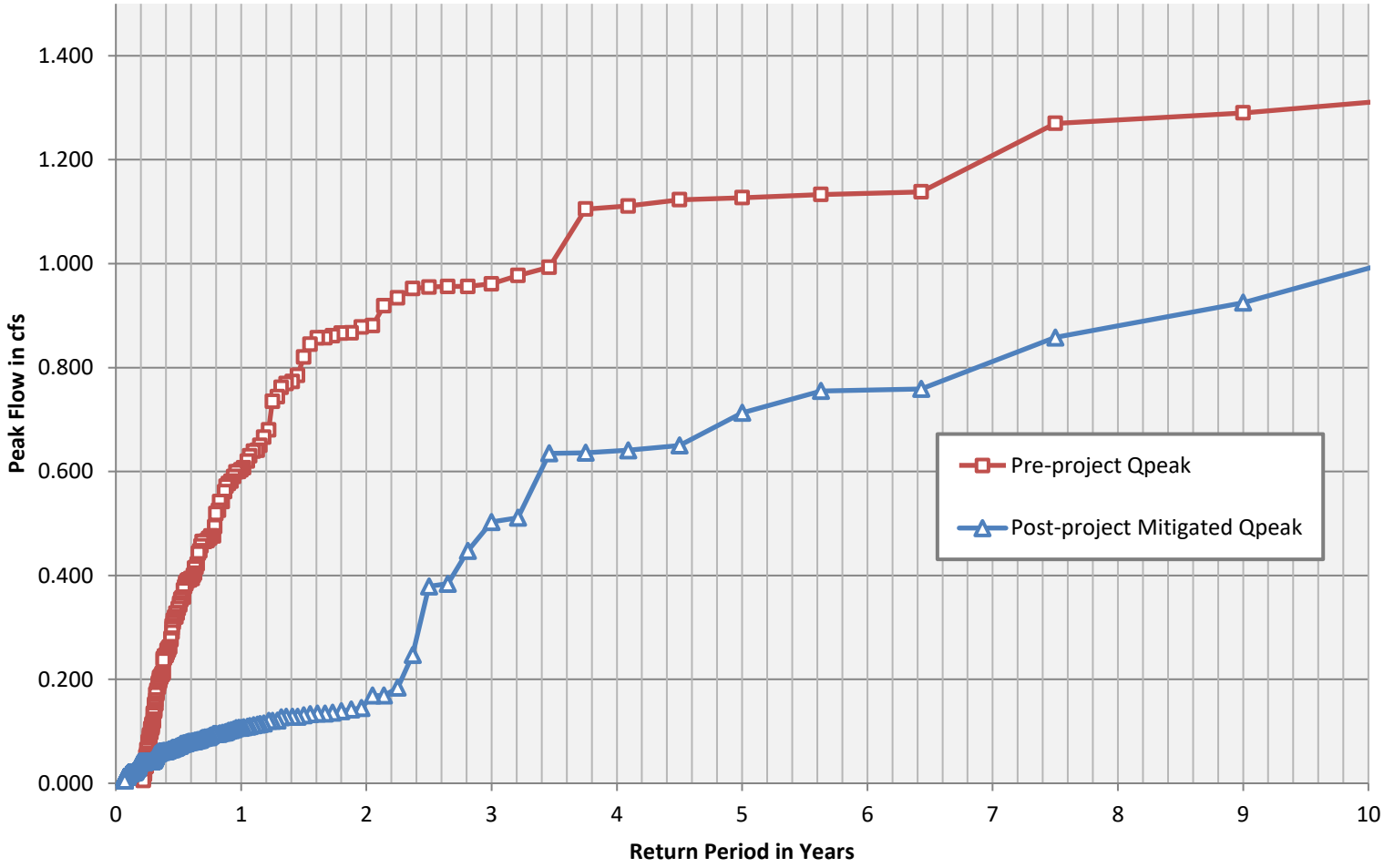
No conduits were surcharged.

Analysis begun on: Wed Mar 2 12:59:17 2022
Analysis ended on: Wed Mar 2 12:59:56 2022
Total elapsed time: 00:00:39

Peak Flow Frequency Summary

Return Period	Pre-project Qpeak (cfs)	Post-project - Mitigated Q (cfs)
LF = 0.1xQ2	0.088	0.016
2-year	0.879	0.156
5-year	1.127	0.713
10-year	1.310	0.991

Peak Flow Frequency Curves

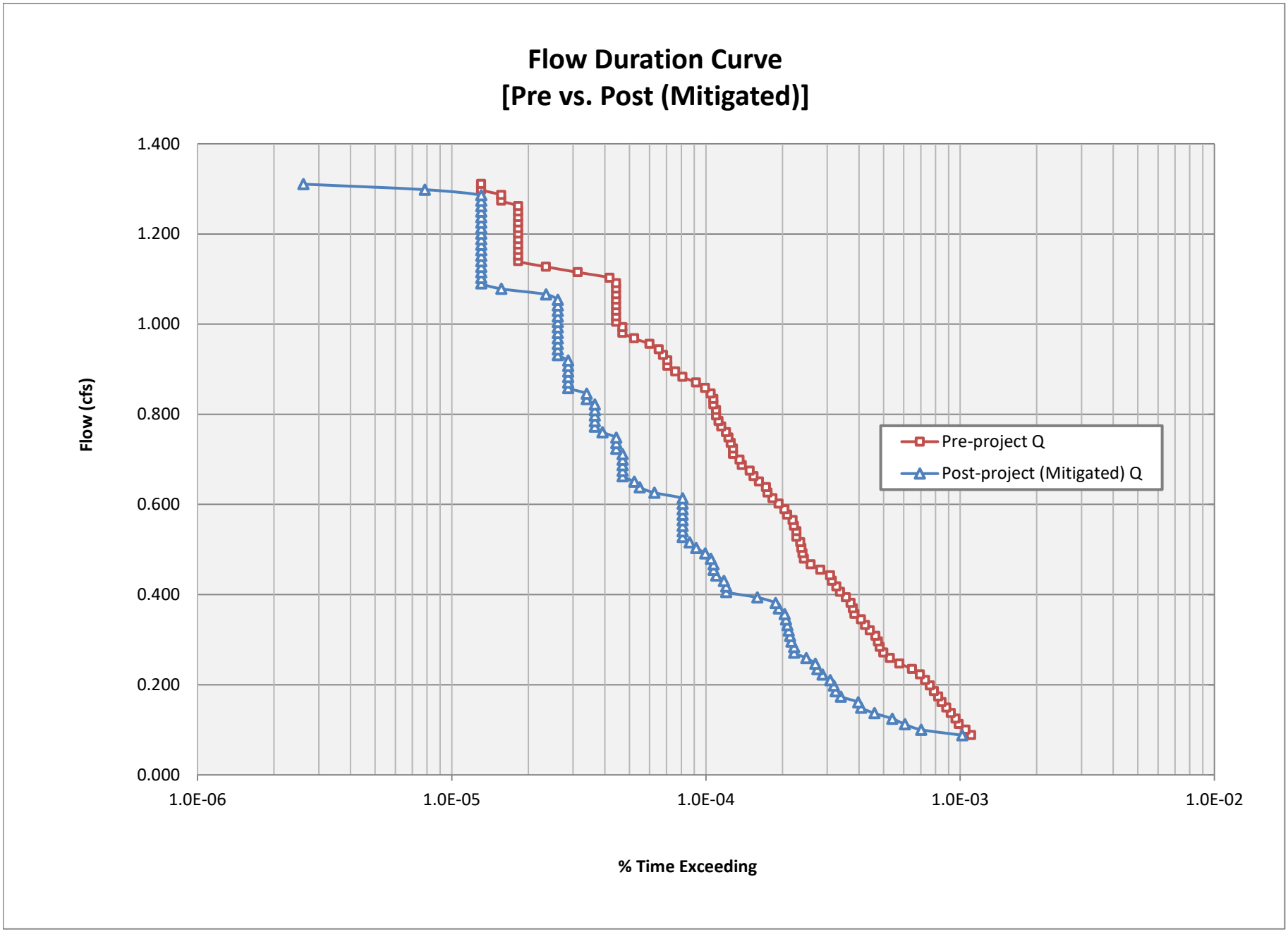


Low-flow Threshold:	10%	
0.1xQ2 (Pre):	0.088	cfs
Q10 (Pre):	1.310	cfs
Ordinate #:	100	
Incremental Q (Pre):	0.01223	cfs
Total Hourly Data:	382736	hours

The proposed BMP: PASSED

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
0	0.088	423	1.11E-03	390	1.02E-03	92%	Pass
1	0.100	402	1.05E-03	269	7.03E-04	67%	Pass
2	0.112	378	9.88E-04	232	6.06E-04	61%	Pass
3	0.125	368	9.61E-04	207	5.41E-04	56%	Pass
4	0.137	352	9.20E-04	176	4.60E-04	50%	Pass
5	0.149	338	8.83E-04	156	4.08E-04	46%	Pass
6	0.161	324	8.47E-04	152	3.97E-04	47%	Pass
7	0.174	314	8.20E-04	130	3.40E-04	41%	Pass
8	0.186	302	7.89E-04	124	3.24E-04	41%	Pass
9	0.198	291	7.60E-04	122	3.19E-04	42%	Pass
10	0.210	279	7.29E-04	118	3.08E-04	42%	Pass
11	0.222	266	6.95E-04	110	2.87E-04	41%	Pass
12	0.235	248	6.48E-04	105	2.74E-04	42%	Pass
13	0.247	221	5.77E-04	103	2.69E-04	47%	Pass
14	0.259	203	5.30E-04	95	2.48E-04	47%	Pass
15	0.271	191	4.99E-04	85	2.22E-04	45%	Pass
16	0.284	185	4.83E-04	85	2.22E-04	46%	Pass
17	0.296	182	4.76E-04	83	2.17E-04	46%	Pass
18	0.308	178	4.65E-04	82	2.14E-04	46%	Pass
19	0.320	169	4.42E-04	81	2.12E-04	48%	Pass
20	0.332	162	4.23E-04	80	2.09E-04	49%	Pass
21	0.345	156	4.08E-04	79	2.06E-04	51%	Pass
22	0.357	147	3.84E-04	78	2.04E-04	53%	Pass
23	0.369	145	3.79E-04	74	1.93E-04	51%	Pass
24	0.381	142	3.71E-04	72	1.88E-04	51%	Pass
25	0.394	136	3.55E-04	61	1.59E-04	45%	Pass
26	0.406	129	3.37E-04	46	1.20E-04	36%	Pass
27	0.418	125	3.27E-04	46	1.20E-04	37%	Pass
28	0.430	120	3.14E-04	45	1.18E-04	38%	Pass
29	0.442	118	3.08E-04	42	1.10E-04	36%	Pass
30	0.455	108	2.82E-04	41	1.07E-04	38%	Pass
31	0.467	99	2.59E-04	41	1.07E-04	41%	Pass
32	0.479	93	2.43E-04	40	1.05E-04	43%	Pass
33	0.491	92	2.40E-04	38	9.93E-05	41%	Pass
34	0.504	91	2.38E-04	35	9.14E-05	38%	Pass
35	0.516	90	2.35E-04	33	8.62E-05	37%	Pass
36	0.528	87	2.27E-04	31	8.10E-05	36%	Pass
37	0.540	87	2.27E-04	31	8.10E-05	36%	Pass
38	0.552	85	2.22E-04	31	8.10E-05	36%	Pass
39	0.565	84	2.19E-04	31	8.10E-05	37%	Pass
40	0.577	80	2.09E-04	31	8.10E-05	39%	Pass
41	0.589	78	2.04E-04	31	8.10E-05	40%	Pass
42	0.601	74	1.93E-04	31	8.10E-05	42%	Pass
43	0.614	70	1.83E-04	31	8.10E-05	44%	Pass
44	0.626	67	1.75E-04	24	6.27E-05	36%	Pass
45	0.638	66	1.72E-04	21	5.49E-05	32%	Pass
46	0.650	62	1.62E-04	20	5.23E-05	32%	Pass
47	0.663	59	1.54E-04	18	4.70E-05	31%	Pass
48	0.675	57	1.49E-04	18	4.70E-05	32%	Pass
49	0.687	53	1.38E-04	18	4.70E-05	34%	Pass
50	0.699	52	1.36E-04	18	4.70E-05	35%	Pass
51	0.711	49	1.28E-04	18	4.70E-05	37%	Pass
52	0.724	49	1.28E-04	17	4.44E-05	35%	Pass
53	0.736	48	1.25E-04	17	4.44E-05	35%	Pass

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
54	0.748	47	1.23E-04	17	4.44E-05	36%	Pass
55	0.760	46	1.20E-04	15	3.92E-05	33%	Pass
56	0.773	44	1.15E-04	14	3.66E-05	32%	Pass
57	0.785	43	1.12E-04	14	3.66E-05	33%	Pass
58	0.797	42	1.10E-04	14	3.66E-05	33%	Pass
59	0.809	42	1.10E-04	14	3.66E-05	33%	Pass
60	0.821	41	1.07E-04	14	3.66E-05	34%	Pass
61	0.834	41	1.07E-04	13	3.40E-05	32%	Pass
62	0.846	40	1.05E-04	13	3.40E-05	33%	Pass
63	0.858	38	9.93E-05	11	2.87E-05	29%	Pass
64	0.870	35	9.14E-05	11	2.87E-05	31%	Pass
65	0.883	31	8.10E-05	11	2.87E-05	35%	Pass
66	0.895	29	7.58E-05	11	2.87E-05	38%	Pass
67	0.907	27	7.05E-05	11	2.87E-05	41%	Pass
68	0.919	27	7.05E-05	11	2.87E-05	41%	Pass
69	0.931	26	6.79E-05	10	2.61E-05	38%	Pass
70	0.944	25	6.53E-05	10	2.61E-05	40%	Pass
71	0.956	23	6.01E-05	10	2.61E-05	43%	Pass
72	0.968	20	5.23E-05	10	2.61E-05	50%	Pass
73	0.980	18	4.70E-05	10	2.61E-05	56%	Pass
74	0.993	18	4.70E-05	10	2.61E-05	56%	Pass
75	1.005	17	4.44E-05	10	2.61E-05	59%	Pass
76	1.017	17	4.44E-05	10	2.61E-05	59%	Pass
77	1.029	17	4.44E-05	10	2.61E-05	59%	Pass
78	1.041	17	4.44E-05	10	2.61E-05	59%	Pass
79	1.054	17	4.44E-05	10	2.61E-05	59%	Pass
80	1.066	17	4.44E-05	9	2.35E-05	53%	Pass
81	1.078	17	4.44E-05	6	1.57E-05	35%	Pass
82	1.090	17	4.44E-05	5	1.31E-05	29%	Pass
83	1.103	16	4.18E-05	5	1.31E-05	31%	Pass
84	1.115	12	3.14E-05	5	1.31E-05	42%	Pass
85	1.127	9	2.35E-05	5	1.31E-05	56%	Pass
86	1.139	7	1.83E-05	5	1.31E-05	71%	Pass
87	1.152	7	1.83E-05	5	1.31E-05	71%	Pass
88	1.164	7	1.83E-05	5	1.31E-05	71%	Pass
89	1.176	7	1.83E-05	5	1.31E-05	71%	Pass
90	1.188	7	1.83E-05	5	1.31E-05	71%	Pass
91	1.200	7	1.83E-05	5	1.31E-05	71%	Pass
92	1.213	7	1.83E-05	5	1.31E-05	71%	Pass
93	1.225	7	1.83E-05	5	1.31E-05	71%	Pass
94	1.237	7	1.83E-05	5	1.31E-05	71%	Pass
95	1.249	7	1.83E-05	5	1.31E-05	71%	Pass
96	1.262	7	1.83E-05	5	1.31E-05	71%	Pass
97	1.274	6	1.57E-05	5	1.31E-05	83%	Pass
98	1.286	6	1.57E-05	5	1.31E-05	83%	Pass
99	1.298	5	1.31E-05	3	7.84E-06	60%	Pass
100	1.310	5	1.31E-05	1	2.61E-06	20%	Pass


Flow Duration Curve
[Pre vs. Post (Mitigated)]
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Flow (cfs)
1.0E-06
1.0E-05
1.0E-04
1.0E-03
1.0E-02
% Time Exceeding
Pre-project Q
Post-project (Mitigated) Q

Summary for Pond 6P: Tank-1 Upper

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	8,482 cf	**Tank-1 Upper (Conic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.00	1,600	0.0	0	0	1,600
101.00	1,600	95.0	1,520	1,520	1,742
102.00	1,600	95.0	1,520	3,040	1,884
103.00	1,600	95.0	1,520	4,560	2,025
104.00	1,600	95.0	1,520	6,080	2,167
105.00	1,600	95.0	1,520	7,600	2,309
105.08	1,600	95.0	122	7,722	2,320
105.58	1,600	95.0	760	8,482	2,391

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**12.00" Round Culvert** L= 100.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 100.00' / 99.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	100.00'	**0.90" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	105.08'	**Custom Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 0.50 Width (feet) 6.00 6.00 0.00

Stage-Discharge for Pond 6P: Tank-1 Upper

Elevation (feet)	Primary (cfs)
100.00	0.00
100.20	0.01
100.40	0.01
100.60	0.02
100.80	0.02
101.00	0.02
101.20	0.02
101.40	0.02
101.60	0.03
101.80	0.03
102.00	0.03
102.20	0.03
102.40	0.03
102.60	0.03
102.80	0.04
103.00	0.04
103.20	0.04
103.40	0.04
103.60	0.04
103.80	0.04
104.00	0.04
104.20	0.04
104.40	0.04
104.60	0.05
104.80	0.05
105.00	0.05
105.20	0.87
105.40	**3.61**
105.58	**7.00**

Summary for Pond 8P: Tank-2 Lower

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	7,062 cf	**Tank-2 Lower (Conic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.00	2,100	0.0	0	0	2,100
101.00	2,100	95.0	1,995	1,995	2,262
102.00	2,100	95.0	1,995	3,990	2,425
103.00	2,100	95.0	1,995	5,985	2,587
103.04	2,100	95.0	80	6,065	2,594
103.54	2,100	95.0	998	7,062	2,675

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**12.00" Round Culvert** L= 100.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 100.00' / 99.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	100.00'	**0.90" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	103.04'	**Custom Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 0.50 Width (feet) 7.00 7.00 0.00

Stage-Discharge for Pond 8P: Tank-2 Lower

Elevation (feet)	Primary (cfs)
100.00	0.00
100.10	0.01
100.20	0.01
100.30	0.01
100.40	0.01
100.50	0.01
100.60	0.02
100.70	0.02
100.80	0.02
100.90	0.02
101.00	0.02
101.10	0.02
101.20	0.02
101.30	0.02
101.40	0.02
101.50	0.03
101.60	0.03
101.70	0.03
101.80	0.03
101.90	0.03
102.00	0.03
102.10	0.03
102.20	0.03
102.30	0.03
102.40	0.03
102.50	0.03
102.60	0.03
102.70	0.03
102.80	0.04
102.90	0.04
103.00	0.04
103.10	0.37
103.20	1.51
103.30	3.08
103.40	4.99
103.50	**5.66**
103.54	**5.69**

Vault Drawdown Calculation

Project Name	South Santa Fe	Tank-1	
Project No	3527	Date	3/2/2022
Vault Drawdown	**92.2**	**hrs**	

Note: Drawdown time is calculated assuming an initial water surface depth equal to the invert of the lowest surface discharge opening in the vault outlet structure.

Underdrain Orifice Diameter:	**0.9**	in
C:	**0.6**	

Surface Depth (ft)	Volume (cf)	$Q_{orifice}$ (cfs)	ΔT (hr)	Total Time (hr)
5.08	7722	0.048	0.000	0.0
4	6080	0.042	10.181	10.2
3	4560	0.036	10.773	21.0
2	3040	0.029	12.844	33.8
1	1520	0.020	16.960	50.8
0	0	0.000	41.484	92.2

Vault Drawdown Calculation

Project Name	South Santa Fe	Tank-2	
Project No	3527	Date	3/2/2022

Vault Drawdown	**94.2**	**hrs**

Note: Drawdown time is calculated assuming an initial water surface depth equal to the invert of the lowest surface discharge opening in the vault outlet structure.

Underdrain Orifice Diameter:	**0.9**	in
C:	**0.6**	

Surface Depth (ft)	Volume (cf)	$Q_{orifice}$ (cfs)	ΔT (hr)	Total Time (hr)
3.04	6065	0.037	0.000	0.0
2	3990	0.029	17.468	17.5
1	1995	0.020	22.260	39.7
0	0	0.000	54.448	94.2

Manning's *n* Values for Overland Flow[1]

The BMP Design Manuals within the County of San Diego allow for a land surface description other than short prairie grass to be used for hydromodification BMP design only if documentation provided is consistent with Table A.6 of the SWMM 5 User's Manual.

In January 2016, the EPA released the SWMM Reference Manual Volume I – Hydrology (SWMM Hydrology Reference Manual). The SWMM Hydrology Reference Manual complements the SWMM 5 User's Manual by providing an in-depth description of the program's hydrologic components. Table 3-5 of the SWMM Hydrology Reference Manual expounds upon Table A.6 of the SWMM 5 User's Manual by providing Manning's *n* values for additional overland flow surfaces. Therefore, in order to provide SWMM users with a wider range of land surfaces suitable for local application and to provide Copermittees with confidence in the design parameters, we recommend using the values published by Yen and Chow in Table 3-5 of the EPA SWMM Reference Manual Volume I – Hydrology. The values are provided in the table below:

Overland Surface	**Manning value (*n*)**
Smooth asphalt pavement	0.010
Smooth impervious surface	0.011
Tar and sand pavement	0.012
Concrete pavement	0.014
Rough impervious surface	0.015
Smooth bare packed soil	0.017
Moderate bare packed soil	0.025
Rough bare packed soil	0.032
Gravel soil	0.025
Mowed poor grass	0.030
Average grass, closely clipped sod	0.040
Pasture	0.040
Timberland	0.060
Dense grass	0.060
Shrubs and bushes	0.080
Land Use	
Business	0.014
Semibusiness	0.022
Industrial	0.020
Dense residential	0.025
Suburban residential	0.030
Parks and lawns	0.040

[1]Content summarized from *Improving Accuracy in Continuous Simulation Modeling: Guidance for Selecting Pervious Overland Flow Manning's n Values in the San Diego Region* (TRWE, 2016).

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Diego County Area, California

July 27, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Information for All Uses.....8
Soil Properties and Qualities.....8
Soil Qualities and Features.....8
Hydrologic Soil Group (2972/2982 South Santa Fe Avenue).....8
References.....13

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (2972/2982 South Santa Fe Avenue)

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group (2972/2982 South Santa Fe Avenue)

Map Scale: 1:1,060 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 15, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 24, 2020—Feb 12, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group (2972/2982 South Santa Fe Avenue)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DaD	Diablo clay, 9 to 15 percent slopes, warm MAAT	C	1.7	72.6%
HrC	Huerhuero loam, 2 to 9 percent slopes	D	0.6	27.4%
Totals for Area of Interest			**2.3**	**100.0%**

Rating Options—Hydrologic Soil Group (2972/2982 South Santa Fe Avenue)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

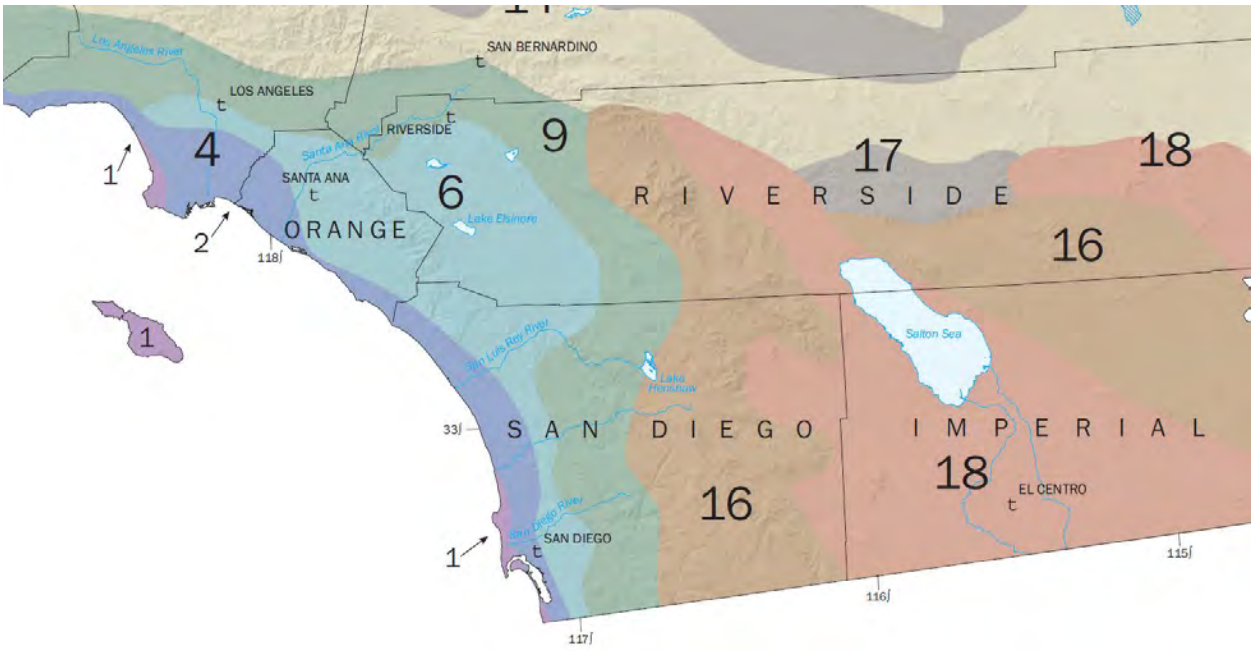


Figure G.1-2: California Irrigation Management Information System "Reference Evapotranspiration Zones"

Table G.1-1: Monthly Average Reference Evapotranspiration by ETo Zone (inches/month and inches/day) for use in SWMM Models for Hydromodification Management Studies in San Diego County CIMIS Zones 1, 4, 6, 9, and 16 (See CIMIS ETo Zone Map)

	January	February	March	April	May	June	July	August	September	October	November	December
Zone	in/month	in/month	in/month	in/month	in/month	in/month	in/month	in/month	in/month	in/month	in/month	in/month
1	0.93	1.4	2.48	3.3	4.03	4.5	4.65	4.03	3.3	2.48	1.2	0.62
4	1.86	2.24	3.41	4.5	5.27	5.7	5.89	5.58	4.5	3.41	2.4	1.86
6	1.86	2.24	3.41	4.8	5.58	6.3	6.51	6.2	4.8	3.72	2.4	1.86
9	2.17	2.8	4.03	5.1	5.89	6.6	7.44	6.82	5.7	4.03	2.7	1.86
16	1.55	2.52	4.03	5.7	7.75	8.7	9.3	8.37	6.3	4.34	2.4	1.55
	January	February	March	April	May	June	July	August	September	October	November	December
Days	31	28	31	30	31	30	31	31	30	31	30	31
Zone	in/day	in/day	in/day	in/day	in/day	in/day	in/day	in/day	in/day	in/day	in/day	in/day
1	0.030	0.050	0.080	0.110	0.130	0.150	0.150	0.130	0.110	0.080	0.040	0.020
4	0.060	0.080	0.110	0.150	0.170	0.190	0.190	0.180	0.150	0.110	0.080	0.060
6	0.060	0.080	0.110	0.160	0.180	0.210	0.210	0.200	0.160	0.120	0.080	0.060
9	0.070	0.100	0.130	0.170	0.190	0.220	0.240	0.220	0.190	0.130	0.090	0.060
16	0.050	0.090	0.130	0.190	0.250	0.290	0.300	0.270	0.210	0.140	0.080	0.050

ATTACHMENT 3 STRUCTURAL BMP MAINTENANCE INFORMATION

This is the cover sheet for Attachment 3.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	☑ Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet.
Attachment 3b	Draft Maintenance Agreement (when applicable)	☐ Included ☐ Not Applicable

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)
- ☐ 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 shall include a draft maintenance agreement in the local jurisdiction's standard format (PDP applicant to contact the [City Engineer] to obtain the current maintenance agreement forms).

R-TANK MAINTENANCE

Designing an underground stormwater detention system with future maintenance in mind is a simple process that includes three primary objectives: **PREVENT** debris from entering the system by using good pre-treatment systems, **ISOLATE** debris and sediments that manage to enter the system, and **PROTECT** the body of the system by providing backflush mechanisms to ensure longevity.

1. PREVENT

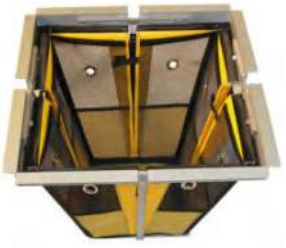
Keeping debris and sediment out of the system by pre-treating runoff is one of the smartest things an engineer can do when designing underground detention systems. It makes no sense to allow trash and sediments to flow unrestricted into an underground system where removal will be expensive. Instead, capture pollutants simply and inexpensively in the inlets, where removal is easy. There are several ways this can be accomplished with minimal cost impacts to your project.

Trash Guard Plus®

Trash Guard Plus®

Trash Guard Plus is a patented stormwater pretreatment device that traps debris, sediment and floatables in the inlet. It helps extend maintenance cycles by using the full volume of the inlet structure for sediment capacity. And it is easy to maintain by accessing pollutants through the manhole lid.

Trash Guard Plus works by both screening debris out of the runoff and by slowing the flow of runoff, causing sediments to fall to the bottom of the inlet. Testing at NC State has shown the Trash Guard to be effective at removing trash, sediment, nutrients, and metals.



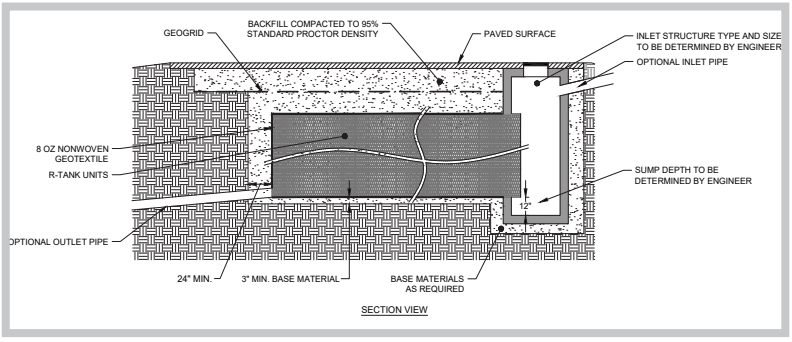
Gratemaster

Gratemaster

To treat a single inlet that serves as a junction for a larger drainage area, consider an insert like the Gratemaster. Ideal for capturing sediment and trash, it makes clean-up a snap by holding all the pollutants right near the surface for easy extraction.

R-Tank Screening

For a more centralized approach, some engineers prefer to create an opening in the inlet structures to allow the R-Tank modules to penetrate the structure to act as a trash screen. This works best with a structure that includes a sump (see drawing below).



R-TANK MAINTENANCE

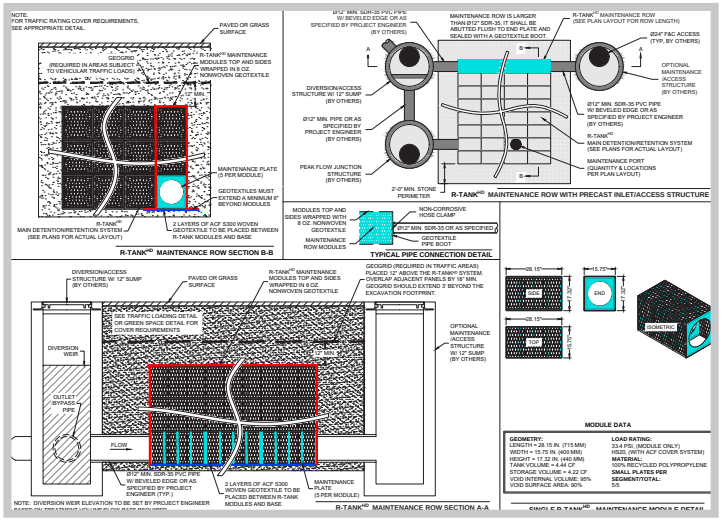
2. ISOLATE

Some pollutants may elude the pre-treatment systems. Trap these materials inside the maintenance row (see drawing to right). Consolidating sediments in a single location makes them easy to remove. Maintenance rows are formed by using maintenance modules, which have open internal components that are fully accessible by conventional jet-vac systems. These modules are set in a row (or multiple rows) to your desired length. Longer maintenance rows should include an access structure on both ends. Extremely long rows may require access from the middle of the row, as well.

The maintenance row is always wrapped in geotextile independently from the rest of the system. The geotextile retains trash, sediments, and other solids, preventing contamination of the rest of the system.

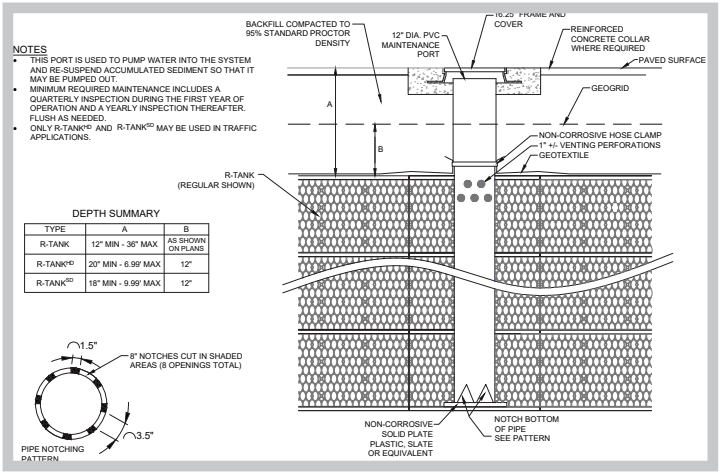
The maintenance row should be sized to treat the first flush (usually 1”) of runoff. Use a bypass structure to divert that flow into the maintenance row, and allow larger flows to continue to a downstream inlet where they can enter the R-Tank outside of the maintenance row.

The maintenance row is only available in LD, HD, and UD modules. For SD and XD modules, consider creating a forebay around the inlet locations to collect sediment. This is done by using a taller module installed at a lower invert. Geotextile baffles between the forebay and the rest of the system can help retain sediments. Concentrate Maintenance Ports (see PROTECT below) in the forebay to ensure access to sediment for removal.



3. PROTECT

Every good system has a fall-back plan. You can ensure a long system life by including maintenance ports throughout the system footprint to remove any pollutants that evade the pretreatment system and maintenance row. Maintenance ports should be specified within 10’ of inlet and outlet connections, and roughly 50’ on center (see maintenance port detail to right).



ENVIRONMENTAL
LET’S GET IT DONE
800.448.3636
acfenvironmental.com

Maintenance Procedures

Maintaining the StormGarden system is necessary to continue the effective pollutant removal from stormwater runoff prior to discharge into the stormdarin system. Ongoing maintenance will also extend the life of the filter media and the StormGarden system. As the StormGarden filters stormwater runoff, pollutants accumulate within the filter media and floating debris such as silt, trash and leaves accumulate on top of the media underneath the concrete slab. When an excessive amount of silt and trash build up on top of the media, the flow-through rate of the media is reduced, thus decreasing the capacity of the system. Regular replacement of the top mulch layer helps stop the accumulation of such sediment and debris and maintaining the overall performance of the system.

The manufacturer or manufacturer's representative includes a 1-year maintenance plan with each StormGarden purchase. The included maintenance plan consists of a maximum of 2 scheduled visits. If additional visits are required due to excessive sediment and trash loading, they can be performed by the manufacturer/representative for an additional charge. The start of the maintenance plan begins when the system is activated for full operation. Full operation is defined as the unit installed, curb and gutter and transitions in place, and the unit activated by installation contractor, which includes the mulch and plant installed and the temporary throat protection removed.

Activation cannot occur until the site is fully stabilized, which means full landscaping, grass cover, final paving and sweeping is complete. Maintenance visits are scheduled seasonally. The spring visit cleans up after winter loads which include salts and sands, and the fall visit is to remove excessive leaves and debris.

It is the responsibility of the owner to provide adequate irrigation when necessary to the plant of the StormGarden system. Cleanup due to major contamination such as oils, chemicals, toxic spills, etc. will result in additional costs and are not covered under the 1-year maintenance plan provided by manufacturer/representative. Should a major contamination event occur, the owner must block off the outlet pipe to the StormGarden unit (where the cleaned runoff drains to from the StormGarden, such as the bypass inlet) and block off the throat of the StormGarden. All appropriate regulatory parties as well as the manufacturer/representative should be informed immediately.

Each maintenance visit consists of the following tasks:

- Visual inspection of StormGarden unit and surrounding area
- Removal of tree grate and erosion control stones
- Removal of sediment, trash, debris and mulch
- Mulch replacement
- Clean and replace erosion control stones
- Evaluation of plant and pruning or replacement if necessary
- Clean area around StormGarden unit
- Maintenance report

StormGarden Maintenance Checklist

System Component	Problem	Conditions to Check	Condition that Should Exist	Actions
Inlet/Forebay Area	Excessive sediment or trash accumulation.	Accumulated sediments or trash impair free flow of water into StormGarden.	Inlet should be free of obstructions allowing free distributed flow of water into StormGarden.	Sediment and/or trash should be removed.
Mulch Cover	Trash and floatable debris accumulation.	Excessive trash and/or debris accumulation.	Minimal trash or other debrison mulch cover.	Trash and debris should be removed, and mulch cover rakedlevel.
Mulch/Media	"Ponding" of water	"Ponding" could indicate clogging due to excessive fine sediment loading or spill of petroleum oils.	Stormwater should drain freely and evenly through system	Replace mulch and/or media as necessary.
Underdrain	Not draining/ponding of water above	"Ponding" could indicate the drain rock or perforated piping is clogged.	Stormwater should drain freely and evenly through system	Flush the underdrain piping using the cleanout provided. Worse case scenario is you replace all internal components if terminally failed.
Vegetation	Plants not growing or in poor condition.	Soil/mulch too wet, evidence ofspill. Incorrect plant selection. Pest infestation. Vandalism to plants.	Plants should be healthy and pest free.	Replant with plants suitable to for system. Contact qualified landscape professional or arborist.
Vegetation	Plant growth excessive.	Plants should be appropriate to the region/climate of the site.	Plants should not be overgrown or be excessive for the system.	Trim/prune plants in accordance with typical landscaping and safety needs.
Structure	Structure has visible cracks.	Cracks wider than 1/2 inch		Vault should be repaired.

Maintenance frequency will depend on site specific characteristics and will generally need to occur 1-2 times per year

StormGarden Inspection & Maintenance Log

StormGarden System Size/Model:_____Location: _____

Date	Mulch & Debris Removed	Depth of Mulch Added	Mulch Brand	Height of Vegetation Above Grate	Vegetation Species	Issues with System	Comments

StormGarden Activation Checklist

Project Name:_____ Company:_____

Site Contact Name:_____ Site Contact Phone/Email:_____

Site Owner/End User Name:_____ Site Owner/End User Phone/Email:_____

Site Designation	System Size	Final Pavement /Top Coat Complete	Landscaping Complete/ Soil Stabilized	Construction materials / Piles / Debris Removed	Throat Opening Measures According to Plan	Plant Species Requested
		☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	
		☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	
		☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	
		☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	
		☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	
		☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	
		☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	
		☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	
		☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	

ATTACHMENT 4 COPY OF PLAN SHEETS WITH PERMANENT STORM WATER BMPS

This is the cover sheet for Attachment 4.

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 proprietary BMPs are used, site-specific cross section with outflow, inflow, and model number shall be provided. Photocopies of general brochures are not acceptable.

GPA21-0008 | MFSDP21-0002 | R21-0004

PRELIMINARY GRADING FOR SAN MARCOS RESIDENCES

2972 & 2982 S. SANTA FE AVENUE

LEGEND

- PROPERTY BOUNDARY
- CENTERLINE OF ROAD
- ADJACENT PROPERTY LINE / RIGHT-OF-WAY
- EXISTING CONTOUR LINE — 64
- EXISTING SPOT ELEVATION — (XXX.XX) FG
- PROPOSED SPOT ELEVATION — XXX.XX FS
- PROPOSED CURB & GUTTER
- PROPOSED RIBBON GUTTER
- PROPOSED RETAINING WALL
- PROPOSED GRADING DAYLIGHT
- PROPOSED STORM DRAIN — SD
- PROPOSED DOMESTIC WATER — W
- PROPOSED FIRE WATER — F
- PROPOSED SEWER — S
- PROPOSED UNDERGROUND STORM DRAIN DETENTION SYSTEM
- PROPOSED FIRE HYDRANT
- PROPOSED RIP RAP
- EXISTING WATER MAIN — W
- EXISTING SEWER MAIN — S
- EXISTING STORM DRAIN — SD
- EXISTING GAS MAIN — G
- EXISTING TELECOM CONDUIT — T

AERIAL TOPOGRAPHY

AERIAL TOPOGRAPHY SUPPLIED BY: HOOPER LAND COMPANY
1642 MOON ROCK ROAD
FALLBROOK, CA 92028
760-723-2891
SURVEY COMPLETED: JUNE 2020

ASSESSOR'S PARCEL NUMBER

217-161-18-00, 217-161-19-00

RAW EARTHWORK QUANTITIES

CUT:	17,500 CY
FILL:	250 CY
NET(EXPORT):	17,250 CY

THE ABOVE RAW EARTHWORK QUANTITIES ARE ESTIMATES ONLY. CONTRACTOR SHALL NOT RELY UPON QUANTITIES FOR BID PURPOSES. CONTRACTOR TO VERIFY EARTHWORK QUANTITIES TO THEIR SATISFACTION PRIOR TO START OF WORK.

NOTE: QUANTITIES DO NOT INCLUDE ANY EARTHWORK FOR REMEDIAL PURPOSES. EARTHWORK ESTIMATES ARE BASED ON IN PLACE VOLUMES AN DO NOT ACCOUNT FOR ANY SHRINKAGE OR SWELL OF THE SOIL THAT MAY OCCUR DURING GRADING.

PROPOSED EASEMENT INFORMATION

1 PROPOSED LANDSCAPE MAINTENANCE EASEMENT FOR OPEN SPACE SLOPE TO THE CITY OF SAN MARCOS.

EXISTING EASEMENT INFORMATION

2 EASEMENT GRANTED TO THE COUNTY OF SAN DIEGO FOR PUBLIC HIGHWAY PURPOSES, RECORDED JUNE 11, 1913 IN BOOK 500, PAGE 135, OFFICIAL RECORDS. NOT PLOTTABLE.

3 EASEMENT GRANTED TO VISTA IRRIGATION DISTRICT FOR PIPELINE AND OTHER DISTRICT WORKS, RECORDED OCTOBER 24, 1925, IN BOOK 1136, PAGE 238, OFFICIAL RECORDS. NOT PLOTTABLE.

4 EASEMENT GRANTED TO SAN DIEGO GAS AND ELECTRIC COMPANY FOR PUBLIC UTILITIES, INGRESS AND EGRESS, RECORDED JUNE 19, 1973 AS DOC. NO. 73-167727, OFFICIAL RECORDS TO BE QUITCLAIMED.

5 EASEMENT GRANTED TO THE COUNTY OF SAN DIEGO FOR UTILITY PURPOSES, RECORDED OCTOBER 25, 1979 AS DOC. NO. 79-448104, OFFICIAL RECORDS TO BE QUITCLAIMED. VACATION OF COUNTY HIGHWAY.

6 EASEMENT GRANTED TO THE COUNTY OF SAN DIEGO FOR UTILITY PURPOSES, RECORDED JUNE 24, 1987 AS DOC. NO. 87-353275 TO BE QUITCLAIMED. VACATION OF COUNTY HIGHWAY.

7 EASEMENT GRANTED TO THE CITY OF SAN MARCOS FOR PUBLIC STREET AND UTILITY PURPOSES, RECORDED OCTOBER 13, 2005 AS DOC. NO. 2005-0887133.

8 EASEMENT GRANTED TO THE CITY OF SAN MARCOS FOR OPEN SPACE SLOPE LANDSCAPE MAINTENANCE AND ACCESS PURPOSES, RECORDED OCTOBER 13, 2005 AS DOC. NO. 2005-0887134, OFFICIAL RECORDS.

9 EASEMENT GRANTED TO VISTA IRRIGATION DISTRICT FOR UTILITY PURPOSES, RECORDED NOVEMBER 17, 2005 AS DOC. NO. 2005-0996226, OFFICIAL RECORDS.

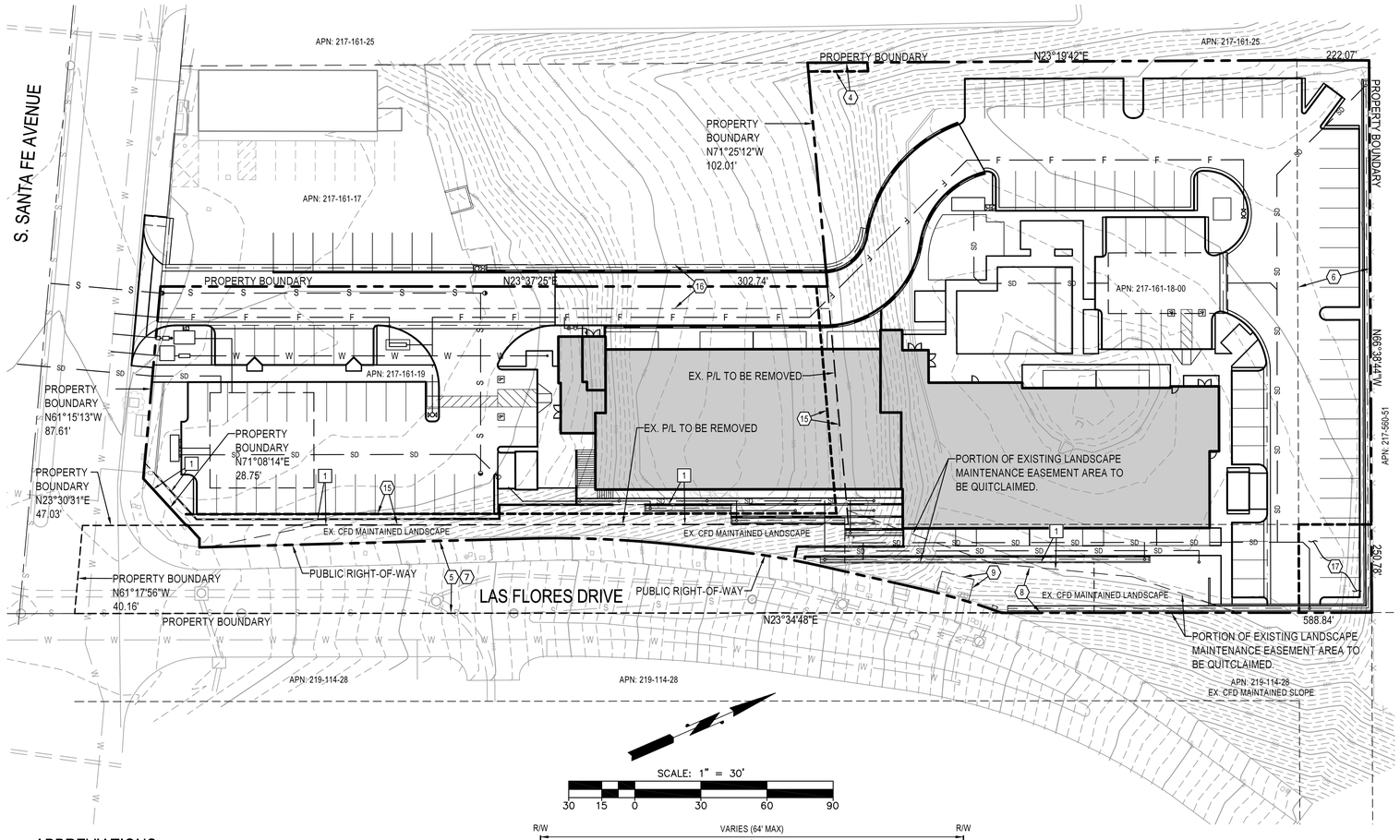
13 EASEMENT GRANTED TO COUNTY OF SAN DIEGO FOR PUBLIC STREET PURPOSES, RECORDED JUNE 11, 1913 IN BOOK 500, PAGE 135 OF DEEDS. NOT PLOTTABLE.

14 EASEMENT GRANTED TO VISTA IRRIGATION DISTRICT FOR PIPELINES, INGRESS AND EGRESS, AND ALL NECESSARY APPURTENANCES, RECORDED OCTOBER 24, 1925 IN BOOK 1136, PAGE 238 OF DEEDS. NOT PLOTTABLE.

15 EASEMENT GRANTED TO BARENY COLEMAN AND JEAN S. COLEMAN FOR PUBLIC UTILITIES, INGRESS AND EGRESS RECORDED OCTOBER 27, 1959 IN BOOK 7959, PAGE 126, OFFICIAL RECORDS TO BE QUITCLAIMED.

16 EASEMENT GRANTED TO FAIRMONT FOODS COMPANY FOR ROAD AND UTILITY PURPOSES, RECORDED JULY 5, 1973 AS DOC. NO. 73-184604, OFFICIAL RECORDS.

17 EASEMENT GRANTED TO COUNTY OF SAN DIEGO FOR UTILITIES, INGRESS AND EGRESS, RECORDED JUNE 24, 1987 AS DOC. NO. 87-353275, OFFICIAL RECORDS TO BE QUITCLAIMED. VACATION OF COUNTY HIGHWAY.

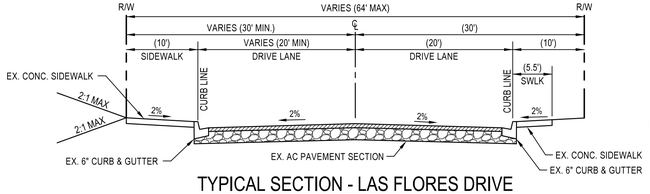


SCALE: 1" = 30'

30 15 0 30 60 90

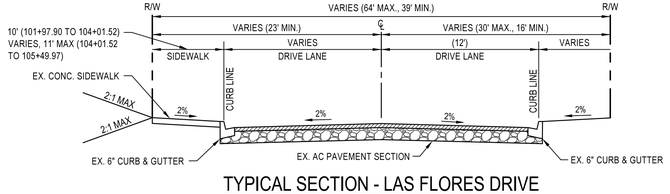
ABBREVIATIONS

AC	ASPHALT CONCRETE
ADA	AMERICAN WITH DISABILITIES ACT
BFD	BACKFLOW DEVICE
BLDG	BUILDING
BS	BOTTOM OF STAIRS
BW	BOTTOM OF WALL
CB	CATCH BASIN
CF	CURB FACE
CMU	CONCRETE MASONRY UNIT
CO	CLEANOUT
COMM	COMMUNICATIONS
CONC	CONCRETE
DS	DOWNSPOUT
EG	EDGE OF GUTTER
ELEC	ELECTRICAL
EX	EXISTING
FF	FINISH FLOOR
FG	FINISHED GRADE
FL	FLOW LINE
FM	FORCE MAIN
FS	FINISHED SURFACE
GA	GUY ANCHOR
GB	GRADE BREAK
GFF	GARAGE FINISH FLOOR
GP	GUY POLE
GV	GAS VALVE
HP	HIGH POINT
HT	HEIGHT
INV	INVERT ELEVATION
MH	MANHOLE
MIN	MINIMUM
PA	PLANTER AREA
PBOX	PULL BOX
P/L	PROPERTY LINE
POC	POINT OF CONNECTION
POT	PATH OF TRAVEL
PP	POWER POLE
PROP	PROPOSED
PVC	POLYVINYL CHLORIDE
R/W	RIGHT-OF-WAY
SCO	SEWER CLEANOUT
SD	STORM DRAIN
SDCO	STORM DRAIN CLEANOUT
SDMH	STORM DRAIN MANHOLE
SL	STREET LIGHT
SMH	SEWER MANHOLE
TC	TOP OF CURB
TD	TOP OF DECK
TG	TOP OF GRATE
TS	TOP OF STAIRS
TW	TOP OF WALL
TYP	TYPICAL
WAR	WATER AIR RELEASE
WM	WATER METER
WV	WATER VALVE



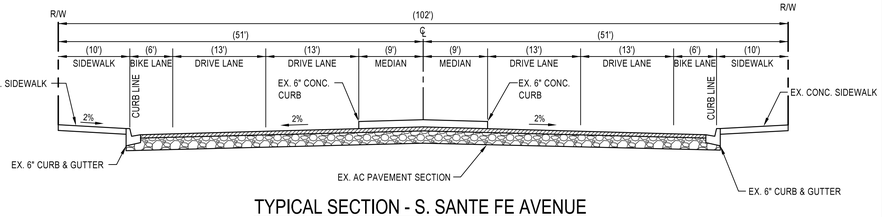
TYPICAL SECTION - LAS FLORES DRIVE

SCALE: NTS
UP TO STA. 101+97.90 (PER IP-4629)



TYPICAL SECTION - LAS FLORES DRIVE

SCALE: NTS
STA. 101+97.90 TO STA. 105+49.97 (PER IP-4629)



TYPICAL SECTION - S. SANTE FE AVENUE

SCALE: NTS

OWNER

WE HEREBY CERTIFY THAT WE ARE THE RECORD OWNERS OF THE PROPERTY SHOWN ON THESE PLANS AND THAT SAID PLANS SHOW OUR ENTIRE CONTIGUOUS OWNERSHIP (EXCLUDING SUBDIVISION LOTS). WE UNDERSTAND THAT PROPERTY IS CONSIDERED CONTIGUOUS EVEN IF IT IS SEPARATED BY ROADS, STREETS, UTILITY EASEMENTS OR RAILROADS RIGHTS-OF-WAY.

OWNER

SANTA FE FLORES LP
CONTACT: PAUL MAYER
P.O. BOX 903
RANCHO SANTA FE, CA 92067

ENGINEER OF WORK

WILLIAM J. SUITER RCE 68964

REGISTERED PROFESSIONAL ENGINEER — WILLIAM J. SUITER — No. RCE 68964 — EXP. 12-31-23 — Civil — STATE OF CALIFORNIA

LEGAL DESCRIPTION

PORTION OF LOT 4 IN BLOCK 95 OF RANCHO LOS VALLECITOS DE SAN MARCOS, IN THE CITY OF SAN MARCOS, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP NO. 806, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, DECEMBER 21, 1895.

GENERAL NOTES:

1. APN: 217-161-18-00, 217-161-19-00
2. GROSS ACREAGE: 2.50 AC
3. GROSS ACREAGE WITHOUT LAS FLORES ROW: 2.23 AC
4. NET ACREAGE : 2.23 AC
5. NUMBER OF DWELLING UNITS: 50
6. EXISTING ZONING: COMMERCIAL (C) AND LIGHT INDUSTRIAL (LI)
   PROPOSED ZONING: RESIDENTIAL-3-10 (R-3-10)
7. EXISTING GENERAL PLAN: COMMERCIAL (C) AND LIGHT INDUSTRIAL (LI)
   PROPOSED GENERAL PLAN: MEDIUM HIGH DENSITY RESIDENTIAL (MHDR)
8. FINISH GRADES SHOWN HEREON ARE APPROXIMATE AND ARE SUBJECT TO CHANGE IN FINAL DESIGN.
9. PROPOSED DENSITY: 22.42 DU/AC
10. CUT AND FILL SLOPES NO STEEPER THAN 2:1
11. PUBLIC SERVICES AND DISTRICTS:
    GAS & ELECTRIC: SAN DIEGO GAS AND ELECTRIC
    TELEPHONE: AT&T
    WATER: VISTA IRRIGATION DISTRICT
    SEWER: BUENA SANITATION DISTRICT/ CITY OF VISTA
    FIRE DISTRICT: CITY OF SAN MARCOS
    SCHOOL DISTRICT: SAN MARCOS UNIFIED SCHOOL DISTRICT
12. PROPOSED SETBACKS: FRONT YARD = MINIMUM 15'
    SIDE YARD = MINIMUM 15'
    REAR YARD= MINIMUM 10'
13. SEE STORM WATER QUALITY MANAGMENT PLAN PREPARED BY: PASCO LARET SUITER & ASSOCIATES (DATED: APRIL 2022)
14. SEE PRELIMINARY DRAINAGE STUDY PREPARED BY: PASCO LARET SUITER & ASSOCIATES (DATED: APRIL 2022)
15. SEE PRELIMINARY GEOTECHNICAL EVALUATION PREPARED BY: GHOSTRIDER , INC. DATED: JULY 1, 2020 W.O. (PROJECT NO. 19-2118C)

PROJECT DESCRIPTION

A GENERAL PLAN AMENDMENT, REZONE AND LOT CONSOLIDATION PROPOSING A 50-UNIT MULTIFAMILY DEVELOPMENT WITH PARKING LOTS, ACCESS DRIVE, OUTDOOR GARDEN AREA, MISCELLANEOUS HARDSCAPE AND LANDSCAPING.

PASCO LARET SUITER & ASSOCIATES
San Diego | Encinitas | Orange County
Phone 949.661.6695 | www.plsaengineering.com

SAN MARCOS RESIDENCES

TITLE SHEET

PLSA JOB NO.3527
4-28-2022
SHEET 1 OF 3

SAVE DATE: 04/26/22 ~ PLOT DATE: 04/28/22 ~ FILE NAME: J:\ACTIVE JOBS\3527 WATER-SOUTH SANTA FE AVE\CIVIL\DRAWING\DISCRETIONARY PLANS\3527-PRLM-GRAD-01-TITL.dwg

EX. SDMH
EX. 18" RCP SD PER COSM IP-4589
(51')
(51')
(102')
EX. SMH
EX. CURB INLET
APN: 217-161-25
EXISTING COMMERCIAL BUILDING
S. SANTA FE AVENUE
EX. 60" RCP SD PER COSM IP-4589
EX. 6" PVC S PER COV DWG. NO. 3804
EX. 10" PVC W PER D-2140
EX. NCTD BUS STOP
EX. AC PARKING LOT
APN: 217-161-17
REGRADE EX. SLOPE TO CONSTRUCT LEVEL TRASH ENCLOSURE
MATCH EX. GRADE
PROP. RIP-RAP DISSIPATOR
PROP. CONCRETE RETAINING J DITCH
EX. TRASH ENCLOSURE TO BE RELOCATED
EX. PARKING STALLS TO BE RELOCATED
EX. ACCESS ESMT PER DOC NO. 73-184604 (DATED JULY 5, 1973)
PROP. RECIPROCAL DRAINAGE ESMT
PROP. CONCRETE BROW DITCH
PROP. CONC. PAVEMENT
PROPERTY BOUNDARY
N23°37'25"E
302.74'
N71°25'17"W
(650')
120.21'
PROPERTY BOUNDARY
N23°19'42"E
222.07'
APN: 217-161-25
PROP. CONC. PAVEMENT
PROP. STORMGARDEN BIOFILTRATION SYSTEM FG=529.64
PROP. CARPORT CANOPY (TYP.)
PROP AC PAVEMENT
PROP. 8" FS
PROP. TRANSFORMER
PROP. FH
PROP. CURB OPENING & RIP-RAP DISSIPATOR
PROP. UNDERGROUND DETENTION SYSTEM
PROP. AC PAVEMENT
TOP OF TANK=527.49
526.49 INV SD INLET
BOT OF TANK=521.91
TOP OF TANK=527.49
521.91 INV SD OUTLET
BOT OF TANK=521.91
PROP. CONCRETE RETAINING J DITCH
PROP. CONNECTION TO EX. 8" PVC S
PROP. IRRG. WATER METER & BACKFLOW
PROP. DRIVEWAY PER CITY OF SAN MARCOS RADIUS TYPE DRIVEWAY
PROP. CURB OUTLET PER SDRSD D-25A
PROP AC PAVEMENT
PROP. 3' WIDE RIBBON GUTTER
PROP. CURB OPENING & RIP-RAP DISSIPATOR
PROP. 8" S
PROP. BLDG FS POC
PROP. BLDG DOM. W POC
PROP. CONNECTION TO EX. 10" W
PROP. DOM. WATER METER & BACKFLOW
PROP. SDCO (TYPE A) PER SDRSD D-09
PROP. FIRE SERVICE BACKFLOW
PROP. CONNECTION TO EX. 10" W
PROP. STORMGARDEN BIOFILTRATION SYSTEM, FG=493.70
PROP. DOM. W
PROP. 8" FS
PROP. 8" S
PROP. UNDERGROUND DETENTION SYSTEM
PROP. FH
PROP. STORMGARDEN BIOFILTRATION SYSTEM FG=494.07
PROP. CURB OPENING & RIP RAP DISSIPATOR
PROP. SCREEN WALL
PROP AC PAVEMENT
PROPERTY BOUNDARY
N61°15'13"W
87.61'
PROPERTY BOUNDARY
N71°08'14"E
28.75'
PROPERTY BOUNDARY
N23°30'31"E
47.03'
PROPERTY BOUNDARY
N61°17'56"W
40.16'
PROPERTY BOUNDARY
PRKG LEVEL
FF=500.00
P=499.33
PATIO
LOWER LEVEL BUILDING
LOWER 3RD FLOOR FF=533.00
LOWER 2ND FLOOR FF=523.00
LOWER 1ST FLOOR FF=513.00
LOWER 1ST FLOOR PAD=512.33
UPPER LEVEL BUILDING
UPPER 3RD FLOOR FF=553.00
UPPER 2ND FLOOR FF=543.00
UPPER 1ST FLOOR FF=533.00
UPPER 1ST FLOOR PAD=532.33
PROP. PRIVACY WALL
PROP. TRASH ENCLOSURE
PROP. STAIRS
PROP. TRASH ENCLOSURE
PROP. AC PAVEMENT
REMOVE AND DISPOSE OF EX. ON-SITE 18" RCP SD AND CAP HERE.
EX. VID EASEMENT FOR WATER FACILITIES TO REMAIN
PROP. CONCRETE RETAINING J DITCH
PROP. DRAINAGE EASEMENT TO THE BENEFIT OF APN 219-114-28
PROTECT IN PLACE EX. IRRIGATION WATER SERVICE
REMOVE AND DISPOSE OF EX. ON-SITE 18" RCP SD AND CAP AT PROPERTY LINE
ABANDON EX. WM & LATERAL
PROP. CONNECTION TO EX. 18" SD
EX. 6" PVC W PER D-2140
ABANDON EX. WM & LATERAL
EX. 8" PVC S PER COV D-3804
EX. 8" W PER D-2140
EX. 10" PVC W PER D-2140
EX. 42" RCP SD PER COSM IP-4589
EX. 18" RCP SD
EX. 24" RCP SD PER COSM IP-4589
EX. 24" RCP PER COSM GP-2280
EX. 42" RCP SD PER COSM GP-2280
EX. 8" PVC S PER COV D-3810
EX. 10" PVC W PER I-3007
EX. 18" RCP SD PER COSM GP-2280
EX. 10" W
EX. CURB INLET
EX. RIGHT-OF-WAY
EX. VEHICULAR GUARDRAIL
EX. RAISED MEDIAN
LAS FLORES DRIVE
APN: 219-114-28
APN: 217-560-51
EX. FENCING
PROP. CONCRETE RETAINING J DITCH
EX. FH
EX. SDMH
EX. SMH
A
B
SCALE: 1" = 20'
20 10 0 20 40 60

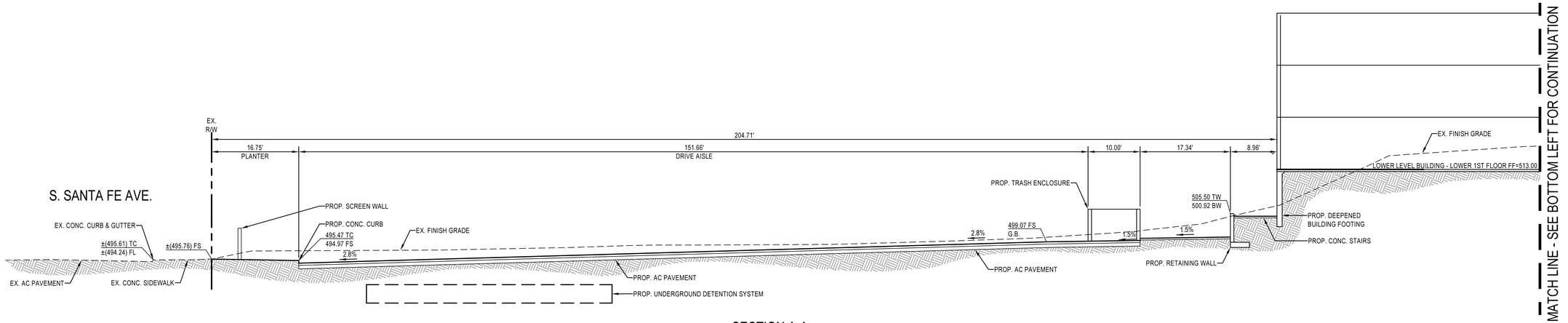
PASCO LARET SUITER & ASSOCIATES
San Diego | Encinitas | Orange County
Phone 949.661.6695 | www.plsaengineering.com

SAN MARCOS RESIDENCES

PRELIMINARY GRADING PLAN

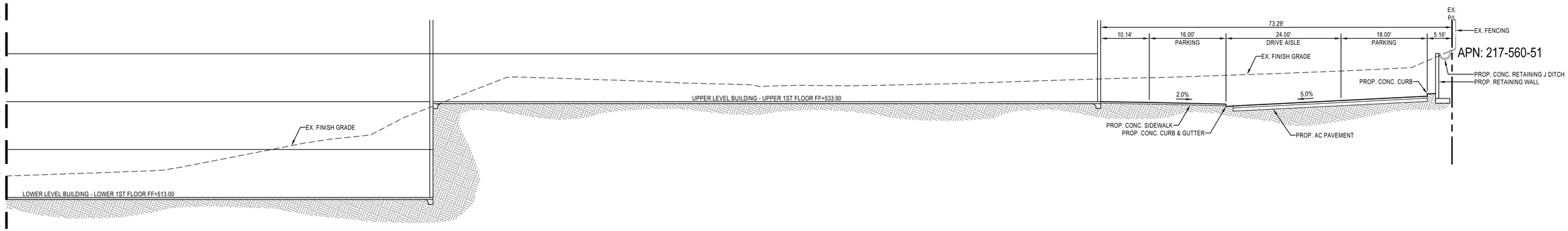
PLSA JOB NO.3527
4-28-2022
SHEET 2 OF 3

SAVE DATE: 04/26/22 ~ PLOT DATE: 04/26/22 ~ FILE NAME: J:\ACTIVE JOBS\3527 MAYER-SOUTH SANTA FE AVE\CIVIL\DRAWING\DISCRETIONARY PLANS\3527-PRLM-GRAD-02-03.dwg



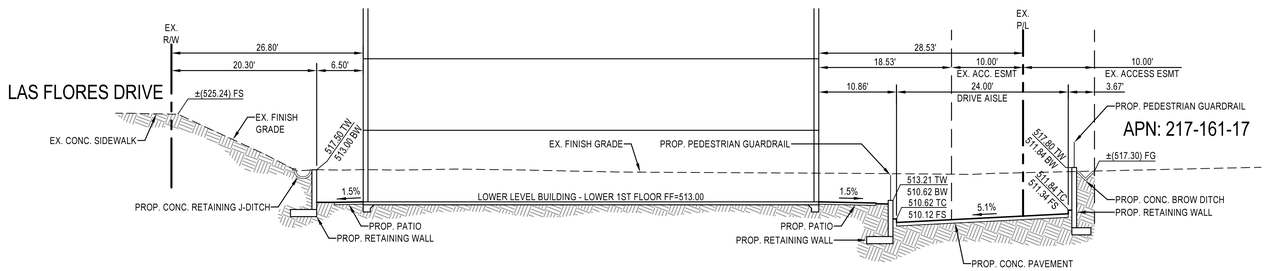
SECTION A-A

SCALE: 1"=10'



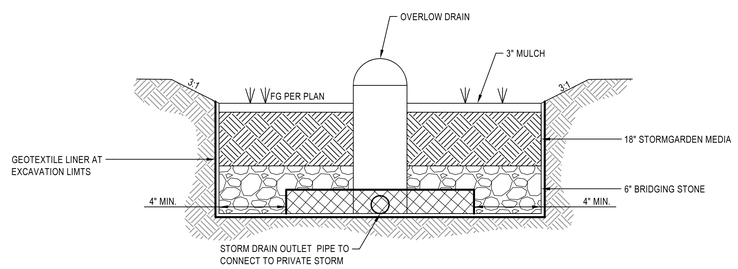
SECTION A-A (CONTINUED)

SCALE: 1"=10'



SECTION B-B

SCALE: 1"=10'



TYPICAL SECTION - STORMGARDEN BIOFILTRATION SYSTEM

SCALE: NOT TO SCALE

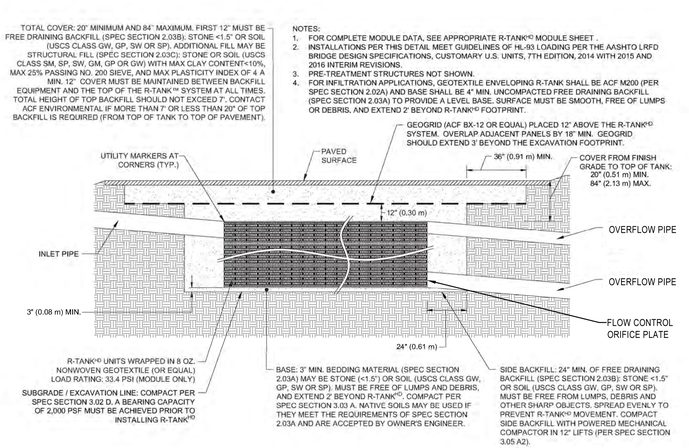
StormGarden Biofilttration System
San Marcos Residences
3/1/2022

DMA	BMP type	DMA AREA (SF)	Total DMA AREA (acres)	RFQ flow for dma (cfs)	StormGarden Filter Bed Size (SF)	StormGarden System Flow Rate (cfs)
1	StormGarden Boxless BioFiltration	43,958	1.01		70	0.226
2	StormGarden Boxless BioFiltration	22,743	0.52		41	0.132
3	StormGarden Boxless BioFiltration	23,845	0.55		34	0.110
Totals					***145***	

NOTES:
1. StormGarden loading rate at 145"/HR is 1.45 GPM/SF of Filter Bed
2. The StormGarden width and length can be customized to any size and shape conceivable because it is a boxless system and indipendent of a concrete form.

