Attachment A
Updated Air Quality Assessment

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AIR QUALITY ASSESSMENT

Chick-fil-A – I-5 & Palomar Airport Road
5850 Avenida Encinas
Carlsbad, California 92008

<u>Prepared For</u>

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July 15, 2021

Air Quality Assessment

for the

Chick-fil-A Carlsbad Restaurant

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1.0 INTRODUCTION

This report presents an assessment of potential air quality impacts associated with the proposed Chick-fil-A Carlsbad Restaurant. The Project is proposing to construct a 3,427-square foot Chick-fil-A Restaurant on a site at 5850 Avenida Encinas in the City of Carlsbad. The project site is located near the intersection of Interstate 5 and Palomar Airport Road. The site is currently occupied by a 10,977-square foot office building.

Air quality impacts will be attributable to emissions associated with construction and operational emissions associated with traffic and energy use. This report presents an evaluation of existing conditions at the site, thresholds of significance, and potential air quality impacts associated with construction and operation of the project.

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2.0 EXISTING CONDITIONS

2.1 Current Development

The project site is currently occupied by a 10,977-square foot commercial office building. The building will be demolished prior to construction of the Chick-fil-A restaurant. As it currently exists, the office building is a source of air emissions.

2.2 Regulatory Setting

Air quality is defined by ambient air concentrations of specific pollutants identified by the United States Environmental Protection Agency (EPA) to be of concern with respect to health and welfare of the general public. The EPA is responsible for enforcing the Federal Clean Air Act (CAA) of 1970 and its 1977 and 1990 Amendments. The CAA required the EPA to establish National Ambient Air Quality Standards (NAAQS), which identify concentrations of pollutants in the ambient air below which no adverse effects on the public health and welfare are anticipated. In response, the EPA established both primary and secondary standards for several pollutants (called “criteria” pollutants). Primary standards are designed to protect human health with an adequate margin of safety. Secondary standards are designed to protect property and the public welfare from air pollutants in the atmosphere.

The CAA allows states to adopt ambient air quality standards and other regulations provided they are at least as stringent as federal standards. The California Air Resources Board (ARB) has established the more stringent California Ambient Air Quality Standards (CAAQS) for the six criteria pollutants through the California Clean Air Act of 1988, and also has established CAAQS for additional pollutants, including sulfates, hydrogen sulfide, vinyl chloride and visibility-reducing particles.

Areas that do not meet the NAAQS or the CAAQS for a particular pollutant are considered to be “nonattainment areas” for that pollutant. In September 1997, the EPA promulgated 8-hour O_3 and 24-hour and annual $PM_{2.5}$ national standards. As a result, this action has initiated a new planning process to monitor and evaluate emission control measures for these pollutants. The SDAB is currently designated as a serious nonattainment area for the 2008 NAAQS for ozone (O_3), and a moderate nonattainment area for the 2015 NAAQS for O_3. In January 2021, The USEPA received a request from the state of California and the SDAPCD to reclassify the SDAB as a severe nonattainment area for both the 2008 and 2015 NAAQS for O_3. The SDAB is in attainment for the NAAQS for all other criteria pollutants.

The ARB is the state regulatory agency with authority to enforce regulations to both achieve and maintain the NAAQS and CAAQS. The ARB is responsible for the development, adoption, and enforcement of the state's motor vehicle emissions program, as well as the adoption of the CAAQS. The ARB also reviews operations and programs of the local air districts, and requires each air district with jurisdiction over a nonattainment area to develop its own strategy for achieving the NAAQS and CAAQS. The local air district has the primary responsibility for the development and implementation of rules and regulations designed to attain the NAAQS and CAAQS, as well as the permitting of new or modified sources, development of air quality management plans, and adoption and enforcement of air pollution regulations. The San Diego APCD is the local agency responsible for the administration and enforcement of air quality regulations for San Diego County.

The APCD and the San Diego Association of Governments (SANDAG) are responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the SDAB. The San Diego County Regional Air Quality Strategy (RAQS) was initially adopted in 1991, and is updated on a triennial basis. The RAQS was updated in 1995, 1998, 2001, 2004, 2009, and most recently in 2016 (APCD 2016). The RAQS outlines APCD's plans and control measures designed to attain the state air quality standards for O_3. The RAQS does not address the state air quality standards for PM_{10} or $PM_{2.5}$. The APCD has also developed the air basin's input to the State Implementation Plan (SIP), which is required under the Federal Clean Air Act for areas that are out of attainment of air quality standards. The SIP includes the APCD's plans and control measures for attaining the O_3 NAAQS. The SIP is also updated on a triennial basis. The Attainment Plan forms the basis for the SIP update, as it contains documentation on emission inventories and trends, the APCD's emission control strategy, and an attainment demonstration that shows that the SDAB will meet the NAAQS for O_3. Emission inventories, projections, and trends in the Attainment Plan are based on the latest O_3 SIP planning emission projections compiled and maintained by ARB. Supporting data were developed jointly by stakeholder agencies, including ARB, the APCD, the South Coast Air Quality Management District (SCAQMD), the Southern California Association of Governments (SCAG), and SANDAG. Each agency plays a role in collecting and reviewing data as necessary to generate comprehensive emission inventories. The supporting data include socio-economic projections, industrial and travel activity levels, emission factors, and emission speciation profiles. These projections are based on data submitted by stakeholder agencies including projections in municipal General Plans.

The following specific descriptions of health effects for each of the criteria air pollutants associated with project construction and operations are based on EPA (EPA 2007) and the ARB (ARB 2005).

Ozone. O_3 is considered a photochemical oxidant, which is a chemical that is formed when volatile organic compounds (VOCs) and oxides of nitrogen (NOx), both by-products of combustion, react in the presence of ultraviolet light. O_3 is considered a respiratory irritant and prolonged exposure can reduce lung function, aggravate asthma and increase susceptibility to respiratory infections. Children and those with existing respiratory diseases are at greatest risk from exposure to O_3.

Carbon Monoxide. CO is a product of combustion, and the main source of CO in the SDAB is from motor vehicle exhaust. CO is an odorless, colorless gas. CO affects red blood cells in the body by binding to hemoglobin and reducing the amount of oxygen that can be carried to the body's organs and tissues. CO can cause health effects to those with cardiovascular disease, and can also affect mental alertness and vision.

Nitrogen Dioxide. NO_2 is also a by-product of fuel combustion, and is formed both directly as a product of combustion and in the atmosphere through the reaction of nitrogen oxide (NO) with oxygen. NO_2 is a respiratory irritant and may affect those with existing respiratory illness, including asthma. NO_2 can also increase the risk of respiratory illness.

Respirable Particulate Matter and Fine Particulate Matter. Respirable particulate matter, or PM_{10}, refers to particulate matter with an aerodynamic diameter of 10 microns or less. Fine particulate matter, or $PM_{2.5}$, refers to particulate matter with an aerodynamic diameter of 2.5 microns or less. Particulate matter in this size range has been determined to have the potential to lodge in the lungs and contribute to respiratory problems. PM_{10} and $PM_{2.5}$ arise from a variety of sources, including road dust, diesel exhaust, combustion, tire and brake wear, construction operations and windblown dust. PM_{10} and $PM_{2.5}$ can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases such as asthma and chronic bronchitis. $PM_{2.5}$ is considered to have the potential to lodge deeper in the lungs.

Sulfur dioxide. SO_2 is a colorless, reactive gas that is produced from the burning of sulfur-containing fuels such as coal and oil, and by other industrial processes. Generally, the highest concentrations of SO_2 are found near large industrial sources. SO_2 is a respiratory irritant that can cause narrowing of the airways leading to wheezing and shortness of breath. Long-term exposure to SO_2 can cause respiratory illness and aggravate existing cardiovascular disease.

Lead. Pb in the atmosphere occurs as particulate matter. Pb has historically been emitted from vehicles combusting leaded gasoline, as well as from industrial sources. With the phase-out of leaded gasoline, large manufacturing facilities are the sources of the largest amounts of lead emissions. Pb has the potential to cause gastrointestinal, central nervous system, kidney and blood diseases upon prolonged exposure. Pb is also classified as a probable human carcinogen.

Volatile Organic Compounds. While the EPA has not set ambient air quality standards for VOCs, VOCs are considered ozone precursors as they react in the atmosphere to form O_3. Accordingly, VOCs are regulated through limitations on VOC emissions from solvents, paints, processes, and other sources.

Hazardous Air Pollutants. Also referred to as toxic air contaminants (TACs), HAPs are pollutants that are known or suspected to result in adverse health effects upon exposure through inhalation or other exposure routes. HAPs from stationary sources are regulated through the federal National Emission Standards for Hazardous Air Pollutants (NESHAPS) program. HAPs from mobile sources such as vehicles and off-road equipment are regulated through emission standards implemented by the EPA and/or state regulatory agencies.

Sulfates. Sulfates are the fully oxidized ionic form of sulfur. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to sulfur dioxide (SO_2) during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features. The ARB's sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and due to fact that they are usually acidic, can harm ecosystems and damage materials and property.

Hydrogen Sulfide. H_2S is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation. Breathing H_2S at levels above the standard would result in exposure to a very disagreeable odor. In 1984, an ARB committee concluded that the ambient standard for H_2S is adequate to protect public health and to significantly reduce odor annoyance.

Vinyl Chloride. Vinyl chloride, a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants and hazardous waste sites, due to microbial breakdown of chlorinated solvents. Short-term exposure to high levels of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness and headaches. Long-term exposure to vinyl chloride through inhalation and oral exposure causes liver damage. Cancer is a major concern from exposure to vinyl chloride via inhalation. Vinyl chloride exposure has been shown to increase the risk of angiosarcoma, a rare form of liver cancer, in humans.

Visibility Reducing Particles. Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt. The CAAQS is intended to limit the frequency and severity of visibility impairment due to regional haze. A separate standard for visibility-reducing particles that is applicable only in the Lake Tahoe Air Basin is based on reduction in scenic quality.

Table 1 presents a summary of the ambient air quality standards adopted by the federal and California Clean Air Acts.

Table 1 Ambient Air Quality Standards						
POLLUTANT	**AVERAGE TIME**	**CALIFORNIA STANDARDS**		**NATIONAL STANDARDS**		
		Concentration	**Method**	**Primary**	**Secondary**	**Method**
Ozone (O_3)	1 hour	0.09 ppm (176 µg/m^3)	Ultraviolet Photometry	--	--	Ethylene Chemiluminescence
	8 hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)	0.070 ppm (137 µg/m^3)	
Carbon Monoxide (CO)	8 hours	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Spectroscopy (NDIR)	9 ppm (10 mg/m^3)	--	Non-Dispersive Infrared Spectroscopy (NDIR)
	1 hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
Nitrogen Dioxide (NO_2)	Annual Average	0.030 ppm (57 µg/m^3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	0.053 ppm (100 µg/m^3)	Gas Phase Chemiluminescence
	1 hour	0.18 ppm (339 µg/m^3)		0.100 ppm (188 µg/m^3)	--	
Sulfur Dioxide (SO_2)	24 hours	0.04 ppm (105 µg/m^3)	Ultraviolet Fluorescence	--	--	Pararosaniline
	3 hours	--		--	0.5 ppm (1300 µg/m^3)	
	1 hour	0.25 ppm (655 µg/m^3)		0.075 ppm (196 µg/m^3)	--	
Respirable Particulate Matter (PM_{10})	24 hours	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	150 µg/m^3	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		--	--	
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12 µg/m^3	15 µg/m^3	Inertial Separation and Gravimetric Analysis
	24 hours	--		35 µg/m^3	35 µg/m^3	
Sulfates	24 hours	25 µg/m^3	Ion Chromatography	--	--	--
Lead	30-day Average	1.5 µg/m^3	Atomic Absorption	--	--	Atomic Absorption
	Calendar Quarter	--		1.5 µg/m^3	1.5 µg/m^3	
	3-Month Rolling Average	--		0.15 µg/m^3	0.15 µg/m^3	
Hydrogen Sulfide	1 hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence	--	--	--
Vinyl Chloride	24 hours	0.010 ppm (26 µg/m^3)	Gas Chromatography	--	--	--

ppm= parts per million; µg/m^3 = micrograms per cubic meter ; mg/m^3= milligrams per cubic meter
Source: California Air Resources Board, www.arb.ca.gov, 2021

2.3 Background Air Quality

The APCD operates a network of ambient air monitoring stations throughout San Diego County. The purpose of the monitoring stations is to measure ambient concentrations of the pollutants and determine whether the ambient air quality meets the CAAQS and the NAAQS. The nearest ambient monitoring station to the project site is the Camp Pendleton monitoring station located north of Carlsbad, which measures O_3, $PM_{2.5}$, and NO_2.

The 2015 federal 8-hour ozone standard (0.070 ppm) was exceeded twice in 2015, and four times in both 2016 and 2017. The Camp Pendleton monitoring station recorded an individual exceedance of the federal $PM_{2.5}$ standard in 2015; however, the standard is not defined by a single exceedance and the SDAB remains unclassified/attainment for $PM_{2.5}$. The data from the monitoring stations indicate that air quality is in attainment of all other NAAQS and CAAQS.

Table 2
Ambient Background Concentrations
(ppm unless otherwise indicated)

Pollutant	Averaging Time	2017	2018	2019	CAAQS	NAAQS	Monitoring Station
Ozone	8 hour	0.081	0.068	0.064	0.070	0.070	Camp Pendleton
	1 hour	0.094	0.084	0.075	0.09	--	Camp Pendleton
$PM_{2.5}$	Annual	NA	NA		12 μg/m^3	15 μg/m^3	Camp Pendleton
	24 hour	26.0	30.5	13.8	--	35 μg/m^3	Camp Pendleton
NO_2	Annual	0.006	NA	0.005	0.030	0.053	Camp Pendleton
	1 hour	0.0\638	0.048	0.053	0.18	0.100	Camp Pendleton

[1]Secondary NAAQS

NA – Data not available

3.0 THRESHOLDS OF SIGNIFICANCE

The State of California has developed guidelines to address the significance of air quality impacts based on Appendix G of the State CEQA Guidelines which provides guidance that a project would have a significant environmental impact if it would:

1. Conflict or obstruct the implementation of the San Diego Regional Air Quality Strategy (RAQS) or applicable portions of the State Implementation Plan (SIP);
2. Result in emissions that would violate any air quality standard or contribute substantially to an existing or projected air quality violation;
3. Result in a cumulatively considerable net increase of PM_{10} or exceed quantitative thresholds for O_3 precursors, oxides of nitrogen (NO_X) and volatile organic compounds (VOCs);
4. Expose sensitive receptors (including, but not limited to, schools, hospitals, resident care facilities, or day-care centers) to substantial pollutant concentrations; or
5. Create objectionable odors affecting a substantial number of people.

To determine whether a project would (a) result in emissions that would violate any air quality standard or contribute substantially to an existing or projected air quality violation; or (b) result in a cumulatively considerable net increase of PM_{10} or exceed quantitative thresholds for O_3 precursors NO_X and VOCs, project emissions may be evaluated based on the quantitative emission thresholds established by the San Diego APCD. As part of its air quality permitting process, the APCD has established thresholds in Rule 20.2 for the preparation of Air Quality Impact Assessments (AQIA).

For CEQA purposes, these screening criteria can be used as numeric methods to demonstrate that a project's total emissions would not result in a significant impact to air quality. Since APCD does not have AQIA thresholds for emissions of VOCs, for conservative purposes the SCAQMD's quantitative significance thresholds were used to evaluate potential significance of impacts. The screening thresholds are included in the table below.

Table 3 SCREENING-LEVEL CRITERIA FOR AIR QUALITY IMPACTS	
Pollutant	Total Emissions
Construction Emissions	
	Lb. per Day
Respirable Particulate Matter (PM_{10})	150
Fine Particulate Matter ($PM_{2.5}$)	55
Oxides of Nitrogen (NOx)	100
Oxides of Sulfur (SOx)	150
Carbon Monoxide (CO)	550
Volatile Organic Compounds (VOCs)	75
Operational Emissions	
	Lb. per Day
Respirable Particulate Matter (PM_{10})	150
Fine Particulate Matter ($PM_{2.5}$)[1]	55
Oxides of Nitrogen (NOx)	55
Oxides of Sulfur (SOx)	150
Carbon Monoxide (CO)	550
Lead and Lead Compounds	3
Volatile Organic Compounds (VOC)[2]	55

Source: SCAQMD CEQA Significance Thresholds, www.aqmd.gov

The thresholds listed in Table 3 represent screening-level thresholds that can be used to evaluate whether project-related emissions could cause a significant impact on air quality. Emissions below the screening-level thresholds would not cause a significant impact. In the event that emissions exceed these thresholds, modeling would be required to demonstrate that the project's total air quality impacts result in ground-level concentrations that are below the State and Federal Ambient Air Quality Standards, including appropriate background levels. For nonattainment pollutants (ozone, with ozone precursors NOx and VOCs, and PM_{10}), if emissions exceed the thresholds shown in Table 3, the project could have the potential to result in a cumulatively considerable net increase in these pollutants and thus could have a significant impact on the ambient air quality.

In addition to impacts from criteria pollutants, project impacts may include emissions of pollutants identified by the state and federal government as toxic air contaminants (TACs) or Hazardous Air Pollutants (HAPs). In San Diego County, APCD Regulation XII establishes acceptable risk levels and emission control requirements for new and modified facilities that may emit additional TACs. Under Rule 1210, emissions of TACs that result in a cancer risk of 10 in 1 million or less and a health hazard index of one or less would not be required to notify the public of potential health risks. If a project has the potential to result in emissions of any TAC or HAP which result in a cancer risk of greater than 10 in 1 million, the project would be deemed to have a potentially significant impact.

With regard to evaluating whether a project would have a significant impact on sensitive receptors, air quality regulators typically define sensitive receptors as schools (Preschool-12th Grade), hospitals, resident care facilities, or day-care centers, or other facilities that may house individuals with health conditions that would be adversely impacted by changes in air quality. Any project which has the potential to directly impact a sensitive receptor located within 1 mile and results in a health risk greater than 10 in 1 million would be deemed to have a potentially significant impact.

APCD Rule 51 (Public Nuisance) also prohibits emission of any material which causes nuisance to a considerable number of persons or endangers the comfort, health or safety of any person. A project that proposes a use which would produce objectionable odors would be deemed to have a significant odor impact if it would affect a considerable number of offsite receptors.

The impacts associated with construction and operation of the project were evaluated for significance based on these significance criteria.

4.0 IMPACTS

The proposed Chick-fil-A Carlsbad Project includes both construction and operational impacts. Construction impacts include emissions associated with site grading/preparation, utilities installation, construction of buildings, and paving. Operational impacts include emissions associated with the project, including traffic, at full buildout.

4.1 Existing Conditions

As discussed in Section 1.0, the project site is currently occupied by an office building. As it exists, the office building is a source of air emissions from vehicles and building operations. Emissions from the existing office building were calculated with the CalEEMod Model, Version 2016.3.2. Table 4 presents a summary of the existing emissions.

Table 4
Estimated Existing Operational Emissions

Emission Source	ROG	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$
Summer, lbs/day						
Area Sources	0.25	0.00	0.001	0.00	0.00	0.00
Energy Use	0.008	0.07	0.06	0.00	0.005	0.005
Vehicular Emissions	0.35	1.42	4.00	0.01	1.23	0.34
TOTAL	**0.61**	**1.49**	**4.06**	**0.01**	**1.24**	**0.35**
Significance Criteria	55	55	550	150	150	55
Winter, lbs/day						
Area Sources	0.25	0.00	0.001	0.00	0.00	0.00
Energy Use	0.008	0.07	0.06	0.00	0.005	0.005
Vehicular Emissions	0.34	1.46	3.93	0.01	1.23	0.34
TOTAL	**0.60**	**1.53**	**3.99**	**0.01**	**1.24**	**0.34**
Significance Criteria	55	55	550	150	150	55

4.2 Construction

Emissions of pollutants such as fugitive dust that are generated during construction are generally highest near the construction site. Emissions from the construction phase of the project were estimated through the use of the CalEEMod Model (SCAQMD 2017). Construction is anticipated to be carried out in three main phases. The first phase of construction involves demolition of the existing office building. The second phase of construction involves site preparation/grading.

Grading will occur over the entire site (33,964 square feet), and will include 2,160 cubic yards of cut and 220 cubic yard of fill, with approximately 1,940 cubic yards of export. The third phase of construction involves construction of the building, along with paving and architectural coatings application. It was assumed that the entire construction project would be completed within 6 months, starting in the summer of 2021 and ending at the end of 2021. It was assumed that heavy construction equipment would be operating at the site for eight hours per day, five days per week during project construction. It was assumed that fugitive dust controls would be utilized during construction, including watering of active sites three times daily.

For the purpose of estimating emissions from the application of architectural coatings, it was assumed that water-based coatings that would be compliant with SDAPCD Regulations would be used for both exterior and interior surfaces. Within the CalEEMod Model, this assumption was included by assuming that the architectural coating emissions would have a VOC content of 50 grams per liter for interior coatings and 100 grams per liter for exterior coatings

Table 5 provides a summary of the emission estimates for construction of the proposed project, assuming standard measures are implemented to reduce emissions, as calculated with the CalEEMod Model, in comparison with the regional and localized significance thresholds. As shown in Table 5, emissions associated with construction are below the significance thresholds for all construction phases and pollutants. Construction of the project would be short-term and temporary. Thus the emissions associated with construction would not result in a significant impact on the ambient air quality. Because emissions are less than the significance levels, they would not conflict or obstruct the implementation of the AQMP or applicable portions of the SIP.

Project construction would also not result in emission of any odor compounds that would cause a nuisance or significant impact to nearby receptors. The impacts associated with Project construction are therefore not considered significant.

Table 5 Estimated Construction Emissions						
Emission Source	**ROG**	**NOx**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
lbs/day						
Demolition						
Fugitive Dust	-	-	-	-	0.36	0.05
Offroad Diesel	0.80	7.25	7.57	0.01	0.41	0.39
Onroad Diesel	0.03	1.07	0.26	0.003	0.08	0.02
Worker Travel	0.03	0.02	0.27	0.0008	0.08	0.02
TOTAL	**0.86**	**8.34**	**8.10**	**0.01**	**0.93**	**0.48**
Significance Criteria	75	100	550	150	150	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Grading						
Fugitive Dust	-	-	-	-	0.29	0.16
Offroad Diesel	0.80	7.25	7.57	0.01	0.41	0.39
Onroad Diesel	0.04	1.54	0.38	0.01	0.11	0.03
Worker Travel	0.03	0.02	0.27	0.0008	0.08	0.02
TOTAL	**0.87**	**8.81**	**8.16**	**0.02**	**0.89**	**0.50**
Significance Criteria	75	100	550	150	150	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Building Construction						
Building Offroad Diesel	0.78	7.99	7.26	0.01	0.45	0.41
Building Vendor Travel	0.01	0.31	0.08	0.0008	0.02	0.006
Building Worker Travel	0.003	0.002	0.03	0.0001	0.008	0.002
TOTAL	**0.79**	**8.30**	**7.34**	**0.01**	**0.47**	**0.42**
Significance Criteria	75	100	550	150	150	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Paving						
Asphalt Offgassing	0.02	-	-	-	-	-
Offroad Diesel	0.72	6.72	7.09	0.01	0.35	0.33
Worker Travel	0.06	0.04	0.48	0.001	0.15	0.04
TOTAL	**0.80**	**6.76**	**7.57**	**0.01**	**0.50**	**0.37**
Significance Criteria	75	100	550	150	150	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Architectural Coatings						
Architectural Coatings Offgassing	1.30	-	-	-	-	-
Architectural Coatings Offroad Diesel	0.22	1.53	1.82	0.003	0.09	0.09
Worker Travel	0.003	0.002	0.03	0.0001	0.008	0.002
TOTAL	**1.52**	**1.53**	**1.85**	**0.003**	**0.10**	**0.09**
Significance Criteria	75	100	550	150	150	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
MAXIMUM SIMULTANEOUS CONSTRUCTION EMISSIONS	**3.13**	**16.59**	**16.94**	**0.03**	**1.13**	**0.90**
Significance Criteria	75	100	550	150	150	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*

4.2 Operational Impacts

The main operational impacts associated with the Project would be impacts associated with traffic. Minor impacts would be associated with energy use and area sources.

To address whether the Project would result in emissions that would violate any air quality standard or contribute substantially to an existing or proposed air quality violation, the emissions associated with Project-generated traffic and area sources were compared with the significance criteria. Trip generation rates from the Transportation Impact Analysis (Linscott, Law and Greenspan 2020) were used to estimate emissions from vehicles. Project-related traffic was assumed to be comprised of a mixture of vehicles in accordance with the CalEEMod Model default outputs for traffic. This assumption includes light duty autos and light duty trucks (i.e., small trucks, SUVs, and vans) as well as medium- and heavy-duty vehicles that may be traveling to the facility to make deliveries. For conservative purposes, emission factors representing the vehicle mix for 2022 were used to estimate emissions as 2022 was assumed to be the first year of full operation; based on the results of the EMFAC model for subsequent years, emissions would decrease on an annual basis from 2022 onward due to phase-out of higher polluting vehicles and implementation of more stringent emission standards that are taken into account in the EMFAC model. Emissions associated with area sources (energy use and landscaping activities) were also estimated using the default assumptions in the CalEEMod Model.

Table 6 presents the results of the emission calculations in lbs/day, considering the project's design features listed above, along with a comparison with the significance criteria. The calculation assumed that the project would be constructed to 2016 Title 24 buildings standards, and would use low-flow plumbing fixtures.

Table 6 also presents a summary of the net emissions, accounting for the demolition of the existing office building.

Table 6 Estimated Operational Emissions						
Emission Source	**ROG**	**NOx**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Summer, lbs/day						
Area Sources	0.08	0.00	0.00	0.00	0.00	0.00
Energy Use	0.02	0.16	0.13	0.00	0.01	0.01
Vehicular Emissions	2.88	10.17	21.50	0.06	4.95	1.36
TOTAL	**2.98**	**10.33**	**21.63**	**0.06**	**4.96**	**1.37**
TOTAL EXISTING EMISSIONS	**0.61**	**1.49**	**4.06**	**0.01**	**1.24**	**0.35**
NET EMISSIONS	**2.37**	**8.84**	**17.57**	**0.05**	**3.72**	**1.02**
Significance Criteria	55	55	550	150	150	55
Winter, lbs/day						
Area Sources	0.08	0.00	0.00	0.00	0.00	0.00
Energy Use	0.02	0.16	0.13	0.00	0.01	0.01
Vehicular Emissions	2.78	10.24	22.79	0.06	4.95	1.36
TOTAL	**2.88**	**10.40**	**22.92**	**0.06**	**4.96**	**1.37**
TOTAL EXISTING EMISSIONS	**0.60**	**1.53**	**3.99**	**0.01**	**1.24**	**0.34**
NET EMISSIONS	**2.28**	**8.87**	**18.93**	**0.04**	**3.72**	**1.03**
Significance Criteria	55	55	550	150	150	55

Based on the estimates of the emissions associated with project operations, the emissions are below the significance criteria for all pollutants. As shown in Table 6, the reduction in emissions due to removal of the existing office building would reduce emissions further. Because emissions are less than the significance levels, they would not conflict or obstruct the implementation of the RAQS or applicable portions of the SIP. It should be noted that the emissions from vehicles are projected to decrease with time due to phase-out of older, more polluting vehicles and increasingly stringent emissions standards.

Projects involving traffic impacts may result in the formation of locally high concentrations of CO, known as CO “hot spots.” According to the Transportation Impact Analysis (Linscott, Law and Greenspan 2019), the project would result in an unacceptable level of service (LOS) at the intersection of Avenida Encinas and the project driveway. The Traffic Impact Analysis recommends signalization of this intersection and a dedicated left-turn lane exiting the project driveway. The proposed signal would provide a protected pedestrian crossing connecting office/business uses to the Chick-fil-A restaurant. With implementation of the traffic mitigation, the intersection would operate at LOS A and would not result in a CO “hot spot”.

4.3 Odors

During construction, diesel equipment operating at the site may generate some nuisance odors; however, due to the distance of sensitive receptors to the project site and the temporary nature of construction, odors associated with project construction would not be significant.

Land uses associated with odor complaints include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting activities, refineries, landfills, dairies, and fiberglass molding operations. These land uses are not proposed for the Chick-fil-A Carlsbad Project. Cooking odors are not considered to be objectionable odors. Odor impacts would not be significant.

5.0 CONCLUSIONS

The air quality analysis for the Chick-fil-A Carlsbad project evaluated emissions associated with both the construction and operation of the project. Emissions associated with construction and operation were compared with significance thresholds developed by the SCAQMD, which provide a conservative means of evaluating whether project emissions would cause a significant impact on the ambient air quality or whether further evaluation is warranted. Emissions associated with construction and operation are below the significance thresholds for all phases and pollutants. Thus the emissions associated with construction and operation of the project would not result in a significant impact on the ambient air quality.

6.0 REFERENCES

California Air Resources Board. 2005. *ARB Fact Sheet: Air Pollution and Health.* December 27.

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Linscott, Law, and Greenspan. 2020. *Transportation Impact Analysis, Chick-fil-A I-5 and Palomar Airport Road*. May 12.

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South Coast Air Quality Management District (SCAQMD). 1999. CEQA Air Quality Handbook. (as updated)

SCAQMD. 2013. CEQA Significance Thresholds. http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2

SCAQMD. 2017. CalEEMod Model, Version 2016.3.2.

U.S. EPA. 2007. *The Plain English Guide to the Clean Air Act*. http://www.epa.gov/air/caa/peg/index.html.

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Appendix A

CalEEMod
Model Outputs

Chick fil A Carlsbad

San Diego Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Fast Food Restaurant w/o Drive Thru	3.43	1000sqft	0.08	3,430.00	0
Parking Lot	36.00	Space	0.32	14,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2022
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	517.31	**CH4 Intensity (lb/MWhr)**	0.021	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Implementation of RPS

Land Use - Project description

Construction Phase - Project information

Grading -

Demolition -

Architectural Coating - Rule 67.0.1 coatings

Vehicle Trips - Traffic information

Area Coating - Rule 67.0.1 coatings

Energy Use - Title 24 as of 2019

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Energy Mitigation -

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	100
tblAreaCoating	Area_EF_Nonresidential_Interior	250	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	5.00	23.00
tblConstructionPhase	NumDays	100.00	88.00
tblConstructionPhase	NumDays	10.00	12.00
tblConstructionPhase	NumDays	2.00	32.00
tblConstructionPhase	NumDays	5.00	45.00
tblConstructionPhase	PhaseEndDate	12/30/2021	12/31/2021
tblConstructionPhase	PhaseEndDate	12/16/2021	12/31/2021
tblConstructionPhase	PhaseEndDate	7/26/2021	7/16/2021
tblConstructionPhase	PhaseEndDate	7/29/2021	8/31/2021
tblConstructionPhase	PhaseEndDate	12/23/2021	12/31/2021
tblConstructionPhase	PhaseStartDate	12/24/2021	12/1/2021
tblConstructionPhase	PhaseStartDate	7/30/2021	9/1/2021
tblConstructionPhase	PhaseStartDate	7/13/2021	7/1/2021
tblConstructionPhase	PhaseStartDate	7/28/2021	7/17/2021
tblConstructionPhase	PhaseStartDate	12/17/2021	11/1/2021
tblEnergyUse	T24E	8.23	7.35
tblEnergyUse	T24NG	35.92	35.56
tblGrading	MaterialExported	0.00	1,940.00

tblProjectCharacteristics	CH4IntensityFactor	0.029	0.021
tblProjectCharacteristics	CO2IntensityFactor	720.49	517.31
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblVehicleTrips	CC_TL	7.30	4.70
tblVehicleTrips	CC_TL	7.30	4.70
tblVehicleTrips	CNW_TL	7.30	4.70
tblVehicleTrips	CNW_TL	7.30	4.70
tblVehicleTrips	CW_TL	9.50	4.70
tblVehicleTrips	CW_TL	9.50	4.70
tblVehicleTrips	DV_TP	37.00	25.00
tblVehicleTrips	PB_TP	12.00	25.00
tblVehicleTrips	PR_TP	51.00	50.00
tblVehicleTrips	ST_TR	696.00	700.00
tblVehicleTrips	SU_TR	500.00	0.00
tblVehicleTrips	WD_TR	716.00	700.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	3.1322	16.5935	16.9386	0.0286	1.0666	0.8972	1.4778	0.4643	0.8364	0.8989	0.0000	2,719.1666	2,719.1666	0.6900	0.0000	2,736.4160
Maximum	**3.1322**	**16.5935**	**16.9386**	**0.0286**	**1.0666**	**0.8972**	**1.4778**	**0.4643**	**0.8364**	**0.8989**	**0.0000**	**2,719.1666**	**2,719.1666**	**0.6900**	**0.0000**	**2,736.4160**

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					
2021	3.1322	16.5935	16.9386	0.0286	0.5105	0.8972	1.1311	0.2119	0.8364	0.8989	0.0000	2,719.1666	2,719.1666	0.6900	0.0000	2,736.4160
Maximum	**3.1322**	**16.5935**	**16.9386**	**0.0286**	**0.5105**	**0.8972**	**1.1311**	**0.2119**	**0.8364**	**0.8989**	**0.0000**	**2,719.1666**	**2,719.1666**	**0.6900**	**0.0000**	**2,736.4160**

	ROG	**NOx**	**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**	**52.14**	**0.00**	**23.46**	**54.36**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0871	4.0000e-005	4.0300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		8.6300e-003	8.6300e-003	2.0000e-005		9.2000e-003
Energy	0.0176	0.1603	0.1347	9.6000e-004		0.0122	0.0122		0.0122	0.0122		192.3896	192.3896	3.6900e-003	3.5300e-003	193.5328
Mobile	2.8833	10.2072	21.6528	0.0632	4.9455	0.0547	5.0002	1.3217	0.0510	1.3728		6,443.7854	6,443.7854	0.3908		6,453.5545
Total	**2.9880**	**10.3675**	**21.7915**	**0.0642**	**4.9455**	**0.0669**	**5.0124**	**1.3217**	**0.0632**	**1.3849**		**6,636.1836**	**6,636.1836**	**0.3945**	**3.5300e-003**	**6,647.0965**

Mitigated Operational

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Area	0.0871	4.0000e-005	4.0300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		8.6300e-003	8.6300e-003	2.0000e-005		9.2000e-003
Energy	0.0176	0.1603	0.1347	9.6000e-004		0.0122	0.0122		0.0122	0.0122		192.3896	192.3896	3.6900e-003	3.5300e-003	193.5328
Mobile	2.8777	10.1756	21.5228	0.0627	4.8961	0.0543	4.9504	1.3085	0.0506	1.3592		6,389.2664	6,389.2664	0.3884		6,398.9760
Total	**2.9824**	**10.3360**	**21.6615**	**0.0637**	**4.8961**	**0.0665**	**4.9626**	**1.3085**	**0.0628**	**1.3713**		**6,581.6646**	**6,581.6646**	**0.3921**	**3.5300e-003**	**6,592.5181**

	ROG	NOx	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	0.19	0.30	0.60	0.84	1.00	0.61	0.99	1.00	0.60	0.98	0.00	0.82	0.82	0.60	0.00	0.82

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/1/2021	7/16/2021	5	12	
2	Grading	Grading	7/17/2021	8/31/2021	5	32	
3	Building Construction	Building Construction	9/1/2021	12/31/2021	5	88	
4	Paving	Paving	11/1/2021	12/31/2021	5	45	
5	Architectural Coating	Architectural Coating	12/1/2021	12/31/2021	5	23	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.32

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 5,145; Non-Residential Outdoor: 1,715; Striped Parking Area: 864

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	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	50.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	192.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	7.00	3.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.9117	0.0000	0.9117	0.1381	0.0000	0.1381			0.0000			0.0000
Off-Road	0.7965	7.2530	7.5691	0.0120		0.4073	0.4073		0.3886	0.3886		1,147.4338	1,147.4338	0.2138		1,152.7797
Total	**0.7965**	**7.2530**	**7.5691**	**0.0120**	**0.9117**	**0.4073**	**1.3190**	**0.1381**	**0.3886**	**0.5267**		**1,147.4338**	**1,147.4338**	**0.2138**		**1,152.7797**

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	0.0309	1.0681	0.2613	3.2100e-003	0.0728	3.2600e-003	0.0761	0.0200	3.1200e-003	0.0231		352.3668	352.3668	0.0311		353.1450
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0346	0.0225	0.2652	8.2000e-004	0.0822	5.7000e-004	0.0827	0.0218	5.2000e-004	0.0223		81.4441	81.4441	2.3200e-003		81.5022
Total	**0.0655**	**1.0905**	**0.5265**	**4.0300e-003**	**0.1550**	**3.8300e-003**	**0.1588**	**0.0417**	**3.6400e-003**	**0.0454**		**433.8109**	**433.8109**	**0.0335**		**434.6472**

Mitigated Construction On-Site

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

Category	lb/day										lb/day					
Fugitive Dust					0.3556	0.0000	0.3556	0.0538	0.0000	0.0538			0.0000			0.0000
Off-Road	0.7965	7.2530	7.5691	0.0120		0.4073	0.4073		0.3886	0.3886	0.0000	1,147.4338	1,147.4338	0.2138		1,152.7797
Total	**0.7965**	**7.2530**	**7.5691**	**0.0120**	**0.3556**	**0.4073**	**0.7629**	**0.0538**	**0.3886**	**0.4424**	**0.0000**	**1,147.4338**	**1,147.4338**	**0.2138**		**1,152.7797**

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	0.0309	1.0681	0.2613	3.2100e-003	0.0728	3.2600e-003	0.0761	0.0200	3.1200e-003	0.0231		352.3668	352.3668	0.0311		353.1450
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0346	0.0225	0.2652	8.2000e-004	0.0822	5.7000e-004	0.0827	0.0218	5.2000e-004	0.0223		81.4441	81.4441	2.3200e-003		81.5022
Total	**0.0655**	**1.0905**	**0.5265**	**4.0300e-003**	**0.1550**	**3.8300e-003**	**0.1588**	**0.0417**	**3.6400e-003**	**0.0454**		**433.8109**	**433.8109**	**0.0335**		**434.6472**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7528	0.0000	0.7528	0.4138	0.0000	0.4138			0.0000			0.0000
Off-Road	0.7965	7.2530	7.5691	0.0120		0.4073	0.4073		0.3886	0.3886		1,147.4338	1,147.4338	0.2138		1,152.7797

Total	0.7965	7.2530	7.5691	0.0120	0.7528	0.4073	1.1601	0.4138	0.3886	0.8024		1,147.4338	1,147.4338	0.2138		1,152.7797

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	0.0445	1.5380	0.3763	4.6300e-003	0.1048	4.6900e-003	0.1095	0.0287	4.4900e-003	0.0332		507.4082	507.4082	0.0448		508.5287
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0346	0.0225	0.2652	8.2000e-004	0.0822	5.7000e-004	0.0827	0.0218	5.2000e-004	0.0223		81.4441	81.4441	2.3200e-003		81.5022
Total	**0.0791**	**1.5605**	**0.6415**	**5.4500e-003**	**0.1870**	**5.2600e-003**	**0.1923**	**0.0505**	**5.0100e-003**	**0.0555**		**588.8523**	**588.8523**	**0.0471**		**590.0309**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2936	0.0000	0.2936	0.1614	0.0000	0.1614			0.0000			0.0000
Off-Road	0.7965	7.2530	7.5691	0.0120		0.4073	0.4073		0.3886	0.3886	0.0000	1,147.4338	1,147.4338	0.2138		1,152.7797
Total	**0.7965**	**7.2530**	**7.5691**	**0.0120**	**0.2936**	**0.4073**	**0.7009**	**0.1614**	**0.3886**	**0.5500**	**0.0000**	**1,147.4338**	**1,147.4338**	**0.2138**		**1,152.7797**

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	0.0445	1.5380	0.3763	4.6300e-003	0.1048	4.6900e-003	0.1095	0.0287	4.4900e-003	0.0332		507.4082	507.4082	0.0448		508.5287
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0346	0.0225	0.2652	8.2000e-004	0.0822	5.7000e-004	0.0827	0.0218	5.2000e-004	0.0223		81.4441	81.4441	2.3200e-003		81.5022
Total	**0.0791**	**1.5605**	**0.6415**	**5.4500e-003**	**0.1870**	**5.2600e-003**	**0.1923**	**0.0505**	**5.0100e-003**	**0.0555**		**588.8523**	**588.8523**	**0.0471**		**590.0309**

3.4 Building Construction - 2021

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	0.7750	7.9850	7.2637	0.0114		0.4475	0.4475		0.4117	0.4117		1,103.2158	1,103.2158	0.3568		1,112.1358
Total	**0.7750**	**7.9850**	**7.2637**	**0.0114**		**0.4475**	**0.4475**		**0.4117**	**0.4117**		**1,103.2158**	**1,103.2158**	**0.3568**		**1,112.1358**

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					

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	9.0700e-003	0.3055	0.0779	8.1000e-004	0.0203	6.4000e-004	0.0210	5.8500e-003	6.1000e-004	6.4600e-003		87.4056	87.4056	6.2500e-003		87.5617
Worker	0.0242	0.0157	0.1857	5.7000e-004	0.0575	4.0000e-004	0.0579	0.0153	3.7000e-004	0.0156		57.0109	57.0109	1.6300e-003		57.0515
Total	**0.0333**	**0.3212**	**0.2635**	**1.3800e-003**	**0.0778**	**1.0400e-003**	**0.0789**	**0.0211**	**9.8000e-004**	**0.0221**		**144.4164**	**144.4164**	**7.8800e-003**		**144.6133**

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	0.7750	7.9850	7.2637	0.0114		0.4475	0.4475		0.4117	0.4117	0.0000	1,103.2158	1,103.2158	0.3568		1,112.1358
Total	**0.7750**	**7.9850**	**7.2637**	**0.0114**		**0.4475**	**0.4475**		**0.4117**	**0.4117**	**0.0000**	**1,103.2158**	**1,103.2158**	**0.3568**		**1,112.1358**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	9.0700e-003	0.3055	0.0779	8.1000e-004	0.0203	6.4000e-004	0.0210	5.8500e-003	6.1000e-004	6.4600e-003		87.4056	87.4056	6.2500e-003		87.5617
Worker	0.0242	0.0157	0.1857	5.7000e-004	0.0575	4.0000e-004	0.0579	0.0153	3.7000e-004	0.0156		57.0109	57.0109	1.6300e-003		57.0515
Total	**0.0333**	**0.3212**	**0.2635**	**1.3800e-003**	**0.0778**	**1.0400e-003**	**0.0789**	**0.0211**	**9.8000e-004**	**0.0221**		**144.4164**	**144.4164**	**7.8800e-003**		**144.6133**

3.5 Paving - 2021

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	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286		1,035.3425	1,035.3425	0.3016		1,042.8818
Paving	0.0186					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7400**	**6.7178**	**7.0899**	**0.0113**		**0.3534**	**0.3534**		**0.3286**	**0.3286**		**1,035.3425**	**1,035.3425**	**0.3016**		**1,042.8818**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0623	0.0405	0.4774	1.4700e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		146.5994	146.5994	4.1800e-003		146.7040
Total	**0.0623**	**0.0405**	**0.4774**	**1.4700e-003**	**0.1479**	**1.0200e-003**	**0.1489**	**0.0392**	**9.4000e-004**	**0.0402**		**146.5994**	**146.5994**	**4.1800e-003**		**146.7040**

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	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286	0.0000	1,035.3425	1,035.3425	0.3016		1,042.8818
Paving	0.0186					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7400**	**6.7178**	**7.0899**	**0.0113**		**0.3534**	**0.3534**		**0.3286**	**0.3286**	**0.0000**	**1,035.3425**	**1,035.3425**	**0.3016**		**1,042.8818**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0623	0.0405	0.4774	1.4700e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		146.5994	146.5994	4.1800e-003		146.7040
Total	**0.0623**	**0.0405**	**0.4774**	**1.4700e-003**	**0.1479**	**1.0200e-003**	**0.1489**	**0.0392**	**9.4000e-004**	**0.0402**		**146.5994**	**146.5994**	**4.1800e-003**		**146.7040**

3.6 Architectural Coating - 2021

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	1.2993					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309
Total	**1.5182**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**		**281.4481**	**281.4481**	**0.0193**		**281.9309**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.4600e-003	2.2500e-003	0.0265	8.0000e-005	8.2100e-003	6.0000e-005	8.2700e-003	2.1800e-003	5.0000e-005	2.2300e-003		8.1444	8.1444	2.3000e-004		8.1502
Total	**3.4600e-003**	**2.2500e-003**	**0.0265**	**8.0000e-005**	**8.2100e-003**	**6.0000e-005**	**8.2700e-003**	**2.1800e-003**	**5.0000e-005**	**2.2300e-003**		**8.1444**	**8.1444**	**2.3000e-004**		**8.1502**

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	1.2993					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309
Total	**1.5182**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**	**0.0000**	**281.4481**	**281.4481**	**0.0193**		**281.9309**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.4600e-003	2.2500e-003	0.0265	8.0000e-005	8.2100e-003	6.0000e-005	8.2700e-003	2.1800e-003	5.0000e-005	2.2300e-003		8.1444	8.1444	2.3000e-004		8.1502
Total	**3.4600e-003**	**2.2500e-003**	**0.0265**	**8.0000e-005**	**8.2100e-003**	**6.0000e-005**	**8.2700e-003**	**2.1800e-003**	**5.0000e-005**	**2.2300e-003**		**8.1444**	**8.1444**	**2.3000e-004**		**8.1502**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Mitigated	2.8777	10.1756	21.5228	0.0627	4.8961	0.0543	4.9504	1.3085	0.0506	1.3592		6,389.2664	6,389.2664	0.3884		6,398.9760
Unmitigated	2.8833	10.2072	21.6528	0.0632	4.9455	0.0547	5.0002	1.3217	0.0510	1.3728		6,443.7854	6,443.7854	0.3908		6,453.5545

4.2 Trip Summary Information

	Average Daily Trip Rate	Unmitigated	Mitigated

Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Fast Food Restaurant w/o Drive Thru	2,401.00	2,401.00	0.00	1,999,193	1,979,201
Parking Lot	0.00	0.00	0.00		
Total	2,401.00	2,401.00	0.00	1,999,193	1,979,201

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
Fast Food Restaurant w/o Drive Thru	4.70	4.70	4.70	1.50	79.50	19.00	50	25	25
Parking Lot	4.70	4.70	4.70	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
Fast Food Restaurant w/o Drive Thru	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
Parking Lot	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Kilowatt Hours of Renewable Electricity Generated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 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	0.0176	0.1603	0.1347	9.6000e-004		0.0122	0.0122		0.0122	0.0122		192.3896	192.3896	3.6900e-003	3.5300e-003	193.5328
NaturalGas Unmitigated	0.0176	0.1603	0.1347	9.6000e-004		0.0122	0.0122		0.0122	0.0122		192.3896	192.3896	3.6900e-003	3.5300e-003	193.5328

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					
Fast Food Restaurant w/o Drive Thru	1635.31	0.0176	0.1603	0.1347	9.6000e-004		0.0122	0.0122		0.0122	0.0122		192.3896	192.3896	3.6900e-003	3.5300e-003	193.5328
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		**0.0176**	**0.1603**	**0.1347**	**9.6000e-004**		**0.0122**	**0.0122**		**0.0122**	**0.0122**		**192.3896**	**192.3896**	**3.6900e-003**	**3.5300e-003**	**193.5328**

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					
Fast Food Restaurant w/o Drive Thru	1.63531	0.0176	0.1603	0.1347	9.6000e-004		0.0122	0.0122		0.0122	0.0122		192.3896	192.3896	3.6900e-003	3.5300e-003	193.5328
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		**0.0176**	**0.1603**	**0.1347**	**9.6000e-004**		**0.0122**	**0.0122**		**0.0122**	**0.0122**		**192.3896**	**192.3896**	**3.6900e-003**	**3.5300e-003**	**193.5328**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0871	4.0000e-005	4.0300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		8.6300e-003	8.6300e-003	2.0000e-005		9.2000e-003
Unmitigated	0.0871	4.0000e-005	4.0300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		8.6300e-003	8.6300e-003	2.0000e-005		9.2000e-003

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	8.1900e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0785					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.8000e-004	4.0000e-005	4.0300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		8.6300e-003	8.6300e-003	2.0000e-005		9.2000e-003
Total	**0.0871**	**4.0000e-005**	**4.0300e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**		**8.6300e-003**	**8.6300e-003**	**2.0000e-005**		**9.2000e-003**

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	8.1900e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0785					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.8000e-004	4.0000e-005	4.0300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		8.6300e-003	8.6300e-003	2.0000e-005		9.2000e-003
Total	**0.0871**	**4.0000e-005**	**4.0300e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**		**8.6300e-003**	**8.6300e-003**	**2.0000e-005**		**9.2000e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Chick fil A Carlsbad

San Diego Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Fast Food Restaurant w/o Drive Thru	3.43	1000sqft	0.08	3,430.00	0
Parking Lot	36.00	Space	0.32	14,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2022
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	517.31	**CH4 Intensity (lb/MWhr)**	0.021	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Implementation of RPS

Land Use - Project description

Construction Phase - Project information

Grading -

Demolition -

Architectural Coating - Rule 67.0.1 coatings

Vehicle Trips - Traffic information

Area Coating - Rule 67.0.1 coatings

Energy Use - Title 24 as of 2019

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Energy Mitigation -

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	100
tblAreaCoating	Area_EF_Nonresidential_Interior	250	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	5.00	23.00
tblConstructionPhase	NumDays	100.00	88.00
tblConstructionPhase	NumDays	10.00	12.00
tblConstructionPhase	NumDays	2.00	32.00
tblConstructionPhase	NumDays	5.00	45.00
tblConstructionPhase	PhaseEndDate	12/30/2021	12/31/2021
tblConstructionPhase	PhaseEndDate	12/16/2021	12/31/2021
tblConstructionPhase	PhaseEndDate	7/26/2021	7/16/2021
tblConstructionPhase	PhaseEndDate	7/29/2021	8/31/2021
tblConstructionPhase	PhaseEndDate	12/23/2021	12/31/2021
tblConstructionPhase	PhaseStartDate	12/24/2021	12/1/2021
tblConstructionPhase	PhaseStartDate	7/30/2021	9/1/2021
tblConstructionPhase	PhaseStartDate	7/13/2021	7/1/2021
tblConstructionPhase	PhaseStartDate	7/28/2021	7/17/2021
tblConstructionPhase	PhaseStartDate	12/17/2021	11/1/2021
tblEnergyUse	T24E	8.23	7.35
tblEnergyUse	T24NG	35.92	35.56
tblGrading	MaterialExported	0.00	1,940.00

tblProjectCharacteristics	CH4IntensityFactor	0.029	0.021
tblProjectCharacteristics	CO2IntensityFactor	720.49	517.31
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblVehicleTrips	CC_TL	7.30	4.70
tblVehicleTrips	CC_TL	7.30	4.70
tblVehicleTrips	CNW_TL	7.30	4.70
tblVehicleTrips	CNW_TL	7.30	4.70
tblVehicleTrips	CW_TL	9.50	4.70
tblVehicleTrips	CW_TL	9.50	4.70
tblVehicleTrips	DV_TP	37.00	25.00
tblVehicleTrips	PB_TP	12.00	25.00
tblVehicleTrips	PR_TP	51.00	50.00
tblVehicleTrips	ST_TR	696.00	700.00
tblVehicleTrips	SU_TR	500.00	0.00
tblVehicleTrips	WD_TR	716.00	700.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	3.1448	16.5998	16.9060	0.0284	1.0666	0.8972	1.4779	0.4643	0.8364	0.8989	0.0000	2,703.9345	2,703.9345	0.6900	0.0000	2,721.1853
Maximum	**3.1448**	**16.5998**	**16.9060**	**0.0284**	**1.0666**	**0.8972**	**1.4779**	**0.4643**	**0.8364**	**0.8989**	**0.0000**	**2,703.9345**	**2,703.9345**	**0.6900**	**0.0000**	**2,721.1853**

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					
2021	3.1448	16.5998	16.9060	0.0284	0.5105	0.8972	1.1311	0.2119	0.8364	0.8989	0.0000	2,703.9345	2,703.9345	0.6900	0.0000	2,721.1853
Maximum	**3.1448**	**16.5998**	**16.9060**	**0.0284**	**0.5105**	**0.8972**	**1.1311**	**0.2119**	**0.8364**	**0.8989**	**0.0000**	**2,703.9345**	**2,703.9345**	**0.6900**	**0.0000**	**2,721.1853**

	ROG	**NOx**	**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**	**52.14**	**0.00**	**23.47**	**54.36**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0871	4.0000e-005	4.0300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		8.6300e-003	8.6300e-003	2.0000e-005		9.2000e-003
Energy	0.0176	0.1603	0.1347	9.6000e-004		0.0122	0.0122		0.0122	0.0122		192.3896	192.3896	3.6900e-003	3.5300e-003	193.5328
Mobile	2.7851	10.2799	22.9241	0.0598	4.9455	0.0556	5.0011	1.3217	0.0519	1.3736		6,089.6856	6,089.6856	0.4071		6,099.8619
Total	**2.8898**	**10.4403**	**23.0628**	**0.0607**	**4.9455**	**0.0678**	**5.0133**	**1.3217**	**0.0641**	**1.3858**		**6,282.0838**	**6,282.0838**	**0.4108**	**3.5300e-003**	**6,293.4039**

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	0.0871	4.0000e-005	4.0300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		8.6300e-003	8.6300e-003	2.0000e-005		9.2000e-003
Energy	0.0176	0.1603	0.1347	9.6000e-004		0.0122	0.0122		0.0122	0.0122		192.3896	192.3896	3.6900e-003	3.5300e-003	193.5328
Mobile	2.7796	10.2464	22.8056	0.0593	4.8961	0.0552	4.9513	1.3085	0.0515	1.3600		6,037.8442	6,037.8442	0.4047		6,047.9628
Total	**2.8843**	**10.4068**	**22.9443**	**0.0602**	**4.8961**	**0.0674**	**4.9635**	**1.3085**	**0.0637**	**1.3722**		**6,230.2424**	**6,230.2424**	**0.4085**	**3.5300e-003**	**6,241.5048**

	ROG	NOx	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	**0.19**	**0.32**	**0.51**	**0.84**	**1.00**	**0.59**	**0.99**	**1.00**	**0.59**	**0.98**	**0.00**	**0.83**	**0.83**	**0.56**	**0.00**	**0.82**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/1/2021	7/16/2021	5	12	
2	Grading	Grading	7/17/2021	8/31/2021	5	32	
3	Building Construction	Building Construction	9/1/2021	12/31/2021	5	88	
4	Paving	Paving	11/1/2021	12/31/2021	5	45	
5	Architectural Coating	Architectural Coating	12/1/2021	12/31/2021	5	23	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.32

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 5,145; Non-Residential Outdoor: 1,715; Striped Parking Area: 864

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	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	50.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	192.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	7.00	3.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.9117	0.0000	0.9117	0.1381	0.0000	0.1381			0.0000			0.0000
Off-Road	0.7965	7.2530	7.5691	0.0120		0.4073	0.4073		0.3886	0.3886		1,147.4338	1,147.4338	0.2138		1,152.7797
Total	**0.7965**	**7.2530**	**7.5691**	**0.0120**	**0.9117**	**0.4073**	**1.3190**	**0.1381**	**0.3886**	**0.5267**		**1,147.4338**	**1,147.4338**	**0.2138**		**1,152.7797**

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	0.0318	1.0773	0.2777	3.1600e-003	0.0728	3.3300e-003	0.0761	0.0200	3.1800e-003	0.0231		346.2788	346.2788	0.0322		347.0826
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0392	0.0252	0.2493	7.7000e-004	0.0822	5.7000e-004	0.0827	0.0218	5.2000e-004	0.0223		76.4548	76.4548	2.2000e-003		76.5097
Total	**0.0710**	**1.1025**	**0.5271**	**3.9300e-003**	**0.1550**	**3.9000e-003**	**0.1589**	**0.0417**	**3.7000e-003**	**0.0455**		**422.7336**	**422.7336**	**0.0344**		**423.5922**

Mitigated Construction On-Site

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

Category	lb/day										lb/day					
Fugitive Dust					0.3556	0.0000	0.3556	0.0538	0.0000	0.0538			0.0000			0.0000
Off-Road	0.7965	7.2530	7.5691	0.0120		0.4073	0.4073		0.3886	0.3886	0.0000	1,147.4338	1,147.4338	0.2138		1,152.7797
Total	**0.7965**	**7.2530**	**7.5691**	**0.0120**	**0.3556**	**0.4073**	**0.7629**	**0.0538**	**0.3886**	**0.4424**	**0.0000**	**1,147.4338**	**1,147.4338**	**0.2138**		**1,152.7797**

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	0.0318	1.0773	0.2777	3.1600e-003	0.0728	3.3300e-003	0.0761	0.0200	3.1800e-003	0.0231		346.2788	346.2788	0.0322		347.0826
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0392	0.0252	0.2493	7.7000e-004	0.0822	5.7000e-004	0.0827	0.0218	5.2000e-004	0.0223		76.4548	76.4548	2.2000e-003		76.5097
Total	**0.0710**	**1.1025**	**0.5271**	**3.9300e-003**	**0.1550**	**3.9000e-003**	**0.1589**	**0.0417**	**3.7000e-003**	**0.0455**		**422.7336**	**422.7336**	**0.0344**		**423.5922**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7528	0.0000	0.7528	0.4138	0.0000	0.4138			0.0000			0.0000
Off-Road	0.7965	7.2530	7.5691	0.0120		0.4073	0.4073		0.3886	0.3886		1,147.4338	1,147.4338	0.2138		1,152.7797

Total	**0.7965**	**7.2530**	**7.5691**	**0.0120**	**0.7528**	**0.4073**	**1.1601**	**0.4138**	**0.3886**	**0.8024**		**1,147.4338**	**1,147.4338**	**0.2138**		**1,152.7797**

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	0.0458	1.5513	0.4000	4.5500e-003	0.1048	4.7900e-003	0.1096	0.0287	4.5900e-003	0.0333		498.6415	498.6415	0.0463		499.7989
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0392	0.0252	0.2493	7.7000e-004	0.0822	5.7000e-004	0.0827	0.0218	5.2000e-004	0.0223		76.4548	76.4548	2.2000e-003		76.5097
Total	**0.0850**	**1.5765**	**0.6493**	**5.3200e-003**	**0.1870**	**5.3600e-003**	**0.1924**	**0.0505**	**5.1100e-003**	**0.0556**		**575.0963**	**575.0963**	**0.0485**		**576.3086**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2936	0.0000	0.2936	0.1614	0.0000	0.1614			0.0000			0.0000
Off-Road	0.7965	7.2530	7.5691	0.0120		0.4073	0.4073		0.3886	0.3886	0.0000	1,147.4338	1,147.4338	0.2138		1,152.7797
Total	**0.7965**	**7.2530**	**7.5691**	**0.0120**	**0.2936**	**0.4073**	**0.7009**	**0.1614**	**0.3886**	**0.5500**	**0.0000**	**1,147.4338**	**1,147.4338**	**0.2138**		**1,152.7797**