STORMGARDEN BIOFILTRATION SYSTEM SIZING TABLE

SCALE: NOT TO SCALE



TYPICAL SECTION - R-TANK STORMWATER DETENTION SYSTEM

SCALE: NOT TO SCALE

SAN MARCOS RESIDENCES

SITE SECTIONS & DETAILS

PASCO LARET SUITER & ASSOCIATES
San Diego | Encinitas | Orange County
Phone 949.661.6695 | www.plsaengineering.com

PLSA JOB NO.3527
4-28-2022
SHEET 3 OF 3

SAVE DATE: 04/26/22 ~ PLOT DATE: 04/26/22 ~ FILE NAME: J:\ACTIVE JOBS\3527 MAYER-SOUTH SANTA FE AVE\CIVIL\DRAWING\DISCRETIONARY PLANS\3527-PRLM-GRAD-02-03.dwg

APPENDIX G

Hydrology Study

PRELIMINARY HYDROLOGY STUDY

FOR

SAN MARCOS RESIDENCES
2972 &2982 S SANTA FE AVENUE
APN: 217-161-18

CITY OF SAN MARCOS, CA

PREPARED FOR:

SANTA FE FLORES LP
P.O. BOX 903
RANCHO SANTA FE, CA 92067

PREPARED BY:

PASCO LARET SUITER & ASSOCIATES, INC.
27127 CALLE ARROYO, SUITE 1904
SAN JUAN CAPISTRANO, CA 92675
949-661-6695

Prepared: October 2021
Revised: March 2022
Revised: April 2022

William J. Suiter, RCE 68964 DATE

TABLE OF CONTENTS

	SECTION
Executive Summary	**1.0**
Introduction	1.1
Existing Conditions	1.2
Proposed Project	1.3
Conclusions	1.4
References	1.5
Methodology	**2.0**
Rational Method	2.1
County of San Diego Criteria	2.2
AES Rational Method Computer Model	2.3
Hydrologic Analysis	**3.0**
Existing Condition Hydrologic Model Output (100-Year Event)	3.1
Proposed Condition Hydrologic Model Output (100-Year Event Undetained)	3.2
Detention Analysis	3.3
Proposed Condition Hydrologic Model Output (100-Year Event Detained)	3.4
Hydromodification Management	3.5
Storm Water Pollutant Control	3.6

Appendices

Appendix A: Hydrology Support Material

Appendix B: Detention Support Material

Appendix C: Existing and Proposed Hydrology Maps

1.0 EXECUTIVE SUMMARY

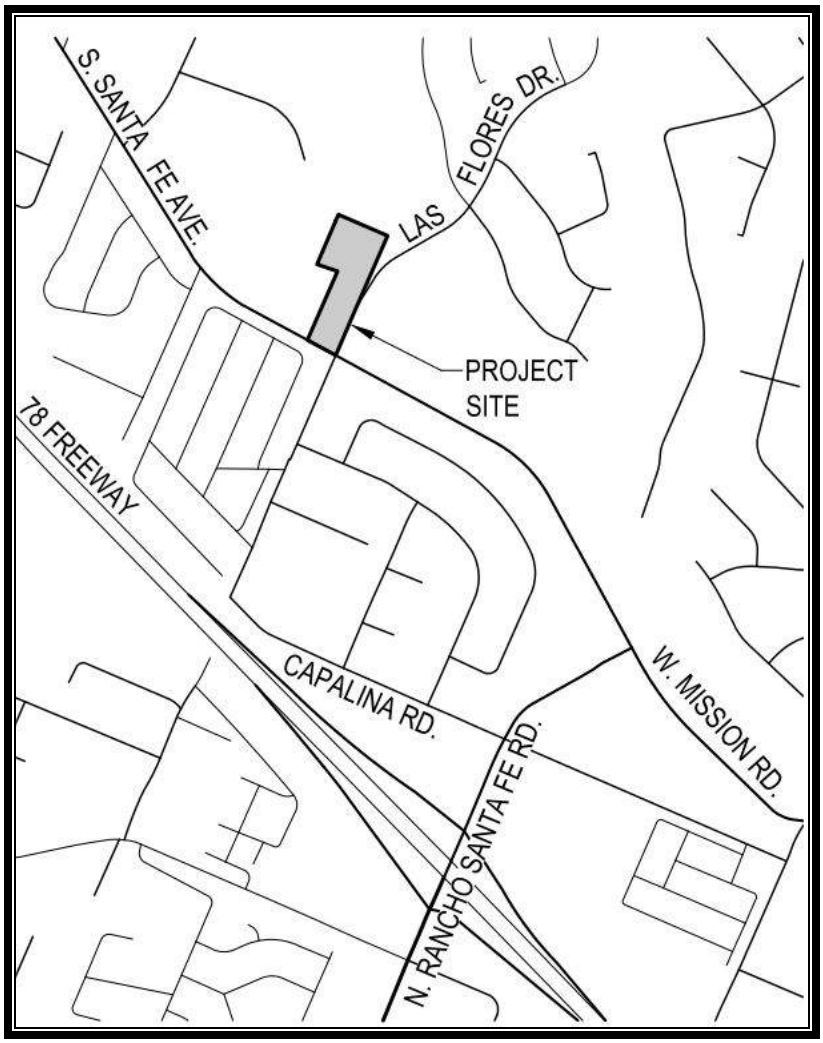
1.1 Introduction

This Hydrology Study for the proposed development has been prepared to analyze the hydrologic characteristics of the existing and proposed project site. This report presents both the methodology and the calculations used for determining the storm water runoff from the project site in the pre-developed (existing) conditions and the post-developed (proposed) conditions produced by the 100-year, 6-hour storm event.

1.2 Existing Conditions

The subject property is located at 2972 & 2982 S. Santa Fe Avenue in the City of Vista. The site is west of Las Flores Drive, north of South Santa Fe Avenue, and approximately 1/4 mile north of the 78 freeway.

Vicinity Map



The site is surrounded by residential homes to the north, east and south, and industrial offices to the west. The site is primarily undeveloped with a shared access driveway at the property's southerly boundary. The driveway also provides access to the adjacent commercial property's parking lot and commercial building. The southern portion of the site is relatively flat while the central portion slopes up to an elevated pad at the north end of the site. Las Flores Drive along the property's eastern boundary has approximately a 15-20% grade upward to the north to allow vehicle access over the railroad tracks north of the property. Elevations across the site range from a high of approximately 546 feet in the northeast corner of the property to a low of approximately 494.50 feet at the southwest corner of the property.

The project site is approximately 2.23 acres. In the existing condition, the project site is divided into four drainage basins (see Pre-Project Hydrology Map in Appendix C).

Drainage basin E1 consists of the northerly half graded pad where runoff flows overland and into an existing storm drain inlet structure in the center of the pad. Captured runoff exits the site through an existing 18" RCP at the easterly boundary and into the public storm drain system within Las Flores Drive. Drainage Basin E2 is a similar, but much smaller, sump condition into a storm drain inlet structure exists just southerly of the north half sump condition mentioned above. Captured runoff also exits the site through a separate 18" RCP at the easterly boundary and into the public storm drain system within Las Flores Drive where it confluences with the north half pad runoff. Pipe flows continue to travel southerly down Las Flores Drive before combining with flows from a 54" RCP and 24" RCP. Combined pipe flows are then diverted to the west along South Santa Fe Avenue through a 60" RCP.

Drainage Basin E3 consists of the southern half of the site where runoff generated from the adjacent liquor store property and the project site combines to surface flow southerly. Surface runoff exits the drainage basin through the existing shared access driveway on South Santa Fe Avenue then into the public street's curb and gutter and flows northerly approximately 100' before being captured by an existing curb inlet structure. Captured runoff is diverted across South Santa Fe Avenue through an 18" RCP storm drain pipe and into a 60" RCP that continues flowing westerly.

Drainage Basin E4 is located along the west edge of Drainage Basin E1 north half pad, a small area of existing graded slopes that surface flows to the west and onto the adjacent property.

Per the United States Department of Agriculture Web Soil Survey, the project site is underlain with Hydrologic Soil Group C and D. Refer to Appendix A for soil information.

Area weighted runoff coefficients were calculated using the methodology described in section 3.2.1 of the San Diego County Hydrology Manual and Table 3-1 Runoff Coefficients for Urban Areas. Using the Rational Method Procedure outlined in the San Diego County Hydrology Manual, a peak flow rate was calculated for the existing condition 100-year, 6-hour storm event. The following table summarizes the existing condition hydrologic data.

Summary of Existing Condition 100-yr Peak Discharge Rates

Drainage Basin ID	Area (ac)	Q100 (cfs)
E1	1.24	2.35
E2	0.04	0.10
E3	1.65	5.16
E4	0.12	0.31

Refer to the existing condition hydrologic calculations included in Section 3.1 for detailed analysis.

1.3 Proposed Project

The project proposes to develop the existing site into a 54-unit multifamily residential development consisting of 1-bed/1-bath units and 2-bed/2-bath units, access drive, parking stalls, landscape, associated utilities and improvements, proprietary biofiltration systems to meet the requirements for pollutant control and underground storm water storage facilities to meet the requirements for hydromodification management flow control and to mitigate for the 100-year 6-hour storm event.

In the proposed condition, onsite storm water runoff will be collected in a proposed storm drain system and conveyed to the proposed proprietary biofiltration system (BMPs) and subsequently the proposed underground storage facilities (BMPs). Two storm drain systems, each with their own BMPs, are proposed to maintain the site's historical points of discharge.

In the proposed condition, the project site consists of five drainage basins (see Post-Project Hydrology Map in Appendix C).

Drainage Basin P1 consists of the proposed site's upper level building, north parking lot area and a portion of existing public ROW hillside area that drains into the project site at the northeast corner of the property. Surface runoff will sheet flow southwesterly across the parking area, through a curb opening and into a proprietary biofiltration system. Treated flows and peak flows will enter the private storm drain pipe system then divert pipe flows to an underground storm water storage facility before exiting the project site through an existing 18" RCP storm drain pipe that flows out into the public storm drain system in Las Flores Drive.

Drainage Basin P2 consists of the proposed sites' lower level building, south parking lot area, and access road. Surface runoff will sheet flow southerly down the access road, across the parking area then through curb openings into one of two proprietary biofiltration systems. Treated flows and peak flows will enter the private storm drain pipe system then divert pipe flows to an underground storm water storage facility before exiting the project site through a new 18" RCP storm drain pipe and connect to the existing 60" RCP storm drain pipe in South Santa Fe Avenue.

Drainage Basin P3 consists of the adjacent property's existing commercial building, existing parking area and existing undeveloped hillside to the west of the project site. A new concrete ditch is proposed along the project site's westerly boundary along the new access road and a new ribbon gutter along the existing parking area to capture off-site runoff without comingling with on-site runoff and divert the surface flows out onto South Santa Fe Avenue as in the existing condition.

Drainage Basin P4 consists of the existing hillside area at the northwest corner of the site. Storm water runoff will surface flow westerly and onto the adjacent property as in the existing condition.

Drainage Basin P5 consists of the existing public right-of-way hillside area at the northeast corner of the project site. A new concrete ditch is proposed along the project's easterly boundary to capture off-site runoff from the hillside without comingling with on-site runoff and divert the surface flow to an underground storm drain piping system to confluence with runoff from Drainage Basin 1. Pipe flows will combine with Drainage Basin 1 pipe flows (downstream of its BMP systems) and exit the site through an existing 18" RCP storm drain pipe that flows out into the public storm drain system in Las Flores Drive.

The BMPs will provide hydromodification management flow control and storm water pollutant control to meet the requirements the California Regional Water Quality Control Board San Diego Region municipal storm water permit (Order No. R9-2013-0001, referred to as MS4 Permit). For detailed pollutant control and HMP calculations refer to the report titled "Priority Development Project (PDP) Storm Water Quality Management Plan (SWQMP) for San Marcos Residences" dated March 2021, prepared by Pasco Laret Suiter & Associates.

Area weighted runoff coefficients were calculated using the methodology described in section 3.2.1 of the San Diego County Hydrology Manual and Table 3-1 Runoff Coefficients for Urban Areas. Using the Rational Method Procedure outlined in the San Diego County Hydrology Manual, a peak flow rate was calculated for the proposed condition 100-year, 6-hour storm event. The underground storm water storage facilities provide mitigation for the 100-year 6-hour storm event. A detention analysis was performed to evaluate the effects of the storage facilities on the 100-year, 6-hour storm event peak discharge rates. The following table summarizes the proposed condition hydrologic data.

Summary of Proposed Condition 100-yr Peak Discharge Rates

Drainage Basin ID	Area (ac)	Q100 (cfs) Undetained	Q100 (cfs) Detained
P1 & P2	1.25	5.71	0.69
P3	1.07	6.44	4.02
P4	0.66	2.90	N/A
P5	0.06	0.16	N/A

Refer to the proposed undetained and detained hydrologic calculations and detention analysis included in Sections 3.2, 3.3, 3.4 and Appendix B for detailed analysis.

1.4 Conclusions

Based upon the analyses included in this report, the proposed proprietary biofiltration devices and underground storage facilities are sized to accommodate the increase in peak runoff in the proposed condition and are designed to meet the requirements of the MS4 Permit for both pollutant control and hydromodification management.

1.5 References

"San Diego County Hydrology Manual", revised June 2003, County of San Diego, Department of Public Works, Flood Control Section.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov.

2.0 METHODOLOGY

Pursuant to the San Diego County Hydrology Manual (SDCHM) dated June 2003, the Rational Method is recommended for analyzing the runoff response from drainage areas up to approximately 1 square mile in size. The proposed project and associated watershed basins are less than 1 square mile, therefore the Rational Method was used to analyze the project's hydrologic characteristics in the existing and proposed conditions.

2.1 Rational Method

The Rational Method (RM) formula estimates the peak rate of runoff based on the variables of area, runoff coefficient, and rainfall intensity. The rainfall intensity (I) is equal to:

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

Where:

I = Intensity (in/hr)
P_6 = 6-hour precipitation (in)
D = duration (min – use Tc)

Using the Time of Concentration (Tc) which is the time required for a given element of water that originates at the most remote point of the basin being analyzed to reach the point at which the runoff from the basin is being analyzed, the RM equation determines the storm water runoff rate (Q) for a given basin in terms of flow, typically in cubic feet per second (cfs). The RM equation is as follows:

$$Q = CIA$$

Where:

Q= flow (cfs)
C = runoff coefficient, ratio of rainfall that produces storm water runoff (runoff vs. infiltration/evaporation/absorption/etc)
I = average rainfall intensity for a duration equal to the Tc for the area (in/hr)
A = drainage area contributing to the basin (ac)

The RM equation assumes that the storm event being analyzed delivers precipitation to the entire basin uniformly, and therefore the peak discharge rate will occur when a raindrop that falls at the most remote portion of the basin arrives at the point of analysis. The RM also assumes that the fraction of rainfall that becomes runoff or the runoff coefficient, C, is not affected by the storm intensity, I, or the precipitation zone number.

2.2 County of San Diego Criteria

The County of San Diego has developed its own tables, nomographs, and methodologies for analyzing storm water runoff for areas within the County. The County has also developed precipitation isopluvial contour maps that show even lines of rainfall anticipated from a given storm event (i.e. 100-year, 6-hour storm). The 100-year 6-hour storm event rainfall isopluvial map is included in Appendix A.

One of the variables of the RM equation is the runoff coefficient, C, which is dependent upon land use and soil type. Table 3-1 Runoff Coefficients for Urban Areas in the SDCHM categorizes the land use, the associated development density (dwelling units per acre) and the percentage of impervious area. Each of the categories listed has an associated runoff coefficient for each soil type class. A composite runoff coefficient can also be calculated for an area based on soil type and impervious percentage using the following equation from Section 3.1.2 of the SDCHM:

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

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

The onsite hydrologic calculations contained herein figure a composite runoff coefficient for the onsite project areas based on the percentage of impervious area and the percentage of pervious or landscape area. Refer to Appendix A for runoff coefficient calculations.

The County has also illustrated in detail the methodology for determining the time of concentration, in particular the initial time of concentration. The County has adopted the Federal Aviation Agency's (FAA) overland time of flow equation. This equation essentially limits the flow path length for the initial time of concentration to lengths of 100 feet or less, and is dependent on land use and slope.

2.3 AES Rational Method Computer Model

The Rational Method computer program developed by Advanced Engineering Software (AES) satisfies the County of San Diego design criteria, therefore it is the computer model used for this study. The AES hydrologic model is capable of creating independent node-link models of each interior drainage basin and linking these sub-models together at confluence points to determine peak flow rates. The program utilizes base information input by the user to perform calculations for up to 15 hydrologic processes. The required base information includes drainage basin area, storm water facility locations and sizes, land uses, flow patterns, and topographic elevations. The hydrologic conditions were analyzed in accordance with the 2003 County of San Diego Hydrology Manual criteria as follows:

Design Storm	100-year, 6-hour
100-year, 6-hour Precipitation	3.3 inches

Rainfall Intensity	Based on the 2003 County of San Diego Hydrology Manual criteria	
Runoff Coefficient*	Pervious C soil	C = 0.30
	Pervious D soil	C =0.35
	Impervious C soil	C = 0.90
	Impervious D soil	C = 0.90
Soil Type	C & D	

*Weighted runoff coefficients were calculated where appropriate. Refer to Appendix A.

3.0 HYDROLOGIC ANALYSIS

Table 1 below compares and summarizes the hydrologic calculations provided in Sections 3.1, 3.2 and 3.4.

Table 1: Summary of 100-yr Peak Discharge Rates

Existing			**Proposed**			**Proposed (Detained)**		
Drainage Basin ID	*Area (ac)*	*Q100 (cfs)*	*Drainage Basin ID*	*Area (ac)*	*Q100 (cfs)*	*Drainage Basin ID*	*Area (ac)*	*Q100 (cfs)*
E1	1.24	2.35	P1 & P2	1.25	5.71	P1 & P2	1.25	0.69
E2	0.04	0.10	P3	1.07	6.44	P3	1.07	4.02
E3	1.65	5.16	P4	0.66	2.90	N/A		
E4	0.12	0.31	P5	0.06	0.16	N/A		
Existing			**Proposed (Detained, Cumulative)**					
Drainage Basin ID	*Area (ac)*	*Q100 (cfs)*	*Drainage Basin ID*		*Area (ac)*		*Q100 (cfs)*	
E1, E2 & E3	2.93	**7.61**	P1, P2, P3 & P4		2.98		**7.61**	
E4	0.12	0.31	P5		0.06		0.16	

3.1 Existing Condition Hydrologic Model Output (100-Year Event)

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1452

                              Analysis prepared by:
```


PASCO LARET SUITER & ASSOCIATES
27127 CALLE ARROYO, SUITE 1904
SAN JUAN CAPISTRANO, CA 92675
ph 949.661.6695
plsaengineering.com


```
 ************************** DESCRIPTION OF STUDY **************************
* 3527 SOUTH SANTA FE                                                    *
* EXISTING CONDITION                                                     *
* 100-YEAR                                                               *
 **************************************************************************
--------------------------------------------------------------------------
  FILE NAME: 100PRE.DAT
  TIME/DATE OF STUDY: 15:49 03/01/2022
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
```

```
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =  85
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    575.97
  DOWNSTREAM ELEVATION(FEET) =    538.97
  ELEVATION DIFFERENCE(FEET) =     37.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.210
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    538.97  DOWNSTREAM(FEET) =    532.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   149.00   CHANNEL SLOPE =  0.0441
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.321
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =  85
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.64
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.51
  Tc(MIN.) =    8.20
  SUBAREA AREA(ACRES) =     1.11       SUBAREA RUNOFF(CFS) =    2.10
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       2.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   2.05
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     249.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   530.34  DOWNSTREAM(FEET) =   528.21
  FLOW LENGTH(FEET) =    92.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.35
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    8.44
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =     341.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    125.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =  85
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    57.00
  UPSTREAM ELEVATION(FEET) =    543.68
  DOWNSTREAM ELEVATION(FEET) =    517.12
  ELEVATION DIFFERENCE(FEET) =     26.56
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.047
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.643
  SUBAREA RUNOFF(CFS) =      0.10
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.10

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   517.12  DOWNSTREAM(FEET) =   516.53
  FLOW LENGTH(FEET) =    29.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.10
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    5.25
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    130.00 =      86.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    140.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =  85
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    538.13
  DOWNSTREAM ELEVATION(FEET) =    517.74
  ELEVATION DIFFERENCE(FEET) =     20.39
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.431
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.243
  SUBAREA RUNOFF(CFS) =      0.82
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      0.82

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    145.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    517.74  DOWNSTREAM(FEET) =    494.68
  CHANNEL LENGTH THRU SUBAREA(FEET) =   270.00   CHANNEL SLOPE =  0.0854
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.947
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =  85
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.73
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.65
  Tc(MIN.) =    7.08
  SUBAREA AREA(ACRES) =     1.43       SUBAREA RUNOFF(CFS) =    4.47
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       5.16

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   3.24
  LONGEST FLOWPATH FROM NODE    135.00 TO NODE    145.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    155.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =  85
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    34.00
  UPSTREAM ELEVATION(FEET) =    538.66
  DOWNSTREAM ELEVATION(FEET) =    527.29
  ELEVATION DIFFERENCE(FEET) =     11.37
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.898
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.31
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.31

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    155.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =  85
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  SUBAREA RUNOFF(CFS) =      0.31
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.31
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.1  TC(MIN.) =      5.00
  PEAK FLOW RATE(CFS)   =       0.31
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

3.2 Proposed Undetained Condition Hydrologic Model Output (100-Year Event)

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1452

                             Analysis prepared by:
                           PASCO LARET SUITER & ASSOCIATES
                           27127 CALLE ARROYO, SUITE 1904
                           SAN JUAN CAPISTRANO, CA 92675
                                  ph 949.661.6695
                                plsaengineering.com

 ************************* DESCRIPTION OF STUDY *************************
* 3527 SOUTH SANTA FE                                                    *
* PROPOSED CONDITION                                                     *
* 100-YR                                                                 *
 ************************************************************************

  FILE NAME: 100PST.DAT
  TIME/DATE OF STUDY: 10:31 03/02/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
```

```
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    535.41
  DOWNSTREAM ELEVATION(FEET) =    532.13
  ELEVATION DIFFERENCE(FEET) =      3.28
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.146
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    532.13  DOWNSTREAM(FEET) =    529.64
  CHANNEL LENGTH THRU SUBAREA(FEET) =   304.00   CHANNEL SLOPE =  0.0082
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.649
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.82
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.96
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   2.58
  Tc(MIN.) =    7.58
  SUBAREA AREA(ACRES) =     0.96       SUBAREA RUNOFF(CFS) =    4.91
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.770
```

```
  TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       5.17

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   2.26
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =    7804.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   527.39  DOWNSTREAM(FEET) =   526.49
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.49
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.17
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    7.78
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =    7894.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    220.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   521.91  DOWNSTREAM(FEET) =   519.88
  FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.50
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.17
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    8.05
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =    8032.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.05
  RAINFALL INTENSITY(INCH/HR) =   6.40
  TOTAL STREAM AREA(ACRES) =     1.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.17

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    230.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    575.94
  DOWNSTREAM ELEVATION(FEET) =    536.32
  ELEVATION DIFFERENCE(FEET) =     39.62
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.945
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.776
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    220.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   532.00  DOWNSTREAM(FEET) =   519.88
  FLOW LENGTH(FEET) =    42.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   1.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.29
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.65
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.99
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    220.00 =     132.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.99
  RAINFALL INTENSITY(INCH/HR) =   7.74
  TOTAL STREAM AREA(ACRES) =     0.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.65

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.17     8.05        6.395          1.01
      2        0.65     5.99        7.738          0.24
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.50     5.99       7.738
      2        5.71     8.05       6.395

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.71   Tc(MIN.) =    8.05
  TOTAL AREA(ACRES) =        1.2
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =    8032.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    235.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   519.88  DOWNSTREAM(FEET) =   517.05
  FLOW LENGTH(FEET) =   193.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.57
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.71
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    8.42
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    235.00 =    8225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    245.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    82.00
  UPSTREAM ELEVATION(FEET) =    532.03
  DOWNSTREAM ELEVATION(FEET) =    524.56
  ELEVATION DIFFERENCE(FEET) =      7.47
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.420
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    245.00 IS CODE =  22
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.27

********************************************************************************
  FLOW PROCESS FROM NODE    245.00 TO NODE    250.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    524.56  DOWNSTREAM(FEET) =    494.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   349.00   CHANNEL SLOPE =  0.0870
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.617
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.37
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.11
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.14
  Tc(MIN.) =    6.14
  SUBAREA AREA(ACRES) =     1.03       SUBAREA RUNOFF(CFS) =    6.20
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.790
  TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       6.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   6.03
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    250.00 =  750349.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    255.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   491.45  DOWNSTREAM(FEET) =   491.04
  FLOW LENGTH(FEET) =    41.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.86
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.44
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    6.22
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    255.00 =  750390.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    255.00 TO NODE    260.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   488.50  DOWNSTREAM(FEET) =   486.47
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.70
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.44
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.27
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    260.00 =  750429.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    270.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    531.96
  DOWNSTREAM ELEVATION(FEET) =    518.31
  ELEVATION DIFFERENCE(FEET) =     13.65
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.428
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.74
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.74

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    270.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  SUBAREA RUNOFF(CFS) =      0.74
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.74

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    275.00 IS CODE =  51
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    518.31  DOWNSTREAM(FEET) =    494.55
  CHANNEL LENGTH THRU SUBAREA(FEET) =   276.00   CHANNEL SLOPE =  0.0861
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.709
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.86
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.49
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.02
  Tc(MIN.) =    6.02
  SUBAREA AREA(ACRES) =     0.51       SUBAREA RUNOFF(CFS) =    2.24
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       2.90

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   4.55
  LONGEST FLOWPATH FROM NODE    265.00 TO NODE    275.00 = ********** FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    285.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    37.00
  UPSTREAM ELEVATION(FEET) =    531.96
  DOWNSTREAM ELEVATION(FEET) =    527.86
  ELEVATION DIFFERENCE(FEET) =      4.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.066
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    285.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.16
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.1  TC(MIN.) =      5.00
  PEAK FLOW RATE(CFS)   =       0.16
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

3.3 Detention Analysis (100-Year Event)

The underground storm water storage facilities (BMPs) provide hydromodification management flow control and mitigation of the 100-year storm event peak flow rate. The 100-year storm event detention analysis was performed using HydroCAD Stormwater Modeling software. The inflow runoff hydrographs to the BMPs were modeled using RatHydro which is a Rational Method Design Storm Hydrograph software that creates a hydrograph using the results of the Rational Method calculations. HydroCAD has the ability to route the 100-year 6-hour storm event inflow hydrograph through the BMPs. Based on the BMP cross sectional geometry, stage storage and outlet structure data, HydroCAD calculates the detained peak flow rate and detained time to peak.

Each underground storm water storage facility has a low-flow orifice to comply with HMP requirements and an overflow weir for larger storm events. Refer to the plans for facility details.

The proposed BMP at the north end of the project site will discharge via proposed storm drain to the east and into the existing public storm drain system within Las Flores Drive. The proposed BMP at the south end of the project site will discharge via proposed storm drain pipe to the south and into the existing public storm drain system within South Santa Fe Drive.

For the proposed detained hydrologic analysis, the effects of the detention provided by the two (2) underground storage facilities were incorporated into the AES analysis. This was done by inserting the results from the HydroCAD analysis, detained peak flow rate and detained time to peak, into the proposed undetained condition AES model to create the proposed detained condition model. Refer to Section 3.4 for the detained AES output.

Based on the results of the HydroCAD analysis, mitigation for the 100-year storm event peak flow rate is provided. Refer to Appendix B for the HydroCAD detention detailed output.

3.4 Proposed Detained Condition Hydrologic Model Output (100-Year Event)

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1452

                              Analysis prepared by:

                            PASCO LARET SUITER & ASSOCIATES
                            27127 CALLE ARROYO, SUITE 1904
                            SAN JUAN CAPISTRANO, CA 92675
                                    ph 949.661.6695
                                 plsaengineering.com

 ************************* DESCRIPTION OF STUDY *************************
* 3527 SOUTH SANTA FE                                                    *
* PROPOSED CONDITION DETAINED                                            *
* 100-YR                                                                 *
 **************************************************************************

  FILE NAME: 100PSTD.DAT
  TIME/DATE OF STUDY: 11:06 03/02/2022
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    535.41
  DOWNSTREAM ELEVATION(FEET) =    532.13
  ELEVATION DIFFERENCE(FEET) =      3.28
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.146
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    532.13  DOWNSTREAM(FEET) =    529.64
  CHANNEL LENGTH THRU SUBAREA(FEET) =   304.00   CHANNEL SLOPE =  0.0082
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.649
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.82
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.96
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   2.58
  Tc(MIN.) =    7.58
  SUBAREA AREA(ACRES) =     0.96       SUBAREA RUNOFF(CFS) =    4.91
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.770
  TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       5.17

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   2.26
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =    7804.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   527.39  DOWNSTREAM(FEET) =   526.49
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.49
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.17
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    7.78
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =    7894.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  55.68   RAIN INTENSITY(INCH/HOUR) =  1.84
  TOTAL AREA(ACRES) =     1.01   TOTAL RUNOFF(CFS) =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    220.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   521.91  DOWNSTREAM(FEET) =   519.88
  FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   2.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.26
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.30
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   56.22
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =    8032.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   56.22
  RAINFALL INTENSITY(INCH/HR) =   1.83
  TOTAL STREAM AREA(ACRES) =     1.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    230.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    575.94
  DOWNSTREAM ELEVATION(FEET) =    536.32
  ELEVATION DIFFERENCE(FEET) =     39.62
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.945
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.776
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    220.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   532.00  DOWNSTREAM(FEET) =   519.88
  FLOW LENGTH(FEET) =    42.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   1.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.29
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.65
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.99
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    220.00 =     132.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.99
```

```
  RAINFALL INTENSITY(INCH/HR) =   7.74
  TOTAL STREAM AREA(ACRES) =     0.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.65

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.30    56.22        1.826          1.01
      2        0.65     5.99        7.738          0.24

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        0.69     5.99       7.738
      2        0.45    56.22       1.826

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       0.69   Tc(MIN.) =    5.99
  TOTAL AREA(ACRES) =        1.2
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =    8032.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    235.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   519.88  DOWNSTREAM(FEET) =   517.05
  FLOW LENGTH(FEET) =   193.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.19
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.69
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    6.61
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    235.00 =    8225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    245.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    82.00
  UPSTREAM ELEVATION(FEET) =    532.03
  DOWNSTREAM ELEVATION(FEET) =    524.56
```

```
  ELEVATION DIFFERENCE(FEET) =      7.47
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.420
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    245.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE    245.00 TO NODE    250.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    524.56  DOWNSTREAM(FEET) =    494.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   349.00   CHANNEL SLOPE =  0.0870
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.617
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.37
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.11
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.14
  Tc(MIN.) =    6.14
  SUBAREA AREA(ACRES) =     1.03       SUBAREA RUNOFF(CFS) =    6.20
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.790
  TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       6.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   6.03
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    250.00 =  750349.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    255.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   491.45  DOWNSTREAM(FEET) =   491.04
  FLOW LENGTH(FEET) =    41.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.86
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.44
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    6.22
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    255.00 =  750390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    255.00 TO NODE    255.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   8.92   RAIN INTENSITY(INCH/HOUR) =  5.99
  TOTAL AREA(ACRES) =     1.07   TOTAL RUNOFF(CFS) =      4.02

****************************************************************************
  FLOW PROCESS FROM NODE    255.00 TO NODE    260.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   488.50  DOWNSTREAM(FEET) =   486.47
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.94
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.02
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.97
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    260.00 =  750429.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    270.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    531.96
  DOWNSTREAM ELEVATION(FEET) =    518.31
  ELEVATION DIFFERENCE(FEET) =     13.65
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.428
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
```

```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.74
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.74

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    270.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  SUBAREA RUNOFF(CFS) =      0.74
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.74

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    275.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    518.31  DOWNSTREAM(FEET) =    494.55
  CHANNEL LENGTH THRU SUBAREA(FEET) =   276.00   CHANNEL SLOPE =  0.0861
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.709
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.86
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.49
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.02
  Tc(MIN.) =    6.02
  SUBAREA AREA(ACRES) =     0.51       SUBAREA RUNOFF(CFS) =    2.24
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       2.90

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   4.55
  LONGEST FLOWPATH FROM NODE    265.00 TO NODE    275.00 = ********** FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    285.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    37.00
  UPSTREAM ELEVATION(FEET) =    531.96
  DOWNSTREAM ELEVATION(FEET) =    527.86
  ELEVATION DIFFERENCE(FEET) =      4.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.066
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    285.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.16
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.1  TC(MIN.) =      5.00
  PEAK FLOW RATE(CFS)   =       0.16
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

3.5 Hydromodification Management

To satisfy the requirements of the MS4 Permit, a hydromodification management strategy has been developed for the project based on the Final Hydromodification Management Plan dated March 2011, (Final HMP). A continuous simulation model, the Environmental Protection Agency (EPA) Storm Water Management Model (SWMM) version 5.1, was selected to size mitigation measures. The SWMM model is capable of modeling hydromodification management facilities to mitigate the effects of increased runoff from the post-development conditions and use changes that may cause negative impacts (i.e. erosion) to downstream channels. For HMP calculations refer to the report titled "Priority Development Project (PDP) Storm Water Quality Management Plan (SWQMP) for San Marcos Residences" dated March 2021,, prepared by Pasco Laret Suiter & Associates.

3.6 Storm Water Pollutant Control

To meet the requirements of the MS4 Permit, the Modular Wetlands Systems are designed to treat onsite storm water pollutants for the 24-hour, 85th percentile storm event. For detailed pollutant control calculations refer to the report titled ""Priority Development Project (PDP) Storm Water Quality Management Plan (SWQMP) for San Marcos Residences" dated March 2021,, prepared by Pasco Laret Suiter & Associates.

APPENDIX A

Hydrology Support Material

San Marcos Residences
PLSA Project No. 3527
3/4/2022

C = 0.9(%Impervious)+Cp(1 - %Impervious)

Runoff Coefficient Table		
Soil Type	C	D
Impervious	0.9	0.9
Pervious, Cp	0.3	0.35

PRE-PROJECT CONDITION						
Drainage Basin ID	**Total Area (sf)**	**Soil Type**	**Impervious Area (sf)**	**Pervious Area (sf)**	**% Impervious**	**Weighted Runoff Coefficient, C**
E1	53762	C	0	53762	0	0.30
E2	1834	C	0	1834	0	0.30
E3	71987	D	12919	59068	17.9%	0.45
E4	5243	C	0	5243	0	0.30

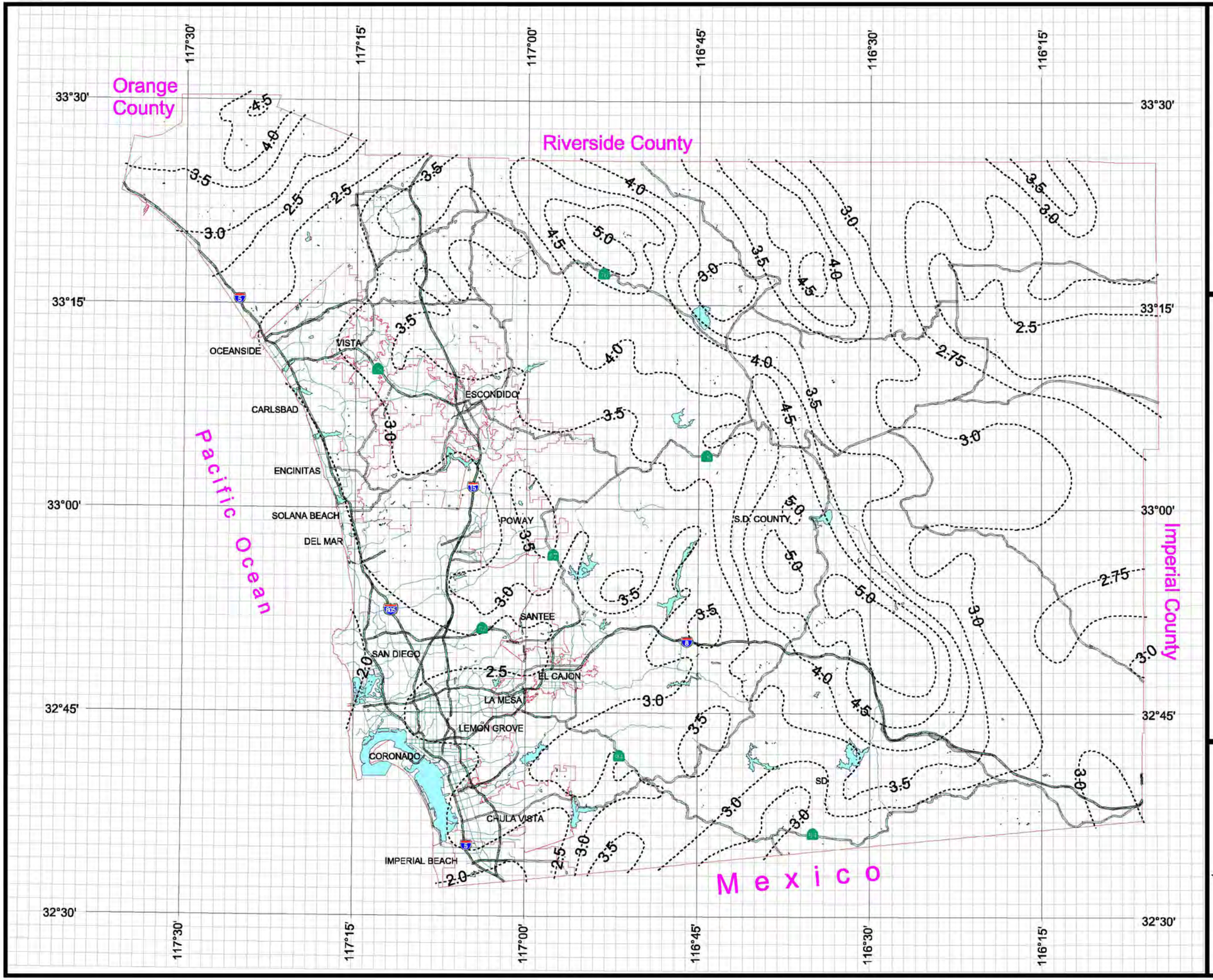
POST-PROJECT CONDITION						
Drainage Basin ID	**Total Area (sf)**	**Soil Type**	**Impervious Area (sf)**	**Pervious Area (sf)**	**% Impervious**	**Weighted Runoff Coefficient, C**
P1	43998	C	34828	9170	79.2%	0.77
P2	10531	C	829	9702	7.9%	0.35
P3	46587	D	37689	8898	80.9%	0.79
P4	28583	D	11520	17063	40.3%	0.57
P5	2470	C	0	2470	0.0%	0.30

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)



DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles

THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
Copyright SanGIS. All Rights Reserved.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Diego County Area, California

July 27, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Information for All Uses.....8
Soil Properties and Qualities.....8
Soil Qualities and Features.....8
Hydrologic Soil Group (2972/2982 South Santa Fe Avenue).....8
References.....13

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (2972/2982 South Santa Fe Avenue)

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group (2972/2982 South Santa Fe Avenue)

Map Scale: 1:1,060 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 15, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 24, 2020—Feb 12, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group (2972/2982 South Santa Fe Avenue)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DaD	Diablo clay, 9 to 15 percent slopes, warm MAAT	C	1.7	72.6%
HrC	Huerhuero loam, 2 to 9 percent slopes	D	0.6	27.4%
Totals for Area of Interest			**2.3**	**100.0%**

Rating Options—Hydrologic Soil Group (2972/2982 South Santa Fe Avenue)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

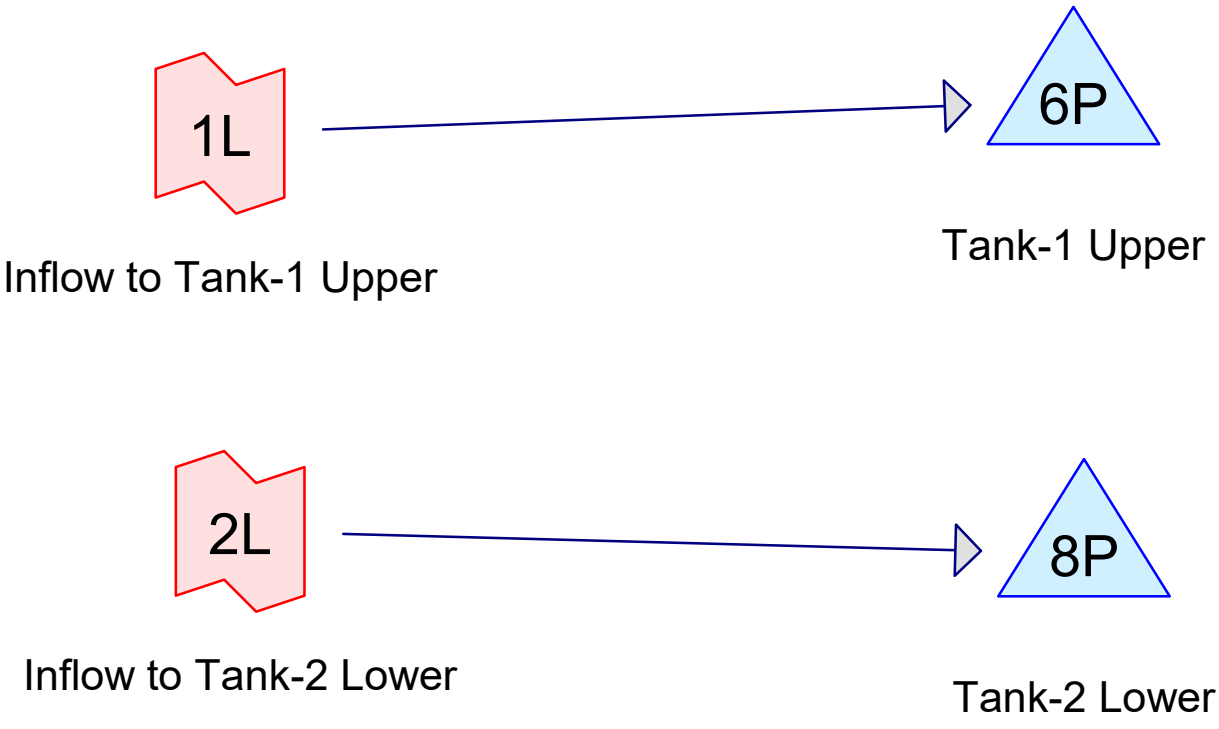
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX B

Detention Support Material



Subcat Reach Pond Link

Routing Diagram for 3527
Prepared by Pasco Laret Suiter & Associates, Printed 3/2/2022
HydroCAD® 10.10-7a s/n 10097 © 2021 HydroCAD Software Solutions LLC

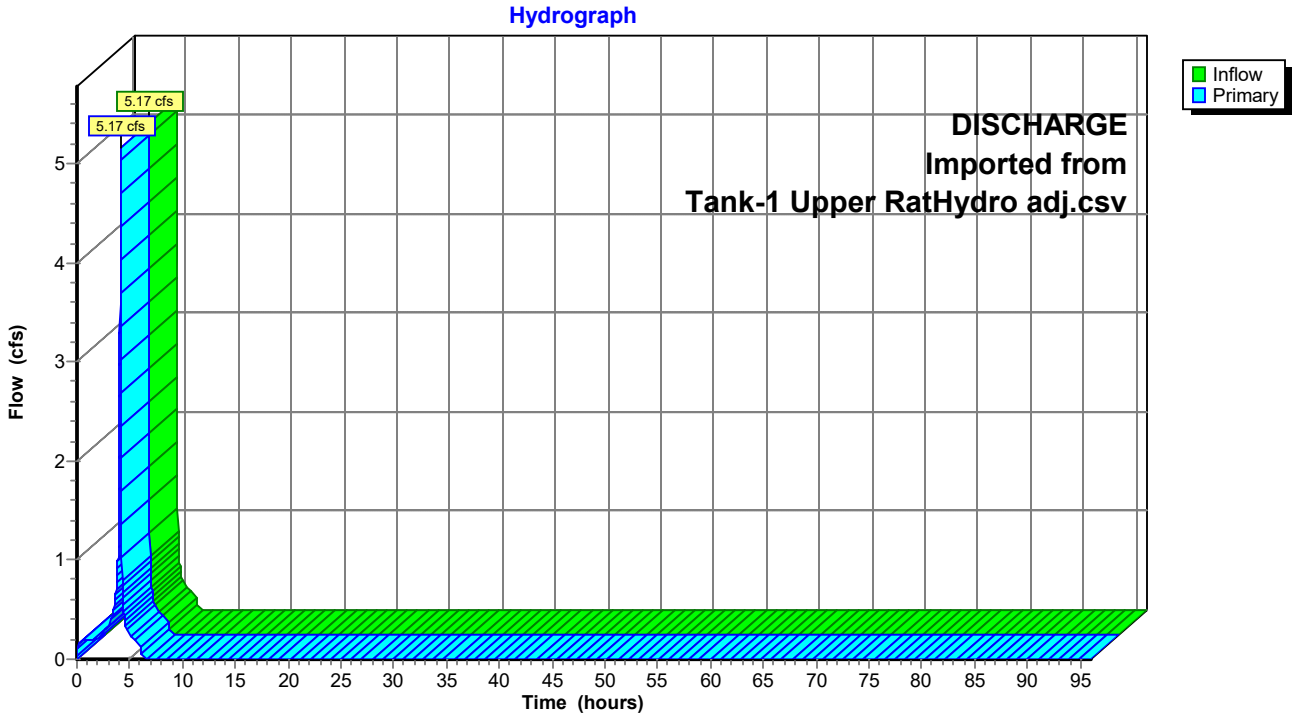
Summary for Link 1L: Inflow to Tank-1 Upper

Inflow = 5.17 cfs @ 4.13 hrs, Volume= 0.216 af
Primary = 5.17 cfs @ 4.13 hrs, Volume= 0.216 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 6P : Tank-1 Upper

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

DISCHARGE Imported from Tank-1 Upper RatHydro adj.csv

Link 1L: Inflow to Tank-1 Upper



Summary for Pond 6P: Tank-1 Upper

Inflow	=	5.17 cfs @	4.13 hrs,	Volume=	0.216 af
Outflow	=	0.30 cfs @	4.93 hrs,	Volume=	0.214 af, Atten= 94%, Lag= 47.9 min
Primary	=	0.30 cfs @	4.93 hrs,	Volume=	0.214 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 105.13' @ 4.93 hrs Surf.Area= 1,600 sf Storage= 7,805 cf

Plug-Flow detention time= 1,616.3 min calculated for 0.214 af (99% of inflow)
Center-of-Mass det. time= 1,615.9 min (1,828.4 - 212.5)

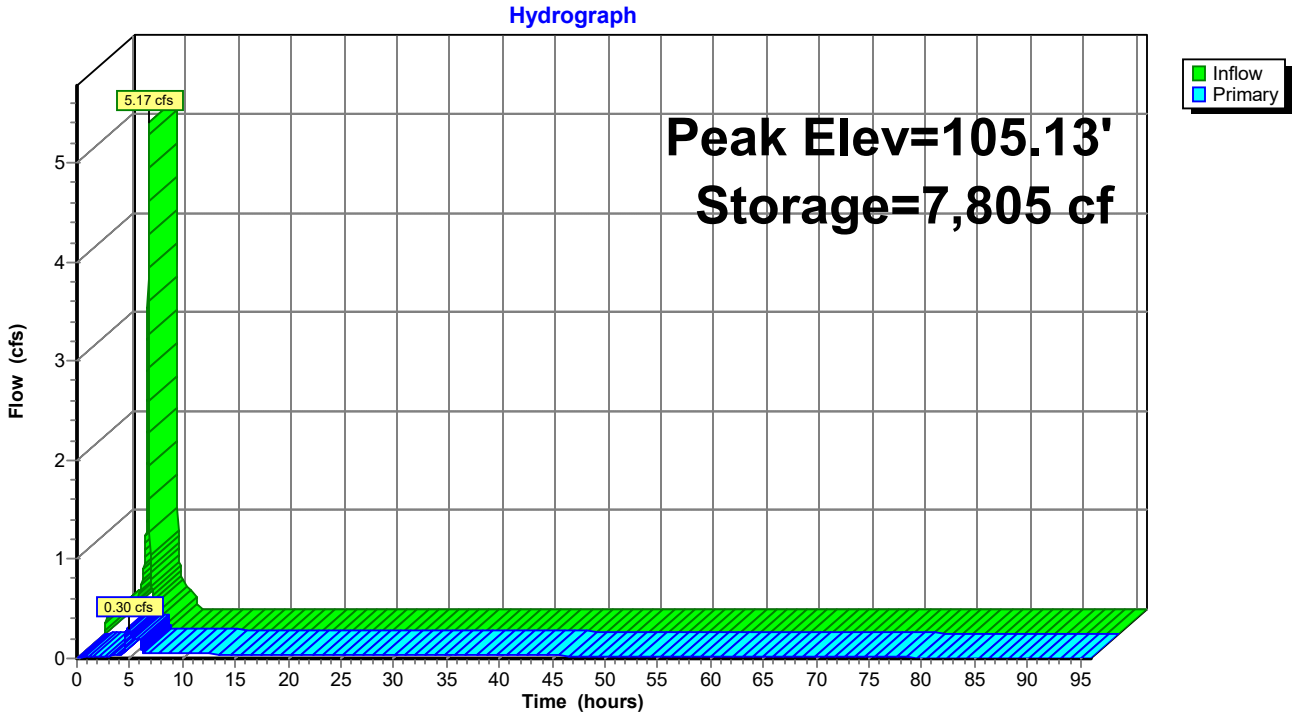
Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	8,482 cf	**Tank-1 Upper (Conic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.00	1,600	0.0	0	0	1,600
101.00	1,600	95.0	1,520	1,520	1,742
102.00	1,600	95.0	1,520	3,040	1,884
103.00	1,600	95.0	1,520	4,560	2,025
104.00	1,600	95.0	1,520	6,080	2,167
105.00	1,600	95.0	1,520	7,600	2,309
105.08	1,600	95.0	122	7,722	2,320
105.58	1,600	95.0	760	8,482	2,391

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**12.00" Round Culvert** L= 100.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 100.00' / 99.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	100.00'	**0.90" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	105.08'	**Custom Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 0.50 Width (feet) 6.00 6.00 0.00

Primary OutFlow Max=0.30 cfs @ 4.93 hrs HW=105.13' (Free Discharge)
└**1=Culvert** (Passes 0.30 cfs of 6.86 cfs potential flow)
  ├**2=Orifice** (Orifice Controls 0.05 cfs @ 10.87 fps)
  └**3=Custom Weir** (Weir Controls 0.25 cfs @ 0.77 fps)

Pond 6P: Tank-1 Upper



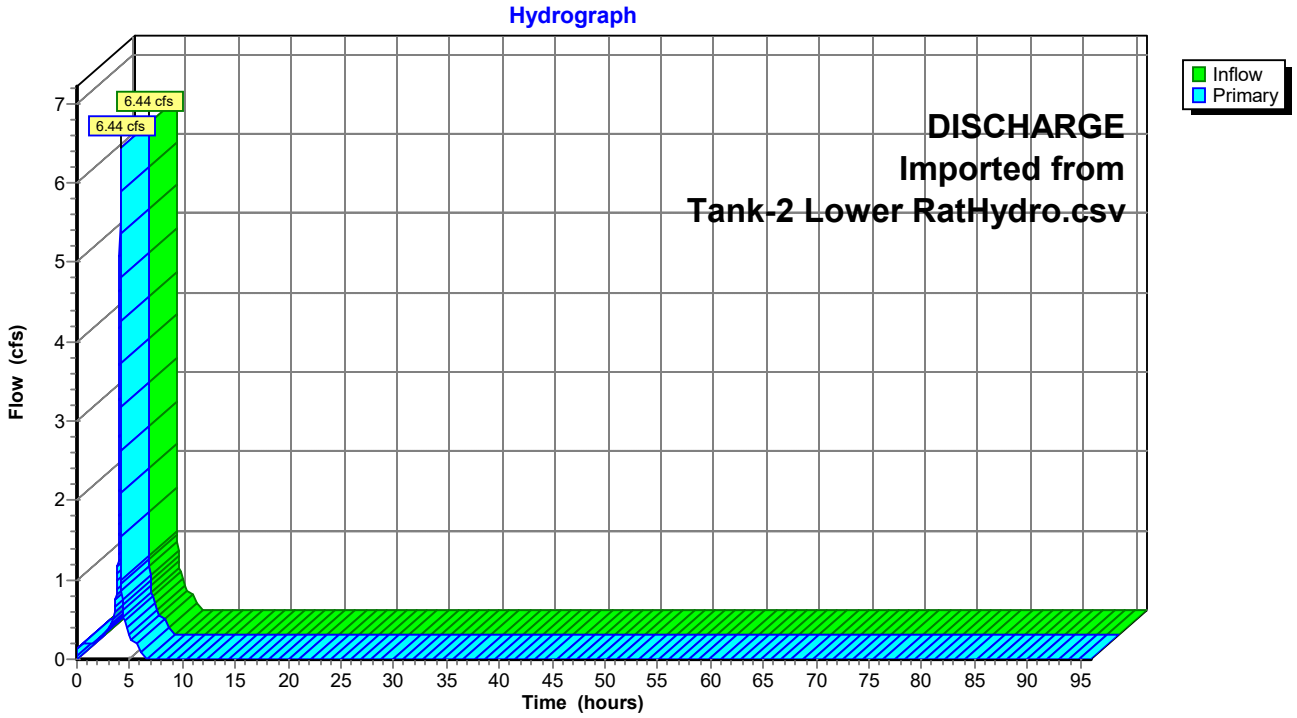
Summary for Link 2L: Inflow to Tank-2 Lower

Inflow = 6.44 cfs @ 4.10 hrs, Volume= 0.233 af
Primary = 6.44 cfs @ 4.10 hrs, Volume= 0.233 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 8P : Tank-2 Lower

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

DISCHARGE Imported from Tank-2 Lower RatHydro.csv

Link 2L: Inflow to Tank-2 Lower



Summary for Pond 8P: Tank-2 Lower

Inflow	=	6.44 cfs @	4.10 hrs,	Volume=	0.233 af
Outflow	=	4.02 cfs @	4.14 hrs,	Volume=	0.231 af, Atten= 38%, Lag= 2.7 min
Primary	=	4.02 cfs @	4.14 hrs,	Volume=	0.231 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 103.35' @ 4.14 hrs Surf.Area= 2,100 sf Storage= 6,686 cf

Plug-Flow detention time= 1,202.2 min calculated for 0.231 af (99% of inflow)
Center-of-Mass det. time= 1,201.2 min (1,413.6 - 212.4)

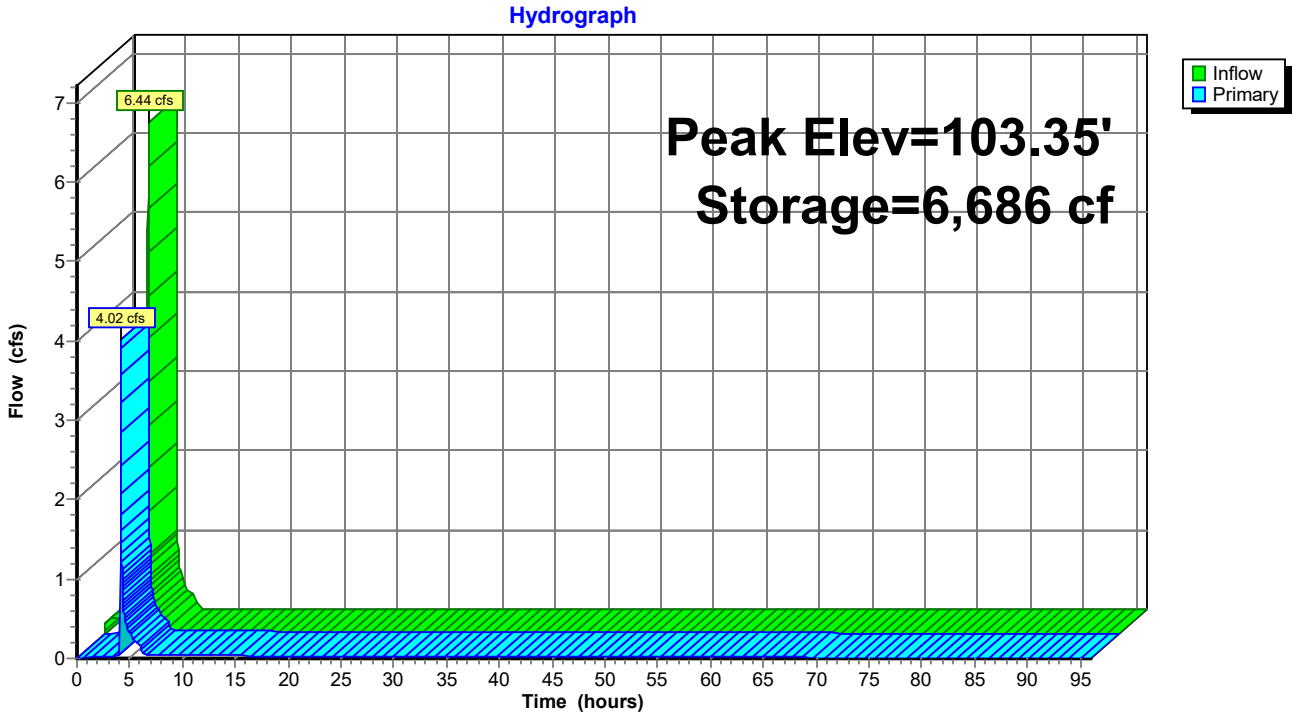
Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	7,062 cf	**Tank-2 Lower (Conic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.00	2,100	0.0	0	0	2,100
101.00	2,100	95.0	1,995	1,995	2,262
102.00	2,100	95.0	1,995	3,990	2,425
103.00	2,100	95.0	1,995	5,985	2,587
103.04	2,100	95.0	80	6,065	2,594
103.54	2,100	95.0	998	7,062	2,675

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**12.00" Round Culvert** L= 100.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 100.00' / 99.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	100.00'	**0.90" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	103.04'	**Custom Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 0.50 Width (feet) 7.00 7.00 0.00

Primary OutFlow Max=3.99 cfs @ 4.14 hrs HW=103.35' (Free Discharge)
└**1=Culvert** (Passes 3.99 cfs of 5.54 cfs potential flow)
  ├**2=Orifice** (Orifice Controls 0.04 cfs @ 8.76 fps)
  └**3=Custom Weir** (Weir Controls 3.95 cfs @ 1.82 fps)

Pond 8P: Tank-2 Lower

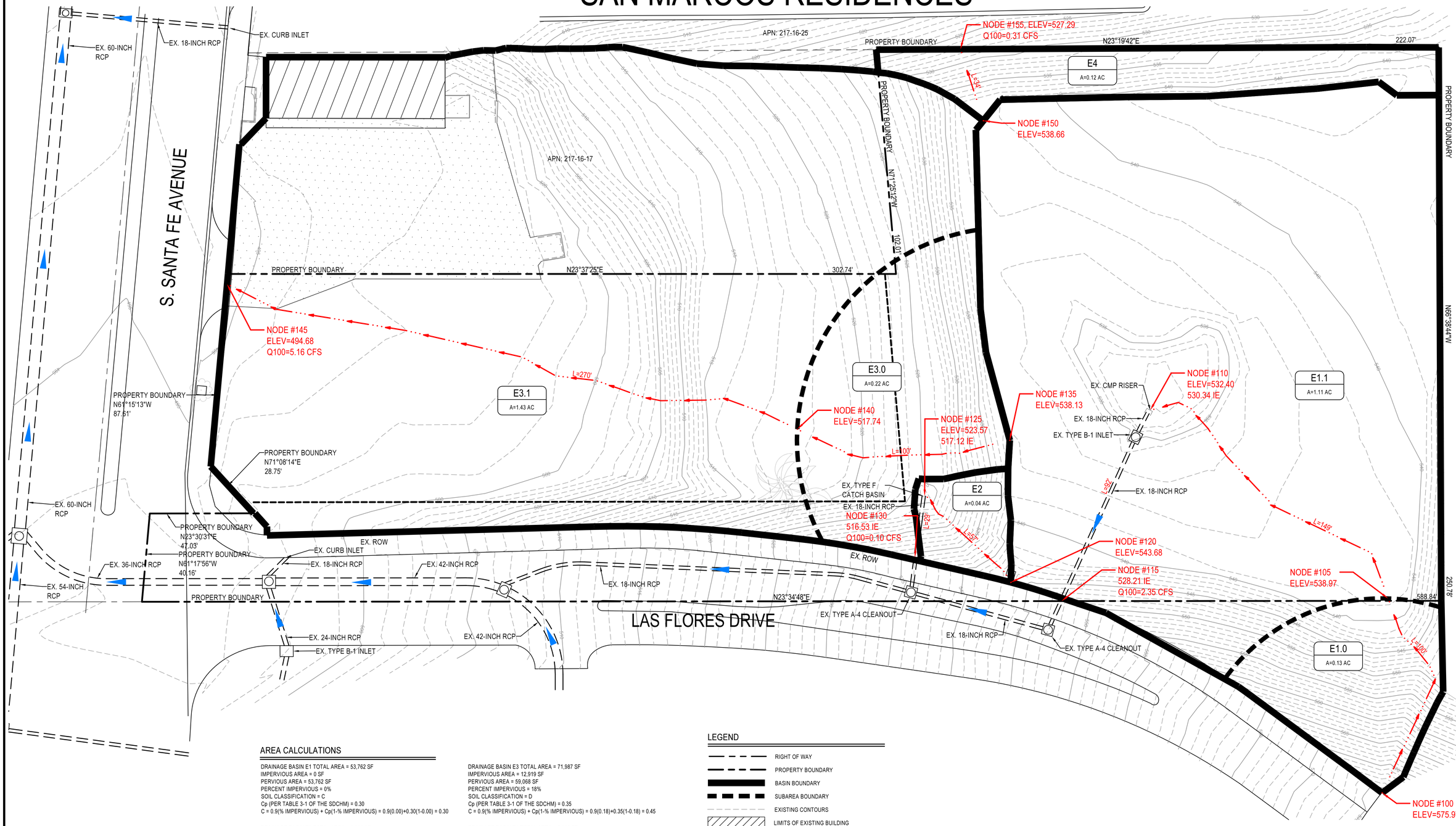


APPENDIX C

Existing and Proposed Hydrology Maps

PRE-PROJECT HYDROLOGY MAP

SAN MARCOS RESIDENCES



AREA CALCULATIONS

DRAINAGE BASIN E1 TOTAL AREA = 53,762 SF
IMPERVIOUS AREA = 0 SF
PERVIOUS AREA = 53,762 SF
PERCENT IMPERVIOUS = 0%
SOIL CLASSIFICATION = C
Cp (PER TABLE 3-1 OF THE SDCHM) = 0.30
C = 0.9(% IMPERVIOUS) + Cp(1-% IMPERVIOUS) = 0.9(0.00)+0.30(1-0.00) = 0.30

DRAINAGE BASIN E2 TOTAL AREA = 1,834 SF
IMPERVIOUS AREA = 0 SF
PERVIOUS AREA = 1,834 SF
PERCENT IMPERVIOUS = 0%
SOIL CLASSIFICATION = C
Cp (PER TABLE 3-1 OF THE SDCHM) = 0.30
C = 0.9(% IMPERVIOUS) + Cp(1-% IMPERVIOUS) = 0.9(0.00)+0.30(1-0.00) = 0.30

DRAINAGE BASIN E3 TOTAL AREA = 71,987 SF
IMPERVIOUS AREA = 12,919 SF
PERVIOUS AREA = 59,068 SF
PERCENT IMPERVIOUS = 18%
SOIL CLASSIFICATION = D
Cp (PER TABLE 3-1 OF THE SDCHM) = 0.35
C = 0.9(% IMPERVIOUS) + Cp(1-% IMPERVIOUS) = 0.9(0.18)+0.35(1-0.18) = 0.45

DRAINAGE BASIN E4 TOTAL AREA = 5,243 SF
IMPERVIOUS AREA = 0 SF
PERVIOUS AREA = 5,243 SF
PERCENT IMPERVIOUS = 0%
SOIL CLASSIFICATION = C
Cp (PER TABLE 3-1 OF THE SDCHM) = 0.30
C = 0.9(% IMPERVIOUS) + Cp(1-% IMPERVIOUS) = 0.9(0.00)+0.30(1-0.00) = 0.30

LEGEND

- RIGHT OF WAY
- PROPERTY BOUNDARY
- BASIN BOUNDARY
- SUBAREA BOUNDARY
- EXISTING CONTOURS
- LIMITS OF EXISTING BUILDING
- LIMITS OF EXISTING AC PAVEMENT
- STREET CENTERLINE
- SURFACE DRAINAGE PATH
- UNDERGROUND PIPE DRAINAGE PATH
- STORM DRAINAGE PIPE

SCALE: 1" = 20'

20 10 0 20 40 60

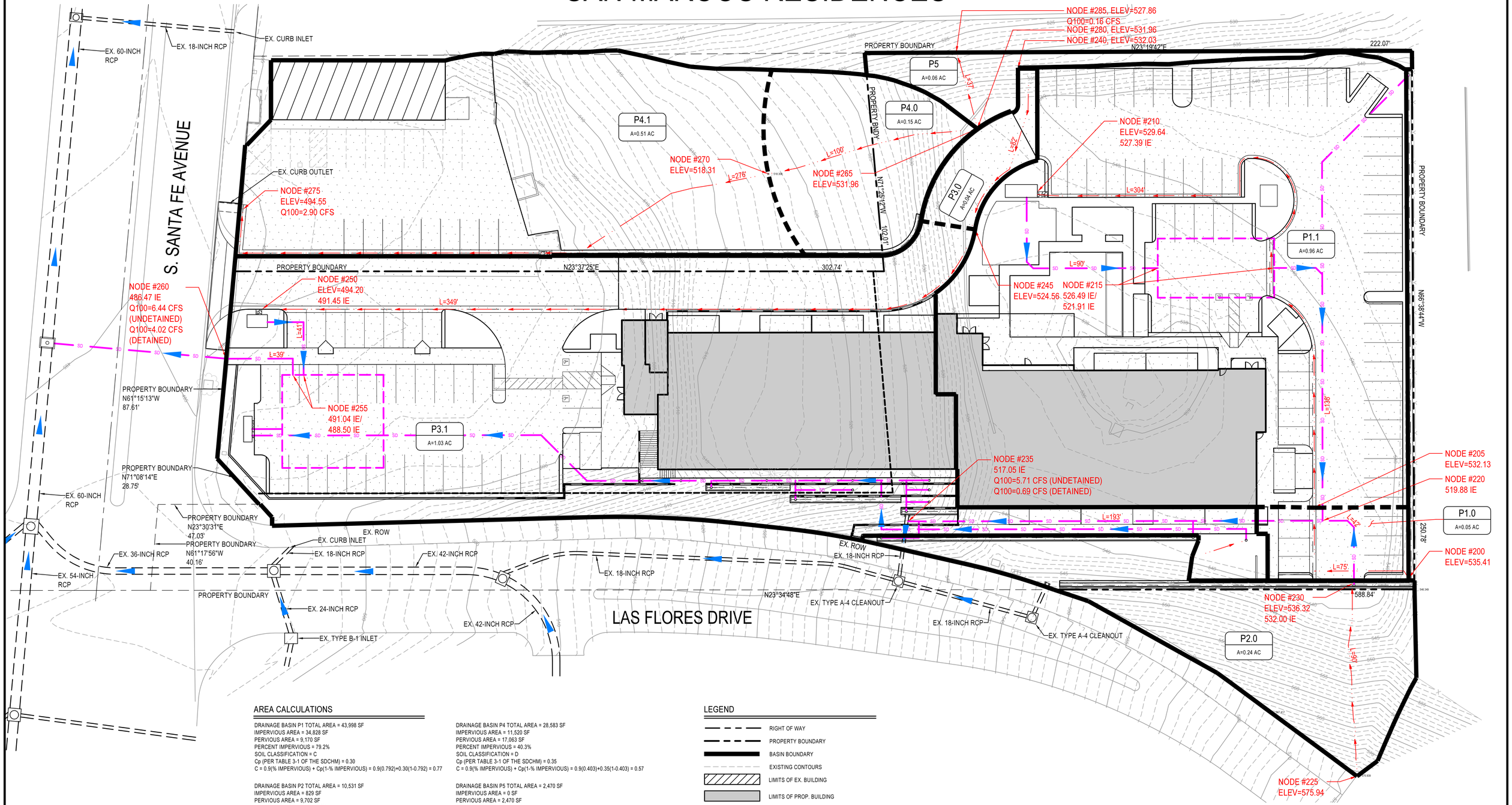
PRE-PROJECT HYDROLOGY MAP
SAN MARCOS RESIDENCES
CITY OF SAN MARCOS

PASCO LARET SUITER & ASSOCIATES
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

SAVE DATE: 03/04/22 ~ PLOT DATE: 04/25/22 ~ FILE NAME: J:\ACTIVE JOBS\3527 MAYER-SOUTH SANTA FE AVE\CIVIL\REPORTS\HYDROLOGY\Pre and Post Project Conditions Maps\3527-HYDRO-Pre Project Conditions Map.dwg

POST-PROJECT HYDROLOGY MAP

SAN MARCOS RESIDENCES



AREA CALCULATIONS

DRAINAGE BASIN P1 TOTAL AREA = 43,998 SF
IMPERVIOUS AREA = 34,828 SF
PERVIOUS AREA = 9,170 SF
PERCENT IMPERVIOUS = 79.2%
SOIL CLASSIFICATION = C
Cp (PER TABLE 3-1 OF THE SDCHM) = 0.30
C = 0.9(% IMPERVIOUS) + Cp(1-% IMPERVIOUS) = 0.9(0.792)+0.30(1-0.792) = 0.77

DRAINAGE BASIN P2 TOTAL AREA = 10,531 SF
IMPERVIOUS AREA = 829 SF
PERVIOUS AREA = 9,702 SF
PERCENT IMPERVIOUS = 7.9%
SOIL CLASSIFICATION = C
Cp (PER TABLE 3-1 OF THE SDCHM) = 0.30
C = 0.9(% IMPERVIOUS) + Cp(1-% IMPERVIOUS) = 0.9(0.079)+0.30(1-0.079) = 0.35

DRAINAGE BASIN P3 TOTAL AREA = 46,587 SF
IMPERVIOUS AREA = 37,689 SF
PERVIOUS AREA = 8,898 SF
PERCENT IMPERVIOUS = 80.9%
SOIL CLASSIFICATION = D
Cp (PER TABLE 3-1 OF THE SDCHM) = 0.35
C = 0.9(% IMPERVIOUS) + Cp(1-% IMPERVIOUS) = 0.9(0.809)+0.35(1-0.809) = 0.79

DRAINAGE BASIN P4 TOTAL AREA = 28,583 SF
IMPERVIOUS AREA = 11,520 SF
PERVIOUS AREA = 17,063 SF
PERCENT IMPERVIOUS = 40.3%
SOIL CLASSIFICATION = D
Cp (PER TABLE 3-1 OF THE SDCHM) = 0.35
C = 0.9(% IMPERVIOUS) + Cp(1-% IMPERVIOUS) = 0.9(0.403)+0.35(1-0.403) = 0.57

DRAINAGE BASIN P5 TOTAL AREA = 2,470 SF
IMPERVIOUS AREA = 0 SF
PERVIOUS AREA = 2,470 SF
PERCENT IMPERVIOUS = 0%
SOIL CLASSIFICATION = C
Cp (PER TABLE 3-1 OF THE SDCHM) = 0.30
C = 0.9(% IMPERVIOUS) + Cp(1-% IMPERVIOUS) = 0.9(0.00)+0.30(1-0.00) = 0.30

LEGEND

- RIGHT OF WAY
- PROPERTY BOUNDARY
- BASIN BOUNDARY
- EXISTING CONTOURS
- LIMITS OF EX. BUILDING
- LIMITS OF PROP. BUILDING
- LIMITS OF EX. OR PROP. CONCRETE/PAVEMENT
- STREET CENTERLINE
- SURFACE DRAINAGE PATH
- UNDERGROUND PIPE DRAINAGE PATH
- EX. STORM DRAINAGE PIPE
- PROP. STORM DRAINAGE PIPE
- PROP. UNDERGROUND DETENTION SYSTEM

SCALE: 1" = 20'

20 10 0 20 40 60

POST-PROJECT HYDROLOGY MAP
SAN MARCOS RESIDENCES
CITY OF SAN MARCOS

PASCO LARET SUITER & ASSOCIATES
San Diego | Encinitas | Orange County
Phone 949.661.6695 | www.plsaengineering.com

SAVE DATE: 03/04/22 ~ PLOT DATE: 04/25/22 ~ FILE NAME: J:\ACTIVE JOBS\3527 MAYER-SOUTH SANTA FE AVE\CIVIL\REPORTS\HYDROLOGY\Pre and Post Project Conditions Maps\3527-HYDRO-Post Project Conditions Map.dwg

APPENDIX H

Water Supply Study

S. SANTA FE & LAS FLORES WATER SUPPLY STUDY

LN 2022-004

January 25, 2022

Prepared By: Robert Scholl, P.E.