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	0.0458	1.5513	0.4000	4.5500e-003	0.1048	4.7900e-003	0.1096	0.0287	4.5900e-003	0.0333		498.6415	498.6415	0.0463		499.7989
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0392	0.0252	0.2493	7.7000e-004	0.0822	5.7000e-004	0.0827	0.0218	5.2000e-004	0.0223		76.4548	76.4548	2.2000e-003		76.5097
Total	**0.0850**	**1.5765**	**0.6493**	**5.3200e-003**	**0.1870**	**5.3600e-003**	**0.1924**	**0.0505**	**5.1100e-003**	**0.0556**		**575.0963**	**575.0963**	**0.0485**		**576.3086**

3.4 Building Construction - 2021

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	0.7750	7.9850	7.2637	0.0114		0.4475	0.4475		0.4117	0.4117		1,103.2158	1,103.2158	0.3568		1,112.1358
Total	**0.7750**	**7.9850**	**7.2637**	**0.0114**		**0.4475**	**0.4475**		**0.4117**	**0.4117**		**1,103.2158**	**1,103.2158**	**0.3568**		**1,112.1358**

Unmitigated Construction Off-Site

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

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	9.5600e-003	0.3047	0.0867	7.9000e-004	0.0203	6.7000e-004	0.0210	5.8500e-003	6.4000e-004	6.4800e-003		85.1458	85.1458	6.6300e-003		85.3116
Worker	0.0275	0.0177	0.1745	5.4000e-004	0.0575	4.0000e-004	0.0579	0.0153	3.7000e-004	0.0156		53.5183	53.5183	1.5400e-003		53.5568
Total	**0.0370**	**0.3223**	**0.2612**	**1.3300e-003**	**0.0778**	**1.0700e-003**	**0.0789**	**0.0211**	**1.0100e-003**	**0.0221**		**138.6641**	**138.6641**	**8.1700e-003**		**138.8684**

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	0.7750	7.9850	7.2637	0.0114		0.4475	0.4475		0.4117	0.4117	0.0000	1,103.2158	1,103.2158	0.3568		1,112.1358
Total	**0.7750**	**7.9850**	**7.2637**	**0.0114**		**0.4475**	**0.4475**		**0.4117**	**0.4117**	**0.0000**	**1,103.2158**	**1,103.2158**	**0.3568**		**1,112.1358**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	9.5600e-003	0.3047	0.0867	7.9000e-004	0.0203	6.7000e-004	0.0210	5.8500e-003	6.4000e-004	6.4800e-003		85.1458	85.1458	6.6300e-003		85.3116
Worker	0.0275	0.0177	0.1745	5.4000e-004	0.0575	4.0000e-004	0.0579	0.0153	3.7000e-004	0.0156		53.5183	53.5183	1.5400e-003		53.5568
Total	**0.0370**	**0.3223**	**0.2612**	**1.3300e-003**	**0.0778**	**1.0700e-003**	**0.0789**	**0.0211**	**1.0100e-003**	**0.0221**		**138.6641**	**138.6641**	**8.1700e-003**		**138.8684**

3.5 Paving - 2021

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	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286		1,035.3425	1,035.3425	0.3016		1,042.8818
Paving	0.0186					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7400**	**6.7178**	**7.0899**	**0.0113**		**0.3534**	**0.3534**		**0.3286**	**0.3286**		**1,035.3425**	**1,035.3425**	**0.3016**		**1,042.8818**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0706	0.0454	0.4488	1.3800e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		137.6186	137.6186	3.9500e-003		137.7174
Total	**0.0706**	**0.0454**	**0.4488**	**1.3800e-003**	**0.1479**	**1.0200e-003**	**0.1489**	**0.0392**	**9.4000e-004**	**0.0402**		**137.6186**	**137.6186**	**3.9500e-003**		**137.7174**

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	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286	0.0000	1,035.3425	1,035.3425	0.3016		1,042.8818
Paving	0.0186					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7400**	**6.7178**	**7.0899**	**0.0113**		**0.3534**	**0.3534**		**0.3286**	**0.3286**	**0.0000**	**1,035.3425**	**1,035.3425**	**0.3016**		**1,042.8818**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0706	0.0454	0.4488	1.3800e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		137.6186	137.6186	3.9500e-003		137.7174
Total	**0.0706**	**0.0454**	**0.4488**	**1.3800e-003**	**0.1479**	**1.0200e-003**	**0.1489**	**0.0392**	**9.4000e-004**	**0.0402**		**137.6186**	**137.6186**	**3.9500e-003**		**137.7174**

3.6 Architectural Coating - 2021

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	1.2993					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309
Total	**1.5182**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**		**281.4481**	**281.4481**	**0.0193**		**281.9309**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.9200e-003	2.5200e-003	0.0249	8.0000e-005	8.2100e-003	6.0000e-005	8.2700e-003	2.1800e-003	5.0000e-005	2.2300e-003		7.6455	7.6455	2.2000e-004		7.6510
Total	**3.9200e-003**	**2.5200e-003**	**0.0249**	**8.0000e-005**	**8.2100e-003**	**6.0000e-005**	**8.2700e-003**	**2.1800e-003**	**5.0000e-005**	**2.2300e-003**		**7.6455**	**7.6455**	**2.2000e-004**		**7.6510**

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	1.2993					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309
Total	**1.5182**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**	**0.0000**	**281.4481**	**281.4481**	**0.0193**		**281.9309**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.9200e-003	2.5200e-003	0.0249	8.0000e-005	8.2100e-003	6.0000e-005	8.2700e-003	2.1800e-003	5.0000e-005	2.2300e-003		7.6455	7.6455	2.2000e-004		7.6510
Total	**3.9200e-003**	**2.5200e-003**	**0.0249**	**8.0000e-005**	**8.2100e-003**	**6.0000e-005**	**8.2700e-003**	**2.1800e-003**	**5.0000e-005**	**2.2300e-003**		**7.6455**	**7.6455**	**2.2000e-004**		**7.6510**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 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	2.7796	10.2464	22.8056	0.0593	4.8961	0.0552	4.9513	1.3085	0.0515	1.3600		6,037.8442	6,037.8442	0.4047		6,047.9628
Unmitigated	2.7851	10.2799	22.9241	0.0598	4.9455	0.0556	5.0011	1.3217	0.0519	1.3736		6,089.6856	6,089.6856	0.4071		6,099.8619

4.2 Trip Summary Information

	Average Daily Trip Rate	Unmitigated	Mitigated

Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Fast Food Restaurant w/o Drive Thru	2,401.00	2,401.00	0.00	1,999,193	1,979,201
Parking Lot	0.00	0.00	0.00		
Total	2,401.00	2,401.00	0.00	1,999,193	1,979,201

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
Fast Food Restaurant w/o Drive Thru	4.70	4.70	4.70	1.50	79.50	19.00	50	25	25
Parking Lot	4.70	4.70	4.70	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
Fast Food Restaurant w/o Drive Thru	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
Parking Lot	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Kilowatt Hours of Renewable Electricity Generated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 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	0.0176	0.1603	0.1347	9.6000e-004		0.0122	0.0122		0.0122	0.0122		192.3896	192.3896	3.6900e-003	3.5300e-003	193.5328
NaturalGas Unmitigated	0.0176	0.1603	0.1347	9.6000e-004		0.0122	0.0122		0.0122	0.0122		192.3896	192.3896	3.6900e-003	3.5300e-003	193.5328

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					
Fast Food Restaurant w/o Drive Thru	1635.31	0.0176	0.1603	0.1347	9.6000e-004		0.0122	0.0122		0.0122	0.0122		192.3896	192.3896	3.6900e-003	3.5300e-003	193.5328
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		**0.0176**	**0.1603**	**0.1347**	**9.6000e-004**		**0.0122**	**0.0122**		**0.0122**	**0.0122**		**192.3896**	**192.3896**	**3.6900e-003**	**3.5300e-003**	**193.5328**

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					
Fast Food Restaurant w/o Drive Thru	1.63531	0.0176	0.1603	0.1347	9.6000e-004		0.0122	0.0122		0.0122	0.0122		192.3896	192.3896	3.6900e-003	3.5300e-003	193.5328
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		**0.0176**	**0.1603**	**0.1347**	**9.6000e-004**		**0.0122**	**0.0122**		**0.0122**	**0.0122**		**192.3896**	**192.3896**	**3.6900e-003**	**3.5300e-003**	**193.5328**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0871	4.0000e-005	4.0300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		8.6300e-003	8.6300e-003	2.0000e-005		9.2000e-003
Unmitigated	0.0871	4.0000e-005	4.0300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		8.6300e-003	8.6300e-003	2.0000e-005		9.2000e-003

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	8.1900e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0785					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.8000e-004	4.0000e-005	4.0300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		8.6300e-003	8.6300e-003	2.0000e-005		9.2000e-003
Total	**0.0871**	**4.0000e-005**	**4.0300e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**		**8.6300e-003**	**8.6300e-003**	**2.0000e-005**		**9.2000e-003**

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	8.1900e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0785					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.8000e-004	4.0000e-005	4.0300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		8.6300e-003	8.6300e-003	2.0000e-005		9.2000e-003
Total	**0.0871**	**4.0000e-005**	**4.0300e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**		**8.6300e-003**	**8.6300e-003**	**2.0000e-005**		**9.2000e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Chick fil A Carlsbad

San Diego Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Fast Food Restaurant w/o Drive Thru	3.43	1000sqft	0.08	3,430.00	0
Parking Lot	36.00	Space	0.32	14,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2022
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	517.31	**CH4 Intensity (lb/MWhr)**	0.021	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Implementation of RPS

Land Use - Project description

Construction Phase - Project information

Grading -

Demolition -

Architectural Coating - Rule 67.0.1 coatings

Vehicle Trips - Traffic information

Area Coating - Rule 67.0.1 coatings

Energy Use - Title 24 as of 2019

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Energy Mitigation -

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	100
tblAreaCoating	Area_EF_Nonresidential_Interior	250	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	5.00	23.00
tblConstructionPhase	NumDays	100.00	88.00
tblConstructionPhase	NumDays	10.00	12.00
tblConstructionPhase	NumDays	2.00	32.00
tblConstructionPhase	NumDays	5.00	45.00
tblConstructionPhase	PhaseEndDate	12/30/2021	12/31/2021
tblConstructionPhase	PhaseEndDate	12/16/2021	12/31/2021
tblConstructionPhase	PhaseEndDate	7/26/2021	7/16/2021
tblConstructionPhase	PhaseEndDate	7/29/2021	8/31/2021
tblConstructionPhase	PhaseEndDate	12/23/2021	12/31/2021
tblConstructionPhase	PhaseStartDate	12/24/2021	12/1/2021
tblConstructionPhase	PhaseStartDate	7/30/2021	9/1/2021
tblConstructionPhase	PhaseStartDate	7/13/2021	7/1/2021
tblConstructionPhase	PhaseStartDate	7/28/2021	7/17/2021
tblConstructionPhase	PhaseStartDate	12/17/2021	11/1/2021
tblEnergyUse	T24E	8.23	7.35
tblEnergyUse	T24NG	35.92	35.56
tblGrading	MaterialExported	0.00	1,940.00

tblProjectCharacteristics	CH4IntensityFactor	0.029	0.021
tblProjectCharacteristics	CO2IntensityFactor	720.49	517.31
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblVehicleTrips	CC_TL	7.30	4.70
tblVehicleTrips	CC_TL	7.30	4.70
tblVehicleTrips	CNW_TL	7.30	4.70
tblVehicleTrips	CNW_TL	7.30	4.70
tblVehicleTrips	CW_TL	9.50	4.70
tblVehicleTrips	CW_TL	9.50	4.70
tblVehicleTrips	DV_TP	37.00	25.00
tblVehicleTrips	PB_TP	12.00	25.00
tblVehicleTrips	PR_TP	51.00	50.00
tblVehicleTrips	ST_TR	696.00	700.00
tblVehicleTrips	SU_TR	500.00	0.00
tblVehicleTrips	WD_TR	716.00	700.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0903	0.7271	0.7016	1.2500e-003	0.0280	0.0379	0.0659	0.0103	0.0353	0.0456	0.0000	110.2890	110.2890	0.0261	0.0000	110.9426
Maximum	**0.0903**	**0.7271**	**0.7016**	**1.2500e-003**	**0.0280**	**0.0379**	**0.0659**	**0.0103**	**0.0353**	**0.0456**	**0.0000**	**110.2890**	**110.2890**	**0.0261**	**0.0000**	**110.9426**

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					
2021	0.0903	0.7271	0.7016	1.2500e-003	0.0174	0.0379	0.0552	5.7400e-003	0.0353	0.0411	0.0000	110.2889	110.2889	0.0261	0.0000	110.9425
Maximum	**0.0903**	**0.7271**	**0.7016**	**1.2500e-003**	**0.0174**	**0.0379**	**0.0552**	**5.7400e-003**	**0.0353**	**0.0411**	**0.0000**	**110.2889**	**110.2889**	**0.0261**	**0.0000**	**110.9425**

	ROG	**NOx**	**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**	**38.10**	**0.00**	**16.21**	**44.16**	**0.00**	**9.96**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
1	**7-13-2021**	**9-30-2021**	0.2700	0.2700
		Highest	0.2700	0.2700

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	0.0159	0.0000	3.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-004	7.0000e-004	0.0000	0.0000	7.5000e-004
Energy	3.2200e-003	0.0293	0.0246	1.8000e-004		2.2200e-003	2.2200e-003		2.2200e-003	2.2200e-003	0.0000	63.4740	63.4740	1.8900e-003	8.3000e-004	63.7682
Mobile	0.4201	1.6155	3.4686	9.4500e-003	0.7534	8.5800e-003	0.7620	0.2018	8.0000e-003	0.2098	0.0000	873.6712	873.6712	0.0562	0.0000	875.0757
Waste						0.0000	0.0000		0.0000	0.0000	8.0202	0.0000	8.0202	0.4740	0.0000	19.8696

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Water						0.0000	0.0000		0.0000	0.0000	0.3303	3.3542	3.6845	0.0341	8.3000e-004	4.7825
Total	**0.4392**	**1.6448**	**3.4936**	**9.6300e-003**	**0.7534**	**0.0108**	**0.7642**	**0.2018**	**0.0102**	**0.2120**	**8.3505**	**940.5001**	**948.8506**	**0.5661**	**1.6600e-003**	**963.4968**

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	0.0159	0.0000	3.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-004	7.0000e-004	0.0000	0.0000	7.5000e-004
Energy	3.2200e-003	0.0293	0.0246	1.8000e-004		2.2200e-003	2.2200e-003		2.2200e-003	2.2200e-003	0.0000	63.4728	63.4728	1.8900e-003	8.3000e-004	63.7671
Mobile	0.4192	1.6103	3.4500	9.3700e-003	0.7459	8.5200e-003	0.7544	0.1997	7.9500e-003	0.2077	0.0000	866.2853	866.2853	0.0559	0.0000	867.6816
Waste						0.0000	0.0000		0.0000	0.0000	4.0101	0.0000	4.0101	0.2370	0.0000	9.9348
Water						0.0000	0.0000		0.0000	0.0000	0.2642	2.7180	2.9823	0.0273	6.6000e-004	3.8608
Total	**0.4383**	**1.6395**	**3.4749**	**9.5500e-003**	**0.7459**	**0.0107**	**0.7566**	**0.1997**	**0.0102**	**0.2099**	**4.2743**	**932.4768**	**936.7512**	**0.3220**	**1.4900e-003**	**945.2450**

	ROG	**NOx**	**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	**0.20**	**0.32**	**0.53**	**0.83**	**1.00**	**0.56**	**0.99**	**1.00**	**0.49**	**0.98**	**48.81**	**0.85**	**1.28**	**43.12**	**10.24**	**1.89**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/1/2021	7/16/2021	5	12	
2	Grading	Grading	7/17/2021	8/31/2021	5	32	
3	Building Construction	Building Construction	9/1/2021	12/31/2021	5	88	

4	Paving	Paving	11/1/2021	12/31/2021	5	45	
5	Architectural Coating	Architectural Coating	12/1/2021	12/31/2021	5	23	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.32

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 5,145; Non-Residential Outdoor: 1,715; Striped Parking Area: 864

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	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	50.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	192.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

Building Construction	5	7.00	3.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2021

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					5.4700e-003	0.0000	5.4700e-003	8.3000e-004	0.0000	8.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7800e-003	0.0435	0.0454	7.0000e-005		2.4400e-003	2.4400e-003		2.3300e-003	2.3300e-003	0.0000	6.2456	6.2456	1.1600e-003	0.0000	6.2747
Total	**4.7800e-003**	**0.0435**	**0.0454**	**7.0000e-005**	**5.4700e-003**	**2.4400e-003**	**7.9100e-003**	**8.3000e-004**	**2.3300e-003**	**3.1600e-003**	**0.0000**	**6.2456**	**6.2456**	**1.1600e-003**	**0.0000**	**6.2747**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.9000e-004	6.5300e-003	1.6100e-003	2.0000e-005	4.3000e-004	2.0000e-005	4.5000e-004	1.2000e-004	2.0000e-005	1.4000e-004	0.0000	1.9041	1.9041	1.7000e-004	0.0000	1.9084
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	2.1000e-004	1.5000e-004	1.5000e-003	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4203	0.4203	1.0000e-005	0.0000	0.4206
Total	**4.0000e-004**	**6.6800e-003**	**3.1100e-003**	**2.0000e-005**	**9.1000e-004**	**2.0000e-005**	**9.3000e-004**	**2.5000e-004**	**2.0000e-005**	**2.7000e-004**	**0.0000**	**2.3244**	**2.3244**	**1.8000e-004**	**0.0000**	**2.3290**

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					2.1300e-003	0.0000	2.1300e-003	3.2000e-004	0.0000	3.2000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7800e-003	0.0435	0.0454	7.0000e-005		2.4400e-003	2.4400e-003		2.3300e-003	2.3300e-003	0.0000	6.2456	6.2456	1.1600e-003	0.0000	6.2747
Total	**4.7800e-003**	**0.0435**	**0.0454**	**7.0000e-005**	**2.1300e-003**	**2.4400e-003**	**4.5700e-003**	**3.2000e-004**	**2.3300e-003**	**2.6500e-003**	**0.0000**	**6.2456**	**6.2456**	**1.1600e-003**	**0.0000**	**6.2747**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.9000e-004	6.5300e-003	1.6100e-003	2.0000e-005	4.3000e-004	2.0000e-005	4.5000e-004	1.2000e-004	2.0000e-005	1.4000e-004	0.0000	1.9041	1.9041	1.7000e-004	0.0000	1.9084
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.5000e-004	1.5000e-003	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4203	0.4203	1.0000e-005	0.0000	0.4206
Total	**4.0000e-004**	**6.6800e-003**	**3.1100e-003**	**2.0000e-005**	**9.1000e-004**	**2.0000e-005**	**9.3000e-004**	**2.5000e-004**	**2.0000e-005**	**2.7000e-004**	**0.0000**	**2.3244**	**2.3244**	**1.8000e-004**	**0.0000**	**2.3290**

3.3 Grading - 2021

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					0.0120	0.0000	0.0120	6.6200e-003	0.0000	6.6200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0127	0.1161	0.1211	1.9000e-004		6.5200e-003	6.5200e-003		6.2200e-003	6.2200e-003	0.0000	16.6550	16.6550	3.1000e-003	0.0000	16.7326
Total	**0.0127**	**0.1161**	**0.1211**	**1.9000e-004**	**0.0120**	**6.5200e-003**	**0.0186**	**6.6200e-003**	**6.2200e-003**	**0.0128**	**0.0000**	**16.6550**	**16.6550**	**3.1000e-003**	**0.0000**	**16.7326**

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	7.2000e-004	0.0251	6.1800e-003	7.0000e-005	1.6400e-003	8.0000e-005	1.7200e-003	4.5000e-004	7.0000e-005	5.2000e-004	0.0000	7.3116	7.3116	6.6000e-004	0.0000	7.3281
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	4.0000e-004	4.0000e-003	1.0000e-005	1.2800e-003	1.0000e-005	1.2900e-003	3.4000e-004	1.0000e-005	3.5000e-004	0.0000	1.1208	1.1208	3.0000e-005	0.0000	1.1216
Total	**1.2800e-003**	**0.0255**	**0.0102**	**8.0000e-005**	**2.9200e-003**	**9.0000e-005**	**3.0100e-003**	**7.9000e-004**	**8.0000e-005**	**8.7000e-004**	**0.0000**	**8.4324**	**8.4324**	**6.9000e-004**	**0.0000**	**8.4497**

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					4.7000e-003	0.0000	4.7000e-003	2.5800e-003	0.0000	2.5800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0127	0.1161	0.1211	1.9000e-004		6.5200e-003	6.5200e-003		6.2200e-003	6.2200e-003	0.0000	16.6549	16.6549	3.1000e-003	0.0000	16.7325
Total	**0.0127**	**0.1161**	**0.1211**	**1.9000e-004**	**4.7000e-003**	**6.5200e-003**	**0.0112**	**2.5800e-003**	**6.2200e-003**	**8.8000e-003**	**0.0000**	**16.6549**	**16.6549**	**3.1000e-003**	**0.0000**	**16.7325**

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	7.2000e-004	0.0251	6.1800e-003	7.0000e-005	1.6400e-003	8.0000e-005	1.7200e-003	4.5000e-004	7.0000e-005	5.2000e-004	0.0000	7.3116	7.3116	6.6000e-004	0.0000	7.3281
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	4.0000e-004	4.0000e-003	1.0000e-005	1.2800e-003	1.0000e-005	1.2900e-003	3.4000e-004	1.0000e-005	3.5000e-004	0.0000	1.1208	1.1208	3.0000e-005	0.0000	1.1216
Total	**1.2800e-003**	**0.0255**	**0.0102**	**8.0000e-005**	**2.9200e-003**	**9.0000e-005**	**3.0100e-003**	**7.9000e-004**	**8.0000e-005**	**8.7000e-004**	**0.0000**	**8.4324**	**8.4324**	**6.9000e-004**	**0.0000**	**8.4497**

3.4 Building Construction - 2021

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	0.0341	0.3513	0.3196	5.0000e-004		0.0197	0.0197		0.0181	0.0181	0.0000	44.0361	44.0361	0.0142	0.0000	44.3922
Total	**0.0341**	**0.3513**	**0.3196**	**5.0000e-004**		**0.0197**	**0.0197**		**0.0181**	**0.0181**	**0.0000**	**44.0361**	**44.0361**	**0.0142**	**0.0000**	**44.3922**

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	4.1000e-004	0.0136	3.6200e-003	4.0000e-005	8.8000e-004	3.0000e-005	9.0000e-004	2.5000e-004	3.0000e-005	2.8000e-004	0.0000	3.4510	3.4510	2.6000e-004	0.0000	3.4574
Worker	1.0700e-003	7.6000e-004	7.6900e-003	2.0000e-005	2.4700e-003	2.0000e-005	2.4900e-003	6.6000e-004	2.0000e-005	6.7000e-004	0.0000	2.1576	2.1576	6.0000e-005	0.0000	2.1592
Total	**1.4800e-003**	**0.0143**	**0.0113**	**6.0000e-005**	**3.3500e-003**	**5.0000e-005**	**3.3900e-003**	**9.1000e-004**	**5.0000e-005**	**9.5000e-004**	**0.0000**	**5.6086**	**5.6086**	**3.2000e-004**	**0.0000**	**5.6166**

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	0.0341	0.3513	0.3196	5.0000e-004		0.0197	0.0197		0.0181	0.0181	0.0000	44.0361	44.0361	0.0142	0.0000	44.3921
Total	**0.0341**	**0.3513**	**0.3196**	**5.0000e-004**		**0.0197**	**0.0197**		**0.0181**	**0.0181**	**0.0000**	**44.0361**	**44.0361**	**0.0142**	**0.0000**	**44.3921**

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	4.1000e-004	0.0136	3.6200e-003	4.0000e-005	8.8000e-004	3.0000e-005	9.0000e-004	2.5000e-004	3.0000e-005	2.8000e-004	0.0000	3.4510	3.4510	2.6000e-004	0.0000	3.4574
Worker	1.0700e-003	7.6000e-004	7.6900e-003	2.0000e-005	2.4700e-003	2.0000e-005	2.4900e-003	6.6000e-004	2.0000e-005	6.7000e-004	0.0000	2.1576	2.1576	6.0000e-005	0.0000	2.1592
Total	**1.4800e-003**	**0.0143**	**0.0113**	**6.0000e-005**	**3.3500e-003**	**5.0000e-005**	**3.3900e-003**	**9.1000e-004**	**5.0000e-005**	**9.5000e-004**	**0.0000**	**5.6086**	**5.6086**	**3.2000e-004**	**0.0000**	**5.6166**

3.5 Paving - 2021

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	0.0162	0.1512	0.1595	2.5000e-004		7.9500e-003	7.9500e-003		7.3900e-003	7.3900e-003	0.0000	21.1331	21.1331	6.1600e-003	0.0000	21.2869
Paving	4.2000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0167**	**0.1512**	**0.1595**	**2.5000e-004**		**7.9500e-003**	**7.9500e-003**		**7.3900e-003**	**7.3900e-003**	**0.0000**	**21.1331**	**21.1331**	**6.1600e-003**	**0.0000**	**21.2869**

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	1.4100e-003	1.0000e-003	0.0101	3.0000e-005	3.2500e-003	2.0000e-005	3.2700e-003	8.6000e-004	2.0000e-005	8.8000e-004	0.0000	2.8371	2.8371	8.0000e-005	0.0000	2.8392

Total	**1.4100e-003**	**1.0000e-003**	**0.0101**	**3.0000e-005**	**3.2500e-003**	**2.0000e-005**	**3.2700e-003**	**8.6000e-004**	**2.0000e-005**	**8.8000e-004**	**0.0000**	**2.8371**	**2.8371**	**8.0000e-005**	**0.0000**	**2.8392**

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	0.0162	0.1512	0.1595	2.5000e-004		7.9500e-003	7.9500e-003		7.3900e-003	7.3900e-003	0.0000	21.1330	21.1330	6.1600e-003	0.0000	21.2869
Paving	4.2000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0167**	**0.1512**	**0.1595**	**2.5000e-004**		**7.9500e-003**	**7.9500e-003**		**7.3900e-003**	**7.3900e-003**	**0.0000**	**21.1330**	**21.1330**	**6.1600e-003**	**0.0000**	**21.2869**

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	1.4100e-003	1.0000e-003	0.0101	3.0000e-005	3.2500e-003	2.0000e-005	3.2700e-003	8.6000e-004	2.0000e-005	8.8000e-004	0.0000	2.8371	2.8371	8.0000e-005	0.0000	2.8392
Total	**1.4100e-003**	**1.0000e-003**	**0.0101**	**3.0000e-005**	**3.2500e-003**	**2.0000e-005**	**3.2700e-003**	**8.6000e-004**	**2.0000e-005**	**8.8000e-004**	**0.0000**	**2.8371**	**2.8371**	**8.0000e-005**	**0.0000**	**2.8392**

3.6 Architectural Coating - 2021

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	0.0149					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.5200e-003	0.0176	0.0209	3.0000e-005		1.0800e-003	1.0800e-003		1.0800e-003	1.0800e-003	0.0000	2.9362	2.9362	2.0000e-004	0.0000	2.9413
Total	**0.0175**	**0.0176**	**0.0209**	**3.0000e-005**		**1.0800e-003**	**1.0800e-003**		**1.0800e-003**	**1.0800e-003**	**0.0000**	**2.9362**	**2.9362**	**2.0000e-004**	**0.0000**	**2.9413**

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	4.0000e-005	3.0000e-005	2.9000e-004	0.0000	9.0000e-005	0.0000	9.0000e-005	2.0000e-005	0.0000	3.0000e-005	0.0000	0.0806	0.0806	0.0000	0.0000	0.0806
Total	**4.0000e-005**	**3.0000e-005**	**2.9000e-004**	**0.0000**	**9.0000e-005**	**0.0000**	**9.0000e-005**	**2.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0806**	**0.0806**	**0.0000**	**0.0000**	**0.0806**

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	0.0149					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.5200e-003	0.0176	0.0209	3.0000e-005		1.0800e-003	1.0800e-003		1.0800e-003	1.0800e-003	0.0000	2.9362	2.9362	2.0000e-004	0.0000	2.9413
Total	**0.0175**	**0.0176**	**0.0209**	**3.0000e-005**		**1.0800e-003**	**1.0800e-003**		**1.0800e-003**	**1.0800e-003**	**0.0000**	**2.9362**	**2.9362**	**2.0000e-004**	**0.0000**	**2.9413**

<u>Mitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive 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	4.0000e-005	3.0000e-005	2.9000e-004	0.0000	9.0000e-005	0.0000	9.0000e-005	2.0000e-005	0.0000	3.0000e-005	0.0000	0.0806	0.0806	0.0000	0.0000	0.0806
Total	**4.0000e-005**	**3.0000e-005**	**2.9000e-004**	**0.0000**	**9.0000e-005**	**0.0000**	**9.0000e-005**	**2.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0806**	**0.0806**	**0.0000**	**0.0000**	**0.0806**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive 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	0.4192	1.6103	3.4500	9.3700e-003	0.7459	8.5200e-003	0.7544	0.1997	7.9500e-003	0.2077	0.0000	866.2853	866.2853	0.0559	0.0000	867.6816
Unmitigated	0.4201	1.6155	3.4686	9.4500e-003	0.7534	8.5800e-003	0.7620	0.2018	8.0000e-003	0.2098	0.0000	873.6712	873.6712	0.0562	0.0000	875.0757

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Fast Food Restaurant w/o Drive Thru	2,401.00	2,401.00	0.00	1,999,193	1,979,201
Parking Lot	0.00	0.00	0.00		
Total	2,401.00	2,401.00	0.00	1,999,193	1,979,201

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
Fast Food Restaurant w/o Drive Thru	4.70	4.70	4.70	1.50	79.50	19.00	50	25	25
Parking Lot	4.70	4.70	4.70	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
Fast Food Restaurant w/o Drive Thru	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
Parking Lot	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Kilowatt Hours of Renewable Electricity Generated

	ROG	NOx	CO	SO2	Fugitive 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	31.6206	31.6206	1.2800e-003	2.4000e-004	31.7255
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	31.6218	31.6218	1.2800e-003	2.4000e-004	31.7267
NaturalGas Mitigated	3.2200e-003	0.0293	0.0246	1.8000e-004		2.2200e-003	2.2200e-003		2.2200e-003	2.2200e-003	0.0000	31.8523	31.8523	6.1000e-004	5.8000e-004	32.0415
NaturalGas Unmitigated	3.2200e-003	0.0293	0.0246	1.8000e-004		2.2200e-003	2.2200e-003		2.2200e-003	2.2200e-003	0.0000	31.8523	31.8523	6.1000e-004	5.8000e-004	32.0415

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					
Fast Food Restaurant w/o Drive Thru	596889	3.2200e-003	0.0293	0.0246	1.8000e-004		2.2200e-003	2.2200e-003		2.2200e-003	2.2200e-003	0.0000	31.8523	31.8523	6.1000e-004	5.8000e-004	32.0415
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		**3.2200e-003**	**0.0293**	**0.0246**	**1.8000e-004**		**2.2200e-003**	**2.2200e-003**		**2.2200e-003**	**2.2200e-003**	**0.0000**	**31.8523**	**31.8523**	**6.1000e-004**	**5.8000e-004**	**32.0415**

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					
Fast Food Restaurant w/o Drive Thru	596889	3.2200e-003	0.0293	0.0246	1.8000e-004		2.2200e-003	2.2200e-003		2.2200e-003	2.2200e-003	0.0000	31.8523	31.8523	6.1000e-004	5.8000e-004	32.0415
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		**3.2200e-003**	**0.0293**	**0.0246**	**1.8000e-004**		**2.2200e-003**	**2.2200e-003**		**2.2200e-003**	**2.2200e-003**	**0.0000**	**31.8523**	**31.8523**	**6.1000e-004**	**5.8000e-004**	**32.0415**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Fast Food Restaurant w/o Drive Thru	129723	30.4391	1.2400e-003	2.4000e-004	30.5402
Parking Lot	5040	1.1826	5.0000e-005	1.0000e-005	1.1866
Total		**31.6218**	**1.2900e-003**	**2.5000e-004**	**31.7267**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Fast Food Restaurant w/o Drive Thru	129720	30.4386	1.2400e-003	2.4000e-004	30.5396
Parking Lot	5037.5	1.1820	5.0000e-005	1.0000e-005	1.1860
Total		**31.6206**	**1.2900e-003**	**2.5000e-004**	**31.7255**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0159	0.0000	3.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-004	7.0000e-004	0.0000	0.0000	7.5000e-004
Unmitigated	0.0159	0.0000	3.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-004	7.0000e-004	0.0000	0.0000	7.5000e-004

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	1.4900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0143					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.0000e-005	0.0000	3.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-004	7.0000e-004	0.0000	0.0000	7.5000e-004
Total	**0.0159**	**0.0000**	**3.6000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**7.0000e-004**	**7.0000e-004**	**0.0000**	**0.0000**	**7.5000e-004**

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	1.4900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0143					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.0000e-005	0.0000	3.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-004	7.0000e-004	0.0000	0.0000	7.5000e-004
Total	**0.0159**	**0.0000**	**3.6000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**7.0000e-004**	**7.0000e-004**	**0.0000**	**0.0000**	**7.5000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	2.9823	0.0273	6.6000e-004	3.8608
Unmitigated	3.6845	0.0341	8.3000e-004	4.7825

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Fast Food Restaurant w/o Drive Thru	1.04112 / 0.0664545	3.6845	0.0341	8.3000e-004	4.7825
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**3.6845**	**0.0341**	**8.3000e-004**	**4.7825**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Fast Food Restaurant w/o Drive Thru	0.832897 / 0.0664545	2.9823	0.0273	6.6000e-004	3.8608
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**2.9823**	**0.0273**	**6.6000e-004**	**3.8608**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e

	MT/yr			
Mitigated	4.0101	0.2370	0.0000	9.9348
Unmitigated	8.0202	0.4740	0.0000	19.8696

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Fast Food Restaurant w/o Drive Thru	39.51	8.0202	0.4740	0.0000	19.8696
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**8.0202**	**0.4740**	**0.0000**	**19.8696**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Fast Food Restaurant w/o Drive Thru	19.755	4.0101	0.2370	0.0000	9.9348
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**4.0101**	**0.2370**	**0.0000**	**9.9348**

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

Attachment B
Updated GHG Analysis

This document is designed for double-sided printing to conserve natural resources.

GREENHOUSE GAS ANALYSIS

Chick-fil-A – I-5 & Palomar Airport Road
5850 Avenida Encinas
Carlsbad, California 92008

Prepared For

Chick-fil-A. Inc.
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Prepared By

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Job # S190205A.3 GHG

July 15, 2021

Greenhouse Gas Analysis

for the

Chick-fil-A Carlsbad Project

Submitted To:

Eilar Associates
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Escondido, CA 92025

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July 15, 2021

Table of Contents

1.0 INTRODUCTION

The project is proposing to construct a 3,427-square foot Chick-fil-A restaurant on a site at 5850 Avenida Encinas in the City of Carlsbad. The project site is located near the intersection of Interstate 5 and Palomar Airport Road. The site is currently occupied by a 10,977-square foot office building. The office building will be demolished and replaced by the restaurant as part of the project. Figure 1 presents the proposed plot plan for the project.

Greenhouse gas (GHG) impacts will be attributable to emissions associated with construction and operational emissions associated with traffic; energy use; water use, transport, and treatment; area sources; and solid waste handling. This report presents an evaluation of existing conditions at the site, thresholds of significance, and potential GHG impacts associated with construction and operation of the project.

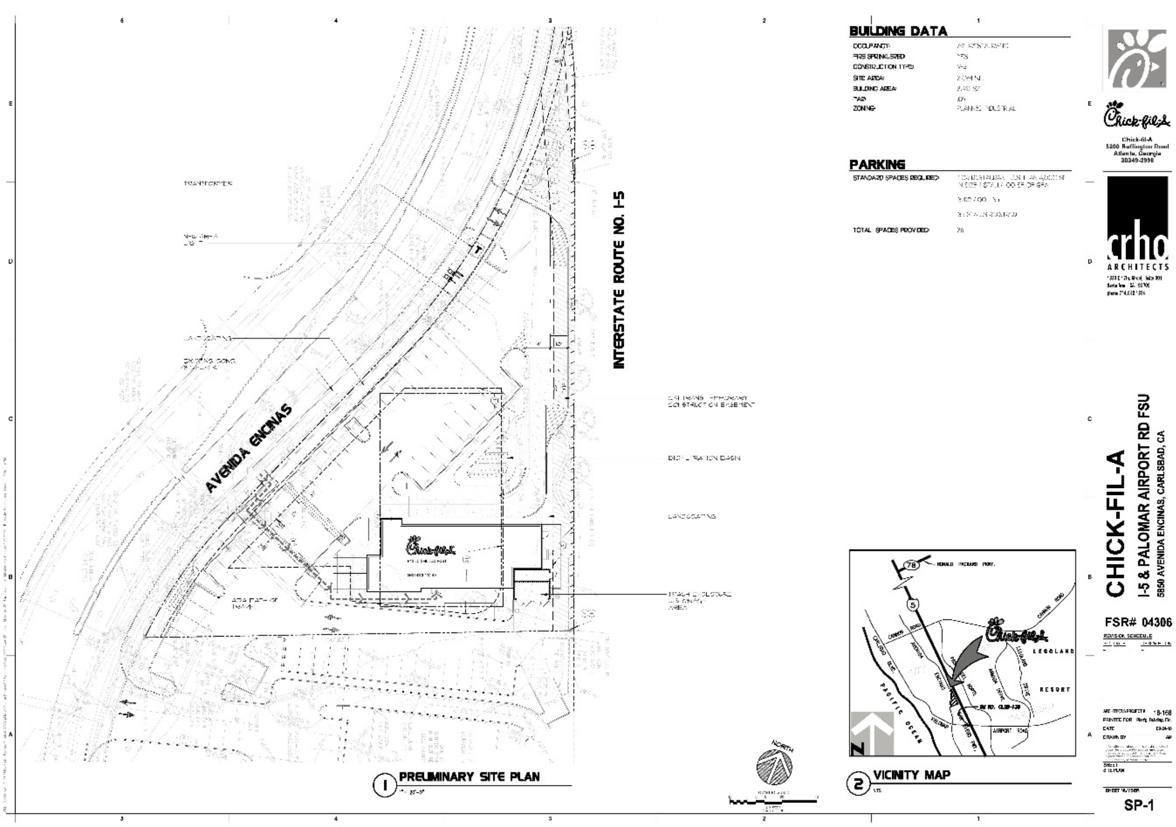

Figure 1. Preliminary Site Plan – Chick-fil-A Carlsbad

2.0 ENVIRONMENTAL SETTING

2.1 Global Climate Change

Global climate change (GCC) refers to changes in average climatic conditions on the Earth as a whole, including temperature, wind patterns, precipitation, and storms. Global climate change may result from natural factors, natural processes, and/or human activities that change the composition of the atmosphere and alter the surface and features of land. Human-caused emissions of GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect[1] and have led to a trend of unnatural warming of Earth's climate, known as (GCC) or global warming.

California law defines GHGs as any of the following compounds: carbon dioxide (CO_2), methane (CH_4), nitrous oxides (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and sulfur hexafluoride (NF_3) (Health & Safety Code, §38505(g)). CO_2, followed by CH_4 and N_2O, are the most common GHGs that result from human activity.

Climate change is a global problem; and, GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern.

2.2 Greenhouse Gases

The California Air Resources Board (ARB) annually prepares a GHG inventory that identifies and quantifies statewide anthropogenic GHG emissions and sinks. The current inventory covers the years 1990 to 2017, and is summarized in Table 1, State of California GHG Emissions by Sector. The inventory is divided into nine broad sectors and categories: Agriculture, Commercial, Electricity Generation, Forestry, Industrial, Residential, Transportation, Solvents and Chemicals, and Forestry Sinks.

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[1] GHGs allow solar radiation (sunlight) into the Earth's atmosphere, but prevent radiative heat from escaping, thus warming the Earth's atmosphere.

GHGs have varying global warming potentials (GWP) (i.e., the potential of a gas or aerosol to trap heat in the atmosphere). The reference gas for GWP is CO_2; therefore, CO_2 has a GWP of 1. The other main GHGs that have been attributed to human activity include CH_4, which has a GWP of 25, and N_2O, which has a GWP of 298. (The GWP values used in this section are sourced to the Fourth Assessment Report (2007) of the Intergovernmental Panel on Climate Change.) When accounting for GHGs, emissions are expressed in terms of CO_2 equivalents (CO_2e), are typically quantified in metric tons (MT) or millions of metric tons (MMT), and are shown as MT CO_2e.

Human-caused sources of CO_2 include combustion of fossil fuels (e.g., coal, oil, natural gas, gasoline). CH_4 is the main component of natural gas and also arises naturally from anaerobic decay of organic matter. Human-caused sources of methane include landfills, fermentation of manure, and cattle farming. Human-caused sources of N_2O include combustion of fossil fuels and industrial processes such as nylon production and production of nitric acid. Other GHGs are present in trace amounts in the atmosphere and are generated from various industrial or other uses.

Table 1
STATE OF CALIFORNIA GHG EMISSIONS BY SECTOR

Sector	Total 1990 Emissions ($MMTCO_2e$)	Percent of Total 1990 Emissions	Total 2017 Emissions ($MMTCO_2e$)	Percent of Total 2017 Emissions
Agriculture	23.4	5%	32.42	8%
Commercial	14.4	3%	15.14	4%
Electricity Generation	110.6	26%	62.39	15%
Forestry (excluding sinks)	0.2	<1%	N/A	N/A
Industrial	103.0	24%	89.40	21%
Residential	29.7	7%	26.00	6%
Transportation	150.7	35%	169.86	40%
High-GWP Gases	N/A	N/A	19.99	5%
Recycling and Waste	N/A	N/A	8.89	2%
Forestry Sinks	(6.7)	N/A	N/A	N/A
Total	425.3	100%	424.10	100%

N/A – data not provided
Source: *https://ww3.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_sum_2000-17.pdf*

In their Climate Action Plan, Amendment No. 1 (City of Carlsbad 2020), the City provided an updated GHG inventory for the City for the baseline year of 2012. Table 2 presents the City's baseline GHG inventory.

Table 2
CITY OF CARLSBAD
2012 COMMUNITY GHG EMISSIONS

Emissions Category	GHG Emissions, $MTCO_2e$	Percentage of Total Emissions, %
On-Road Transportation	488,000	49.9
Electricity	301,000	30.8
Natural Gas	134,000	13.7
Solid Waste	25,000	2.5
Off-Road Transportation	14,000	1.4
Water	12,000	1.2
Wastewater	3,000	<1
Total	**977,000**	**100**

Source: City of Carlsbad Climate Action Plan, Amendment No. 1.
https://cityadmin.carlsbadca.gov/civicax/filebank/blobdload.aspx?BlobID=45370

2.3 Existing Site

As it currently exists, the existing office building is a source of GHGs from traffic, energy use, area sources, water use, treatment, and conveyance, and solid waste disposal. Emissions of GHGs have been quantified in this analysis to address existing conditions.

3.0 REGULATORY REQUIREMENTS

3.1 Federal Action

3.1.1 Clean Air Act

In *Massachusetts v. Environmental Protection Agency* (2007) 549 U.S. 497, the U.S. Supreme Court held that the U.S. Environmental Protection Agency (USEPA) has authority under the Clean Air Act to regulate CO_2 emissions if those emissions pose an endangerment to the public health or welfare.

In 2009, the USEPA issued an "endangerment finding" under the Clean Air Act, concluding that GHGs threaten the public health and welfare of current and future generations and that motor vehicles contribute to GHG emissions. These findings provide the basis for adopting national regulations to mandate GHG emission reductions under the Clean Air Act.

To date, the USEPA has exercised its authority to regulate mobile sources that reduce GHG emissions via the control of vehicle manufacturers, as discussed immediately below.[2]

3.1.2 Federal Vehicle Standards

In response to the U.S. Supreme Court ruling discussed above, the Bush Administration issued Executive Order 13432 in 2007 directing the USEPA, the Department of Transportation (DOT), and the Department of Energy (DOE) to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the National Highway

[2] The USEPA also has adopted standards that set a national limit on GHG emissions produced from new, modified, and reconstructed power plants, and has issued the Clean Power Plan, which is targeted toward the reduction of carbon emissions from existing power plants. The Clean Power Plan requires states to develop and implement plans that ensure that the power plants in their state – either individually, together or in combination with other measures – achieve interim performance rates over the period of 2022 to 2029 and final performance rates, rate-based goals or mass-based goals by 2030. In February 2016, the U.S. Supreme Court stayed implementation of the Clean Power Plan pending judicial review. Additionally, in March 2017, President Donald Trump's Executive Order on Energy Independence directed the USEPA to undertake a review of the Clean Power Plan.

Traffic Safety Administration (NHTSA) issued a final rule regulating fuel efficiency and GHG emissions from cars and light-duty trucks for model year 2011; and, in 2010, the USEPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, President Obama issued a memorandum directing the same federal agencies to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the USEPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017–2025 light-duty vehicles. The proposed standards are projected to achieve 163 grams/mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon (mpg) if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the USEPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. In August 2016, the USEPA and NHTSA finalized the next phase (Phase 2) of the fuel economy and GHG standards for medium- and heavy-duty trucks, which will apply to vehicles with model year 2018 and later. In 2018, the National Highway Traffic Safety Administration (NHTSA) and the Environmental Protection Agency (EPA) proposed the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks'' (SAFE Vehicles Rule). The SAFE Vehicles Rule would amend certain existing CAFE and tailpipe carbon dioxide emissions standards for passenger cars and light trucks and establish new standards, all covering model years 2021 through 2026. In short, whereas both EPA and DOT had previously adopted standards that would become more stringent over time, as of March 2020, they have adopted the SAFE Rule that now proposing freezes vehicle standards after MY2020.

3.1.3 Energy Independence and Security Act

The Energy Independence and Security Act of 2007 facilitates the reduction of national GHG emissions by requiring the following:

- Increasing the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) that requires fuel producers to use at least 36 billion gallons of biofuel in 2022;
- Prescribing or revising standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances;
- Requiring approximately 25 percent greater efficiency for light bulbs by phasing out incandescent light bulbs between 2012 and 2014; requiring approximately 200 percent greater efficiency for light bulbs, or similar energy savings, by 2020.

While superseded by the USEPA and NHTSA actions described above, (i) establishing mpg targets for cars and light trucks and (ii) directing the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and to create a separate fuel economy standard for trucks.

Additional provisions of this Act address energy savings in government and public institutions, promote research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

3.2 State Action

3.1.2 Executive Orders and Legislation Establishing Overarching State Climate Policies

Executive Order S-3-05

In 2005, former Governor Schwarzenegger signed Executive Order S-3-05, which established the following GHG emission reduction goals for California: (1) by 2010, reduce GHG emissions to 2000 levels; (2) by 2020, reduce GHG emissions to 1990 levels; and (3) by 2050, reduce GHG emissions to 80 percent below 1990 levels.

Assembly Bill 32

Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, was enacted after considerable study and expert testimony before the Legislature. The heart of AB 32 is the requirement that statewide GHG emissions be reduced to 1990 levels by 2020 (Health & Safety Code, §38550). In order to achieve this reduction mandate, AB 32 requires the ARB to adopt rules and regulations in an open public process that achieve the maximum technologically feasible and cost-effective GHG reductions.

In response to the adoption of AB 32, in 2007, the ARB approved a statewide limit on the GHG emissions level for year 2020 consistent with the determined 1990 baseline. The ARB's adoption of this limit is in accordance with Health & Safety Code section 38550.

Further, in 2008, the ARB adopted the *Climate Change Scoping Plan: A Framework for Change* (*Scoping Plan*) in accordance with Health & Safety Code section 38561. The *Scoping Plan* establishes an overall framework for the measures that have been adopted to reduce California's GHG emissions for various emission sources/sectors to 1990 levels by 2020.

In 2014, the ARB adopted the *First Update to the Climate Change Scoping Plan: Building on the Framework* (*First Update*).[3] The stated purpose of the *First Update* is to "highlight California's success to date in reducing its GHG emissions and lay the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050."[4] The *First Update* found that California is on track to meet the 2020 emissions reduction mandate established by AB 32. The *First Update* also noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80 percent below 1990 levels by 2050 if the State realizes the expected benefits of existing policy goals.[5]

In conjunction with the *First Update*, the ARB identified "six key focus areas comprising major components of the State's economy to evaluate and describe the larger transformative actions that will be needed to meet the State's more expansive emission reduction needs by 2050."[6] Those six areas are: (1) energy; (2) transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure); (3) agriculture; (4) water; (5) waste management; and, (6) natural and working lands. The *First Update* identifies key recommended actions for each sector that will facilitate achievement of the 2050 reduction target.

Based on the ARB's research efforts, it has a "strong sense of the mix of technologies needed to reduce emissions through 2050."[7] Those technologies include energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings and industrial machinery; decarbonizing electricity and fuel supplies; and, the rapid market penetration of efficient and clean energy technologies.

In December 2017, the ARB adopted *California's 2017 Climate Change Scoping Plan* (*Second Update*). The *Second Update* addresses the statewide emissions reduction target established

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[3] Health & Safety Code section 38561(h) requires the ARB to update the Scoping Plan every five years.
[4] ARB, First Update (May 2014), p. 4.
[5] Id. at p. 34.
[6] Id. at p. 6.
[7] Id. at p. 32.

pursuant to Senate Bill (SB) 32 and Executive Order B-30-15, as discussed below. The *Second Update* includes continuation of the Cap-and-Trade Program through 2030, and incorporates a Mobile Source Strategy (also developed by the ARB) that is intended to increase zero emission vehicle fleet penetration and establish a more stringent Low Carbon Fuel Standard target by 2030.

When discussing project-level GHG emissions reduction actions and thresholds in the *Second Update*, the ARB states "[a]chieving no net additional increase in GHG emissions, resulting in no contribution to GHG impacts, is an appropriate overall objective for new development."[8] However, the ARB also recognizes that "[a]chieving net zero … may not be feasible or appropriate for every project … and the inability of a project to mitigate its GHG emissions to net zero does not imply the project results in a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA."[9] To the extent that a project's CEQA analysis recommends mitigation to reduce GHG emissions, the ARB "recommends that lead agencies prioritize on-site design features that reduce emissions, especially from vehicle miles traveled (VMT), and direct investments in GHG reductions within the project's region that contribute potential air quality, health, and economic co-benefits locally."[10]

2015 State of the State Address

In his January 2015 inaugural address, Governor Brown identified key climate change strategy pillars, including: (1) reducing today's petroleum use in cars and trucks by up to 50 percent; (2) increasing the amount of electricity derived from renewable sources from one-third to 50 percent; (3) doubling the energy efficiency savings achieved at existing buildings and making heating fuels cleaner; (4) reducing the release of methane, black carbon, and other short-lived climate pollutants; (5) managing farm and rangelands, forests and wetlands so they can store carbon; and (6) periodically updating the State's climate adaptation strategy. As discussed below, the second and third pillars have been codified via legislation (SB 350).

[8] ARB, Second Update (November 2017), p. 101.
[9] Id. at p. 102.
[10] Id. at p. 102.

Executive Order B-30-15

In April 2015, Governor Brown signed Executive Order B-30-15, which established the following GHG emission reduction goal for California: by 2030, reduce GHG emissions to 40 percent below 1990 levels. This Executive Order also directed all state agencies with jurisdiction over GHG-emitting sources to implement measures designed to achieve the new interim 2030 goal, as well as the pre-existing, long-term 2050 goal identified in Executive Order S-3-05 (see discussion above). Additionally, the Executive Order directed the ARB to update its Scoping Plan (see discussion above) to address the 2030 goal. In November 2017, CARB published the 2017 Climate Change Scoping Plan, which offers the framework for achieving the 2030 reductions set forth in EO B-30-15 and SB 32.

2016 State of the State Address

In his January 2016 inaugural address, Governor Brown identified a statewide goal to bring per capita GHGs down to two tons per person. The origin of this goal is the Global Climate Leadership Memorandum of Understanding (Under 2 MOU), which established limiting global warming to less than two degrees Celsius as the guiding principle for the reduction of GHG emissions by 2050. The parties to the Under 2 MOU have agreed to pursue emissions reductions consistent with a trajectory of 80 to 95 percent below 1990 levels by 2050 and/or achieve a per capita annual emissions goal of less than two metric tons by 2050. The Under 2 MOU has been signed or endorsed by 127 jurisdictions (including California) that represent 27 countries and six continents.

Senate Bill 32, and Assembly Bill 197

Enacted in 2016, SB 32 codifies the 2030 emissions reduction goal of Executive Order B-30-15 by requiring the ARB to ensure that statewide GHG emissions are reduced to 40 percent below 1990 levels by 2030.

SB 32 was coupled with a companion bill: AB 197. Designed to improve the transparency of the ARB's regulatory and policy-oriented processes, AB 197 created the Joint Legislative Committee on Climate Change Policies, a committee with the responsibility to ascertain facts and make recommendations to the Legislature concerning statewide programs, policies and investments related to climate change. AB 197 also requires the ARB to make certain GHG emissions inventory data publicly available on its web site; consider the social costs of GHG emissions when adopting rules and regulations designed to achieve GHG emission reductions; and, include specified information in all Scoping Plan updates for the emission reduction measures contained therein.

3.2.2 Energy-Related Sources

Renewable Portfolio Standard

California's Renewable Portfolio Standard requires retail sellers of electric services to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020. Further, as amended in 2015 by SB 350, retail sellers of electric services must increase procurement from eligible renewable energy resources to 40 percent of total retail sales by 2024, 45 percent of total retail sales by 2027, and 50 percent of total retail sales by 2030. In 2018, SB 100 updated SB X1-2 and requires 100 percent of electric retail sales and 100 percent of electricity procured to serve state agencies be carbon-free by 2045.

Building Energy Efficiency Standards (Title 24)

Title 24, Part 6, of the California Code of Regulations regulates the design of building shells and building components. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. The California Energy Commission's (CEC) 2016 Building Energy Efficiency Standards became effective on January 1, 2017. The 2019 Building Energy Efficiency Standards became effective on January 1, 2020. According to the report prepared for the California Energy Commission (CEC) by NORESCO

(NORESCO 2018), the 2019 standards would provide first-year energy savings for energy use, energy demand, and natural gas use of 10.7%, 9%, and 1%, respectively

The California Public Utilities Commission, CEC, and the ARB also have a shared, established goal of achieving Zero Net Energy (ZNE) for new construction in California. The key policy timelines include: (1) all new residential construction in California will be ZNE by 2020, and (2) all new commercial construction in California will be ZNE by 2030.

The ZNE goal generally means that new buildings must use a combination of improved efficiency and renewable energy generation to meet 100 percent of their annual energy need, as specifically defined by the CEC:

"A ZNE Code Building is one where the value of the energy produced by on-site renewable energy resources is equal to the value of the energy consumed annually by the building, at the level of a single 'project' seeking development entitlements and building code permits, measured using the [CEC]'s Time Dependent Valuation (TDV) metric. A ZNE Code Building meets an Energy Use Intensity value designated in the Building Energy Efficiency Standards by building type and climate zone that reflect best practices for highly efficient buildings."[11]

In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) are commonly referred to as CALGreen, and establish voluntary and mandatory standards pertaining to the planning and design of sustainable site development, energy efficiency, water conservation, material conservation, and interior air quality. The mandatory standards require the following:

- Mandatory reduction in indoor water use through compliance with specified flow rates for plumbing fixtures and fittings;

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[11] CEC, 2015 Integrated Energy Policy Report (2015), p. 41.

- Mandatory reduction in outdoor water use through compliance with a local water efficient landscaping ordinance or the California Department of Water Resources' Model Water Efficient Landsca.pe Ordinance;
- Sixty five (65) percent of construction and demolition waste must be diverted from landfills;
- Mandatory inspections of energy systems to ensure optimal working efficiency;
- Inclusion of electric vehicle charging stations or designated spaces capable of supporting future charging stations; and,
- Low-pollutant emitting exterior and interior finish materials, such as paints, carpets, vinyl flooring, and particle boards.
- CALGreen is periodically amended; the most recent 2019 standards became effective on January 1, 2020.

Appliance Energy Efficiency Standards (Title 20)

The CEC periodically amends and enforces Appliance Efficiency Regulations contained in Title 20 of the California Code of Regulations. The regulations establish water and energy efficiency standards for both federally-regulated appliances and non-federally regulated appliances. The 2017 Appliance Efficiency Regulations, dated January 2017, cover 23 categories of appliances (e.g., refrigerators; plumbing fixtures; dishwashers; clothes washer and dryers; televisions) and apply to appliances offered for sale in California. The Appliance Efficiency Standards were updated in January 2019, and cover additional appliances including desktop computers, thin clients, mobile gaming systems, portable all-in-one units, notebook computers, portable electric spas, LED light bulbs, and computer monitors.

3.2.3 Mobile Sources

Pavley Standards

AB 1493 required the ARB to adopt regulations to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks for model years 2009–2016, which are often times referred to as the "Pavley I" standards. The ARB obtained a waiver from the USEPA that allows for implementation of these regulations notwithstanding possible federal preemption concerns.

Low Carbon Fuel Standard

Executive Order S-1-07 requires a 10 percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by the ARB by 2020.[12] In 2009, the ARB approved the Low Carbon Fuel Standard regulations, which became fully effective in April 2010. The regulations were subsequently re-adopted in September 2015 in response to related litigation.

Advanced Clean Cars Program

In 2012, the ARB approved the Advanced Clean Cars (ACC) program, a new emissions-control program for model years 2017–2025. (This program is sometimes referred to as "Pavley II.") The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero-emission vehicles. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer GHGs. In September 2019, the EPA withdrew the January 9, 2013 waiver of Clean Air Act preemption for California vehicle emission standards set for model years 2021 through 2025.

[12] Carbon intensity is a measure of the GHG emissions associated with the various production, distribution and use steps in the "lifecycle" of a transportation fuel.