Approvals: RSW

GENERAL POLICY STATEMENT

This water supply study is based on current criteria. It is not a representation, expressed or implied, that the Vista Irrigation District (District) will furnish water at a future date. Applications for service are governed by separate rules and regulations, and are the subject of separate District proceedings, apart from this water supply study.

The location of existing improvements and the recommendations of this hydraulic analysis are presented in schematic form only. It is the responsibility of the Developer/Engineer to design the final improvements, including independent investigation of existing conditions.

This Study is based on the current adopted land use utilized in the City of San Marcos's General Plan, adopted in 2012 (General Plan). The study addresses the incremental facility impacts of this Project only and does not include or consider any additional projects within District's service area that have deviated from General Plan land uses. Any land use changes within the vicinity of the Study area may necessitate a revision to the Study. The District shall determine if and when revisions to the Study are necessary. Costs for revising this Study shall be borne by the Developer.

INTRODUCTION AND PURPOSE

The proposed development at 2972 and 2982 S. Santa Fe Avenue (Project) consists of 54 multi-family residential units on 2.23 acres (APNs 217-161-18 & 19). Another 0.27 acre of the Project is being dedicated as public right-of-way along Las Flores Drive. The property is located on the northwestern side of the S. Santa Fe Avenue and Las Flores Drive intersection in the City of San Marcos. The Project is located within the District's Sphere of Influence and water service boundary.

The purpose of this study is to serve as a nexus document for setting development conditions. It evaluates the configuration of the proposed water system, District service rights, and the ability of the existing water distribution system to serve the Project during peak hour and maximum day plus fire flow demand conditions. Evaluation includes:

- Water distribution system; including the need to upsize or install new pipelines and appurtenances.

- Access and utility easements; including evaluation of the adequacy of existing easements, and the need for new easements.

SOURCE OF WATER, PROPOSED FACILITIES, AND EASEMENTS

The proposed Project lies completely within the District's 837 Pressure Zone, which is supplied by gravity from the 20.0 million gallon (mg) Pechstein Reservoir and multiple pressure regulating stations. Figures 1 through 3 show the development's location, existing water infrastructure within the vicinity of the development, and the proposed facilities.

The site is currently vacant and undeveloped; however, 2972 S. Santa Fe Avenue is served by a 5/8-inch domestic meter (account #3745-0261) on the southern side of the parcel that is connected to the District's 10-inch pipeline within S. Santa Fe Avenue. In addition, 2982 S. Santa Fe Avenue is served by a 1-inch domestic meter (account #3745-0265) and a 1-inch irrigation meter (account #3745-0139) on the eastern side of the parcel which are both connected to the District's 10-inch pipeline within N. Las Flores Drive. The Developer proposes to remove the two domestic services while keeping the irrigation service. Based on the utility site plan provided by the Developer, new domestic water service and fire service (size to be determined) lines would connect to the District's 10-inch pipeline within S. Santa Fe Avenue. The fire service would supply two private on-site fire hydrants. An extension of the public water system is not considered necessary to allow a connection point for the new services.

The proposed Project lies within the District's Blanket Easement BF59 and Specific Easement SW24. Since an extension of the public water system is not necessary, the District does not need any access and utility easements for the Project. However, the District will require being signatory on any mapping for the Project.

WATER FLOW PROJECTIONS AND DESIGN CRITERIA

The existing zoning designations by the City of San Marcos's General Plan are commercial for 2972 S. Santa Fe Avenue and light industrial for 2982 S. Santa Fe Avenue. The District's 2018 Potable Water Master Plan (Master Plan) based its water demand planning on these approved land uses. The Project developer proposes to build 54 multi-family residential townhomes on 2.23 acres, which equates to approximately 24 dwelling units per acre. In order to accommodate this dwelling unit density, the developer is proposing a General Plan Amendment to modify the property's land use to Multi-Family Residential.

Based on the unit demand factor of 3,650 gallons per day (gpd)/acre developed in the Master Plan for multi-family residential land use and site size of 2.23 acres, the projected average annual water demand for the Project is 8,140 gpd.

The Master Plan outlines the District's water system design criteria, which are as follows:

Peaking Factors

- Maximum day demands: 200% of average annual demands
- Peak hour demands: 300% of average annual demands

System Pressure

- Peak hour demand conditions: 40 pounds per square inch (psi) minimum
- Maximum day demand plus fire flow: 20 psi minimum
- Static: 150 psi maximum

Fire Flow

- The City of San Marcos Fire Marshal has set the required fire demand at 1,500 gallons per minute (gpm) for the Project.

Pipeline Fluid Velocity

- Peak hour demand conditions: 8 feet per second (fps) maximum
- Maximum day demand plus fire flow: 16 fps maximum

Pipeline Diameter

- Short dead-end, no hydrants: 4-inch diameter minimum
- Feeding hydrants: 8-inch diameter minimum

HYDRAULIC ANALYSES

A hydraulic analysis was performed on the District's distribution system with the Project's proposed water demands on the District's 10-inch pipeline within S. Santa Fe Avenue. The analysis was carried out using the District's InfoWater® v12.4 water distribution computer model. The modeled pressure results are summarized in the table below.

Hydraulic Modeling Results

Node Location	Elevation (ft)	Static Pressure (psi)	Peak Hour Pressure (psi)	Max Day + FF Pressure (psi)*
S. Santa Fe Water Main South of Project	492.3	149	110	N/A
Proposed Fire Hydrant #1 in Project	495.5	148	N/A	80**
Proposed Fire Hydrant #2 in Project	528.0	134	N/A	60**

*Simulated fire flows are within the distribution system water mains, analyses do not represent actual flow available through a fire hydrant assembly or fire sprinkler system.

**Maximum day plus fire flow pressure results for the private infrastructure within the limits of the development assumes a 15-psi headloss through the reduced pressure detector assembly (RPDA) and an 8-inch private fire service pipeline.

No existing system deficiencies were identified in any pipe segments in the vicinity of the development during any scenario. Results from the analysis show that the required fire flow

demand of 1,500 gpm can be met at both of the proposed private fire hydrants within the development.

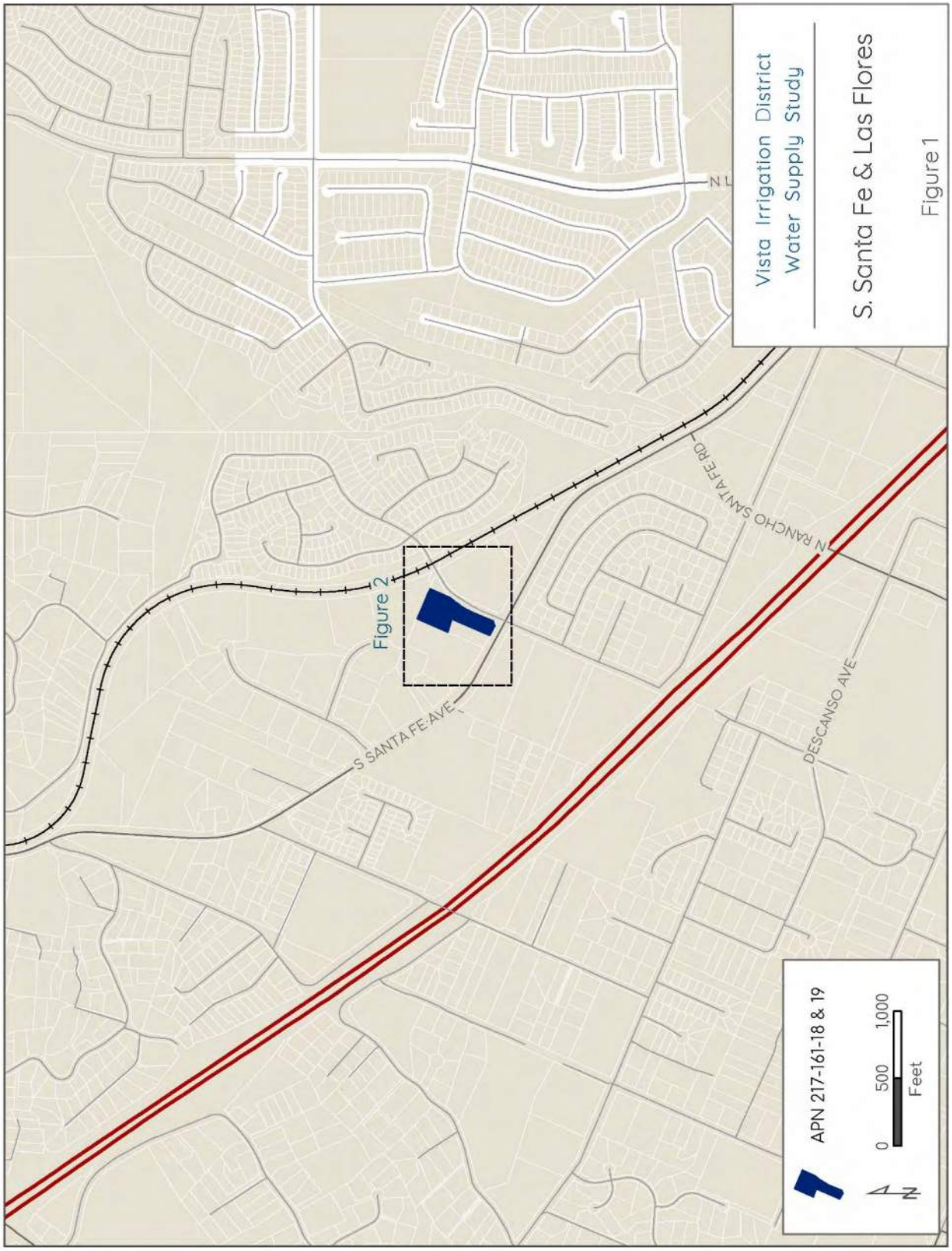
The District makes no guarantee that the available fire flow and pressures are presently available, nor guarantee that the flow and pressure will be available in the future due to continued growth that places additional demands for water on the water distribution system. Availability of flow and pressure is also subject to shutdowns and variations required by the operation of the District's distribution system.

CONCLUSION AND CONDITIONS

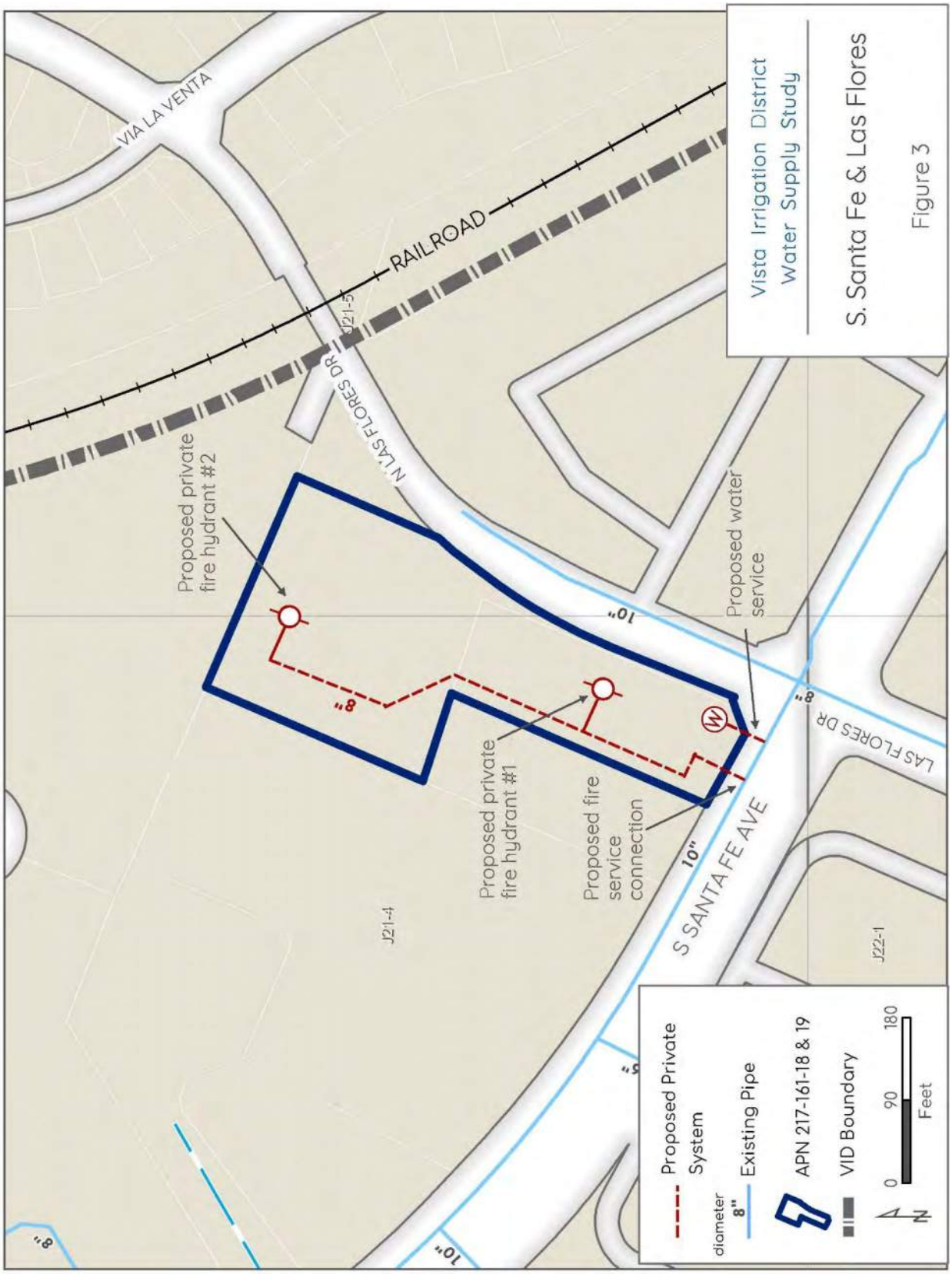
The Project is proposing a General Plan Amendment to modify the property's land use to Multi-Family Residential. Based on the unit demand factor of 3,650 gpd/acre for multi-family residential development and site size of 2.23 acres, the projected average annual water demand for the Project is 8,140 gpd.

The Study did not identify any existing system deficiencies within the Project limits or in the vicinity of the development during peak hour demand or maximum day plus fire flow demand scenarios. The following improvements were assumed to be constructed as part of this development:

- Installation of a water service and master meter sized to accommodate the development, and connected to the District's 10-inch main in S. Santa Fe Avenue. The site is currently served by a 5/8-inch domestic meter and a 1-inch domestic meter, both of which will be removed.
- Installation of an RPDA and fire service connected to the District's main in S. Santa Fe Avenue.
- Installation of an 8-inch minimum private fire system sized to serve the 54 multi-family residential units.


Vista Irrigation District
Water Supply Study
S. Santa Fe & Las Flores
Figure 1
Figure 2
N RANCHO SANTA FE RD
S SANTA FE AVE
DESCANSO AVE
APN 217-161-18 & 19
0
500
1,000
Feet
N

Vista Irrigation District
Water Supply Study
S. Santa Fe & Las Flores
Figure 2
VIA LA VENTA
RAILROAD
N LAS FLORES DR
J21-5
J21-4
J22-1
LAS FLORES DR
S SANTA FE AVE
10"
8"
6"
diameter
Existing Pipe
APN 217-161-18 & 19
VID Boundary
0
90
180
Feet
N


Vista Irrigation District
Water Supply Study
S. Santa Fe & Las Flores
Figure 3
VIA LA VENTA
RAILROAD
N LAS FLORES DR
J21-5
Proposed private fire hydrant #2
Proposed water service
Proposed private fire hydrant #1
Proposed fire service connection
S SANTA FE AVE
LAS FLORES DR
J21-4
J22-1
10"
8"
Proposed Private System
diameter
Existing Pipe
APN 217-161-18 & 19
VID Boundary
0
90
180
Feet
N

APPENDIX I

Noise Analysis

Noise Analysis for the Santa Fe Flores Project San Marcos, California

Prepared for

Santa Fe Flores, LP
P.O. Box 903
Rancho Santa Fe, CA 92067
Contact: Paul Mayer

Prepared by

RECON Environmental, Inc.
3111 Camino del Rio North, Suite 600
San Diego, CA 92108
P 619.308.9333

RECON Number 9865
March 28, 2022

Jessica Fleming
Environmental Specialist
Noise, Air Quality, Greenhouse Gas

TABLE OF CONTENTS

Acronyms and Abbreviations iii
Executive Summary 1
1.0 Introduction 2
1.1 Project Description 2
1.2 Fundamentals of Noise 6
2.0 Applicable Noise Standards 7
2.1 General Plan 7
2.2 Municipal Code 8
2.3 California Green Building Standards Code – Environmental Comfort 9
3.0 Existing Conditions 9
4.0 Analysis Methodology 10
4.1 Construction Noise Analysis 12
4.2 Traffic Noise Analysis 13
4.3 On-site Generated Noise Analysis 15
5.0 Future Acoustical Environment and Impacts 16
5.1 Construction Noise 16
5.2 Traffic Noise 17
5.3 On-site Generated Noise 21
6.0 Conclusions 23
6.1 Construction Noise 23
6.2 Traffic Noise 23
6.3 On-site Generated Noise 24
7.0 References Cited 24

FIGURES

1: Regional Location 3
2: Project Location on Aerial Photograph 4
3: Site Plan 5
4: Noise Measurement Locations 11
5: Construction Noise Contours 18
6: Vehicle and Rail Traffic Noise Contours 19
7: HVAC Noise Contours 22

TABLE OF CONTENTS (cont.)

TABLES

1: Interior and Exterior Noise Guidelines 8
2: Municipal Code Property Line Noise Standards 9
3: Noise Measurements 10
4: 15-minute Traffic Counts 10
5: Typical Construction Equipment Noise Levels 12
6: Modeled Vehicle Traffic Parameters 14
7: Modeled Sprinter Trains 14
8: Future Vehicle Traffic Parameters 15
9: Construction Noise Levels 16
10: Future Vehicle and Rail Traffic Noise Levels 17
11: Traffic Noise Level with and without Project and Ambient Noise Increases 20
12: HVAC Noise Levels at Adjacent Properties 23

ATTACHMENTS

1: Noise Measurement Data
2: HVAC Specifications
3: SoundPLAN Data – Construction Noise
4: SoundPLAN Data – On-site Traffic and Rail Noise
5: FHWA RD-77-108 – Off-site Traffic Noise
6: SoundPLAN Data – On-site Generated Noise

Acronyms and Abbreviations

ADT	average daily traffic
CALGreen	California Green Building Standards
Caltrans	California Department of Transportation
CCR	California Code of Regulations
City	City of San Marcos
CNEL	community noise equivalent level
dB	decibel
dB(A)	A-weighted decibel
FHWA	Federal Highway Administration
HVAC	heating, ventilating, and air conditioning
L_{90}	noise level exceeded 90 percent of the time
L_{eq}	one-hour equivalent noise level
L_{max}	maximum noise level
LOS	Level of Service
L_{pw}	sound power level
project	Santa Fe Flores Project

Executive Summary

The Santa Fe Flores Project (project) is located in the city of San Marcos at 2972 and 2982 South Santa Fe Avenue adjacent to Las Flores Drive. The 2.5-acre project site has been previously graded and is undeveloped, and is currently designated Commercial and Light Industrial in the City of San Marcos (City) General Plan and zoned as Commercial and Light Industrial. The project would require a General Plan Amendment and Rezone to Multi-family Residential to allow the development of 50 multi-family residential units.

This report discusses potential noise impacts from the construction and operation of the project. As part of this assessment, noise levels due to vehicle traffic were calculated and evaluated against City noise and land use compatibility guidelines. In addition to compatibility, the potential for noise to impact adjacent uses from future on-site sources and construction activity was assessed. A summary of the findings is provided below.

Construction Noise

Construction activity is regulated by the City Municipal Code, which limits noise by restricting construction activities to hours unlikely to impact the community. Noise associated with the grading, building, and paving for the project would potentially result in short-term impacts to surrounding residential properties. Construction noise levels would range from 57 to 74 A-weighted decibels equivalent noise level [dB(A) L_{eq}] at the adjacent properties. Construction activities would generally occur over the period between 7:00 a.m. and 6:00 p.m. on weekdays. Although the existing adjacent uses would be exposed to construction noise levels that may be heard above ambient conditions, the exposure would be temporary and would not exceed 75 dB(A) L_{eq}. As construction activities associated with the project would comply with Section 10.24.020 (b)(9) of the City Municipal Code, temporary increases in noise levels from construction activities would be less than significant.

Traffic Noise

The additional vehicle trips associated with the project would increase noise levels on nearby roadways. A noise increase of 3 dB or more would be considered significant because 3 dB is the level at which an increase in noise is perceptible to a person. However, the project would not generate enough trips to result in a direct or cumulative noise increase of more than 3 dB. Therefore, the project would result in less than significant direct and cumulative impacts related to traffic noise.

The main source of noise at the project site is vehicle traffic on South Santa Fe Avenue and Las Flores Drive as well as Sprinters on the adjacent rail line. Exterior noise levels were modeled at the project site to determine compatibility with City standards. The applicable standards for multi-family uses are an exterior noise level of 65 community noise equivalent level (CNEL) and an interior noise level of 45 CNEL. The project's exterior useable spaces include the patios and the open play lawn, tot lot, and seating areas on the western side of the proposed buildings. As calculated in this analysis, exterior noise levels are projected to range from 45 to 63 CNEL at the outdoor use areas and building

façade. Noise levels would be compatible with the City's exterior multi-family noise level standard of 65 CNEL. Exterior noise impacts would be less than significant.

The interior noise level standard is 45 CNEL. Interior noise levels can be reduced through standard construction techniques. When windows are closed, standard construction techniques provide various exterior-to-interior noise level reductions depending on the type of structure and window. Standard light-frame construction would reduce exterior to interior noise levels by at least 20 dB (Federal Highway Administration 2011). Therefore, interior noise levels would be 43 CNEL or less, and are not projected to exceed the interior noise level standard of 45 CNEL. Interior noise impacts would be less than significant.

On-site Generated Noise

The noise sources on the project site after completion of construction are anticipated to be those that would be typical of any residential use, such as vehicles arriving and leaving, children at play, and landscape maintenance machinery. None of these noise sources are anticipated to violate the Municipal Code. Rooftop heating, ventilating, and air conditioning noise levels were modeled at the property line adjacent properties. As calculated in this analysis, HVAC noise levels would range from 33 to 44 dB(A) L_{eq} at the adjacent properties. Noise levels would not exceed the applicable Noise Ordinance limits at the property lines.

1.0 Introduction

1.1 Project Description

The Santa Fe Flores Project (project) is located in the city of San Marcos at 2972 and 2982 South Santa Fe Avenue adjacent to Las Flores Drive on assessor parcel numbers 217-161-1800 and 217-161-1900. Figure 1 shows the regional location. The 2.5-acre project site has been previously graded and is undeveloped, and is currently designated Commercial and Light Industrial in the City of San Marcos (City) General Plan and zoned as Commercial and Light Industrial. Figure 2 shows an aerial photograph of the project site and vicinity.

The project would require a General Plan Amendment and Rezone to Multi-family Residential to allow the development of 50 multi-family residential units in one building that would be three to four stories in height. The project would also include a 1,000-square-foot roof deck for fitness and leisure, a 1,170-square-foot ground floor leasing and amenity center, and 120-square-foot ground floor fire command center. Vehicle parking would include a total of 107 surface parking spaces and bicycle parking would include a total of 11 lockers or bike storage rooms located on the upper and lower levels. Figure 3 shows the proposed site plan.

Project Location

RECON

M:\JOBS5\9865\common_gis\fig1.mxd 03/08/2022 bma

FIGURE 1
Regional Location

Image Source: NearMap (flown January 2022)

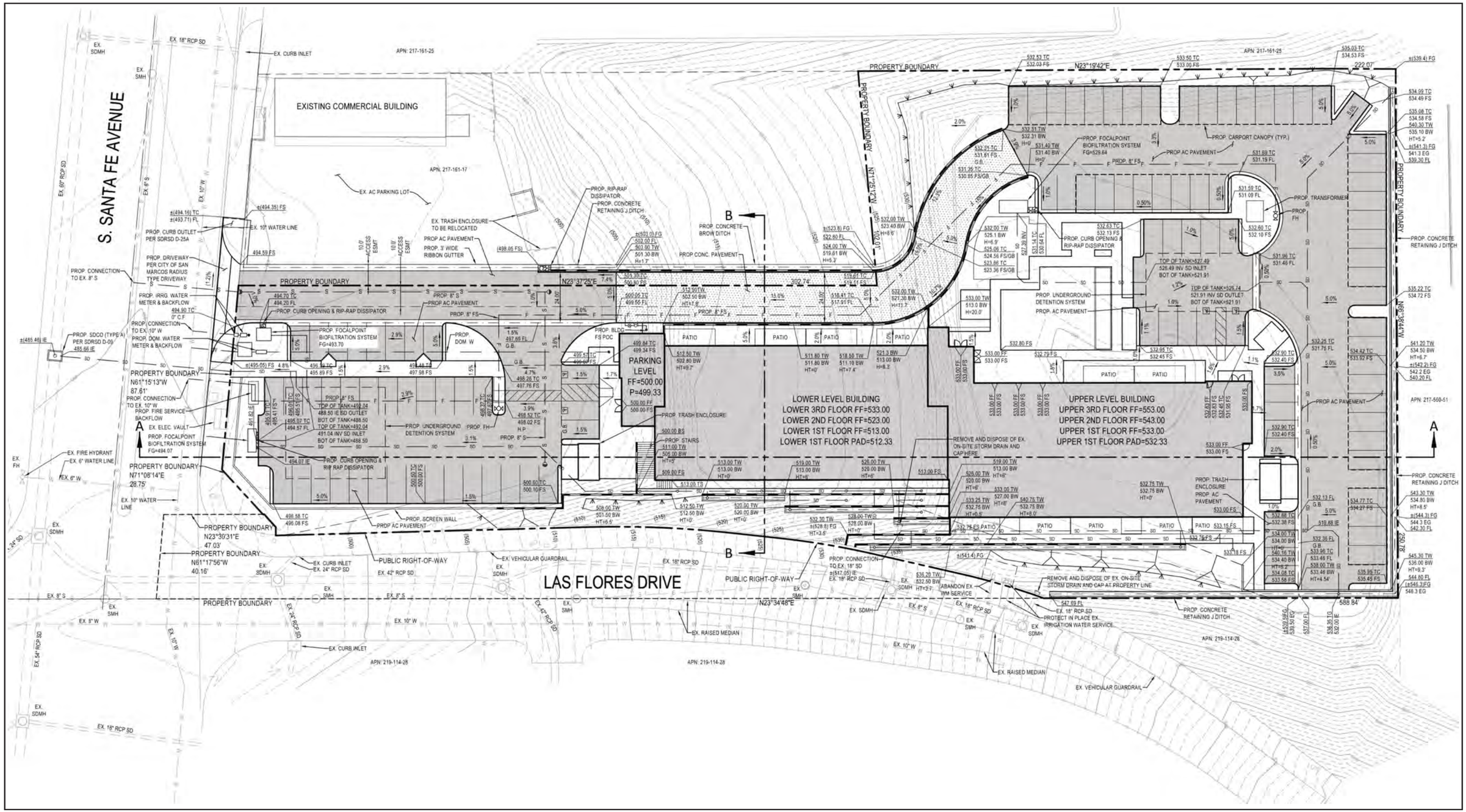
Project Boundary

RECON

M:\JOBS5\9865\common_gis\fig2_air.mxd 03/23/2022 bma

FIGURE 2
Project Location on Aerial Photograph

Map Source: Pasco Laret Suiter & Associates



0 Feet 40

RECON

M:\JOBS5\9865\air\graphics\fig3.afdesign 03/23/22 bma

FIGURE 3
Site Plan

1.2 Fundamentals of Noise

Sound levels are described in units called the decibel (dB). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; a halving of the energy would result in a 3 dB decrease. However, human perception of noise has no simple correlation with acoustical energy. A change in noise levels is generally perceived as follows: 3 A-weighted dB [dB(A)] barely perceptible, 5 dB(A) readily perceptible, and 10 dB(A) perceived as a doubling or halving of noise (California Department of Transportation 2013).

In technical terms, sound levels are described as either a "sound power level" or a "sound pressure level," which while commonly confused, are two distinct characteristics of sound. Both share the same unit of measure, the dB. However, sound power, expressed as L_{pw}, is the energy converted into sound by the source. As sound energy travels through the air, it creates a sound wave that exerts pressure on receivers such as an eardrum or microphone, the sound pressure level. Sound measurement instruments only measure sound pressure, and limits used in standards are generally sound pressure levels.

The human ear is not equally sensitive to all frequencies within the sound spectrum. To accommodate this phenomenon, the A-scale, which approximates the frequency response of the average young ear when listening to most ordinary everyday sounds, was devised. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Therefore, the "A-weighted" noise scale is used for measurements and standards involving the human perception of noise. Noise levels using A-weighted measurements are designated with the notation dB(A).

1.2.1 Descriptors

The impact of noise is not a function of loudness alone. The time of day when noise occurs and the duration of the noise are also important. In addition, most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors has been developed. The noise descriptors used for this study are the equivalent noise level (L_{eq}) and the community noise equivalent level (CNEL). The L_{eq} is the equivalent steady-state noise level in a stated period of time that is calculated by averaging the acoustic energy over a time period; when no period is specified, a 1-hour period is assumed.

The CNEL is a 24-hour equivalent sound level. The CNEL calculation applies an additional 5 dB(A) penalty to noise occurring during evening hours, between 7:00 p.m. and 10:00 p.m., and a 10 dB(A) penalty is added to noise occurring during the night, between 10:00 p.m. and 7:00 a.m. These increases for certain times are intended to account for the added sensitivity of humans to noise during the evening and night.

1.2.2 Propagation

Sound from a localized source (approximating a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern, known as geometric spreading. The sound level decreases or drops off at a rate of 6 dB(A) for each doubling of the distance.

Traffic noise is not a single, stationary point source of sound. The movement of vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over some time interval. The drop-off rate for a line source is 3 dB(A) for each doubling of distance.

The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site (such as parking lots or smooth bodies of water) receives no additional ground attenuation, and the changes in noise levels with distance (drop-off rate) are simply the geometric spreading of the source. A soft site (such as soft dirt, grass, or scattered bushes and trees) provides an additional ground attenuation value of 1.5 dB(A) per doubling of distance. Thus, a point source over a soft site would drop off at 7.5 dB(A) per doubling of distance.

2.0 Applicable Noise Standards

2.1 General Plan

The Noise Element of the City General Plan provides land use compatibility guidelines to ensure that new developments are sited, designed, and constructed in such a manner that ambient noise levels would not create an unacceptable noise environment for the occupants and patrons of the new development. Table 1 provides the interior and exterior noise guidelines for various types of uses and developments.

The project proposes multi-family residential uses. As shown in Table 1, the applicable standards for multi-family uses are an exterior noise level of 65 CNEL and an interior noise level of 45 CNEL. The exterior noise level standard is applicable at the proposed exterior use areas. For the proposed project, this includes patios and the open play lawn, tot lot, and seating areas on the western side of the proposed buildings.

Table 1 Interior and Exterior Noise Guidelines		
Land Use	Maximum Noise Level (CNEL)	
	Interior[1]	Exterior[2,3]
Residential – single-family, mobile homes, or age-restricted housing	45	60
Residential – multi-family residences or mixed use	45	65
Lodging – hotels, motels	45	65
Schools, churches, hospitals, residential care facility, child-care facilities	50	65
Passive recreational parks, nature preserves, contemplative spaces, cemeteries	--	65
Active parks, golf courses, athletic fields, outdoor spectator sports, water recreation	--	65
Office/professional, government, medical/dental, commercial, retail, laboratories	50	65
Industrial, manufacturing, utilities, agriculture, mining, stables, ranching, warehouse, maintenance/repair	--	65

SOURCE: City of San Marcos General Plan Update, Noise Element 2013.
CNEL = community noise equivalent level.
[1]Applies only to interior habitable rooms.
[2]Exterior noise standard does not apply for land uses where no exterior use area is proposed or necessary, such as a library.
[3]For single-family detached dwelling units, "exterior noise level" is defined as the noise level measured at an outdoor living area that adjoins and is on the same lot as the dwelling.

2.2 Municipal Code

2.2.1 Title 10, Chapter 10.24 – Construction

Section 10.24.020 (b)(9) of the City Municipal Code identifies permissible hours for general construction activities. Excluding City holidays, construction may occur weekdays from 7:00 a.m. to 6:00 p.m. or Saturdays from 8:00 a.m. to 5:00 p.m. Grading is often the loudest phase of construction. Section 17.32.180 restricts grading and earthworks activities to between the hours of 7:00 a.m. and 4:30 p.m., Monday through Friday.

2.2.2 Title 20 – Zoning Ordinance

City Municipal Code Title 20 – Zoning Ordinance contains General Development Standards. Performance standards in Section 20.300.070 (f) set restrictions on noise levels by zoning. No person shall create or allow the creation of exterior noise that causes the noise level to exceed the noise standards shown in Table 2.

Table 2 Municipal Code Property Line Noise Standards		
Zone	Time	Allowable Property Line Noise Level [dB(A) L_{eq}]
Single-Family Residential (A, R-1, R-2)	7:00 a.m. to 10:00 p.m. 10:00 p.m. to 7:00 a.m.	60 50
Multi-Family Residential (R-3)	7:00 a.m. to 10:00 p.m. 10:00 p.m. to 7:00 a.m.	65 55
Commercial (C, O-P, SR)	7:00 a.m. to 10:00 p.m. 10:00 p.m. to 7:00 a.m.	65 55
Industrial	7:00 a.m. to 10:00 p.m. 10:00 p.m. to 7:00 a.m.	65 60
SOURCE: Section 20.300.070(f) Table 20.300-4, San Marcos Municipal Code Title 20 – Zoning Code dB(A) L_{eq} = A-weighted decibels equivalent noise level		

The project site is surrounded by single-family residential uses to the northeast and southeast, multi-family residential uses to the east, a mobile home park to the south, a commercial use to the southwest, and industrial uses to the west and north.

2.3 California Green Building Standards Code – Environmental Comfort

Interior noise levels for habitable rooms are regulated also by Title 24 of the California Code of Regulations (CCR) California Noise Insulation Standards. Title 24, Chapter 12, Section 1206.4, of the 2019 California Building Code requires that interior noise levels attributable to exterior sources not exceed 45 CNEL in any habitable room (CCR 2019). A habitable room is a room used for living, sleeping, eating, or cooking. Bathrooms, closets, hallways, utility spaces, and similar areas are not considered habitable rooms for this regulation (24 CCR, Chapter 12, Section 1206.4 2019).

3.0 Existing Conditions

Existing noise levels in the vicinity of the project site were measured on March 22, 2022, using one Larson-Davis Model LxT, Type 1 Integrating Sound Level Meter, serial number 3895. The following parameters were used:

Filter:	A-weighted
Response:	Slow
Interval Period	1 minute
Time History Period:	5 seconds

The meter was calibrated before and after each measurement. The meter was set 5 feet above the ground level for each measurement.

Noise measurements were taken to obtain typical ambient noise levels at the project site and in the vicinity. The weather was sunny and warm. Two 15-minute measurements were taken, as described

below. The measurement locations are shown on Figure 4, and detailed data is contained in Attachment 1.

Measurement 1 was located near the southern project boundary, 50 feet north of South Sante Fe Avenue. Noise levels were measured for 15 minutes. The main noise source at this location was vehicle traffic on South Santa Fe Avenue. Vehicle traffic on South Sante Fe Avenue was counted during the measurement period. The average measured noise level was 63.2 dB(A) L_{eq}.

Measurement 2 was located near the eastern project boundary, approximately 50 feet west of Las Flores Drive. Noise levels were measured for 15 minutes. The main noise source at this location was vehicle traffic on Las Flores Drive. Secondary sources of noise included vehicle traffic on South Santa Fe Avenue. Vehicle traffic on Las Flores Drive was counted during the measurement period. The average measured noise level was 57.5dB(A) L_{eq}.

Noise measurements are summarized in Table 3. Traffic counts conducted during Measurements 1 and 2 are summarized in Table 4.

Table 3
Noise Measurements

Measurement	Location	Time	Main Noise Source	L_{eq}
1	50 Feet North of S. Santa Fe Avenue	1:34 p.m. – 1:49 p.m.	Vehicle Traffic on S. Santa Fe Avenue	63.2
2	50 feet west of Las Flores Drive	1:55 p.m. – 2:10 p.m.	Vehicle traffic on Las Flores Drive	57.5

L_{90} = Noise level exceeded 90 percent of the time.
NOTE: Noise measurement data is contained in Attachment 1.

Table 4
15-minute Traffic Counts

Measurement	Roadway	Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles
1	S. Santa Fe Avenue	Eastbound	78	8	0	5	0
		Westbound	71	4	1	2	0
2	Las Flores Drive	Northbound	13	0	0	0	0
		Southbound	11	0	0	0	0

4.0 Analysis Methodology

Noise level predictions and contour mapping were developed using noise modeling software, SoundPlan Essential, version 4.1 (Navcon Engineering 2018). SoundPLAN calculates noise propagation based on the International Organization for Standardization method (ISO 9613-2 – Acoustics, Attenuation of Sound during Propagation Outdoors). The model calculates noise levels at selected receiver locations using input parameter estimates such as total noise generated by each noise source; distances between sources, barriers, and receivers; and shielding provided by intervening terrain, barriers, and structures. The model outputs can be developed as noise level contour maps or noise levels at specific receivers. In all cases, receivers were modeled at 5 feet above ground elevation, which represents the average height of the human ear.

Image Source: NearMap (flown January 2022)

RECON

M:\JOBS5\9865\common_gis\fig4_nos.mxd 03/24/2022 bma

FIGURE 4
Noise Measurement Locations

4.1 Construction Noise Analysis

Project construction noise would be generated by diesel engine-driven construction equipment used for site preparation and grading, building construction, loading, unloading, and placing materials and paving. Diesel engine-driven trucks also would bring materials to the site and remove the soils from excavation.

Construction equipment with a diesel engine typically generates maximum noise levels from 70 to 95 dB(A) L_{eq} at a distance of 50 feet (Federal Highway Administration [FHWA] 2006 and 2008, Federal Transit Authority 2006). During construction, equipment moves to different locations and goes through varying load cycles, and there are breaks for the operators and for non-equipment tasks, such as measurement. Table 5 summarizes typical construction equipment noise levels and duty cycles.

Table 5
Typical Construction Equipment Noise Levels

Equipment	Noise Level at 50 Feet [dB(A) L_{eq}]	Typical Duty Cycle
Auger Drill Rig	85	20%
Backhoe	80	40%
Blasting	94	1%
Chain Saw	85	20%
Clam Shovel	93	20%
Compactor (ground)	80	20%
Compressor (air)	80	40%
Concrete Mixer Truck	85	40%
Concrete Pump	82	20%
Concrete Saw	90	20%
Crane (mobile or stationary)	85	20%
Dozer	85	40%
Dump Truck	84	40%
Excavator	85	40%
Front End Loader	80	40%
Generator (25 kilovolt amps or less)	70	50%
Generator (more than 25 kilovolt amps)	82	50%
Grader	85	40%
Hydra Break Ram	90	10%
Impact Pile Driver (diesel or drop)	95	20%
In situ Soil Sampling Rig	84	20%
Jackhammer	85	20%
Mounted Impact Hammer (hoe ram)	90	20%
Paver	85	50%
Pneumatic Tools	85	50%
Pumps	77	50%
Rock Drill	85	20%
Roller	74	40%
Scraper	85	40%
Tractor	84	40%

Table 5 Typical Construction Equipment Noise Levels		
Equipment	Noise Level at 50 Feet [dB(A) L_{eq}]	Typical Duty Cycle
Vacuum Excavator (vac-truck)	85	40%
Vibratory Concrete Mixer	80	20%
Vibratory Pile Driver	95	20%
SOURCE: Federal Highway Administration 2006 and 2008; Federal Transit Authority 2006. dB(A) L_{eq} = A-weighted decibels average noise level		

Construction equipment would generate maximum noise levels between 70 and 95 dB(A) L_{max} at 50 feet from the source when in operation. During excavation, grading, and paving operations, equipment moves to different locations and goes through varying load cycles, and there are breaks for the operators and for non-equipment tasks, such as measurement. Average construction noise levels were calculated for the simultaneous operation of three common pieces of construction equipment: dozer, excavator, and loader. The usage factors were applied to the maximum noise level at 50 feet for each piece of equipment, and then noise levels were added logarithmically. Hourly average noise levels would be approximately 85 dB(A) L_{eq} at 50 feet from the center of construction activity when assessing three pieces of common construction equipment working simultaneously.

4.2 Traffic Noise Analysis

4.2.1 On-Site Traffic and Rail Noise

The SoundPLAN program uses the FHWA Traffic Noise Model algorithms and reference levels to calculate noise levels at selected receiver locations. The model uses various input parameters, such as projected hourly average traffic rates; vehicle mix, distribution, and speed; roadway lengths and gradients; distances between sources, barriers, and receivers; and shielding provided by intervening terrain, barriers, and structures. Receivers, roadways, and barriers were input into the model using three-dimensional coordinates. The locations of future buildings were obtained from project plans and drawings.

The main source of traffic noise at the project site is vehicle traffic on South Santa Fe Avenue and Las Flores Drive as well as Sprinters on the adjacent rail line. Future year 205 with project traffic volumes for South Santa Fe Avenue were obtained from the Traffic Impact Analysis prepared for the project (Linscott, Law and Greenspan, Engineers 2022). Future year 2050 traffic volumes for Las Flores Drive were obtained from San Diego Association of Governments (SANDAG) Series 14 traffic projections (SANDAG 2022). A vehicle classification mix of 93.0 percent automobiles, 3.0 percent medium trucks, 2.0 percent heavy trucks, 1.0 percent buses, and 1.0 percent motorcycles was modeled. Based on the field traffic counts, this classification mix is conservative.

Table 6 summarizes the traffic volumes and vehicle classification mixes for the modeled roadways.

Table 6 Modeled Vehicle Traffic Parameters								
				Vehicle Mix (percent)				
Roadway	Segment	Year 2050 Average Daily Traffic	Speed	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles
S. Santa Fe Avenue	Vern Road to Las Flores Drive	22,500	45	93	3	2	1	1
	Las Flores Drive to N. Rancho Santa Fe Road	21,450	45	93	3	2	1	1
Las Flores Drive	South of S. Santa Fe Avenue	2,600	25	93	3	2	1	1
	North of S. Santa Fe Avenue	1,600	25	93	3	2	1	1

The project site is also located approximately 150 feet southwest of the Sprinter rail line. The Sprinter is a light rail commuter train operated by the North County Transit District. The east-west Sprinter rail spans 22 miles from Oceanside to Escondido. The Palomar College Station is the closest Sprinter station to the project site. The number of daytime, evening, and nighttime Sprinter trains was obtained from published schedules and is summarized in Table 7.

Table 7 Modeled Sprinter Trains			
Direction	Daytime 7:00 a.m. – 7:00 p.m.	Evening 7:00 p.m. – 10:00 p.m.	Nighttime 10:00 p.m. – 7:00 a.m.
Eastbound	88	17	22
Westbound	88	15	21
Total	176	32	43

4.2.2 Off-site Traffic Noise

Off-site traffic noise was modeled using the FHWA Traffic Noise Prediction Model algorithms and reference levels. Traffic noise levels were calculated at 50 feet from the centerline of the affected roadways to determine the noise level increase associated with the project. The model uses various input parameters, such as traffic volumes; vehicle mix, distribution, and speed.

The roadways included in the traffic impact analysis are South Santa Fe Avenue, Hollencrest Road, and North Rancho Santa Fe Road. Traffic noise levels were calculated based on the total average daily traffic volumes on each roadway segment. For modeling purposes, "hard" ground conditions were used for the analysis of future conditions, since a majority of the project area is paved and the hard site provides the most conservative impact assessment.

Existing (year 2022), near term (year 2025), and future (year 2050) traffic volumes with and without the project were obtained from the project traffic impact analysis (Linscott, Law, and Greenspan Engineers 2022). Table 8 summarizes the future traffic volumes for the area roadway segments. Modeled noise levels do not account for shielding provided by intervening barriers and structures.

Table 8 Future Vehicle Traffic Parameters							
	Average Daily Traffic						
Roadway Segment	Year 2022	Year 2022 + Project	Year 2025	Year 2025 + Project	Year 2050	Year 2050 + Project	Speed (mph)
S. Santa Fe Avenue							
Similax Road to Bosstick Boulevard	14,850	14,940	15,610	15,700	22,200	22,290	45
Bosstick Boulevard to Vern Road	16,660	16,750	17,510	17,600	22,200	22,290	45
Vern Road to Las Flores Drive	16,660	16,960	17,510	17,810	22,200	22,500	45
Las Flores Drive to N. Rancho Santa Fe Road	14,600	14,750	15,340	15,490	21,300	21,450	45
N. Rancho Santa Fe Road to N. Pacific Street	13,500	13,560	14,190	14,250	24,400	24,460	40
Hollencrest Road							
De Leone Road to Hollenbeck Road	560	590	590	620	830	860	25
N. Rancho Santa Fe Avenue							
S. Santa Fe Avenue to Capalina Road	11,730	11,820	12,330	12,420	16,800	16,890	40
mph = miles per hour SOURCE: Linscott, Law and Greenspan, Engineers, Inc. 2022.							

4.3 On-site Generated Noise Analysis

On-site noise sources on the project site after completion of construction are anticipated to be those that would be typical of any multi-family use, such as vehicles arriving and leaving, children at play, and landscape maintenance machinery. None of these noise sources are anticipated to violate the City Municipal Code or result in a substantial permanent increase in existing noise levels. However, the project would include rooftop heating, ventilation, and air conditioning (HVAC) equipment. Noise levels due to HVAC equipment were modeled and compared to City limits (see Table 2).

The HVAC equipment would be located on the roof with screened walls. It is not known at this time which manufacturer, brand, or model of unit or units will be selected for use in the project. For the purposes of this analysis, to determine what general noise levels the HVAC units would generate, it was assumed that the rooftop units would be similar to a Carrier unit with a sound power level of 75 dB(A). Noise specifications are contained in Attachment 2. All units were modeled at full capacity during the daytime and nighttime hours.

Noise levels due to on-site sources were modeled using SoundPLAN. The SoundPLAN program models noise propagation following the International Organization for Standardization method *ISO 9613-2 – Acoustics, Attenuation of Sound during Propagation Outdoors*. The model calculates noise levels at selected receiver locations using input parameter estimates such as total noise generated by each noise source; distances between sources, barriers, and receivers; and shielding provided by intervening structures.

5.0 Future Acoustical Environment and Impacts

5.1 Construction Noise

Noise associated with the grading, building, and paving for the project would potentially result in short-term impacts to surrounding residential properties. There are residential uses located northeast, east, southeast, and south of the project site. A variety of noise-generating equipment would be used during the construction phase of the project, such as excavators, backhoes, front-end loaders, and concrete saws, along with others. The exact number and pieces of construction equipment required are not known at this time. As discussed, average construction noise levels were calculated. Based on this analysis, hourly average noise levels would be approximately 85 dB(A) L_{eq} at 50 feet from the center of construction activity when assessing three pieces of common construction equipment working simultaneously. Construction noise is considered a point source and would attenuate at approximately 6 dB(A) for every doubling of distance. To reflect the nature of grading and construction activities, equipment was modeled as an area source distributed over the project footprint. Noise levels were modeled at a series of 18 receivers located at the adjacent uses. The results are summarized in Table 9. Modeled receiver locations and construction noise contours are shown in Figure 5. SoundPLAN data is contained in Attachment 3.

Table 9
Construction Noise Levels

Receiver	Land Use	Noise Level [dB(A) L_{eq}]
1	Single-Family Residential	59
2	Single-Family Residential	61
3	Single-Family Residential	61
4	Single-Family Residential	61
5	Single-Family Residential	59
6	Multi-Family Residential	57
7	Multi-Family Residential	58
8	Multi-Family Residential	68
9	Multi-Family Residential	70
10	Single-Family Residential	63
11	Mobile Home Park	66
12	Mobile Home Park	65
13	Mobile Home Park	61
14	Mobile Home Park	59
15	Commercial	72
16	Industrial	65
17	Industrial	66
18	Industrial	74

dB(A) L_{eq} = A-weighted decibels equivalent noise level

As shown, construction noise levels would range from 57 to 74 dB(A) L_{eq} at the adjacent uses. The City's Municipal Code does not place noise limit restrictions on construction activities, however, other jurisdictions commonly apply a noise level limit of 75 dB(A) L_{eq} at residential uses. Construction noise levels would not exceed 75 dB(A) L_{eq}. Construction activities would generally occur over the period between 7:00 a.m. and 6:00 p.m. on weekdays. Although the existing adjacent uses would be exposed

to construction noise levels that may be heard above ambient conditions, the exposure would be temporary and would not exceed 75 dB(A) L_{eq}. As construction activities associated with the project would comply with the time limits established in Section 10.24.020 (b)(9) of the City Municipal Code, temporary increases in noise levels from construction activities would be less than significant.

5.2 Traffic Noise

5.2.1 On-site Traffic and Rail Noise

On-site traffic and rail noise contours were developed using the SoundPLAN program. Noise level contours were modeled at the first-floor level. These contours take into account shielding provided by the proposed building and grading. Future vehicle traffic noise-level contours are shown in Figure 6. SoundPLAN data are contained in Attachment 4.

As discussed in Section 2.1, the exterior noise level standard for multi-family uses is 65 CNEL. This standard is applicable at exterior use areas which include the patios and the open play lawn, tot lot, and seating areas on the western side of the proposed buildings. . The interior noise level standard is 45 CNEL. To refine the noise analysis and determine noise levels at exterior use areas and the building façade, exterior noise levels were calculated at a series of first- through fourth-floor specific receiver locations at the outdoor use areas and around the proposed building. Modeled receiver locations are shown in Figure 6. Table 10 summarizes the projected future noise levels at the 20 modeled receivers.

Table 10
Future Vehicle and Rail Traffic Noise Levels

Receiver	Exterior Noise Level (CNEL)			
	First-Floor	Second-Floor	Third-Floor	Fourth-Floor
1	54	56	57	58
2	51	54	56	57
3	54	56	57	58
4	52	55	56	57
5	47	53	55	56
6	48	53	55	56
7	45	51	57	58
8	47	55	57	58
9	50	56	58	59
10	55	57	58	60
11	58	62	63	63
12	57	60	61	62
13	51	57	60	61
14	55	60	61	61
15	53	59	60	61
16	52	56	60	60
17	51	55	59	60
18	51	54	57	59
19	49	54	55	56
20	50	54	55	56

CNEL = community noise equivalent level

Image Source: NearMap (flown January 2022)

Project Boundary

Receivers

Construction Noise

60 dB(A) L_{eq}

65 dB(A) L_{eq}

70 dB(A) L_{eq}

75 dB(A) L_{eq}

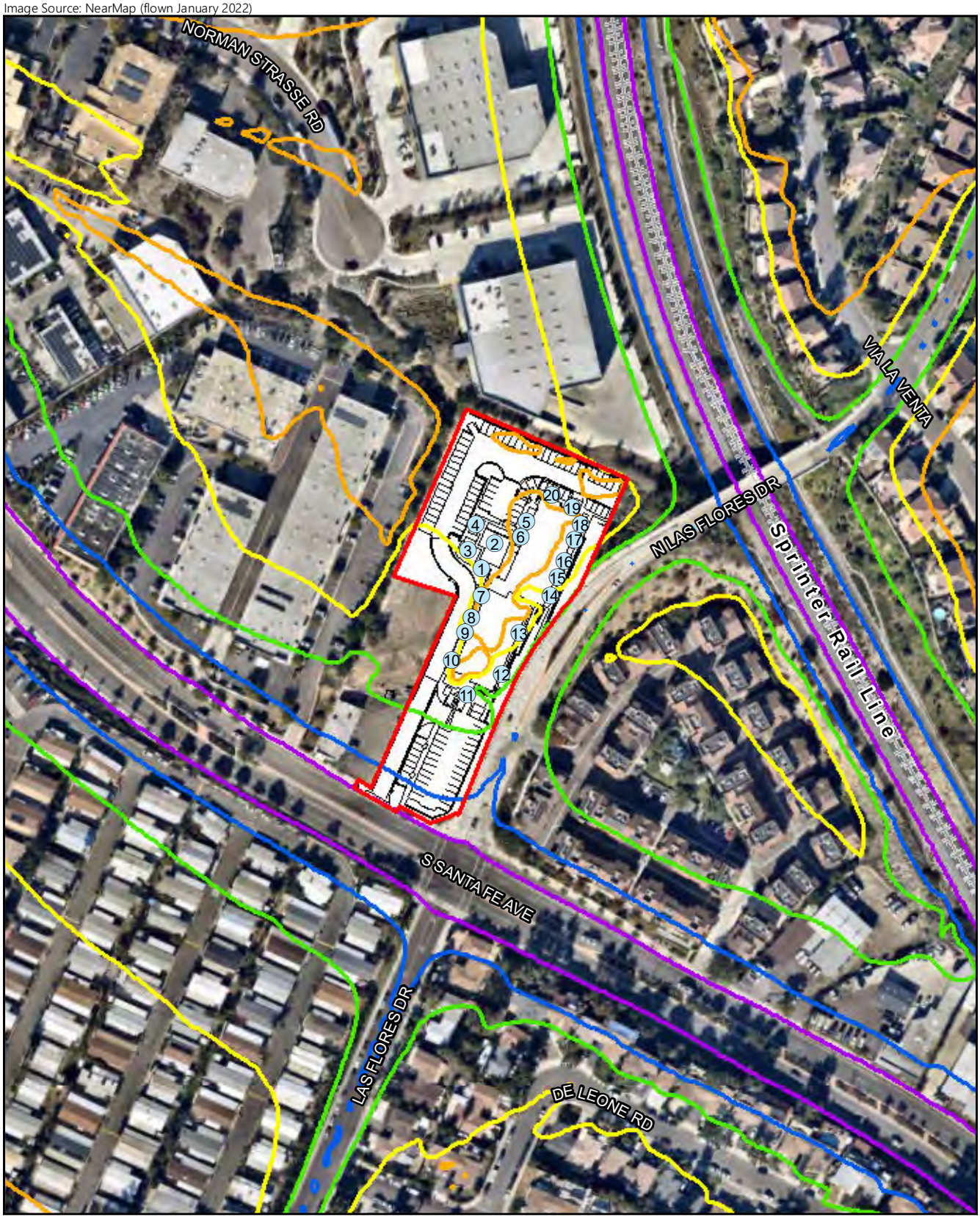
0 Feet 200

RECON

M:\JOBS5\9865\common_gis\fig5_nos.mxd 03/24/2022 bma

FIGURE 5
Construction Noise Contours

Image Source: NearMap (flown January 2022)



Project Boundary
Receivers
Site Plan

Vehicle and Rail Traffic Noise

50 CNEL
55 CNEL
60 CNEL
65 CNEL
70 CNEL

0 Feet 200

FIGURE 6
Future Vehicle and Rail Traffic Noise Contours

RECON

M:\JOBS5\9865\common_gis\fig6_nos.mxd 03/24/2022 bma

As shown, exterior noise levels are projected to range from 45 to 63 CNEL at the outdoor use areas and building façade. Noise levels would be compatible with the City's exterior multi-family noise level standard of 65 CNEL. Exterior noise impacts would be less than significant.

The interior noise level standard is 45 CNEL. Interior noise levels can be reduced through standard construction techniques. When windows are closed, standard construction techniques provide various exterior-to-interior noise level reductions depending on the type of structure and window. Standard light-frame construction would reduce exterior to interior noise levels by at least 20 dB (FHWA 2011). Therefore, interior noise levels would be 43 CNEL or less, and are not projected to exceed the interior noise level standard of 45 CNEL. Interior noise impacts would be less than significant.

5.2.2 Off-site Traffic Noise

The project would increase traffic volumes on local roadways. However, the project would not substantially alter the vehicle classifications mix on local or regional roadways, nor would the project alter the speed on an existing roadway or create a new roadway. Thus, the primary factor affecting off-site noise levels would be increased traffic volumes. While changes in noise levels would occur along any roadway where project-related traffic occurs, for noise assessment purposes, noise level increases are assumed to be greatest nearest the project site, as this location would represent the greatest concentration of project-related traffic. Traffic noise increases attributable to the project were assessed against a significance threshold of 3 dB, which is the level at which an increase in noise is considered to be barely perceptible (Caltrans 2013).

Table 11 presents a conservative assessment of traffic noise levels based on the existing (year 2022), near term (year 2025), and future (year 2050) noise levels without and with the project. Table 11 also summarizes the direct and cumulative traffic noise level increases due to the project. Noise level calculations are contained in Attachment 5.

Table 11
Traffic Noise Level with and without Project and Ambient Noise Increases (CNEL)

Roadway Segment	Year 2022			Year 2025			Year 2050			Cumulative Increase Over Existing
	No Project	Project	Increase	No Project	Project	Increase	No Project	Project	Increase	
S. Santa Fe Avenue										
Similax Road to Bosstick Boulevard	71.3	71.3	0.0	71.5	71.5	0.0	73.0	73.1	0.1	1.8
Bosstick Boulevard to Vern Road	71.8	71.8	0.0	72.0	72.0	0.0	73.0	73.1	0.1	1.3
Vern Road to Las Flores Drive	71.8	71.9	0.1	72.0	72.1	0.1	73.0	73.1	0.1	1.3
Las Flores Drive to N. Rancho Santa Fe Road	71.2	71.3	0.1	71.4	71.5	0.1	72.9	72.9	0.0	1.7
N. Rancho Santa Fe Road to N. Pacific Street	69.8	69.8	0.0	70.0	70.0	0.0	72.3	72.3	0.0	2.5

Table 11 Traffic Noise Level with and without Project and Ambient Noise Increases (CNEL)										
	Year 2022			Year 2025			Year 2050			Cumulative Increase Over Existing
Roadway Segment	No Project	Project	Increase	No Project	Project	Increase	No Project	Project	Increase	
Hollencrest Road										
De Leone Road to Hollenbeck Road	52.7	53.0	0.3	53.0	53.2	0.2	54.4	54.6	0.2	1.9
N. Rancho Santa Fe Avenue										
S. Santa Fe Avenue to Capalina Road	69.1	69.2	0.1	69.4	69.4	0.0	70.7	70.7	0.0	1.6
Note: Increase calculations may vary due to independent rounding.										

As shown, the project would not result in a direct or cumulative noise increase of more than 3 dB. Therefore, the project would result in less than significant direct and cumulative impacts related to traffic noise.

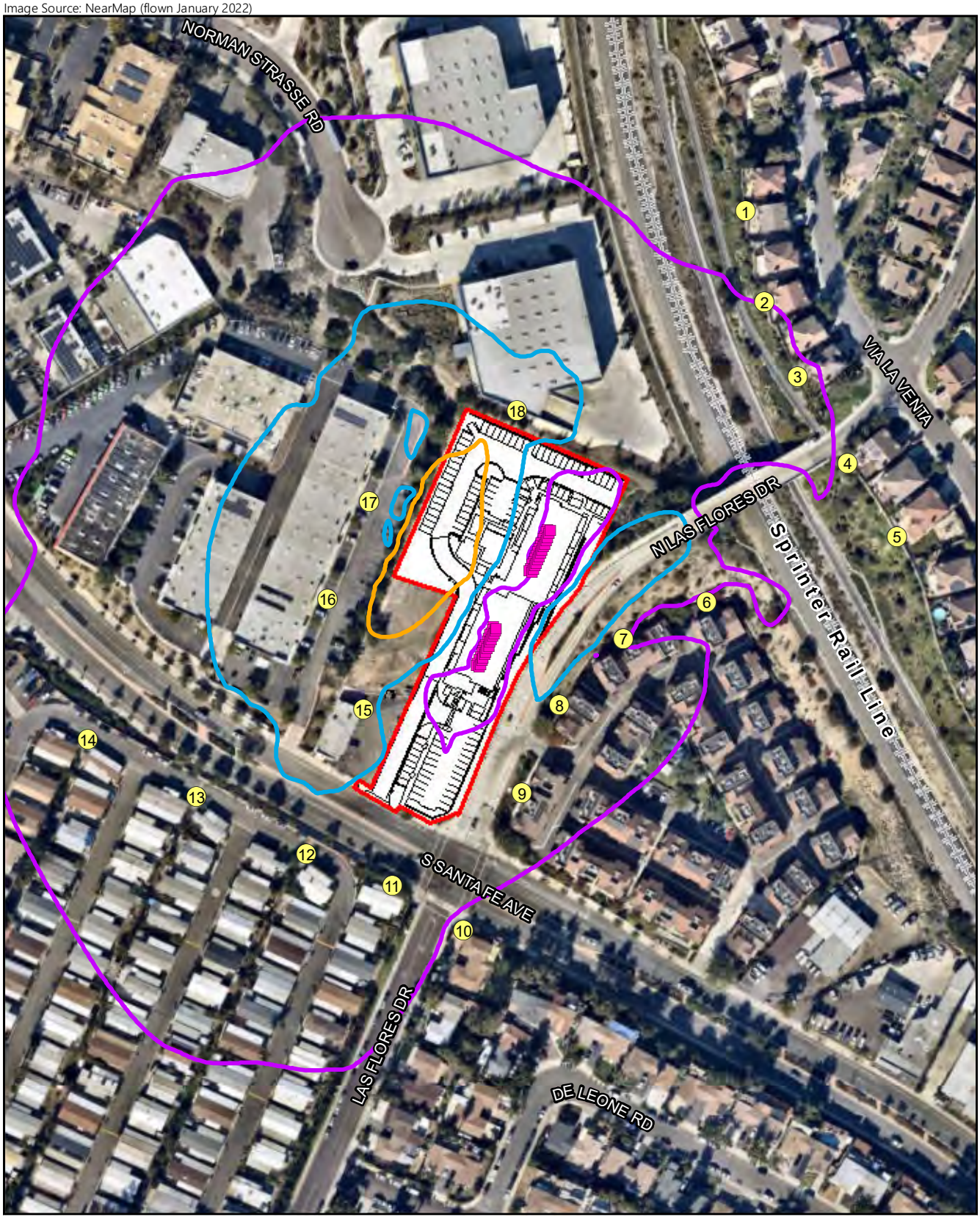
5.3 On-site Generated Noise

The primary noise sources on-site would be HVAC equipment. Rooftop HVAC equipment that would have the potential to produce noise in excess of City limits (see Table 2). Using the on-site noise source parameters discussed in Section 4.3, noise levels were modeled at a series of 18 receivers located at the adjacent properties. The rooftop mechanical equipment would be screened with a six-foot wall. Noise generated by HVAC equipment would occur on an intermittent basis, primarily during the day and evening hours and less frequently during the nighttime hours. For a worst-case analysis, it was assumed that the HVAC units would operate at maximum capacity during the daytime and nighttime hours.

Modeled receivers and the locations of the HVAC units are shown in Figure 7. Modeled data is included in Attachment 6. Future projected noise levels are summarized in Table 12.

As shown, HVAC noise levels would range from 33 to 44 dB(A) L_{eq}. Noise levels would not exceed the applicable Noise Ordinance limits at the property lines and impacts related to on-site generated noise would be less than significant.

Image Source: NearMap (flown January 2022)



RECON

M:\JOBS5\9865\common_gis\fig7_nos.mxd 03/24/2022 bma

FIGURE 7
HVAC Noise Contours

Table 12 HVAC Noise Levels at Adjacent Properties			
Receiver	Land Use	Noise Level [dB(A) L_{eq}]	Noise Ordinance Limit Daytime/Nighttime [dB(A) L_{eq}]
1	Single Family Residential	34	60/50
2	Single Family Residential	36	60/50
3	Single Family Residential	36	60/50
4	Single-Family Residential	35	60/50
5	Single-Family Residential	34	60/50
6	Multi-Family Residential	33	65/55
7	Multi-Family Residential	33	65/55
8	Multi-Family Residential	38	65/55
9	Multi-Family Residential	37	65/55
10	Single-Family Residential	35	60/50
11	Mobile Home Park	37	65/55
12	Mobile Home Park	39	65/55
13	Mobile Home Park	38	65/55
14	Mobile Home Park	37	65/55
15	Commercial	41	60/55
16	Industrial	43	65/60
17	Industrial	43	65/60
18	Industrial	44	65/60
dB(A) L_{eq} = A-weighted decibels equivalent noise level			

6.0 Conclusions

6.1 Construction Noise

As shown in Table 9, construction noise levels would range from 57 to 74 dB(A) L_{eq} at the adjacent property lines. The City's Municipal Code does not place noise limit restrictions on construction activities, however, other jurisdictions commonly apply a noise level limit of 75 dB(A) L_{eq} at residential uses. Construction activities would generally occur over the period between 7:00 a.m. and 6:00 p.m. on weekdays. Although the existing adjacent uses would be exposed to construction noise levels that may be heard above ambient conditions, the exposure would be temporary and would not exceed 75 dB(A) L_{eq}. As construction activities associated with the project would comply with the time limits established in Section 10.24.020 (b)(9) of the City Municipal Code, temporary increases in noise levels from construction activities would be less than significant.

6.2 Traffic Noise

6.2.1 On-site Traffic and Rail Noise

The main source of noise at the project site is vehicle traffic on South Santa Fe Avenue and Las Flores Drive as well as Sprinters on the adjacent rail line. The exterior noise level standard for multi-family

uses is 65 CNEL. This standard is applicable at exterior use areas which include the patios and the open play lawn, tot lot, and seating areas on the western side of the proposed buildings. As shown in Table 10, exterior noise levels are projected to range from 45 to 63 CNEL at the outdoor use areas and building façade. Noise levels would be compatible with the City's exterior multi-family noise level standard of 65 CNEL. Exterior noise impacts would be less than significant.

The interior noise level standard is 45 CNEL. Interior noise levels can be reduced through standard construction techniques. When windows are closed, standard construction techniques provide various exterior-to-interior noise level reductions depending on the type of structure and window. Standard light-frame construction would reduce exterior to interior noise levels by at least 20 dB (FHWA 2011). Therefore, interior noise levels would be 43 CNEL or less, and are not projected to exceed the interior noise level standard of 45 CNEL. Interior noise impacts would be less than significant.

6.2.2 Off-site Traffic Noise

The additional vehicle trips associated with the project would increase noise levels on nearby roadways. A noise increase of 3 dB or more would be considered significant because 3 dB is the level at which an increase in noise is perceptible to a person. As shown in Table 11, the project would not result in a direct or cumulative noise increase of more than 3 dB. Therefore, the project would result in less than significant direct and cumulative impact related to traffic noise.

6.3 On-site Generated Noise

The noise sources on the project site after completion of construction are anticipated to be those that would be typical of any residential use, such as vehicles arriving and leaving, children at play, and landscape maintenance machinery. None of these noise sources are anticipated to violate the City Municipal Code. Rooftop HVAC noise levels were modeled at the adjacent properties. As shown in Table 12, HVAC noise levels would range from 33 to 44 dB(A) L_{eq}. Noise levels would not exceed the applicable Noise Ordinance limits at the property lines.

7.0 References Cited

California Code of Regulations

2019 2019 California Building Code, California Code of Regulations, Title 24, Chapter 12 Interior Environment, Section 1206, Sound Transmission. http://www.bsc.ca.gov/codes.aspx.

California Department of Transportation (Caltrans)

2013 Technical Noise Supplement. November.

Federal Highway Administration (FHWA)

2006 Roadway Construction Noise Model. FHWA-HEP-05-054, SOT-VNTSC-FHWA-05-01. Final Report. January 2006.

2008 Roadway Construction Noise Mode, V1.1. Washington, DC.

2011 Highway Traffic Noise: Analysis and Abatement Guidance. FHWA-HEP-10-025. December 2011.

Federal Transit Administration (FTA)
2006 Transit Noise and Vibration Impact Assessment. Washington, DC. May.