Senate Bill 375

The Sustainable Communities and Climate Protection Act of 2008 (SB 375) coordinates land use planning, regional transportation plans, and funding priorities to reduce GHG emissions from passenger vehicles through better-integrated regional transportation, land use, and housing planning that provides easier access to jobs, services, public transit, and active transportation options.[13] SB 375 specifically requires the Metropolitan Planning Organization (MPO) relevant to the project area (here, the San Diego Association of Governments [SANDAG]) to include a Sustainable Communities Strategy in its Regional Transportation Plan that will achieve GHG emission reduction targets set by the ARB by reducing vehicle miles traveled from light-duty vehicles through the development of more compact, complete, and efficient communities.

For the area under SANDAG's jurisdiction, including the project site, the ARB adopted regional targets for reduction of mobile source-related GHG emissions by 7 percent for 2020 and by 13 percent for 2035. (These targets are expressed by the ARB as a percent change in per capita GHG emissions relative to 2005 levels.)

Pursuant to Government Code Section 65080(b)(2)(K), a Sustainable Communities Strategy does not: (i) regulate the use of land; (ii) supersede the land use authority of cities and counties; or (iii) require that a city's or county's land use policies and regulations, including those in a general plan, be consistent with it.

Zero Emission Vehicles

Zero emission vehicles (ZEVs) include plug-in electric vehicles, such as battery electric vehicles and plug-in hybrid electric vehicles, and hydrogen fuel cell electric vehicles.

[13] ARB, First Update (May 2014), pp. 49-50.

In 2012, Governor Brown issued Executive Order B-16-2012, which calls for the increased penetration of ZEVs into California's vehicle fleet in order to help California achieve a reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels by 2050. In furtherance of that statewide target for the transportation sector, the Executive Order also calls upon the ARB, CEC and the California Public Utilities Commission to establish benchmarks that will: (1) allow over 1.5 million ZEVs to be on California roadways by 2025, and (2) provide the State's residents with easy access to ZEV infrastructure.

In its *First Update*, the ARB recognized that the light-duty vehicle fleet "will need to become largely electrified by 2050 in order to meet California's emission reduction goals."[14] Accordingly, the ARB's ACC program – summarized above – requires about 15 percent of new cars sold in California in 2025 to be a plug-in hybrid, battery electric or fuel cell vehicle.[15] Further, one of the elements of SB 350 (2015) – the Clean Energy and Pollution Reduction Act –establishes a statewide policy for widespread electrification of the transportation sector, recognizing that such electrification is required for achievement of the State's 2030 and 2050 reduction targets (see Public Utilities Code section 740.12). The ARB's *Second Update* also identified, as an element of its framework to achieve the statewide 2030 emissions reduction target codified by SB 32, the objective to put 4.2 million zero emission and plug-in hybrid light-duty electric vehicles on the road by 2030.

The proliferation of ZEVs is being supported in multiple ways. For example, California is incentivizing the purchase of ZEVs through implementation of the Clean Vehicle Rebate Project (CVRP), which is administered by a non-profit organization (The Center for Sustainable Energy) for the ARB and currently subsidizes the purchase of passenger near-zero and ZEVs. Additionally, CALGreen requires new residential and non-residential construction to be pre-wired to facilitate the future installation and use of electric vehicle chargers (see Section 4.106.4 and Section 5.106.5.3 of 2016 CALGreen Standards for the residential and non-residential pre-wiring requirements, respectively). As a final example, in January 2017, San Diego Gas & Electric

[14] Id. at p. 48.
[15] Id. at p. 47.

Company (SDG&E) applied to the California Public Utilities Commission for authority to implement numerous programs intended to accelerate the electrification of the transportation sector. SDG&E's application includes, but is not limited to, proposals to: (i) install up to 90,000 charging stations at single-family homes throughout the company's service area; (ii) install charging infrastructure at various park-and-ride locations; (iii) provide incentives for electric taxis and shuttles; and, (iv) provide educational programs and financial incentives for the sale of electric vehicles.

Also of note is AB 1236 (2015), as enacted in California's Planning and Zoning Law, which requires local land use jurisdictions to approve applications for the installation of electric vehicle charging stations, as defined, through the issuance of specified permits unless there is substantial evidence in the record that the proposed installation would have a specific, adverse impact upon the public health or safety, and there is no feasible method to satisfactorily mitigate or avoid the specific, adverse impact. The bill requires local land use jurisdictions with a population of 200,000 or more residents to adopt an ordinance, by September 30, 2016, that creates an expedited and streamlined permitting process for electric vehicle charging stations, as specified.

3.2.4 Water Sources

In response to an ongoing drought in California, Executive Order B-29-15 (April 2015) set a goal of achieving a statewide reduction in potable urban water usage of 25 percent relative to water use in 2013. The Executive Order includes specific directives that set strict limits on water usage in the State, and many of the directives have since become permanent water-efficiency standards and requirements. In response to this Executive Order, the California Department of Water Resources modified and adopted a revised version of the Model Water Efficient Landscape Ordinance that, among other changes, significantly increases the requirements for landscape water use efficiency and broadens its applicability to include new development projects with smaller landscape areas.

3.2.5 Solid Waste Sources

The California Integrated Waste Management Act of 1989, as modified by AB 341, requires each jurisdiction's source reduction and recycling element to include an implementation schedule that shows: (1) diversion of 25 percent of all solid waste by January 1, 1995, through source reduction, recycling, and composting activities; (2) diversion of 50 percent of all solid waste on and after January 1, 2000; and (3) diversion of 75 percent of all solid waste on or after 2020, and annually thereafter. The California Department of Resources Recycling and Recovery (CalRecycle) is required to develop strategies, including source reduction, recycling, and composting activities, to achieve the 2020 goal.

CalRecycle published a discussion document, entitled *California's New Goal: 75 Percent Recycling,* which identified concepts that would assist the State in reaching the 75 percent goal by 2020. Subsequently, in August 2015, CalRecycle released the *AB 341 Report to the Legislature*, which identifies five priority strategies for achievement of the 75 percent goal: (1) moving organics out of landfills; (2) expanding recycling/manufacturing infrastructure; (3) exploring new approaches for State and local funding of sustainable waste management programs; (4) promoting State procurement of post-consumer recycled content products; and, (5) promoting extended producer responsibility.

3.3 Local Action

3.3.1 San Diego Forward

In October 2015, and in accordance with the requirements established by SB 375 (discussed above), SANDAG adopted *San Diego Forward: The Regional Plan*. The plan establishes a planning framework and implementation actions that increase the region's sustainability and encourage "smart growth while preserving natural resources and limiting urban sprawl."

In December 2015, the ARB accepted SANDAG's GHG emissions quantification determination for the *San Diego Forward* plan and found that it would meet the regional emission reduction targets adopted by the ARB in furtherance of SB 375 (see ARB Executive Order G-15-075). Emission reduction targets beginning October 1, 2018 for SANDAG are 15% in 2020 and 19% in 2035.

3.3.2 City of Carlsbad Requirements

In September 2015, the City of Carlsbad adopted a Climate Action Plan (CAP) that outlines actions that the City will undertake to achieve its proportional share of GHG reductions. As part of the CAP, the City developed programs designed to require new development to meet the City's GHG reduction goals.

In March 2019, the City Council adopted several ordinances aimed at reducing GHGs in new construction and alterations to existing buildings. Projects requiring building permits will be subject to these ordinances, which include the following:

- Energy Efficiency – Ord. No. CS-347
- Solar Photovoltaic Systems – Ord. No. CS-347
- Water Heating Systems using Renewable Energy (Ord. Nos. CS-347 and CS-348)
- Electric Vehicle Charging – Ord. No. CS-349
- Transportation Demand Management – Ord. No. CS-350

In January 2020, the City's Climate Action Plan (CAP) was withdrawn due to errors in VMT calculations. The City has subsequently developed an updated CAP. The updated CAP was adopted by the City in June 2020 (City of Carlsbad 2020). The CAP is designed to reduce Carlsbad's greenhouse gas (GHG) emissions and streamline environmental review of future development projects in the city in accordance with the California Environmental Quality Act (CEQA).

The CAP includes goals, policies, and actions for Carlsbad to reduce GHG emissions and combat climate change and includes:

- An inventory of Carlsbad's citywide and local government GHG emissions;
- Forecasts of future citywide and local government GHG emissions;
- A comprehensive, citywide strategy and actions to manage and reduce GHG emissions, with emission targets through 2035; and
- Actions that demonstrate Carlsbad's commitment to achieve state GHG reduction targets by creating enforceable measures, and monitoring and reporting processes to ensure targets are met.

The timeframe for the Plan extends from the date of adoption through 2035.

The forecast emissions in the CAP incorporate reductions from (1) state and federal actions, (2) General Plan land use and roadways, and (3) additional General Plan policies and actions. This chapter describes additional GHG reduction measures to close the emissions "gap" between emissions targets and forecast emissions for 2035. These are:

- Residential, commercial and industrial photovoltaic systems
- Building cogeneration
- Single-family, multi-family and commercial efficiency retrofits
- Commercial commissioning
- CALGreen building code
- Solar water heater/heat pump installation
- Efficient lighting standards
- Increased zero-emissions vehicle travel
- Transportation Demand Management (TDM)
- Citywide renewable projects
- Water delivery and conservation

Table 3 presents a summary of the forecast community emissions for 2020 and 2035 with implementation of the CAP GHG reduction measures.

Table 3
FORECAST CITY OF CARLSBAD COMMUNITY EMISSIONS WITH CAP GHG REDUCTION MEASURES AND TARGETS

Year	Business as Usual Forecast, $MTCO_2e$	Total Modified Baseline Forecast	CAP GHG Reduction Measures, $MTCO_2e$	Forecast Community Emissions with CAP GHG Reduction Measures, $MTCO_2e$	GHG Emission Targets, $MTCO_2e$	Emission Target Met?
2020	926,000	N/A	N/A	N/A	939,000	Yes
2035	956,000	588,817	142,918	445,899	472,000	Yes

Source: City of Carlsbad CAP Amendment No. 1,
https://cityadmin.carlsbadca.gov/civicax/filebank/blobdload.aspx?BlobID=45370

The City's General Plan (City of Carlsbad 2015) adopted policies to implement the Climate Action Plan, including the following:

- 9-P.1 Enforce the Climate Action Plan as the city's strategy to reduce greenhouse gas emissions.
- 9-P.2 Continue efforts to decrease use of energy and fossil fuel consumption in municipal operations, including transportation, waste reduction and recycling, and efficient building design and use

As discussed in the Transportation Impact Analysis (Linscott, Law and Greenspan 2020), the City has also adopted a Mobility Element within the General Plan. General Plan Policy 3-P.11 requires implementation of transportation demand management (TDM) and transportation systems management (TSM) strategies. The TDM is discussed in detail in the Transportation Impact Analysis.

4.0 SIGNIFICANCE THRESHOLDS

According to Appendix G of the CEQA Guidelines, the following criteria are considered to establish a significance threshold for GCC impacts:

Would the project:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

The City of Carlsbad has adopted a Climate Action Plan (CAP) that serves as an environmental review tiering document pursuant to Seciton 15183.5 of the CEQA Guidelines. According to the CAP, any discretionary project that will have GHG emissions greater than 900 MT CO2e must either demonstrate consistency with the CAP or submit a project-specific GHG analysis for review and approval. The CAP states that new projects demonstrated to emit less than 900 MT CO2e would not contribute considerably to cumulative climate change impacts, and therefore do not need to demonstrate consistency with the CAP.

All projects requiring building permits are subject to the City's ordinances discussed in Section 3 of this report, as applicable plans, policies, and regulations adopted for the purpose of reducing the emissions of greenhouse gases. Projects within the state of California are also required to be consistent with state and regional plans designed to reduce GHG emissions as described in Section 3.

To address the project's consistency with applicable plans, policies, and regulations adopted for the purpose of reducing GHG emissions, a discussion of the project's proposed features to comply with local GHG ordinances is provided in Section 5.

5.0 GREENHOUSE GAS EMISSIONS

GHG emissions associated with the Chick-fil-A project were estimated for six categories of emissions: (1) construction; (2) area sources (including landscape equipment use, routine maintenance activities); (3) energy use, including electricity and natural gas usage; (4) water consumption, use, and treatment; (5) solid waste disposal, and (6) vehicles. The analysis also includes an estimate of GHG emissions from energy use that assumes the restaurant will be constructed to 2019 Title 24 standards. The complete emissions inventory is summarized below and included in the Appendix.

5.1 Existing Conditions

As discussed above, the site is currently occupied by a 10,977-square foot commercial office building. The building is currently occupied and is in use. As it exists, the site is a source of GHG emissions.

To calculate the GHG emissions associated with the existing building, California Emissions Estimator Model (CalEEMod) Version 2016.3.2 was used. The model was run for 2022 operations to provide a basis of comparison with the project. CalEEMod was run using historial data (CalEEMod option) for energy efficiency because the building was constructed in 1972 and was not built to current Title 24 standards. According to the CalEEMod User's Guide, the historical energy use reflects Title 24 as of 2005, which likely underestimates the energy use of the existing building, and provides a conservative estimate of net GHG emissions for the project.

The carbon intensity of electricity was adjusted based on the statewide target of 60% renewable energy by 2030, assuming an operational year of 2022. CalEEMod includes energy intensity factors for utilities that are based on emission factors for electricity that are based on Power Utility Protocol reports submitted to the California Climate Action Registry (CCAR) with the year 2009 emissions reported in CalEEMod. Based on the SDG&E Provisional Closing Report (SDG&E 2012), SDG&E obtained 10.2% of its electricity from renewable sources in 2009. SDG&E would therefore be required to obtain an additional 22.8% of its electricity from renewable sources to meet the 33% RPS by 2020. As mandated by SB 350 and further updated by SB100, SDG&E would ultimately be required to meet a 60% RPS by 2030. Because the project would be operational in 2022, assuming a linear increase in renewables, the carbon intensity of SDG&E's energy was adjusted downward by 6.99% from 2020 RPS implementation, which exceed the CalEEMod default values by 22.8%.

Trip generation rates from the traffic analysis prepared for the project (Linscott, Law and Greenspan 2020) were used to calculate vehicular GHG emissions for weekday trips. CalEEMod default values for Saturday and Sunday trips were used in the analysis. According to SANDAG (SANDAG 2002), trip lengths for office buildings would be 8.8 miles. CalEEMod default values for weekday trips were overridden within the model to provide a region-specific estimate of trip lengths based on SANDAG data rather than statewide default values that are used within CalEEMod.

Table 4 presents a summary of the GHG emissions from the existing building for the year 2022, which represents the first fully operational year of the project. GHG emissions associated with the project include CO_2, CH_4, and N_2O. As discussed in Section 2.2, CO_2 has a GWP of 1, CH_4 has a GWP of 25, and N_2O has a GWP of 298. To calculate CO_2e, the emissions of each of these three gases were multiplied by their GWP, and the total adjusted emissions are summed to provide an estimate of CO_2e.

Table 4 SUMMARY OF EXISTING OPERATIONAL GREENHOUSE GAS EMISSIONS - 2022				
Emission Source	**Annual Emissions (Metric tons/year)**			
	CO_2	**CH_4**	**N_2O**	**CO_2e**
Operational Emissions				
Area Sources	2.00E-04	0.0000	0.0000	2.10E-04
Energy Use	54	0.00191	0.00057	55
Water Use	9.7	0.0640	0.00157	12
Solid Waste Management	1.0	0.0612	0.0000	3
Vehicle Emissions	168	0.0088	0.0000	168
Total	**233**	**0.1359**	**0.0021**	**237**
Global Warming Potential Factor	**1**	**25**	**298**	
CO_2 Equivalent Emissions	**233**	**3**	**1**	**237**

Note: CO_2 is defined as having a global warming potential factor of 1; therefore, CO_2 equivalent (CO_2e) emissions are calculated based on multiplication of the emissions of each GHG times its global warming potential factor. This provides an estimate of the contribution of each GHG based on the contribution of equivalent amounts of CO_2.

Because the State of California has established a target reduction of 40% below 1990 levels by 2030, net GHG emissions for 2030 were calculated with CalEEMod for the existing office building. 2030 emissions for the existing office building are presented in Table 5. The 2030 operational scenario results in a decrease in GHG emissions due to further implementation of the RPS to 60% renewables by 2030, and due to emission standards accounted for within the EMFAC2014 model that are included within CalEEMod. No other future reductions in GHG emissions are included in Table 5.

Also, because the City of Carlsbad has set forth its GHG reduction goals based on 2035, net GHG emissions for 2035 were calculated with CalEEMod for the existing office building for 2035. 2035 emissions for the existing building are presented in Table 6. For the purpose of this analysis, the only change in the emission estimates are attributable to emission standards for vehicles in 2035.

Table 5 SUMMARY OF EXISTING OPERATIONAL GREENHOUSE GAS EMISSIONS - 2030				
Emission Source	**Annual Emissions (Metric tons/year)**			
	CO_2	**CH_4**	**N_2O**	**CO_2e**
Operational Emissions				
Area Sources	2.00E-04	0.0000	0.0000	2.10E-04
Energy Use	42	0.00144	0.00049	42
Water Use	7.0	0.0639	0.00155	9
Solid Waste Management	1.0	0.0612	0.0000	3
Vehicle Emissions	134	0.0065	0.0000	134
Total	**184**	**0.1330**	**0.0020**	**188**
Global Warming Potential Factor	**1**	**25**	**298**	
CO_2 Equivalent Emissions	**184**	**3**	**1**	**188**

Note: CO_2 is defined as having a global warming potential factor of 1; therefore, CO_2 equivalent (CO_2e) emissions are calculated based on multiplication of the emissions of each GHG times its global warming potential factor. This provides an estimate of the contribution of each GHG based on the contribution of equivalent amounts of CO_2.

Table 6 SUMMARY OF EXISTING OPERATIONAL GREENHOUSE GAS EMISSIONS - 2035				
Emission Source	**Annual Emissions (Metric tons/year)**			
	CO_2	**CH_4**	**N_2O**	**CO_2e**
Operational Emissions				
Area Sources	2.00E-04	0.0000	0.0000	2.10E-04
Energy Use	42	0.00144	0.00049	42
Water Use	7.0	0.0639	0.00155	9
Solid Waste Management	1.0	0.0612	0.0000	3
Vehicle Emissions	127	0.0061	0.0000	127
Total	**177**	**0.1326**	**0.0020**	**181**
Global Warming Potential Factor	**1**	**25**	**298**	
CO_2 Equivalent Emissions	**177**	**3**	**1**	**181**

Note: CO_2 is defined as having a global warming potential factor of 1; therefore, CO_2 equivalent (CO_2e) emissions are calculated based on multiplication of the emissions of each GHG times its global warming potential factor. This provides an estimate of the contribution of each GHG based on the contribution of equivalent amounts of CO_2.

5.2 Construction Greenhouse Gas Emissions

Construction GHG emissions include emissions from demolition of the existing building and construction of the Chick-fil-A building, including use of heavy construction equipment, truck traffic, and worker trips. Emissions were calculated using CalEEMod, Version 2016.3.2, which is the newest land use emissions model developed by the California Air Pollution Control Officers Association (CAPCOA) () (CAPCOA 2016), for completed and proposed construction. Construction is anticipated to be carried out in three main phases. The first phase of construction involves demolition of the existing office building. The second phase of construction involves site preparation/grading. Grading will occur over the entire site (33,964 square feet), and will include 2,160 cubic yards of cut and 220 cubic yards of fill, with approximately 1,940 cubic yards of export for a total of 243 haul truck trips. The project includes the building and construction of site parking, including 36 parking spaces. It was assumed that following demolition and grading, construction of the building, paving, and architectural coatings application could occur concurrently during the final month of construction. It was assumed based on input from the project applicant that the entire construction project would be completed within 6 months, starting in the summer of 2021 and ending at the end of 2021. Table 7 presents the construction-related emissions associated with construction of the project.

Table 7
Construction GHG Emissions, Construction Year 2021
Total MT

Construction Phase	$MTCO_2e$
Construction	111

Per guidance from the SCAQMD (SCAQMD 2008), construction emissions are amortized over a 30-year period to account for the contribution of construction emissions over the lifetime of the project. Amortizing the emissions from construction of the project over a 30-year period would result in an annual contribution of 4 MT CO_2e. These emissions are added to operational emissions to account for the contribution of construction to GHG emissions for the lifetime of the project.

5.3 Operational Greenhouse Gas Emissions

GHG emissions associated with operation of the Chick-fil-A restaurant would include emissions from area sources, energy use, water use, solid waste disposal, and vehicles.

5.3.1 Area Sources

CalEEMod assumes that area source emissions associated with the project would include minor emissions from landscaping equipment and maintenance of the building.

5.3.2 Energy Use

As discussed above, CalEEMod assumes a baseline of 2016 Title 24 standards. To account for implementation of the 2019 Title 24 standards, Title 24 electricity use was reduced by 10.7% and Title 24 natural gas use was reduced by 1% based on reductions from the 2016 Title 24 standards (CalEEMod defaults) for electricity and natural gas usage as discussed in Section 1.2, Page 7, for Non-residential Newly Construction Buildings in *Impact Analysis – 2019 Update to the California Energy Efficiency Standards for Residential and Non-Residential Buildings* (NORESCO 2018). The Title 24 energy use within CalEEMod was adjusted based on these reductions.

An additional feature that will be included in the project design include installation of a 5 kW solar array which generates approximately 15.12 kWh/day on the building to generate electricity (based on design information from the project engineering team). This feature was taken into account in CalEEMod.

5.3.3 Water Usage

Water usage was estimated based on CalEEMod. The GHG emissions associated with water usage, conveyance, and treatment, are included within CalEEMod calculations. For the purpose of this analysis, it was assumed that the project would be equipped with low-flow fixtures and would utilize water-efficient irrigation. These measures were taken into account in CalEEMod within the "mitigation" section of the model, by selecting low-flow fixtures and assuming the CalEEMod default value for water-efficient irrigation of 6.1% reduction in water use.

5.3.4 Vehicle Emissions

The analysis of GHG emissions from vehicles is based on total vehicle miles traveled (VMT) annually. According to the traffic analysis, the restaurant would generate 700 daily trips per 1,000 square foot of building space, and the pass-by trip rate would be 25%, the diverted trip rate would be 25%, and primary trips would be 50% (Linscott, Law, and Greenspan 2020). The traffic analysis does not differentiate between vendor trips, employee trips and other trips; the fleet mix within CalEEMod accounts for this distribution. The traffic analysis does not differentiate between weekend and weekday trips; the restaurant is open Monday through Saturday and the traffic analysis trip generation rate was used for all 6 days of operation. According to SANDAG guidance (SANDAG 2002), trip lengths would be 4.7 miles. These trip generation rates were included in the analysis.

According to the traffic analysis, the project is proposing a traffic signal at its main entrance to provide a controlled pedestrian crossing to the west side of Avenida Encinas. The west side of Avenida Encinas is developed with office/employment uses. The pedestrian access would therefore encourage pedestrians from these locations to walk to the restaurant.

Based on CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures* (CAPCOA 2010), Measure SDT-1, Neighborhood/Site Enhancements, providing pedestrian network improvements such as installing a traffic signal at the main entrance to the project to allow pedestrian access from the existing employment center would reduce VMT. The range of effectiveness is from 0 to 2% reduction in VMT. In urban/suburban areas, the VMT reduction for this measure ranges from 1% (for on-site pedestrian improvements) to 2% (for pedestrian improvements on-site and connecting to off-site). While the signal would connect the project with off-site uses, for conservative purposes, it was assumed within CalEEMod that the signal would reduce VMT by 1%. Therefore, the on-site pedestrian improvements selection was used within CalEEMod under measure SDT-1.

5.3.5 Solid Waste

The disposal of solid waste produces GHG emissions from anaerobic decomposition in landfills, incineration, transportation of waste, and disposal. Solid waste generation rates were estimated from CalEEMod Model, and GHG emissions from solid waste disposal were estimated using the model, assuming landfilling of solid waste with flaring. It was assumed based on statewide solid waste reduction goals per SB 341 that solid waste generation would be reduced by 50%.

5.3.6 Operational Emissions Summary

The results of the inventory for operational emissions for the project are presented in Table 8. These include GHG emissions associated with buildings (natural gas, purchased electricity), water consumption (energy embodied in potable water) and wastewater treatment and conveyance, solid waste disposal (including landfill gas generation), and vehicles.

As shown in Table 8, the net CO_2e emissions from the project would be 712 $MTCO_2e$. This level is below the City's CAP threshold of 900 MT CO2e. The project's contribution to GHG emissions would therefore be less than significant.

Table 8 SUMMARY OF OPERATIONAL GREENHOUSE GAS EMISSIONS - 2022				
Emission Source	**Annual Emissions (MT/year)**			
	CO_2	**CH_4**	**N_2O**	**CO_2e**
Operational Emissions				
Area Sources	7.00E-04	0.0000	0.0000	7.50E-04
Energy Use	63	0.00189	0.00083	64
Water Use and Wastewater Treatment/Conveyance	3	0.0273	0.00066	4
Solid Waste Disposal	4	0.2370	0.0000	10
Vehicle Emissions	866	0.0558	0.0000	867
Amortized Construction Emissions	4	0.0000	0.0000	4
Total	**940**	**0.3220**	**0.0015**	**949**
Global Warming Potential Factor	**1**	**25**	**298**	
CO_2 Equivalent Emissions	**940**	**8**	**1**	**949**
Existing CO_2 Equivalent Emissions	**233**	**3**	**1**	**237**
Net CO_2 Equivalent Emissions	**707**	**5**	**0**	**712**

Note: CO_2 is defined as having a global warming potential factor of 1; therefore, CO_2 equivalent (CO_2e) emissions are calculated based on multiplication of the emissions of each GHG times its global warming potential factor. This provides an estimate of the contribution of each GHG based on the contribution of equivalent amounts of CO_2.

According to the City's CAP guidance, projects that are projected to emit fewer than 900 MTCO2e annually would not make a considerable contribution to the cumulative impact of climate change, and therefore, do not need to demonstrate consistency with the CAP. Regardless of this screening threshold, all projects requiring building permits are subject to the above-referenced CAP ordinances. The project is therefore required to show compliance with the ordinances. The following discussion presents the project's consistency with CAP ordinances.

The project has implemented all feasible GHG reduction measures within the project design, including the following:

- Solar Photovoltaic Systems - The project will install a 5 kW rooftop solar photovoltaic system. The solar system will provide 1.5% of the restaurant's annual electricity consumption needs based on information from the applicant's architect. Additional solar panels are not feasible due to the size of the panels and the configuration of the rooftop and building.

- Water Heating Systems using Renewable Energy - The project will utilize electric water heating, and will utilize electricity generated by the photovoltaic system to provide 40% of the electricity for service water heating.

- Electric Vehicle Charging - The project will install four Level 2, 240 V connection electric vehicle (EV) charging stations; two stations will be equipped with chargers installed and two with conduit writing to pullboxes at the spaces, such that there will be 2 EV-ready spaces and 2 EV-capable spaces. EV charging stations are open to both employees and customers. For conservative purposes, GHG reductions were not calculated for the EV charging stations.

- Transportation Demand Management – The project will prepare a Tier 1 TDM to the satisfaction of the City Engineer. A Tier 1 TDM Plan requires the following elements:
    - Existing conditions and context
    - Agreement to implement the following strategies:
        - Designation of a transportation point of contact who will attend at least one annual citywide program event/meeting
        - Promotion of at least one citywide program per year (if available)
        - Distribution of the citywide program flyer to all new hires
        - Agreement to adhere to monitoring and reporting requirements as described in Section 2.7 of the *Carlsbad TDM Handbook*

Chick-fil-A Carlsbad has reviewed the CAPCOA *Quantifying Greenhouse Gas Mitigation Measures* (CAPCOA 2010) to determine which measures could be implemented to reduce GHG emissions on site. Table 9 presents a summary of the measures and a discussion of their applicability and feasibility.

Table 9 CAPCOA Greenhouse Gas Reduction Measures Applicability to Project				
Category	**Measure Number**	**Description**	**GHG Reduction**	**Applicability to Project**
Energy	BE-1	Buildings exceed Title 24 standard by X%	0.2-5.5% for electricity, 0.7-10% for natural gas	The building is already energy efficient in both electricity and natural gas use, and additional efficiencies would not reduce GHG emissions appreciably.
	BE-4	Install energy efficient appliances	2-4% electricity for residential	N/A
	BE-5	Install energy efficient boilers	1.2-18.4% boiler emissions	No boilers proposed
	LE-1	Install higher efficiency public street and area lighting	16-40% of electricity used by outdoor lighting	LEDs will be used for outdoor lighting. No credit was taken for this feature.
	LE-3	Replace traffic lights with LED traffic lights	90% of emissions from electricity from existing traffic lights	The project is not replacing traffic lights and will use LED lighting at the new signal
	AE-1	Establish onsite renewable or carbon-neutral energy systems	Dependent on amount of energy generated	The site is proposing to use renewable energy for water heating and will install rooftop solar PV
	AE-2	Establish onsite renewable energy systems – solar power	Dependent on amount of energy generated	The project will install rooftop solar PV
	AE-3	Establish onsite renewable energy systems – wind power	Dependent on amount of energy generated	The site is not appropriate for a wind power installation
	AE-4	Utilize a combined heat and power system	0-46% of emissions associated with electricity use.	The project will utilize renewables for water heating

Table 9 CAPCOA Greenhouse Gas Reduction Measures Applicability to Project				
Category	**Measure Number**	**Description**	**GHG Reduction**	**Applicability to Project**
Transportation	LUT-1	Increase density	0.8-30% of emissions associated with vehicles	N/A
	LUT-2	Increase location efficiency	10-65% of emissions associated with vehicles	The project is a restaurant to be located in an employment center
	LUT-3	Increase diversity of urban and suburban developments (mixed use)	9-30% of emissions associated with vehicles	The project increases the diversity of the immediate vicinity by providing a restaurant in an employment center
	LUT-4	Increase destination accessibility	6.7-20% of emissions associated with vehicles	The project is located adjacent to the I-5 freeway and includes a traffic signal for pedestrian access
	LUT-5	Increase transit accessibility	0.5-24.5% of emissions associated with vehicles	N/A
	LUT-6	Integrate affordable and below market rate housing	0.04-1.2% of emissions associated with vehicles	N/A
	LUT-7	Orient project toward non-auto corridor	0.25-0.5% of emissions associated with vehicles	The project is located adjacent to the I-5 freeway and includes a traffic signal for pedestrian access
	LUT-8	Locate project near bike path/bike lane	0.625% of emissions associated with vehicles	Bike lanes exist on Avenida Encinas
	SDT-1	Provide pedestrian network improvements	0-2% of emissions	The project includes a traffic

Table 9 CAPCOA Greenhouse Gas Reduction Measures Applicability to Project				
Category	**Measure Number**	**Description**	**GHG Reduction**	**Applicability to Project**
			associated with vehicles	signal for pedestrian access
	SDT-2	Provide traffic calming measures	0.25-1% of emissions associated with vehicles	N/A
	SDT-3	Implement a neighborhood electric vehicle (NEV) network	0.5-12.7% of emissions associated with vehicles	N/A
	SDT-4	Create urban non-motorized zones	0.01-0.2% annual VMT reduction	N/A
	SDT-5	Incorporate bike lane street design (on-site)	0.05-0.14% GHG reduction	N/A
	SDT-6	Provide bike parking in non-residential projects	0.625% VMT reduction	Bike parking will be incorporated into the site plan. No additional GHG reductions were assumed.
	SDT-7	Provide bike parking with multi-unit residential projects	No reduction quantified	N/A
	SDT-8	Provide electric vehicle parking	No reduction quantified	The project will include four EV charging stations for electric vehicle parking
	SDT-9	Dedicate land for bike trails	No reduction quantified	N/A
	PDT-1	Limit parking supply	5-12.5% of emissions associated with vehicles	The project must comply with parking requirements within the City of Carlsbad Limiting the parking supply is infeasible
	PDT-2	Unbundle parking cost from property cost	2.5-13% of emissions associated with vehicles	N/A
	PDT-3	Implement market price public parking	2.8-5.5% of emissions	N/A

Table 9 **CAPCOA Greenhouse Gas Reduction Measures** **Applicability to Project**				
Category	**Measure Number**	**Description**	**GHG Reduction**	**Applicability to Project**
			associated with vehicles	
	PDT-4	Require residential area parking permits	0.08% GHG reduction	N/A
	TRT-1	Implement commute trip reduction program – voluntary	1-6.2% of emissions associated with commuting	The project will prepare a Transportation Demand Management Program to address trip reductions
	TRT-2	Implement commute trip reduction program – required implementation/monitoring	4-21% of emissions associated with commuting	The project will prepare a Transportation Demand Management Program to address trip reductions
	TRT-3	Provide ride-sharing programs	1-15% of emissions associated with commuting	The project will prepare a Transportation Demand Management Program to address trip reductions
	TRT-4	Implement subsidized or discounted transit program	0.3-20% of emissions associated with commuting	The project is located along bus routes 444 and 445 within the BREEZE bus system. Since the majority of trips are associated with customers and not employees, no credit was taken for proximity to bus routes
	TRT-6	Encourage telecommuting and alternative work schedules	0.7-5.5% of emissions associated with commuting	The project is a restaurant and cannot be operated with telecommuting

Table 9 CAPCOA Greenhouse Gas Reduction Measures Applicability to Project				
Category	**Measure Number**	**Description**	**GHG Reduction**	**Applicability to Project**
	TRT-7	Implement commute trip reduction marketing	0.8-4.0% of emissions associated with commuting	The project will prepare a Transportation Demand Management Program to address trip reductions
	TRT-9	Implement car-sharing programs	0.4-0.7% of emissions associated with vehicles	The project will prepare a Transportation Demand Management Program to address trip reductions
	TRT-10	Implement a school pool program	7.2-15.8% of emissions associated with school trips	N/A
	TRT-11	Provide employer-sponsored vanpool/shuttle	0.3-13.4% of emissions associated with commuting	N/A
	TRT-13	Implement school bus program	38-63% of emissions associated with school trips	N/A
	TRT-14	Price workplace parking	0.1-19.7% of emissions associated with commuting	N/A
	TRT-15	Implement employee parking “cash-out”	0.6-7.7% of emissions associated with commuting	N/A
	VT-1	Electrify loading docks and/or require idling reduction systems	No reduction quantified	The project is not designed with loading docks as it is not a warehousing or distribution center. Idling of construction vehicles will be reduced to five minutes in accordance with

Table 9
CAPCOA Greenhouse Gas Reduction Measures
Applicability to Project

Category	Measure Number	Description	GHG Reduction	Applicability to Project
				ARB idling restrictions No signage is proposed but construction managers will monitor activity.
	VT-2	Utilize alternative fueled vehicles	No reduction quantified	Because the project does not own vehicles, this measure is not applicable.
	VT-3	Use electric or hybrid vehicles	0.4-20.3% GHG reduction	The project will include four EV charging stations for electric vehicle parking
Water	WSW-1	Use reclaimed water	Up to 81% of emissions associated with water use	It is not feasible to use reclaimed water at the site due to the nature of the project as a restaurant, the small size of the site and the lack of extensive landscaping.
	WSW-2	Use gray water	Up to 100% of emissions associated with outdoor water use	It is not feasible to use gray water at the site due to the small size of the site and the lack of extensive landscaping.
	WSW-3	Use locally sourced water supply	11-75% of emissions associated with water use	N/A
	WUW-1	Install low-flow water fixtures	20% of emissions associated with indoor water use	The project will install low-flow fixtures
	WUW-2	Adopt a water conservation strategy	Varies depending on system	The site will include drip irrigation and drought-tolerant landscaping. No additional credit

Table 9 CAPCOA Greenhouse Gas Reduction Measures Applicability to Project				
Category	**Measure Number**	**Description**	**GHG Reduction**	**Applicability to Project**
				was taken for this measure.
	WUW-3	Design water efficient landscapes	0-70% of emissions associated with outdoor water use	The landscaping will be water efficient. No additional credit was taken for this measure.
	WUW-4	Use water-efficient landscape irrigation systems	6.1% of emissions associated with outdoor water use	The project will use water-efficient landscape irrigation systems
	WUW-5	Reduce turf in landscapes and lawns	Varies	No turf is proposed.
	WUW-6	Plant native or drought resistant trees and vegetation	No reduction quantified	Drought tolerant landscaping has been included in the plan.
Area Landscaping	A-1	Prohibit gas powered landscape equipment	Varies	The landscaping crew will use battery-powered landscaping equipment.
	A-2	Implement lawnmower exchange program	No reduction quantified	N/A
	A-3	Electric yard equipment compatibility	No reduction quantified	N/A
Solid Waste	SW-1	Institute or extend recycling and composting services	Varies	The project will include recycling bins to meet statewide requirements for solid waste reduction
	SW-2	Recycle demolished construction material	Varies	65% of demolished construction material will be recycled per City / CALGreen requirements.
Vegetation	V-1	Urban tree planting	Varies	The project does not have the ability to individually

Table 9 CAPCOA Greenhouse Gas Reduction Measures Applicability to Project				
Category	**Measure Number**	**Description**	**GHG Reduction**	**Applicability to Project**
				plant trees to the extent that they would reduce GHG emissions substantially
	V-2	Create new vegetated open space	Varies	N/A
Construction	C-1	Use alternative fuels for construction equipment	0-22% reduction in GHG emissions	Due to the small size of the project and the limited duration and extent of construction, this measure is not feasible and would not result in substantial GHG emission reductions.
	C-2	Use electric and hybrid construction equipment	2.5-80% reduction in GHG emissions	Due to the small size of the project and the limited duration and extent of construction, this measure is not feasible and would not result in substantial GHG emission reductions.
	C-3	Limit construction equipment idling beyond regulation requirements	Varies	Construction equipment idling will be limited on site. No credit was taken for this measure.
	C-4	Institute a heavy-duty off-road vehicle plan	No reduction quantified	Due to the small size of the project and the limited duration and extent of construction, this measure is not feasible and would not result in substantial GHG emission reductions.

Table 9 CAPCOA Greenhouse Gas Reduction Measures Applicability to Project				
Category	**Measure Number**	**Description**	**GHG Reduction**	**Applicability to Project**
	C-5	Implement a construction vehicle inventory tracking system	No reduction quantified	A construction vehicle inventory tracking system will be implemented during construction. No credit was taken for this measure.
Miscellaneous	Misc-1	Establish a carbon sequestration project	Varies	The project will purchase offsets as mitigation which may include carbon sequestration programs
	Misc-2	Establish off-site mitigation	Varies	The project will provide offsets as mitigation
	Misc-3	Use local and sustainable building materials	Varies	Concrete from Coronado Stone will be used in the construction of the building. This material is sourced locally and contains recycled materials.
	Misc-4	Require best management practices in agriculture and animal operations	No reduction quantified	N/A
	Misc-5	Require environmentally responsible purchasing	Varies	The project has proposed a steel instead of wood trellis and complies with CALGreen requirements. While steel production results in higher GHG emissions, Structural steel contains over 90% recycled content and does

Table 9 CAPCOA Greenhouse Gas Reduction Measures Applicability to Project				
Category	**Measure Number**	**Description**	**GHG Reduction**	**Applicability to Project**
				not require continued maintenance as does wood, thus reducing GHG emissions from continued maintenance.
	Misc-6	Implement an innovative strategy for GHG mitigation	Varies	The project will provide offsets as mitigation which may include innovative GHG reduction strategies

5.3.7 Operational Emissions Summary – Future Years

Because the State of California has established a target reduction of 40% below 1990 levels by 2030, net GHG emissions for 2030 were calculated with CalEEMod for the project. Net 2030 emissions for the project are presented in Table 10. The 2030 operational scenario results in a decrease in GHG emissions due to further implementation of the RPS to 60% renewables by 2030, and due to emission standards accounted for within the EMFAC2014 model that are included within CalEEMod. No other future reductions in GHG emissions are included in Table 10.

Also, because the City of Carlsbad has set forth its GHG reduction goals based on 2035, net GHG emissions for 2035 were calculated with CalEEMod for the project for 2035. Net 2035 emissions for the project are presented in Table 11. For the purpose of this analysis, the only change in the emission estimates are attributable to emission standards for vehicles in 2035.

Table 10 SUMMARY OF OPERATIONAL GREENHOUSE GAS EMISSIONS - 2030				
Emission Source	**Annual Emissions (MT/year)**			
	CO_2	**CH_4**	**N_2O**	**CO_2e**
Operational Emissions				
Area Sources	7.00E-04	0.0000	0.0000	7.50E-04
Energy Use	54	0.00153	0.00077	54
Water Use and Wastewater Treatment/Conveyance	2	0.0272	0.00066	3
Solid Waste Disposal	4	0.2370	0.0000	10
Vehicle Emissions	699	0.0399	0.0000	700
Amortized Construction Emissions	4	0.0000	0.0000	4
Total	**763**	**0.3056**	**0.0014**	**771**
Global Warming Potential Factor	**1**	**25**	**298**	
CO_2 Equivalent Emissions	**763**	**8**	**0**	**771**
Existing CO_2 Equivalent Emissions	**184**	**3**	**1**	**188**
Net CO_2 Equivalent Emissions	**579**	**5**	**0**	**583**

Note: CO_2 is defined as having a global warming potential factor of 1; therefore, CO_2 equivalent (CO_2e) emissions are calculated based on multiplication of the emissions of each GHG times its global warming potential factor. This provides an estimate of the contribution of each GHG based on the contribution of equivalent amounts of CO_2.

Table 11 SUMMARY OF OPERATIONAL GREENHOUSE GAS EMISSIONS - 2035				
Emission Source	**Annual Emissions (MT/year)**			
	CO_2	**CH_4**	**N_2O**	**CO_2e**
Operational Emissions				
Area Sources	7.00E-04	0.0000	0.0000	7.50E-04
Energy Use	54	0.00153	0.00077	54
Water Use and Wastewater Treatment/Conveyance	2	0.0272	0.00066	3
Solid Waste Disposal	4	0.2370	0.0000	10
Vehicle Emissions	664	0.0373	0.0000	664
Amortized Construction Emissions	4	0.0000	0.0000	4
Total	**728**	**0.3030**	**0.0014**	**736**
Global Warming Potential Factor	**1**	**25**	**298**	
CO_2 Equivalent Emissions	**728**	**8**	**0**	**736**
Existing CO_2 Equivalent Emissions	**177**	**3**	**1**	**181**
Net CO_2 Equivalent Emissions	**551**	**5**	**0**	**555**

Note: CO_2 is defined as having a global warming potential factor of 1; therefore, CO_2 equivalent (CO_2e) emissions are calculated based on multiplication of the emissions of each GHG times its global warming potential factor. This provides an estimate of the contribution of each GHG based on the contribution of equivalent amounts of CO_2.

6.0 CONSISTENCY WITH APPLICABLE PLANS, POLICIES, AND REGULATIONS

6.1 California GHG Scoping Plan

The project would be consistent with the 2017 Scoping Plan as it would be consistent with the policies of the Plan, as discussed below:

- **Ensure the State achieves the 2030 Target** By implementing GHG reduction measures in its project design, the project will be consistent with the State of California and the City of Carlsbad's goals of reducing emissions by 40% below 1990 levels in 2030.
- **Provide Air Quality Co-Benefits** The project would provide co-benefits to air quality through its GHG reduction measures, including meeting CALGreen requirements, installation of a solar photovoltaic system, use of renewable energy for water heating, and installation of EV charging stations on site.
- **Reduce GHG Emissions in the Electricity Sector** The project would install a solar photovoltaic system and would use renewable energy for water heating, thus reducing its grid-based electricity demand.
- **Mobile Source Strategy** The project would install EV charging stations which would encourage the use of EVs. Furthermore, the project would provide pedestrian access through installation of a traffic signal between the existing employment uses and the restaurant.
- **Waste Reduction** The project would be consistent with statewide solid waste reduction goals and include waste recycling.

6.2 San Diego Regional Plan

The San Diego Regional Plan does not provide specific regulations or requirements that apply to restaurant uses. The project would not conflict with the plan and would provide an additional contribution to mixed uses within the immediate vicinity.

6.3 City of Carlsbad GHG Requirements

The project would be consistent with the City's CAP because it would be consistent with the CAP policies designed to reduce GHG emissions. The CAP measures have been adopted by the City as ordinances. The project will be consistent with the applicable ordinances, as discussed below:

- **Energy Efficiency – Ord. No. CS-347** The project will be constructed to CALGreen standards to include Appendix A5 – Nonresidential Voluntary Measures, Energy Efficiency. These measures include installation of the solar photovoltaic system and water heating using renewable energy as discussed below.

- **Solar Photovoltaic Systems – Ord. No. CS-347** The project will install a 5 kW rooftop solar photovoltaic system as required under Ordinance CS-347 Section 6, California Energy Code 120.10(a)(2). Additional solar panels are not feasible due to the size of the panels and the configuration of the rooftop and building.

- **Water Heating Systems using Renewable Energy (Ord. Nos. CS-347 and CS-348)** The project will utilize electric water heating, and will utilize electricity generated by the photovoltaic system to provide 40% of the electricity for service water heating as required under Ordinance CS-347 Section 7, California Energy Code 120.11.

- **Electric Vehicle Charging – Ord. No. CS-349** The project will install four electric vehicle (EV) charging stations as required under Ordinance CS-349 Section 6, as specified under CALGreen Code 5.106.5.3.3. The EV charging stations will be available for both employees and visitors.

- **Transportation Demand Management – Ord. No. CS-350** The TDM ordinance requires new nonresidential development where the employees generate a minimum of 110 average daily trips (ADT) to develop a Transportation Demand Management plan. According to the traffic analysis, the project proposes to add 3,427 SF of fast-food restaurant commercial development with a maximum of 10-15 employees per shift, which will not exceed the 110 employee ADT threshold. However, according to the traffic analysis, the project is still required to prepare a TDM plan on the basis of adding in excess of 110 total ADT to the exempt segment of Palomar Airport Road. To meet the requirements of the Mobility Element policy 3-P.11 , the Project shall prepare a Tier 1 TDM to the satisfaction of the City Engineer. A Tier 1 TDM Plan requires the following elements:

- Existing conditions and context
- Agreement to implement the following strategies:
  - Designation of a transportation point of contact who will attend at least one annual citywide program event/meeting
  - Promotion of at least one citywide program per year (if available)
  - Distribution of the citywide program flyer to all new hires
  - Agreement to adhere to monitoring and reporting requirements as described in Section 2.7 of the *Carlsbad TDM Handbook*

Furthermore, the projet's net emission increases are below the CAP threshold of 900 $MTCO_2e$. The project would therefore not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

7.0 CONCLUSIONS

Emissions of GHGs were calculated for both the existing office building and the proposed Chick-fil-A restaurant. The project would result in a net increase of 712 MT CO_2e for construction and operation. The project's emissions would be below the CAP significance threshold of 900 MTCO2e. Emissions are therefore less than significant.

The project would be consistent with the State of California's 2017 Scoping Plan, the San Diego Regional Plan, and the City's CAP and plans, policies, and regulations adopted for the purpose of reducing GHG emissions. The project's GHG impacts are therefore less than significant.

8.0 REFERENCES

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Appendix A

Greenhouse Gas Emission Calculations

Chick fil A Carlsbad

San Diego Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Fast Food Restaurant w/o Drive Thru	3.43	1000sqft	0.08	3,430.00	0
Parking Lot	36.00	Space	0.32	14,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2022
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	517.31	**CH4 Intensity (lb/MWhr)**	0.021	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Implementation of RPS

Land Use - Project description

Construction Phase - Project information

Grading -

Demolition -

Architectural Coating - Rule 67.0.1 coatings

Vehicle Trips - Traffic information

Area Coating - Rule 67.0.1 coatings

Energy Use - Title 24 as of 2019

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Energy Mitigation -

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	100
tblAreaCoating	Area_EF_Nonresidential_Interior	250	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	5.00	23.00
tblConstructionPhase	NumDays	100.00	88.00
tblConstructionPhase	NumDays	10.00	12.00
tblConstructionPhase	NumDays	2.00	32.00
tblConstructionPhase	NumDays	5.00	45.00
tblConstructionPhase	PhaseEndDate	12/30/2021	12/31/2021
tblConstructionPhase	PhaseEndDate	12/16/2021	12/31/2021
tblConstructionPhase	PhaseEndDate	7/26/2021	7/16/2021
tblConstructionPhase	PhaseEndDate	7/29/2021	8/31/2021
tblConstructionPhase	PhaseEndDate	12/23/2021	12/31/2021
tblConstructionPhase	PhaseStartDate	12/24/2021	12/1/2021
tblConstructionPhase	PhaseStartDate	7/30/2021	9/1/2021
tblConstructionPhase	PhaseStartDate	7/13/2021	7/1/2021
tblConstructionPhase	PhaseStartDate	7/28/2021	7/17/2021
tblConstructionPhase	PhaseStartDate	12/17/2021	11/1/2021
tblEnergyUse	T24E	8.23	7.35
tblEnergyUse	T24NG	35.92	35.56
tblGrading	MaterialExported	0.00	1,940.00

tblProjectCharacteristics	CH4IntensityFactor	0.029	0.021
tblProjectCharacteristics	CO2IntensityFactor	720.49	517.31
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblVehicleTrips	CC_TL	7.30	4.70
tblVehicleTrips	CC_TL	7.30	4.70
tblVehicleTrips	CNW_TL	7.30	4.70
tblVehicleTrips	CNW_TL	7.30	4.70
tblVehicleTrips	CW_TL	9.50	4.70
tblVehicleTrips	CW_TL	9.50	4.70
tblVehicleTrips	DV_TP	37.00	25.00
tblVehicleTrips	PB_TP	12.00	25.00
tblVehicleTrips	PR_TP	51.00	50.00
tblVehicleTrips	ST_TR	696.00	700.00
tblVehicleTrips	SU_TR	500.00	0.00
tblVehicleTrips	WD_TR	716.00	700.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0903	0.7271	0.7016	1.2500e-003	0.0280	0.0379	0.0659	0.0103	0.0353	0.0456	0.0000	110.2890	110.2890	0.0261	0.0000	110.9426
Maximum	**0.0903**	**0.7271**	**0.7016**	**1.2500e-003**	**0.0280**	**0.0379**	**0.0659**	**0.0103**	**0.0353**	**0.0456**	**0.0000**	**110.2890**	**110.2890**	**0.0261**	**0.0000**	**110.9426**

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					
2021	0.0903	0.7271	0.7016	1.2500e-003	0.0174	0.0379	0.0552	5.7400e-003	0.0353	0.0411	0.0000	110.2889	110.2889	0.0261	0.0000	110.9425
Maximum	**0.0903**	**0.7271**	**0.7016**	**1.2500e-003**	**0.0174**	**0.0379**	**0.0552**	**5.7400e-003**	**0.0353**	**0.0411**	**0.0000**	**110.2889**	**110.2889**	**0.0261**	**0.0000**	**110.9425**

	ROG	NOx	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**	**38.10**	**0.00**	**16.21**	**44.16**	**0.00**	**9.96**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**7-13-2021**	**9-30-2021**	0.2700	0.2700
		Highest	0.2700	0.2700

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	0.0159	0.0000	3.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-004	7.0000e-004	0.0000	0.0000	7.5000e-004
Energy	3.2200e-003	0.0293	0.0246	1.8000e-004		2.2200e-003	2.2200e-003		2.2200e-003	2.2200e-003	0.0000	63.4740	63.4740	1.8900e-003	8.3000e-004	63.7682
Mobile	0.4201	1.6155	3.4686	9.4500e-003	0.7534	8.5800e-003	0.7620	0.2018	8.0000e-003	0.2098	0.0000	873.6712	873.6712	0.0562	0.0000	875.0757
Waste						0.0000	0.0000		0.0000	0.0000	8.0202	0.0000	8.0202	0.4740	0.0000	19.8696

Water						0.0000	0.0000		0.0000	0.0000	0.3303	3.3542	3.6845	0.0341	8.3000e-004	4.7825
Total	**0.4392**	**1.6448**	**3.4936**	**9.6300e-003**	**0.7534**	**0.0108**	**0.7642**	**0.2018**	**0.0102**	**0.2120**	**8.3505**	**940.5001**	**948.8506**	**0.5661**	**1.6600e-003**	**963.4968**

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	0.0159	0.0000	3.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-004	7.0000e-004	0.0000	0.0000	7.5000e-004
Energy	3.2200e-003	0.0293	0.0246	1.8000e-004		2.2200e-003	2.2200e-003		2.2200e-003	2.2200e-003	0.0000	63.4728	63.4728	1.8900e-003	8.3000e-004	63.7671
Mobile	0.4192	1.6103	3.4500	9.3700e-003	0.7459	8.5200e-003	0.7544	0.1997	7.9500e-003	0.2077	0.0000	866.2853	866.2853	0.0559	0.0000	867.6816
Waste						0.0000	0.0000		0.0000	0.0000	4.0101	0.0000	4.0101	0.2370	0.0000	9.9348
Water						0.0000	0.0000		0.0000	0.0000	0.2642	2.7180	2.9823	0.0273	6.6000e-004	3.8608
Total	**0.4383**	**1.6395**	**3.4749**	**9.5500e-003**	**0.7459**	**0.0107**	**0.7566**	**0.1997**	**0.0102**	**0.2099**	**4.2743**	**932.4768**	**936.7512**	**0.3220**	**1.4900e-003**	**945.2450**

	ROG	**NOx**	**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	**0.20**	**0.32**	**0.53**	**0.83**	**1.00**	**0.56**	**0.99**	**1.00**	**0.49**	**0.98**	**48.81**	**0.85**	**1.28**	**43.12**	**10.24**	**1.89**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/1/2021	7/16/2021	5	12	
2	Grading	Grading	7/17/2021	8/31/2021	5	32	
3	Building Construction	Building Construction	9/1/2021	12/31/2021	5	88	

4	Paving	Paving	11/1/2021	12/31/2021	5	45	
5	Architectural Coating	Architectural Coating	12/1/2021	12/31/2021	5	23	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.32

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 5,145; Non-Residential Outdoor: 1,715; Striped Parking Area: 864

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	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	50.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	192.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

Building Construction	5	7.00	3.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2021

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					5.4700e-003	0.0000	5.4700e-003	8.3000e-004	0.0000	8.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7800e-003	0.0435	0.0454	7.0000e-005		2.4400e-003	2.4400e-003		2.3300e-003	2.3300e-003	0.0000	6.2456	6.2456	1.1600e-003	0.0000	6.2747
Total	**4.7800e-003**	**0.0435**	**0.0454**	**7.0000e-005**	**5.4700e-003**	**2.4400e-003**	**7.9100e-003**	**8.3000e-004**	**2.3300e-003**	**3.1600e-003**	**0.0000**	**6.2456**	**6.2456**	**1.1600e-003**	**0.0000**	**6.2747**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.9000e-004	6.5300e-003	1.6100e-003	2.0000e-005	4.3000e-004	2.0000e-005	4.5000e-004	1.2000e-004	2.0000e-005	1.4000e-004	0.0000	1.9041	1.9041	1.7000e-004	0.0000	1.9084
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	2.1000e-004	1.5000e-004	1.5000e-003	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4203	0.4203	1.0000e-005	0.0000	0.4206
Total	**4.0000e-004**	**6.6800e-003**	**3.1100e-003**	**2.0000e-005**	**9.1000e-004**	**2.0000e-005**	**9.3000e-004**	**2.5000e-004**	**2.0000e-005**	**2.7000e-004**	**0.0000**	**2.3244**	**2.3244**	**1.8000e-004**	**0.0000**	**2.3290**

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					2.1300e-003	0.0000	2.1300e-003	3.2000e-004	0.0000	3.2000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7800e-003	0.0435	0.0454	7.0000e-005		2.4400e-003	2.4400e-003		2.3300e-003	2.3300e-003	0.0000	6.2456	6.2456	1.1600e-003	0.0000	6.2747
Total	**4.7800e-003**	**0.0435**	**0.0454**	**7.0000e-005**	**2.1300e-003**	**2.4400e-003**	**4.5700e-003**	**3.2000e-004**	**2.3300e-003**	**2.6500e-003**	**0.0000**	**6.2456**	**6.2456**	**1.1600e-003**	**0.0000**	**6.2747**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.9000e-004	6.5300e-003	1.6100e-003	2.0000e-005	4.3000e-004	2.0000e-005	4.5000e-004	1.2000e-004	2.0000e-005	1.4000e-004	0.0000	1.9041	1.9041	1.7000e-004	0.0000	1.9084
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.5000e-004	1.5000e-003	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4203	0.4203	1.0000e-005	0.0000	0.4206
Total	**4.0000e-004**	**6.6800e-003**	**3.1100e-003**	**2.0000e-005**	**9.1000e-004**	**2.0000e-005**	**9.3000e-004**	**2.5000e-004**	**2.0000e-005**	**2.7000e-004**	**0.0000**	**2.3244**	**2.3244**	**1.8000e-004**	**0.0000**	**2.3290**

3.3 Grading - 2021

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					0.0120	0.0000	0.0120	6.6200e-003	0.0000	6.6200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0127	0.1161	0.1211	1.9000e-004		6.5200e-003	6.5200e-003		6.2200e-003	6.2200e-003	0.0000	16.6550	16.6550	3.1000e-003	0.0000	16.7326
Total	**0.0127**	**0.1161**	**0.1211**	**1.9000e-004**	**0.0120**	**6.5200e-003**	**0.0186**	**6.6200e-003**	**6.2200e-003**	**0.0128**	**0.0000**	**16.6550**	**16.6550**	**3.1000e-003**	**0.0000**	**16.7326**

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	7.2000e-004	0.0251	6.1800e-003	7.0000e-005	1.6400e-003	8.0000e-005	1.7200e-003	4.5000e-004	7.0000e-005	5.2000e-004	0.0000	7.3116	7.3116	6.6000e-004	0.0000	7.3281
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	4.0000e-004	4.0000e-003	1.0000e-005	1.2800e-003	1.0000e-005	1.2900e-003	3.4000e-004	1.0000e-005	3.5000e-004	0.0000	1.1208	1.1208	3.0000e-005	0.0000	1.1216
Total	**1.2800e-003**	**0.0255**	**0.0102**	**8.0000e-005**	**2.9200e-003**	**9.0000e-005**	**3.0100e-003**	**7.9000e-004**	**8.0000e-005**	**8.7000e-004**	**0.0000**	**8.4324**	**8.4324**	**6.9000e-004**	**0.0000**	**8.4497**

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					4.7000e-003	0.0000	4.7000e-003	2.5800e-003	0.0000	2.5800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0127	0.1161	0.1211	1.9000e-004		6.5200e-003	6.5200e-003		6.2200e-003	6.2200e-003	0.0000	16.6549	16.6549	3.1000e-003	0.0000	16.7325
Total	**0.0127**	**0.1161**	**0.1211**	**1.9000e-004**	**4.7000e-003**	**6.5200e-003**	**0.0112**	**2.5800e-003**	**6.2200e-003**	**8.8000e-003**	**0.0000**	**16.6549**	**16.6549**	**3.1000e-003**	**0.0000**	**16.7325**