Linscott, Law, and Greenspan, Engineers, Inc. (LLG)
2022 Existing, Year 2025, and Year 2050 Forecasted Traffic Volumes and Trip Generation Data emailed to RECON by Amelia Giacalone, Senior Transportation Planner, on March 21, 2022.

Navcon Engineering, Inc.
2018 SoundPLAN Essential version 4.1.

San Diego Association of Governments (SANDAG)
2022 Transportation Forecast Information Center. Year 2050 Traffic Volumes. Accessed at https://tfic.sandag.org/ on March 23, 2022.

San Marcos, City of
2013 City of San Marcos General Plan Update, Noise Element.

ATTACHMENTS

ATTACHMENT 1

Noise Measurement Data

9865 Santa Fe Flores
Noise Measurement Data

Summary				
Start	2022/03/22	13:34:51		
Stop	2022/03/22	13:49:56		
Duration		0:15:04.7		
Run Time		0:15:02.6		
Pause		0:00:02.1		
Pre Calibration	2022/03/22	13:33:32		
Post Calibration		None		
Calibration Deviation		---		
Overall Settings				
RMS Weight		A Weighting		
Peak Weight		A Weighting		
Detector		Slow		
Preamp		PRMLxT1		
Microphone Correction		Off		
Integration Method		Linear		
Overload		144.6 dB		
		A	**C**	**Z**
Under Range Peak		**100.6**	97.6	102.6 dB
Under Range Limit		**37.8**	37.4	44.5 dB
Noise Floor		28.6	28.3	35.3 dB
Results				
LAeq		63.2 dB		
LAE		92.8 dB		
EA		210.368 µPa²h		
EA8		6.712 mPa²h		
EA40		33.562 mPa²h		
LApeak (max)	2022/03/22	13:37:15	101.8 dB	
LASmax	2022/03/22	13:39:26	74.7 dB	
LASmin	2022/03/22	13:46:59	51.6 dB	
SEA		-99.9 dB		
LAS > 60.0 dB (Exceedence Counts / Duration)		31	563.6 s	
LAS > 70.0 dB (Exceedence Counts / Duration)		6	27.3 s	
LApeak > 135.0 dB (Exceedence Counts / Duration)		0	0.0 s	
LApeak > 137.0 dB (Exceedence Counts / Duration)		0	0.0 s	
LApeak > 140.0 dB (Exceedence Counts / Duration)		0	0.0 s	
LCeq		75.2 dB		
LAeq		63.2 dB		
LCeq - LAeq		12.0 dB		
LAIeq		65.0 dB		
LAeq		63.2 dB		
LAIeq - LAeq		1.8 dB		
# Overloads		0		
Overload Duration		0.0 s		

Dose Settings			
Dose Name	OSHA-1	OSHA-2	
Exch. Rate	5	5	dB
Threshold	90	80	dB
Criterion Level	90	90	dB
Criterion Duration	8	8	h
Results			
Dose	-99.9	-99.9	%
Projected Dose	-99.9	-99.9	%
TWA (Projected)	-99.9	-99.9	dB
TWA (t)	-99.9	-99.9	dB
Lep (t)	48.2	48.2	dB

Statistics		
LAS5.00	68.6	dB
LAS10.00	66.6	dB
LAS33.30	62.9	dB
LAS50.00	60.5	dB
LAS66.60	58.4	dB
LAS90.00	55.0	dB

9865 Santa Fe Flores
Noise Measurement Data

Summary				
Start	2022/03/22 13:55:50			
Stop	2022/03/22 14:10:51			
Duration	0:15:00.5			
Run Time	0:15:00.5			
Pause	0:00:00.0			
Pre Calibration	2022/03/22 13:33:30			
Post Calibration	None			
Calibration Deviation	---			
Overall Settings				
RMS Weight	A Weighting			
Peak Weight	A Weighting			
Detector	Slow			
Preamp	PRMLxT1			
Microphone Correction	Off			
Integration Method	Linear			
Overload	144.6 dB			
	A	**C**	**Z**	
Under Range Peak	**100.6**	97.6	102.6	dB
Under Range Limit	**37.8**	37.4	44.5	dB
Noise Floor	28.6	28.3	35.3	dB
Results				
LAeq	57.5 dB			
LAE	87.0 dB			
EA	55.989 µPa²h			
EA8	1.791 mPa²h			
EA40	8.953 mPa²h			
LApeak (max)	2022/03/22 14:03:57		102.3	dB
LASmax	2022/03/22 14:09:26		66.5	dB
LASmin	2022/03/22 14:03:45		49.9	dB
SEA	-99.9 dB			
LAS > 60.0 dB (Exceedence Counts / Duration)	19		185.3	s
LAS > 70.0 dB (Exceedence Counts / Duration)	0		0.0	s
LApeak > 135.0 dB (Exceedence Counts / Duration)	0		0.0	s
LApeak > 137.0 dB (Exceedence Counts / Duration)	0		0.0	s
LApeak > 140.0 dB (Exceedence Counts / Duration)	0		0.0	s
LCeq	66.1 dB			
LAeq	57.5 dB			
LCeq - LAeq	8.6 dB			
LAIeq	59.3 dB			
LAeq	57.5 dB			
LAIeq - LAeq	1.8 dB			
# Overloads	0			
Overload Duration	0.0 s			

Dose Settings				
Dose Name	OSHA-1	OSHA-2		
Exch. Rate	5	5	dB	
Threshold	90	80	dB	
Criterion Level	90	90	dB	
Criterion Duration	8	8	h	
Results				
Dose	-99.9	-99.9	%	
Projected Dose	-99.9	-99.9	%	
TWA (Projected)	-99.9	-99.9	dB	
TWA (t)	-99.9	-99.9	dB	
Lep (t)	42.4	42.4	dB	

Statistics		
LAS5.00	61.7	dB
LAS10.00	60.6	dB
LAS33.30	57.6	dB
LAS50.00	56.1	dB
LAS66.60	54.4	dB
LAS90.00	52.7	dB

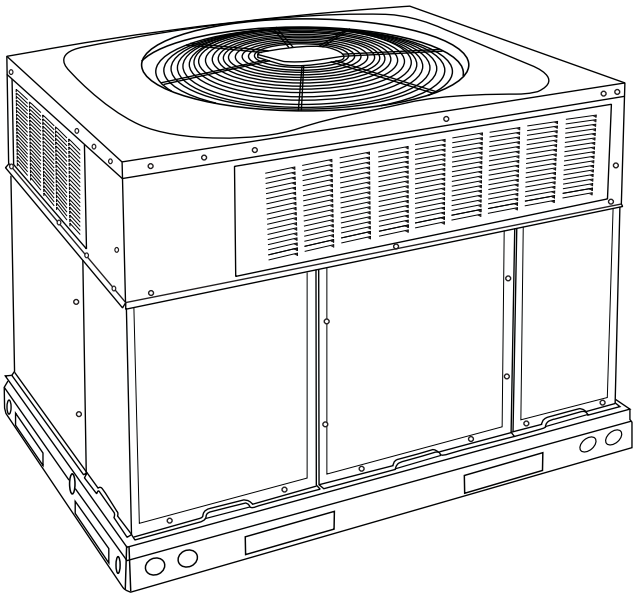
ATTACHMENT 2

HVAC Specifications

50VG–A
Performance™ 16 SEER 2–Stage Packaged Air Conditioner System with Puron® (R–410A) Refrigerant
Single and Three Phase
2 to 5 Nominal Tons (Sizes 24–60)

Carrier
turn to the experts

Product Data



A09033

Fig. 1 - Unit 50VG-A

Single-Packaged Products with Energy-Saving Features and Puron® refrigerant.

- 15.0-16.0 SEER / 12.0-12.5 EER
- Factory-Installed TXV
- Multi-speed ECM Blower Motor - Standard
- Sound levels as low as 72dBA
- Two Stages of Cooling
- Dehumidification Feature

FEATURES/BENEFITS

One-piece cooling unit with optional electric heater, low sound levels, easy installation, low maintenance, and dependable performance.

Puron Environmentally Sound Refrigerant is Carrier's unique refrigerant designed to help protect the environment. Puron is an HFC refrigerant which does not contain chlorine that can harm the ozone layer. Puron refrigerant is in service in millions of systems proving highly reliable, environmentally sound performance.

Easy Installation

Factory-assembled package is a compact, fully self-contained, electric cooling unit that is prewired, pre-piped, and pre-charged for minimum installation expense. These units are available in a variety of standard cooling sizes with voltage options to meet residential and light commercial requirements. Units are lightweight and install easily on a rooftop or at ground level. The high tech composite base eliminates rust problems associated with ground level applications.

Innovative Unit Base Design

On the inside a high-tech composite material will not rust and incorporates a sloped drain pan which improves drainage and helps inhibit mold, algae and bacterial growth. On the outside metal base rails provide added stability as well as easier handling and rigging.

Convertible duct configuration

Unit is designed for use in either downflow or horizontal applications. Each unit is converted from horizontal to downflow and includes horizontal duct covers. Downflow operation is provided in the field to allow vertical ductwork connections. The basepan seals on the bottom openings to ensure a positive seal in the vertical airflow mode.

Efficient operation High-efficiency design offers SEER (Seasonal Energy Efficiency Ratios) of up to 16.0. (See page 4.)

Durable, dependable components

Scroll Compressors have 2 stages of cooling and are designed for high efficiency. Each compressor is hermetically sealed against contamination to help promote longer life and dependable operation. Each compressor also has vibration isolation to provide quieter operation. All compressors have internal high pressure and overcurrent protection.

Multi-speed ECM Blower Motor is standard on all 50VG-A.

Direct-drive PSC (Permanent Split Capacitor) condenser-fan motors are designed to help reduce energy consumption and provide for cooing operation down to 40°F (4.4°C) outdoor temperature. Motormaster® II low ambient kit is available as a field-installed accessory.

Thermostatic Expansion Valve - A hard shutoff, balance port TXV maintains a constant superheat at the evaporator exit (cooling cycle) resulting in higher overall system efficiency.

Refrigerant system is designed to provide dependability. Liquid filter driers are used to promote clean, unrestricted operation. Each unit leaves the factory with a full refrigerant charge. Refrigerant service connections make checking operating pressures easier.

High and Low Pressure Switches provide added reliability for the compressor.

Indoor and Outdoor coils are computer-designed for optimum heat transfer and efficiency. The indoor coil is fabricated from copper tube and aluminum fins and is located inside the unit for protection against damage. The outdoor coil is internally mounted on the top tier of the unit.

Low sound ratings ensure a quiet indoor and outdoor environment with sound ratings as low as 72dBA. (See Page 4.)

Easy to service cabinets provide easy 3 panel accessibility to serviceable components during maintenance and installation. The basepan with integrated drain pan provides easy ground level installation with a mounting pad. A nesting feature ensures a positive basepan to roof curb seal when the unit is roof mounted. A convenient 3/4-in. (19.05 mm) wide perimeter flange makes frame mounting on a rooftop easy.

AHRI* CAPACITIES

Cooling Capacities and Efficiencies

Unit Model 50VG-A	Nominal Tons	Standard CFM (High / Low Stage)	Net Cooling Capacities - Btuh (High Stage)	EER @A**	SEER†
24	2	800 / 600	23000	12.0	15.0
30	2-1/2	1000 / 750	29000	12.0	15.0
36	3	1200 / 900	35400	12.5	16.0
42	3-1/2	1400 / 1050	42000	12.5	16.0
48	4	1600 / 1200	47500	12.3	16.0
60	5	1750 / 1200	57000	12.3	16.0

LEGEND
dB–Sound Levels (decibels)
db—Dry Bulb
SEER—Seasonal Energy Efficiency Ratio
wb—Wet Bulb
COP–Coefficient of Performance
* Air Conditioning, Heating & Refrigeration Institute.
**At "A" conditions–80°F (26.7°C) indoor db/67°F (19.4°C) indoor wb & 95°F (35°C) outdoor db.
† Rated in accordance with U.S. Government DOE Department of Energy) test procedures and/or AHRI Standards 210/240.

Notes:
1. Ratings are net values, reflecting the effects of circulating fan heat. Ratings are based on:
Cooling Standard: 80°F (26.7°C) db, 67°F wb (19.4°C) indoor entering–air temperature and 95°F db (35°C) outdoor entering–air temperature.
2. Before purchasing this appliance, read important energy cost and efficiency information available from AHRIdirectory.org.

A-WEIGHTED SOUND POWER LEVEL (dBA)

Model 50VG-A	Sound Ratings (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA without tone adjustment)						
		125	250	500	1000	2000	4000	8000
24	73	60.0	62.5	68.5	68.5	64.0	60.0	53.0
30	77	57.5	67.0	73.5	72.0	67.0	61.0	52.5
36	73	62.5	65.5	67.5	68.0	65.5	60.0	52.5
42	73	60.5	63.5	68.0	68.0	66.0	60.5	53.0
48	72	60.0	63.5	66.0	67.0	63.5	58.5	49.5
60	75	69.0	67.0	69.0	68.0	65.0	61.5	54.0

NOTE: Tested in accordance with AHRI Standard 270 (not listed in AHRI).

ATTACHMENT 3

SoundPLAN Data – Construction Noise

9865 Santa Fe Flores

SoundPLAN Data - Construction

Source name	Reference	Level	Corrections		
		Leq1	Cwall	CI	CT
		dB(A)	dB(A)	dB(A)	dB(A)
Construction	Lw/unit	116.3	-	-	-

9865 Santa Fe Flores

SoundPLAN Data - Construction

No.	Coordinates X	Y	Height	Noise Level
	(meters)		(meters)	dB(A)
1	481468.23	3668972.47	182.38	58.9
2	481477.03	3668933.16	185.26	60.9
3	481491.51	3668901.09	186.46	61.4
4	481513.24	3668863.85	186.82	60.5
5	481534.96	3668832.30	186.16	59.2
6	481452.72	3668803.33	161.69	56.8
7	481417.03	3668787.30	160.02	58.2
8	481389.61	3668758.33	159.09	67.7
9	481373.58	3668720.06	157.61	70.1
10	481348.75	3668660.57	154.54	63.4
11	481317.72	3668679.71	153.92	66.4
12	481280.47	3668693.16	153.14	64.9
13	481232.89	3668717.47	152.07	61.3
14	481185.82	3668741.78	151.46	58.7
15	481304.72	3668755.81	153.73	72.3
16	481288.85	3668803.43	156.64	65.3
17	481306.71	3668845.77	157.91	66.3
18	481370.21	3668885.46	167.46	74.2

ATTACHMENT 4

SoundPLAN Data – On-site Traffic and Rail Noise

Station	ADT	Traffic values Vehicles type	Vehicle name	day	evening	night	Speed	Control device	Constr. Speed	Affect. veh.	Road surface	Gradient Min / Max
km	Veh/24h			Veh/h	Veh/h	Veh/h	km/h		km/h	%		%
Santa Fe Avenue		Traffic direction:	In entry direction									
0+000	21447	Total	-	1376	715	310	-	none	-	-	Average (of DGAC and PCC)	2.407407407
0+000	21447	Automobiles	-	1280	665	288	72	none	-	-	Average (of DGAC and PCC)	2.407407407
0+000	21447	Medium trucks	-	41	21	9	72	none	-	-	Average (of DGAC and PCC)	2.407407407
0+000	21447	Heavy trucks	-	28	14	6	72	none	-	-	Average (of DGAC and PCC)	2.407407407
0+000	21447	Buses	-	14	7	3	72	none	-	-	Average (of DGAC and PCC)	2.407407407
0+000	21447	Motorcycles	-	14	7	3	72	none	-	-	Average (of DGAC and PCC)	2.407407407
0+000	21447	Auxiliary vehicle	-	-	-	-	-	none	-	-	Average (of DGAC and PCC)	2.407407407
0+426	22503	Total	-	1444	750	325	-	none	-	-	Average (of DGAC and PCC)	-2.923076923
0+426	22503	Automobiles	-	1343	698	302	72	none	-	-	Average (of DGAC and PCC)	-2.923076923
0+426	22503	Medium trucks	-	43	23	10	72	none	-	-	Average (of DGAC and PCC)	-2.923076923
0+426	22503	Heavy trucks	-	29	15	7	72	none	-	-	Average (of DGAC and PCC)	-2.923076923
0+426	22503	Buses	-	14	8	3	72	none	-	-	Average (of DGAC and PCC)	-2.923076923
0+426	22503	Motorcycles	-	14	8	3	72	none	-	-	Average (of DGAC and PCC)	-2.923076923
0+426	22503	Auxiliary vehicle	-	-	-	-	-	none	-	-	Average (of DGAC and PCC)	-2.923076923
0+985	-	-	-	-	-	-						
Las Flores Drive		Traffic direction:	In entry direction									
0+000	2607	Total	-	167	87	38	-	none	-	-	Average (of DGAC and PCC)	1.75
0+000	2607	Automobiles	-	155	81	35	40	none	-	-	Average (of DGAC and PCC)	1.75
0+000	2607	Medium trucks	-	5	3	1	40	none	-	-	Average (of DGAC and PCC)	1.75
0+000	2607	Heavy trucks	-	3	2	1	40	none	-	-	Average (of DGAC and PCC)	1.75
0+000	2607	Buses	-	2	1	0	40	none	-	-	Average (of DGAC and PCC)	1.75
0+000	2607	Motorcycles	-	2	1	0	40	none	-	-	Average (of DGAC and PCC)	1.75
0+000	2607	Auxiliary vehicle	-	-	-	-	-	none	-	-	Average (of DGAC and PCC)	1.75
0+221	1602	Total	-	103	53	23	-	none	-	-	Average (of DGAC and PCC)	-0.010362694
0+221	1602	Automobiles	-	96	49	21	40	none	-	-	Average (of DGAC and PCC)	-0.010362694
0+221	1602	Medium trucks	-	3	2	1	40	none	-	-	Average (of DGAC and PCC)	-0.010362694
0+221	1602	Heavy trucks	-	2	1	0	40	none	-	-	Average (of DGAC and PCC)	-0.010362694
0+221	1602	Buses	-	1	1	0	40	none	-	-	Average (of DGAC and PCC)	-0.010362694
0+221	1602	Motorcycles	-	1	1	0	40	none	-	-	Average (of DGAC and PCC)	-0.010362694
0+221	1602	Auxiliary vehicle	-	-	-	-	-	none	-	-	Average (of DGAC and PCC)	-0.010362694
0+628	-	-	-	-	-	-						

SoundPLAN Data - Vehicle and Rail

Track Station km	Coordinates of track axis X	Y	Z	Track type [dB]	Curve radius [dB]	Multiple reflections [dB]		Corrected Emission level Evening	night
Sprinter	Rail track:	Direction:		Section:	1	Km:	0+000		
Train type	Number of trains day	Evening	night	Speed km/h	Length per train m	Max	day dB(A)	Emission level Evening dB(A)	night dB(A)
LRT	176	32	43	80	80	yes	62.9	61.6	58.1
0+000	481709.9	3668428	173.36	-	-	-	-	62.9	61.6
0+951	481421.7	3669304	162.19	-	-	-	-	62.9	61.6

9865 Santa Fe Flores

SoundPLAN Data - Vehicle and Rail

	Coordinates				Noise Level			
No.	X	Y	Floor	Height	Day	Evening	Night	Lden
	(meters)			(meters)		dB(A)		
1	481355.17	3668817.11	1.Fl	163.65	51.9	49.3	45.7	54.0
1	481355.17	3668817.11	2.Fl	166.75	54.1	51.4	47.8	56.1
1	481355.17	3668817.11	3.Fl	169.85	54.8	52.1	48.5	56.8
1	481355.17	3668817.11	4.Fl	172.95	55.4	52.8	49.2	57.5
2	481360.87	3668828.12	1.Fl	163.65	48.4	46.0	42.5	50.7
2	481360.87	3668828.12	2.Fl	166.75	52.3	49.8	46.2	54.4
2	481360.87	3668828.12	3.Fl	169.85	53.4	50.8	47.2	55.5
2	481360.87	3668828.12	4.Fl	172.95	54.6	52.1	48.5	56.7
3	481349.23	3668825.03	1.Fl	163.65	51.7	49.0	45.4	53.7
3	481349.23	3668825.03	2.Fl	166.75	54.0	51.3	47.7	56.0
3	481349.23	3668825.03	3.Fl	169.85	55.1	52.4	48.8	57.1
3	481349.23	3668825.03	4.Fl	172.95	55.6	53.0	49.4	57.7
4	481352.64	3668836.27	1.Fl	163.71	49.8	47.3	43.8	52.0
4	481352.64	3668836.27	2.Fl	166.81	53.3	50.7	47.1	55.4
4	481352.64	3668836.27	3.Fl	169.91	54.3	51.7	48.1	56.4
4	481352.64	3668836.27	4.Fl	173.01	55.2	52.7	49.1	57.3
5	481374.70	3668837.75	1.Fl	163.65	44.9	42.8	39.2	47.3
5	481374.70	3668837.75	2.Fl	166.75	50.9	48.5	44.9	53.1
5	481374.70	3668837.75	3.Fl	169.85	52.5	50.1	46.5	54.7
5	481374.70	3668837.75	4.Fl	172.95	53.6	51.1	47.5	55.8
6	481372.16	3668831.08	1.Fl	163.65	45.4	43.2	39.7	47.8
6	481372.16	3668831.08	2.Fl	166.75	51.0	48.5	45.0	53.2
6	481372.16	3668831.08	3.Fl	169.85	52.5	50.0	46.5	54.7
6	481372.16	3668831.08	4.Fl	172.95	53.6	51.1	47.5	55.8
7	481355.33	3668805.47	1.Fl	157.56	43.0	40.8	37.2	45.4
7	481355.33	3668805.47	2.Fl	160.66	48.9	46.2	42.6	50.9
7	481355.33	3668805.47	3.Fl	163.76	54.8	52.0	48.4	56.7
7	481355.33	3668805.47	4.Fl	166.86	55.9	53.1	49.5	57.8
8	481351.20	3668795.95	1.Fl	157.56	45.3	42.8	39.2	47.4
8	481351.20	3668795.95	2.Fl	160.66	53.4	50.6	47.0	55.3
8	481351.20	3668795.95	3.Fl	163.76	55.2	52.5	48.8	57.2
8	481351.20	3668795.95	4.Fl	166.86	56.2	53.4	49.8	58.2
9	481348.34	3668789.49	1.Fl	157.56	47.8	45.1	41.5	49.8
9	481348.34	3668789.49	2.Fl	160.66	54.3	51.5	47.9	56.2
9	481348.34	3668789.49	3.Fl	163.76	55.7	53.0	49.3	57.7
9	481348.34	3668789.49	4.Fl	166.86	56.6	53.9	50.3	58.6
10	481342.84	3668777.53	1.Fl	157.56	52.8	50.0	46.4	54.7
10	481342.84	3668777.53	2.Fl	160.66	54.7	51.9	48.3	56.7
10	481342.84	3668777.53	3.Fl	163.76	55.8	53.0	49.4	57.8

10	481342.84	3668777.53	4.Fl	166.86	57.7	54.9	51.3	59.7
11	481349.40	3668762.50	1.Fl	153.57	56.4	53.6	49.9	58.3
11	481349.40	3668762.50	2.Fl	156.67	59.6	56.8	53.1	61.5
11	481349.40	3668762.50	3.Fl	159.77	60.7	57.9	54.3	62.7
11	481349.40	3668762.50	4.Fl	162.87	61.5	58.7	55.1	63.4
12	481364.54	3668771.50	1.Fl	157.75	55.3	52.5	48.9	57.3
12	481364.54	3668771.50	2.Fl	160.85	58.4	55.7	52.1	60.4
12	481364.54	3668771.50	3.Fl	163.95	59.2	56.5	52.9	61.2
12	481364.54	3668771.50	4.Fl	167.05	59.6	57.0	53.4	61.7
13	481371.84	3668789.38	1.Fl	157.71	48.6	45.8	42.2	50.6
13	481371.84	3668789.38	2.Fl	160.81	54.9	52.2	48.5	56.9
13	481371.84	3668789.38	3.Fl	163.91	58.1	55.4	51.8	60.1
13	481371.84	3668789.38	4.Fl	167.01	58.8	56.1	52.5	60.8
14	481385.07	3668805.89	1.Fl	163.65	52.7	50.0	46.4	54.7
14	481385.07	3668805.89	2.Fl	166.75	57.8	55.2	51.6	59.9
14	481385.07	3668805.89	3.Fl	169.85	58.4	55.9	52.3	60.6
14	481385.07	3668805.89	4.Fl	172.95	58.7	56.2	52.6	60.9
15	481388.24	3668813.73	1.Fl	163.65	51.1	48.6	45.0	53.2
15	481388.24	3668813.73	2.Fl	166.75	56.5	53.9	50.3	58.6
15	481388.24	3668813.73	3.Fl	169.85	57.8	55.3	51.7	59.9
15	481388.24	3668813.73	4.Fl	172.95	58.3	55.8	52.2	60.5
16	481391.21	3668820.60	1.Fl	163.65	49.9	47.5	43.9	52.1
16	481391.21	3668820.60	2.Fl	166.75	53.7	51.2	47.6	55.8
16	481391.21	3668820.60	3.Fl	169.85	57.3	54.8	51.2	59.5
16	481391.21	3668820.60	4.Fl	172.95	57.9	55.5	51.9	60.1
17	481395.44	3668830.02	1.Fl	163.65	48.9	46.6	43.0	51.2
17	481395.44	3668830.02	2.Fl	166.75	52.3	50.0	46.4	54.6
17	481395.44	3668830.02	3.Fl	169.85	56.6	54.2	50.6	58.8
17	481395.44	3668830.02	4.Fl	172.95	57.5	55.1	51.5	59.7
18	481397.98	3668836.59	1.Fl	163.65	48.4	46.1	42.5	50.7
18	481397.98	3668836.59	2.Fl	166.75	51.9	49.7	46.2	54.3
18	481397.98	3668836.59	3.Fl	169.85	55.0	52.6	49.0	57.2
18	481397.98	3668836.59	4.Fl	172.95	57.1	54.7	51.2	59.4
19	481394.38	3668843.78	1.Fl	163.65	46.0	44.2	40.7	48.7
19	481394.38	3668843.78	2.Fl	166.75	50.7	49.1	45.6	53.6
19	481394.38	3668843.78	3.Fl	169.85	51.9	50.3	46.8	54.8
19	481394.38	3668843.78	4.Fl	172.95	53.2	51.6	48.0	56.0
20	481385.49	3668849.18	1.Fl	163.70	46.9	45.2	41.7	49.7
20	481385.49	3668849.18	2.Fl	166.80	50.8	49.2	45.7	53.7
20	481385.49	3668849.18	3.Fl	169.90	52.2	50.5	47.0	55.0
20	481385.49	3668849.18	4.Fl	173.00	53.1	51.5	48.0	55.9

Source name									Noise Level Day	Evening	Night	Lden
									dB(A)			
1	1.Fl	51.9	49.3	45.7	54.0	0.0	0.0	0.0	0.0			
Las Flores Drive									23.1	20.3	16.6	25.0
Santa Fe Avenue									51.4	48.5	44.9	53.3
Sprinter									42.5	41.1	37.7	45.6
1	2.Fl	54.1	51.4	47.8	56.1	0.0	0.0	0.0	0.0			
Las Flores Drive									27.2	24.4	20.8	29.1
Santa Fe Avenue									53.7	50.8	47.2	55.6
Sprinter									43.6	42.2	38.7	46.6
1	3.Fl	54.8	52.1	48.5	56.8	0.0	0.0	0.0	0.0			
Las Flores Drive									32.3	29.5	25.9	34.3
Santa Fe Avenue									54.4	51.5	47.9	56.3
Sprinter									44.2	42.9	39.4	47.3
1	4.Fl	55.4	52.8	49.2	57.5	0.0	0.0	0.0	0.0			
Las Flores Drive									36.7	33.9	30.3	38.6
Santa Fe Avenue									54.7	51.8	48.2	56.6
Sprinter									46.9	45.6	42.1	50.0
2	1.Fl	48.4	46.0	42.5	50.7	0.0	0.0	0.0	0.0			
Las Flores Drive									21.8	18.9	15.3	23.7
Santa Fe Avenue									46.8	44.0	40.3	48.7
Sprinter									43.2	41.8	38.3	46.2
2	2.Fl	52.3	49.8	46.2	54.4	0.0	0.0	0.0	0.0			
Las Flores Drive									23.5	20.6	17.0	25.3
Santa Fe Avenue									51.6	48.7	45.1	53.5
Sprinter									44.3	42.9	39.4	47.3
2	3.Fl	53.4	50.8	47.2	55.5	0.0	0.0	0.0	0.0			
Las Flores Drive									27.7	24.8	21.2	29.6
Santa Fe Avenue									52.8	49.9	46.3	54.7
Sprinter									44.9	43.5	40.1	48.0
2	4.Fl	54.6	52.1	48.5	56.7	0.0	0.0	0.0	0.0			
Las Flores Drive									33.0	30.2	26.5	34.9
Santa Fe Avenue									53.5	50.6	47.0	55.4
Sprinter									47.9	46.5	43.0	50.9
3	1.Fl	51.7	49.0	45.4	53.7	0.0	0.0	0.0	0.0			
Las Flores Drive									31.1	28.3	24.7	33.0
Santa Fe Avenue									51.0	48.1	44.5	52.9
Sprinter									42.9	41.5	38.0	45.9
3	2.Fl	54.0	51.3	47.7	56.0	0.0	0.0	0.0	0.0			
Las Flores Drive									32.0	29.1	25.5	33.9
Santa Fe Avenue									53.5	50.7	47.1	55.4
Sprinter									43.9	42.5	39.0	46.9
3	3.Fl	55.1	52.4	48.8	57.1	0.0	0.0	0.0	0.0			
Las Flores Drive									34.1	31.3	27.7	36.0
Santa Fe Avenue									54.6	51.8	48.1	56.5
Sprinter									44.7	43.3	39.8	47.7
3	4.Fl	55.6	53.0	49.4	57.7	0.0	0.0	0.0	0.0			
Las Flores Drive									37.2	34.3	30.7	39.1
Santa Fe Avenue									54.8	52.0	48.3	56.7
Sprinter									47.6	46.2	42.7	50.6
4	1.Fl	49.8	47.3	43.8	52.0	0.0	0.0	0.0	0.0			
Las Flores Drive									30.5	27.6	24.0	32.4
Santa Fe Avenue									48.5	45.7	42.1	50.4

Sprinter										43.6	42.2	38.7	46.6
4	2.Fl	53.3	50.7	47.1	55.4	0.0	0.0	0.0	0.0				
Las Flores Drive										31.4	28.6	25.0	33.3
Santa Fe Avenue										52.6	49.8	46.1	54.5
Sprinter										44.8	43.4	40.0	47.9
4	3.Fl	54.3	51.7	48.1	56.4	0.0	0.0	0.0	0.0				
Las Flores Drive										33.6	30.8	27.1	35.5
Santa Fe Avenue										53.6	50.8	47.2	55.5
Sprinter										45.6	44.3	40.8	48.7
4	4.Fl	55.2	52.7	49.1	57.3	0.0	0.0	0.0	0.0				
Las Flores Drive										37.8	34.9	31.3	39.7
Santa Fe Avenue										54.1	51.3	47.6	56.0
Sprinter										48.2	46.8	43.4	51.3
5	1.Fl	44.9	42.8	39.2	47.3	0.0	0.0	0.0	0.0				
Las Flores Drive										20.5	17.6	13.9	22.3
Santa Fe Avenue										42.6	39.8	36.1	44.5
Sprinter										41.1	39.7	36.2	44.1
5	2.Fl	50.9	48.5	44.9	53.1	0.0	0.0	0.0	0.0				
Las Flores Drive										20.6	17.7	14.1	22.5
Santa Fe Avenue										49.6	46.8	43.1	51.5
Sprinter										44.9	43.6	40.1	48.0
5	3.Fl	52.5	50.1	46.5	54.7	0.0	0.0	0.0	0.0				
Las Flores Drive										24.1	21.3	17.6	26.0
Santa Fe Avenue										51.5	48.7	45.0	53.4
Sprinter										45.8	44.4	40.9	48.8
5	4.Fl	53.6	51.1	47.5	55.8	0.0	0.0	0.0	0.0				
Las Flores Drive										29.5	26.7	23.0	31.4
Santa Fe Avenue										52.5	49.6	46.0	54.4
Sprinter										47.1	45.7	42.2	50.1
6	1.Fl	45.4	43.2	39.7	47.8	0.0	0.0	0.0	0.0				
Las Flores Drive										20.5	17.6	14.0	22.4
Santa Fe Avenue										43.0	40.1	36.5	44.9
Sprinter										41.7	40.3	36.8	44.7
6	2.Fl	51.0	48.5	45.0	53.2	0.0	0.0	0.0	0.0				
Las Flores Drive										20.3	17.4	13.8	22.2
Santa Fe Avenue										49.7	46.8	43.2	51.6
Sprinter										45.0	43.7	40.2	48.1
6	3.Fl	52.5	50.0	46.5	54.7	0.0	0.0	0.0	0.0				
Las Flores Drive										24.1	21.2	17.6	26.0
Santa Fe Avenue										51.5	48.7	45.0	53.4
Sprinter										45.8	44.4	40.9	48.8
6	4.Fl	53.6	51.1	47.5	55.8	0.0	0.0	0.0	0.0				
Las Flores Drive										28.9	26.0	22.4	30.7
Santa Fe Avenue										52.5	49.6	46.0	54.4
Sprinter										47.1	45.7	42.2	50.1
7	1.Fl	43.0	40.8	37.2	45.4	0.0	0.0	0.0	0.0				
Las Flores Drive										17.5	14.6	11.0	19.4
Santa Fe Avenue										41.0	38.2	34.5	42.9
Sprinter										38.7	37.3	33.8	41.7
7	2.Fl	48.9	46.2	42.6	50.9	0.0	0.0	0.0	0.0				
Las Flores Drive										18.6	15.8	12.1	20.5
Santa Fe Avenue										48.4	45.6	41.9	50.3
Sprinter										38.8	37.4	33.9	41.9
7	3.Fl	54.8	52.0	48.4	56.7	0.0	0.0	0.0	0.0				

Las Flores Drive										21.3	18.4	14.8	23.2
Santa Fe Avenue										54.6	51.7	48.1	56.5
Sprinter										41.5	40.1	36.6	44.5
7	4.Fl	55.9	53.1	49.5	57.8	0.0	0.0	0.0	0.0				
Las Flores Drive										28.3	25.5	21.8	30.2
Santa Fe Avenue										55.6	52.7	49.1	57.5
Sprinter										43.6	42.2	38.7	46.6
8	1.Fl	45.3	42.8	39.2	47.4	0.0	0.0	0.0	0.0				
Las Flores Drive										18.1	15.3	11.6	20.0
Santa Fe Avenue										44.4	41.5	37.9	46.3
Sprinter										38.0	36.6	33.2	41.1
8	2.Fl	53.4	50.6	47.0	55.3	0.0	0.0	0.0	0.0				
Las Flores Drive										18.7	15.9	12.2	20.6
Santa Fe Avenue										53.2	50.4	46.7	55.1
Sprinter										39.1	37.7	34.2	42.1
8	3.Fl	55.2	52.5	48.8	57.2	0.0	0.0	0.0	0.0				
Las Flores Drive										22.0	19.1	15.5	23.8
Santa Fe Avenue										55.0	52.2	48.6	57.0
Sprinter										41.5	40.1	36.6	44.5
8	4.Fl	56.2	53.4	49.8	58.2	0.0	0.0	0.0	0.0				
Las Flores Drive										29.0	26.1	22.5	30.9
Santa Fe Avenue										56.0	53.1	49.5	57.9
Sprinter										43.4	42.1	38.6	46.5
9	1.Fl	47.8	45.1	41.5	49.8	0.0	0.0	0.0	0.0				
Las Flores Drive										18.7	15.8	12.2	20.6
Santa Fe Avenue										47.4	44.6	40.9	49.3
Sprinter										37.4	36.0	32.5	40.4
9	2.Fl	54.3	51.5	47.9	56.2	0.0	0.0	0.0	0.0				
Las Flores Drive										19.4	16.5	12.9	21.3
Santa Fe Avenue										54.2	51.3	47.7	56.1
Sprinter										39.2	37.8	34.3	42.2
9	3.Fl	55.7	53.0	49.3	57.7	0.0	0.0	0.0	0.0				
Las Flores Drive										22.4	19.5	15.9	24.3
Santa Fe Avenue										55.6	52.7	49.1	57.5
Sprinter										41.7	40.3	36.9	44.8
9	4.Fl	56.6	53.9	50.3	58.6	0.0	0.0	0.0	0.0				
Las Flores Drive										29.7	26.8	23.2	31.6
Santa Fe Avenue										56.4	53.6	49.9	58.3
Sprinter										43.8	42.4	38.9	46.8
10	1.Fl	52.8	50.0	46.4	54.7	0.0	0.0	0.0	0.0				
Las Flores Drive										19.4	16.6	12.9	21.3
Santa Fe Avenue										52.6	49.7	46.1	54.5
Sprinter										39.0	37.6	34.1	42.0
10	2.Fl	54.7	51.9	48.3	56.7	0.0	0.0	0.0	0.0				
Las Flores Drive										21.4	18.5	14.9	23.3
Santa Fe Avenue										54.6	51.7	48.1	56.5
Sprinter										40.0	38.6	35.1	43.0
10	3.Fl	55.8	53.0	49.4	57.8	0.0	0.0	0.0	0.0				
Las Flores Drive										24.7	21.9	18.2	26.6
Santa Fe Avenue										55.6	52.8	49.2	57.5
Sprinter										42.0	40.7	37.2	45.1
10	4.Fl	57.7	54.9	51.3	59.7	0.0	0.0	0.0	0.0				
Las Flores Drive										37.8	35.0	31.4	39.7
Santa Fe Avenue										57.5	54.6	51.0	59.4

Sprinter										44.1	42.8	39.3	47.2
11	1.Fl	56.4	53.6	49.9	58.3	0.0	0.0	0.0	0.0				
Las Flores Drive										44.6	41.7	38.1	46.4
Santa Fe Avenue										56.1	53.2	49.6	58.0
Sprinter										36.3	34.9	31.4	39.3
11	2.Fl	59.6	56.8	53.1	61.5	0.0	0.0	0.0	0.0				
Las Flores Drive										48.1	45.2	41.6	50.0
Santa Fe Avenue										59.2	56.3	52.7	61.1
Sprinter										43.1	41.7	38.3	46.2
11	3.Fl	60.7	57.9	54.3	62.7	0.0	0.0	0.0	0.0				
Las Flores Drive										49.4	46.5	42.9	51.2
Santa Fe Avenue										60.3	57.5	53.8	62.2
Sprinter										43.9	42.5	39.0	46.9
11	4.Fl	61.5	58.7	55.1	63.4	0.0	0.0	0.0	0.0				
Las Flores Drive										49.5	46.7	43.0	51.4
Santa Fe Avenue										61.1	58.3	54.6	63.0
Sprinter										45.1	43.7	40.2	48.1
12	1.Fl	55.3	52.5	48.9	57.3	0.0	0.0	0.0	0.0				
Las Flores Drive										50.5	47.6	44.0	52.4
Santa Fe Avenue										53.2	50.4	46.7	55.1
Sprinter										42.2	40.8	37.3	45.2
12	2.Fl	58.4	55.7	52.1	60.4	0.0	0.0	0.0	0.0				
Las Flores Drive										54.1	51.2	47.6	55.9
Santa Fe Avenue										55.8	52.9	49.3	57.7
Sprinter										47.8	46.4	42.9	50.8
12	3.Fl	59.2	56.5	52.9	61.2	0.0	0.0	0.0	0.0				
Las Flores Drive										54.3	51.4	47.7	56.1
Santa Fe Avenue										56.9	54.0	50.4	58.8
Sprinter										49.0	47.6	44.1	52.0
12	4.Fl	59.6	57.0	53.4	61.7	0.0	0.0	0.0	0.0				
Las Flores Drive										54.0	51.1	47.5	55.9
Santa Fe Avenue										57.5	54.7	51.0	59.4
Sprinter										50.0	48.6	45.1	53.0
13	1.Fl	48.6	45.8	42.2	50.6	0.0	0.0	0.0	0.0				
Las Flores Drive										45.0	42.1	38.5	46.9
Santa Fe Avenue										45.3	42.5	38.8	47.2
Sprinter										37.8	36.4	32.9	40.9
13	2.Fl	54.9	52.2	48.5	56.9	0.0	0.0	0.0	0.0				
Las Flores Drive										50.6	47.8	44.1	52.5
Santa Fe Avenue										52.6	49.7	46.1	54.5
Sprinter										41.7	40.3	36.9	44.8
13	3.Fl	58.1	55.4	51.8	60.1	0.0	0.0	0.0	0.0				
Las Flores Drive										53.8	50.9	47.3	55.7
Santa Fe Avenue										55.2	52.3	48.7	57.1
Sprinter										48.4	47.0	43.5	51.4
13	4.Fl	58.8	56.1	52.5	60.8	0.0	0.0	0.0	0.0				
Las Flores Drive										54.0	51.1	47.5	55.9
Santa Fe Avenue										56.1	53.3	49.7	58.0
Sprinter										49.5	48.1	44.6	52.5
14	1.Fl	52.7	50.0	46.4	54.7	0.0	0.0	0.0	0.0				
Las Flores Drive										49.1	46.2	42.6	51.0
Santa Fe Avenue										49.1	46.3	42.6	51.0
Sprinter										43.6	42.2	38.7	46.6
14	2.Fl	57.8	55.2	51.6	59.9	0.0	0.0	0.0	0.0				

Las Flores Drive										54.2	51.3	47.7	56.0
Santa Fe Avenue										53.9	51.1	47.4	55.8
Sprinter										49.7	48.3	44.8	52.7
14	3.Fl	58.4	55.9	52.3	60.6	0.0	0.0	0.0	0.0				
Las Flores Drive										54.2	51.4	47.7	56.1
Santa Fe Avenue										54.9	52.0	48.4	56.8
Sprinter										51.0	49.6	46.1	54.0
14	4.Fl	58.7	56.2	52.6	60.9	0.0	0.0	0.0	0.0				
Las Flores Drive										54.0	51.2	47.5	55.9
Santa Fe Avenue										55.2	52.4	48.8	57.1
Sprinter										52.0	50.6	47.1	55.0
15	1.Fl	51.1	48.6	45.0	53.2	0.0	0.0	0.0	0.0				
Las Flores Drive										47.4	44.5	40.9	49.3
Santa Fe Avenue										46.9	44.0	40.4	48.8
Sprinter										44.1	42.7	39.2	47.1
15	2.Fl	56.5	53.9	50.3	58.6	0.0	0.0	0.0	0.0				
Las Flores Drive										52.8	49.9	46.3	54.7
Santa Fe Avenue										52.5	49.7	46.0	54.4
Sprinter										48.6	47.3	43.8	51.7
15	3.Fl	57.8	55.3	51.7	59.9	0.0	0.0	0.0	0.0				
Las Flores Drive										53.7	50.8	47.2	55.6
Santa Fe Avenue										53.9	51.0	47.4	55.8
Sprinter										50.9	49.5	46.0	53.9
15	4.Fl	58.3	55.8	52.2	60.5	0.0	0.0	0.0	0.0				
Las Flores Drive										53.6	50.7	47.1	55.5
Santa Fe Avenue										54.5	51.7	48.0	56.4
Sprinter										52.0	50.7	47.2	55.1
16	1.Fl	49.9	47.5	43.9	52.1	0.0	0.0	0.0	0.0				
Las Flores Drive										46.2	43.3	39.7	48.1
Santa Fe Avenue										44.4	41.5	37.9	46.3
Sprinter										44.4	43.1	39.6	47.5
16	2.Fl	53.7	51.2	47.6	55.8	0.0	0.0	0.0	0.0				
Las Flores Drive										49.6	46.7	43.1	51.5
Santa Fe Avenue										49.7	46.9	43.2	51.6
Sprinter										46.8	45.4	41.9	49.8
16	3.Fl	57.3	54.8	51.2	59.5	0.0	0.0	0.0	0.0				
Las Flores Drive										53.0	50.1	46.5	54.9
Santa Fe Avenue										53.4	50.6	47.0	55.3
Sprinter										50.7	49.3	45.8	53.8
16	4.Fl	57.9	55.5	51.9	60.1	0.0	0.0	0.0	0.0				
Las Flores Drive										53.1	50.2	46.6	55.0
Santa Fe Avenue										54.1	51.2	47.6	56.0
Sprinter										52.0	50.6	47.2	55.1
17	1.Fl	48.9	46.6	43.0	51.2	0.0	0.0	0.0	0.0				
Las Flores Drive										45.5	42.6	39.0	47.4
Santa Fe Avenue										42.0	39.1	35.5	43.9
Sprinter										44.2	42.8	39.3	47.2
17	2.Fl	52.3	50.0	46.4	54.6	0.0	0.0	0.0	0.0				
Las Flores Drive										47.9	45.0	41.4	49.8
Santa Fe Avenue										47.0	44.2	40.5	48.9
Sprinter										47.6	46.2	42.7	50.6
17	3.Fl	56.6	54.2	50.6	58.8	0.0	0.0	0.0	0.0				
Las Flores Drive										51.9	49.0	45.3	53.7
Santa Fe Avenue										52.9	50.0	46.4	54.8

Sprinter										50.5	49.1	45.7	53.6
17	4.Fl	57.5	55.1	51.5	59.7	0.0	0.0	0.0	0.0				
Las Flores Drive										52.1	49.2	45.6	53.9
Santa Fe Avenue										53.7	50.9	47.3	55.6
Sprinter										52.0	50.7	47.2	55.1
18	1.Fl	48.4	46.1	42.5	50.7	0.0	0.0	0.0	0.0				
Las Flores Drive										45.3	42.4	38.8	47.2
Santa Fe Avenue										41.5	38.6	35.0	43.4
Sprinter										43.4	42.0	38.5	46.4
18	2.Fl	51.9	49.7	46.2	54.3	0.0	0.0	0.0	0.0				
Las Flores Drive										47.1	44.2	40.6	49.0
Santa Fe Avenue										45.6	42.8	39.2	47.5
Sprinter										48.3	46.9	43.4	51.3
18	3.Fl	55.0	52.6	49.0	57.2	0.0	0.0	0.0	0.0				
Las Flores Drive										50.5	47.6	44.0	52.4
Santa Fe Avenue										50.0	47.1	43.5	51.9
Sprinter										50.0	48.6	45.2	53.1
18	4.Fl	57.1	54.7	51.2	59.4	0.0	0.0	0.0	0.0				
Las Flores Drive										51.4	48.5	44.9	53.3
Santa Fe Avenue										53.1	50.3	46.7	55.0
Sprinter										52.2	50.8	47.3	55.2
19	1.Fl	46.0	44.2	40.7	48.7	0.0	0.0	0.0	0.0				
Las Flores Drive										40.8	37.9	34.3	42.6
Santa Fe Avenue										27.3	24.5	20.8	29.2
Sprinter										44.4	43.0	39.5	47.4
19	2.Fl	50.7	49.1	45.6	53.6	0.0	0.0	0.0	0.0				
Las Flores Drive										42.0	39.1	35.5	43.9
Santa Fe Avenue										31.1	28.2	24.6	33.0
Sprinter										50.0	48.6	45.1	53.0
19	3.Fl	51.9	50.3	46.8	54.8	0.0	0.0	0.0	0.0				
Las Flores Drive										44.0	41.1	37.5	45.8
Santa Fe Avenue										36.4	33.6	29.9	38.3
Sprinter										51.0	49.6	46.2	54.1
19	4.Fl	53.2	51.6	48.0	56.0	0.0	0.0	0.0	0.0				
Las Flores Drive										44.7	41.8	38.2	46.6
Santa Fe Avenue										38.4	35.5	31.9	40.3
Sprinter										52.3	50.9	47.4	55.4
20	1.Fl	46.9	45.2	41.7	49.7	0.0	0.0	0.0	0.0				
Las Flores Drive										40.3	37.5	33.8	42.2
Santa Fe Avenue										31.4	28.6	25.0	33.3
Sprinter										45.6	44.3	40.8	48.7
20	2.Fl	50.8	49.2	45.7	53.7	0.0	0.0	0.0	0.0				
Las Flores Drive										41.3	38.4	34.8	43.2
Santa Fe Avenue										38.5	35.7	32.0	40.4
Sprinter										50.0	48.7	45.2	53.1
20	3.Fl	52.2	50.5	47.0	55.0	0.0	0.0	0.0	0.0				
Las Flores Drive										42.6	39.7	36.1	44.5
Santa Fe Avenue										42.6	39.8	36.1	44.5
Sprinter										51.1	49.7	46.2	54.1
20	4.Fl	53.1	51.5	48.0	55.9	0.0	0.0	0.0	0.0				
Las Flores Drive										43.0	40.1	36.5	44.9
Santa Fe Avenue										44.0	41.2	37.6	45.9
Sprinter										52.1	50.7	47.2	55.1

ATTACHMENT 5

FHWA RD-77-108 – Off-site Traffic Noise

FHWA RD-77-108

Traffic Noise Prediction Model

Data Input Sheet

Project Name : Santa Fe Flores
Project Number : 9865
Modeled Condition : 2022

Surface Refelction: CNEL
Assessment Metric: Hard
Peak ratio to ADT: 10.0
Traffic Desc. (Peak or ADT) : ADT

Segment	Roadway	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	%MT	% HT	Day %	Eve %	Night %	K-Factor
WITHOUT PROJECT												
1	S. Santa Fe Avenue	Smilax Road to Bosstick Boulevard	14,850	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
2	S. Santa Fe Avenue	Bosstick Boulevard to Vern Road	16,660	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
3	S. Santa Fe Avenue	Vern Road to Las Flores Drive	16,660	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
4	S. Santa Fe Avenue	Las Flores Drive to N. Rancho Santa Fe Road	14,600	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
5	S. Santa Fe Avenue	N. Rancho Santa Fe Road and N. Pacific Street	13,500	40	50	95.00	3.00	2.00	77.00	10.00	13.00	
6	Hollencrest Road	De Leone Road to Hollenbeck Road	560	25	50	95.00	3.00	2.00	77.00	10.00	13.00	
7	N. Rancho Santa Fe Road	S. Santa Fe Avenue to Capalina Road	11,730	40	50	95.00	3.00	2.00	77.00	10.00	13.00	
WITH PROJECT												
1	S. Santa Fe Avenue	Smilax Road to Bosstick Boulevard	14,940	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
2	S. Santa Fe Avenue	Bosstick Boulevard to Vern Road	16,750	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
3	S. Santa Fe Avenue	Vern Road to Las Flores Drive	16,960	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
4	S. Santa Fe Avenue	Las Flores Drive to N. Rancho Santa Fe Road	14,750	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
5	S. Santa Fe Avenue	N. Rancho Santa Fe Road and N. Pacific Street	13,560	40	50	95.00	3.00	2.00	77.00	10.00	13.00	
6	Hollencrest Road	De Leone Road to Hollenbeck Road	590	25	50	95.00	3.00	2.00	77.00	10.00	13.00	
7	N. Rancho Santa Fe Road	S. Santa Fe Avenue to Capalina Road	11,820	40	50	95.00	3.00	2.00	77.00	10.00	13.00	

FHWA RD-77-108

Traffic Noise Prediction Model

Predicted Noise Levels

Project Name : Santa Fe Flores
Project Number : 9865
Modeled Condition : 2022
Assessment Metric: Hard

			Noise Levels, dBA Hard				Distance to Traffic Noise Level Contours, Feet					
Segment	Roadway	Segment	Auto	MT	HT	Total	75 dB	70 dB	65 dB	60 dB	55 dB	50 dB
WITHOUT PROJECT												
1	S. Santa Fe Avenue	Smilax Road to Bosstick Boulevard	69.2	62.5	65.2	71.3	21	67	213	674	2,133	6,745
2	S. Santa Fe Avenue	Bosstick Boulevard to Vern Road	69.7	63.0	65.7	71.8	24	76	239	757	2,393	7,568
3	S. Santa Fe Avenue	Vern Road to Las Flores Drive	69.7	63.0	65.7	71.8	24	76	239	757	2,393	7,568
4	S. Santa Fe Avenue	Las Flores Drive to N. Rancho Santa Fe Road	69.2	62.4	65.1	71.2	21	66	208	659	2,084	6,591
5	S. Santa Fe Avenue	N. Rancho Santa Fe Road and N. Pacific Street	67.3	61.3	64.3	69.8	15	48	151	477	1,510	4,775
6	Hollencrest Road	De Leone Road to Hollenbeck Road	47.6	44.3	50.1	52.7	0	1	3	9	29	93
7	N. Rancho Santa Fe Road	S. Santa Fe Avenue to Capalina Road	66.7	60.6	63.7	69.1	13	41	129	406	1,285	4,064
WITH PROJECT												
1	S. Santa Fe Avenue	Smilax Road to Bosstick Boulevard	69.3	62.5	65.2	71.3	21	67	213	674	2,133	6,745
2	S. Santa Fe Avenue	Bosstick Boulevard to Vern Road	69.7	63.0	65.7	71.8	24	76	239	757	2,393	7,568
3	S. Santa Fe Avenue	Vern Road to Las Flores Drive	69.8	63.0	65.8	71.9	24	77	245	774	2,449	7,744
4	S. Santa Fe Avenue	Las Flores Drive to N. Rancho Santa Fe Road	69.2	62.4	65.2	71.3	21	67	213	674	2,133	6,745
5	S. Santa Fe Avenue	N. Rancho Santa Fe Road and N. Pacific Street	67.4	61.3	64.3	69.8	15	48	151	477	1,510	4,775
6	Hollencrest Road	De Leone Road to Hollenbeck Road	47.9	44.5	50.3	53.0	0	1	3	10	32	100
7	N. Rancho Santa Fe Road	S. Santa Fe Avenue to Capalina Road	66.8	60.7	63.7	69.2	13	42	132	416	1,315	4,159

FHWA RD-77-108

Traffic Noise Prediction Model

Data Input Sheet

Project Name : Santa Fe Flores
Project Number : 9865
Modeled Condition : 2025

Surface Refelction: CNEL
Assessment Metric: Hard
Peak ratio to ADT: 10.0
Traffic Desc. (Peak or ADT) : ADT

Segment	Roadway	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	%MT	% HT	Day %	Eve %	Night %	K-Factor
WITHOUT PROJECT												
1	S. Santa Fe Avenue	Smilax Road to Bosstick Boulevard	15,610	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
2	S. Santa Fe Avenue	Bosstick Boulevard to Vern Road	17,510	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
3	S. Santa Fe Avenue	Vern Road to Las Flores Drive	17,510	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
4	S. Santa Fe Avenue	Las Flores Drive to N. Rancho Santa Fe Road	15,340	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
5	S. Santa Fe Avenue	N. Rancho Santa Fe Road and N. Pacific Street	14,190	40	50	95.00	3.00	2.00	77.00	10.00	13.00	
6	Hollencrest Road	De Leone Road to Hollenbeck Road	590	25	50	95.00	3.00	2.00	77.00	10.00	13.00	
7	N. Rancho Santa Fe Road	S. Santa Fe Avenue to Capalina Road	12,330	40	50	95.00	3.00	2.00	77.00	10.00	13.00	
WITH PROJECT												
1	S. Santa Fe Avenue	Smilax Road to Bosstick Boulevard	15,700	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
2	S. Santa Fe Avenue	Bosstick Boulevard to Vern Road	17,600	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
3	S. Santa Fe Avenue	Vern Road to Las Flores Drive	17,810	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
4	S. Santa Fe Avenue	Las Flores Drive to N. Rancho Santa Fe Road	15,490	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
5	S. Santa Fe Avenue	N. Rancho Santa Fe Road and N. Pacific Street	14,250	40	50	95.00	3.00	2.00	77.00	10.00	13.00	
6	Hollencrest Road	De Leone Road to Hollenbeck Road	620	25	50	95.00	3.00	2.00	77.00	10.00	13.00	
7	N. Rancho Santa Fe Road	S. Santa Fe Avenue to Capalina Road	12,420	40	50	95.00	3.00	2.00	77.00	10.00	13.00	

FHWA RD-77-108

Traffic Noise Prediction Model

Predicted Noise Levels

Project Name : Santa Fe Flores
Project Number : 9865
Modeled Condition : 2025
Assessment Metric: Hard

			Noise Levels, dBA Hard				Distance to Traffic Noise Level Contours, Feet					
Segment	Roadway	Segment	Auto	MT	HT	Total	75 dB	70 dB	65 dB	60 dB	55 dB	50 dB
WITHOUT PROJECT												
1	S. Santa Fe Avenue	Smilax Road to Bosstick Boulevard	69.4	62.7	65.4	71.5	22	71	223	706	2,233	7,063
2	S. Santa Fe Avenue	Bosstick Boulevard to Vern Road	69.9	63.2	65.9	72.0	25	79	251	792	2,506	7,924
3	S. Santa Fe Avenue	Vern Road to Las Flores Drive	69.9	63.2	65.9	72.0	25	79	251	792	2,506	7,924
4	S. Santa Fe Avenue	Las Flores Drive to N. Rancho Santa Fe Road	69.4	62.6	65.3	71.4	22	69	218	690	2,183	6,902
5	S. Santa Fe Avenue	N. Rancho Santa Fe Road and N. Pacific Street	67.6	61.5	64.5	70.0	16	50	158	500	1,581	5,000
6	Hollencrest Road	De Leone Road to Hollenbeck Road	47.9	44.5	50.3	53.0	0	1	3	10	32	100
7	N. Rancho Santa Fe Road	S. Santa Fe Avenue to Capalina Road	66.9	60.9	63.9	69.4	14	44	138	435	1,377	4,355
WITH PROJECT												
1	S. Santa Fe Avenue	Smilax Road to Bosstick Boulevard	69.5	62.7	65.4	71.5	22	71	223	706	2,233	7,063
2	S. Santa Fe Avenue	Bosstick Boulevard to Vern Road	70.0	63.2	65.9	72.0	25	79	251	792	2,506	7,924
3	S. Santa Fe Avenue	Vern Road to Las Flores Drive	70.0	63.3	66.0	72.1	26	81	256	811	2,564	8,109
4	S. Santa Fe Avenue	Las Flores Drive to N. Rancho Santa Fe Road	69.4	62.7	65.4	71.5	22	71	223	706	2,233	7,063
5	S. Santa Fe Avenue	N. Rancho Santa Fe Road and N. Pacific Street	67.6	61.5	64.6	70.0	16	50	158	500	1,581	5,000
6	Hollencrest Road	De Leone Road to Hollenbeck Road	48.1	44.7	50.6	53.2	0	1	3	10	33	104
7	N. Rancho Santa Fe Road	S. Santa Fe Avenue to Capalina Road	67.0	60.9	64.0	69.4	14	44	138	435	1,377	4,355

FHWA RD-77-108

Traffic Noise Prediction Model

Data Input Sheet

Project Name : Santa Fe Flores
Project Number : 9865
Modeled Condition : 2050

Surface Refelction: CNEL
Assessment Metric: Hard
Peak ratio to ADT: 10.0
Traffic Desc. (Peak or ADT) : ADT

Segment	Roadway	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	%MT	% HT	Day %	Eve %	Night %	K-Factor
WITHOUT PROJECT												
1	S. Santa Fe Avenue	Smilax Road to Bosstick Boulevard	22,200	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
2	S. Santa Fe Avenue	Bosstick Boulevard to Vern Road	22,200	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
3	S. Santa Fe Avenue	Vern Road to Las Flores Drive	22,200	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
4	S. Santa Fe Avenue	Las Flores Drive to N. Rancho Santa Fe Road	21,300	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
5	S. Santa Fe Avenue	N. Rancho Santa Fe Road and N. Pacific Street	24,400	40	50	95.00	3.00	2.00	77.00	10.00	13.00	
6	Hollencrest Road	De Leone Road to Hollenbeck Road	830	25	50	95.00	3.00	2.00	77.00	10.00	13.00	
7	N. Rancho Santa Fe Road	S. Santa Fe Avenue to Capalina Road	16,800	40	50	95.00	3.00	2.00	77.00	10.00	13.00	
WITH PROJECT												
1	S. Santa Fe Avenue	Smilax Road to Bosstick Boulevard	22,290	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
2	S. Santa Fe Avenue	Bosstick Boulevard to Vern Road	22,290	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
3	S. Santa Fe Avenue	Vern Road to Las Flores Drive	22,500	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
4	S. Santa Fe Avenue	Las Flores Drive to N. Rancho Santa Fe Road	21,450	45	50	95.00	3.00	2.00	77.00	10.00	13.00	
5	S. Santa Fe Avenue	N. Rancho Santa Fe Road and N. Pacific Street	24,460	40	50	95.00	3.00	2.00	77.00	10.00	13.00	
6	Hollencrest Road	De Leone Road to Hollenbeck Road	860	25	50	95.00	3.00	2.00	77.00	10.00	13.00	
7	N. Rancho Santa Fe Road	S. Santa Fe Avenue to Capalina Road	16,890	40	50	95.00	3.00	2.00	77.00	10.00	13.00	

FHWA RD-77-108

Traffic Noise Prediction Model

Predicted Noise Levels

Project Name : Santa Fe Flores
Project Number : 9865
Modeled Condition : 2050
Assessment Metric: Hard

			Noise Levels, dBA Hard				Distance to Traffic Noise Level Contours, Feet					
Segment	Roadway	Segment	Auto	MT	HT	Total	75 dB	70 dB	65 dB	60 dB	55 dB	50 dB
WITHOUT PROJECT												
1	S. Santa Fe Avenue	Smilax Road to Bosstick Boulevard	71.0	64.2	67.0	73.0	32	100	315	998	3,155	9,976
2	S. Santa Fe Avenue	Bosstick Boulevard to Vern Road	71.0	64.2	67.0	73.0	32	100	315	998	3,155	9,976
3	S. Santa Fe Avenue	Vern Road to Las Flores Drive	71.0	64.2	67.0	73.0	32	100	315	998	3,155	9,976
4	S. Santa Fe Avenue	Las Flores Drive to N. Rancho Santa Fe Road	70.8	64.0	66.8	72.9	31	97	308	975	3,083	9,749
5	S. Santa Fe Avenue	N. Rancho Santa Fe Road and N. Pacific Street	69.9	63.8	66.9	72.3	27	85	269	849	2,685	8,491
6	Hollencrest Road	De Leone Road to Hollenbeck Road	49.3	46.0	51.8	54.4	0	1	4	14	44	138
7	N. Rancho Santa Fe Road	S. Santa Fe Avenue to Capalina Road	68.3	62.2	65.3	70.7	19	59	186	587	1,858	5,874
WITH PROJECT												
1	S. Santa Fe Avenue	Smilax Road to Bosstick Boulevard	71.0	64.2	67.0	73.1	32	102	323	1,021	3,228	10,209
2	S. Santa Fe Avenue	Bosstick Boulevard to Vern Road	71.0	64.2	67.0	73.1	32	102	323	1,021	3,228	10,209
3	S. Santa Fe Avenue	Vern Road to Las Flores Drive	71.0	64.3	67.0	73.1	32	102	323	1,021	3,228	10,209
4	S. Santa Fe Avenue	Las Flores Drive to N. Rancho Santa Fe Road	70.8	64.1	66.8	72.9	31	97	308	975	3,083	9,749
5	S. Santa Fe Avenue	N. Rancho Santa Fe Road and N. Pacific Street	69.9	63.8	66.9	72.3	27	85	269	849	2,685	8,491
6	Hollencrest Road	De Leone Road to Hollenbeck Road	49.5	46.1	52.0	54.6	0	1	5	14	46	144
7	N. Rancho Santa Fe Road	S. Santa Fe Avenue to Capalina Road	68.3	62.2	65.3	70.7	19	59	186	587	1,858	5,874

ATTACHMENT 6

SoundPLAN Data – On-site Generated Noise

9865 Santa Fe Flores
SoundPLAN Data - HVAC

Source name	Reference	Noise Level dB(A) Lpw
HVAC1	Lw/unit	75
HVAC2	Lw/unit	75
HVAC3	Lw/unit	75
HVAC4	Lw/unit	75
HVAC5	Lw/unit	75
HVAC6	Lw/unit	75
HVAC7	Lw/unit	75
HVAC8	Lw/unit	75
HVAC9	Lw/unit	75
HVAC10	Lw/unit	75
HVAC11	Lw/unit	75
HVAC12	Lw/unit	75
HVAC13	Lw/unit	75
HVAC14	Lw/unit	75
HVAC15	Lw/unit	75
HVAC16	Lw/unit	75
HVAC17	Lw/unit	75
HVAC18	Lw/unit	75
HVAC19	Lw/unit	75
HVAC20	Lw/unit	75
HVAC21	Lw/unit	75
HVAC22	Lw/unit	75
HVAC23	Lw/unit	75
HVAC24	Lw/unit	75
HVAC25	Lw/unit	75
HVAC26	Lw/unit	75
HVAC27	Lw/unit	75
HVAC28	Lw/unit	75
HVAC29	Lw/unit	75
HVAC30	Lw/unit	75
HVAC31	Lw/unit	75
HVAC32	Lw/unit	75
HVAC33	Lw/unit	75
HVAC34	Lw/unit	75
HVAC35	Lw/unit	75
HVAC36	Lw/unit	75
HVAC37	Lw/unit	75
HVAC38	Lw/unit	75
HVAC39	Lw/unit	75
HVAC40	Lw/unit	75
HVAC41	Lw/unit	75
HVAC42	Lw/unit	75
HVAC43	Lw/unit	75
HVAC44	Lw/unit	75
HVAC45	Lw/unit	75
HVAC46	Lw/unit	75
HVAC47	Lw/unit	75
HVAC48	Lw/unit	75
HVAC49	Lw/unit	75
HVAC50	Lw/unit	75
HVAC51	Lw/unit	75
HVAC52	Lw/unit	75
HVAC53	Lw/unit	75
HVAC54	Lw/unit	75
HVAC55	Lw/unit	75
HVAC56	Lw/unit	75

9865 Santa Fe Flores

SoundPLAN Data - HVAC

No.	Coordinates X	Y	Height	Noise Level
	(meters)		(meters)	dB(A) Leq
1	481468.23	3668972.47	182.38	33.7
2	481477.03	3668933.16	185.26	35.7
3	481491.51	3668901.09	186.46	35.6
4	481513.24	3668863.85	186.82	35.2
5	481534.96	3668832.30	186.16	34.2
6	481452.72	3668803.33	161.69	33.3
7	481417.03	3668787.30	160.02	32.9
8	481389.61	3668758.33	159.09	37.9
9	481373.58	3668720.06	157.61	37.0
10	481348.75	3668660.57	154.54	35.1
11	481317.72	3668679.71	153.92	37.4
12	481280.47	3668693.16	153.14	38.8
13	481232.89	3668717.47	152.07	38.0
14	481185.82	3668741.78	151.46	36.6
15	481304.72	3668755.81	153.73	40.8
16	481288.85	3668803.43	156.64	43.2
17	481306.71	3668845.77	157.91	43.0
18	481370.21	3668885.46	167.46	44.1

Source name			Noise Level dB(A) Leq
1	1.Fl	33.7	
HVAC1			15.9
HVAC2			16.8
HVAC3			17.7
HVAC4			17.8
HVAC5			18.0
HVAC6			18.0
HVAC7			19.7
HVAC8			19.7
HVAC9			19.6
HVAC10			19.6
HVAC11			19.6
HVAC12			19.5
HVAC13			19.5
HVAC14			19.5
HVAC15			19.4
HVAC16			19.4
HVAC17			19.4
HVAC18			19.4
HVAC19			19.4
HVAC20			19.4
HVAC21			19.4
HVAC22			19.5
HVAC23			17.6
HVAC24			17.5
HVAC25			17.3
HVAC26			17.0
HVAC27			16.1
HVAC28			14.7
HVAC29			5.2
HVAC30			6.2
HVAC31			8.1
HVAC32			9.2
HVAC33			9.5
HVAC34			9.7
HVAC35			10.0
HVAC36			10.2
HVAC37			10.4
HVAC38			10.6
HVAC39			11.4
HVAC40			11.6
HVAC41			11.7
HVAC42			11.9
HVAC43			11.6
HVAC44			11.4
HVAC45			11.5
HVAC46			11.3
HVAC47			10.6
HVAC48			10.4
HVAC49			10.2
HVAC50			10.0
HVAC51			9.7
HVAC52			9.5
HVAC53			9.2
HVAC54			8.9
HVAC55			3.4
HVAC56			2.9
2	1.Fl	35.7	
HVAC1			17.4
HVAC2			18.4
HVAC3			19.1
HVAC4			19.2
HVAC5			19.3
HVAC6			19.2
HVAC7			19.0
HVAC8			20.8
HVAC9			22.0
HVAC10			22.0

HVAC11			22.0
HVAC12			21.9
HVAC13			21.9
HVAC14			21.8
HVAC15			21.2
HVAC16			21.2
HVAC17			21.2
HVAC18			21.3
HVAC19			19.6
HVAC20			19.6
HVAC21			18.8
HVAC22			18.8
HVAC23			19.0
HVAC24			19.1
HVAC25			19.1
HVAC26			18.9
HVAC27			18.0
HVAC28			16.7
HVAC29			5.1
HVAC30			5.8
HVAC31			14.3
HVAC32			14.6
HVAC33			14.9
HVAC34			15.1
HVAC35			15.7
HVAC36			15.7
HVAC37			15.7
HVAC38			15.8
HVAC39			15.8
HVAC40			15.9
HVAC41			15.8
HVAC42			15.8
HVAC43			15.8
HVAC44			15.8
HVAC45			15.8
HVAC46			15.8
HVAC47			15.8
HVAC48			15.7
HVAC49			15.5
HVAC50			15.4
HVAC51			15.1
HVAC52			14.9
HVAC53			14.6
HVAC54			14.3
HVAC55			9.8
HVAC56			8.5
3	1.Fl	35.6	
HVAC1			18.2
HVAC2			19.2
HVAC3			19.8
HVAC4			19.8
HVAC5			19.7
HVAC6			19.6
HVAC7			20.0
HVAC8			20.0
HVAC9			19.9
HVAC10			19.8
HVAC11			19.8
HVAC12			21.7
HVAC13			21.6
HVAC14			21.6
HVAC15			21.0
HVAC16			18.7
HVAC17			18.9
HVAC18			19.0
HVAC19			19.0
HVAC20			19.1
HVAC21			19.1
HVAC22			18.8
HVAC23			19.0
HVAC24			19.1