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	7.2000e-004	0.0251	6.1800e-003	7.0000e-005	1.6400e-003	8.0000e-005	1.7200e-003	4.5000e-004	7.0000e-005	5.2000e-004	0.0000	7.3116	7.3116	6.6000e-004	0.0000	7.3281
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	4.0000e-004	4.0000e-003	1.0000e-005	1.2800e-003	1.0000e-005	1.2900e-003	3.4000e-004	1.0000e-005	3.5000e-004	0.0000	1.1208	1.1208	3.0000e-005	0.0000	1.1216
Total	**1.2800e-003**	**0.0255**	**0.0102**	**8.0000e-005**	**2.9200e-003**	**9.0000e-005**	**3.0100e-003**	**7.9000e-004**	**8.0000e-005**	**8.7000e-004**	**0.0000**	**8.4324**	**8.4324**	**6.9000e-004**	**0.0000**	**8.4497**

3.4 Building Construction - 2021

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	0.0341	0.3513	0.3196	5.0000e-004		0.0197	0.0197		0.0181	0.0181	0.0000	44.0361	44.0361	0.0142	0.0000	44.3922
Total	**0.0341**	**0.3513**	**0.3196**	**5.0000e-004**		**0.0197**	**0.0197**		**0.0181**	**0.0181**	**0.0000**	**44.0361**	**44.0361**	**0.0142**	**0.0000**	**44.3922**

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	4.1000e-004	0.0136	3.6200e-003	4.0000e-005	8.8000e-004	3.0000e-005	9.0000e-004	2.5000e-004	3.0000e-005	2.8000e-004	0.0000	3.4510	3.4510	2.6000e-004	0.0000	3.4574
Worker	1.0700e-003	7.6000e-004	7.6900e-003	2.0000e-005	2.4700e-003	2.0000e-005	2.4900e-003	6.6000e-004	2.0000e-005	6.7000e-004	0.0000	2.1576	2.1576	6.0000e-005	0.0000	2.1592
Total	**1.4800e-003**	**0.0143**	**0.0113**	**6.0000e-005**	**3.3500e-003**	**5.0000e-005**	**3.3900e-003**	**9.1000e-004**	**5.0000e-005**	**9.5000e-004**	**0.0000**	**5.6086**	**5.6086**	**3.2000e-004**	**0.0000**	**5.6166**

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	0.0341	0.3513	0.3196	5.0000e-004		0.0197	0.0197		0.0181	0.0181	0.0000	44.0361	44.0361	0.0142	0.0000	44.3921
Total	**0.0341**	**0.3513**	**0.3196**	**5.0000e-004**		**0.0197**	**0.0197**		**0.0181**	**0.0181**	**0.0000**	**44.0361**	**44.0361**	**0.0142**	**0.0000**	**44.3921**

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	4.1000e-004	0.0136	3.6200e-003	4.0000e-005	8.8000e-004	3.0000e-005	9.0000e-004	2.5000e-004	3.0000e-005	2.8000e-004	0.0000	3.4510	3.4510	2.6000e-004	0.0000	3.4574
Worker	1.0700e-003	7.6000e-004	7.6900e-003	2.0000e-005	2.4700e-003	2.0000e-005	2.4900e-003	6.6000e-004	2.0000e-005	6.7000e-004	0.0000	2.1576	2.1576	6.0000e-005	0.0000	2.1592
Total	**1.4800e-003**	**0.0143**	**0.0113**	**6.0000e-005**	**3.3500e-003**	**5.0000e-005**	**3.3900e-003**	**9.1000e-004**	**5.0000e-005**	**9.5000e-004**	**0.0000**	**5.6086**	**5.6086**	**3.2000e-004**	**0.0000**	**5.6166**

3.5 Paving - 2021

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	0.0162	0.1512	0.1595	2.5000e-004		7.9500e-003	7.9500e-003		7.3900e-003	7.3900e-003	0.0000	21.1331	21.1331	6.1600e-003	0.0000	21.2869
Paving	4.2000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0167**	**0.1512**	**0.1595**	**2.5000e-004**		**7.9500e-003**	**7.9500e-003**		**7.3900e-003**	**7.3900e-003**	**0.0000**	**21.1331**	**21.1331**	**6.1600e-003**	**0.0000**	**21.2869**

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	1.4100e-003	1.0000e-003	0.0101	3.0000e-005	3.2500e-003	2.0000e-005	3.2700e-003	8.6000e-004	2.0000e-005	8.8000e-004	0.0000	2.8371	2.8371	8.0000e-005	0.0000	2.8392

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Total	**1.4100e-003**	**1.0000e-003**	**0.0101**	**3.0000e-005**	**3.2500e-003**	**2.0000e-005**	**3.2700e-003**	**8.6000e-004**	**2.0000e-005**	**8.8000e-004**	**0.0000**	**2.8371**	**2.8371**	**8.0000e-005**	**0.0000**	**2.8392**

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	0.0162	0.1512	0.1595	2.5000e-004		7.9500e-003	7.9500e-003		7.3900e-003	7.3900e-003	0.0000	21.1330	21.1330	6.1600e-003	0.0000	21.2869
Paving	4.2000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0167**	**0.1512**	**0.1595**	**2.5000e-004**		**7.9500e-003**	**7.9500e-003**		**7.3900e-003**	**7.3900e-003**	**0.0000**	**21.1330**	**21.1330**	**6.1600e-003**	**0.0000**	**21.2869**

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	1.4100e-003	1.0000e-003	0.0101	3.0000e-005	3.2500e-003	2.0000e-005	3.2700e-003	8.6000e-004	2.0000e-005	8.8000e-004	0.0000	2.8371	2.8371	8.0000e-005	0.0000	2.8392
Total	**1.4100e-003**	**1.0000e-003**	**0.0101**	**3.0000e-005**	**3.2500e-003**	**2.0000e-005**	**3.2700e-003**	**8.6000e-004**	**2.0000e-005**	**8.8000e-004**	**0.0000**	**2.8371**	**2.8371**	**8.0000e-005**	**0.0000**	**2.8392**

3.6 Architectural Coating - 2021

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	0.0149					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.5200e-003	0.0176	0.0209	3.0000e-005		1.0800e-003	1.0800e-003		1.0800e-003	1.0800e-003	0.0000	2.9362	2.9362	2.0000e-004	0.0000	2.9413
Total	**0.0175**	**0.0176**	**0.0209**	**3.0000e-005**		**1.0800e-003**	**1.0800e-003**		**1.0800e-003**	**1.0800e-003**	**0.0000**	**2.9362**	**2.9362**	**2.0000e-004**	**0.0000**	**2.9413**

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	4.0000e-005	3.0000e-005	2.9000e-004	0.0000	9.0000e-005	0.0000	9.0000e-005	2.0000e-005	0.0000	3.0000e-005	0.0000	0.0806	0.0806	0.0000	0.0000	0.0806
Total	**4.0000e-005**	**3.0000e-005**	**2.9000e-004**	**0.0000**	**9.0000e-005**	**0.0000**	**9.0000e-005**	**2.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0806**	**0.0806**	**0.0000**	**0.0000**	**0.0806**

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	0.0149					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.5200e-003	0.0176	0.0209	3.0000e-005		1.0800e-003	1.0800e-003		1.0800e-003	1.0800e-003	0.0000	2.9362	2.9362	2.0000e-004	0.0000	2.9413
Total	**0.0175**	**0.0176**	**0.0209**	**3.0000e-005**		**1.0800e-003**	**1.0800e-003**		**1.0800e-003**	**1.0800e-003**	**0.0000**	**2.9362**	**2.9362**	**2.0000e-004**	**0.0000**	**2.9413**

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	4.0000e-005	3.0000e-005	2.9000e-004	0.0000	9.0000e-005	0.0000	9.0000e-005	2.0000e-005	0.0000	3.0000e-005	0.0000	0.0806	0.0806	0.0000	0.0000	0.0806
Total	**4.0000e-005**	**3.0000e-005**	**2.9000e-004**	**0.0000**	**9.0000e-005**	**0.0000**	**9.0000e-005**	**2.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0806**	**0.0806**	**0.0000**	**0.0000**	**0.0806**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive 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	0.4192	1.6103	3.4500	9.3700e-003	0.7459	8.5200e-003	0.7544	0.1997	7.9500e-003	0.2077	0.0000	866.2853	866.2853	0.0559	0.0000	867.6816
Unmitigated	0.4201	1.6155	3.4686	9.4500e-003	0.7534	8.5800e-003	0.7620	0.2018	8.0000e-003	0.2098	0.0000	873.6712	873.6712	0.0562	0.0000	875.0757

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Fast Food Restaurant w/o Drive Thru	2,401.00	2,401.00	0.00	1,999,193	1,979,201
Parking Lot	0.00	0.00	0.00		
Total	2,401.00	2,401.00	0.00	1,999,193	1,979,201

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
Fast Food Restaurant w/o Drive Thru	4.70	4.70	4.70	1.50	79.50	19.00	50	25	25
Parking Lot	4.70	4.70	4.70	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
Fast Food Restaurant w/o Drive Thru	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
Parking Lot	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Kilowatt Hours of Renewable Electricity Generated

	ROG	NOx	CO	SO2	Fugitive 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	31.6206	31.6206	1.2800e-003	2.4000e-004	31.7255
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	31.6218	31.6218	1.2800e-003	2.4000e-004	31.7267
NaturalGas Mitigated	3.2200e-003	0.0293	0.0246	1.8000e-004		2.2200e-003	2.2200e-003		2.2200e-003	2.2200e-003	0.0000	31.8523	31.8523	6.1000e-004	5.8000e-004	32.0415
NaturalGas Unmitigated	3.2200e-003	0.0293	0.0246	1.8000e-004		2.2200e-003	2.2200e-003		2.2200e-003	2.2200e-003	0.0000	31.8523	31.8523	6.1000e-004	5.8000e-004	32.0415

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					
Fast Food Restaurant w/o Drive Thru	596889	3.2200e-003	0.0293	0.0246	1.8000e-004		2.2200e-003	2.2200e-003		2.2200e-003	2.2200e-003	0.0000	31.8523	31.8523	6.1000e-004	5.8000e-004	32.0415
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		**3.2200e-003**	**0.0293**	**0.0246**	**1.8000e-004**		**2.2200e-003**	**2.2200e-003**		**2.2200e-003**	**2.2200e-003**	**0.0000**	**31.8523**	**31.8523**	**6.1000e-004**	**5.8000e-004**	**32.0415**

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					
Fast Food Restaurant w/o Drive Thru	596889	3.2200e-003	0.0293	0.0246	1.8000e-004		2.2200e-003	2.2200e-003		2.2200e-003	2.2200e-003	0.0000	31.8523	31.8523	6.1000e-004	5.8000e-004	32.0415
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		**3.2200e-003**	**0.0293**	**0.0246**	**1.8000e-004**		**2.2200e-003**	**2.2200e-003**		**2.2200e-003**	**2.2200e-003**	**0.0000**	**31.8523**	**31.8523**	**6.1000e-004**	**5.8000e-004**	**32.0415**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Fast Food Restaurant w/o Drive Thru	129723	30.4391	1.2400e-003	2.4000e-004	30.5402
Parking Lot	5040	1.1826	5.0000e-005	1.0000e-005	1.1866
Total		**31.6218**	**1.2900e-003**	**2.5000e-004**	**31.7267**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Fast Food Restaurant w/o Drive Thru	129720	30.4386	1.2400e-003	2.4000e-004	30.5396
Parking Lot	5037.5	1.1820	5.0000e-005	1.0000e-005	1.1860
Total		**31.6206**	**1.2900e-003**	**2.5000e-004**	**31.7255**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0159	0.0000	3.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-004	7.0000e-004	0.0000	0.0000	7.5000e-004
Unmitigated	0.0159	0.0000	3.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-004	7.0000e-004	0.0000	0.0000	7.5000e-004

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	1.4900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0143					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.0000e-005	0.0000	3.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-004	7.0000e-004	0.0000	0.0000	7.5000e-004
Total	**0.0159**	**0.0000**	**3.6000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**7.0000e-004**	**7.0000e-004**	**0.0000**	**0.0000**	**7.5000e-004**

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	1.4900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0143					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.0000e-005	0.0000	3.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-004	7.0000e-004	0.0000	0.0000	7.5000e-004
Total	**0.0159**	**0.0000**	**3.6000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**7.0000e-004**	**7.0000e-004**	**0.0000**	**0.0000**	**7.5000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	2.9823	0.0273	6.6000e-004	3.8608
Unmitigated	3.6845	0.0341	8.3000e-004	4.7825

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Fast Food Restaurant w/o Drive Thru	1.04112 / 0.0664545	3.6845	0.0341	8.3000e-004	4.7825
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**3.6845**	**0.0341**	**8.3000e-004**	**4.7825**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Fast Food Restaurant w/o Drive Thru	0.832897 / 0.0664545	2.9823	0.0273	6.6000e-004	3.8608
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**2.9823**	**0.0273**	**6.6000e-004**	**3.8608**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e

	MT/yr			
Mitigated	4.0101	0.2370	0.0000	9.9348
Unmitigated	8.0202	0.4740	0.0000	19.8696

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Fast Food Restaurant w/o Drive Thru	39.51	8.0202	0.4740	0.0000	19.8696
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**8.0202**	**0.4740**	**0.0000**	**19.8696**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Fast Food Restaurant w/o Drive Thru	19.755	4.0101	0.2370	0.0000	9.9348
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**4.0101**	**0.2370**	**0.0000**	**9.9348**

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

This document is designed for double-sided printing to conserve natural resources.

Attachment C
Updated WQMP

CITY OF CARLSBAD

PRELIMINARY

PRIORITY DEVELOPMENT PROJECT (PDP)
STORM WATER QUALITY MANAGEMENT PLAN (SWQMP)
FOR
CHICK-FIL-A, #4306

SWQMP No. PENDING

ENGINEER OF WORK:

REGISTERED PROFESSIONAL ENGINEER
RANDY J. DECKER
No. 81077
CIVIL
STATE OF CALIFORNIA

RANDY J. DECKER
P.E. 81077

PREPARED FOR:

CHICK-FIL-A, INC.
5200 BUFFINGTON RD.
ATLANTA, GA 30349-2998

PREPARED BY:

JOSEPH C. TRUXAW & ASSOCIATES, INC.
1915 W. ORANGEWOOD AVE. SUITE 101
ORANGE, CA 92868
(714) 935-0265

DATE:
June 29, 2021

City of Carlsbad	**STORM WATER STANDARDS QUESTIONNAIRE E-34**	**Development Services** **Land Development Engineering** 1635 Faraday Avenue (760) 602-2750 www.carlsbadca.gov

INSTRUCTIONS:

To address post-development pollutants that may be generated from development projects, the city requires that new development and significant redevelopment priority projects incorporate Permanent Storm Water Best Management Practices (BMPs) into the project design per Carlsbad BMP Design Manual (BMP Manual). To view the BMP Manual, refer to the Engineering Standards (Volume 5).

This questionnaire must be completed by the applicant in advance of submitting for a development application (subdivision, discretionary permits and/or construction permits). The results of the questionnaire determine the level of storm water standards that must be applied to a proposed development or redevelopment project. Depending on the outcome, your project will either be subject to '**STANDARD PROJECT'** requirements or be subject to '**PRIORITY DEVELOPMENT PROJECT' (PDP)** requirements.

Your responses to the questionnaire represent an initial assessment of the proposed project conditions and impacts. City staff has responsibility for making the final assessment after submission of the development application. If staff determines that the questionnaire was incorrectly filled out and is subject to more stringent storm water standards than initially assessed by you, this will result in the return of the development application as incomplete. In this case, please make the changes to the questionnaire and resubmit to the city.

If you are unsure about the meaning of a question or need help in determining how to respond to one or more of the questions, please seek assistance from Land Development Engineering staff.

A completed and signed questionnaire must be submitted with each development project application. Only one completed and signed questionnaire is required when multiple development applications for the same project are submitted concurrently.

PROJECT INFORMATION	
PROJECT NAME: CHICK-FIL-A, #4306	PROJECT ID: PENDING
ADDRESS: 5850 AVENIDA ENCINAS, CARLSBAD, CA	APN: 210-170-08-00 & 210-170-09-00
The project is (check one): ☐ New Development ☒ Redevelopment	
The total proposed disturbed area is: 42,587 ft² (0.978) acres [Private Property]	
The total proposed newly created and/or replaced impervious area is: 30,405 ft² (0.698) acres	
If your project is covered by an approved SWQMP as part of a larger development project, provide the project ID and the SWQMP # of the larger development project: Project ID________________ SWQMP #: ________________ Then, go to Step 1 and follow the instructions. When completed, sign the form at the end and submit this with your application to the city.	

STEP 1 TO BE COMPLETED FOR ALL PROJECTS		
To determine if your project is a "development project", please answer the following question:	YES	NO
Is your project LIMITED TO routine maintenance activity and/or repair/improvements to an existing building or structure that do not alter the size (See Section 1.3 of the BMP Design Manual for guidance)?	☐	☒
If you answered "yes" to the above question, provide justification below then **go to Step 5**, mark the third box stating "my project is **not a 'development project'** and not subject to the requirements of the BMP manual" and complete applicant information. Justification/discussion: (e.g. the project includes only interior remodels within an existing building): If you answered "no" to the above question, the project is a '**development project**', **go to Step 2**.		

STEP 2 TO BE COMPLETED FOR ALL DEVELOPMENT PROJECTS		
To determine if your project is exempt from PDP requirements pursuant to MS4 Permit Provision E.3.b.(3), please answer the following questions:		
Is your project LIMITED to one or more of the following:	YES	NO
1. Constructing new or retrofitting paved sidewalks, bicycle lanes or trails that meet the following criteria: a) Designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas; b) Designed and constructed to be hydraulically disconnected from paved streets or roads; c) Designed and constructed with permeable pavements or surfaces in accordance with USEPA Green Streets guidance?	☐	☒ `
2. Retrofitting or redeveloping existing paved alleys, streets, or roads that are designed and constructed in accordance with the USEPA Green Streets guidance?	☐	☒
3. Ground Mounted Solar Array that meets the criteria provided in section 1.4.2 of the BMP manual?	☐	☒
If you answered "yes" to one or more of the above questions, provide discussion/justification below, then **go to Step 5**, mark the second box stating "my project is **EXEMPT** from PDP …" and complete applicant information. Discussion to justify exemption (e.g. the project redeveloping existing road designed and constructed in accordance with the USEPA Green Street guidance): If you answered "no" to the above questions, your project is not exempt from PDP, **go to Step 3**.		

STEP 3 TO BE COMPLETED FOR ALL NEW OR REDEVELOPMENT PROJECTS		
To determine if your project is a PDP, please answer the following questions (MS4 Permit Provision E.3.b.(1)):	YES	NO
1. Is your project a new development that creates 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.*	☐	☒
2. Is your project a redevelopment project creating and/or replacing 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 surface? *This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.*	☒	☐
3. Is your project a new or redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surface collectively over the entire project site and supports a restaurant? A restaurant is 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).	☒	☐
4. Is your project a new or redevelopment project that creates 5,000 square feet or more of impervious surface collectively over the entire project site and supports a hillside development project? A hillside development project includes development on any natural slope that is twenty-five percent or greater.	☐	☒
5. Is your project a new or redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surface collectively over the entire project site and supports a parking lot? A parking lot is a land area or facility for the temporary parking or storage of motor vehicles used personally for business or for commerce.	☒	☐
6. Is your project a new or redevelopment project that creates and/or replaces 5,000 square feet or more of impervious street, road, highway, freeway or driveway surface collectively over the entire project site? *A street, road, highway, freeway or driveway is any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.*	☐	☒
7. Is your project a new or redevelopment project that creates and/or replaces 2,500 square feet or more of impervious surface collectively over the entire site, and discharges directly to an Environmentally Sensitive Area (ESA)? *"Discharging Directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).**	☒	☐
8. Is your project a new development or redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surface that supports an automotive repair shop? *An automotive repair shop is a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.*	☐	☒
9. Is your project a new development or redevelopment project that creates and/or replaces 5,000 square feet or more of impervious area that supports a retail gasoline outlet (RGO)? *This category includes RGO's that meet the following criteria: (a) 5,000 square feet or more or (b) a project Average Daily Traffic (ADT) of 100 or more vehicles per day.*	☐	☒
10. Is your project a new or redevelopment project that results in the disturbance of one or more acres of land and are expected to generate pollutants post construction?	☐	☒
11. Is your project located within 200 feet of the Pacific Ocean and (1) creates 2,500 square feet or more of impervious surface or (2) increases impervious surface on the property by more than 10%? (CMC 21.203.040)	☐	☒
If you answered "yes" to one or more of the above questions, your project is a **PDP**. If your project is a redevelopment project, **go to step 4**. If your project is a new project, **go to step 5,** check the first box stating "My project is a **PDP** …" and complete applicant information. If you answered "no" to all of the above questions, your project is a '**STANDARD PROJECT.**' **Go to step 5**, check the second box stating "My project is a 'STANDARD PROJECT'…" and complete applicant information.		

STEP 4 **TO BE COMPLETED FOR REDEVELOPMENT PROJECTS THAT ARE PRIORITY DEVELOPMENT PROJECTS (PDP) ONLY**		
Complete the questions below regarding your redevelopment project (MS4 Permit Provision E.3.b.(2)):	YES	NO
Does the redevelopment project result in the creation or replacement of impervious surface in an amount of less than 50% of the surface area of the previously existing development? Complete the percent impervious calculation below: Existing impervious area (A) = 25,878 sq. ft. [Chick-fil-A Parcel Only] Total proposed newly created or replaced impervious area (B) = 25,552 sq.ft. [Chick-fil-A Parcel Only] Percent impervious area created or replaced (B/A)*100 = 98.7%	☐	☒
If you answered "yes", the structural BMPs required for PDP apply only to the creation or replacement of impervious surface and not the entire development. **Go to step 5,** check the first box stating "My project is a **PDP** …" and complete applicant information. If you answered "no," the structural BMP's required for PDP apply to the entire development. **Go to step 5**, check the check the first box stating "My project is a **PDP** …" and complete applicant information.		

STEP 5
CHECK THE APPROPRIATE BOX AND COMPLETE APPLICANT INFORMATION

☐ My project **is a PDP** and must comply with **PDP** stormwater requirements of the BMP Manual. I understand I must prepare a Storm Water Quality Management Plan **(SWQMP)** for submittal at time of application.

☐ My project **is a 'STANDARD PROJECT'** OR **EXEMPT** from PDP and must only comply with '**STANDARD PROJECT'** stormwater requirements of the BMP Manual. As part of these requirements, I will submit a "*Standard Project Requirement Checklist Form E-36*" and incorporate low impact development strategies throughout my project.

Note: For projects that are close to meeting the PDP threshold, staff may require detailed impervious area calculations and exhibits to verify if 'STANDARD PROJECT' stormwater requirements apply.

☐ My Project is **NOT a 'development project**' and is not subject to the requirements of the BMP Manual.

Applicant Information and Signature Box

Applicant Name:______________________________________Applicant Title: ____________________________________

Applicant Signature:____________________________________Date: ____

* Environmentally Sensitive Areas 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 Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments); water bodies designated with the RARE beneficial use by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments); areas designated as preserves or their equivalent under the Multi Species Conservation Program within the Cities and County of San Diego; Habitat Management Plan; and any other equivalent environmentally sensitive areas which have been identified by the City.

This Box for City Use Only

	YES	NO
City Concurrence:	☐	☐
By:		
Date:		
Project ID:		

TABLE OF CONTENTS

CERTIFICATION PAGE

Project Name: CHICK-FIL-A, #4306
Project ID: PENDING

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the requirements of the BMP Design Manual, which is based on the requirements of SDRWQCB Order No. R9-2013-0001 (MS4 Permit) or the current Order.

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 SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable source control and site design BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this 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

RANDY J. DECKER

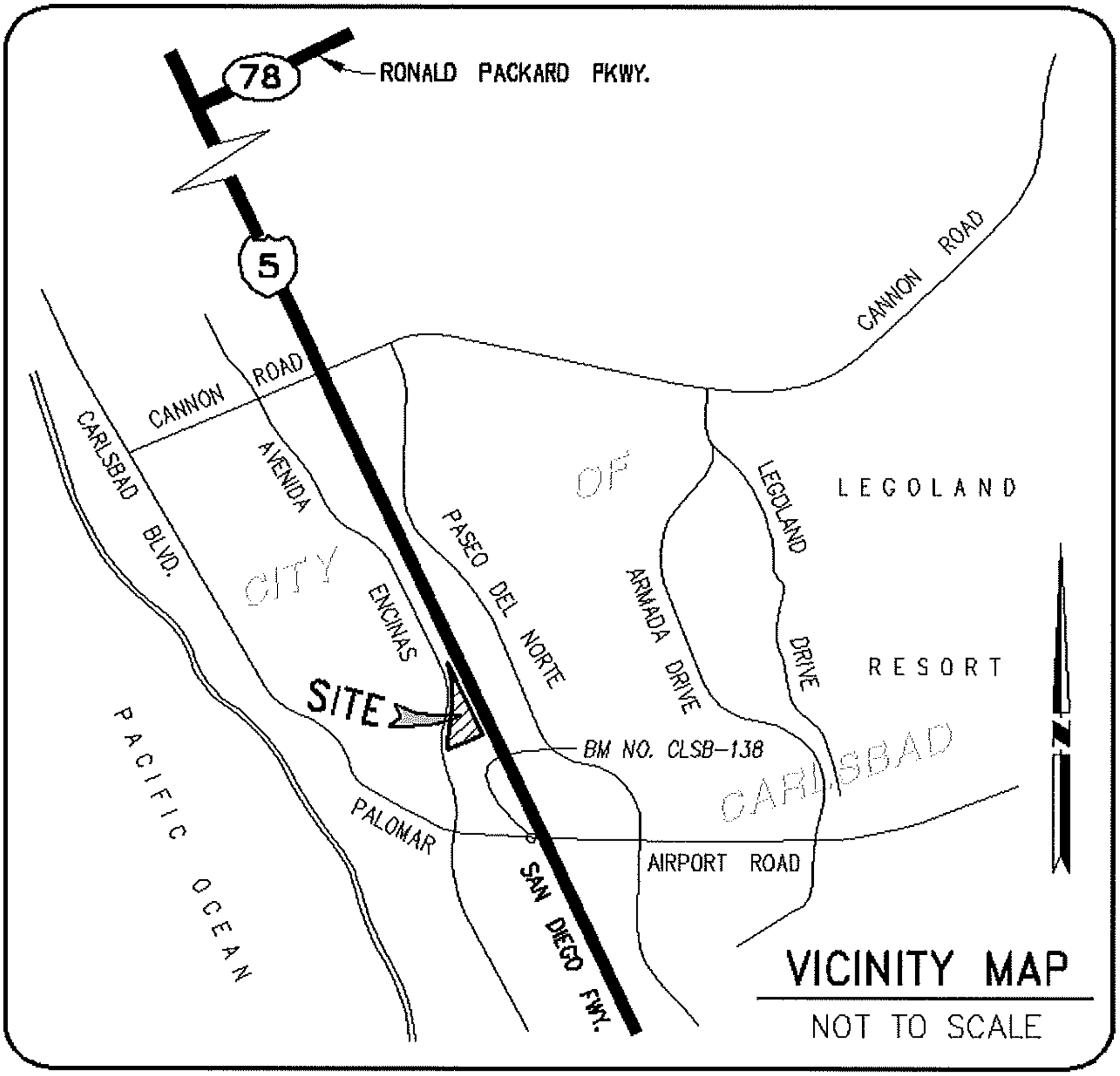
Print Name

JOSEPH C. TRUXAW & ASSOCIATES, INC.

Company

Date

PROJECT VICINITY MAP



SITE INFORMATION CHECKLIST

Project Summary Information	
Project Name	**CHICK-FIL-A, #4306**
Project ID	PENDING
Project Address	5850 AVENIDA ENCINAS CARLSBAD, CA
Assessor's Parcel Number(s) (APN(s))	210-170-08-00 & 210-170-09-00
Project Watershed (Hydrologic Unit)	Carlsbad 904
Parcel Area	0.890 Acres (38,761 Square Feet)
Existing Impervious Area (subset of Parcel Area)	0.594 Acres (25,878 Square Feet)
Area to be disturbed by the project (Project Area)	1.030 Acres (44,867 Square Feet)
Project Proposed Impervious Area (subset of Project Area)	0.698 Acres (30,405 Square Feet)
Project Proposed Pervious Area (subset of Project Area)	0.290 Acres (12,614 Square Feet)

Note:

- Disturbed area includes improvements in the Public R/W and on the adjacent property which consists of both pervious and impervious surfaces. Proposed pervious and impervious values above reflect only proposed surfaces within property limits and therefore do not add up to the total disturbed area.
- Proposed pervious area includes the surface of the bio-filtration basins.