HVAC25		19.2
HVAC26		19.2
HVAC27		19.1
HVAC28		17.8
HVAC29		10.1
HVAC30		11.8
HVAC31		18.3
HVAC32		16.1
HVAC33		16.3
HVAC34		16.5
HVAC35		16.6
HVAC36		16.7
HVAC37		16.7
HVAC38		16.7
HVAC39		16.6
HVAC40		16.6
HVAC41		16.5
HVAC42		18.2
HVAC43		17.1
HVAC44		17.2
HVAC45		17.2
HVAC46		15.9
HVAC47		15.6
HVAC48		15.5
HVAC49		15.3
HVAC50		14.8
HVAC51		14.5
HVAC52		14.1
HVAC53		13.5
HVAC54		15.9
HVAC55		11.9
HVAC56		10.3
4	1.Fl	35.2
HVAC1		18.4
HVAC2		19.1
HVAC3		19.0
HVAC4		18.9
HVAC5		18.9
HVAC6		18.8
HVAC7		18.7
HVAC8		18.7
HVAC9		18.6
HVAC10		18.6
HVAC11		18.6
HVAC12		18.5
HVAC13		18.5
HVAC14		20.8
HVAC15		17.5
HVAC16		17.4
HVAC17		17.6
HVAC18		17.7
HVAC19		17.7
HVAC20		17.7
HVAC21		17.6
HVAC22		17.6
HVAC23		17.8
HVAC24		17.9
HVAC25		17.9
HVAC26		17.9
HVAC27		18.0
HVAC28		18.1
HVAC29		11.8
HVAC30		18.2
HVAC31		19.5
HVAC32		19.5
HVAC33		17.1
HVAC34		17.4
HVAC35		17.3
HVAC36		17.3
HVAC37		17.2
HVAC38		17.2

HVAC39			17.1
HVAC40			17.1
HVAC41			17.1
HVAC42			17.1
HVAC43			16.2
HVAC44			16.3
HVAC45			16.3
HVAC46			16.4
HVAC47			16.2
HVAC48			16.3
HVAC49			16.5
HVAC50			16.3
HVAC51			16.4
HVAC52			16.4
HVAC53			16.3
HVAC54			19.1
HVAC55			16.4
HVAC56			15.5
5	1.Fl	34.2	
HVAC1			17.6
HVAC2			17.5
HVAC3			17.5
HVAC4			17.4
HVAC5			17.4
HVAC6			17.3
HVAC7			17.3
HVAC8			17.3
HVAC9			17.2
HVAC10			17.2
HVAC11			17.2
HVAC12			17.1
HVAC13			17.1
HVAC14			17.0
HVAC15			16.0
HVAC16			15.9
HVAC17			16.0
HVAC18			16.1
HVAC19			16.1
HVAC20			16.1
HVAC21			16.0
HVAC22			16.0
HVAC23			16.2
HVAC24			16.3
HVAC25			16.3
HVAC26			16.2
HVAC27			16.3
HVAC28			16.4
HVAC29			17.9
HVAC30			18.9
HVAC31			19.0
HVAC32			19.0
HVAC33			16.3
HVAC34			16.2
HVAC35			16.2
HVAC36			16.3
HVAC37			16.3
HVAC38			16.3
HVAC39			16.2
HVAC40			16.1
HVAC41			16.2
HVAC42			16.2
HVAC43			15.2
HVAC44			15.2
HVAC45			15.2
HVAC46			15.3
HVAC47			15.1
HVAC48			15.1
HVAC49			15.2
HVAC50			15.0
HVAC51			15.3
HVAC52			15.3

HVAC53			18.4
HVAC54			18.4
HVAC55			18.3
HVAC56			15.2
6	1.Fl	33.3	
HVAC1			11.3
HVAC2			11.5
HVAC3			11.8
HVAC4			12.1
HVAC5			12.4
HVAC6			12.5
HVAC7			12.7
HVAC8			13.1
HVAC9			13.3
HVAC10			13.4
HVAC11			13.6
HVAC12			13.7
HVAC13			13.9
HVAC14			14.0
HVAC15			13.8
HVAC16			13.7
HVAC17			13.5
HVAC18			13.4
HVAC19			13.2
HVAC20			13.1
HVAC21			12.9
HVAC22			12.6
HVAC23			12.4
HVAC24			12.3
HVAC25			12.0
HVAC26			11.8
HVAC27			11.4
HVAC28			11.2
HVAC29			16.6
HVAC30			17.1
HVAC31			17.4
HVAC32			17.5
HVAC33			14.9
HVAC34			18.4
HVAC35			18.3
HVAC36			18.3
HVAC37			18.3
HVAC38			18.3
HVAC39			18.2
HVAC40			18.2
HVAC41			18.2
HVAC42			18.2
HVAC43			17.6
HVAC44			17.6
HVAC45			17.6
HVAC46			17.7
HVAC47			17.6
HVAC48			17.7
HVAC49			17.8
HVAC50			17.7
HVAC51			17.8
HVAC52			17.9
HVAC53			17.0
HVAC54			16.9
HVAC55			16.7
HVAC56			16.3
7	1.Fl	32.9	
HVAC1			14.7
HVAC2			12.5
HVAC3			12.8
HVAC4			13.1
HVAC5			13.4
HVAC6			13.6
HVAC7			13.9
HVAC8			14.0
HVAC9			14.3

HVAC10			14.4
HVAC11			14.6
HVAC12			14.7
HVAC13			14.9
HVAC14			15.0
HVAC15			15.2
HVAC16			15.1
HVAC17			15.0
HVAC18			14.9
HVAC19			14.7
HVAC20			14.5
HVAC21			14.3
HVAC22			14.1
HVAC23			13.8
HVAC24			13.5
HVAC25			13.2
HVAC26			13.0
HVAC27			12.7
HVAC28			12.5
HVAC29			17.9
HVAC30			18.0
HVAC31			18.1
HVAC32			15.8
HVAC33			15.9
HVAC34			16.0
HVAC35			16.0
HVAC36			16.1
HVAC37			16.1
HVAC38			16.2
HVAC39			16.2
HVAC40			16.3
HVAC41			16.3
HVAC42			16.3
HVAC43			16.1
HVAC44			16.1
HVAC45			16.1
HVAC46			16.1
HVAC47			16.0
HVAC48			16.0
HVAC49			15.9
HVAC50			15.8
HVAC51			15.9
HVAC52			15.8
HVAC53			15.7
HVAC54			17.9
HVAC55			17.8
HVAC56			17.8
8	1.Fl	37.9	
HVAC1			15.4
HVAC2			15.4
HVAC3			15.4
HVAC4			15.4
HVAC5			15.4
HVAC6			13.4
HVAC7			13.5
HVAC8			13.5
HVAC9			13.7
HVAC10			13.7
HVAC11			14.2
HVAC12			14.5
HVAC13			15.0
HVAC14			15.4
HVAC15			15.5
HVAC16			15.1
HVAC17			14.6
HVAC18			14.4
HVAC19			14.3
HVAC20			14.2
HVAC21			14.1
HVAC22			14.0
HVAC23			13.9

HVAC24			13.8
HVAC25			13.7
HVAC26			13.7
HVAC27			15.9
HVAC28			15.9
HVAC29			25.6
HVAC30			24.1
HVAC31			22.1
HVAC32			22.2
HVAC33			22.2
HVAC34			22.3
HVAC35			22.3
HVAC36			22.3
HVAC37			22.4
HVAC38			22.4
HVAC39			22.5
HVAC40			22.5
HVAC41			22.5
HVAC42			22.6
HVAC43			22.8
HVAC44			22.7
HVAC45			22.7
HVAC46			22.6
HVAC47			22.6
HVAC48			22.6
HVAC49			22.5
HVAC50			22.5
HVAC51			22.4
HVAC52			22.4
HVAC53			22.3
HVAC54			22.3
HVAC55			24.1
HVAC56			24.0
9	1.Fl	37.0	
HVAC1			13.3
HVAC2			13.4
HVAC3			13.4
HVAC4			13.5
HVAC5			16.2
HVAC6			16.3
HVAC7			16.3
HVAC8			16.3
HVAC9			15.6
HVAC10			15.7
HVAC11			16.0
HVAC12			16.2
HVAC13			16.4
HVAC14			16.3
HVAC15			16.4
HVAC16			16.4
HVAC17			16.2
HVAC18			16.1
HVAC19			16.0
HVAC20			16.0
HVAC21			15.9
HVAC22			12.3
HVAC23			12.1
HVAC24			11.9
HVAC25			13.8
HVAC26			13.7
HVAC27			13.6
HVAC28			13.5
HVAC29			23.5
HVAC30			23.6
HVAC31			22.6
HVAC32			22.7
HVAC33			21.3
HVAC34			21.2
HVAC35			21.3
HVAC36			21.3
HVAC37			20.0

HVAC38			20.1
HVAC39			20.8
HVAC40			21.2
HVAC41			22.2
HVAC42			24.9
HVAC43			22.1
HVAC44			21.5
HVAC45			20.9
HVAC46			20.7
HVAC47			20.5
HVAC48			20.1
HVAC49			20.0
HVAC50			19.9
HVAC51			19.8
HVAC52			21.3
HVAC53			21.2
HVAC54			21.1
HVAC55			22.6
HVAC56			22.4
10	1.Fl	35.1	
HVAC1			15.1
HVAC2			15.1
HVAC3			15.1
HVAC4			15.1
HVAC5			14.0
HVAC6			14.1
HVAC7			14.2
HVAC8			14.3
HVAC9			14.4
HVAC10			13.7
HVAC11			14.6
HVAC12			14.8
HVAC13			14.8
HVAC14			14.6
HVAC15			13.7
HVAC16			13.9
HVAC17			14.1
HVAC18			14.0
HVAC19			13.6
HVAC20			13.3
HVAC21			13.3
HVAC22			14.4
HVAC23			14.3
HVAC24			14.3
HVAC25			14.3
HVAC26			14.4
HVAC27			14.3
HVAC28			14.3
HVAC29			18.2
HVAC30			18.3
HVAC31			18.6
HVAC32			18.7
HVAC33			18.8
HVAC34			18.9
HVAC35			19.5
HVAC36			19.6
HVAC37			18.3
HVAC38			19.1
HVAC39			20.1
HVAC40			21.2
HVAC41			23.2
HVAC42			21.6
HVAC43			21.4
HVAC44			20.2
HVAC45			18.7
HVAC46			18.5
HVAC47			18.2
HVAC48			18.2
HVAC49			18.1
HVAC50			18.0
HVAC51			17.9

HVAC52			19.4
HVAC53			19.3
HVAC54			18.6
HVAC55			18.6
HVAC56			18.3
11	1.Fl	37.4	
HVAC1			14.5
HVAC2			14.6
HVAC3			14.6
HVAC4			14.6
HVAC5			14.7
HVAC6			14.7
HVAC7			14.8
HVAC8			14.9
HVAC9			14.9
HVAC10			15.0
HVAC11			13.7
HVAC12			17.3
HVAC13			17.0
HVAC14			16.6
HVAC15			14.5
HVAC16			14.8
HVAC17			15.2
HVAC18			13.6
HVAC19			15.0
HVAC20			14.9
HVAC21			14.9
HVAC22			14.8
HVAC23			14.7
HVAC24			14.7
HVAC25			14.6
HVAC26			14.6
HVAC27			14.6
HVAC28			14.5
HVAC29			20.3
HVAC30			20.4
HVAC31			20.4
HVAC32			20.6
HVAC33			20.9
HVAC34			21.9
HVAC35			22.4
HVAC36			23.0
HVAC37			23.5
HVAC38			24.0
HVAC39			24.3
HVAC40			22.3
HVAC41			23.8
HVAC42			25.9
HVAC43			24.6
HVAC44			24.1
HVAC45			23.0
HVAC46			22.6
HVAC47			21.6
HVAC48			21.4
HVAC49			21.0
HVAC50			20.5
HVAC51			20.3
HVAC52			19.6
HVAC53			19.1
HVAC54			19.1
HVAC55			18.9
HVAC56			18.8
12	1.Fl	38.8	
HVAC1			18.8
HVAC2			18.8
HVAC3			17.4
HVAC4			17.6
HVAC5			17.8
HVAC6			18.0
HVAC7			18.2
HVAC8			17.2

HVAC9			17.5
HVAC10			17.6
HVAC11			18.0
HVAC12			17.8
HVAC13			18.0
HVAC14			18.2
HVAC15			15.3
HVAC16			16.2
HVAC17			13.4
HVAC18			13.3
HVAC19			18.8
HVAC20			18.7
HVAC21			18.5
HVAC22			18.4
HVAC23			19.2
HVAC24			19.1
HVAC25			19.0
HVAC26			18.9
HVAC27			18.8
HVAC28			18.7
HVAC29			21.5
HVAC30			21.7
HVAC31			22.2
HVAC32			22.3
HVAC33			22.6
HVAC34			23.7
HVAC35			22.1
HVAC36			22.2
HVAC37			22.5
HVAC38			22.3
HVAC39			24.0
HVAC40			24.6
HVAC41			25.0
HVAC42			25.1
HVAC43			24.1
HVAC44			23.4
HVAC45			23.5
HVAC46			23.6
HVAC47			23.1
HVAC48			22.8
HVAC49			22.6
HVAC50			22.9
HVAC51			24.1
HVAC52			22.9
HVAC53			23.0
HVAC54			22.9
HVAC55			22.8
HVAC56			22.7
13	1.Fl	38.0	
HVAC1			18.1
HVAC2			18.2
HVAC3			19.1
HVAC4			19.0
HVAC5			19.0
HVAC6			18.9
HVAC7			19.0
HVAC8			17.7
HVAC9			17.8
HVAC10			18.0
HVAC11			18.2
HVAC12			18.3
HVAC13			17.4
HVAC14			17.9
HVAC15			12.5
HVAC16			18.1
HVAC17			18.3
HVAC18			18.1
HVAC19			17.8
HVAC20			19.0
HVAC21			18.8
HVAC22			18.7

HVAC23			18.7
HVAC24			18.7
HVAC25			18.3
HVAC26			18.2
HVAC27			20.0
HVAC28			20.0
HVAC29			21.0
HVAC30			20.7
HVAC31			20.7
HVAC32			21.2
HVAC33			21.2
HVAC34			21.4
HVAC35			21.7
HVAC36			21.8
HVAC37			21.9
HVAC38			22.0
HVAC39			22.4
HVAC40			23.0
HVAC41			22.5
HVAC42			22.0
HVAC43			22.7
HVAC44			23.1
HVAC45			23.2
HVAC46			22.4
HVAC47			22.0
HVAC48			21.7
HVAC49			21.5
HVAC50			21.4
HVAC51			21.3
HVAC52			22.1
HVAC53			21.2
HVAC54			21.5
HVAC55			21.8
HVAC56			21.6
14	1.Fl	36.6	
HVAC1			18.1
HVAC2			18.1
HVAC3			18.2
HVAC4			18.2
HVAC5			18.3
HVAC6			18.2
HVAC7			18.3
HVAC8			18.4
HVAC9			18.4
HVAC10			18.7
HVAC11			17.8
HVAC12			17.7
HVAC13			17.5
HVAC14			16.6
HVAC15			17.5
HVAC16			17.2
HVAC17			17.2
HVAC18			18.4
HVAC19			18.6
HVAC20			18.6
HVAC21			17.9
HVAC22			17.9
HVAC23			17.9
HVAC24			17.9
HVAC25			17.8
HVAC26			17.8
HVAC27			17.7
HVAC28			19.3
HVAC29			17.6
HVAC30			18.1
HVAC31			18.9
HVAC32			19.3
HVAC33			19.2
HVAC34			19.5
HVAC35			20.3
HVAC36			20.4

HVAC37			20.5
HVAC38			20.6
HVAC39			20.8
HVAC40			21.1
HVAC41			20.7
HVAC42			20.3
HVAC43			20.8
HVAC44			21.1
HVAC45			21.1
HVAC46			20.8
HVAC47			20.7
HVAC48			20.6
HVAC49			20.5
HVAC50			19.8
HVAC51			19.3
HVAC52			20.2
HVAC53			19.3
HVAC54			19.0
HVAC55			18.5
HVAC56			19.1
15	1.Fl	40.8	
HVAC1			16.7
HVAC2			17.0
HVAC3			17.4
HVAC4			17.6
HVAC5			18.1
HVAC6			16.7
HVAC7			17.1
HVAC8			17.5
HVAC9			18.8
HVAC10			19.2
HVAC11			19.7
HVAC12			18.9
HVAC13			19.7
HVAC14			20.3
HVAC15			12.6
HVAC16			20.8
HVAC17			20.1
HVAC18			19.7
HVAC19			18.3
HVAC20			17.9
HVAC21			17.4
HVAC22			18.8
HVAC23			18.3
HVAC24			18.0
HVAC25			17.6
HVAC26			18.4
HVAC27			18.1
HVAC28			18.2
HVAC29			20.9
HVAC30			20.6
HVAC31			21.5
HVAC32			22.1
HVAC33			23.6
HVAC34			25.4
HVAC35			26.1
HVAC36			26.0
HVAC37			26.3
HVAC38			25.9
HVAC39			26.3
HVAC40			26.9
HVAC41			28.2
HVAC42			28.9
HVAC43			29.3
HVAC44			28.9
HVAC45			27.1
HVAC46			26.3
HVAC47			25.9
HVAC48			25.9
HVAC49			25.4
HVAC50			24.8

HVAC51			24.6
HVAC52			21.7
HVAC53			21.3
HVAC54			21.7
HVAC55			21.4
HVAC56			21.1
16	1.Fl	43.2	
HVAC1			23.7
HVAC2			23.8
HVAC3			23.8
HVAC4			23.9
HVAC5			24.0
HVAC6			24.1
HVAC7			24.1
HVAC8			24.2
HVAC9			24.3
HVAC10			24.4
HVAC11			23.8
HVAC12			23.9
HVAC13			23.1
HVAC14			24.3
HVAC15			22.2
HVAC16			23.0
HVAC17			24.5
HVAC18			24.5
HVAC19			25.0
HVAC20			24.9
HVAC21			24.8
HVAC22			24.7
HVAC23			24.7
HVAC24			24.6
HVAC25			24.5
HVAC26			24.4
HVAC27			24.4
HVAC28			25.9
HVAC29			22.3
HVAC30			23.0
HVAC31			24.3
HVAC32			25.2
HVAC33			26.3
HVAC34			27.6
HVAC35			26.9
HVAC36			27.8
HVAC37			28.2
HVAC38			28.3
HVAC39			28.3
HVAC40			28.3
HVAC41			28.4
HVAC42			28.5
HVAC43			27.6
HVAC44			27.6
HVAC45			27.6
HVAC46			27.6
HVAC47			27.5
HVAC48			27.5
HVAC49			26.9
HVAC50			27.8
HVAC51			26.5
HVAC52			25.8
HVAC53			24.9
HVAC54			24.2
HVAC55			23.2
HVAC56			22.6
17	1.Fl	43.0	
HVAC1			25.8
HVAC2			25.8
HVAC3			25.8
HVAC4			25.9
HVAC5			25.9
HVAC6			25.9
HVAC7			26.0

HVAC8			26.0
HVAC9			26.0
HVAC10			26.0
HVAC11			26.0
HVAC12			26.0
HVAC13			26.0
HVAC14			26.1
HVAC15			26.1
HVAC16			26.1
HVAC17			26.1
HVAC18			26.1
HVAC19			26.1
HVAC20			26.2
HVAC21			26.2
HVAC22			26.2
HVAC23			26.2
HVAC24			26.2
HVAC25			26.2
HVAC26			26.2
HVAC27			26.2
HVAC28			26.2
HVAC29			20.0
HVAC30			21.7
HVAC31			22.7
HVAC32			23.6
HVAC33			24.9
HVAC34			25.8
HVAC35			25.3
HVAC36			25.4
HVAC37			25.5
HVAC38			25.6
HVAC39			25.8
HVAC40			25.8
HVAC41			25.8
HVAC42			25.8
HVAC43			25.8
HVAC44			25.8
HVAC45			25.9
HVAC46			25.8
HVAC47			25.7
HVAC48			25.7
HVAC49			26.8
HVAC50			25.7
HVAC51			24.7
HVAC52			24.1
HVAC53			23.2
HVAC54			22.6
HVAC55			21.7
HVAC56			21.4
18	1.Fl	44.1	
HVAC1			30.6
HVAC2			30.3
HVAC3			30.5
HVAC4			30.2
HVAC5			30.2
HVAC6			30.0
HVAC7			30.4
HVAC8			30.3
HVAC9			30.0
HVAC10			29.9
HVAC11			29.7
HVAC12			29.6
HVAC13			29.4
HVAC14			29.3
HVAC15			29.8
HVAC16			28.7
HVAC17			28.9
HVAC18			29.0
HVAC19			29.1
HVAC20			29.3
HVAC21			29.4

HVAC22	29.5
HVAC23	29.7
HVAC24	28.9
HVAC25	29.0
HVAC26	29.0
HVAC27	29.2
HVAC28	23.9
HVAC29	9.3
HVAC30	9.6
HVAC31	11.2
HVAC32	11.5
HVAC33	11.9
HVAC34	12.2
HVAC35	12.6
HVAC36	14.4
HVAC37	14.7
HVAC38	15.0
HVAC39	15.4
HVAC40	15.8
HVAC41	16.5
HVAC42	16.7
HVAC43	15.2
HVAC44	14.9
HVAC45	14.6
HVAC46	14.4
HVAC47	14.1
HVAC48	12.5
HVAC49	12.3
HVAC50	12.1
HVAC51	11.8
HVAC52	11.6
HVAC53	11.3
HVAC54	11.2
HVAC55	9.6
HVAC56	9.3

APPENDIX J

Local Transportation Analysis

TECHNICAL APPENDICES - LTA

SANTA FE FLORES PROJECT

San Marcos, California
July 27, 2022

LLG Ref. 3-22-3523

Linscott, Law & Greenspan, Engineers
4542 Ruffner Street
Suite 100
San Diego, CA 92111
858.300.8800 T
858.300.8810 F
www.llgengineers.com

APPENDICES

APPENDIX

A. Intersection and Segment Manual Count Sheets
B. City of San Marcos Roadway Classification Table
C. Analysis Worksheets – Existing
D. K&D Factors Definitions
E. Travel Route Maps
F. Analysis Worksheets – Near-Term
G. Analysis Worksheets – Near-Term + Project
H. Analysis Worksheets – Long-Term
I. Analysis Worksheets – Long- Term + Project
J. Sight Distance Exhibit

APPENDIX A

INTERSECTION AND SEGMENT MANUAL COUNT SHEETS

Intersection Turning Movement - Peak Hour Vehicle Count

LINSCOTT LAW & GREENSPAN engineers

Location:	#01	File Name:	ITM-22-009-01
Intersection:	South Santa Fe Avenue & Smilax Road	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	South Santa Fe Avenue Southbound			Smilax Road Westbound			South Santa Fe Avenue Northbound			Smilax Road Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
7:00	0	89	31	0	0	1	33	42	1	21	0	33	251
7:15	0	98	47	0	0	0	50	45	2	17	0	46	305
7:30	1	90	38	0	0	0	59	77	0	23	0	48	336
7:45	0	124	70	0	0	0	69	74	2	18	0	34	391
8:00	0	83	55	0	0	0	60	76	0	23	0	23	320
8:15	0	101	52	0	0	0	51	56	0	27	0	42	329
8:30	1	96	46	0	0	0	35	77	0	19	0	28	302
8:45	0	82	35	0	0	0	18	93	0	15	0	16	259
Total	2	763	374	0	0	1	375	540	5	163	0	270	2493
Approach%	0.2	67.0	32.8	-	-	100.0	40.8	58.7	0.5	37.6	-	62.4	
Total%	0.1	30.6	15.0	-	-	0.0	15.0	21.7	0.2	6.5	-	10.8	

AM Intersection Peak Hour: **07:30 to 08:30**

Volume	1	398	215	-	-	-	239	283	2	91	-	147	1,376
Approach%	0.2	64.8	35.0	-	-	-	45.6	54.0	0.4	38.2	-	61.8	
Total%	0.1	28.9	15.6	-	-	-	17.4	20.6	0.1	6.6	-	10.7	
PHF			0.79			#DIV/0!			0.90			0.84	0.88

PM	South Santa Fe Avenue Southbound			Smilax Road Westbound			South Santa Fe Avenue Northbound			Smilax Road Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
16:00	0	147	39	0	0	1	40	122	0	15	0	51	415
16:15	0	153	28	0	0	0	22	130	0	21	0	57	411
16:30	0	170	42	0	0	0	26	140	0	31	0	60	469
16:45	10	157	39	0	0	0	41	130	0	19	0	57	453
17:00	0	159	38	0	0	3	35	150	0	23	0	56	464
17:15	0	155	37	0	0	0	41	105	1	30	0	52	421
17:30	0	143	32	0	0	0	26	129	0	24	0	68	422
17:45	0	105	37	0	0	0	41	141	0	25	0	54	403
Total	10	1189	292	0	0	4	272	1047	1	188	0	455	3458
Approach%	0.7	79.7	19.6	-	-	100.0	20.6	79.3	0.1	29.2	-	70.8	
Total%	0.3	34.4	8.4	-	-	0.1	7.9	30.3	0.0	5.4	-	13.2	

PM Intersection Peak Hour: **16:30 to 17:30**

Volume	10	641	156	-	-	3	143	525	1	103	-	225	1,807
Approach%	1.2	79.4	19.3	-	-	100.0	21.4	78.5	0.1	31.4	-	68.6	
Total%	0.6	35.5	8.6	-	-	0.2	7.9	29.1	0.1	5.7	-	12.5	
PHF			0.95			0.25			0.90			0.90	0.96

Intersection Turning Movement - Bicycle & Pedestrian Count

LINSCOTT LAW & GREENSPAN engineers

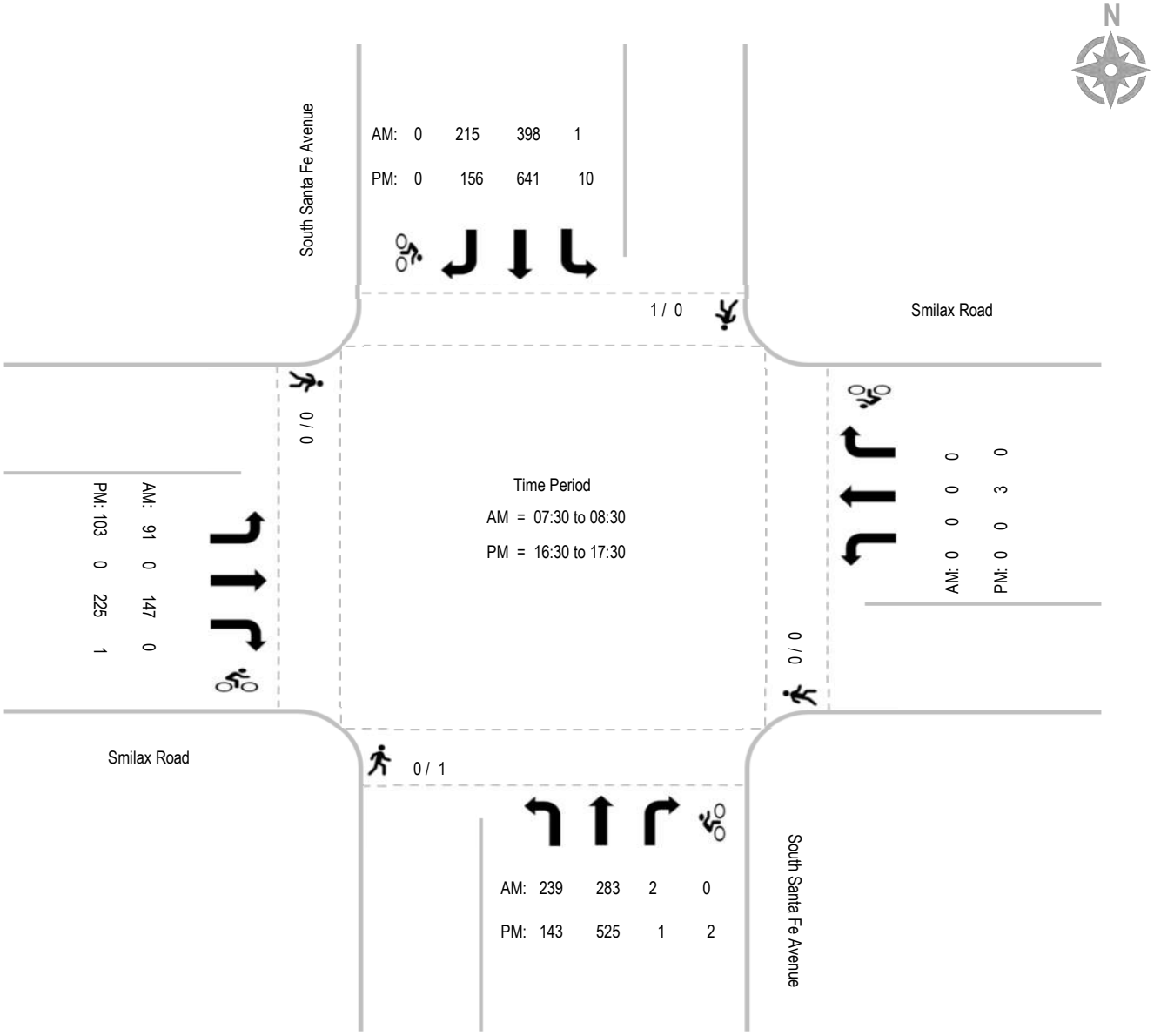
Location:	#01	File Name:	ITM-22-009-01
Intersection:	South Santa Fe Avenue & Smilax Road	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	South Santa Fe Avenue **Southbound**				Smilax Road **Westbound**				South Santa Fe Avenue **Northbound**				Smilax Road **Eastbound**				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Total	1				0				0				0				1	
Bike Total		0	0	0		0	0	0		0	0	0		0	0	0		0

PM	South Santa Fe Avenue **Southbound**				Smilax Road **Westbound**				South Santa Fe Avenue **Northbound**				Smilax Road **Eastbound**				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
17:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Total	0				0				1				0				1	
Bike Total		0	0	0		0	0	0		0	2	0		1	0	0		3

Intersection Turning Movement - Peak Hour Summary

LINSCOTT LAW & GREENSPAN engineers	Location:	#01	File Name: ITM-22-009-01
	Intersection:	South Santa Fe Avenue & Smilax Road	Project: LLG Ref. 3-22-3523
	Date of Count:	Thursday, February 17, 2022	Santa Fe Las Flores



Intersection Turning Movement - Peak Hour Vehicle Count

LINSCOTT LAW & GREENSPAN engineers

Location:	#02	File Name:	ITM-22-009-02
Intersection:	South Santa Fe Avenue & Bosstick Boulevard	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	Santa Santa Fe Avenue Southbound			Bosstick Boulevard Westbound			Santa Santa Fe Avenue Northbound			Bosstick Boulevard Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
7:00	23	96	1	6	0	2	2	72	28	1	2	9	242
7:15	22	127	1	13	0	6	6	91	16	2	0	3	287
7:30	16	113	3	23	0	13	2	120	19	2	0	9	320
7:45	23	127	1	21	0	11	4	151	20	0	0	6	364
8:00	17	99	1	12	0	5	9	131	31	6	0	4	315
8:15	15	120	2	11	0	3	6	93	21	2	0	6	279
8:30	4	125	1	16	0	2	4	107	19	0	0	4	282
8:45	8	90	2	5	0	6	3	100	15	4	0	6	239
Total	128	897	12	107	0	48	36	865	169	17	2	47	2328
Approach%	12.3	86.5	1.2	69.0	-	31.0	3.4	80.8	15.8	25.8	3.0	71.2	
Total%	5.5	38.5	0.5	4.6	-	2.1	1.5	37.2	7.3	0.7	0.1	2.0	

AM Intersection Peak Hour: **07:15 to 08:15**

Volume	78	466	6	69	-	35	21	493	86	10	-	22	1,286
Approach%	14.2	84.7	1.1	66.3	-	33.7	3.5	82.2	14.3	31.3	-	68.8	
Total%	6.1	36.2	0.5	5.4	-	2.7	1.6	38.3	6.7	0.8	-	1.7	
PHF			0.91			0.72			0.86			0.73	0.88

PM	Santa Santa Fe Avenue Southbound			Bosstick Boulevard Westbound			Santa Santa Fe Avenue Northbound			Bosstick Boulevard Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
16:00	6	190	4	26	0	12	19	150	12	1	0	4	424
16:15	4	219	2	27	0	18	8	139	7	1	0	4	429
16:30	4	226	2	24	0	30	10	139	9	2	0	2	448
16:45	2	224	2	11	1	17	11	167	9	3	0	4	451
17:00	4	208	5	31	0	17	10	177	13	1	0	1	467
17:15	6	196	4	16	1	11	13	138	8	1	0	3	397
17:30	6	207	4	18	0	14	7	141	10	5	0	1	413
17:45	1	155	1	11	0	11	6	158	9	2	0	2	356
Total	33	1625	24	164	2	130	84	1209	77	16	0	21	3385
Approach%	2.0	96.6	1.4	55.4	0.7	43.9	6.1	88.2	5.6	43.2	-	56.8	
Total%	1.0	48.0	0.7	4.8	0.1	3.8	2.5	35.7	2.3	0.5	-	0.6	

PM Intersection Peak Hour: **16:15 to 17:15**

Volume	14	877	11	93	1	82	39	622	38	7	-	11	1,795
Approach%	1.6	97.2	1.2	52.8	0.6	46.6	5.6	89.0	5.4	38.9	-	61.1	
Total%	0.8	48.9	0.6	5.2	0.1	4.6	2.2	34.7	2.1	0.4	-	0.6	
PHF			0.97			0.81			0.87			0.64	0.96

Intersection Turning Movement - Bicycle & Pedestrian Count

LINSCOTT LAW & GREENSPAN engineers

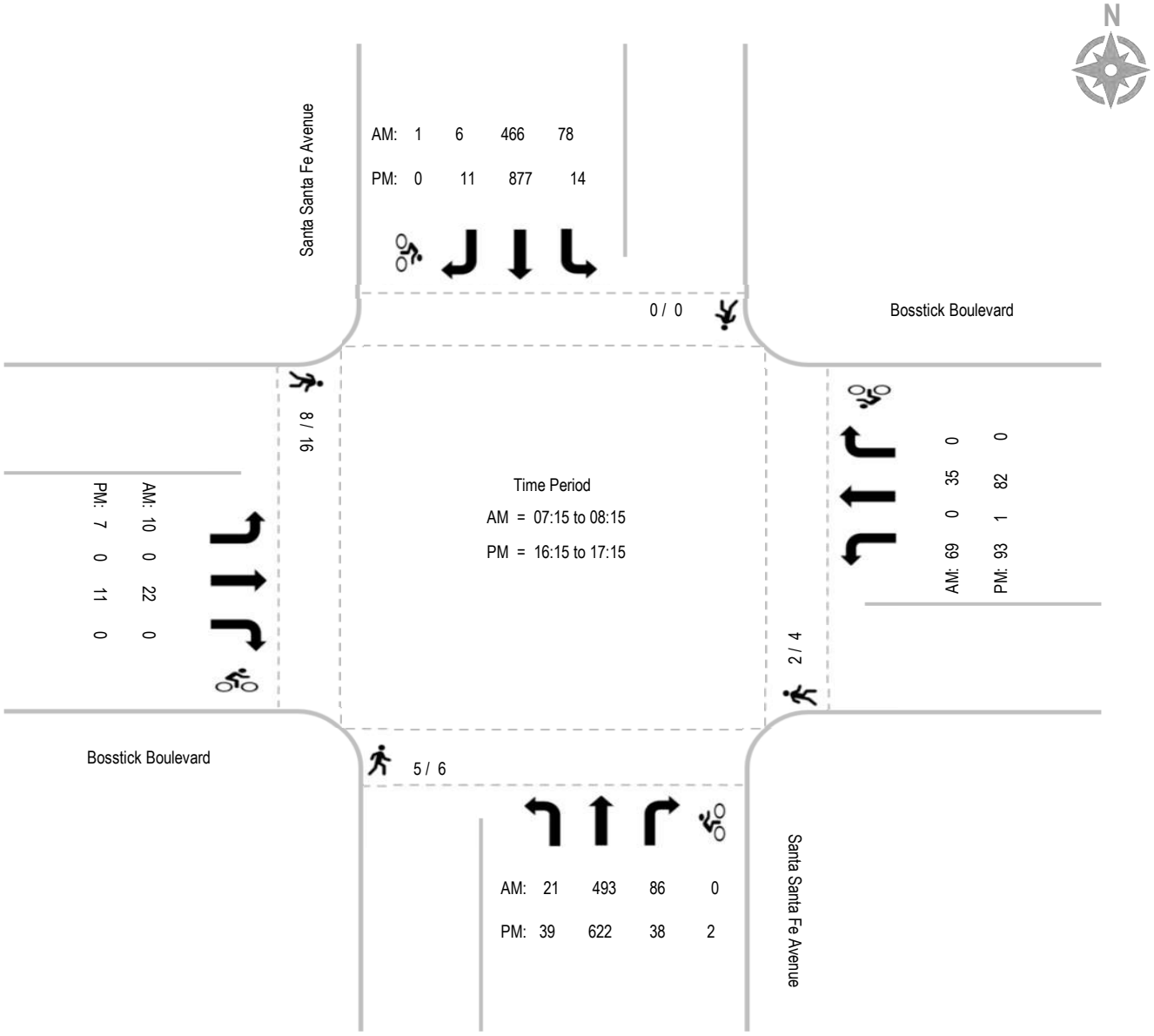
Location:	#02	File Name:	ITM-22-009-02
Intersection:	South Santa Fe Avenue & Bosstick Boulevard	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	Santa Santa Fe Avenue Southbound				Bosstick Boulevard Westbound				Santa Santa Fe Avenue Northbound				Bosstick Boulevard Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	0
7:15	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	3	1
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	1	0	0	0	3	0	0	0	3	0	0	0	7	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Total	0				2				5				8				15	
Bike Total		0	1	0		0	0	0		0	0	0		0	0	0		1

PM	Santa Santa Fe Avenue Southbound				Bosstick Boulevard Westbound				Santa Santa Fe Avenue Northbound				Bosstick Boulevard Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
16:00	0	0	0	0	0	0	0	0	1	0	1	0	3	0	0	0	4	1
16:15	0	0	0	0	1	0	0	0	2	0	0	0	8	0	0	0	11	0
16:30	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	3	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	3	0
17:15	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	2	1
17:30	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2	0
17:45	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Ped Total	0				4				6				16				26	
Bike Total		0	0	0		0	0	0		0	2	0		0	0	0		2

Intersection Turning Movement - Peak Hour Summary

LINSCOTT LAW & GREENSPAN engineers	Location: #02	File Name:	ITM-22-009-02
	Intersection: South Santa Fe Avenue & Bosstick Boulevard	Project:	LLG Ref. 3-22-3523
	Date of Count: Thursday, February 17, 2022		Santa Fe Las Flores



Intersection Turning Movement - Peak Hour Vehicle Count

LINSCOTT LAW & GREENSPAN engineers

Location:	#03	File Name:	ITM-22-009-08
Intersection:	South Santa Fe Avenue & Smilax Road	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	South Santa Fe Avenue Southbound			- Westbound			South Santa Fe Avenue Northbound			Vern Road Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
7:00	0	126	3	0	0	0	2	120	0	2	0	0	253
7:15	0	138	2	0	0	0	2	99	0	0	0	4	245
7:30	0	194	1	0	0	0	3	140	0	4	0	2	344
7:45	0	168	1	0	0	0	2	142	0	1	0	2	316
8:00	0	145	3	0	0	0	3	181	0	1	0	3	336
8:15	0	155	1	0	0	0	2	138	0	3	0	0	299
8:30	0	150	1	0	0	0	3	128	0	2	0	1	285
8:45	0	113	2	0	0	0	3	81	0	1	0	0	200
Total	0	1189	14	0	0	0	20	1029	0	14	0	12	2278
Approach%	-	98.8	1.2	-	-	-	1.9	98.1	-	53.8	-	46.2	
Total%	-	52.2	0.6	-	-	-	0.9	45.2	-	0.6	-	0.5	

AM Intersection Peak Hour: **07:30 to 08:30**

Volume	-	662	6	-	-	-	10	601	-	9	-	7	1,295
Approach%	-	99.1	0.9	-	-	-	1.6	98.4	-	56.3	-	43.8	
Total%	-	51.1	0.5	-	-	-	0.8	46.4	-	0.7	-	0.5	
PHF			0.86			#DIV/0!			0.83			0.67	0.94

PM	South Santa Fe Avenue Southbound			- Westbound			South Santa Fe Avenue Northbound			Vern Road Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
16:00	0	296	0	0	0	0	8	173	0	1	0	2	480
16:15	0	297	1	0	0	0	3	172	0	0	0	1	474
16:30	0	254	0	0	0	0	3	167	0	0	0	1	425
16:45	0	248	2	0	0	0	6	156	0	1	0	1	414
17:00	0	264	0	0	0	0	17	174	0	3	0	1	459
17:15	0	269	2	0	0	0	6	202	0	0	0	1	480
17:30	0	253	2	0	0	0	8	188	0	2	0	1	454
17:45	0	226	0	0	0	0	3	159	0	0	0	1	389
Total	0	2107	7	0	0	0	54	1391	0	7	0	9	3575
Approach%	-	99.7	0.3	-	-	-	3.7	96.3	-	43.8	-	56.3	
Total%	-	58.9	0.2	-	-	-	1.5	38.9	-	0.2	-	0.3	

PM Intersection Peak Hour: **16:45 to 17:45**

Volume	-	1,034	6	-	-	-	37	720	-	6	-	4	1,807
Approach%	-	99.4	0.6	-	-	-	4.9	95.1	-	60.0	-	40.0	
Total%	-	57.2	0.3	-	-	-	2.0	39.8	-	0.3	-	0.2	
PHF			0.96			#DIV/0!			0.91			0.63	0.94

Intersection Turning Movement - Bicycle & Pedestrian Count

LINSCOTT LAW & GREENSPAN engineers

Location:	#03	File Name:	ITM-22-009-08
Intersection:	South Santa Fe Avenue & Smilax Road	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

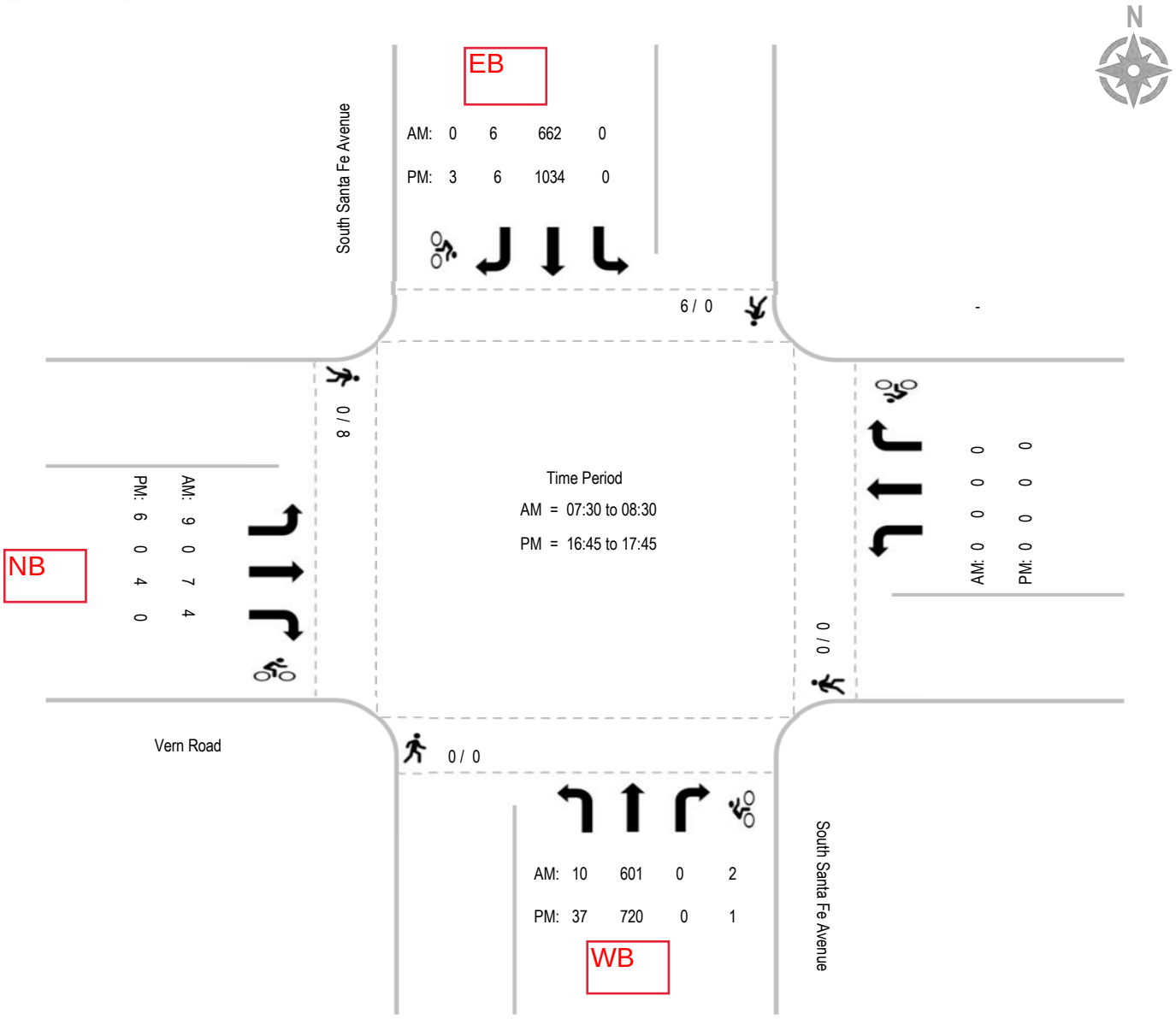
AM	South Santa Fe Avenue Southbound				- Westbound				South Santa Fe Avenue Northbound				Vern Road Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
7:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
8:00	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
8:15	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
8:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
8:45	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Ped Total	6				0				0				0				6	
Bike Total		0	0	0		0	0	0		0	2	0		4	0	0		6

PM	South Santa Fe Avenue Southbound				- Westbound				South Santa Fe Avenue Northbound				Vern Road Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
16:00	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
16:30	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
16:45	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
17:00	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0
17:15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
17:30	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	2	1
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Total	0				0				0				8				8	
Bike Total		0	3	0		0	0	0		0	1	0		0	0	0		4

Intersection Turning Movement - Peak Hour Summary

LINSCOTT LAW & GREENSPAN engineers

Location:	#03	File Name:	ITM-22-009-08
Intersection:	South Santa Fe Avenue & Smilax Road	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores



Intersection Turning Movement - Peak Hour Vehicle Count

LINSCOTT LAW & GREENSPAN engineers

Location:	#04	File Name:	ITM-22-009-03
Intersection:	South Santa Fe Avenue & Las Flores Drive	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	Santa Santa Fe Avenue Southbound			Las Flores Drive Westbound			Santa Santa Fe Avenue Northbound			Las Flores Drive Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
7:00	7	95	5	26	0	6	0	102	9	6	0	4	260
7:15	5	127	9	29	1	7	13	104	10	7	1	5	318
7:30	12	129	5	43	2	6	10	118	5	9	0	9	348
7:45	8	149	8	33	6	16	14	125	6	15	0	8	388
8:00	10	106	5	22	2	9	7	147	13	9	1	7	338
8:15	11	112	10	22	5	20	4	105	13	8	1	6	317
8:30	15	119	15	15	0	13	3	124	13	9	0	6	332
8:45	9	93	6	11	0	6	4	103	14	6	0	4	256
Total	77	930	63	201	16	83	55	928	83	69	3	49	2557
Approach%	7.2	86.9	5.9	67.0	5.3	27.7	5.2	87.1	7.8	57.0	2.5	40.5	
Total%	3.0	36.4	2.5	7.9	0.6	3.2	2.2	36.3	3.2	2.7	0.1	1.9	

AM Intersection Peak Hour: **07:15 to 08:15**

Volume	35	511	27	127	11	38	44	494	34	40	2	29	1,392
Approach%	6.1	89.2	4.7	72.2	6.3	21.6	7.7	86.4	5.9	56.3	2.8	40.8	
Total%	2.5	36.7	1.9	9.1	0.8	2.7	3.2	35.5	2.4	2.9	0.1	2.1	
PHF			0.87			0.80			0.86			0.77	0.90

PM	Santa Santa Fe Avenue Southbound			Las Flores Drive Westbound			Santa Santa Fe Avenue Northbound			Las Flores Drive Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
16:00	15	206	20	17	1	9	9	154	24	7	1	4	467
16:15	18	218	14	13	1	4	9	148	12	10	0	3	450
16:30	10	246	19	9	0	6	9	141	13	7	0	10	470
16:45	13	202	19	18	1	9	10	156	22	11	1	2	464
17:00	13	212	19	13	0	15	7	146	32	12	0	5	474
17:15	12	210	15	9	0	8	5	137	20	15	0	3	434
17:30	17	16	22	24	2	7	7	136	19	9	0	4	263
17:45	16	164	22	13	1	2	4	149	25	11	0	4	411
Total	114	1474	150	116	6	60	60	1167	167	82	2	35	3433
Approach%	6.6	84.8	8.6	63.7	3.3	33.0	4.3	83.7	12.0	68.9	1.7	29.4	
Total%	3.3	42.9	4.4	3.4	0.2	1.7	1.7	34.0	4.9	2.4	0.1	1.0	

PM Intersection Peak Hour: **16:15 to 17:15**

Volume	54	878	71	53	2	34	35	591	79	40	1	20	1,858
Approach%	5.4	87.5	7.1	59.6	2.2	38.2	5.0	83.8	11.2	65.6	1.6	32.8	
Total%	2.9	47.3	3.8	2.9	0.1	1.8	1.9	31.8	4.3	2.2	0.1	1.1	
PHF			0.91			0.79			0.94			0.90	0.98

Intersection Turning Movement - Bicycle & Pedestrian Count

LINSCOTT LAW & GREENSPAN engineers

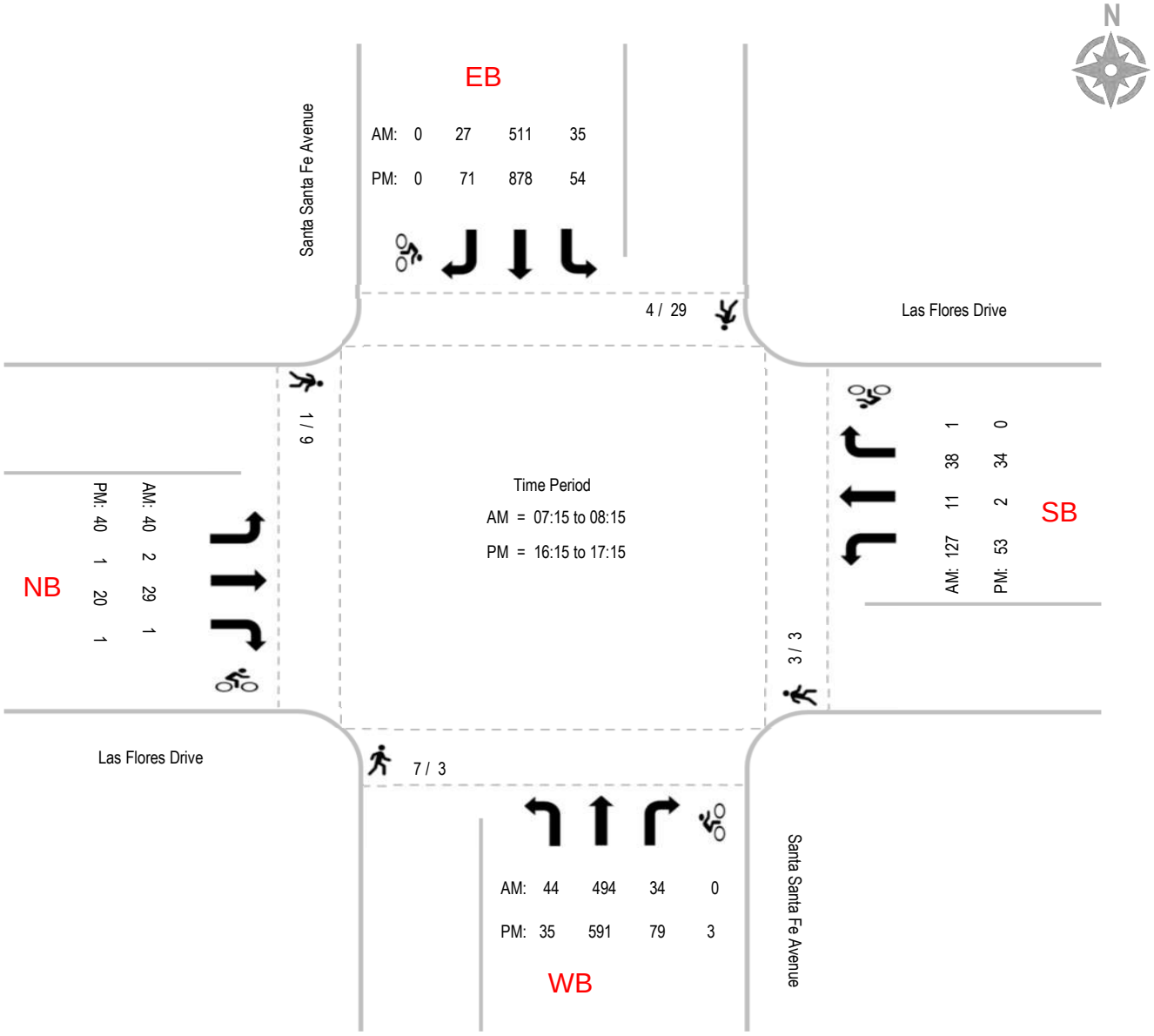
Location:	#04	File Name:	ITM-22-009-03
Intersection:	South Santa Fe Avenue & Las Flores Drive	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	Santa Santa Fe Avenue Southbound				Las Flores Drive Westbound				Santa Santa Fe Avenue Northbound				Las Flores Drive Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
7:15	1	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	3	1
7:30	2	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	4	1
7:45	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	0
8:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0
8:45	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0
Ped Total	4				3				7				1				15	
Bike Total		0	0	0		1	0	0		0	0	0		1	0	0		2

PM	Santa Santa Fe Avenue Southbound				Las Flores Drive Westbound				Santa Santa Fe Avenue Northbound				Las Flores Drive Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
16:00	2	0	0	0	0	0	0	0	1	0	1	0	2	0	0	0	5	1
16:15	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	1
16:30	1	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	6	0
16:45	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0
17:00	3	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	5	0
17:15	2	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	3	1
17:30	5	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	7	1
17:45	11	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	12	0
Ped Total	29				3				3				9				44	
Bike Total		0	0	0		0	0	0		0	3	0		1	0	0		4

Intersection Turning Movement - Peak Hour Summary

LINSCOTT LAW & GREENSPAN engineers	Location:	#04	File Name: ITM-22-009-03
	Intersection:	South Santa Fe Avenue & Las Flores Drive	Project: LLG Ref. 3-22-3523
	Date of Count:	Thursday, February 17, 2022	Santa Fe Las Flores



Intersection Turning Movement - Peak Hour Vehicle Count

LINSCOTT LAW & GREENSPAN engineers

Location:	#05	File Name:	ITM-22-009-04
Intersection:	Hollencrest Road & Las Flores Drive	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	- Southbound			Las Flores Drive Westbound			Hollencrest Road Northbound			Las Flores Drive Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
7:00	0	0	0	3	4	0	3	0	2	0	8	1	21
7:15	0	0	0	1	15	0	1	0	2	0	11	1	31
7:30	0	0	0	3	15	0	1	0	6	0	14	1	40
7:45	0	0	0	2	16	0	1	0	12	0	13	0	44
8:00	0	0	0	0	14	0	0	0	4	0	9	2	29
8:15	0	0	0	7	16	0	5	0	3	0	15	1	47
8:30	0	0	0	1	12	0	1	0	3	0	4	1	22
8:45	0	0	0	0	10	0	0	0	4	0	5	1	20
Total	0	0	0	17	102	0	12	0	36	0	79	8	254
Approach%	-	-	-	14.3	85.7	-	25.0	-	75.0	-	90.8	9.2	
Total%	-	-	-	6.7	40.2	-	4.7	-	14.2	-	31.1	3.1	

AM Intersection Peak Hour: **07:30 to 08:30**

Volume	-	-	-	12	61	-	7	-	25	-	51	4	160
Approach%	-	-	-	16.4	83.6	-	21.9	-	78.1	-	92.7	7.3	
Total%	-	-	-	7.5	38.1	-	4.4	-	15.6	-	31.9	2.5	
PHF			#DIV/0!			0.79			0.62			0.86	0.85

PM	- Southbound			Las Flores Drive Westbound			Hollencrest Road Northbound			Las Flores Drive Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
16:00	0	0	0	6	23	0	2	0	5	0	7	4	47
16:15	0	0	0	5	13	0	2	0	6	2	8	1	37
16:30	0	0	0	5	20	0	0	0	3	1	9	0	38
16:45	0	0	0	10	22	0	1	0	4	0	12	2	51
17:00	0	0	0	9	17	0	0	0	3	0	16	2	47
17:15	0	0	0	6	15	0	0	0	3	0	16	0	40
17:30	0	0	0	6	23	0	2	0	1	0	10	1	43
17:45	0	0	0	10	15	0	0	0	1	0	12	0	38
Total	0	0	0	57	148	0	7	0	26	3	90	10	341
Approach%	-	-	-	27.8	72.2	-	21.2	-	78.8	2.9	87.4	9.7	
Total%	-	-	-	16.7	43.4	-	2.1	-	7.6	0.9	26.4	2.9	

PM Intersection Peak Hour: **16:45 to 17:45**

Volume	-	-	-	31	77	-	3	-	11	-	54	5	181
Approach%	-	-	-	28.7	71.3	-	21.4	-	78.6	-	91.5	8.5	
Total%	-	-	-	17.1	42.5	-	1.7	-	6.1	-	29.8	2.8	
PHF			#DIV/0!			0.84			0.70			0.82	0.89

Intersection Turning Movement - Bicycle & Pedestrian Count

LINSCOTT LAW & GREENSPAN engineers

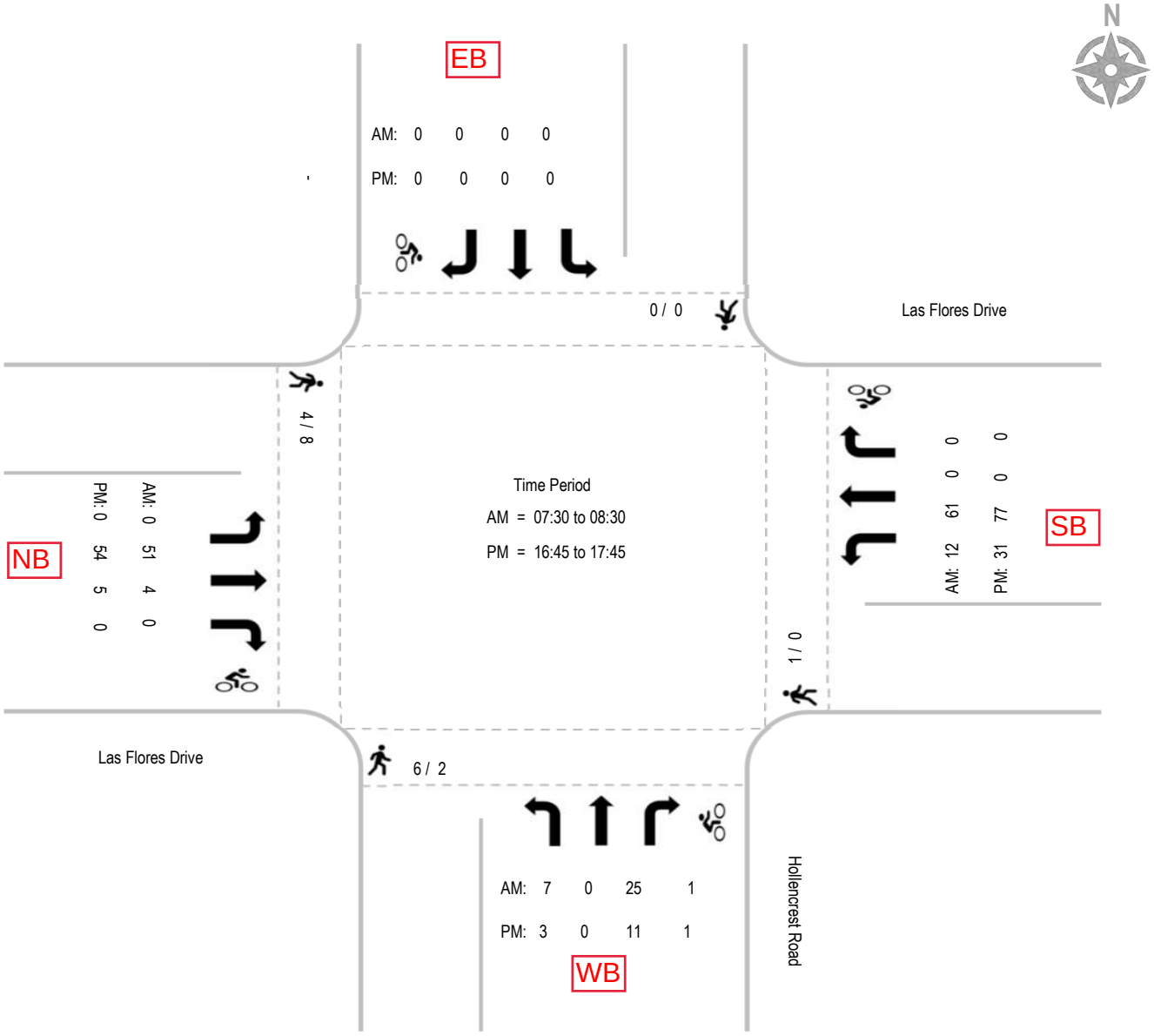
Location:	#05	File Name:	ITM-22-009-04
Intersection:	Hollencrest Road & Las Flores Drive	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	- Southbound				Las Flores Drive Westbound				Hollencrest Road Northbound				Las Flores Drive Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	0
7:15	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	2	1
7:30	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	4	0
7:45	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Total	0				1				6				4				11	
Bike Total		0	0	0		0	0	0		0	0	1		0	0	0		1

PM	- Southbound				Las Flores Drive Westbound				Hollencrest Road Northbound				Las Flores Drive Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
16:00	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0
Ped Total	0				0				2				8				10	
Bike Total		0	0	0		0	0	0		1	0	0		0	0	0		1

Intersection Turning Movement - Peak Hour Summary

Location:	#05	File Name:	ITM-22-009-04
Intersection:	Hollencrest Road & Las Flores Drive	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores



Intersection Turning Movement - Peak Hour Vehicle Count

LINSCOTT LAW & GREENSPAN engineers

Location:	#06	File Name:	ITM-22-009-05
Intersection:	West Mission Road & N. Rancho Santa Fe Rd	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	West Mission Road Southbound			- Westbound			West Mission Road Northbound			N. Rancho Santa Fe Rd Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
7:00	0	74	52	0	0	0	32	45	0	68	0	11	282
7:15	0	94	70	0	0	0	30	81	0	42	0	19	336
7:30	0	107	74	0	0	0	27	73	0	60	0	23	364
7:45	0	121	69	0	0	0	33	92	0	53	0	23	391
8:00	0	78	60	0	0	0	26	90	0	81	0	21	356
8:15	1	64	55	0	0	0	35	57	0	74	0	23	309
8:30	0	79	60	0	0	0	32	66	0	69	0	27	333
8:45	0	62	47	0	0	0	27	56	0	74	0	21	287
Total	1	679	487	0	0	0	242	560	0	521	0	168	2658
Approach%	0.1	58.2	41.7	-	-	-	30.2	69.8	-	75.6	-	24.4	
Total%	0.0	25.5	18.3	-	-	-	9.1	21.1	-	19.6	-	6.3	

AM Intersection Peak Hour: **07:15 to 08:15**

Volume	-	400	273	-	-	-	116	336	-	236	-	86	1,447
Approach%	-	59.4	40.6	-	-	-	25.7	74.3	-	73.3	-	26.7	
Total%	-	27.6	18.9	-	-	-	8.0	23.2	-	16.3	-	5.9	
PHF			0.89			#DIV/0!			0.90			0.79	0.93

PM	West Mission Road Southbound			- Westbound			West Mission Road Northbound			N. Rancho Santa Fe Rd Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
16:00	1	168	59	0	0	0	45	93	0	95	0	76	537
16:15	0	184	38	0	0	0	34	81	0	66	0	75	478
16:30	1	181	58	0	0	0	33	67	0	98	0	108	546
16:45	1	187	46	0	0	0	44	123	0	83	0	72	556
17:00	0	194	56	0	0	0	35	95	0	87	0	74	541
17:15	1	155	46	0	0	0	42	91	0	76	0	79	490
17:30	0	156	51	0	0	0	37	93	0	77	0	74	488
17:45	2	144	42	0	0	0	37	94	0	69	0	57	445
Total	6	1369	396	0	0	0	307	737	0	651	0	615	4081
Approach%	0.3	77.3	22.4	-	-	-	29.4	70.6	-	51.4	-	48.6	
Total%	0.1	33.5	9.7	-	-	-	7.5	18.1	-	16.0	-	15.1	

PM Intersection Peak Hour: **16:30 to 17:30**

Volume	3	717	206	-	-	-	154	376	-	344	-	333	2,133
Approach%	0.3	77.4	22.2	-	-	-	29.1	70.9	-	50.8	-	49.2	
Total%	0.1	33.6	9.7	-	-	-	7.2	17.6	-	16.1	-	15.6	
PHF			0.93			#DIV/0!			0.79			0.82	0.96

Intersection Turning Movement - Bicycle & Pedestrian Count

LINSCOTT LAW & GREENSPAN engineers

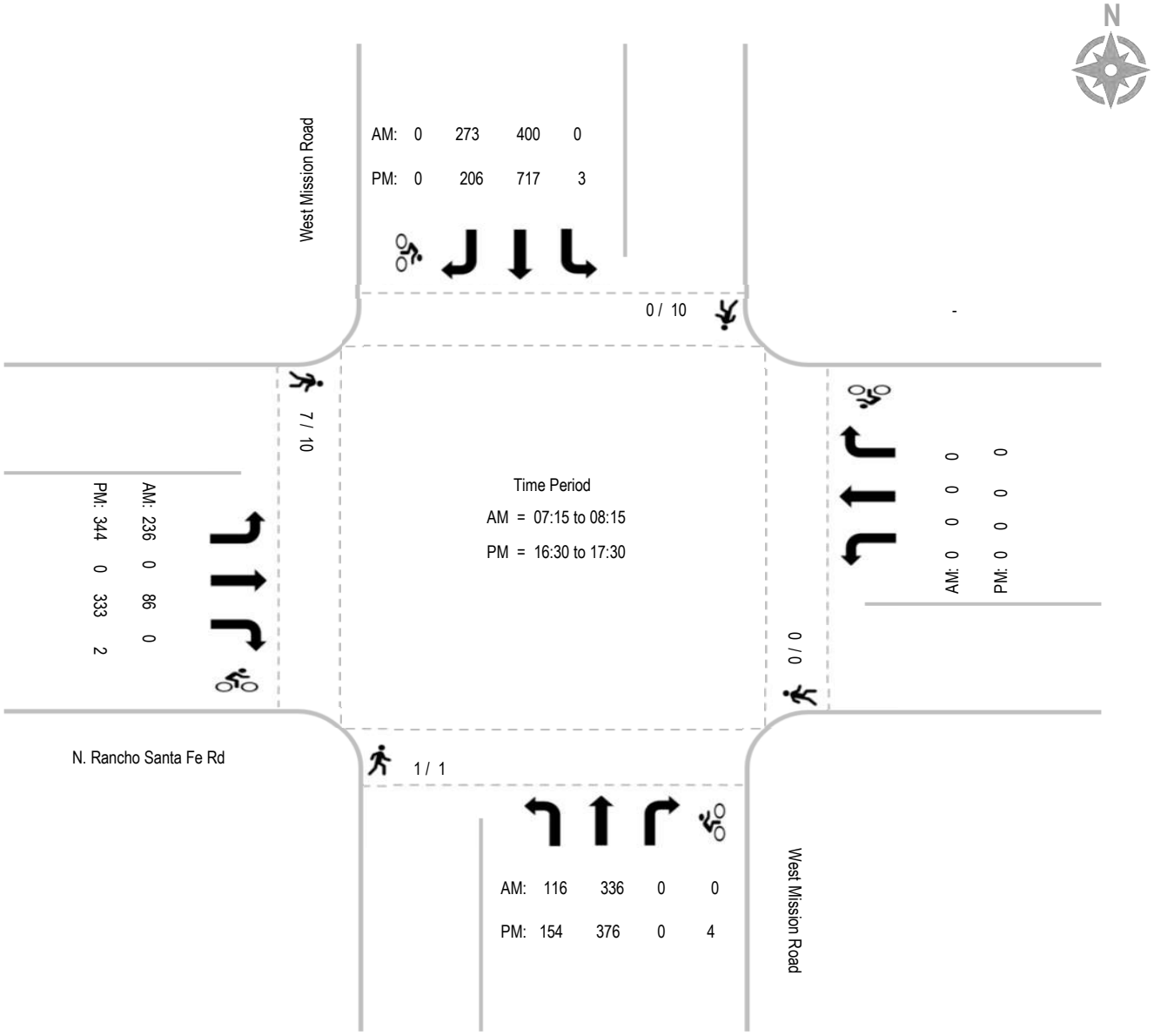
Location:	#06	File Name:	ITM-22-009-05
Intersection:	West Mission Road & N. Rancho Santa Fe Rd	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	West Mission Road Southbound				- Westbound				West Mission Road Northbound				N. Rancho Santa Fe Rd Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
7:15	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
8:45	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
Ped Total	0				0				1				7				8	
Bike Total		0	0	0		0	0	0		0	0	0		0	0	0		0

PM	West Mission Road Southbound				- Westbound				West Mission Road Northbound				N. Rancho Santa Fe Rd Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
16:00	10	0	0	0	0	0	0	0	0	1	0	0	3	1	0	0	13	2
16:15	0	0	0	0	0	0	0	0	0	2	0	0	3	1	0	0	3	3
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	1
17:30	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0
Ped Total	10				0				1				10				21	
Bike Total		0	0	0		0	0	0		3	1	0		2	0	0		6

Intersection Turning Movement - Peak Hour Summary

LINSCOTT LAW & GREENSPAN engineers	Location:	#06	File Name: ITM-22-009-05
	Intersection:	West Mission Road & N. Rancho Santa Fe Rd	Project: LLG Ref. 3-22-3523
	Date of Count:	Thursday, February 17, 2022	Santa Fe Las Flores



Intersection Turning Movement - Peak Hour Vehicle Count

LINSCOTT LAW & GREENSPAN engineers

Location:	#07	File Name:	ITM-22-009-06
Intersection:	Capalina Road & Hollencrest Road	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	Capalina Road Southbound			Hollencrest Road Westbound			Capalina Road Northbound			- Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
7:00	0	37	0	15	0	0	0	8	3	0	0	0	63
7:15	0	35	0	23	0	1	0	15	13	0	0	0	87
7:30	0	61	0	31	0	2	0	10	7	0	0	0	111
7:45	0	55	0	28	0	1	0	28	12	0	0	0	124
8:00	0	36	0	22	0	1	0	14	16	0	0	0	89
8:15	1	20	0	20	0	0	0	24	14	0	0	0	79
8:30	0	32	0	9	0	0	0	18	6	0	0	0	65
8:45	0	13	0	8	0	0	0	17	4	0	0	0	42
Total	1	289	0	156	0	5	0	134	75	0	0	0	660
Approach%	0.3	99.7	-	96.9	-	3.1	-	64.1	35.9	-	-	-	
Total%	0.2	43.8	-	23.6	-	0.8	-	20.3	11.4	-	-	-	

AM Intersection Peak Hour: **07:15 to 08:15**

Volume	-	187	-	104	-	5	-	67	48	-	-	-	411
Approach%	-	100.0	-	95.4	-	4.6	-	58.3	41.7	-	-	-	
Total%	-	45.5	-	25.3	-	1.2	-	16.3	11.7	-	-	-	
PHF			0.77			0.83			0.72			#DIV/0!	0.83

PM	Capalina Road Southbound			Hollencrest Road Westbound			Capalina Road Northbound			- Eastbound			
	Left	Thru	Right	Left	Thru	Right	U-Turn	Thru	Right	Left	Thru	Right	Total
16:00	1	21	0	9	0	2	0	37	29	0	0	0	99
16:15	0	23	0	7	0	0	0	47	14	0	0	0	91
16:30	0	25	0	4	0	0	0	26	18	0	0	0	73
16:45	1	31	0	13	0	1	0	43	19	0	0	0	108
17:00	0	18	0	11	0	2	0	24	18	0	0	0	73
17:15	0	31	0	12	0	1	0	35	21	0	0	0	100
17:30	2	33	0	10	0	1	0	28	15	0	0	0	89
17:45	2	26	0	11	0	2	0	47	16	0	0	0	104
Total	6	208	0	77	0	9	0	287	150	0	0	0	737
Approach%	2.8	97.2	-	89.5	-	10.5	-	65.7	34.3	-	-	-	
Total%	0.8	28.2	-	10.4	-	1.2	-	38.9	20.4	-	-	-	

PM Intersection Peak Hour: **16:00 to 17:00**

Volume	2	100	-	33	-	3	-	153	80	-	-	-	371
Approach%	2.0	98.0	-	91.7	-	8.3	-	65.7	34.3	-	-	-	
Total%	0.5	27.0	-	8.9	-	0.8	-	41.2	21.6	-	-	-	
PHF			0.80			0.64			0.88			#DIV/0!	0.86

Intersection Turning Movement - Bicycle & Pedestrian Count

LINSCOTT LAW & GREENSPAN engineers

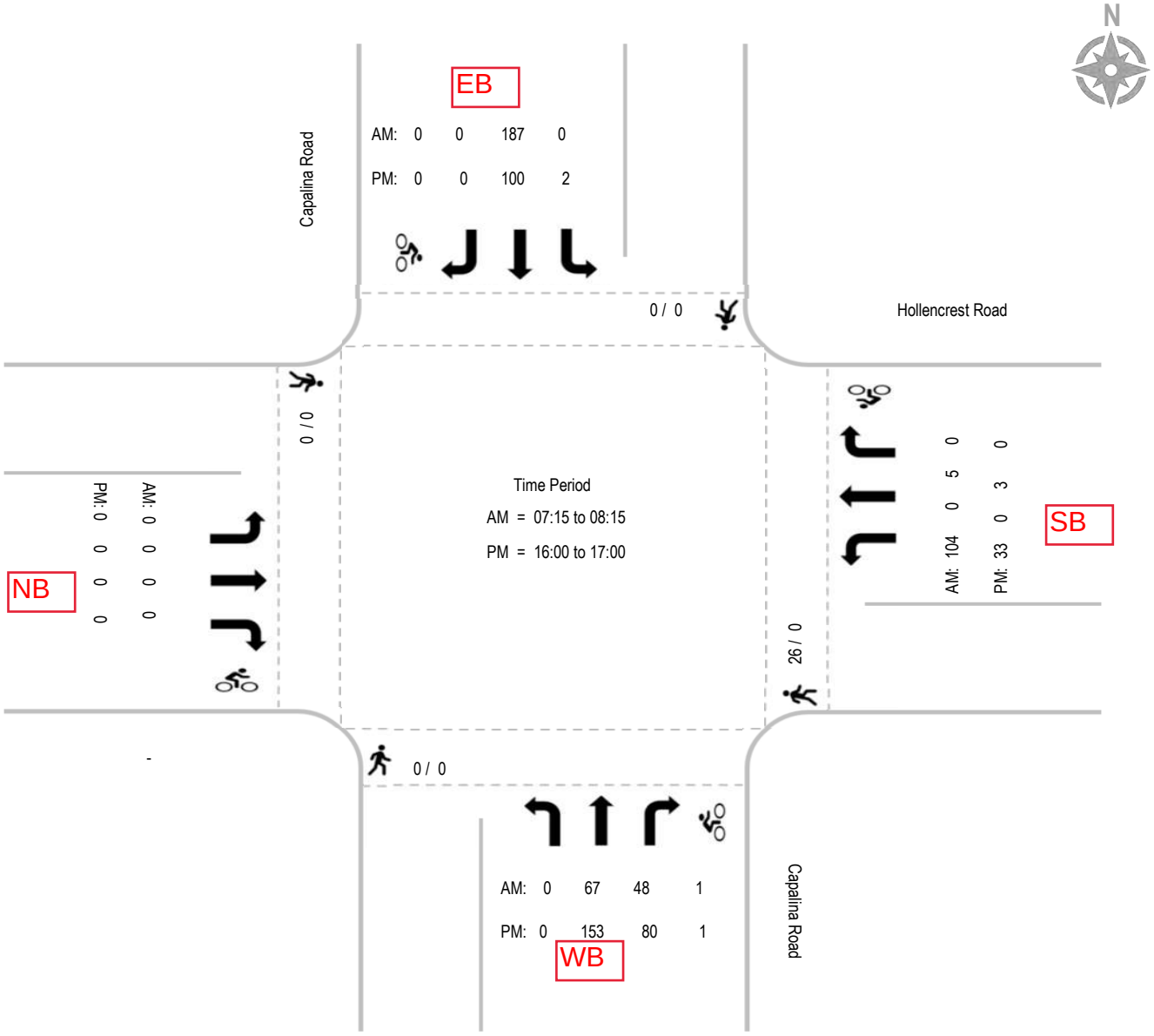
Location:	#07	File Name:	ITM-22-009-06
Intersection:	Capalina Road & Hollencrest Road	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	Capalina Road Southbound				Hollencrest Road Westbound				Capalina Road Northbound				- Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0
7:15	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	10	0
7:30	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	2	1
7:45	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	9	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Ped Total	0				26				0				0				26	
Bike Total		0	0	0		0	0	0		0	1	0		0	0	0		1

PM	Capalina Road Southbound				Hollencrest Road Westbound				Capalina Road Northbound				- Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
16:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Total	0				0				0				0				0	
Bike Total		0	0	0		0	0	0		0	0	1		0	0	0		1

Intersection Turning Movement - Peak Hour Summary

LINSCOTT LAW & GREENSPAN engineers	Location:	#07	File Name: ITM-22-009-06
	Intersection:	Capalina Road & Hollencrest Road	Project: LLG Ref. 3-22-3523
	Date of Count:	Thursday, February 17, 2022	Santa Fe Las Flores



Intersection Turning Movement - Peak Hour Vehicle Count

LINSCOTT LAW & GREENSPAN engineers

Location:	#08 Revised	File Name:	ITM-22-009-07
Intersection:	N. Rancho Santa Fe Road & Capalina Road	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	N. Rancho Santa Fe Rd Southbound			Capalina Road Westbound			N. Rancho Santa Fe Rd Northbound			Capalina Road Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total
7:00	0	70	1	18	2	5	20	78	23	0	9	43	269
7:15	1	102	0	30	5	4	32	46	32	1	7	51	311
7:30	3	91	0	18	1	5	29	76	31	2	8	78	342
7:45	6	97	0	22	5	4	49	76	32	0	5	77	373
8:00	3	82	2	19	4	2	35	94	24	3	1	40	309
8:15	0	91	4	26	2	6	41	81	28	0	2	36	317
8:30	5	85	4	13	2	3	33	90	24	2	7	33	301
8:45	1	68	4	18	5	5	30	84	33	2	3	17	270
Total	19	686	15	164	26	34	269	625	227	10	42	375	2492
Approach%	2.6	95.3	2.1	73.2	11.6	15.2	24.0	55.8	20.2	2.3	9.8	87.8	
Total%	0.8	27.5	0.6	6.6	1.0	1.4	10.8	25.1	9.1	0.4	1.7	15.0	

AM Intersection Peak Hour: **07:30 to 08:30**

Volume	12	361	6	85	12	17	154	327	115	5	16	231	1,341
Approach%	3.2	95.3	1.6	74.6	10.5	14.9	25.8	54.9	19.3	2.0	6.3	91.7	
Total%	0.9	26.9	0.4	6.3	0.9	1.3	11.5	24.4	8.6	0.4	1.2	17.2	
PHF			0.92			0.84			0.95			0.72	0.90

PM	N. Rancho Santa Fe Rd Southbound			Capalina Road Westbound			N. Rancho Santa Fe Rd Northbound			Capalina Road Eastbound			
	Left	Thru	Right	Left	Thru	Right	U-Turn	Thru	Right	Left	Thru	Right	Total
16:00	6	91	6	16	3	13	63	163	25	3	8	22	419
16:15	5	68	0	16	5	9	48	145	27	3	3	23	352
16:30	3	86	7	26	9	9	39	173	30	2	7	24	415
16:45	4	75	4	13	11	5	60	139	30	0	11	33	385
17:00	3	100	5	26	5	5	42	160	18	2	0	19	385
17:15	3	83	5	19	8	2	54	152	23	3	4	33	389
17:30	2	78	1	17	9	9	42	123	22	4	10	33	350
17:45	5	75	7	20	11	4	56	122	36	0	10	29	375
Total	31	656	35	153	61	56	404	1177	211	17	53	216	3070
Approach%	4.3	90.9	4.8	56.7	22.6	20.7	22.5	65.7	11.8	5.9	18.5	75.5	
Total%	1.0	21.4	1.1	5.0	2.0	1.8	13.2	38.3	6.9	0.6	1.7	7.0	

PM Intersection Peak Hour: **16:30 to 17:30**

Volume	13	344	21	84	33	21	195	624	101	7	22	109	1,574
Approach%	3.4	91.0	5.6	60.9	23.9	15.2	21.2	67.8	11.0	5.1	15.9	79.0	
Total%	0.8	21.9	1.3	5.3	2.1	1.3	12.4	39.6	6.4	0.4	1.4	6.9	
PHF			0.88			0.78			0.95			0.78	0.95

Intersection Turning Movement - Bicycle & Pedestrian Count

LINSCOTT LAW & GREENSPAN engineers

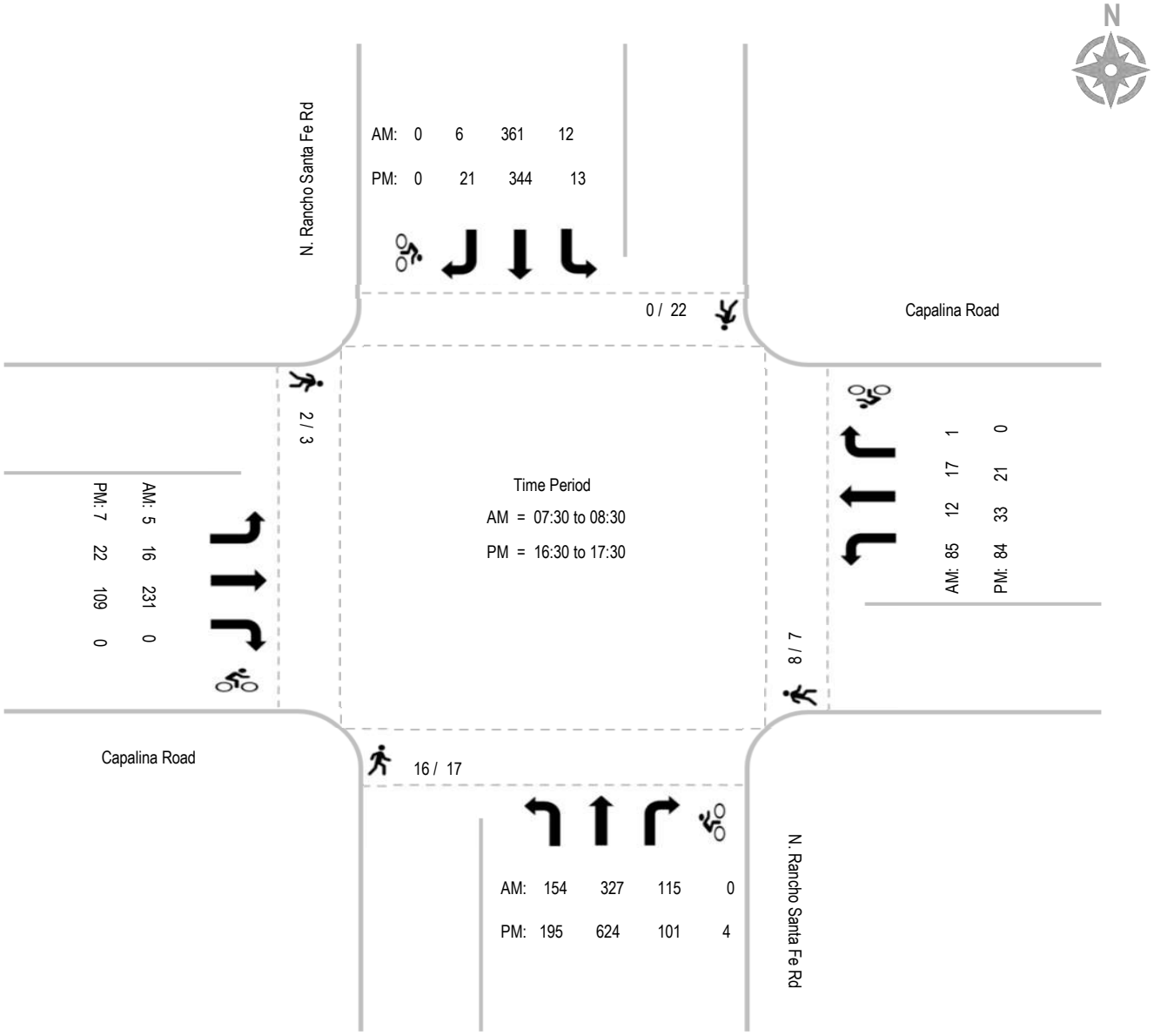
Location:	#08 Revised	File Name:	ITM-22-009-07
Intersection:	N. Rancho Santa Fe Road & Capalina Road	Project:	LLG Ref. 3-22-3523
Date of Count:	Thursday, February 17, 2022		Santa Fe Las Flores

AM	N. Rancho Santa Fe Rd Southbound				Capalina Road Westbound				N. Rancho Santa Fe Rd Northbound				Capalina Road Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
8:00	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	0
8:15	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
8:30	0	0	0	0	5	0	0	0	5	0	0	0	1	0	0	0	11	0
8:45	0	0	0	0	1	0	0	0	9	0	0	0	0	0	0	0	10	0
Ped Total	0				8				16				2				26	
Bike Total		0	0	0		1	0	0		0	0	0		0	0	0		1

PM	N. Rancho Santa Fe Rd Southbound				Capalina Road Westbound				N. Rancho Santa Fe Rd Northbound				Capalina Road Eastbound				Totals	
	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	B-Left	B-Thru	B-Right	Ped	Bicycle
16:00	3	0	0	0	0	0	0	0	9	1	0	0	0	0	0	0	12	1
16:15	0	0	0	0	2	0	0	0	4	0	0	0	0	0	0	0	6	0
16:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
16:45	5	0	0	0	3	0	0	0	3	1	0	0	0	0	0	0	11	1
17:00	6	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	8	0
17:15	4	0	0	0	1	0	0	0	1	0	0	2	1	0	0	0	7	2
17:30	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Total	22				7				17				3				49	
Bike Total		0	0	0		0	0	0		2	0	2		0	0	0		4

Intersection Turning Movement - Peak Hour Summary

LINSCOTT LAW & GREENSPAN engineers	Location:	#08 Revised	File Name: ITM-22-009-07
	Intersection:	N. Rancho Santa Fe Road & Capalina Road	Project: LLG Ref. 3-22-3523
	Date of Count:	Thursday, February 17, 2022	Santa Fe Las Flores



Linscott, Law & Greenspan, Engineers

4542 Ruffner Street, Suite 100, San Diego, CA 92111

Average Daily Traffic

Location: **BC 22-009 Loc #A S. Santa Fe Ave, between Smilax Rd and Bosstick Blvd**

Date: **Tuesday, March 1, 2022** Total Daily Volume: **14854** Description: **Total Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
54	36	18	37	105	351	593	989	906	682	683	767	827	771	1081	1294	1755	1519	866	587	377	283	169	104
20	11	4	6	11	45	110	200	262	161	177	192	185	153	221	286	426	444	266	174	96	81	57	31
20	8	4	11	12	75	126	259	238	181	168	189	198	210	248	310	438	400	240	173	90	84	38	22
9	9	5	9	33	114	148	265	218	148	169	191	212	197	312	347	450	378	195	127	96	55	40	26
5	8	5	11	49	117	209	265	188	192	169	195	232	211	300	351	441	297	165	113	95	63	34	25

Date: **Tuesday, March 1, 2022** Total Daily Volume: **7083** Description: **Northbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
32	18	9	22	58	152	229	451	425	329	325	376	404	397	543	560	813	751	397	307	191	149	87	58
11	6	2	1	3	23	56	86	131	87	75	104	90	83	107	128	169	199	124	88	58	43	25	15
11	3	3	6	7	25	52	114	117	84	65	91	93	105	128	133	183	197	100	89	35	41	21	14
7	5	1	8	18	60	45	115	93	69	90	81	106	100	152	135	245	192	91	77	50	24	23	19
3	4	3	7	30	44	76	136	84	89	95	100	115	109	156	164	216	163	82	53	48	41	18	10

Date: **Tuesday, March 1, 2022** Total Daily Volume: **7771** Description: **Southbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
22	18	9	15	47	199	364	538	481	353	358	391	423	374	538	734	942	768	469	280	186	134	82	46
9	5	2	5	8	22	54	114	131	74	102	88	95	70	114	158	257	245	142	86	38	38	32	16
9	5	1	5	5	50	74	145	121	97	103	98	105	105	120	177	255	203	140	84	55	43	17	8
2	4	4	1	15	54	103	150	125	79	79	110	106	97	160	212	205	186	104	50	46	31	17	7
2	4	2	4	19	73	133	129	104	103	74	95	117	102	144	187	225	134	83	60	47	22	16	15

Report Generated by "Count Data" all rights reserved

Linscott, Law & Greenspan, Engineers

4542 Ruffner Street, Suite 100, San Diego, CA 92111

Average Daily Traffic

Location: **BC 22-009 Loc #B S. Santa Fe Ave, between Bosstick Blvd and Las Flores Dr**

Date: **Tuesday, March 1, 2022** Total Daily Volume: **16657** Description: **Total Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
55	37	28	44	120	410	769	1112	1009	796	818	857	923	932	1220	1413	1830	1658	948	641	441	304	188	104
18	12	5	10	11	54	158	226	285	182	209	203	217	186	257	314	425	496	308	196	121	85	55	30
19	7	7	12	17	84	160	279	277	202	202	213	242	250	283	327	467	441	261	187	94	86	42	19
11	8	6	10	40	131	180	288	250	197	205	217	215	238	370	375	481	407	200	122	115	64	53	32
7	10	10	12	52	141	271	319	197	215	202	224	249	258	310	397	457	314	179	136	111	69	38	23

Date: **Tuesday, March 1, 2022** Total Daily Volume: **7926** Description: **Northbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
31	17	13	25	78	236	394	539	483	396	400	421	447	478	555	593	779	760	430	330	213	156	95	57
11	6	3	4	3	32	92	117	155	98	94	106	100	102	126	138	158	215	135	97	66	41	28	14
7	3	4	5	12	44	84	130	136	100	90	98	120	119	130	140	190	201	123	100	37	39	23	12
8	3	1	8	28	76	78	129	110	96	107	102	108	122	159	134	208	183	86	66	54	32	28	21
5	5	5	8	35	84	140	163	82	102	109	115	119	135	140	181	223	161	86	67	56	44	16	10

Date: **Tuesday, March 1, 2022** Total Daily Volume: **8731** Description: **Southbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
24	20	15	19	42	174	375	573	526	400	418	436	476	454	665	820	1051	898	518	311	228	148	93	47
7	6	2	6	8	22	66	109	130	84	115	97	117	84	131	176	267	281	173	99	55	44	27	16
12	4	3	7	5	40	76	149	141	102	112	115	122	131	153	187	277	240	138	87	57	47	19	7
3	5	5	2	12	55	102	159	140	101	98	115	107	116	211	241	273	224	114	56	61	32	25	11
2	5	5	4	17	57	131	156	115	113	93	109	130	123	170	216	234	153	93	69	55	25	22	13

Report Generated by "Count Data" all rights reserved

Linscott, Law & Greenspan, Engineers

4542 Ruffner Street, Suite 100, San Diego, CA 92111

Average Daily Traffic

Location: **BC 22-009 Loc #C S. Santa Fe Ave, between Las Flores Dr and N. Rancho Santa Fe Rd**

Date: **Tuesday, March 1, 2022** Total Daily Volume: **14595** Description: **Total Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
18	23	18	20	119	396	774	1202	1093	802	861	880	936	951	1262	1439	1664	848	508	273	226	143	96	43
5	6	3	5	7	47	157	236	307	197	222	205	213	204	257	330	447	257	169	85	60	42	27	14
9	6	3	7	18	82	157	305	282	203	209	219	253	255	292	312	480	230	138	78	55	51	20	6
3	6	6	3	37	129	184	330	273	200	211	231	218	244	385	393	444	216	118	49	60	29	24	10
1	5	6	5	57	138	276	331	231	202	219	225	252	248	328	404	293	145	83	61	51	21	25	13

Date: **Tuesday, March 1, 2022** Total Daily Volume: **5755** Description: **Northbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
0	0	0	0	63	208	360	518	517	390	413	431	464	501	587	643	659	0	1	0	0	0	0	0
0	0	0	0	0	28	76	98	149	105	99	103	107	111	125	151	186	0	0	0	0	0	0	0
0	0	0	0	8	42	71	132	142	96	96	101	123	139	130	144	219	0	0	0	0	0	0	0
0	0	0	0	21	67	78	127	113	92	103	111	110	126	183	159	192	0	0	0	0	0	0	0
0	0	0	0	34	71	135	161	113	97	115	116	124	125	149	189	62	0	1	0	0	0	0	0

Date: **Tuesday, March 1, 2022** Total Daily Volume: **8840** Description: **Southbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
18	23	18	20	56	188	414	684	576	412	448	449	472	450	675	796	1005	848	507	273	226	143	96	43
5	6	3	5	7	19	81	138	158	92	123	102	106	93	132	179	261	257	169	85	60	42	27	14
9	6	3	7	10	40	86	173	140	107	113	118	130	116	162	168	261	230	138	78	55	51	20	6
3	6	6	3	16	62	106	203	160	108	108	120	108	118	202	234	252	216	118	49	60	29	24	10
1	5	6	5	23	67	141	170	118	105	104	109	128	123	179	215	231	145	82	61	51	21	25	13

Report Generated by "Count Data" all rights reserved

Linscott, Law & Greenspan, Engineers

4542 Ruffner Street, Suite 100, San Diego, CA 92111

Average Daily Traffic

Location: **BC 22-009 Loc #D S. Santa Fe Ave-Mission Rd, between N. Rancho Santa Fe Rd and N. Pacific St**

Date: **Tuesday, March 1, 2022** Total Daily Volume: **13500** Description: **Total Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
38	32	21	36	68	267	468	983	836	534	516	576	643	651	1000	1298	1772	1650	821	491	337	243	162	57
13	10	7	9	12	27	80	162	233	136	119	140	135	141	177	272	438	472	290	138	88	74	49	13
15	7	2	9	10	49	95	244	220	161	133	148	179	159	246	346	483	427	233	142	86	77	43	12
6	6	4	6	24	99	112	310	200	124	124	131	140	164	298	329	413	435	165	112	74	38	40	19
4	9	8	12	22	92	181	267	183	113	140	157	189	187	279	351	438	316	133	99	89	54	30	13

Date: **Tuesday, March 1, 2022** Total Daily Volume: **5893** Description: **Northbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
13	18	8	20	36	146	216	452	418	268	226	270	306	317	460	442	627	691	333	258	159	113	74	22
5	6	1	4	7	18	38	70	128	75	52	77	66	77	83	82	150	189	107	72	44	33	22	2
3	3	0	6	3	25	42	120	109	85	59	72	82	82	105	131	151	188	101	75	40	34	21	6
2	3	1	4	13	52	52	133	89	58	55	56	72	75	154	105	155	178	63	65	28	17	18	9
3	6	6	6	13	51	84	129	92	50	60	65	86	83	118	124	171	136	62	46	47	29	13	5

Date: **Tuesday, March 1, 2022** Total Daily Volume: **7607** Description: **Southbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
25	14	13	16	32	121	252	531	418	266	290	306	337	334	540	856	1145	959	488	233	178	130	88	35
8	4	6	5	5	9	42	92	105	61	67	63	69	64	94	190	288	283	183	66	44	41	27	11
12	4	2	3	7	24	53	124	111	76	74	76	97	77	141	215	332	239	132	67	46	43	22	6
4	3	3	2	11	47	60	177	111	66	69	75	68	89	144	224	258	257	102	47	46	21	22	10
1	3	2	6	9	41	97	138	91	63	80	92	103	104	161	227	267	180	71	53	42	25	17	8

Report Generated by "Count Data" all rights reserved

Linscott, Law & Greenspan, Engineers

4542 Ruffner Street, Suite 100, San Diego, CA 92111

Average Daily Traffic

Location: **BC 22-009 Loc #E Hollencrest Rd, between De Leone Rd and Hollenbeck Rd**

Date: **Tuesday, March 1, 2022** Total Daily Volume: **562** Description: **Total Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
9	2	1	4	3	11	28	32	41	19	15	16	21	31	36	34	61	53	52	34	20	29	5	5
2	1	0	1	1	0	10	9	16	4	5	3	6	12	5	13	14	13	15	9	3	6	5	2
5	1	0	3	0	1	1	5	7	4	3	5	2	4	6	3	17	6	13	10	8	9	0	2
0	0	0	0	1	4	6	9	13	7	3	3	9	7	10	10	14	19	17	5	5	8	0	1
2	0	1	0	1	6	11	9	5	4	4	5	4	8	15	8	16	15	7	10	4	6	0	0

Date: **Tuesday, March 1, 2022** Total Daily Volume: **245** Description: **Northbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
5	1	1	1	2	4	14	12	13	10	8	8	4	11	15	16	27	22	28	10	11	16	1	5
1	1	0	0	1	0	5	5	7	2	3	2	3	5	3	10	5	5	9	4	1	2	1	2
3	0	0	1	0	1	1	0	1	2	1	3	0	1	2	2	7	2	6	4	4	4	0	2
0	0	0	0	1	2	2	5	5	5	3	2	1	3	4	2	5	10	8	0	3	6	0	1
1	0	1	0	0	1	6	2	0	1	1	1	0	2	6	2	10	5	5	2	3	4	0	0

Date: **Tuesday, March 1, 2022** Total Daily Volume: **317** Description: **Southbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
4	1	0	3	1	7	14	20	28	9	7	8	17	20	21	18	34	31	24	24	9	13	4	0
1	0	0	1	0	0	5	4	9	2	2	1	3	7	2	3	9	8	6	5	2	4	4	0
2	1	0	2	0	0	0	5	6	2	2	2	2	3	4	1	10	4	7	6	4	5	0	0
0	0	0	0	0	2	4	4	8	2	0	1	8	4	6	8	9	9	9	5	2	2	0	0
1	0	0	0	1	5	5	7	5	3	3	4	4	6	9	6	6	10	2	8	1	2	0	0

Report Generated by "Count Data" all rights reserved

Linscott, Law & Greenspan, Engineers

4542 Ruffner Street, Suite 100, San Diego, CA 92111

Average Daily Traffic

Location: **BC 22-009 Loc #F N. Rancho Santa Fe Rd, between S. Santa Fe Ave and Capalina Rd**

Date: **Tuesday, March 1, 2022** Total Daily Volume: **11728** Description: **Total Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
38	30	21	25	100	290	538	706	772	625	682	692	679	690	783	1007	1069	1019	726	419	355	234	144	84
10	6	5	6	9	35	108	159	216	171	183	171	162	149	175	235	261	286	206	129	91	61	40	27
17	7	6	11	16	64	112	177	199	144	167	193	184	183	191	220	277	250	192	109	81	65	33	14
7	8	4	5	35	92	137	179	186	160	166	165	151	188	219	268	269	269	169	97	89	58	37	25
4	9	6	3	40	99	181	191	171	150	166	163	182	170	198	284	262	214	159	84	94	50	34	18

Date: **Tuesday, March 1, 2022** Total Daily Volume: **6469** Description: **Eastbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
30	13	9	11	55	142	259	301	340	306	352	356	359	386	399	628	720	639	433	236	203	146	88	58
10	3	4	3	3	18	52	61	88	91	87	82	87	81	91	148	171	173	122	70	56	40	29	18
12	4	4	4	9	32	56	73	95	61	78	93	98	103	101	145	196	144	118	68	44	34	21	10
6	2	1	3	22	46	59	69	80	74	93	89	79	106	99	162	168	172	99	51	47	36	21	20
2	4	0	1	21	46	92	98	77	80	94	92	95	96	108	173	185	150	94	47	56	36	17	10

Date: **Tuesday, March 1, 2022** Total Daily Volume: **5259** Description: **Westbound Volume**

0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
8	17	12	14	45	148	279	405	432	319	330	336	320	304	384	379	349	380	293	183	152	88	56	26
0	3	1	3	6	17	56	98	128	80	96	89	75	68	84	87	90	113	84	59	35	21	11	9
5	3	2	7	7	32	56	104	104	83	89	100	86	80	90	75	81	106	74	41	37	31	12	4
1	6	3	2	13	46	78	110	106	86	73	76	72	82	120	106	101	97	70	46	42	22	16	5
2	5	6	2	19	53	89	93	94	70	72	71	87	74	90	111	77	64	65	37	38	14	17	8

Report Generated by "Count Data" all rights reserved

APPENDIX B

CITY OF SAN MARCOS ROADWAY CLASSIFICATION TABLE

Table 3: Roadway Classifications, Capacity, and LOS

Street Classification	Lanes	LOS A	LOS B	LOS C	LOS D	LOS E (Capacity)
Expressway	6	30,000	42,000	60,000	70,000	80,000
Prime Arterial	6	25,000	35,000	50,000	55,000	60,000
Major Arterial	6	20,000	28,000	40,000	45,000	50,000
Major Arterial	4	15,000	21,000	30,000	35,000	40,000
Major Arterial (One-Way)	3	12,500	16,500	22,500	25,000	27,500
Major Arterial (One-Way)	2	10,000	13,000	17,500	20,000	22,500
Secondary Arterial/Collector	4	10,000	14,000	20,000	25,000	30,000
Collector (no center lane)	4	5,000	7,000	10,000	13,000	15,000
Collector (continuous left-turn lane)	2	5,000	7,000	10,000	13,000	15,000
Collector (no fronting property)	2	4,000	5,500	7,500	9,000	10,000
Collector (commercial-industrial fronting)	2	2,500	3,500	5,000	6,500	8,000
Collector (multi-family)	2	2,500	3,500	5,000	6,500	8,000
Collector (one-way)	3	11,000	14,000	19,000	22,500	26,000
Collector (one-way)	2	7,500	9,500	12,500	15,000	17,500
Collector (one-way)	1	2,500	3,500	5,000	6,500	7,500
Sub-Collector (single-family)	2	--	--	2,200	--	--

Source: *Guidelines for Transportation Impact Studies in the San Diego Region* (May 2019)
Notes: 1. The volumes and the average daily level of service listed above are only intended as a general planning outline.
2. Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

3.7. LEVEL OF SERVICE STANDARDS

The City of San Marcos strives to maintain intersection and roadway segment operations based on LOS standards outlined in the General Plan Mobility Element. The local transportation analysis should note intersections and roadway segments that perform unacceptably (based on standards in the current General Plan Mobility Element) under no project and/or plus project conditions, and improvements that can be applied to increase performance to acceptable levels.

For study intersections, the study should identify if the addition of the traffic generated from the proposed project results in any one of the following, and improvements should be identified to increase performance to acceptable or pre-project conditions under each scenario:

- Triggers an intersection operating at acceptable LOS to operate at unacceptable LOS and increases the average delay per vehicle by more than 2.0 seconds.
- Increases the average delay per vehicle for a study intersection that is already operating at unacceptable LOS by more than 2.0 seconds.

APPENDIX C

ANALYSIS WORKSHEETS – EXISTING

Intersection	
Int Delay, s/veh	17.8

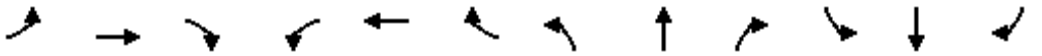
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	91	147	239	283	398	215
Future Vol, veh/h	91	147	239	283	398	215
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	103	167	272	322	452	244

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1440	574	696	0	-	0
Stage 1	574	-	-	-	-	-
Stage 2	866	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	146	518	900	-	-	-
Stage 1	563	-	-	-	-	-
Stage 2	412	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 92	518	900	-	-	-
Mov Cap-2 Maneuver	~ 92	-	-	-	-	-
Stage 1	356	-	-	-	-	-
Stage 2	412	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	91.8	4.9	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	900	-	92	518	-	-
HCM Lane V/C Ratio	0.302	-	1.124	0.322	-	-
HCM Control Delay (s)	10.7	0	215.5	15.2	-	-
HCM Lane LOS	B	A	F	C	-	-
HCM 95th %tile Q(veh)	1.3	-	7	1.4	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	22	69	0	35	21	493	86	78	466	6
Future Volume (veh/h)	10	0	22	69	0	35	21	493	86	78	466	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	25	78	0	40	24	560	98	89	530	7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	31	0	70	212	0	188	69	684	579	189	1555	21
Arrive On Green	0.06	0.00	0.06	0.12	0.00	0.12	0.04	0.37	0.37	0.11	0.43	0.43
Sat Flow, veh/h	501	0	1139	1781	0	1585	1781	1870	1585	1781	3591	47
Grp Volume(v), veh/h	36	0	0	78	0	40	24	560	98	89	262	275
Grp Sat Flow(s),veh/h/ln	1640	0	0	1781	0	1585	1781	1870	1585	1781	1777	1862
Q Serve(g_s), s	1.2	0.0	0.0	2.3	0.0	1.3	0.7	15.4	2.4	2.7	5.6	5.6
Cycle Q Clear(g_c), s	1.2	0.0	0.0	2.3	0.0	1.3	0.7	15.4	2.4	2.7	5.6	5.6
Prop In Lane	0.31		0.69	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	100	0	0	212	0	188	69	684	579	189	769	806
V/C Ratio(X)	0.36	0.00	0.00	0.37	0.00	0.21	0.35	0.82	0.17	0.47	0.34	0.34
Avail Cap(c_a), veh/h	837	0	0	251	0	223	260	1148	973	260	1091	1143
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.6	0.0	0.0	23.1	0.0	22.6	26.6	16.3	12.2	23.9	10.7	10.7
Incr Delay (d2), s/veh	2.2	0.0	0.0	1.1	0.0	0.6	3.0	2.5	0.1	1.8	0.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	1.0	0.0	0.5	0.3	5.6	0.7	1.1	1.7	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.8	0.0	0.0	24.1	0.0	23.2	29.6	18.8	12.3	25.7	11.0	11.0
LnGrp LOS	C	A	A	C	A	C	C	B	B	C	B	B
Approach Vol, veh/h		36			118			682			626	
Approach Delay, s/veh		27.8			23.8			18.3			13.1	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.2	26.2		9.0	6.4	30.0		11.5				
Change Period (Y+Rc), s	* 4.2	5.4		5.5	* 4.2	5.4		4.7				
Max Green Setting (Gmax), s	* 8.3	34.9		29.0	* 8.3	34.9		8.0				
Max Q Clear Time (g_c+I1), s	4.7	17.4		3.2	2.7	7.6		4.3				
Green Ext Time (p_c), s	0.1	3.4		0.1	0.0	2.9		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		16.7	
HCM 6th LOS		B	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

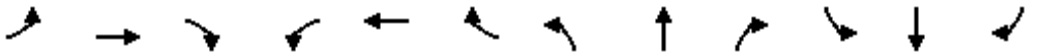
Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	662	6	10	601	9	7
Future Vol, veh/h	662	6	10	601	9	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	704	6	11	639	10	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	710	0	1049	355
Stage 1	-	-	-	-	707	-
Stage 2	-	-	-	-	342	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	885	-	223	641
Stage 1	-	-	-	-	450	-
Stage 2	-	-	-	-	691	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	885	-	220	641
Mov Cap-2 Maneuver	-	-	-	-	220	-
Stage 1	-	-	-	-	450	-
Stage 2	-	-	-	-	683	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	17.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	309	-	-	885	-
HCM Lane V/C Ratio	0.055	-	-	0.012	-
HCM Control Delay (s)	17.3	-	-	9.1	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	511	27	44	494	34	40	2	29	127	11	38
Future Volume (veh/h)	35	511	27	44	494	34	40	2	29	127	11	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	39	568	30	49	549	38	44	2	32	141	12	42
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	105	839	44	106	879	392	131	11	179	279	68	237
Arrive On Green	0.06	0.24	0.24	0.06	0.25	0.25	0.07	0.12	0.12	0.16	0.19	0.19
Sat Flow, veh/h	1781	3433	181	1781	3554	1585	1781	94	1505	1781	365	1276
Grp Volume(v), veh/h	39	294	304	49	549	38	44	0	34	141	0	54
Grp Sat Flow(s),veh/h/ln	1781	1777	1838	1781	1777	1585	1781	0	1599	1781	0	1641
Q Serve(g_s), s	1.0	7.3	7.4	1.3	6.7	0.9	1.2	0.0	0.9	3.6	0.0	1.4
Cycle Q Clear(g_c), s	1.0	7.3	7.4	1.3	6.7	0.9	1.2	0.0	0.9	3.6	0.0	1.4
Prop In Lane	1.00		0.10	1.00		1.00	1.00		0.94	1.00		0.78
Lane Grp Cap(c), veh/h	105	434	449	106	879	392	131	0	191	279	0	305
V/C Ratio(X)	0.37	0.68	0.68	0.46	0.62	0.10	0.34	0.00	0.18	0.51	0.00	0.18
Avail Cap(c_a), veh/h	258	797	825	222	1529	682	291	0	1142	411	0	1255
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.2	16.8	16.8	22.3	16.4	14.2	21.6	0.0	19.4	18.9	0.0	16.8
Incr Delay (d2), s/veh	2.2	1.8	1.8	3.1	0.7	0.1	1.5	0.0	0.4	1.4	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.6	2.7	0.6	2.3	0.3	0.5	0.0	0.3	1.5	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.4	18.6	18.6	25.4	17.2	14.3	23.1	0.0	19.9	20.3	0.0	17.1
LnGrp LOS	C	B	B	C	B	B	C	A	B	C	A	B
Approach Vol, veh/h		637			636			78			195	
Approach Delay, s/veh		18.9			17.6			21.7			19.4	
Approach LOS		B			B			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	17.4	9.1	15.1	7.3	17.5	12.4	11.8
Change Period (Y+Rc), s	4.5	5.4	5.5	6.0	4.4	5.4	* 4.7	6.0
Max Green Setting (Gmax), s	6.1	22.0	8.0	37.5	7.1	21.1	* 11	35.0
Max Q Clear Time (g_c+I1), s	3.3	9.4	3.2	3.4	3.0	8.7	5.6	2.9
Green Ext Time (p_c), s	0.0	2.6	0.0	0.3	0.0	2.7	0.2	0.1

Intersection Summary	
HCM 6th Ctrl Delay	18.6
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	25	51	4	12	61
Future Vol, veh/h	7	25	51	4	12	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	29	60	5	14	72

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	163	63	0	0	65	0
Stage 1	63	-	-	-	-	-
Stage 2	100	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	828	1002	-	-	1537	-
Stage 1	960	-	-	-	-	-
Stage 2	924	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	821	1002	-	-	1537	-
Mov Cap-2 Maneuver	821	-	-	-	-	-
Stage 1	960	-	-	-	-	-
Stage 2	916	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	1.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	956	1537	-
HCM Lane V/C Ratio	-	-	0.039	0.009	-
HCM Control Delay (s)	-	-	8.9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	236	86	116	336	0	400	273
Future Volume (veh/h)	236	86	116	336	0	400	273
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Work Zone On Approach	No			No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870		1870	1870
Adj Flow Rate, veh/h	254	92	125	361		430	294
Peak Hour Factor	0.93	0.93	0.93	0.93		0.93	0.93
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	610	886	251	1924		1025	457
Arrive On Green	0.18	0.18	0.14	0.54		0.29	0.29
Sat Flow, veh/h	3456	2790	1781	3647		3647	1585
Grp Volume(v), veh/h	254	92	125	361		430	294
Grp Sat Flow(s),veh/h/ln	1728	1395	1781	1777		1777	1585
Q Serve(g_s), s	2.9	1.0	2.9	2.3		4.4	7.2
Cycle Q Clear(g_c), s	2.9	1.0	2.9	2.3		4.4	7.2
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	610	886	251	1924		1025	457
V/C Ratio(X)	0.42	0.10	0.50	0.19		0.42	0.64
Avail Cap(c_a), veh/h	1392	1517	399	3133		2736	1220
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	16.4	10.8	17.7	5.2		12.9	13.9
Incr Delay (d2), s/veh	0.5	0.1	1.5	0.0		0.3	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.0	1.1	0.5		1.3	2.1
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	16.8	10.8	19.2	5.3		13.1	15.4
LnGrp LOS	B	B	B	A		B	B
Approach Vol, veh/h	346			486		724	
Approach Delay, s/veh	15.2			8.9		14.1	
Approach LOS	B			A		B	

Timer - Assigned Phs		2		4	5	6	
Phs Duration (G+Y+Rc), s		30.3		14.4	11.3	19.0	
Change Period (Y+Rc), s		* 6.1		6.5	5.0	* 6.1	
Max Green Setting (Gmax), s		* 39		18.0	10.0	* 34	
Max Q Clear Time (g_c+I1), s		4.3		4.9	4.9	9.2	
Green Ext Time (p_c), s		2.3		1.0	0.1	3.7	

Intersection Summary	
HCM 6th Ctrl Delay	12.7
HCM 6th LOS	B

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

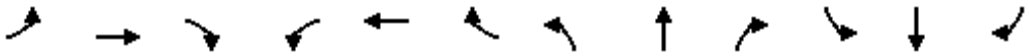
Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	187	67	48	104	5
Future Vol, veh/h	0	187	67	48	104	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	225	81	58	125	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	139	0	-	0	335	110
Stage 1	-	-	-	-	110	-
Stage 2	-	-	-	-	225	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1445	-	-	-	660	943
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1445	-	-	-	660	943
Mov Cap-2 Maneuver	-	-	-	-	660	-
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	812	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1445	-	-	-	669
HCM Lane V/C Ratio	-	-	-	-	0.196
HCM Control Delay (s)	0	-	-	-	11.7
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.7



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	16	231	85	12	17	154	327	115	12	361	6
Future Volume (veh/h)	5	16	231	85	12	17	154	327	115	12	361	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	6	18	257	94	13	19	171	363	128	13	401	7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	42	370	313	329	671	568	212	688	239	20	566	10
Arrive On Green	0.02	0.20	0.20	0.18	0.36	0.36	0.12	0.27	0.27	0.01	0.16	0.16
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	2587	899	1781	3574	62
Grp Volume(v), veh/h	6	18	257	94	13	19	171	248	243	13	199	209
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1709	1781	1777	1859
Q Serve(g_s), s	0.2	0.5	10.4	3.1	0.3	0.5	6.3	8.0	8.2	0.5	7.1	7.2
Cycle Q Clear(g_c), s	0.2	0.5	10.4	3.1	0.3	0.5	6.3	8.0	8.2	0.5	7.1	7.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.53	1.00		0.03
Lane Grp Cap(c), veh/h	42	370	313	329	671	568	212	473	455	20	281	294
V/C Ratio(X)	0.14	0.05	0.82	0.29	0.02	0.03	0.81	0.52	0.54	0.65	0.71	0.71
Avail Cap(c_a), veh/h	410	834	707	410	834	707	212	610	587	93	491	514
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.2	21.9	25.8	23.6	13.9	14.0	28.9	21.0	21.1	33.1	26.8	26.8
Incr Delay (d2), s/veh	1.5	0.1	5.3	0.5	0.0	0.0	20.1	0.9	1.0	30.3	3.3	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.2	4.2	1.3	0.1	0.2	3.7	3.1	3.1	0.4	3.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.7	21.9	31.1	24.1	13.9	14.0	49.0	21.9	22.1	63.5	30.1	30.0
LnGrp LOS	C	C	C	C	B	B	D	C	C	E	C	C
Approach Vol, veh/h		281			126			662			421	
Approach Delay, s/veh		30.6			21.5			29.0			31.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	24.3	16.4	19.8	14.0	17.1	5.6	30.6
Change Period (Y+Rc), s	6.0	6.4	4.0	6.5	6.0	6.4	4.0	6.5
Max Green Setting (Gmax), s	3.5	23.1	15.5	30.0	8.0	18.6	15.5	30.0
Max Q Clear Time (g_c+I1), s	2.5	10.2	5.1	12.4	8.3	9.2	2.2	2.5
Green Ext Time (p_c), s	0.0	2.3	0.1	0.9	0.0	1.5	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	29.3
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	34.8

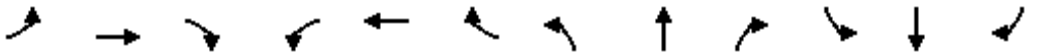
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	103	225	143	525	641	156
Future Vol, veh/h	103	225	143	525	641	156
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	117	256	163	597	728	177

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1740	817	905	0	-	0
Stage 1	817	-	-	-	-	-
Stage 2	923	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 96	376	752	-	-	-
Stage 1	434	-	-	-	-	-
Stage 2	387	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 65	376	752	-	-	-
Mov Cap-2 Maneuver	~ 65	-	-	-	-	-
Stage 1	293	-	-	-	-	-
Stage 2	387	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	185.3	2.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	752	-	65	376	-	-
HCM Lane V/C Ratio	0.216	-	1.801	0.68	-	-
HCM Control Delay (s)	11.1	0$	518.6	32.7	-	-
HCM Lane LOS	B	A	F	D	-	-
HCM 95th %tile Q(veh)	0.8	-	10.6	4.8	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	11	93	0	82	39	622	38	14	877	11
Future Volume (veh/h)	7	0	11	93	0	82	39	622	38	14	877	11
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	8	0	12	106	0	93	44	707	43	16	997	12
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	25	0	38	242	0	215	110	829	702	56	1484	18
Arrive On Green	0.04	0.00	0.04	0.14	0.00	0.14	0.06	0.44	0.44	0.03	0.41	0.41
Sat Flow, veh/h	663	0	995	1781	0	1585	1781	1870	1585	1781	3596	43
Grp Volume(v), veh/h	20	0	0	106	0	93	44	707	43	16	493	516
Grp Sat Flow(s),veh/h/ln	1658	0	0	1781	0	1585	1781	1870	1585	1781	1777	1863
Q Serve(g_s), s	0.7	0.0	0.0	3.1	0.0	3.0	1.3	19.1	0.9	0.5	12.7	12.7
Cycle Q Clear(g_c), s	0.7	0.0	0.0	3.1	0.0	3.0	1.3	19.1	0.9	0.5	12.7	12.7
Prop In Lane	0.40		0.60	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	63	0	0	242	0	215	110	829	702	56	733	769
V/C Ratio(X)	0.32	0.00	0.00	0.44	0.00	0.43	0.40	0.85	0.06	0.29	0.67	0.67
Avail Cap(c_a), veh/h	854	0	0	253	0	225	263	1159	982	263	1101	1154
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.4	0.0	0.0	22.4	0.0	22.3	25.4	14.0	9.0	26.7	13.4	13.4
Incr Delay (d2), s/veh	2.8	0.0	0.0	1.2	0.0	1.4	2.3	4.6	0.0	2.8	1.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.3	0.0	1.1	0.6	6.9	0.2	0.2	4.0	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.2	0.0	0.0	23.6	0.0	23.7	27.7	18.6	9.0	29.4	14.5	14.5
LnGrp LOS	C	A	A	C	A	C	C	B	A	C	B	B
Approach Vol, veh/h		20			199			794			1025	
Approach Delay, s/veh		29.2			23.7			18.6			14.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	30.3		7.6	7.7	28.6		12.3				
Change Period (Y+Rc), s	* 4.2	5.4		5.5	* 4.2	5.4		4.7				
Max Green Setting (Gmax), s	* 8.3	34.9		29.0	* 8.3	34.9		8.0				
Max Q Clear Time (g_c+I1), s	2.5	21.1		2.7	3.3	14.7		5.1				
Green Ext Time (p_c), s	0.0	3.9		0.1	0.0	5.9		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		17.3	
HCM 6th LOS		B	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

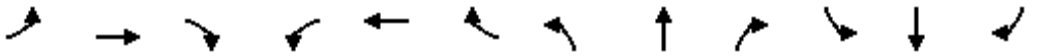
Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1034	6	37	720	6	4
Future Vol, veh/h	1034	6	37	720	6	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1100	6	39	766	6	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1106	0	1564	553
Stage 1	-	-	-	-	1103	-
Stage 2	-	-	-	-	461	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	627	-	102	477
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	601	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	627	-	96	477
Mov Cap-2 Maneuver	-	-	-	-	96	-
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	564	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	32.6
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	141	-	-	627	-
HCM Lane V/C Ratio	0.075	-	-	0.063	-
HCM Control Delay (s)	32.6	-	-	11.1	-
HCM Lane LOS	D	-	-	B	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	878	71	35	591	79	40	1	20	53	2	34
Future Volume (veh/h)	54	878	71	35	591	79	40	1	20	53	2	34
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	976	79	39	657	88	44	1	22	59	2	38
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	137	1191	96	88	1179	526	128	8	173	174	10	189
Arrive On Green	0.08	0.36	0.36	0.05	0.33	0.33	0.07	0.11	0.11	0.10	0.12	0.12
Sat Flow, veh/h	1781	3329	269	1781	3554	1585	1781	69	1526	1781	80	1517
Grp Volume(v), veh/h	60	521	534	39	657	88	44	0	23	59	0	40
Grp Sat Flow(s),veh/h/ln	1781	1777	1822	1781	1777	1585	1781	0	1596	1781	0	1597
Q Serve(g_s), s	1.7	14.4	14.4	1.1	8.2	2.1	1.3	0.0	0.7	1.7	0.0	1.2
Cycle Q Clear(g_c), s	1.7	14.4	14.4	1.1	8.2	2.1	1.3	0.0	0.7	1.7	0.0	1.2
Prop In Lane	1.00		0.15	1.00		1.00	1.00		0.96	1.00		0.95
Lane Grp Cap(c), veh/h	137	636	652	88	1179	526	128	0	180	174	0	199
V/C Ratio(X)	0.44	0.82	0.82	0.44	0.56	0.17	0.34	0.00	0.13	0.34	0.00	0.20
Avail Cap(c_a), veh/h	235	725	744	202	1391	620	264	0	1036	373	0	1111
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.8	15.7	15.7	24.9	14.8	12.7	23.8	0.0	21.5	22.7	0.0	21.2
Incr Delay (d2), s/veh	2.2	6.6	6.5	3.5	0.4	0.1	1.6	0.0	0.3	1.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	5.6	5.7	0.5	2.7	0.7	0.6	0.0	0.3	0.7	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.0	22.4	22.2	28.4	15.2	12.9	25.4	0.0	21.8	23.8	0.0	21.7
LnGrp LOS	C	C	C	C	B	B	C	A	C	C	A	C
Approach Vol, veh/h		1115			784			67			99	
Approach Delay, s/veh		22.5			15.6			24.2			23.0	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	24.7	9.4	12.7	8.5	23.3	10.0	12.1
Change Period (Y+Rc), s	4.5	5.4	5.5	6.0	4.4	5.4	* 4.7	6.0
Max Green Setting (Gmax), s	6.1	22.0	8.0	37.5	7.1	21.1	* 11	35.0
Max Q Clear Time (g_c+I1), s	3.1	16.4	3.3	3.2	3.7	10.2	3.7	2.7
Green Ext Time (p_c), s	0.0	2.9	0.0	0.2	0.0	3.3	0.1	0.1

Intersection Summary	
HCM 6th Ctrl Delay	19.9
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	11	54	5	31	77
Future Vol, veh/h	3	11	54	5	31	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	13	64	6	36	91

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	230	67	0	0	70	0
Stage 1	67	-	-	-	-	-
Stage 2	163	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	758	997	-	-	1531	-
Stage 1	956	-	-	-	-	-
Stage 2	866	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	739	997	-	-	1531	-
Mov Cap-2 Maneuver	739	-	-	-	-	-
Stage 1	956	-	-	-	-	-
Stage 2	844	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	2.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	928	1531	-
HCM Lane V/C Ratio	-	-	0.018	0.024	-
HCM Control Delay (s)	-	-	8.9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	344	333	154	376	0	717	206
Future Volume (veh/h)	344	333	154	376	0	717	206
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Work Zone On Approach	No			No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870		1870	1870
Adj Flow Rate, veh/h	370	358	166	404		771	222
Peak Hour Factor	0.93	0.93	0.93	0.93		0.93	0.93
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	626	898	251	2040		1194	533
Arrive On Green	0.18	0.18	0.14	0.57		0.34	0.34
Sat Flow, veh/h	3456	2790	1781	3647		3647	1585
Grp Volume(v), veh/h	370	358	166	404		771	222
Grp Sat Flow(s),veh/h/ln	1728	1395	1781	1777		1777	1585
Q Serve(g_s), s	5.1	5.1	4.5	2.8		9.5	5.6
Cycle Q Clear(g_c), s	5.1	5.1	4.5	2.8		9.5	5.6
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	626	898	251	2040		1194	533
V/C Ratio(X)	0.59	0.40	0.66	0.20		0.65	0.42
Avail Cap(c_a), veh/h	1209	1369	346	2720		2375	1059
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	19.3	13.6	20.9	5.3		14.5	13.2
Incr Delay (d2), s/veh	0.9	0.3	3.0	0.0		0.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	4.3	1.8	0.6		3.0	1.6
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	20.2	13.9	23.9	5.3		15.1	13.7
LnGrp LOS	C	B	C	A		B	B
Approach Vol, veh/h	728			570		993	
Approach Delay, s/veh	17.1			10.7		14.8	
Approach LOS	B			B		B	

Timer - Assigned Phs		2		4	5	6	
Phs Duration (G+Y+Rc), s		35.6		15.8	12.3	23.4	
Change Period (Y+Rc), s		* 6.1		6.5	5.0	* 6.1	
Max Green Setting (Gmax), s		* 39		18.0	10.0	* 34	
Max Q Clear Time (g_c+I1), s		4.8		7.1	6.5	11.5	
Green Ext Time (p_c), s		2.7		2.2	0.1	5.8	

Intersection Summary	
HCM 6th Ctrl Delay	14.5
HCM 6th LOS	B

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

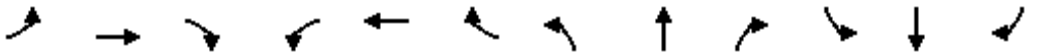
Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	100	153	80	33	3
Future Vol, veh/h	2	100	153	80	33	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	120	184	96	40	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	280	0	-	0	356	232
Stage 1	-	-	-	-	232	-
Stage 2	-	-	-	-	124	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1283	-	-	-	642	807
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	902	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1283	-	-	-	641	807
Mov Cap-2 Maneuver	-	-	-	-	641	-
Stage 1	-	-	-	-	805	-
Stage 2	-	-	-	-	902	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1283	-	-	-	652
HCM Lane V/C Ratio	0.002	-	-	-	0.067
HCM Control Delay (s)	7.8	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	22	109	84	33	21	195	624	101	13	344	21
Future Volume (veh/h)	7	22	109	84	33	21	195	624	101	13	344	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	8	24	121	93	37	23	217	693	112	14	382	23
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	56	209	177	353	521	441	240	898	145	22	582	35
Arrive On Green	0.03	0.11	0.11	0.20	0.28	0.28	0.13	0.29	0.29	0.01	0.17	0.17
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	3063	495	1781	3406	204
Grp Volume(v), veh/h	8	24	121	93	37	23	217	402	403	14	199	206
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1781	1781	1777	1834
Q Serve(g_s), s	0.3	0.7	4.4	2.6	0.9	0.6	7.1	12.3	12.3	0.5	6.2	6.3
Cycle Q Clear(g_c), s	0.3	0.7	4.4	2.6	0.9	0.6	7.1	12.3	12.3	0.5	6.2	6.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.28	1.00		0.11
Lane Grp Cap(c), veh/h	56	209	177	353	521	441	240	521	522	22	304	313
V/C Ratio(X)	0.14	0.11	0.68	0.26	0.07	0.05	0.91	0.77	0.77	0.65	0.65	0.66
Avail Cap(c_a), veh/h	464	943	799	464	943	799	240	690	692	105	556	573
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.0	23.8	25.4	20.2	15.8	15.7	25.4	19.2	19.2	29.3	23.0	23.0
Incr Delay (d2), s/veh	1.2	0.2	4.6	0.4	0.1	0.0	34.1	3.9	3.9	28.0	2.4	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.3	1.8	1.1	0.4	0.2	5.0	4.9	4.9	0.4	2.5	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.2	24.0	30.0	20.6	15.9	15.8	59.5	23.1	23.1	57.2	25.4	25.4
LnGrp LOS	C	C	C	C	B	B	E	C	C	E	C	C
Approach Vol, veh/h		153			153			1022			419	
Approach Delay, s/veh		29.0			18.7			30.8			26.5	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.7	23.8	15.8	13.1	14.0	16.6	5.9	23.1
Change Period (Y+Rc), s	6.0	6.4	4.0	6.5	6.0	6.4	4.0	6.5
Max Green Setting (Gmax), s	3.5	23.1	15.5	30.0	8.0	18.6	15.5	30.0
Max Q Clear Time (g_c+I1), s	2.5	14.3	4.6	6.4	9.1	8.3	2.3	2.9
Green Ext Time (p_c), s	0.0	3.1	0.1	0.5	0.0	1.6	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	28.6
HCM 6th LOS	C

APPENDIX D

K&D FACTORS DEFINITIONS

PEAK HOUR VOLUME DATA

Peak hour volume data consists of hourly volume relationships and data location. The hourly volumes are expressed as a percentage of the Annual Average Daily Traffic (AADT). The percentages are shown for both the AM and the PM peak periods.

The principle data described here are the K factor, the D factor and their product (KD). The K factor is the percentage of AADT during the peak hour for both directions of travel. The D factor is the percentage of the peak hour travel in the peak direction. KD multiplied with the AADT gives the one way peak period directional flow rate or the design hourly volume (DHV). The design hourly volume is used for either Operational Analysis or Design Analysis. Refer to the 2016 Highway Capacity Manual, 6th Edition A Guide for Multimodal Mobility Analysis for more details.

Following is a glossary of terms used in this listing of peak hour volume data:

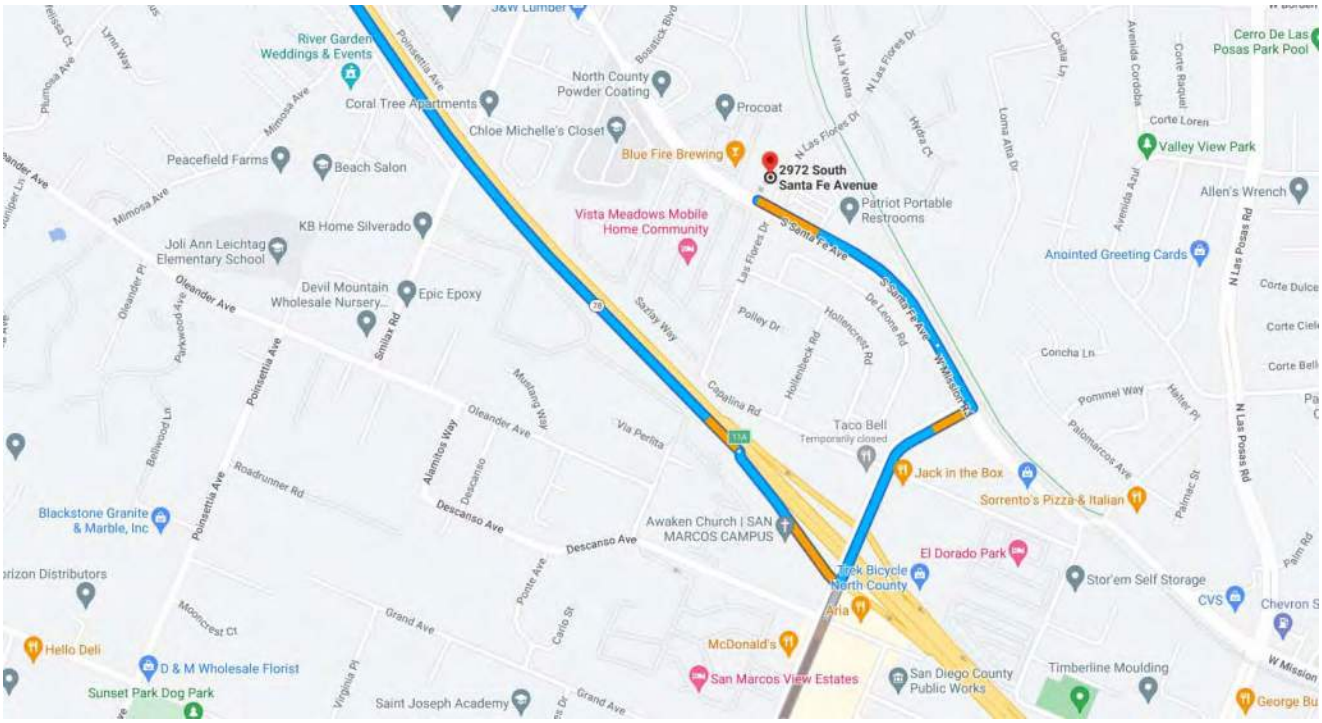
Dir	Indicates direction of travel for peak volume.
AADT	Annual Average Daily Traffic in vehicles per day (vpd).
AM Peak	Represents the morning peak period for traffic analysis.
CS	Control Station Number, Caltrans identification number for monitoring site.
CO	County abbreviation used by Caltrans.
D	D factor. The percentage of traffic in the peak direction during the peak hour. Values in this book are derived by dividing the measured PHV by the sum of both directions of travel during the peak hour.
DAY	Day of week for the peak volume.
DDHV	The directional design hour volume, in vehicles per hour (vph) DDHV=AADTxKxD. See Equation (3-1) on Page 3-13 of the 2016 Highway Capacity Manual.
DI	Caltrans has twelve transportation districts statewide. This abbreviation identifies the district in which the count station is located.
HR	The ending time for the peak hour volume listed. The volume observed from 1 to 2 would be recorded as 2.

K	The percentage of the AADT in both directions during the peak hour. Values in this table are derived by dividing the measured 2-way PHV by the AADT.
KD	The product of K and D. The percentage of AADT in the peak direction during the peak hour. Values in this table are derived by dividing the measured 1-way PHV by the AADT.
LEG	For traffic counting purposes, a highway intersection or interchange is assigned two legs according to increasing postmiles (route direction) and with a postmile reference at the center of the intersection or interchange. The volume of traffic on each leg is denoted by an A, B or O. A = ahead leg, B = back leg, and O – traffic volume being same for both back and ahead legs.
MNTH	The month that the peak volume occurred.
PHV	Peak Hour Volume in the peak direction. A one way volume in vehicles per hour (vph) as used here. The PHV is analogous to the DDHV as used for design purposes.
PM	The Post Mile is the mileage measured from the county line, or from the beginning of a route. Each postmile along a route in a county is a unique location on the state highway system.
PM Peak	Represents the afternoon peak period for traffic analysis.
PRE	The postmile may have a prefix like R, T, L, M, etc. When a length of highway is changed due to construction or realigment, new postmile values are assigned. To distinguish the new values from the old, an alpha code is prefixed to the new postmile.
RTE	The state highway route number.
YR	The year when the count was made. Traffic counting is on a 3-year cycle.

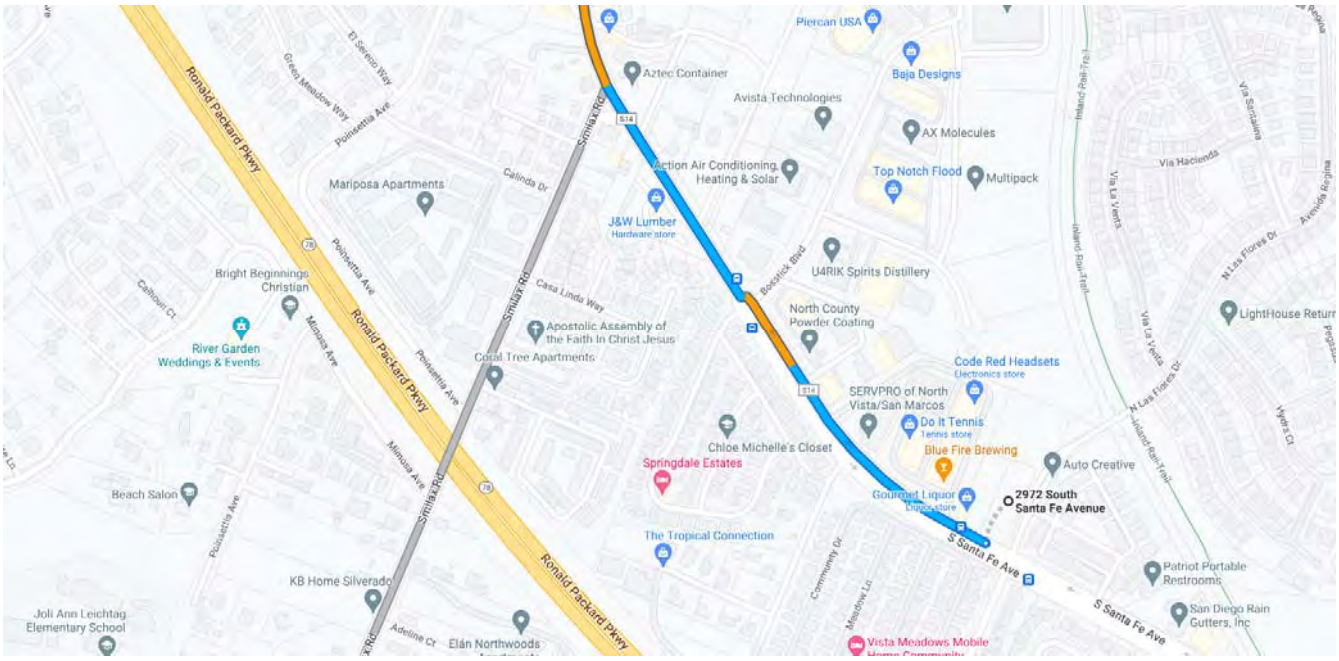
APPENDIX E

TRAVEL ROUTE MAPS

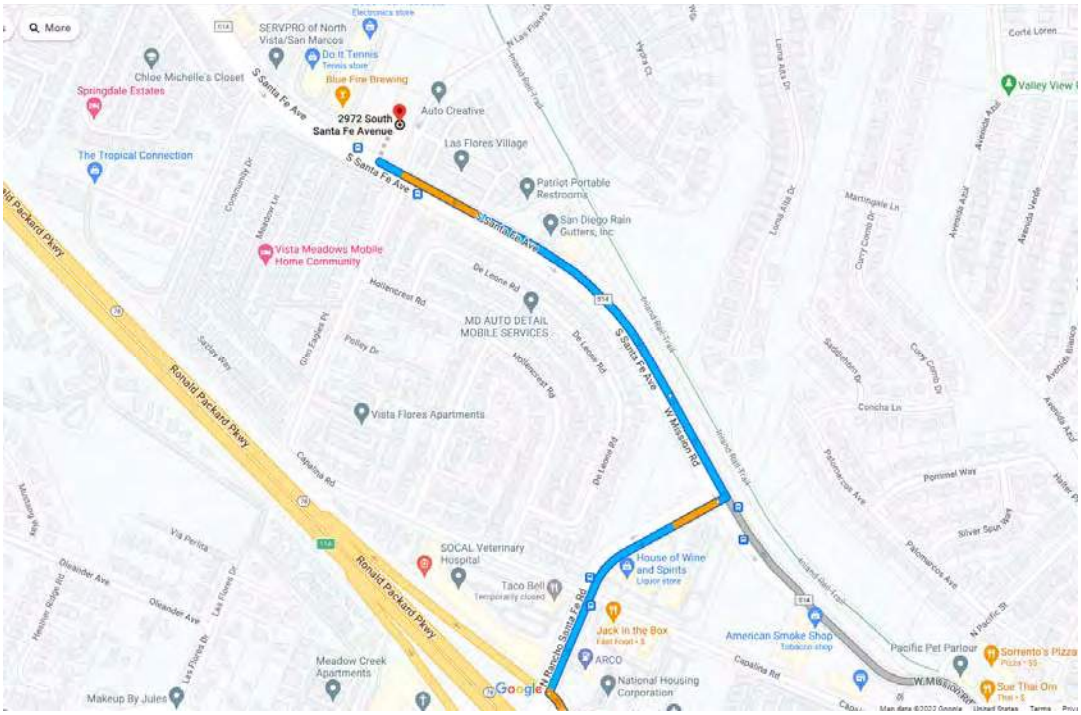
From Oceanside



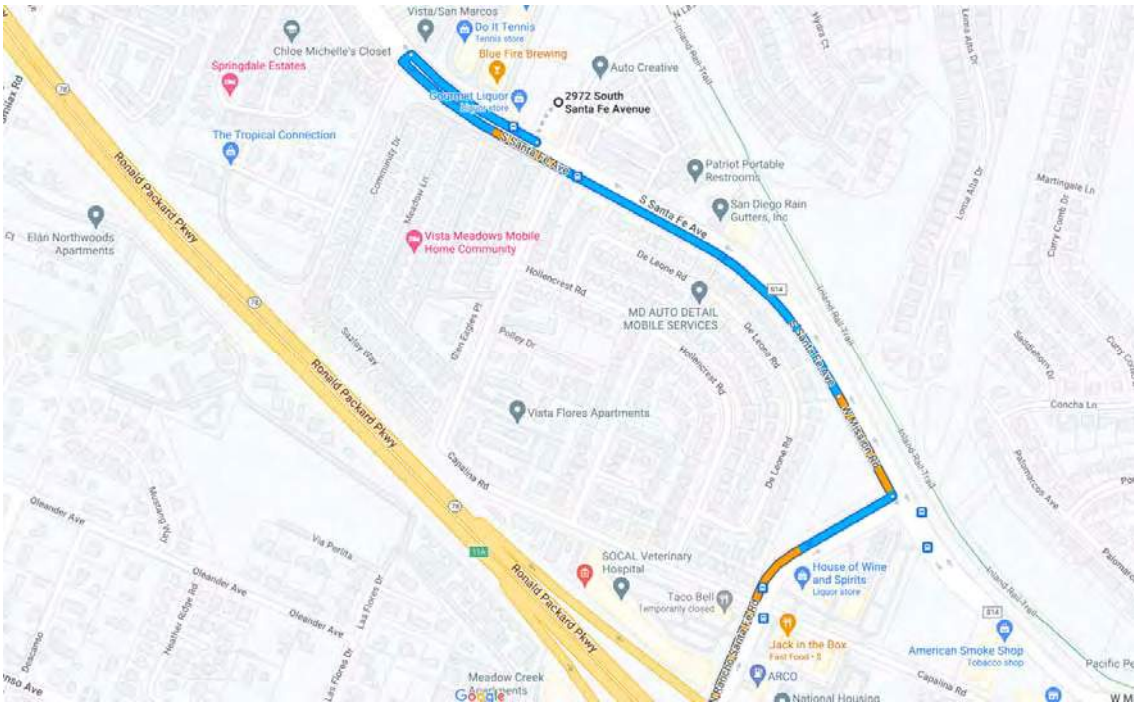
To Oceanside



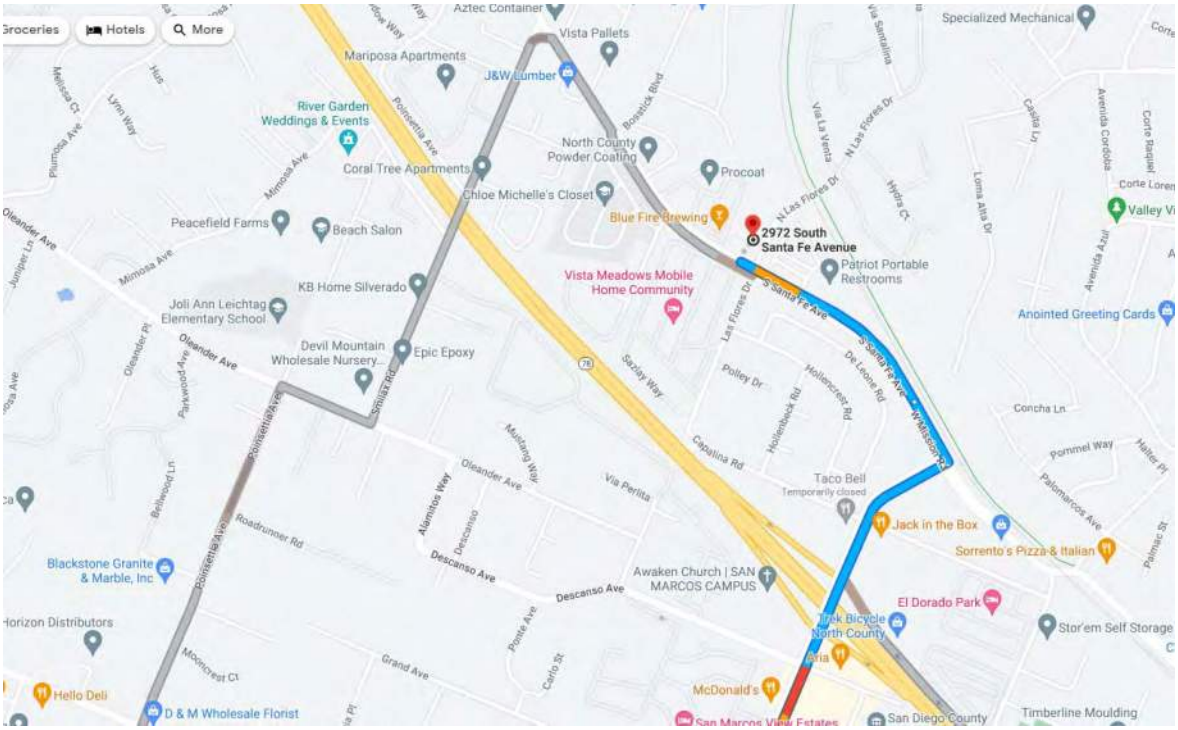
From Escondido



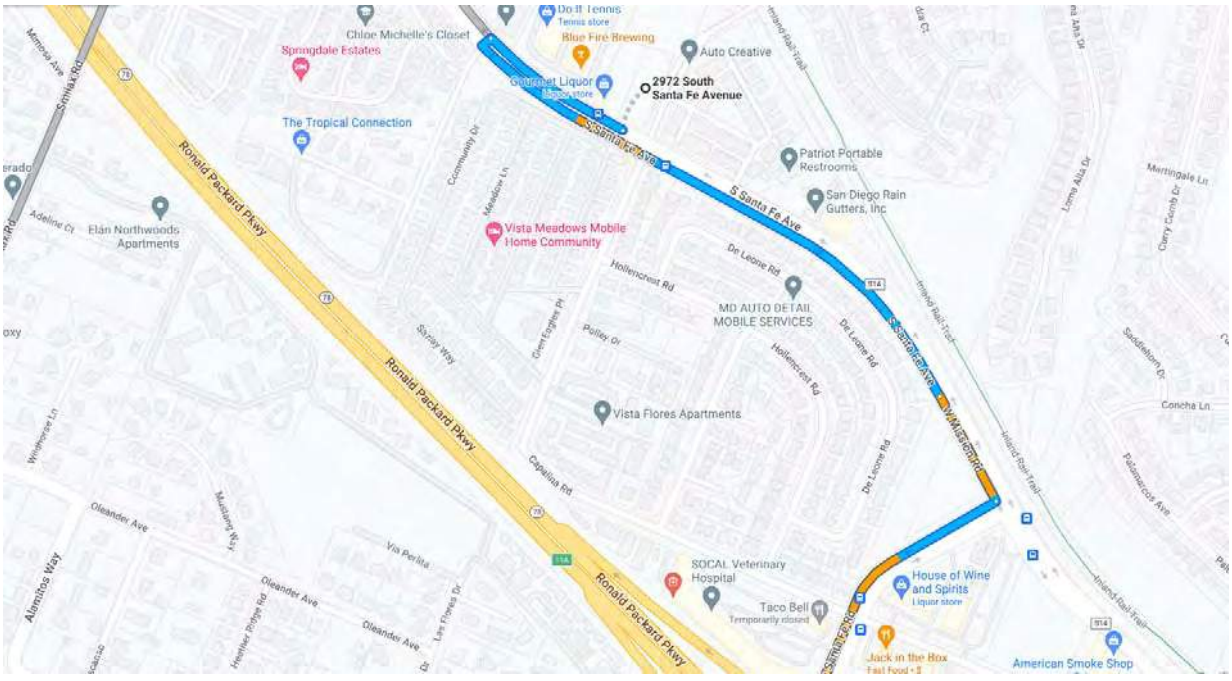
To Escondido



From Rancho Santa Fe



To Rancho Santa Fe



APPENDIX F

ANALYSIS WORKSHEETS – NEAR-TERM

Intersection	
Int Delay, s/veh	25.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	96	155	252	298	420	228
Future Vol, veh/h	96	155	252	298	420	228
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	109	176	286	339	477	259

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1518	607	736	0	-	0
Stage 1	607	-	-	-	-	-
Stage 2	911	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	131	496	870	-	-	-
Stage 1	544	-	-	-	-	-
Stage 2	392	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 78	496	870	-	-	-
Mov Cap-2 Maneuver	~ 78	-	-	-	-	-
Stage 1	324	-	-	-	-	-
Stage 2	392	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	137.5	5.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	870	-	78	496	-	-
HCM Lane V/C Ratio	0.329	-	1.399	0.355	-	-
HCM Control Delay (s)	11.2	0	$ 333.4	16.2	-	-
HCM Lane LOS	B	A	F	C	-	-
HCM 95th %tile Q(veh)	1.4	-	8.6	1.6	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	23	77	0	39	22	508	96	87	480	6
Future Volume (veh/h)	10	0	23	77	0	39	22	508	96	87	480	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	26	88	0	44	25	577	109	99	545	7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	30	0	71	214	0	191	71	697	590	194	1587	20
Arrive On Green	0.06	0.00	0.06	0.12	0.00	0.12	0.04	0.37	0.37	0.11	0.44	0.44
Sat Flow, veh/h	487	0	1152	1781	0	1585	1781	1870	1585	1781	3593	46
Grp Volume(v), veh/h	37	0	0	88	0	44	25	577	109	99	269	283
Grp Sat Flow(s),veh/h/ln	1639	0	0	1781	0	1585	1781	1870	1585	1781	1777	1862
Q Serve(g_s), s	1.3	0.0	0.0	2.7	0.0	1.5	0.8	16.5	2.7	3.1	5.9	5.9
Cycle Q Clear(g_c), s	1.3	0.0	0.0	2.7	0.0	1.5	0.8	16.5	2.7	3.1	5.9	5.9
Prop In Lane	0.30		0.70	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	101	0	0	214	0	191	71	697	590	194	785	822
V/C Ratio(X)	0.37	0.00	0.00	0.41	0.00	0.23	0.35	0.83	0.18	0.51	0.34	0.34
Avail Cap(c_a), veh/h	808	0	0	242	0	216	251	1109	940	251	1054	1105
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.5	0.0	0.0	24.0	0.0	23.4	27.5	16.8	12.4	24.7	10.8	10.8
Incr Delay (d2), s/veh	2.2	0.0	0.0	1.3	0.0	0.6	2.9	3.0	0.1	2.1	0.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	1.1	0.0	0.6	0.4	6.2	0.8	1.3	1.8	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.7	0.0	0.0	25.2	0.0	24.0	30.4	19.7	12.6	26.8	11.1	11.1
LnGrp LOS	C	A	A	C	A	C	C	B	B	C	B	B
Approach Vol, veh/h		37			132			711			651	
Approach Delay, s/veh		28.7			24.8			19.0			13.5	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.6	27.3		9.1	6.5	31.4		11.8				
Change Period (Y+Rc), s	* 4.2	5.4		5.5	* 4.2	5.4		4.7				
Max Green Setting (Gmax), s	* 8.3	34.9		29.0	* 8.3	34.9		8.0				
Max Q Clear Time (g_c+I1), s	5.1	18.5		3.3	2.8	7.9		4.7				
Green Ext Time (p_c), s	0.1	3.4		0.1	0.0	3.0		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		17.4
HCM 6th LOS		B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

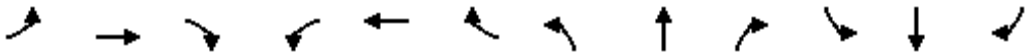
Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	674	6	10	612	9	7
Future Vol, veh/h	674	6	10	612	9	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	717	6	11	651	10	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	723	0	1068	362
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	348	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	875	-	217	635
Stage 1	-	-	-	-	443	-
Stage 2	-	-	-	-	686	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	875	-	214	635
Mov Cap-2 Maneuver	-	-	-	-	214	-
Stage 1	-	-	-	-	443	-
Stage 2	-	-	-	-	677	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	17.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	301	-	-	875	-
HCM Lane V/C Ratio	0.057	-	-	0.012	-
HCM Control Delay (s)	17.7	-	-	9.2	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	523	27	46	505	35	41	3	30	129	12	39
Future Volume (veh/h)	36	523	27	46	505	35	41	3	30	129	12	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	40	581	30	51	561	39	46	3	33	143	13	43
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	107	851	44	109	891	397	135	16	177	278	70	233
Arrive On Green	0.06	0.25	0.25	0.06	0.25	0.25	0.08	0.12	0.12	0.16	0.18	0.18
Sat Flow, veh/h	1781	3438	177	1781	3554	1585	1781	134	1472	1781	381	1262
Grp Volume(v), veh/h	40	300	311	51	561	39	46	0	36	143	0	56
Grp Sat Flow(s),veh/h/ln	1781	1777	1838	1781	1777	1585	1781	0	1605	1781	0	1643
Q Serve(g_s), s	1.1	7.6	7.6	1.4	7.0	0.9	1.2	0.0	1.0	3.7	0.0	1.4
Cycle Q Clear(g_c), s	1.1	7.6	7.6	1.4	7.0	0.9	1.2	0.0	1.0	3.7	0.0	1.4
Prop In Lane	1.00		0.10	1.00		1.00	1.00		0.92	1.00		0.77
Lane Grp Cap(c), veh/h	107	440	455	109	891	397	135	0	193	278	0	303
V/C Ratio(X)	0.38	0.68	0.68	0.47	0.63	0.10	0.34	0.00	0.19	0.51	0.00	0.18
Avail Cap(c_a), veh/h	255	788	815	219	1512	674	287	0	1133	406	0	1242
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.4	16.9	16.9	22.5	16.5	14.3	21.7	0.0	19.6	19.2	0.0	17.1
Incr Delay (d2), s/veh	2.2	1.9	1.8	3.1	0.7	0.1	1.5	0.0	0.5	1.5	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.7	2.8	0.6	2.3	0.3	0.5	0.0	0.4	1.5	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.6	18.8	18.7	25.6	17.3	14.4	23.2	0.0	20.1	20.7	0.0	17.4
LnGrp LOS	C	B	B	C	B	B	C	A	C	C	A	B
Approach Vol, veh/h		651			651			82			199	
Approach Delay, s/veh		19.1			17.8			21.9			19.7	
Approach LOS		B			B			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.5	17.7	9.3	15.1	7.4	17.8	12.4	12.0
Change Period (Y+Rc), s	4.5	5.4	5.5	6.0	4.4	5.4	* 4.7	6.0
Max Green Setting (Gmax), s	6.1	22.0	8.0	37.5	7.1	21.1	* 11	35.0
Max Q Clear Time (g_c+I1), s	3.4	9.6	3.2	3.4	3.1	9.0	5.7	3.0
Green Ext Time (p_c), s	0.0	2.7	0.0	0.3	0.0	2.8	0.2	0.2

Intersection Summary	
HCM 6th Ctrl Delay	18.8
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	26	53	5	13	64
Future Vol, veh/h	7	26	53	5	13	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	31	62	6	15	75

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	170	65	0	0	68	0
Stage 1	65	-	-	-	-	-
Stage 2	105	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	820	999	-	-	1533	-
Stage 1	958	-	-	-	-	-
Stage 2	919	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	812	999	-	-	1533	-
Mov Cap-2 Maneuver	812	-	-	-	-	-
Stage 1	958	-	-	-	-	-
Stage 2	910	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	1.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	952	1533	-
HCM Lane V/C Ratio	-	-	0.041	0.01	-
HCM Control Delay (s)	-	-	8.9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	244	91	122	349	0	416	282
Future Volume (veh/h)	244	91	122	349	0	416	282
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Work Zone On Approach	No			No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870		1870	1870
Adj Flow Rate, veh/h	262	98	131	375		447	303
Peak Hour Factor	0.93	0.93	0.93	0.93		0.93	0.93
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	603	885	254	1946		1047	467
Arrive On Green	0.17	0.17	0.14	0.55		0.29	0.29
Sat Flow, veh/h	3456	2790	1781	3647		3647	1585
Grp Volume(v), veh/h	262	98	131	375		447	303
Grp Sat Flow(s),veh/h/ln	1728	1395	1781	1777		1777	1585
Q Serve(g_s), s	3.1	1.1	3.1	2.4		4.6	7.6
Cycle Q Clear(g_c), s	3.1	1.1	3.1	2.4		4.6	7.6
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	603	885	254	1946		1047	467
V/C Ratio(X)	0.43	0.11	0.52	0.19		0.43	0.65
Avail Cap(c_a), veh/h	1372	1505	393	3089		2697	1203
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	16.7	11.0	18.0	5.2		12.9	13.9
Incr Delay (d2), s/veh	0.5	0.1	1.6	0.0		0.3	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	1.2	0.5		1.4	2.2
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	17.2	11.0	19.6	5.2		13.2	15.5
LnGrp LOS	B	B	B	A		B	B
Approach Vol, veh/h	360			506		750	
Approach Delay, s/veh	15.5			9.0		14.1	
Approach LOS	B			A		B	

Timer - Assigned Phs		2		4	5	6	
Phs Duration (G+Y+Rc), s		30.9		14.4	11.5	19.5	
Change Period (Y+Rc), s		* 6.1		6.5	5.0	* 6.1	
Max Green Setting (Gmax), s		* 39		18.0	10.0	* 34	
Max Q Clear Time (g_c+I1), s		4.4		5.1	5.1	9.6	
Green Ext Time (p_c), s		2.4		1.0	0.1	3.8	

Intersection Summary		
HCM 6th Ctrl Delay		12.8
HCM 6th LOS		B

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

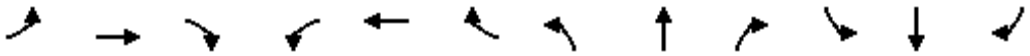
Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	188	67	48	105	6
Future Vol, veh/h	0	188	67	48	105	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	227	81	58	127	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	139	0	-	0	337	110
Stage 1	-	-	-	-	110	-
Stage 2	-	-	-	-	227	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1445	-	-	-	658	943
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	811	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1445	-	-	-	658	943
Mov Cap-2 Maneuver	-	-	-	-	658	-
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	811	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1445	-	-	-	669
HCM Lane V/C Ratio	-	-	-	-	0.2
HCM Control Delay (s)	0	-	-	-	11.7
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.7



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	16	233	86	13	18	156	340	117	13	376	6
Future Volume (veh/h)	6	16	233	86	13	18	156	340	117	13	376	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	7	18	259	96	14	20	173	378	130	14	418	7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	49	372	315	329	666	564	209	699	237	21	582	10
Arrive On Green	0.03	0.20	0.20	0.18	0.36	0.36	0.12	0.27	0.27	0.01	0.16	0.16
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	2604	884	1781	3577	60
Grp Volume(v), veh/h	7	18	259	96	14	20	173	256	252	14	207	218
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1711	1781	1777	1860
Q Serve(g_s), s	0.3	0.5	10.7	3.2	0.3	0.6	6.5	8.4	8.6	0.5	7.5	7.5
Cycle Q Clear(g_c), s	0.3	0.5	10.7	3.2	0.3	0.6	6.5	8.4	8.6	0.5	7.5	7.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.52	1.00		0.03
Lane Grp Cap(c), veh/h	49	372	315	329	666	564	209	477	459	21	289	303
V/C Ratio(X)	0.14	0.05	0.82	0.29	0.02	0.04	0.83	0.54	0.55	0.66	0.72	0.72
Avail Cap(c_a), veh/h	406	825	699	406	825	699	209	603	581	92	486	508
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.3	22.1	26.1	23.9	14.2	14.3	29.3	21.3	21.4	33.5	27.0	27.0
Incr Delay (d2), s/veh	1.3	0.1	5.4	0.5	0.0	0.0	23.0	0.9	1.0	29.4	3.3	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.2	4.3	1.3	0.1	0.2	3.9	3.3	3.2	0.4	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.7	22.1	31.5	24.4	14.2	14.3	52.3	22.2	22.4	62.9	30.3	30.2
LnGrp LOS	C	C	C	C	B	B	D	C	C	E	C	C
Approach Vol, veh/h		284			130			681			439	
Approach Delay, s/veh		30.9			21.8			29.9			31.3	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	24.7	16.6	20.0	14.0	17.5	5.9	30.7
Change Period (Y+Rc), s	6.0	6.4	4.0	6.5	6.0	6.4	4.0	6.5
Max Green Setting (Gmax), s	3.5	23.1	15.5	30.0	8.0	18.6	15.5	30.0
Max Q Clear Time (g_c+I1), s	2.5	10.6	5.2	12.7	8.5	9.5	2.3	2.6
Green Ext Time (p_c), s	0.0	2.3	0.1	0.9	0.0	1.5	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	29.8
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	49.6

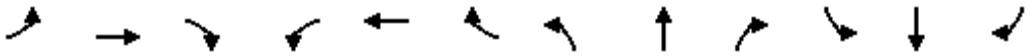
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	109	237	150	553	675	166
Future Vol, veh/h	109	237	150	553	675	166
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	124	269	170	628	767	189

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1830	862	956	0	-	0
Stage 1	862	-	-	-	-	-
Stage 2	968	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 84	355	719	-	-	-
Stage 1	414	-	-	-	-	-
Stage 2	368	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 54	355	719	-	-	-
Mov Cap-2 Maneuver	~ 54	-	-	-	-	-
Stage 1	264	-	-	-	-	-
Stage 2	368	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	265.7	2.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	719	-	54	355	-	-
HCM Lane V/C Ratio	0.237	-	2.294	0.759	-	-
HCM Control Delay (s)	11.6	0$	754.6	40.9	-	-
HCM Lane LOS	B	A	F	E	-	-
HCM 95th %tile Q(veh)	0.9	-	12.5	6	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	12	103	0	91	40	641	43	16	904	12
Future Volume (veh/h)	7	0	12	103	0	91	40	641	43	16	904	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	8	0	14	117	0	103	45	728	49	18	1027	14
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	25	0	43	238	0	212	111	843	714	62	1519	21
Arrive On Green	0.04	0.00	0.04	0.13	0.00	0.13	0.06	0.45	0.45	0.03	0.42	0.42
Sat Flow, veh/h	600	0	1051	1781	0	1585	1781	1870	1585	1781	3589	49
Grp Volume(v), veh/h	22	0	0	117	0	103	45	728	49	18	508	533
Grp Sat Flow(s),veh/h/ln	1651	0	0	1781	0	1585	1781	1870	1585	1781	1777	1862
Q Serve(g_s), s	0.8	0.0	0.0	3.5	0.0	3.5	1.4	20.4	1.0	0.6	13.5	13.5
Cycle Q Clear(g_c), s	0.8	0.0	0.0	3.5	0.0	3.5	1.4	20.4	1.0	0.6	13.5	13.5
Prop In Lane	0.36		0.64	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	68	0	0	238	0	212	111	843	714	62	752	788
V/C Ratio(X)	0.32	0.00	0.00	0.49	0.00	0.49	0.41	0.86	0.07	0.29	0.68	0.68
Avail Cap(c_a), veh/h	822	0	0	245	0	218	254	1121	950	254	1065	1116
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.1	0.0	0.0	23.4	0.0	23.4	26.3	14.4	9.1	27.4	13.6	13.6
Incr Delay (d2), s/veh	2.7	0.0	0.0	1.6	0.0	1.7	2.4	5.6	0.0	2.6	1.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.5	0.0	1.3	0.6	7.6	0.3	0.3	4.3	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.8	0.0	0.0	25.0	0.0	25.1	28.7	20.0	9.1	30.0	14.6	14.6
LnGrp LOS	C	A	A	C	A	C	C	B	A	C	B	B
Approach Vol, veh/h		22			220			822			1059	
Approach Delay, s/veh		29.8			25.0			19.8			14.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	31.6		7.9	7.8	30.0		12.5				
Change Period (Y+Rc), s	* 4.2	5.4		5.5	* 4.2	5.4		4.7				
Max Green Setting (Gmax), s	* 8.3	34.9		29.0	* 8.3	34.9		8.0				
Max Q Clear Time (g_c+I1), s	2.6	22.4		2.8	3.4	15.5		5.5				
Green Ext Time (p_c), s	0.0	3.9		0.1	0.0	6.1		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		18.0
HCM 6th LOS		B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

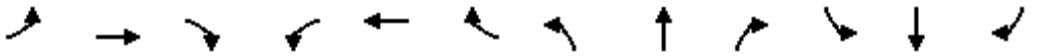
Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1052	6	37	733	6	5
Future Vol, veh/h	1052	6	37	733	6	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1119	6	39	780	6	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1125	0	1590	563
Stage 1	-	-	-	-	1122	-
Stage 2	-	-	-	-	468	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	617	-	98	470
Stage 1	-	-	-	-	273	-
Stage 2	-	-	-	-	597	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	617	-	92	470
Mov Cap-2 Maneuver	-	-	-	-	92	-
Stage 1	-	-	-	-	273	-
Stage 2	-	-	-	-	559	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	32
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	145	-	-	617	-
HCM Lane V/C Ratio	0.081	-	-	0.064	-
HCM Control Delay (s)	32	-	-	11.2	-
HCM Lane LOS	D	-	-	B	-
HCM 95th %tile Q(veh)	0.3	-	-	0.2	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	899	73	36	605	80	41	2	21	54	3	35
Future Volume (veh/h)	55	899	73	36	605	80	41	2	21	54	3	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	61	999	81	40	672	89	46	2	23	60	3	39
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	138	1200	97	89	1190	531	131	15	169	175	14	186
Arrive On Green	0.08	0.36	0.36	0.05	0.33	0.33	0.07	0.11	0.11	0.10	0.12	0.12
Sat Flow, veh/h	1781	3329	270	1781	3554	1585	1781	128	1476	1781	114	1488
Grp Volume(v), veh/h	61	533	547	40	672	89	46	0	25	60	0	42
Grp Sat Flow(s),veh/h/ln	1781	1777	1822	1781	1777	1585	1781	0	1605	1781	0	1603
Q Serve(g_s), s	1.8	15.0	15.0	1.2	8.5	2.2	1.3	0.0	0.8	1.7	0.0	1.3
Cycle Q Clear(g_c), s	1.8	15.0	15.0	1.2	8.5	2.2	1.3	0.0	0.8	1.7	0.0	1.3
Prop In Lane	1.00		0.15	1.00		1.00	1.00		0.92	1.00		0.93
Lane Grp Cap(c), veh/h	138	640	657	89	1190	531	131	0	184	175	0	200
V/C Ratio(X)	0.44	0.83	0.83	0.45	0.56	0.17	0.35	0.00	0.14	0.34	0.00	0.21
Avail Cap(c_a), veh/h	231	714	733	199	1370	611	260	0	1026	368	0	1098
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.1	16.0	16.0	25.3	14.9	12.8	24.1	0.0	21.8	23.0	0.0	21.5
Incr Delay (d2), s/veh	2.2	7.6	7.5	3.5	0.4	0.1	1.6	0.0	0.3	1.2	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	6.0	6.2	0.5	2.8	0.7	0.6	0.0	0.3	0.7	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.3	23.6	23.5	28.8	15.3	13.0	25.7	0.0	22.1	24.2	0.0	22.0
LnGrp LOS	C	C	C	C	B	B	C	A	C	C	A	C
Approach Vol, veh/h		1141			801			71			102	
Approach Delay, s/veh		23.7			15.8			24.4			23.3	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	25.1	9.5	12.8	8.6	23.7	10.1	12.3
Change Period (Y+Rc), s	4.5	5.4	5.5	6.0	4.4	5.4	* 4.7	6.0
Max Green Setting (Gmax), s	6.1	22.0	8.0	37.5	7.1	21.1	* 11	35.0
Max Q Clear Time (g_c+I1), s	3.2	17.0	3.3	3.3	3.8	10.5	3.7	2.8
Green Ext Time (p_c), s	0.0	2.7	0.0	0.2	0.0	3.3	0.1	0.1

Intersection Summary	
HCM 6th Ctrl Delay	20.7
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	12	57	6	32	81
Future Vol, veh/h	4	12	57	6	32	81
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	14	67	7	38	95

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	242	71	0	0	74	0
Stage 1	71	-	-	-	-	-
Stage 2	171	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	746	991	-	-	1526	-
Stage 1	952	-	-	-	-	-
Stage 2	859	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	727	991	-	-	1526	-
Mov Cap-2 Maneuver	727	-	-	-	-	-
Stage 1	952	-	-	-	-	-
Stage 2	837	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	2.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	909	1526	-
HCM Lane V/C Ratio	-	-	0.021	0.025	-
HCM Control Delay (s)	-	-	9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	356	350	162	391	0	746	213
Future Volume (veh/h)	356	350	162	391	0	746	213
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Work Zone On Approach	No			No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870		1870	1870
Adj Flow Rate, veh/h	383	376	174	420		802	229
Peak Hour Factor	0.93	0.93	0.93	0.93		0.93	0.93
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	640	906	248	2050		1220	544
Arrive On Green	0.19	0.19	0.14	0.58		0.34	0.34
Sat Flow, veh/h	3456	2790	1781	3647		3647	1585
Grp Volume(v), veh/h	383	376	174	420		802	229
Grp Sat Flow(s),veh/h/ln	1728	1395	1781	1777		1777	1585
Q Serve(g_s), s	5.4	5.6	4.9	3.0		10.1	5.9
Cycle Q Clear(g_c), s	5.4	5.6	4.9	3.0		10.1	5.9
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	640	906	248	2050		1220	544
V/C Ratio(X)	0.60	0.42	0.70	0.20		0.66	0.42
Avail Cap(c_a), veh/h	1174	1336	336	2642		2307	1029
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	19.8	14.0	21.8	5.4		14.8	13.4
Incr Delay (d2), s/veh	0.9	0.3	4.0	0.0		0.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.7	2.1	0.7		3.3	1.7
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	20.7	14.3	25.8	5.4		15.4	13.9
LnGrp LOS	C	B	C	A		B	B
Approach Vol, veh/h	759			594		1031	
Approach Delay, s/veh	17.5			11.4		15.0	
Approach LOS	B			B		B	

Timer - Assigned Phs		2		4	5	6	
Phs Duration (G+Y+Rc), s		36.7		16.3	12.4	24.3	
Change Period (Y+Rc), s		* 6.1		6.5	5.0	* 6.1	
Max Green Setting (Gmax), s		* 39		18.0	10.0	* 34	
Max Q Clear Time (g_c+I1), s		5.0		7.6	6.9	12.1	
Green Ext Time (p_c), s		2.8		2.2	0.1	6.0	

Intersection Summary	
HCM 6th Ctrl Delay	14.9
HCM 6th LOS	B

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

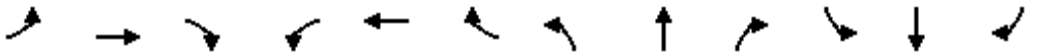
Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	101	155	81	34	4
Future Vol, veh/h	0	101	155	81	34	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	122	187	98	41	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	285	0	-	0	358	236
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	122	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1277	-	-	-	640	803
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	903	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1277	-	-	-	640	803
Mov Cap-2 Maneuver	-	-	-	-	640	-
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	903	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1277	-	-	-	654
HCM Lane V/C Ratio	-	-	-	-	0.07
HCM Control Delay (s)	0	-	-	-	10.9
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	23	110	85	34	22	197	649	102	14	359	22
Future Volume (veh/h)	7	23	110	85	34	22	197	649	102	14	359	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	8	26	122	94	38	24	219	721	113	16	399	24
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	56	210	178	351	520	441	235	920	144	24	614	37
Arrive On Green	0.03	0.11	0.11	0.20	0.28	0.28	0.13	0.30	0.30	0.01	0.18	0.18
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	3078	482	1781	3406	204
Grp Volume(v), veh/h	8	26	122	94	38	24	219	416	418	16	208	215
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1784	1781	1777	1834
Q Serve(g_s), s	0.3	0.8	4.5	2.7	0.9	0.7	7.4	13.0	13.0	0.5	6.6	6.6
Cycle Q Clear(g_c), s	0.3	0.8	4.5	2.7	0.9	0.7	7.4	13.0	13.0	0.5	6.6	6.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.27	1.00		0.11
Lane Grp Cap(c), veh/h	56	210	178	351	520	441	235	531	533	24	320	330
V/C Ratio(X)	0.14	0.12	0.69	0.27	0.07	0.05	0.93	0.78	0.78	0.66	0.65	0.65
Avail Cap(c_a), veh/h	456	927	786	456	927	786	235	678	681	103	546	564
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.5	24.2	25.8	20.6	16.1	16.0	26.0	19.4	19.4	29.7	23.0	23.0
Incr Delay (d2), s/veh	1.2	0.3	4.6	0.4	0.1	0.1	39.9	4.6	4.6	26.4	2.2	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.3	1.8	1.1	0.4	0.2	5.4	5.3	5.3	0.4	2.6	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.7	24.4	30.4	21.0	16.2	16.1	65.9	24.0	24.1	56.1	25.2	25.2
LnGrp LOS	C	C	C	C	B	B	E	C	C	E	C	C
Approach Vol, veh/h		156			156			1053			439	
Approach Delay, s/veh		29.4			19.1			32.7			26.3	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	24.5	15.9	13.3	14.0	17.3	5.9	23.3
Change Period (Y+Rc), s	6.0	6.4	4.0	6.5	6.0	6.4	4.0	6.5
Max Green Setting (Gmax), s	3.5	23.1	15.5	30.0	8.0	18.6	15.5	30.0
Max Q Clear Time (g_c+I1), s	2.5	15.0	4.7	6.5	9.4	8.6	2.3	2.9
Green Ext Time (p_c), s	0.0	3.1	0.1	0.5	0.0	1.6	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	29.7
HCM 6th LOS	C

APPENDIX G

ANALYSIS WORKSHEETS – NEAR-TERM + PROJECT

Intersection	
Int Delay, s/veh	26.8

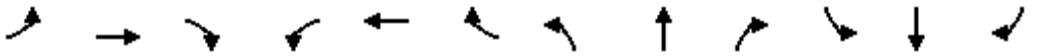
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	96	155	254	302	421	228
Future Vol, veh/h	96	155	254	302	421	228
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	109	176	289	343	478	259

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1529	608	737	0	-	0
Stage 1	608	-	-	-	-	-
Stage 2	921	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	129	496	869	-	-	-
Stage 1	543	-	-	-	-	-
Stage 2	388	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 76	496	869	-	-	-
Mov Cap-2 Maneuver	~ 76	-	-	-	-	-
Stage 1	320	-	-	-	-	-
Stage 2	388	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	144.2	5.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	869	-	76	496	-	-
HCM Lane V/C Ratio	0.332	-	1.435	0.355	-	-
HCM Control Delay (s)	11.2	0	$ 350.8	16.2	-	-
HCM Lane LOS	B	A	F	C	-	-
HCM 95th %tile Q(veh)	1.5	-	8.8	1.6	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	23	77	0	39	22	514	96	87	481	6
Future Volume (veh/h)	10	0	23	77	0	39	22	514	96	87	481	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	26	88	0	44	25	584	109	99	547	7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	30	0	71	213	0	190	71	703	596	193	1597	20
Arrive On Green	0.06	0.00	0.06	0.12	0.00	0.12	0.04	0.38	0.38	0.11	0.44	0.44
Sat Flow, veh/h	487	0	1152	1781	0	1585	1781	1870	1585	1781	3593	46
Grp Volume(v), veh/h	37	0	0	88	0	44	25	584	109	99	270	284
Grp Sat Flow(s),veh/h/ln	1639	0	0	1781	0	1585	1781	1870	1585	1781	1777	1862
Q Serve(g_s), s	1.3	0.0	0.0	2.7	0.0	1.5	0.8	16.8	2.7	3.1	5.9	5.9
Cycle Q Clear(g_c), s	1.3	0.0	0.0	2.7	0.0	1.5	0.8	16.8	2.7	3.1	5.9	5.9
Prop In Lane	0.30		0.70	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	101	0	0	213	0	190	71	703	596	193	790	828
V/C Ratio(X)	0.37	0.00	0.00	0.41	0.00	0.23	0.35	0.83	0.18	0.51	0.34	0.34
Avail Cap(c_a), veh/h	803	0	0	241	0	214	250	1102	934	250	1047	1097
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.7	0.0	0.0	24.1	0.0	23.6	27.7	16.8	12.4	24.9	10.8	10.8
Incr Delay (d2), s/veh	2.2	0.0	0.0	1.3	0.0	0.6	2.9	3.2	0.1	2.1	0.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	1.1	0.0	0.6	0.4	6.3	0.8	1.3	1.8	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.9	0.0	0.0	25.4	0.0	24.2	30.6	20.0	12.5	27.0	11.0	11.0
LnGrp LOS	C	A	A	C	A	C	C	B	B	C	B	B
Approach Vol, veh/h		37			132			718			653	
Approach Delay, s/veh		28.9			25.0			19.2			13.4	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.6	27.7		9.1	6.6	31.7		11.8				
Change Period (Y+Rc), s	* 4.2	5.4		5.5	* 4.2	5.4		4.7				
Max Green Setting (Gmax), s	* 8.3	34.9		29.0	* 8.3	34.9		8.0				
Max Q Clear Time (g_c+I1), s	5.1	18.8		3.3	2.8	7.9		4.7				
Green Ext Time (p_c), s	0.1	3.5		0.1	0.0	3.1		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		17.5
HCM 6th LOS		B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

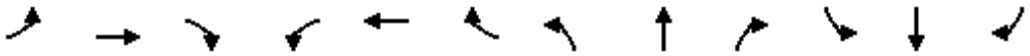
Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	675	6	23	618	9	7
Future Vol, veh/h	675	6	23	618	9	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	718	6	24	657	10	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	724	0	1098	362
Stage 1	-	-	-	-	721	-
Stage 2	-	-	-	-	377	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	874	-	207	635
Stage 1	-	-	-	-	443	-
Stage 2	-	-	-	-	663	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	874	-	201	635
Mov Cap-2 Maneuver	-	-	-	-	201	-
Stage 1	-	-	-	-	443	-
Stage 2	-	-	-	-	645	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	18.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	287	-	-	874	-
HCM Lane V/C Ratio	0.059	-	-	0.028	-
HCM Control Delay (s)	18.3	-	-	9.2	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	533	30	46	508	35	43	3	30	129	12	39
Future Volume (veh/h)	37	533	30	46	508	35	43	3	30	129	12	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	41	592	33	51	564	39	48	3	33	143	13	43
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	108	860	48	109	901	402	139	16	177	277	69	229
Arrive On Green	0.06	0.25	0.25	0.06	0.25	0.25	0.08	0.12	0.12	0.16	0.18	0.18
Sat Flow, veh/h	1781	3422	191	1781	3554	1585	1781	134	1472	1781	381	1262
Grp Volume(v), veh/h	41	307	318	51	564	39	48	0	36	143	0	56
Grp Sat Flow(s),veh/h/ln	1781	1777	1836	1781	1777	1585	1781	0	1605	1781	0	1643
Q Serve(g_s), s	1.1	7.8	7.8	1.4	7.0	0.9	1.3	0.0	1.0	3.7	0.0	1.4
Cycle Q Clear(g_c), s	1.1	7.8	7.8	1.4	7.0	0.9	1.3	0.0	1.0	3.7	0.0	1.4
Prop In Lane	1.00		0.10	1.00		1.00	1.00		0.92	1.00		0.77
Lane Grp Cap(c), veh/h	108	446	461	109	901	402	139	0	193	277	0	298
V/C Ratio(X)	0.38	0.69	0.69	0.47	0.63	0.10	0.35	0.00	0.19	0.52	0.00	0.19
Avail Cap(c_a), veh/h	253	783	809	218	1501	669	285	0	1125	403	0	1234
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.6	16.9	16.9	22.7	16.5	14.3	21.8	0.0	19.8	19.4	0.0	17.3
Incr Delay (d2), s/veh	2.2	1.9	1.8	3.1	0.7	0.1	1.5	0.0	0.5	1.5	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	2.8	2.9	0.6	2.4	0.3	0.6	0.0	0.4	1.5	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.7	18.8	18.8	25.8	17.3	14.4	23.3	0.0	20.2	20.9	0.0	17.6
LnGrp LOS	C	B	B	C	B	B	C	A	C	C	A	B
Approach Vol, veh/h		666			654			84			199	
Approach Delay, s/veh		19.2			17.8			22.0			20.0	
Approach LOS		B			B			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.5	18.0	9.4	15.1	7.4	18.1	12.5	12.0
Change Period (Y+Rc), s	4.5	5.4	5.5	6.0	4.4	5.4	* 4.7	6.0
Max Green Setting (Gmax), s	6.1	22.0	8.0	37.5	7.1	21.1	* 11	35.0
Max Q Clear Time (g_c+I1), s	3.4	9.8	3.3	3.4	3.1	9.0	5.7	3.0
Green Ext Time (p_c), s	0.0	2.7	0.0	0.3	0.0	2.8	0.2	0.2

Intersection Summary	
HCM 6th Ctrl Delay	18.8
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	27	54	5	14	66
Future Vol, veh/h	7	27	54	5	14	66
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	32	64	6	16	78

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	177	67	0	0	70	0
Stage 1	67	-	-	-	-	-
Stage 2	110	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	813	997	-	-	1531	-
Stage 1	956	-	-	-	-	-
Stage 2	915	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	804	997	-	-	1531	-
Mov Cap-2 Maneuver	804	-	-	-	-	-
Stage 1	956	-	-	-	-	-
Stage 2	905	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	1.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	950	1531	-
HCM Lane V/C Ratio	-	-	0.042	0.011	-
HCM Control Delay (s)	-	-	9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	246	91	122	349	0	420	288
Future Volume (veh/h)	246	91	122	349	0	420	288
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Work Zone On Approach	No			No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870		1870	1870
Adj Flow Rate, veh/h	265	98	131	375		452	310
Peak Hour Factor	0.93	0.93	0.93	0.93		0.93	0.93
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	600	880	253	1956		1062	474
Arrive On Green	0.17	0.17	0.14	0.55		0.30	0.30
Sat Flow, veh/h	3456	2790	1781	3647		3647	1585
Grp Volume(v), veh/h	265	98	131	375		452	310
Grp Sat Flow(s),veh/h/ln	1728	1395	1781	1777		1777	1585
Q Serve(g_s), s	3.1	1.1	3.1	2.4		4.7	7.8
Cycle Q Clear(g_c), s	3.1	1.1	3.1	2.4		4.7	7.8
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	600	880	253	1956		1062	474
V/C Ratio(X)	0.44	0.11	0.52	0.19		0.43	0.65
Avail Cap(c_a), veh/h	1363	1496	390	3068		2679	1195
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	16.9	11.1	18.1	5.2		12.9	13.9
Incr Delay (d2), s/veh	0.5	0.1	1.6	0.0		0.3	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	1.2	0.5		1.4	2.2
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	17.4	11.1	19.8	5.2		13.1	15.5
LnGrp LOS	B	B	B	A		B	B
Approach Vol, veh/h	363			506		762	
Approach Delay, s/veh	15.7			9.0		14.1	
Approach LOS	B			A		B	

Timer - Assigned Phs		2		4	5	6	
Phs Duration (G+Y+Rc), s		31.2		14.4	11.5	19.7	
Change Period (Y+Rc), s		* 6.1		6.5	5.0	* 6.1	
Max Green Setting (Gmax), s		* 39		18.0	10.0	* 34	
Max Q Clear Time (g_c+I1), s		4.4		5.1	5.1	9.8	
Green Ext Time (p_c), s		2.4		1.0	0.1	3.9	

Intersection Summary		
HCM 6th Ctrl Delay		12.9
HCM 6th LOS		B

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

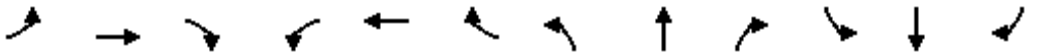
Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	190	68	49	106	6
Future Vol, veh/h	0	190	68	49	106	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	229	82	59	128	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	141	0	-	0	341	112
Stage 1	-	-	-	-	112	-
Stage 2	-	-	-	-	229	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1442	-	-	-	655	941
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	809	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1442	-	-	-	655	941
Mov Cap-2 Maneuver	-	-	-	-	655	-
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	809	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1442	-	-	-	666
HCM Lane V/C Ratio	-	-	-	-	0.203
HCM Control Delay (s)	0	-	-	-	11.8
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.8



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	16	236	86	13	18	157	342	117	13	382	6
Future Volume (veh/h)	6	16	236	86	13	18	157	342	117	13	382	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	7	18	262	96	14	20	174	380	130	14	424	7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	49	375	318	328	668	566	208	702	237	21	587	10
Arrive On Green	0.03	0.20	0.20	0.18	0.36	0.36	0.12	0.27	0.27	0.01	0.16	0.16
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	2608	881	1781	3578	59
Grp Volume(v), veh/h	7	18	262	96	14	20	174	257	253	14	210	221
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1712	1781	1777	1860
Q Serve(g_s), s	0.3	0.5	10.8	3.2	0.3	0.6	6.5	8.5	8.7	0.5	7.7	7.7
Cycle Q Clear(g_c), s	0.3	0.5	10.8	3.2	0.3	0.6	6.5	8.5	8.7	0.5	7.7	7.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.51	1.00		0.03
Lane Grp Cap(c), veh/h	49	375	318	328	668	566	208	478	461	21	292	305
V/C Ratio(X)	0.14	0.05	0.82	0.29	0.02	0.04	0.84	0.54	0.55	0.66	0.72	0.72
Avail Cap(c_a), veh/h	404	820	695	404	820	695	208	600	578	91	483	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.5	22.1	26.2	24.1	14.3	14.3	29.6	21.4	21.4	33.7	27.1	27.1
Incr Delay (d2), s/veh	1.3	0.1	5.4	0.5	0.0	0.0	24.5	0.9	1.0	29.5	3.4	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.2	4.4	1.3	0.1	0.2	4.0	3.3	3.3	0.4	3.3	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.8	22.1	31.6	24.6	14.3	14.4	54.0	22.3	22.5	63.1	30.5	30.4
LnGrp LOS	C	C	C	C	B	B	D	C	C	E	C	C
Approach Vol, veh/h		287			130			684			445	
Approach Delay, s/veh		31.1			21.9			30.4			31.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	24.8	16.6	20.2	14.0	17.6	5.9	30.9
Change Period (Y+Rc), s	6.0	6.4	4.0	6.5	6.0	6.4	4.0	6.5
Max Green Setting (Gmax), s	3.5	23.1	15.5	30.0	8.0	18.6	15.5	30.0
Max Q Clear Time (g_c+I1), s	2.5	10.7	5.2	12.8	8.5	9.7	2.3	2.6
Green Ext Time (p_c), s	0.0	2.3	0.1	0.9	0.0	1.5	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	30.1
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	52.1

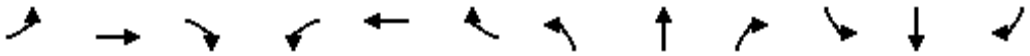
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	109	239	151	554	679	166
Future Vol, veh/h	109	239	151	554	679	166
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	124	272	172	630	772	189

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1841	867	961	0	-	0
Stage 1	867	-	-	-	-	-
Stage 2	974	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 83	352	716	-	-	-
Stage 1	411	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 52	352	716	-	-	-
Mov Cap-2 Maneuver	~ 52	-	-	-	-	-
Stage 1	259	-	-	-	-	-
Stage 2	366	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	279.3	2.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	716	-	52	352	-	-
HCM Lane V/C Ratio	0.24	-	2.382	0.772	-	-
HCM Control Delay (s)	11.6	0$	798.6	42.5	-	-
HCM Lane LOS	B	A	F	E	-	-
HCM 95th %tile Q(veh)	0.9	-	12.7	6.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	12	103	0	91	40	643	43	16	910	12
Future Volume (veh/h)	7	0	12	103	0	91	40	643	43	16	910	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	8	0	14	117	0	103	45	731	49	18	1034	14
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	25	0	43	237	0	211	111	845	716	62	1524	21
Arrive On Green	0.04	0.00	0.04	0.13	0.00	0.13	0.06	0.45	0.45	0.03	0.42	0.42
Sat Flow, veh/h	600	0	1051	1781	0	1585	1781	1870	1585	1781	3590	49
Grp Volume(v), veh/h	22	0	0	117	0	103	45	731	49	18	512	536
Grp Sat Flow(s),veh/h/ln	1651	0	0	1781	0	1585	1781	1870	1585	1781	1777	1862
Q Serve(g_s), s	0.8	0.0	0.0	3.6	0.0	3.5	1.4	20.5	1.0	0.6	13.6	13.6
Cycle Q Clear(g_c), s	0.8	0.0	0.0	3.6	0.0	3.5	1.4	20.5	1.0	0.6	13.6	13.6
Prop In Lane	0.36		0.64	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	68	0	0	237	0	211	111	845	716	62	754	790
V/C Ratio(X)	0.32	0.00	0.00	0.49	0.00	0.49	0.41	0.86	0.07	0.29	0.68	0.68
Avail Cap(c_a), veh/h	820	0	0	244	0	217	253	1118	948	253	1062	1113
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.2	0.0	0.0	23.5	0.0	23.5	26.3	14.4	9.0	27.5	13.6	13.6
Incr Delay (d2), s/veh	2.7	0.0	0.0	1.6	0.0	1.7	2.4	5.7	0.0	2.6	1.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.5	0.0	1.3	0.6	7.7	0.3	0.3	4.4	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.9	0.0	0.0	25.1	0.0	25.2	28.7	20.1	9.1	30.0	14.7	14.6
LnGrp LOS	C	A	A	C	A	C	C	C	A	C	B	B
Approach Vol, veh/h		22			220			825			1066	
Approach Delay, s/veh		29.9			25.1			19.9			14.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	31.8		7.9	7.8	30.2		12.5				
Change Period (Y+Rc), s	* 4.2	5.4		5.5	* 4.2	5.4		4.7				
Max Green Setting (Gmax), s	* 8.3	34.9		29.0	* 8.3	34.9		8.0				
Max Q Clear Time (g_c+I1), s	2.6	22.5		2.8	3.4	15.6		5.6				
Green Ext Time (p_c), s	0.0	3.8		0.1	0.0	6.1		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		18.0	
HCM 6th LOS		B	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

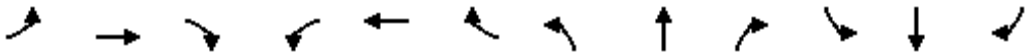
Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1058	6	43	735	6	5
Future Vol, veh/h	1058	6	43	735	6	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1126	6	46	782	6	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1132	0	1612	566
Stage 1	-	-	-	-	1129	-
Stage 2	-	-	-	-	483	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	613	-	95	467
Stage 1	-	-	-	-	271	-
Stage 2	-	-	-	-	586	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	613	-	88	467
Mov Cap-2 Maneuver	-	-	-	-	88	-
Stage 1	-	-	-	-	271	-
Stage 2	-	-	-	-	542	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	33.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	139	-	-	613	-
HCM Lane V/C Ratio	0.084	-	-	0.075	-
HCM Control Delay (s)	33.3	-	-	11.3	-
HCM Lane LOS	D	-	-	B	-
HCM 95th %tile Q(veh)	0.3	-	-	0.2	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	903	75	36	615	80	45	2	21	54	3	35
Future Volume (veh/h)	61	903	75	36	615	80	45	2	21	54	3	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	68	1003	83	40	683	89	50	2	23	60	3	39
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	146	1197	99	89	1172	523	138	15	175	175	14	185
Arrive On Green	0.08	0.36	0.36	0.05	0.33	0.33	0.08	0.12	0.12	0.10	0.12	0.12
Sat Flow, veh/h	1781	3323	275	1781	3554	1585	1781	128	1476	1781	114	1488
Grp Volume(v), veh/h	68	536	550	40	683	89	50	0	25	60	0	42
Grp Sat Flow(s),veh/h/ln	1781	1777	1821	1781	1777	1585	1781	0	1605	1781	0	1603
Q Serve(g_s), s	2.0	15.3	15.3	1.2	8.8	2.2	1.5	0.0	0.8	1.7	0.0	1.3
Cycle Q Clear(g_c), s	2.0	15.3	15.3	1.2	8.8	2.2	1.5	0.0	0.8	1.7	0.0	1.3
Prop In Lane	1.00		0.15	1.00		1.00	1.00		0.92	1.00		0.93
Lane Grp Cap(c), veh/h	146	640	656	89	1172	523	138	0	190	175	0	199
V/C Ratio(X)	0.46	0.84	0.84	0.45	0.58	0.17	0.36	0.00	0.13	0.34	0.00	0.21
Avail Cap(c_a), veh/h	229	709	726	197	1359	606	258	0	1018	365	0	1089
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.2	16.2	16.2	25.5	15.3	13.1	24.1	0.0	21.8	23.2	0.0	21.7
Incr Delay (d2), s/veh	2.3	8.1	7.9	3.5	0.5	0.2	1.6	0.0	0.3	1.2	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	6.2	6.3	0.5	2.9	0.7	0.6	0.0	0.3	0.7	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.4	24.3	24.1	29.0	15.8	13.3	25.7	0.0	22.1	24.4	0.0	22.2
LnGrp LOS	C	C	C	C	B	B	C	A	C	C	A	C
Approach Vol, veh/h		1154			812			75			102	
Approach Delay, s/veh		24.3			16.2			24.5			23.5	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	25.3	9.8	12.9	8.9	23.6	10.1	12.5
Change Period (Y+Rc), s	4.5	5.4	5.5	6.0	4.4	5.4	* 4.7	6.0
Max Green Setting (Gmax), s	6.1	22.0	8.0	37.5	7.1	21.1	* 11	35.0
Max Q Clear Time (g_c+I1), s	3.2	17.3	3.5	3.3	4.0	10.8	3.7	2.8
Green Ext Time (p_c), s	0.0	2.6	0.0	0.2	0.0	3.3	0.1	0.1

Intersection Summary	
HCM 6th Ctrl Delay	21.2
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	14	59	6	33	82
Future Vol, veh/h	4	14	59	6	33	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	16	69	7	39	96

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	247	73	0	0	76	0
Stage 1	73	-	-	-	-	-
Stage 2	174	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	741	989	-	-	1523	-
Stage 1	950	-	-	-	-	-
Stage 2	856	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	721	989	-	-	1523	-
Mov Cap-2 Maneuver	721	-	-	-	-	-
Stage 1	950	-	-	-	-	-
Stage 2	833	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	2.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	914	1523	-
HCM Lane V/C Ratio	-	-	0.023	0.025	-
HCM Control Delay (s)	-	-	9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	361	350	162	395	0	748	215
Future Volume (veh/h)	361	350	162	395	0	748	215
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Work Zone On Approach	No			No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870		1870	1870
Adj Flow Rate, veh/h	388	376	174	425		804	231
Peak Hour Factor	0.93	0.93	0.93	0.93		0.93	0.93
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	641	906	248	2051		1222	545
Arrive On Green	0.19	0.19	0.14	0.58		0.34	0.34
Sat Flow, veh/h	3456	2790	1781	3647		3647	1585
Grp Volume(v), veh/h	388	376	174	425		804	231
Grp Sat Flow(s),veh/h/ln	1728	1395	1781	1777		1777	1585
Q Serve(g_s), s	5.5	5.6	4.9	3.0		10.2	5.9
Cycle Q Clear(g_c), s	5.5	5.6	4.9	3.0		10.2	5.9
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	641	906	248	2051		1222	545
V/C Ratio(X)	0.61	0.42	0.70	0.21		0.66	0.42
Avail Cap(c_a), veh/h	1172	1334	336	2638		2303	1027
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	19.8	14.0	21.8	5.4		14.8	13.4
Incr Delay (d2), s/veh	0.9	0.3	4.1	0.0		0.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	4.7	2.1	0.7		3.3	1.7
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	20.8	14.3	25.9	5.4		15.4	13.9
LnGrp LOS	C	B	C	A		B	B
Approach Vol, veh/h	764			599		1035	
Approach Delay, s/veh	17.6			11.4		15.0	
Approach LOS	B			B		B	

Timer - Assigned Phs		2		4	5	6	
Phs Duration (G+Y+Rc), s		36.7		16.3	12.4	24.4	
Change Period (Y+Rc), s		* 6.1		6.5	5.0	* 6.1	
Max Green Setting (Gmax), s		* 39		18.0	10.0	* 34	
Max Q Clear Time (g_c+I1), s		5.0		7.6	6.9	12.2	
Green Ext Time (p_c), s		2.8		2.3	0.1	6.1	

Intersection Summary	
HCM 6th Ctrl Delay	14.9
HCM 6th LOS	B

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

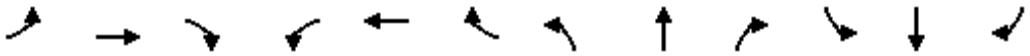
Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	102	157	83	35	4
Future Vol, veh/h	0	102	157	83	35	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	123	189	100	42	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	289	0	-	0	362	239
Stage 1	-	-	-	-	239	-
Stage 2	-	-	-	-	123	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1273	-	-	-	637	800
Stage 1	-	-	-	-	801	-
Stage 2	-	-	-	-	902	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1273	-	-	-	637	800
Mov Cap-2 Maneuver	-	-	-	-	637	-
Stage 1	-	-	-	-	801	-
Stage 2	-	-	-	-	902	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1273	-	-	-	651
HCM Lane V/C Ratio	-	-	-	-	0.072
HCM Control Delay (s)	0	-	-	-	11
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	23	112	85	34	22	201	654	102	14	361	22
Future Volume (veh/h)	7	23	112	85	34	22	201	654	102	14	361	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	8	26	124	94	38	24	223	727	113	16	401	24
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	56	212	180	350	521	442	234	924	144	24	619	37
Arrive On Green	0.03	0.11	0.11	0.20	0.28	0.28	0.13	0.30	0.30	0.01	0.18	0.18
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	3082	479	1781	3407	203
Grp Volume(v), veh/h	8	26	124	94	38	24	223	419	421	16	208	217
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1784	1781	1777	1834
Q Serve(g_s), s	0.3	0.8	4.6	2.7	0.9	0.7	7.6	13.1	13.1	0.5	6.6	6.7
Cycle Q Clear(g_c), s	0.3	0.8	4.6	2.7	0.9	0.7	7.6	13.1	13.1	0.5	6.6	6.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.27	1.00		0.11
Lane Grp Cap(c), veh/h	56	212	180	350	521	442	234	533	535	24	323	333
V/C Ratio(X)	0.14	0.12	0.69	0.27	0.07	0.05	0.95	0.79	0.79	0.66	0.65	0.65
Avail Cap(c_a), veh/h	454	923	782	454	923	782	234	675	678	103	544	561
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	24.2	25.9	20.7	16.1	16.1	26.2	19.5	19.5	29.8	23.1	23.1
Incr Delay (d2), s/veh	1.2	0.3	4.6	0.4	0.1	0.1	45.2	4.8	4.8	26.4	2.2	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.3	1.9	1.1	0.4	0.2	5.8	5.4	5.4	0.4	2.7	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.8	24.5	30.5	21.1	16.2	16.1	71.4	24.3	24.3	56.2	25.2	25.2
LnGrp LOS	C	C	C	C	B	B	E	C	C	E	C	C
Approach Vol, veh/h		158			156			1063			441	
Approach Delay, s/veh		29.5			19.2			34.2			26.3	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	24.6	15.9	13.4	14.0	17.5	5.9	23.4
Change Period (Y+Rc), s	6.0	6.4	4.0	6.5	6.0	6.4	4.0	6.5
Max Green Setting (Gmax), s	3.5	23.1	15.5	30.0	8.0	18.6	15.5	30.0
Max Q Clear Time (g_c+I1), s	2.5	15.1	4.7	6.6	9.6	8.7	2.3	2.9
Green Ext Time (p_c), s	0.0	3.1	0.1	0.5	0.0	1.6	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	30.6
HCM 6th LOS	C

APPENDIX H

ANALYSIS WORKSHEETS – LONG-TERM

Intersection	
Int Delay, s/veh	640.3

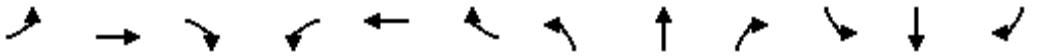
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	140	220	360	420	600	340
Future Vol, veh/h	140	220	360	420	600	340
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	159	250	409	477	682	386

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2170	875	1068	0	-	0
Stage 1	875	-	-	-	-	-
Stage 2	1295	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 51	349	653	-	-	-
Stage 1	408	-	-	-	-	-
Stage 2	257	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 8	349	653	-	-	-
Mov Cap-2 Maneuver	~ 8	-	-	-	-	-
Stage 1	~ 60	-	-	-	-	-
Stage 2	257	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 3680	8.9	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	653	-	8	349	-	-
HCM Lane V/C Ratio	0.626	-	19.886	0.716	-	-
HCM Control Delay (s)	19.3	$ 9	403.9	37.5	-	-
HCM Lane LOS	C	A	F	E	-	-
HCM 95th %tile Q(veh)	4.4	-	21.6	5.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	30	140	0	70	30	630	180	160	600	10
Future Volume (veh/h)	10	0	30	140	0	70	30	630	180	160	600	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	34	159	0	80	34	716	205	182	682	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	26	0	81	200	0	178	86	799	677	208	1773	29
Arrive On Green	0.07	0.00	0.07	0.11	0.00	0.11	0.05	0.43	0.43	0.12	0.50	0.50
Sat Flow, veh/h	398	0	1231	1781	0	1585	1781	1870	1585	1781	3579	58
Grp Volume(v), veh/h	45	0	0	159	0	80	34	716	205	182	339	354
Grp Sat Flow(s),veh/h/ln	1629	0	0	1781	0	1585	1781	1870	1585	1781	1777	1860
Q Serve(g_s), s	1.9	0.0	0.0	6.2	0.0	3.4	1.3	25.3	6.1	7.2	8.5	8.5
Cycle Q Clear(g_c), s	1.9	0.0	0.0	6.2	0.0	3.4	1.3	25.3	6.1	7.2	8.5	8.5
Prop In Lane	0.24		0.76	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	108	0	0	200	0	178	86	799	677	208	880	922
V/C Ratio(X)	0.42	0.00	0.00	0.79	0.00	0.45	0.40	0.90	0.30	0.88	0.38	0.38
Avail Cap(c_a), veh/h	663	0	0	200	0	178	208	916	776	208	880	922
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.9	0.0	0.0	30.8	0.0	29.6	32.9	18.9	13.4	31.0	11.2	11.2
Incr Delay (d2), s/veh	2.6	0.0	0.0	19.5	0.0	1.8	3.0	10.5	0.2	31.7	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	3.6	0.0	1.3	0.6	11.4	1.9	4.7	2.7	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.5	0.0	0.0	50.4	0.0	31.3	35.9	29.4	13.7	62.7	11.5	11.5
LnGrp LOS	C	A	A	D	A	C	D	C	B	E	B	B
Approach Vol, veh/h		45			239			955			875	
Approach Delay, s/veh		34.5			44.0			26.3			22.1	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.5	35.8		10.2	7.6	40.7		12.7				
Change Period (Y+Rc), s	* 4.2	5.4		5.5	* 4.2	5.4		4.7				
Max Green Setting (Gmax), s	* 8.3	34.9		29.0	* 8.3	34.9		8.0				
Max Q Clear Time (g_c+I1), s	9.2	27.3		3.9	3.3	10.5		8.2				
Green Ext Time (p_c), s	0.0	3.1		0.2	0.0	3.9		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		26.7	
HCM 6th LOS		C	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

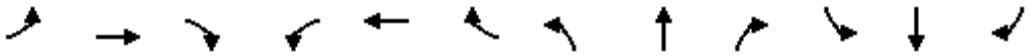
Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	770	10	10	700	10	10
Future Vol, veh/h	770	10	10	700	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	819	11	11	745	11	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	830	0	1220	415
Stage 1	-	-	-	-	825	-
Stage 2	-	-	-	-	395	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	798	-	172	586
Stage 1	-	-	-	-	391	-
Stage 2	-	-	-	-	650	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	798	-	170	586
Mov Cap-2 Maneuver	-	-	-	-	170	-
Stage 1	-	-	-	-	391	-
Stage 2	-	-	-	-	641	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	19.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	264	-	-	798	-
HCM Lane V/C Ratio	0.081	-	-	0.013	-
HCM Control Delay (s)	19.8	-	-	9.6	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	620	30	60	600	40	50	10	40	150	20	50
Future Volume (veh/h)	40	620	30	60	600	40	50	10	40	150	20	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	44	689	33	67	667	44	56	11	44	167	22	56
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	112	941	45	126	1003	447	150	40	160	273	82	209
Arrive On Green	0.06	0.27	0.27	0.07	0.28	0.28	0.08	0.12	0.12	0.15	0.18	0.18
Sat Flow, veh/h	1781	3452	165	1781	3554	1585	1781	327	1308	1781	467	1189
Grp Volume(v), veh/h	44	354	368	67	667	44	56	0	55	167	0	78
Grp Sat Flow(s),veh/h/ln	1781	1777	1841	1781	1777	1585	1781	0	1635	1781	0	1656
Q Serve(g_s), s	1.3	9.8	9.8	2.0	8.9	1.1	1.6	0.0	1.6	4.7	0.0	2.2
Cycle Q Clear(g_c), s	1.3	9.8	9.8	2.0	8.9	1.1	1.6	0.0	1.6	4.7	0.0	2.2
Prop In Lane	1.00		0.09	1.00		1.00	1.00		0.80	1.00		0.72
Lane Grp Cap(c), veh/h	112	484	502	126	1003	447	150	0	200	273	0	292
V/C Ratio(X)	0.39	0.73	0.73	0.53	0.66	0.10	0.37	0.00	0.28	0.61	0.00	0.27
Avail Cap(c_a), veh/h	234	724	750	201	1389	620	264	0	1060	373	0	1151
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.3	17.8	17.8	24.2	17.1	14.3	23.4	0.0	21.5	21.4	0.0	19.2
Incr Delay (d2), s/veh	2.3	2.2	2.1	3.5	0.8	0.1	1.5	0.0	0.7	2.2	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	3.5	3.7	0.8	3.1	0.4	0.7	0.0	0.6	2.0	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.6	20.0	19.9	27.7	17.9	14.4	24.9	0.0	22.3	23.6	0.0	19.7
LnGrp LOS	C	B	B	C	B	B	C	A	C	C	A	B
Approach Vol, veh/h		766			778			111			245	
Approach Delay, s/veh		20.3			18.5			23.6			22.3	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	20.1	10.0	15.5	7.8	20.6	13.0	12.6
Change Period (Y+Rc), s	4.5	5.4	5.5	6.0	4.4	5.4	* 4.7	6.0
Max Green Setting (Gmax), s	6.1	22.0	8.0	37.5	7.1	21.1	* 11	35.0
Max Q Clear Time (g_c+I1), s	4.0	11.8	3.6	4.2	3.3	10.9	6.7	3.6
Green Ext Time (p_c), s	0.0	2.9	0.0	0.5	0.0	3.1	0.2	0.3

Intersection Summary	
HCM 6th Ctrl Delay	20.0
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	30	70	10	20	90
Future Vol, veh/h	10	30	70	10	20	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	35	82	12	24	106

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	242	88	0	0	94	0
Stage 1	88	-	-	-	-	-
Stage 2	154	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	746	970	-	-	1500	-
Stage 1	935	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	733	970	-	-	1500	-
Mov Cap-2 Maneuver	733	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	859	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	1.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	897	1500	-
HCM Lane V/C Ratio	-	-	0.052	0.016	-
HCM Control Delay (s)	-	-	9.2	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	310	130	170	460	0	550	360
Future Volume (veh/h)	310	130	170	460	0	550	360
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Work Zone On Approach	No			No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870		1870	1870
Adj Flow Rate, veh/h	333	140	183	495		591	387
Peak Hour Factor	0.93	0.93	0.93	0.93		0.93	0.93
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	544	846	260	2111		1242	554
Arrive On Green	0.16	0.16	0.15	0.59		0.35	0.35
Sat Flow, veh/h	3456	2790	1781	3647		3647	1585
Grp Volume(v), veh/h	333	140	183	495		591	387
Grp Sat Flow(s),veh/h/ln	1728	1395	1781	1777		1777	1585
Q Serve(g_s), s	4.6	1.9	5.0	3.3		6.6	10.7
Cycle Q Clear(g_c), s	4.6	1.9	5.0	3.3		6.6	10.7
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	544	846	260	2111		1242	554
V/C Ratio(X)	0.61	0.17	0.70	0.23		0.48	0.70
Avail Cap(c_a), veh/h	1227	1397	351	2761		2411	1075
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	19.9	13.0	20.6	4.9		12.9	14.2
Incr Delay (d2), s/veh	1.1	0.1	4.0	0.1		0.3	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	2.1	0.7		2.0	3.1
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	21.0	13.0	24.6	4.9		13.1	15.8
LnGrp LOS	C	B	C	A		B	B
Approach Vol, veh/h	473			678		978	
Approach Delay, s/veh	18.7			10.2		14.2	
Approach LOS	B			B		B	

Timer - Assigned Phs		2		4	5	6	
Phs Duration (G+Y+Rc), s		36.2		14.5	12.4	23.8	
Change Period (Y+Rc), s		* 6.1		6.5	5.0	* 6.1	
Max Green Setting (Gmax), s		* 39		18.0	10.0	* 34	
Max Q Clear Time (g_c+I1), s		5.3		6.6	7.0	12.7	
Green Ext Time (p_c), s		3.3		1.3	0.1	5.1	

Intersection Summary	
HCM 6th Ctrl Delay	13.9
HCM 6th LOS	B

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

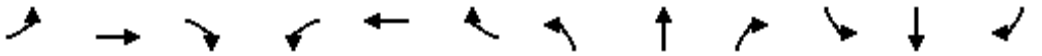
Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	200	70	50	110	10
Future Vol, veh/h	0	200	70	50	110	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	241	84	60	133	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	144	0	-	0	355	114
Stage 1	-	-	-	-	114	-
Stage 2	-	-	-	-	241	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1438	-	-	-	643	939
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	799	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1438	-	-	-	643	939
Mov Cap-2 Maneuver	-	-	-	-	643	-
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	799	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1438	-	-	-	660
HCM Lane V/C Ratio	-	-	-	-	0.219
HCM Control Delay (s)	0	-	-	-	12
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.8



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	20	250	90	20	30	170	450	130	20	500	10
Future Volume (veh/h)	10	20	250	90	20	30	170	450	130	20	500	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	22	278	100	22	33	189	500	144	22	556	11
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	73	390	330	315	644	546	193	784	225	31	701	14
Arrive On Green	0.04	0.21	0.21	0.18	0.34	0.34	0.11	0.29	0.29	0.02	0.20	0.20
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	2726	781	1781	3564	70
Grp Volume(v), veh/h	11	22	278	100	22	33	189	325	319	22	277	290
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1730	1781	1777	1858
Q Serve(g_s), s	0.4	0.7	12.4	3.6	0.6	1.0	7.8	11.8	11.9	0.9	11.0	11.0
Cycle Q Clear(g_c), s	0.4	0.7	12.4	3.6	0.6	1.0	7.8	11.8	11.9	0.9	11.0	11.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.45	1.00		0.04
Lane Grp Cap(c), veh/h	73	390	330	315	644	546	193	511	498	31	349	365
V/C Ratio(X)	0.15	0.06	0.84	0.32	0.03	0.06	0.98	0.64	0.64	0.72	0.79	0.79
Avail Cap(c_a), veh/h	374	759	644	374	759	644	193	555	541	84	447	468
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.2	23.4	28.1	26.5	16.1	16.2	32.9	22.9	23.0	36.1	28.3	28.3
Incr Delay (d2), s/veh	0.9	0.1	5.8	0.6	0.0	0.0	58.8	2.1	2.3	26.6	7.4	7.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.3	5.1	1.6	0.2	0.4	6.3	4.8	4.7	0.6	5.0	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.1	23.5	33.9	27.1	16.1	16.3	91.7	25.1	25.3	62.8	35.6	35.4
LnGrp LOS	D	C	C	C	B	B	F	C	C	E	D	D
Approach Vol, veh/h		311			155			833			589	
Approach Delay, s/veh		33.2			23.2			40.3			36.5	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.3	27.7	17.1	21.9	14.0	20.9	7.0	31.9
Change Period (Y+Rc), s	6.0	6.4	4.0	6.5	6.0	6.4	4.0	6.5
Max Green Setting (Gmax), s	3.5	23.1	15.5	30.0	8.0	18.6	15.5	30.0
Max Q Clear Time (g_c+I1), s	2.9	13.9	5.6	14.4	9.8	13.0	2.4	3.0
Green Ext Time (p_c), s	0.0	2.5	0.1	1.0	0.0	1.5	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	36.5
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	5274.9

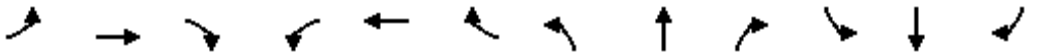
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	160	340	210	790	960	250
Future Vol, veh/h	160	340	210	790	960	250
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	182	386	239	898	1091	284

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2609	1233	1375	0	-	0
Stage 1	1233	-	-	-	-	-
Stage 2	1376	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 27	~ 216	499	-	-	-
Stage 1	275	-	-	-	-	-
Stage 2	234	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 1	~ 216	499	-	-	-
Mov Cap-2 Maneuver	~ 1	-	-	-	-	-
Stage 1	~ 12	-	-	-	-	-
Stage 2	234	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 28581.9	3.9	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	499	-	1	216	-	-
HCM Lane V/C Ratio	0.478	-	181.818	1.789	-	-
HCM Control Delay (s)	18.6	0	$ 88445	$ 411	-	-
HCM Lane LOS	C	A	F	F	-	-
HCM 95th %tile Q(veh)	2.5	-	25.3	26.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	20	190	0	170	50	800	80	30	1130	20
Future Volume (veh/h)	10	0	20	190	0	170	50	800	80	30	1130	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	23	216	0	193	57	909	91	34	1284	23
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	29	0	61	202	0	180	119	926	785	98	1727	31
Arrive On Green	0.06	0.00	0.06	0.11	0.00	0.11	0.07	0.50	0.50	0.06	0.48	0.48
Sat Flow, veh/h	532	0	1112	1781	0	1585	1781	1870	1585	1781	3572	64
Grp Volume(v), veh/h	34	0	0	216	0	193	57	909	91	34	639	668
Grp Sat Flow(s),veh/h/ln	1644	0	0	1781	0	1585	1781	1870	1585	1781	1777	1859
Q Serve(g_s), s	1.4	0.0	0.0	8.0	0.0	8.0	2.2	33.6	2.2	1.3	20.4	20.4
Cycle Q Clear(g_c), s	1.4	0.0	0.0	8.0	0.0	8.0	2.2	33.6	2.2	1.3	20.4	20.4
Prop In Lane	0.32		0.68	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	91	0	0	202	0	180	119	926	785	98	859	899
V/C Ratio(X)	0.37	0.00	0.00	1.07	0.00	1.07	0.48	0.98	0.12	0.35	0.74	0.74
Avail Cap(c_a), veh/h	676	0	0	202	0	180	210	926	785	210	880	921
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.1	0.0	0.0	31.2	0.0	31.2	31.7	17.5	9.5	32.1	14.7	14.7
Incr Delay (d2), s/veh	2.5	0.0	0.0	82.6	0.0	87.7	3.0	25.0	0.1	2.1	3.4	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	7.9	0.0	7.3	1.0	17.6	0.6	0.6	7.3	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.7	0.0	0.0	113.8	0.0	119.0	34.7	42.5	9.6	34.1	18.0	17.9
LnGrp LOS	C	A	A	F	A	F	C	D	A	C	B	B
Approach Vol, veh/h		34			409			1057			1341	
Approach Delay, s/veh		34.7			116.2			39.2			18.4	
Approach LOS		C			F			D			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.1	40.3		9.4	8.9	39.5		12.7				
Change Period (Y+Rc), s	* 4.2	5.4		5.5	* 4.2	5.4		4.7				
Max Green Setting (Gmax), s	* 8.3	34.9		29.0	* 8.3	34.9		8.0				
Max Q Clear Time (g_c+I1), s	3.3	35.6		3.4	4.2	22.4		10.0				
Green Ext Time (p_c), s	0.0	0.0		0.1	0.0	6.4		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		40.4	
HCM 6th LOS		D	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

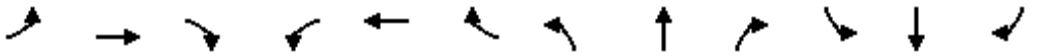
Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1200	10	40	840	10	10
Future Vol, veh/h	1200	10	40	840	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1277	11	43	894	11	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1288	0	1816	644
Stage 1	-	-	-	-	1283	-
Stage 2	-	-	-	-	533	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	534	-	69	416
Stage 1	-	-	-	-	224	-
Stage 2	-	-	-	-	553	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	534	-	63	416
Mov Cap-2 Maneuver	-	-	-	-	63	-
Stage 1	-	-	-	-	224	-
Stage 2	-	-	-	-	508	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	45.9
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	109	-	-	534	-
HCM Lane V/C Ratio	0.195	-	-	0.08	-
HCM Control Delay (s)	45.9	-	-	12.3	-
HCM Lane LOS	E	-	-	B	-
HCM 95th %tile Q(veh)	0.7	-	-	0.3	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	1070	90	40	720	90	50	10	30	60	10	40
Future Volume (veh/h)	60	1070	90	40	720	90	50	10	30	60	10	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	67	1189	100	44	800	100	56	11	33	67	11	44
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	141	1243	104	93	1242	554	145	50	149	181	42	166
Arrive On Green	0.08	0.37	0.37	0.05	0.35	0.35	0.08	0.12	0.12	0.10	0.13	0.13
Sat Flow, veh/h	1781	3318	279	1781	3554	1585	1781	412	1236	1781	327	1308
Grp Volume(v), veh/h	67	636	653	44	800	100	56	0	44	67	0	55
Grp Sat Flow(s),veh/h/ln	1781	1777	1820	1781	1777	1585	1781	0	1648	1781	0	1635
Q Serve(g_s), s	2.1	20.5	20.6	1.4	11.1	2.6	1.8	0.0	1.4	2.1	0.0	1.8
Cycle Q Clear(g_c), s	2.1	20.5	20.6	1.4	11.1	2.6	1.8	0.0	1.4	2.1	0.0	1.8
Prop In Lane	1.00		0.15	1.00		1.00	1.00		0.75	1.00		0.80
Lane Grp Cap(c), veh/h	141	666	682	93	1242	554	145	0	199	181	0	208
V/C Ratio(X)	0.47	0.96	0.96	0.47	0.64	0.18	0.39	0.00	0.22	0.37	0.00	0.26
Avail Cap(c_a), veh/h	215	666	682	185	1277	569	243	0	982	343	0	1044
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.9	17.9	17.9	27.0	16.0	13.3	25.6	0.0	23.3	24.6	0.0	23.2
Incr Delay (d2), s/veh	2.5	24.3	24.5	3.7	1.1	0.2	1.7	0.0	0.6	1.2	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	11.1	11.4	0.6	3.8	0.9	0.8	0.0	0.6	0.9	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.3	42.2	42.4	30.7	17.1	13.4	27.2	0.0	23.9	25.9	0.0	23.8
LnGrp LOS	C	D	D	C	B	B	C	A	C	C	A	C
Approach Vol, veh/h		1356			944			100			122	
Approach Delay, s/veh		41.6			17.4			25.8			24.9	
Approach LOS		D			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	27.4	10.3	13.5	9.1	25.9	10.7	13.1
Change Period (Y+Rc), s	4.5	5.4	5.5	6.0	4.4	5.4	* 4.7	6.0
Max Green Setting (Gmax), s	6.1	22.0	8.0	37.5	7.1	21.1	* 11	35.0
Max Q Clear Time (g_c+I1), s	3.4	22.6	3.8	3.8	4.1	13.1	4.1	3.4
Green Ext Time (p_c), s	0.0	0.0	0.0	0.3	0.0	3.3	0.1	0.2

Intersection Summary	
HCM 6th Ctrl Delay	31.1
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	20	80	10	40	110
Future Vol, veh/h	10	20	80	10	40	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	24	94	12	47	129

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	323	100	0	0	106	0
Stage 1	100	-	-	-	-	-
Stage 2	223	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	671	956	-	-	1485	-
Stage 1	924	-	-	-	-	-
Stage 2	814	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	648	956	-	-	1485	-
Mov Cap-2 Maneuver	648	-	-	-	-	-
Stage 1	924	-	-	-	-	-
Stage 2	786	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	825	1485	-
HCM Lane V/C Ratio	-	-	0.043	0.032	-
HCM Control Delay (s)	-	-	9.6	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	460	490	230	520	0	990	270
Future Volume (veh/h)	460	490	230	520	0	990	270
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Work Zone On Approach	No			No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870		1870	1870
Adj Flow Rate, veh/h	495	527	247	559		1065	290
Peak Hour Factor	0.93	0.93	0.93	0.93		0.93	0.93
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	727	991	258	2157		1384	617
Arrive On Green	0.21	0.21	0.14	0.61		0.39	0.39
Sat Flow, veh/h	3456	2790	1781	3647		3647	1585
Grp Volume(v), veh/h	495	527	247	559		1065	290
Grp Sat Flow(s),veh/h/ln	1728	1395	1781	1777		1777	1585
Q Serve(g_s), s	9.1	10.4	9.5	5.1		18.0	9.4
Cycle Q Clear(g_c), s	9.1	10.4	9.5	5.1		18.0	9.4
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	727	991	258	2157		1384	617
V/C Ratio(X)	0.68	0.53	0.96	0.26		0.77	0.47
Avail Cap(c_a), veh/h	902	1132	258	2157		1772	790
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	25.1	17.7	29.3	6.3		18.4	15.7
Incr Delay (d2), s/veh	1.5	0.4	44.0	0.1		1.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	8.4	6.9	1.4		6.5	3.0
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	26.6	18.1	73.3	6.4		20.0	16.3
LnGrp LOS	C	B	E	A		B	B
Approach Vol, veh/h	1022			806		1355	
Approach Delay, s/veh	22.2			26.9		19.2	
Approach LOS	C			C		B	

Timer - Assigned Phs		2		4	5	6	
Phs Duration (G+Y+Rc), s		48.0		21.0	15.0	33.0	
Change Period (Y+Rc), s		* 6.1		6.5	5.0	* 6.1	
Max Green Setting (Gmax), s		* 39		18.0	10.0	* 34	
Max Q Clear Time (g_c+I1), s		7.1		12.4	11.5	20.0	
Green Ext Time (p_c), s		3.8		2.2	0.0	6.9	

Intersection Summary	
HCM 6th Ctrl Delay	22.1
HCM 6th LOS	C

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

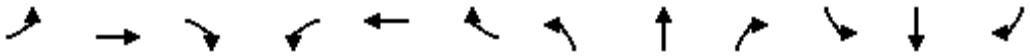
Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	110	170	90	40	10
Future Vol, veh/h	0	110	170	90	40	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	133	205	108	48	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	313	0	-	0	392	259
Stage 1	-	-	-	-	259	-
Stage 2	-	-	-	-	133	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1247	-	-	-	612	780
Stage 1	-	-	-	-	784	-
Stage 2	-	-	-	-	893	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1247	-	-	-	612	780
Mov Cap-2 Maneuver	-	-	-	-	612	-
Stage 1	-	-	-	-	784	-
Stage 2	-	-	-	-	893	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1247	-	-	-	640
HCM Lane V/C Ratio	-	-	-	-	0.094
HCM Control Delay (s)	0	-	-	-	11.2
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	30	120	90	40	30	210	860	110	20	480	30
Future Volume (veh/h)	10	30	120	90	40	30	210	860	110	20	480	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	33	133	100	44	33	233	956	122	22	533	33
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	74	221	187	336	497	421	212	1060	135	31	791	49
Arrive On Green	0.04	0.12	0.12	0.19	0.27	0.27	0.12	0.33	0.33	0.02	0.23	0.23
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	3170	404	1781	3399	210
Grp Volume(v), veh/h	11	33	133	100	44	33	233	536	542	22	278	288
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1798	1781	1777	1833
Q Serve(g_s), s	0.4	1.1	5.4	3.2	1.2	1.0	8.0	19.3	19.3	0.8	9.6	9.6
Cycle Q Clear(g_c), s	0.4	1.1	5.4	3.2	1.2	1.0	8.0	19.3	19.3	0.8	9.6	9.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.22	1.00		0.11
Lane Grp Cap(c), veh/h	74	221	187	336	497	421	212	594	601	31	413	426
V/C Ratio(X)	0.15	0.15	0.71	0.30	0.09	0.08	1.10	0.90	0.90	0.70	0.67	0.68
Avail Cap(c_a), veh/h	411	836	709	411	836	709	212	612	619	93	493	508
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	26.6	28.5	23.4	18.5	18.5	29.5	21.3	21.3	32.8	23.4	23.4
Incr Delay (d2), s/veh	0.9	0.3	4.9	0.5	0.1	0.1	90.1	16.4	16.3	24.9	2.8	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.5	2.3	1.4	0.5	0.4	8.5	9.7	9.8	0.5	3.9	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.9	26.9	33.4	23.9	18.6	18.6	119.7	37.7	37.6	57.7	26.2	26.2
LnGrp LOS	C	C	C	C	B	B	F	D	D	E	C	C
Approach Vol, veh/h		177			177			1311			588	
Approach Delay, s/veh		32.1			21.6			52.2			27.4	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	28.8	16.7	14.4	14.0	22.0	6.8	24.3
Change Period (Y+Rc), s	6.0	6.4	4.0	6.5	6.0	6.4	4.0	6.5
Max Green Setting (Gmax), s	3.5	23.1	15.5	30.0	8.0	18.6	15.5	30.0
Max Q Clear Time (g_c+I1), s	2.8	21.3	5.2	7.4	10.0	11.6	2.4	3.2
Green Ext Time (p_c), s	0.0	1.1	0.2	0.6	0.0	1.8	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	41.8
HCM 6th LOS	D

APPENDIX I

ANALYSIS WORKSHEETS – LONG-TERM + PROJECT

Intersection	
Int Delay, s/veh	732.4

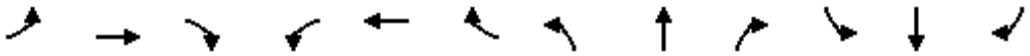
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	140	220	362	424	601	340
Future Vol, veh/h	140	220	362	424	601	340
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	159	250	411	482	683	386

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2180	876	1069	0	-	0
Stage 1	876	-	-	-	-	-
Stage 2	1304	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 51	348	652	-	-	-
Stage 1	407	-	-	-	-	-
Stage 2	254	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 7	348	652	-	-	-
Mov Cap-2 Maneuver	~ 7	-	-	-	-	-
Stage 1	~ 57	-	-	-	-	-
Stage 2	254	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, $	4226.1	9	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	652	-	7	348	-	-
HCM Lane V/C Ratio	0.631	-	22.727	0.718	-	-
HCM Control Delay (s)	19.5	$ 0	10807.8	37.8	-	-
HCM Lane LOS	C	A	F	E	-	-
HCM 95th %tile Q(veh)	4.5	-	21.8	5.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	30	140	0	70	30	636	180	160	601	10
Future Volume (veh/h)	10	0	30	140	0	70	30	636	180	160	601	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	34	159	0	80	34	723	205	182	683	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	26	0	81	199	0	177	86	804	681	207	1781	29
Arrive On Green	0.07	0.00	0.07	0.11	0.00	0.11	0.05	0.43	0.43	0.12	0.50	0.50
Sat Flow, veh/h	398	0	1231	1781	0	1585	1781	1870	1585	1781	3579	58
Grp Volume(v), veh/h	45	0	0	159	0	80	34	723	205	182	339	355
Grp Sat Flow(s),veh/h/ln	1629	0	0	1781	0	1585	1781	1870	1585	1781	1777	1860
Q Serve(g_s), s	1.9	0.0	0.0	6.2	0.0	3.4	1.3	25.7	6.1	7.2	8.5	8.5
Cycle Q Clear(g_c), s	1.9	0.0	0.0	6.2	0.0	3.4	1.3	25.7	6.1	7.2	8.5	8.5
Prop In Lane	0.24		0.76	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	108	0	0	199	0	177	86	804	681	207	884	925
V/C Ratio(X)	0.42	0.00	0.00	0.80	0.00	0.45	0.40	0.90	0.30	0.88	0.38	0.38
Avail Cap(c_a), veh/h	660	0	0	199	0	177	207	912	773	207	884	925
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.1	0.0	0.0	31.0	0.0	29.7	33.1	19.0	13.4	31.2	11.2	11.2
Incr Delay (d2), s/veh	2.6	0.0	0.0	20.1	0.0	1.8	3.0	10.9	0.2	32.7	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	3.7	0.0	1.3	0.6	11.6	1.9	4.7	2.8	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.7	0.0	0.0	51.1	0.0	31.5	36.0	29.9	13.6	63.8	11.4	11.4
LnGrp LOS	C	A	A	D	A	C	D	C	B	E	B	B
Approach Vol, veh/h		45			239			962			876	
Approach Delay, s/veh		34.7			44.6			26.7			22.3	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.5	36.2		10.2	7.6	41.0		12.7				
Change Period (Y+Rc), s	* 4.2	5.4		5.5	* 4.2	5.4		4.7				
Max Green Setting (Gmax), s	* 8.3	34.9		29.0	* 8.3	34.9		8.0				
Max Q Clear Time (g_c+I1), s	9.2	27.7		3.9	3.3	10.5		8.2				
Green Ext Time (p_c), s	0.0	3.0		0.2	0.0	3.9		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		27.1
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

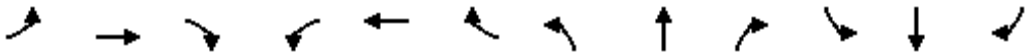
Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	771	10	23	706	10	10
Future Vol, veh/h	771	10	23	706	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	820	11	24	751	11	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	831	0	1250	416
Stage 1	-	-	-	-	826	-
Stage 2	-	-	-	-	424	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	797	-	165	585
Stage 1	-	-	-	-	390	-
Stage 2	-	-	-	-	628	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	797	-	160	585
Mov Cap-2 Maneuver	-	-	-	-	160	-
Stage 1	-	-	-	-	390	-
Stage 2	-	-	-	-	609	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	20.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	251	-	-	797	-
HCM Lane V/C Ratio	0.085	-	-	0.031	-
HCM Control Delay (s)	20.7	-	-	9.7	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	630	33	60	603	40	52	10	40	150	20	50
Future Volume (veh/h)	41	630	33	60	603	40	52	10	40	150	20	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	46	700	37	67	670	44	58	11	44	167	22	56
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	115	949	50	125	1009	450	153	40	159	271	81	206
Arrive On Green	0.06	0.28	0.28	0.07	0.28	0.28	0.09	0.12	0.12	0.15	0.17	0.17
Sat Flow, veh/h	1781	3433	181	1781	3554	1585	1781	327	1308	1781	467	1189
Grp Volume(v), veh/h	46	362	375	67	670	44	58	0	55	167	0	78
Grp Sat Flow(s),veh/h/ln	1781	1777	1838	1781	1777	1585	1781	0	1635	1781	0	1656
Q Serve(g_s), s	1.3	10.1	10.1	2.0	9.0	1.1	1.7	0.0	1.7	4.8	0.0	2.2
Cycle Q Clear(g_c), s	1.3	10.1	10.1	2.0	9.0	1.1	1.7	0.0	1.7	4.8	0.0	2.2
Prop In Lane	1.00		0.10	1.00		1.00	1.00		0.80	1.00		0.72
Lane Grp Cap(c), veh/h	115	491	508	125	1009	450	153	0	199	271	0	287
V/C Ratio(X)	0.40	0.74	0.74	0.54	0.66	0.10	0.38	0.00	0.28	0.62	0.00	0.27
Avail Cap(c_a), veh/h	233	720	744	200	1381	616	262	0	1054	371	0	1144
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.4	17.9	17.9	24.4	17.2	14.3	23.5	0.0	21.7	21.5	0.0	19.5
Incr Delay (d2), s/veh	2.2	2.2	2.2	3.5	0.8	0.1	1.5	0.0	0.7	2.3	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	3.6	3.8	0.8	3.1	0.4	0.7	0.0	0.6	2.0	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.6	20.1	20.0	27.9	17.9	14.4	25.0	0.0	22.4	23.8	0.0	20.0
LnGrp LOS	C	C	C	C	B	B	C	A	C	C	A	B
Approach Vol, veh/h		783			781			113			245	
Approach Delay, s/veh		20.4			18.6			23.7			22.6	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	20.4	10.2	15.4	7.9	20.8	13.0	12.6
Change Period (Y+Rc), s	4.5	5.4	5.5	6.0	4.4	5.4	* 4.7	6.0
Max Green Setting (Gmax), s	6.1	22.0	8.0	37.5	7.1	21.1	* 11	35.0
Max Q Clear Time (g_c+I1), s	4.0	12.1	3.7	4.2	3.3	11.0	6.8	3.7
Green Ext Time (p_c), s	0.0	2.9	0.0	0.5	0.0	3.1	0.2	0.3

Intersection Summary	
HCM 6th Ctrl Delay	20.2
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	31	71	10	21	92
Future Vol, veh/h	10	31	71	10	21	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	36	84	12	25	108

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	248	90	0	0	96	0
Stage 1	90	-	-	-	-	-
Stage 2	158	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	740	968	-	-	1498	-
Stage 1	934	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	727	968	-	-	1498	-
Mov Cap-2 Maneuver	727	-	-	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	855	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	1.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	896	1498	-
HCM Lane V/C Ratio	-	-	0.054	0.016	-
HCM Control Delay (s)	-	-	9.2	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	312	130	170	460	0	554	366
Future Volume (veh/h)	312	130	170	460	0	554	366
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Work Zone On Approach	No			No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870		1870	1870
Adj Flow Rate, veh/h	335	140	183	495		596	394
Peak Hour Factor	0.93	0.93	0.93	0.93		0.93	0.93
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	541	841	258	2120		1256	560
Arrive On Green	0.16	0.16	0.15	0.60		0.35	0.35
Sat Flow, veh/h	3456	2790	1781	3647		3647	1585
Grp Volume(v), veh/h	335	140	183	495		596	394
Grp Sat Flow(s),veh/h/ln	1728	1395	1781	1777		1777	1585
Q Serve(g_s), s	4.6	1.9	5.0	3.3		6.6	10.9
Cycle Q Clear(g_c), s	4.6	1.9	5.0	3.3		6.6	10.9
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	541	841	258	2120		1256	560
V/C Ratio(X)	0.62	0.17	0.71	0.23		0.47	0.70
Avail Cap(c_a), veh/h	1219	1389	349	2743		2395	1068
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	20.1	13.1	20.8	4.8		12.8	14.2
Incr Delay (d2), s/veh	1.2	0.1	4.2	0.1		0.3	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	2.1	0.7		2.0	3.2
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	21.3	13.2	25.0	4.9		13.1	15.8
LnGrp LOS	C	B	C	A		B	B
Approach Vol, veh/h	475			678		990	
Approach Delay, s/veh	18.9			10.3		14.2	
Approach LOS	B			B		B	

Timer - Assigned Phs		2		4	5	6	
Phs Duration (G+Y+Rc), s		36.5		14.5	12.4	24.1	
Change Period (Y+Rc), s		* 6.1		6.5	5.0	* 6.1	
Max Green Setting (Gmax), s		* 39		18.0	10.0	* 34	
Max Q Clear Time (g_c+I1), s		5.3		6.6	7.0	12.9	
Green Ext Time (p_c), s		3.3		1.4	0.1	5.1	

Intersection Summary	
HCM 6th Ctrl Delay	14.0
HCM 6th LOS	B

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

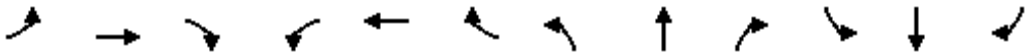
Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	202	71	51	111	10
Future Vol, veh/h	0	202	71	51	111	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	243	86	61	134	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	147	0	-	0	360	117
Stage 1	-	-	-	-	117	-
Stage 2	-	-	-	-	243	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1435	-	-	-	639	935
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	797	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1435	-	-	-	639	935
Mov Cap-2 Maneuver	-	-	-	-	639	-
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	797	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1435	-	-	-	656
HCM Lane V/C Ratio	-	-	-	-	0.222
HCM Control Delay (s)	0	-	-	-	12
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.8



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	20	253	90	20	30	171	452	130	20	506	10
Future Volume (veh/h)	10	20	253	90	20	30	171	452	130	20	506	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	22	281	100	22	33	190	502	144	22	562	11
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	73	393	333	314	646	547	192	787	224	31	705	14
Arrive On Green	0.04	0.21	0.21	0.18	0.35	0.35	0.11	0.29	0.29	0.02	0.20	0.20
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	2729	778	1781	3565	70
Grp Volume(v), veh/h	11	22	281	100	22	33	190	326	320	22	280	293
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1730	1781	1777	1858
Q Serve(g_s), s	0.4	0.7	12.6	3.6	0.6	1.0	7.9	11.9	12.0	0.9	11.1	11.2
Cycle Q Clear(g_c), s	0.4	0.7	12.6	3.6	0.6	1.0	7.9	11.9	12.0	0.9	11.1	11.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.45	1.00		0.04
Lane Grp Cap(c), veh/h	73	393	333	314	646	547	192	512	499	31	351	367
V/C Ratio(X)	0.15	0.06	0.84	0.32	0.03	0.06	0.99	0.64	0.64	0.72	0.80	0.80
Avail Cap(c_a), veh/h	372	755	640	372	755	640	192	553	538	84	445	465
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.4	23.5	28.2	26.7	16.1	16.3	33.1	23.0	23.1	36.3	28.4	28.4
Incr Delay (d2), s/veh	0.9	0.1	5.8	0.6	0.0	0.0	62.1	2.2	2.3	26.7	7.8	7.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.3	5.2	1.6	0.2	0.4	6.5	4.8	4.8	0.6	5.1	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.3	23.5	34.0	27.3	16.1	16.3	95.2	25.2	25.4	63.1	36.1	35.9
LnGrp LOS	D	C	C	C	B	B	F	C	C	E	D	D
Approach Vol, veh/h		314			155			836			595	
Approach Delay, s/veh		33.3			23.4			41.2			37.0	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.3	27.8	17.1	22.1	14.0	21.1	7.0	32.1
Change Period (Y+Rc), s	6.0	6.4	4.0	6.5	6.0	6.4	4.0	6.5
Max Green Setting (Gmax), s	3.5	23.1	15.5	30.0	8.0	18.6	15.5	30.0
Max Q Clear Time (g_c+I1), s	2.9	14.0	5.6	14.6	9.9	13.2	2.4	3.0
Green Ext Time (p_c), s	0.0	2.5	0.1	1.0	0.0	1.5	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	37.1
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	5260.7

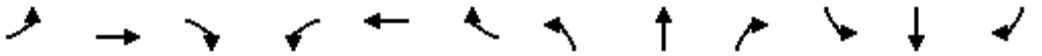
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	160	342	211	791	964	250
Future Vol, veh/h	160	342	211	791	964	250
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	182	389	240	899	1095	284

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2616	1237	1379	0	-	0
Stage 1	1237	-	-	-	-	-
Stage 2	1379	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 27	~ 215	497	-	-	-
Stage 1	274	-	-	-	-	-
Stage 2	234	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 1	~ 215	497	-	-	-
Mov Cap-2 Maneuver	~ 1	-	-	-	-	-
Stage 1	~ 10	-	-	-	-	-
Stage 2	234	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 28475.4	4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	497	-	1	215	-	-
HCM Lane V/C Ratio	0.482	-	181.818	1.808	-	-
HCM Control Delay (s)	18.8	0	$ 88445	$ 419.4	-	-
HCM Lane LOS	C	A	F	F	-	-
HCM 95th %tile Q(veh)	2.6	-	25.3	27.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	20	190	0	170	50	802	80	30	1136	20
Future Volume (veh/h)	10	0	20	190	0	170	50	802	80	30	1136	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	23	216	0	193	57	911	91	34	1291	23
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	29	0	61	202	0	180	119	926	785	98	1727	31
Arrive On Green	0.06	0.00	0.06	0.11	0.00	0.11	0.07	0.50	0.50	0.06	0.48	0.48
Sat Flow, veh/h	532	0	1112	1781	0	1585	1781	1870	1585	1781	3572	64
Grp Volume(v), veh/h	34	0	0	216	0	193	57	911	91	34	642	672
Grp Sat Flow(s),veh/h/ln	1644	0	0	1781	0	1585	1781	1870	1585	1781	1777	1859
Q Serve(g_s), s	1.4	0.0	0.0	8.0	0.0	8.0	2.2	33.8	2.2	1.3	20.6	20.6
Cycle Q Clear(g_c), s	1.4	0.0	0.0	8.0	0.0	8.0	2.2	33.8	2.2	1.3	20.6	20.6
Prop In Lane	0.32		0.68	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	91	0	0	202	0	180	119	926	785	98	859	899
V/C Ratio(X)	0.37	0.00	0.00	1.07	0.00	1.07	0.48	0.98	0.12	0.35	0.75	0.75
Avail Cap(c_a), veh/h	676	0	0	202	0	180	210	926	785	210	880	921
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.1	0.0	0.0	31.2	0.0	31.2	31.7	17.5	9.5	32.1	14.7	14.7
Incr Delay (d2), s/veh	2.5	0.0	0.0	82.6	0.0	87.7	3.0	25.5	0.1	2.1	3.5	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	7.9	0.0	7.3	1.0	17.8	0.6	0.6	7.4	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.7	0.0	0.0	113.8	0.0	119.0	34.7	43.0	9.6	34.1	18.2	18.0
LnGrp LOS	C	A	A	F	A	F	C	D	A	C	B	B
Approach Vol, veh/h		34			409			1059			1348	
Approach Delay, s/veh		34.7			116.2			39.7			18.5	
Approach LOS		C			F			D			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.1	40.3		9.4	8.9	39.5		12.7				
Change Period (Y+Rc), s	* 4.2	5.4		5.5	* 4.2	5.4		4.7				
Max Green Setting (Gmax), s	* 8.3	34.9		29.0	* 8.3	34.9		8.0				
Max Q Clear Time (g_c+I1), s	3.3	35.8		3.4	4.2	22.6		10.0				
Green Ext Time (p_c), s	0.0	0.0		0.1	0.0	6.3		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		40.6	
HCM 6th LOS		D	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

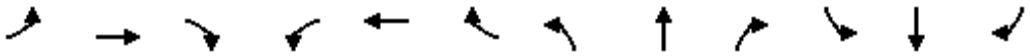
Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1206	10	46	842	10	10
Future Vol, veh/h	1206	10	46	842	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1283	11	49	896	11	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1294	0	1835	647
Stage 1	-	-	-	-	1289	-
Stage 2	-	-	-	-	546	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	531	-	67	414
Stage 1	-	-	-	-	222	-
Stage 2	-	-	-	-	544	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	531	-	61	414
Mov Cap-2 Maneuver	-	-	-	-	61	-
Stage 1	-	-	-	-	222	-
Stage 2	-	-	-	-	494	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	47.3
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	106	-	-	531	-
HCM Lane V/C Ratio	0.201	-	-	0.092	-
HCM Control Delay (s)	47.3	-	-	12.5	-
HCM Lane LOS	E	-	-	B	-
HCM 95th %tile Q(veh)	0.7	-	-	0.3	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	1074	92	40	730	90	54	10	30	60	10	40
Future Volume (veh/h)	66	1074	92	40	730	90	54	10	30	60	10	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	73	1193	102	44	811	100	60	11	33	67	11	44
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	148	1236	106	93	1223	546	151	51	153	181	41	166
Arrive On Green	0.08	0.37	0.37	0.05	0.34	0.34	0.08	0.12	0.12	0.10	0.13	0.13
Sat Flow, veh/h	1781	3313	283	1781	3554	1585	1781	412	1236	1781	327	1308
Grp Volume(v), veh/h	73	639	656	44	811	100	60	0	44	67	0	55
Grp Sat Flow(s),veh/h/ln	1781	1777	1819	1781	1777	1585	1781	0	1648	1781	0	1635
Q Serve(g_s), s	2.3	20.7	20.8	1.4	11.4	2.6	1.9	0.0	1.4	2.1	0.0	1.8
Cycle Q Clear(g_c), s	2.3	20.7	20.8	1.4	11.4	2.6	1.9	0.0	1.4	2.1	0.0	1.8
Prop In Lane	1.00		0.16	1.00		1.00	1.00		0.75	1.00		0.80
Lane Grp Cap(c), veh/h	148	663	679	93	1223	546	151	0	204	181	0	207
V/C Ratio(X)	0.49	0.96	0.97	0.47	0.66	0.18	0.40	0.00	0.22	0.37	0.00	0.27
Avail Cap(c_a), veh/h	215	663	679	184	1272	567	242	0	978	341	0	1040
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.9	18.1	18.1	27.1	16.4	13.5	25.5	0.0	23.3	24.7	0.0	23.3
Incr Delay (d2), s/veh	2.6	26.1	26.4	3.7	1.2	0.2	1.7	0.0	0.5	1.3	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	11.5	11.8	0.6	4.0	0.9	0.8	0.0	0.6	0.9	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.4	44.2	44.5	30.8	17.7	13.7	27.2	0.0	23.8	26.0	0.0	23.9
LnGrp LOS	C	D	D	C	B	B	C	A	C	C	A	C
Approach Vol, veh/h		1368			955			104			122	
Approach Delay, s/veh		43.5			17.9			25.8			25.1	
Approach LOS		D			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	27.4	10.5	13.5	9.3	25.7	10.7	13.3
Change Period (Y+Rc), s	4.5	5.4	5.5	6.0	4.4	5.4	* 4.7	6.0
Max Green Setting (Gmax), s	6.1	22.0	8.0	37.5	7.1	21.1	* 11	35.0
Max Q Clear Time (g_c+I1), s	3.4	22.8	3.9	3.8	4.3	13.4	4.1	3.4
Green Ext Time (p_c), s	0.0	0.0	0.0	0.3	0.0	3.2	0.1	0.2

Intersection Summary	
HCM 6th Ctrl Delay	32.3
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	22	82	10	41	111
Future Vol, veh/h	10	22	82	10	41	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	26	96	12	48	131

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	329	102	0	0	108	0
Stage 1	102	-	-	-	-	-
Stage 2	227	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	665	953	-	-	1483	-
Stage 1	922	-	-	-	-	-
Stage 2	811	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	642	953	-	-	1483	-
Mov Cap-2 Maneuver	642	-	-	-	-	-
Stage 1	922	-	-	-	-	-
Stage 2	783	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	828	1483	-
HCM Lane V/C Ratio	-	-	0.045	0.033	-
HCM Control Delay (s)	-	-	9.6	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	465	490	230	524	0	992	272
Future Volume (veh/h)	465	490	230	524	0	992	272
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Work Zone On Approach	No			No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870		1870	1870
Adj Flow Rate, veh/h	500	527	247	563		1067	292
Peak Hour Factor	0.93	0.93	0.93	0.93		0.93	0.93
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	727	991	258	2158		1386	618
Arrive On Green	0.21	0.21	0.14	0.61		0.39	0.39
Sat Flow, veh/h	3456	2790	1781	3647		3647	1585
Grp Volume(v), veh/h	500	527	247	563		1067	292
Grp Sat Flow(s),veh/h/ln	1728	1395	1781	1777		1777	1585
Q Serve(g_s), s	9.2	10.4	9.5	5.1		18.1	9.5
Cycle Q Clear(g_c), s	9.2	10.4	9.5	5.1		18.1	9.5
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	727	991	258	2158		1386	618
V/C Ratio(X)	0.69	0.53	0.96	0.26		0.77	0.47
Avail Cap(c_a), veh/h	901	1131	258	2158		1770	790
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	25.2	17.7	29.3	6.3		18.4	15.8
Incr Delay (d2), s/veh	1.6	0.4	44.3	0.1		1.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	8.4	6.9	1.4		6.5	3.0
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	26.8	18.1	73.6	6.4		20.0	16.3
LnGrp LOS	C	B	E	A		B	B
Approach Vol, veh/h	1027			810		1359	
Approach Delay, s/veh	22.4			26.9		19.2	
Approach LOS	C			C		B	

Timer - Assigned Phs		2		4	5	6	
Phs Duration (G+Y+Rc), s		48.0		21.0	15.0	33.0	
Change Period (Y+Rc), s		* 6.1		6.5	5.0	* 6.1	
Max Green Setting (Gmax), s		* 39		18.0	10.0	* 34	
Max Q Clear Time (g_c+I1), s		7.1		12.4	11.5	20.1	
Green Ext Time (p_c), s		3.8		2.2	0.0	6.9	

Intersection Summary		
HCM 6th Ctrl Delay		22.2
HCM 6th LOS		C

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

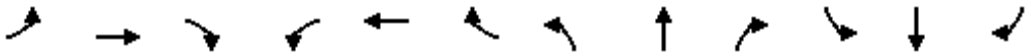
Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	111	172	92	41	10
Future Vol, veh/h	0	111	172	92	41	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	134	207	111	49	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	318	0	-	0	397	263
Stage 1	-	-	-	-	263	-
Stage 2	-	-	-	-	134	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1242	-	-	-	608	776
Stage 1	-	-	-	-	781	-
Stage 2	-	-	-	-	892	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1242	-	-	-	608	776
Mov Cap-2 Maneuver	-	-	-	-	608	-
Stage 1	-	-	-	-	781	-
Stage 2	-	-	-	-	892	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1242	-	-	-	635
HCM Lane V/C Ratio	-	-	-	-	0.097
HCM Control Delay (s)	0	-	-	-	11.3
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3



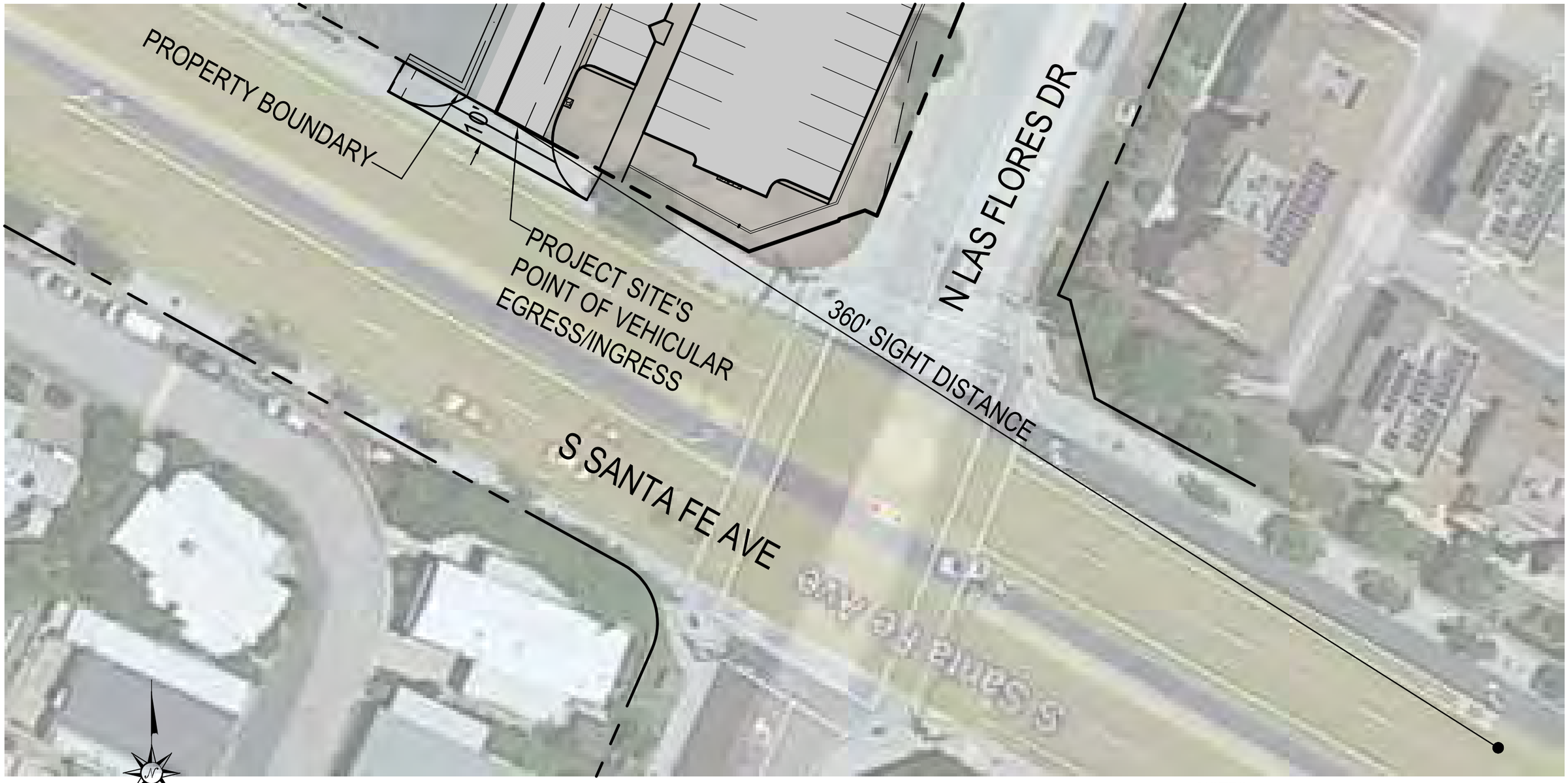
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	30	122	90	40	30	214	865	110	20	482	30
Future Volume (veh/h)	10	30	122	90	40	30	214	865	110	20	482	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	33	136	100	44	33	238	961	122	22	536	33
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	74	224	190	336	499	423	212	1060	135	31	792	49
Arrive On Green	0.04	0.12	0.12	0.19	0.27	0.27	0.12	0.33	0.33	0.02	0.23	0.23
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	3172	403	1781	3401	209
Grp Volume(v), veh/h	11	33	136	100	44	33	238	538	545	22	280	289
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1798	1781	1777	1833
Q Serve(g_s), s	0.4	1.1	5.6	3.3	1.2	1.1	8.0	19.5	19.5	0.8	9.6	9.7
Cycle Q Clear(g_c), s	0.4	1.1	5.6	3.3	1.2	1.1	8.0	19.5	19.5	0.8	9.6	9.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.22	1.00		0.11
Lane Grp Cap(c), veh/h	74	224	190	336	499	423	212	594	601	31	414	427
V/C Ratio(X)	0.15	0.15	0.72	0.30	0.09	0.08	1.13	0.91	0.91	0.70	0.68	0.68
Avail Cap(c_a), veh/h	410	833	706	410	833	706	212	609	617	93	491	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.1	26.6	28.5	23.5	18.5	18.5	29.7	21.4	21.4	32.9	23.5	23.5
Incr Delay (d2), s/veh	0.9	0.3	5.0	0.5	0.1	0.1	99.6	17.0	17.0	25.0	2.9	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.5	2.3	1.4	0.5	0.4	9.0	9.8	10.0	0.6	4.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.1	26.9	33.5	24.0	18.6	18.6	129.2	38.5	38.4	57.9	26.4	26.4
LnGrp LOS	C	C	C	C	B	B	F	D	D	E	C	C
Approach Vol, veh/h		180			177			1321			591	
Approach Delay, s/veh		32.2			21.6			54.8			27.6	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	28.9	16.7	14.6	14.0	22.1	6.8	24.5
Change Period (Y+Rc), s	6.0	6.4	4.0	6.5	6.0	6.4	4.0	6.5
Max Green Setting (Gmax), s	3.5	23.1	15.5	30.0	8.0	18.6	15.5	30.0
Max Q Clear Time (g_c+I1), s	2.8	21.5	5.3	7.6	10.0	11.7	2.4	3.2
Green Ext Time (p_c), s	0.0	1.0	0.2	0.6	0.0	1.8	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	43.3
HCM 6th LOS	D

APPENDIX J

SIGHT DISTANCE EXHIBIT



SIGHT DISTANCE EXHIBIT

2972 S. SANTA FE APARTMENTS

PLSA JOB NO. 3527
07-26-2022
SHEET 1 OF 1

0 30 60 90

SCALE: 1" = 30'

NOTES

* DISTANCES FOLLOW THE CALTRANS HIGHWAY DESIGN MANUAL, CHAPTER 200, INDEX 201.1, ASSUMING A 45MPH SPEED LIMIT ON S SANTA FE AVENUE

PASCO LARET SUITER & ASSOCIATES
San Diego | Encinitas | Orange County
Phone 858.259.8212 | www.plsaengineering.com

SAVE DATE: 07/26/22 ~ PLOT DATE: 07/26/22 ~ FILE NAME: J:\ACTIVE JOBS\3527 MAYER-SOUTH SANTA FE AVE\CIVIL\DRAWING\EXHIBITS\Sight Distance\3527-SIGHT-DISTANCE-EXHIBIT.dwg

APPENDIX K

Vehicle Miles Traveled Analysis

VEHICLE MILES TRAVELED ANALYSIS

SANTA FE FLORES PROJECT

San Marcos, California
July 27, 2022

LLG Ref. 3-22-3523

Prepared by:
Amelia Giacalone
Senior Transportation Planner

Under the Supervision of:
John Boarman, P.E.
Principal

Linscott, Law & Greenspan, Engineers
4542 Ruffner Street
Suite 100
San Diego, CA 92111
858.300.8800 T
858.300.8810 F
www.llgengineers.com

TABLE OF CONTENTS

SECTION		PAGE
1.0	**Introduction**	**1**
2.0	**Project Description**	**2**
	2.1 Project Location & Description	2
	2.2 Project Trip Generation	2
	2.3 Trip Generation	2
	2.3.1 Trip Rates	2
	2.3.2 Project Trips	2
3.0	**Vehicle Miles Traveled Assessment**	**8**
	3.1 VMT Background	8
	3.2 VMT Assessment	8
4.0	**Conclusions**	**11**

LIST OF FIGURES

SECTION—FIGURE #		PAGE
Figure 2–1	Vicinity Map	5
Figure 2–2	Project Area Map	6
Figure 2–3	Project Site Plan	7
Figure 3–1	SANDAG Screening Map Results	10

LIST OF TABLES

SECTION—TABLE #		PAGE
Table 2-1	Project Trip Generation	4

VEHICLE MILES TRAVELED ANALYSIS

SANTA FE FLORES PROJECT

San Marcos, California
April 27, 2022

1.0 INTRODUCTION

Linscott, Law & Greenspan, Engineers (LLG) has prepared the following Vehicle Miles Traveled (VMT) analysis for the proposed Santa Fe Flores project (proposed Project) located at 2972 and 2982 S. Santa Fe Avenue on the northwest corner of the S. Santa Fe Avenue / Las Flores Drive intersection in the City of San Marcos.

A Non-CEQA Local Transportation Analysis is provided under separate cover.

The following items are included in this transportation study:

- Project Description
- VMT Assessment
- Conclusions

2.0 PROJECT DESCRIPTION

2.1 Project Location & Description

The Project is located in the city of San Marcos at 2972 and 2982 South Santa Fe Avenue adjacent to Las Flores Drive on assessor parcel numbers 217-161-1800 and 217-161-1900. The 2.5-acre Project site is undeveloped and is currently designated Commercial and Light Industrial in the City General Plan and zoned as Commercial and Light Industrial. The Project would be located on a previously graded site and require a General Plan amendment and Rezone to Multifamily Residential to allow the development of 50 multi-family residential units that would be 3-4 stories in height. The Project would also include a 1,000 square-foot roof deck for fitness and leisure, a 1,170 square-foot ground floor leasing and amenity center, and a 120 square-foot ground floor fire command center. Vehicle parking would include a total of 107 surface parking spaces and bicycle parking would include a total of 11 lockers or bike storage rooms located on the upper and lower levels.

Access to the site will be provided via a single right-in/right-out only driveway on S. Santa Fe Avenue.

Figure 2–1 shows the vicinity map. ***Figure 2–2*** shows a more detailed project area map. ***Figure 2–3*** shows the conceptual site plan for the Project.

2.2 Project Trip Generation

As described in *Section 2.1*, the proposed Project would provide 50 apartment units. The following is a discussion of the traffic expected to be generated by the Project.

2.3 Trip Generation

2.3.1 *Trip Rates*

Trip generation for the Project's multi-family housing was estimated using trip rates from SANDAG's *(Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2002*. The trip generation rate for "Apartment (or any multi-family units more than 20 DU/acre)" was used based on the proposed use.

2.3.2 *Project Trips*

Table 2–1 tabulates the total Project traffic generation. The Project is calculated to generate a total of 300 ADT with 24 AM peak hour trips (5 inbound / 19 outbound) and 27 PM peak hour trips (19 inbound and 8 outbound).

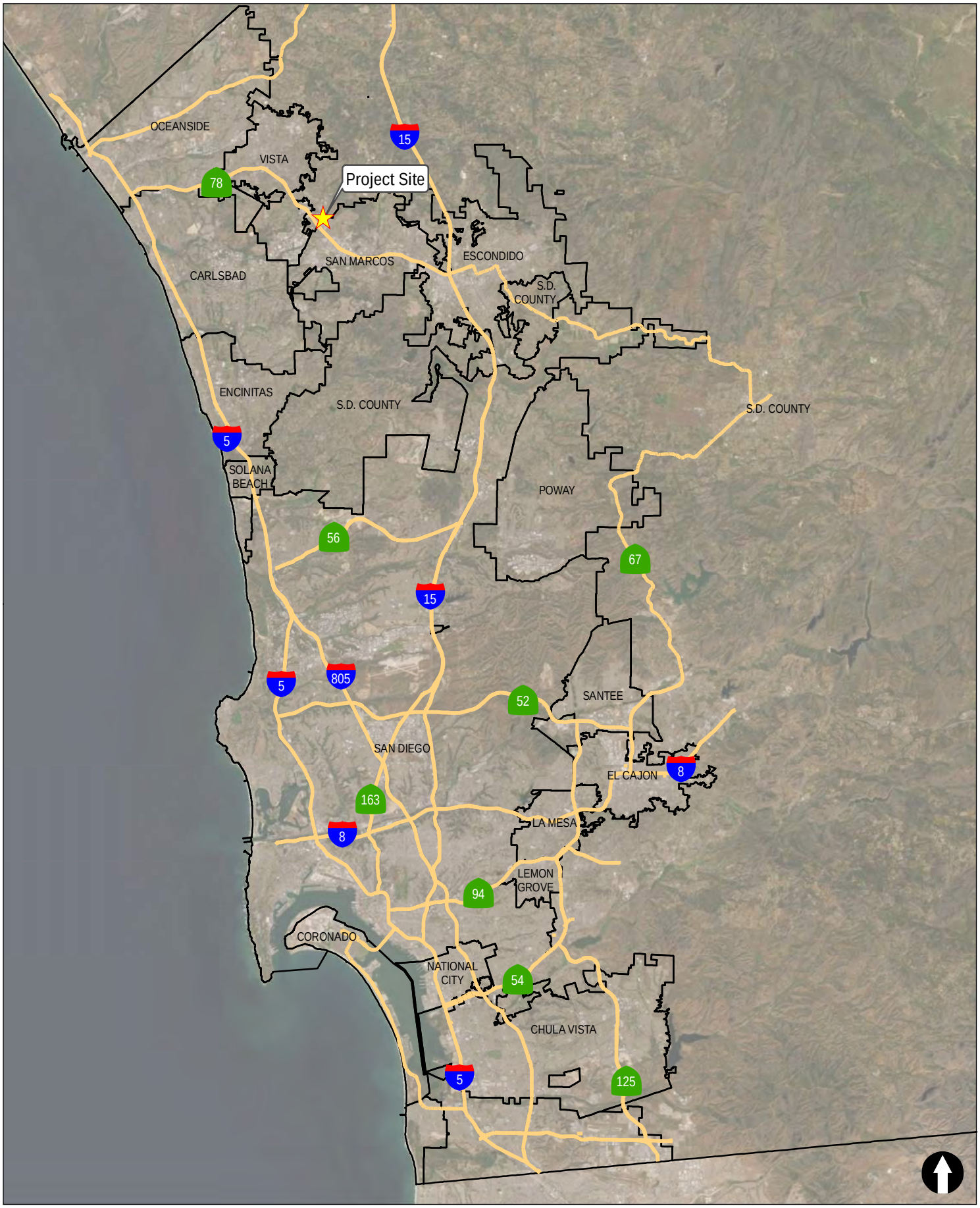
TABLE 2-1
PROJECT TRIP GENERATION

Land Use	Size	Daily Trip Ends (ADT)[b]		AM Peak Hour					PM Peak Hour				
		Rate [a]	Volume	% of ADT	In:Out Split	Volume			% of ADT	In:Out Split	Volume		
						In	Out	Total			In	Out	Total
Proposed Project													
Apartments	50 DU	6 /DU	300	8%	20 : 80	5	19	24	9%	70 : 30	19	8	27
		Project Total	***300***			***5***	***19***	***24***			***19***	***8***	***27***

Footnotes:

a. Trip rates from *SANDAG's (Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region*

b. Average Daily Trips



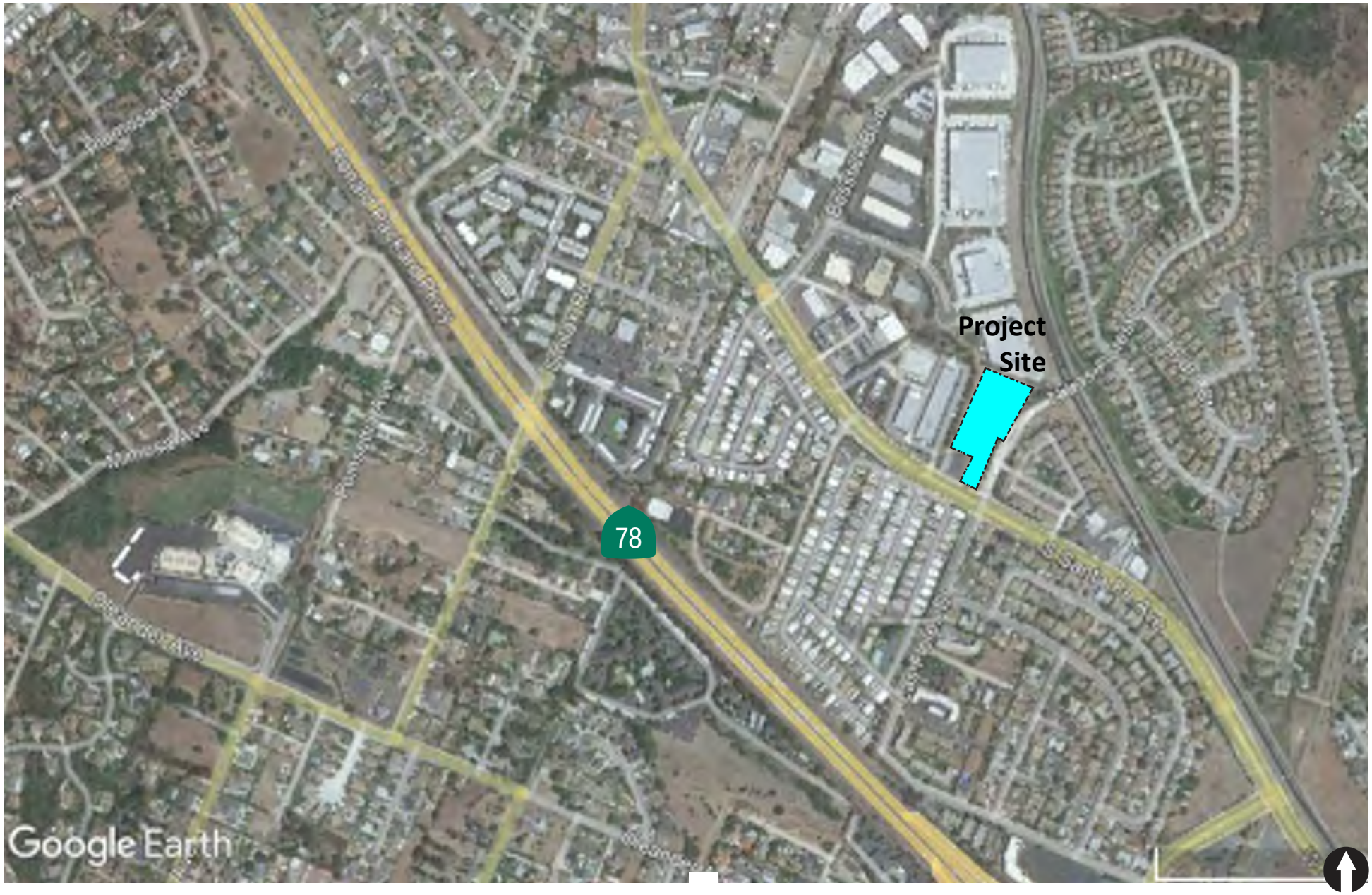
LINSCOTT LAW & GREENSPAN engineers

N:\3523\Figures
Date: 3/28/2022
Time: 2:23 PM

Figure 2-1

Vicinity Map

Santa Fe Las Flores



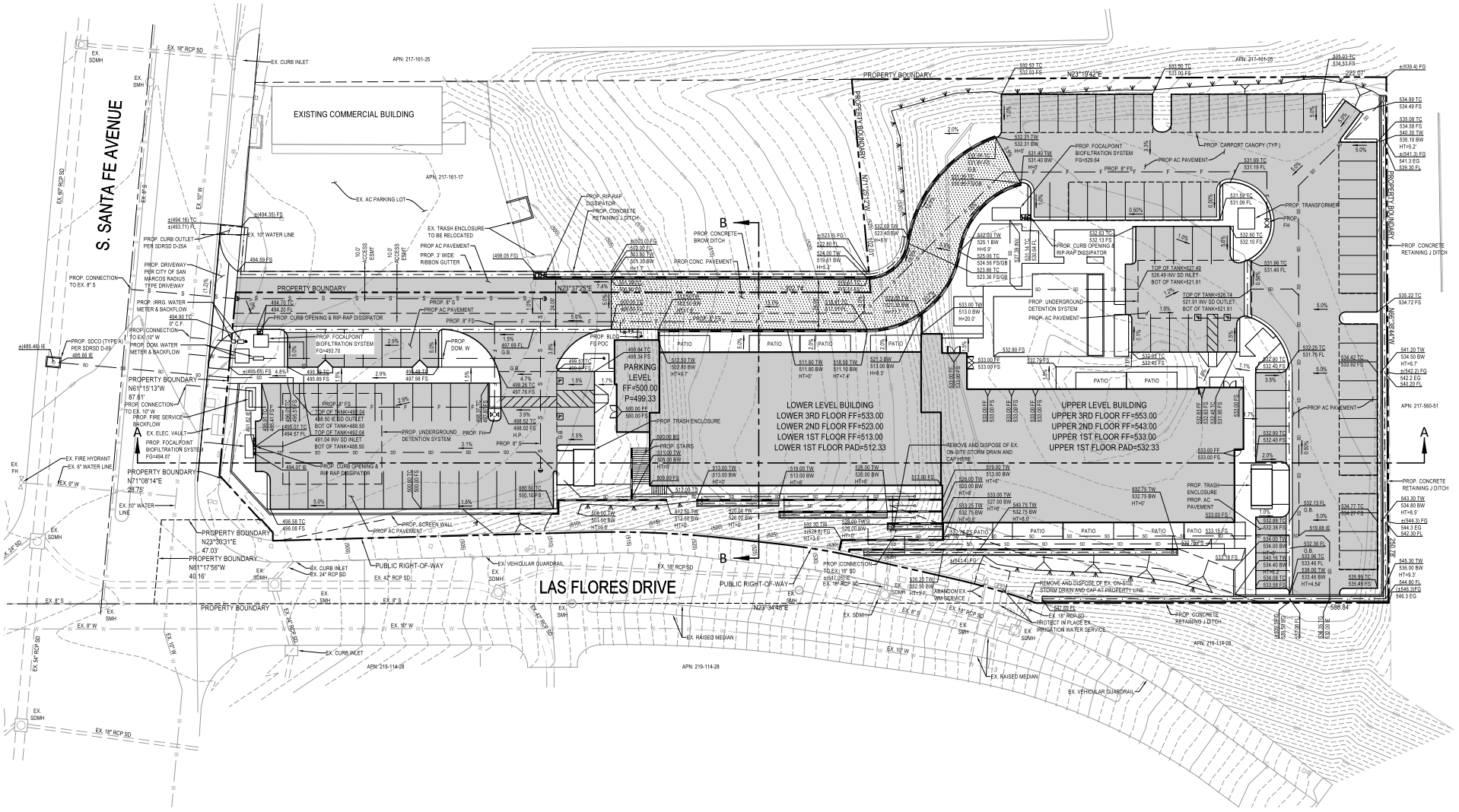
LINSCOTT LAW & GREENSPAN engineers

N:\3523\Figures
Date: 03/28/22

Figure 2-2

Project Area Map

Santa Fe Las Flores



LINSCOTT LAW & GREENSPAN engineers

N:\3523\Figures
Date: 03/28/22

Figure 2-3

Project Site Plan

Santa Fe Las Flores

3.0 VEHICLE MILES TRAVELED ASSESSMENT

The following VMT assessment has been prepared to evaluate the effects of the Project based on VMT, as proposed by the California Governor's Office of Planning and Research (OPR) to implement California State Law Senate Bill (SB) 743 and subsequently adopted by the City of San Marcos in November 2020. The analysis methodology contained in this report utilizes the City of San Marcos' latest *Transportation Impact Analysis Guidelines* (November 16, 2020).

3.1 VMT Background

VMT is defined as the "amount and distance of automobile travel attributable to a project" per CEQA Guidelines Section 15064.3. VMT is a measure of the use and efficiency of the transportation network as well land uses in a region. VMT is calculated based on individual vehicle trips generated and their associated trip lengths. VMT accounts for two-way (roundtrip) travel and is estimated for a typical weekday for the purposes of measuring transportation impacts.

The potential transportation impacts of the proposed Project are based on VMT to satisfy the California Environmental Quality Act (CEQA) guidelines through SB 743. Public Resources Code section 20199, enacted pursuant to SB 743, identifies VMT as an appropriate metric for measuring transportation impacts along with the elimination of auto delay/Level of service (LOS) for CEQA purposes statewide.

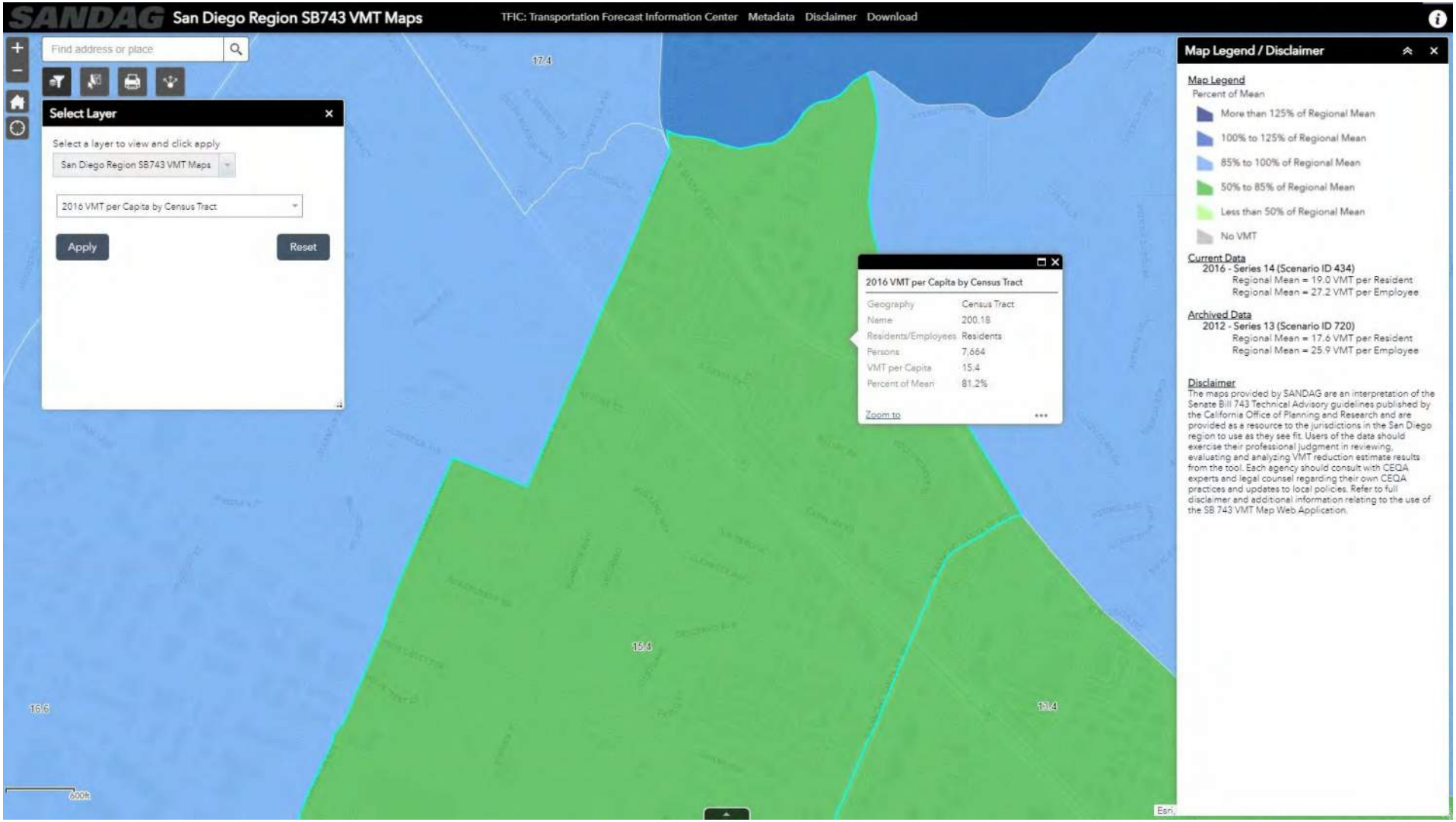
3.2 VMT Assessment

Based on the City of San Marcos *Transportation Impact Analysis Guidelines*, the requirement to prepare a detailed transportation VMT analysis applies to all land development projects except for those that meet at least one of the provided screening criteria. A project that meets at least one of the screening criteria listed below would be considered to have a less-than-significant impact due to the project or location characteristics.

1. Small Projects (less than 110 daily vehicle trips)
2. Affordable Housing (100% deed restricted)
3. Local Serving Retail and Public Facilities (50,000 square feet gross floor area or less)
4. Adjacency to High-Quality Transit
5. Map-Based Screening (projects located in VMT efficient areas): Residential and employment projects that are proposed in areas that generate VMT below adopted City thresholds can be presumed to have a less-than-significant transportation impact and would not require a detailed VMT analysis. This determination must be made using SANDAG's online residential and employment VMT maps, which show census tracts in the city where the VMT is below the regional average. The following types of projects could be screened out using this approach:
    - Residential projects proposed in census tracts with residential VMT per capita below the City's threshold of exceeding 85 percent of the SANDAG regional average

- Employment projects proposed in census tracts with work VMT per employee below the City's threshold of exceeding 85 percent of the SANDAG regional average

Per SANDAG's online residential VMT map, the Project site is located within Census Tract 200.18 as shown in ***Figure 3-1***. The VMT per capita of this Census Tract is 15.4 VMT, which is 81.2% of the SANDAG regional average of 19.0 VMT per capita. Therefore, screening criteria number five (5) listed above is applicable. As such, the Project can be presumed to have a less-than-significant transportation impact and would not require a detailed VMT analysis.



LINSCOTT LAW & GREENSPAN engineers

N:\3523\Figures\VMT Figures
Date: 07/27/22

Figure 3-1

SANDAG Screening Map Results

SANTA FE LAS FLORES

4.0 CONCLUSIONS

The preceding Vehicle Miles Traveled analysis was prepared to determine and evaluate the potential impacts and effects to the local roadway system due to the proposed Project.

Based on the SANDAG's online residential VMT map, the Project's VMT per Resident is less than 15% below the regionwide average. As such, the Project can be presumed to have a less-than-significant transportation impact.