Description of Existing Site Condition and Drainage Patterns
Current Status of the Site (select all that apply): X Existing development ☐ Previously graded but not built out ☐ Agricultural or other non-impervious use ☐ Vacant, undeveloped/natural Description / Additional Information: Site is currently a developed site with a two-story commercial office building, associated parking and landscaped areas (grass)
Existing Land Cover Includes (select all that apply): X Vegetative Cover ☐ Non-Vegetated Pervious Areas X Impervious Areas Description / Additional Information: Impervious surfaces include AC pavement, concrete sidewalk, building roof Pervious surfaces include grassy areas in front of the building, planters around the building and shrubs around the property perimeter
Underlying Soil belongs to Hydrologic Soil Group (select all that apply): ☐ NRCS Type A ☐ NRCS Type B ☐ NRCS Type C X NRCS Type D
Approximate Depth to Groundwater (GW): ☐ GW Depth < 5 feet ☐ 5 feet < GW Depth < 10 feet X 10 feet < GW Depth < 20 feet ☐ GW Depth > 20 feet
Existing Natural Hydrologic Features (select all that apply): ☐ Watercourses ☐ Seeps ☐ Springs ☐ Wetlands X None Description / Additional Information:

Description of Existing Site Topography and Drainage [How is storm water runoff conveyed from the site? At a minimum, this description should answer (1) whether existing drainage conveyance is natural or urban; (2) describe existing constructed storm water conveyance systems, if applicable; and (3) is runoff from offsite conveyed through the site? if so, describe]:

The project site is currently occupied by a two-story commercial building that site approx. in the center of the site. Parking stalls around the building and follow the perimeter of the site where access is provided by a drive aisle from the adjacent property (In-N-Out) and a driveway into Avenida Encinas just north of the building. The perimeter parking is AC pavement that is in moderate condition and drains surface runoff via a concrete v-gutter. The v-gutter was found to have a high point at the southeast corner of the site where it drains in two directions;

- Northerly to discharge surface runoff out the existing driveway and into Avenida Encinas. Once surface runoff has entered the curb & gutter in Avenida Encinas it travels south to a municipal curb opening catch basin where it is collected into the municipal storm drain system.
- Westerly to convey runoff through the shared drive aisle and into an existing grated inlet catch basin. Once collected in the private catch basin it is conveyed through an 18" private storm drain and travels north back onto the project site where it discharges into the same curb opening catch basin in Avenida Encinas as stated above.

The landscaped area in front of the building drains toward Avenida Encinas but also has multiple small grate inlets sparsed around the landscaping. The small grate inlets appear to discharge through curb openings in Aveninad Encinas, but it has not been confirmed.

The survey that was performed revealed that the parking row just south of the building drains to the v-gutter on the project site. This parking row is outside property limits and therefore the project site is accepting offsite drainage.

It was also found that the 18" private storm drain directs concentrated surface runoff from southerly properties through the site, and it was also found that stormwater clarifiers were installed inline with this private storm drain upstream of the projects site. Therefore offsite surface flows collected upstream of the project site that travel through this private storm drain are anticipated to have been treated by these clarifiers.

Description of Proposed Site Development and Drainage Patterns
Project Description / Proposed Land Use and/or Activities: The proposed development will consists of a complete site demolition and removal of existing features for the construction of a new single story restaurant. Proposed improvements will consist of a new building, trash enclosure parking areas, drive-thru, outdoor patio, landscaped areas, and bio-filtration basins. The land use will be commercial and activities will include preparation of food & offsite/onsite food consumption.
List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features): Proposed impervious surfaces will include the rooftop of the building and trash enclosure, Ac pavement in parking areas, concrete sidewalk, and a concrete drive-thru.
List/describe proposed pervious features of the project (e.g., landscape areas): Proposed pervious surfaces will include landscaped areas planted with drought tolerant species and bio-filtration basin surfaces.
Does the project include grading and changes to site topography? X Yes ☐ No Description / Additional Information: A complete demolition and removal of existing features will be done and grading will be performed to allow for the proposed features. Proposed grading will follow the existing site topography as best as possible.
Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)? X Yes ☐ No Description / Additional Information: The site will be designed to follow the existing topography as best as possible, however to comply with Low Impact Development requirements the runoff will be intercepted by 2 bio-filtration basins before discharging into the municipal storm drain system. Once the treated runoff leaves the bio-filtration basins it will enter the proposed onsite storm drain system where it will discharge into the existing catch basin in Avenida Encinas, the same catch basin as the existing condition. The primary change to the site drainage conditions are the bio-filtration basins and underground storm capture vaults that will treat and control the discharge flow of the site runoff. See calculation worksheets and SDHM for bio-filtration sizing and hydromodification calculations. In addition, permeable pavers are proposed at the driveway entrance just west of the existing In-N-Out building where a traffic signal is to be installed.

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply):

X On-site storm drain inlets
☐ Interior floor drains and elevator shaft sump pumps
☐ Interior parking garages
☐ Need for future indoor & structural pest control
X Landscape/Outdoor Pesticide Use
☐ Pools, spas, ponds, decorative fountains, and other water features
X Food service
X 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
X Plazas, sidewalks, and parking lots

Identification of Receiving Water Pollutants of Concern		
Describe path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable): Plans provided by the City of Carlsbad and the Storm Drain Atlas found on the City website were used to determine the ultimate flowpath of runoff leaving the project site. It was found that once the treated and controlled runoff discharge into the catch basin in Avenida Encinas, the storm water is directed through a storm drain in Avenida Encinas. The storm drain travels north and outlets runoff into a vegetated ditch where the runoff continues north, then appears to enter a second storm drain pipe that travels underneath the Encinas Power Plant. Finally the storm drain pipe discharges runoff into Agua Hedionda Lagoon.		
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 for the impaired water bodies:		
303(d) Impaired Water Body	**Pollutant(s)/Stressor(s)**	**TMDLs**
Agua Hedionda Lagoon	Indicator Bacteria-Total Coliform, Fecal Coliform, Enterococcus,	
Agua Hedionda Lagoon	Invasive Species	
Agua Hedionda Lagoon	Sedimentation/Siltation	

Identification of Project Site Pollutants			
Identify pollutants anticipated 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**	**Anticipated from the Project Site**	**Also a Receiving Water Pollutant of Concern**
Sediment	X		
Nutrients	X		
Heavy Metals	X		
Organic Compounds	X		
Trash & Debris		X	
Oxygen Demanding Substances		X	
Oil & Grease		X	
Bacteria & Viruses		X	
Pesticides		P	

Hydromodification Management Requirements
Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual)? X 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): As the runoff from the subject site travels throught the municipal storm drain system, there is a section that is a vegetated ditch that is not concrete lined. Therefore, by MS4 permit regulations this site is required control runoff flowrates to reduce sediment transport from this ditch into Agua Hedionda Lagoon
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 X 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 8 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: No critical coarse sediment yield areas exist downstream of the project site.

Flow Control for Post-Project Runoff*   ***This Section only required if hydromodification management requirements apply**
List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit. The SDHM program was used to design the hydromodification parameters of the storm water treatment system. After inputting the bio-filtration basin design characteristics, the system passed the hydromodification test using the outlet of the Storm Capture Vaults at the flow control device as the Point of Compliance.
Has a geomorphic assessment been performed for the receiving channel(s)? X 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)

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 City 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.

City of Carlsbad	**STANDARD PROJECT REQUIREMENT CHECKLIST E-36**	**Development Services** **Land Development Engineering** 1635 Faraday Avenue (760) 602-2750 www.carlsbadca.gov

Project Information
Project Name: I-5 & Palomar, Chick-fil-A FSU
Project ID: PENDING
DWG No. or Building Permit No.: PENDING

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.1 of the BMP Design Manual (Volume 5 of City Engineering Standards) for information to implement source control BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E.1 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. Please add attachments if more space is needed.
- "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:			

Source Control Requirement (continued)	Applied?		
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: No materials will be stored outdoors			
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 and identify additional BMPs. (See Table in Appendix E.1 of BMP Manual for guidance).			
☐ 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

For "Yes" answers, identify the additional BMP per Appendix E.1. Provide justification for "No" answers.

A. On-site storm drain inlets - Grated Inlets are shown on plans. All inlets will have a 'No Dumping' graphic that will be visible.
D2. Landscape/Outdoor Pesticide Use - Landscape areas that incorporate pesticide use will drain to bio-filtration basins, and self-treating areas are shown on the DMA Exhibit. Plant species will be of drought tolerant type and will minimize the use of irrigation and thus reduce runoff of irrigation water.
E. Food Service - Cleaning of floor mats, container, etc. will occur inside over an interior drain that will be connected to the grease waste line.
G. Refuse Areas - The proposed trash enclosure will be covered and a drain inside the refuse area will be connected to the grease waste line. The door will a roll-up type and will prevent wind from spreading trash/debris throughout the site.
P. Plazas, Sidewalks, and Parking Lots - The sidewalk and patio area will be swept daily.

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.2 thru E.6 of the BMP Design Manual (Volume 5 of City Engineering Standards) for information to implement site design BMPs shown in this checklist. Answer each category below pursuant to the following. • "Yes" means the project will implement the site design BMPs as described in Chapter 4 and/or Appendix E.2 thru E.6 of the Model BMP Design Manual. Discussion / justification is not required. • "No" means the BMPs is applicable to the project but it is not feasible to implement. Discussion/justification must be provided. Please add attachments if more space is needed. • "N/A" means the BMPs is not applicable at the project site because the project does not include the feature that is addressed by the BMPs (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:			

Site Design Requirement (continued)	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: Toilet Flushing and irrigation demand is less than the DCV and will not drawdown in sufficient time.			

SUMMARY OF PDP STRUCTURAL BMPS

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 City at the completion of construction. This may include requiring the project owner or project owner's representative 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 City 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 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 together or separate.

A soils report was provided and analyzed to determine if infiltration of storm water runoff is a feasible option for this site. The report shows two percolation borings with infiltration rates found to be: 0.05 & 0.00 in/hr, giving an average of 0.025 in/hr. Using form I-9 from the City BMP Design Manual Appendices, the factor of safety to be used is 3.5 giving a design infiltration rate of 0.007 in/hr which is insufficient for infiltration purposes and therefore deeming infiltration infeasible.

Form I-7 was used to determine the feasibility of harvest and use as a storm water treatment system. However, due to low demand of irrigation water usage and moderate facility usage, harvest and use is also not feasible as the demand will not allow for drawdown of collected storm water in the required time.

Bio-filtration was decided as the proposed BMP for this project site. The site has sufficient landscaped areas to be used for bio-filtration basins however due to the topography certain areas were deemed infeasible, such as the landscape buffer between Avenida Encinas and the site parking fronting Avenida Encinas. The grading design required two (2) basins to be spaced out around the site instead with one basin within the drive-thru to capture the runoff from the building and trash enclosure roof and drive-thru pavement, and a second basin at the north corner of the site to capture the remainder of the parking lot and existing parking area that is to remain adjacent to the In-N-Out. The surface of each bio-filtration basin was maximized due to the fact that the invert of the existing catch basin invert elevation is approx. 3.6' below finished surface. This requires the basins to be designed with the min. depths:

- 18" Engineered Soil
- 12" Gravel (3" above perf. Pipe, 6" perf pipe, 3" below perf. Pipe)

Due to very low infiltration rates the basins are proposed to be lined. Using the applicable worksheets it was found that with the min. depths the basin still provide the necessary storage for treatment. This BMP type was also selected using the BMP fact sheet BF-1 for pollutant control as is removes the anticipated pollutants from this site.

To comply with hydromodification requirements underground storm capture vaults are proposed to store surface runoff and control the flow discharging from the site due to the fact that the basins do not provide enough storage for hydromodification. See HMP Exhibit for details of the storm capture vault and flow control device.

In addition to the onsite improvements, Chick-fil-A is required to install a traffic signal at the driveway entrance along Avenida Encinas just west of the existing In-N-Out building which is outside of the parcel described in this report. To comply with state storm water regulations, permeable pavers are proposed within the limits of disturbed area for the traffic signal improvements, see DMA Exhibit for details. The permeable pavement shall be designed by the soils engineer on this project and details shall be provided on the final plans.

Structural BMP Summary Information [Copy this page as needed to provide information for each individual proposed structural BMP]
Structural BMP ID No. T1
DWG: Conceptual Grading Plan Sheet No. 4 – Low Impact Development Plan
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) ☐ Partial retention by biofiltration with partial retention (PR-1) X Biofiltration (BF-1) ☐ 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) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)
Purpose: ☐ Pollutant control only ☐ Hydromodification control only X Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)
Discussion (as needed):

Structural BMP Summary Information [Copy this page as needed to provide information for each individual proposed structural BMP]
Structural BMP ID No. T2
DWG: Conceptual Grading Plan Sheet No. 4 – Low Impact Development Plan
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) X Biofiltration (BF-1) ☐ 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) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)
Purpose: ☐ Pollutant control only ☐ Hydromodification control only X Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)
Discussion (as needed):

Structural BMP Summary Information [Copy this page as needed to provide information for each individual proposed structural BMP]
Structural BMP ID No. T3
DWG: Hydromodification Management Plan
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) ☐ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ 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) XDetention pond or vault for hydromodification management ☐ Other (describe in discussion section below)
Purpose: ☐ Pollutant control only XHydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)
Discussion (as needed):

ATTACHMENT 1

BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Check 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. (24"x36" Exhibit typically required)	X 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	X 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.	X 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.	X 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	X Included

Use this checklist to ensure the required information has been included on the DMA Exhibit:

The DMA Exhibit must identify:

X Underlying hydrologic soil group
X Approximate depth to groundwater
X Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
X Critical coarse sediment yield areas to be protected (if present)
X Existing topography and impervious areas
X Existing and proposed site drainage network and connections to drainage offsite
X Proposed grading
X Proposed impervious features
X Proposed design features and surface treatments used to minimize imperviousness
X 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)
X Structural BMPs (identify location and type of BMP)

Harvest and Use Feasibility Checklist	Form I-7

1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?

☒ Toilet and urinal flushing
☒ Landscape irrigation
☐ Other:______________

2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.

[Provide a summary of calculations here]

TOILET FLUSHING
PER TABLE B.3-1: 7 USES/PER./DAY
* ASSUMING 3.45 gal/FLUSH
TOTAL CONSUMPTION OVER 36 hrs
12 employees x 7 x 3.45 x 1.5 = 434.7 gal.

IRRIGATION
HA = 7,354 s.f.
ETWU = 2.7 in x $\frac{0.40 \times 7{,}354 \text{ s.f.}}{0.90}$ x 0.015
ETWU = 1,323.7 gal.

3. Calculate the DCV using worksheet B.2-1.

DCV = 1,343 (cubic feet)

TOILET FLUSHING + ETWU = 1,758.4 gal
=> 234.5 cu.ft
234.5 < 1,343

3a. Is the 36 hour demand greater than or equal to the DCV? ☐ Yes / ☒ No ⇨ ⇩	3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV? ☐ Yes / ☒ No ⇨ ⇩	3c. Is the 36 hour demand less than 0.25DCV? ☒ Yes ⇩
Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.	Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.	Harvest and use is considered to be infeasible.

Is harvest and use feasible based on further evaluation?

☐ Yes, refer to Appendix E to select and size harvest and use BMPs.

☒ No, select alternate BMPs.

Categorization of Infiltration Feasibility Condition			Form I-8
Part 1 - Full Infiltration Feasibility Screening Criteria **Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?**			
Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: PER SOILS REPORT BY GILES ENGINEERING INFILTRATION RATES WERE FOUND TO BE 0.0 IN/HR AND 0.05 IN/HR Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Form I-8 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: 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 the City to substantiate findings.

Form I-8 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X

Provide basis:

PER SOILS REPORT BY GILES ENGINEERING INFILTRATION RATES WERE FOUND TO BE 0.0 IN/HR AND 0.05 IN/HR

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Criteria	Screening Question	Yes	No
6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Provide basis:

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

<table>
<tr><th colspan="4">Form I-8 Page 4 of 4</th></tr>
<tr><th>Criteria</th><th>Screening Question</th><th>Yes</th><th>No</th></tr>
<tr><td>7</td><td>Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td></td><td>X</td></tr>
<tr><td colspan="4">Provide basis:

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</td></tr>
<tr><td>8</td><td>Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</td></tr>
<tr><td>Part 2 Result*</td><td colspan="2">If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.

If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.</td><td></td></tr>
</table>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

Factor of Safety and Design Infiltration Rate Worksheet				Form I-9	
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) $p = w \times v$
A	Suitability Assessment	Soil assessment methods	0.25	2	0.50
		Predominant soil texture	0.25	3	0.75
		Site soil variability	0.25	2	0.50
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			2.00
B	Design	Level of pretreatment/ expected sediment loads	0.5	1	0.50
		Redundancy/resiliency	0.25	3	0.75
		Compaction during construction	0.25	2	0.50
		Design Safety Factor, $S_B = \Sigma p$			1.75
Combined Safety Factor, $S_{total} = S_A \times S_B$					3.5
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)					AVG. $K_{OBSERVED}$ = 0.025 in/hr
Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$					0.007 in/hr
Supporting Data					
Briefly describe infiltration test and provide reference to test forms: PERCOLATION TEST PERFORMED AT 2 LOCALIZED BORINGS. SEE SOILS REPORT BY GILES ENGINEERING, SECTION 4.4, DATED 10/5/18.					

Automated Worksheet B.1-1: Calculation of Design Capture Volume (V1.3)

Category	#	Description	i	ii	iii	iv	v	vi	vii	viii	ix	x	Units
Standard Drainage Basin Inputs	0	Drainage Basin ID or Name	DMA-1	DMA-2									unitless
	1	Basin Drains to the Following BMP Type	Biofiltration	Biofiltration									unitless
	2	85th Percentile 24-hr Storm Depth	0.58	0.58									inches
	3	Design Infiltration Rate Recommended by Geotechnical Engineer	0.007	0.007									in/hr
	4	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	22,578	7,841									sq-ft
	5	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)	0	0									sq-ft
	6	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	0	0									sq-ft
	7	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)	0	0									sq-ft
	8	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)	0	0									sq-ft
	9	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)	0	0									sq-ft
	10	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)	5,254	5,706									sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	11	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No		No	No	No	No	No	No	No	yes/no
	12	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	13	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	14	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	16	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	17	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	18	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	19	Number of Tree Wells Proposed per SD-A											#
	20	Average Mature Tree Canopy Diameter											ft
	21	Number of Rain Barrels Proposed per SD-E											#
	22	Average Rain Barrel Size											gal
Treatment Train Inputs & Calculations	23	Does BMP Overflow to Stormwater Features in Downstream Drainage?	No	No		No	No	No	No	No	No	No	unitless
	24	Identify Downstream Drainage Basin Providing Treatment in Series											unitless
	25	Percent of Upstream Flows Directed to Downstream Dispersion Areas											percent
	26	Upstream Impervious Surfaces Directed to Dispersion Area (Ci=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet
	27	Upstream Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet
Initial Runoff Factor Calculation	28	Total Tributary Area	27,832	13,547	0	0	0	0	0	0	0	0	sq-ft
	29	Initial Runoff Factor for Standard Drainage Areas	0.79	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	30	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	31	Initial Weighted Runoff Factor	0.79	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	32	Initial Design Capture Volume	1,063	426	0	0	0	0	0	0	0	0	cubic-feet
Dispersion Area Adjustments	33	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	34	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	35	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	36	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	37	Runoff Factor After Dispersion Techniques	0.79	0.65	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	38	Design Capture Volume After Dispersion Techniques	1,063	426	0	0	0	0	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	39	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	40	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	41	Final Adjusted Runoff Factor	0.79	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	42	Final Effective Tributary Area	21,987	8,806	0	0	0	0	0	0	0	0	sq-ft
	43	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	44	Final Design Capture Volume Tributary to BMP	1,063	426	0	0	0	0	0	0	0	0	cubic-feet

Worksheet B.1-1 General Notes:

A. Applicants may use this worksheet to calculate design capture volumes for up to 10 drainage areas User input must be provided for yellow shaded cells, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below. Upon completion of this worksheet, proceed to the appropriate BMP Sizing worksheet(s).

Automated Worksheet B.5-1: Sizing Lined or Unlined Biofiltration BMPs (V1.3)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	0	Drainage Basin ID or Name	DMA-1	DMA-2	-	-	-	-	-	-	-	-	sq-ft
	1	Design Infiltration Rate Recommended by Geotechnical Engineer	0.007	0.007	-	-	-	-	-	-	-	-	in/hr
	2	Effective Tributary Area	21,987	8,806	-	-	-	-	-	-	-	-	sq-ft
	3	Minimum Biofiltration Footprint Sizing Factor	0.030	0.030	-	-	-	-	-	-	-	-	ratio
	4	Design Capture Volume Tributary to BMP	1,063	426	-	-	-	-	-	-	-	-	cubic-feet
	5	Is Biofiltration Basin Impermeably Lined or Unlined?	Lined	Lined									unitless
	6	Provided Biofiltration BMP Surface Area	779	364									sq-ft
	7	Provided Surface Ponding Depth	6	6									inches
	8	Provided Soil Media Thickness	18	18									inches
	9	Provided Depth of Gravel Above Underdrain Invert	3	3									inches
	10	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	6.00	6.00									inches
	11	Provided Depth of Gravel Below the Underdrain	3	3									inches
Retention Calculations	12	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	13	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	14	Gravel Pore Space Available for Retention	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	15	Effective Retention Depth	0.90	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	16	Calculated Retention Storage Drawdown (Including 6 Hr Storm)	120	120	0	0	0	0	0	0	0	0	hours
	17	Volume Retained by BMP	58	27	0	0	0	0	0	0	0	0	cubic-feet
	18	Fraction of DCV Retained	0.05	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	19	Portion of Retention Performance Standard Satisfied	0.06	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	20	Fraction of DCV Retained (normalized to 36-hr drawdown)	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	21	Design Capture Volume Remaining for Biofiltration	1,031	413	0	0	0	0	0	0	0	0	cubic-feet
Biofiltration Calculations	22	Max Hydromod Flow Rate through Underdrain	1.3370	1.3370	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	CFS
	23	Max Soil Filtration Rate Allowed by Underdrain Orifice	74.15	158.68	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	in/hr
	24	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	25	Soil Media Filtration Rate to be used for Sizing	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	26	Depth Biofiltered Over 6 Hour Storm	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	27	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	28	Effective Depth of Biofiltration Storage	10.80	10.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	29	Drawdown Time for Surface Ponding	1	1	0	0	0	0	0	0	0	0	hours
	30	Drawdown Time for Effective Biofiltration Depth	2	2	0	0	0	0	0	0	0	0	hours
	31	Total Depth Biofiltered	40.80	40.80	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	32	Option 1 - Biofilter 1.50 DCV: Target Volume	1,547	620	0	0	0	0	0	0	0	0	cubic-feet
	33	Option 1 - Provided Biofiltration Volume	1,547	620	0	0	0	0	0	0	0	0	cubic-feet
	34	Option 2 - Store 0.75 DCV: Target Volume	773	310	0	0	0	0	0	0	0	0	cubic-feet
	35	Option 2 - Provided Storage Volume	701	310	0	0	0	0	0	0	0	0	cubic-feet
	36	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
Result	37	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	-	-	-	-	-	-	-	-	yes/no
	38	Overall Portion of Performance Standard Satisfied	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	39	This BMP Overflows to the Following Drainage Basin	-	-	-	-	-	-	-	-	-	-	unitless
	40	**Deficit of Effectively Treated Stormwater**	**0**	**0**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

Worksheet B.5-1 General Notes:

A. Applicants may use this worksheet to size Lined or Unlined Biofiltration BMPs (BF-1, PR-1) for up to 10 basins. User input must be provided for yellow shaded cells, values for blue cells are automatically populated based on user inputs from previous worksheets, values for all other cells will be automatically generated, errors/notifications will be highlighted in red/orange and summarized below. BMPs fully satisfying the pollutant control performance standards will have a deficit treated volume of zero and be highlighted in green.

Summary of Stormwater Pollutant Control Calculations (V1.3)

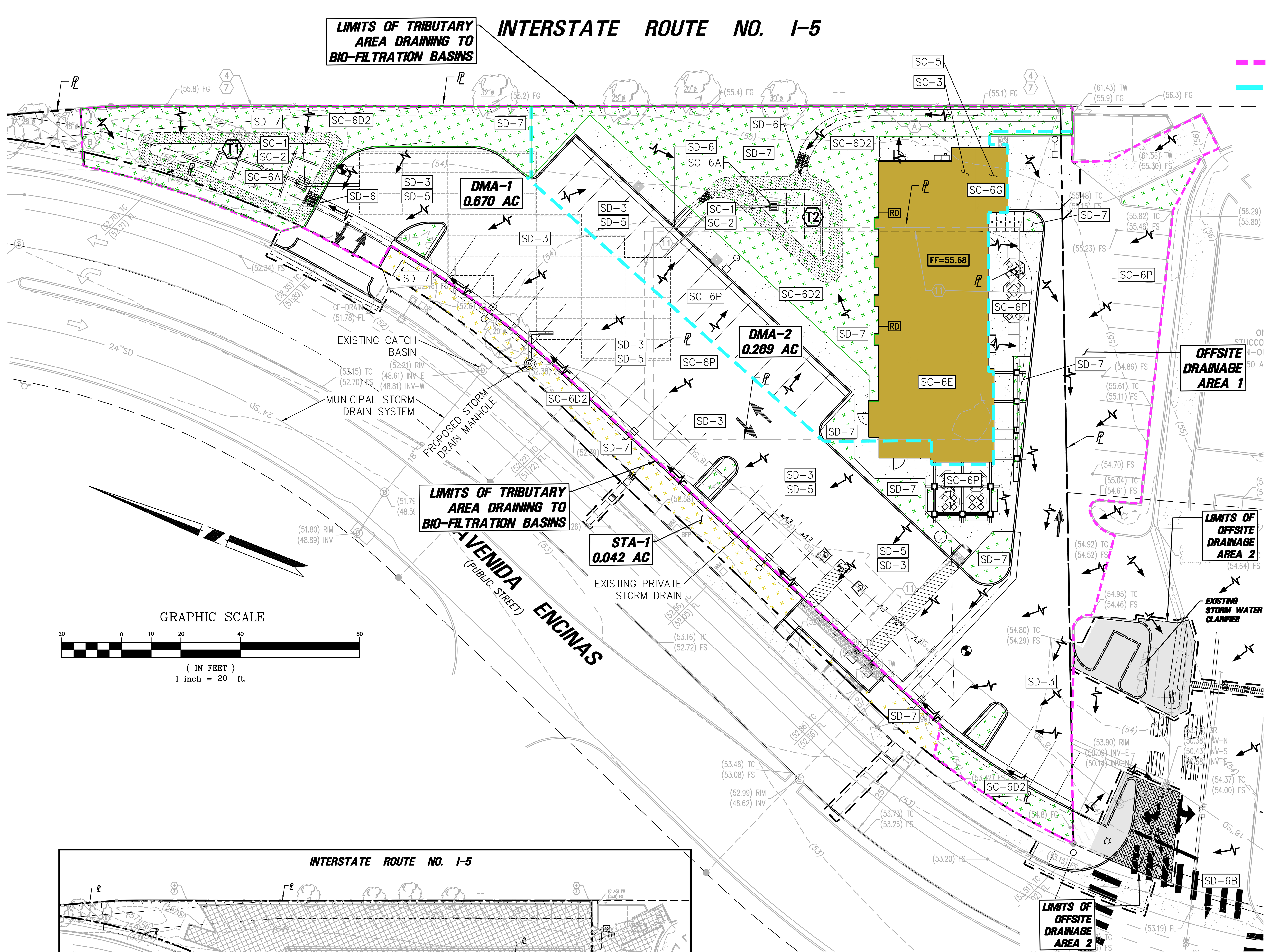
Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
General Info	0	Drainage Basin ID or Name	DMA-1	DMA-2	-	-	-	-	-	-	-	-	unitless
	1	85th Percentile Storm Depth	0.58	0.58	-	-	-	-	-	-	-	-	inches
	2	Design Infiltration Rate Recommended by Geotechnical Engineer	0.007	0.007	-	-	-	-	-	-	-	-	in/hr
	3	Total Tributary Area	27,832	13,547	-	-	-	-	-	-	-	-	sq-ft
	4	85th Percentile Storm Volume (Rainfall Volume)	1,345	655	-	-	-	-	-	-	-	-	cubic-feet
Initial DCV	5	Initial Weighted Runoff Factor	0.79	0.65	-	-	-	-	-	-	-	-	unitless
	6	Initial Design Capture Volume	1,063	426	-	-	-	-	-	-	-	-	cubic-feet
Site Design Volume Reductions	7	Dispersion Area Reductions	0	0	-	-	-	-	-	-	-	-	cubic-feet
	8	Tree Well and Rain Barrel Reductions	0	0	-	-	-	-	-	-	-	-	cubic-feet
BMP Volume Reductions	9	Effective Area Tributary to BMP	21,987	8,806	-	-	-	-	-	-	-	-	square feet
	10	Final Design Capture Volume Tributary to BMP	1,063	426	-	-	-	-	-	-	-	-	cubic-feet
	11	Basin Drains to the Following BMP Type	Biofiltration	Biofiltration	-	-	-	-	-	-	-	-	unitless
	12	Volume Retained by BMP (normalized to 36 hour drawdown)	32	13	-	-	-	-	-	-	-	-	cubic-feet
Total Volume Reductions	13	Total Fraction of Initial DCV Retained within DMA	0.03	0.03	-	-	-	-	-	-	-	-	fraction
	14	Percent of Average Annual Runoff Retention Provided	4.6%	4.6%	-	-	-	-	-	-	-	-	%
	15	Percent of Average Annual Runoff Retention Required	4.5%	4.5%	-	-	-	-	-	-	-	-	%
Performance Standard	16	Percent of Pollution Control Standard Satisfied	100.0%	100.0%	-	-	-	-	-	-	-	-	%
Treatment Train	17	Discharges to Secondary Treatment in Drainage Basin	-	-	-	-	-	-	-	-	-	-	unitless
	18	Impervious Surface Area Still Requiring Treatment	0	0	-	-	-	-	-	-	-	-	square feet
	19	Impervious Surfaces Directed to Downstream Dispersion Area	-	-	-	-	-	-	-	-	-	-	square feet
	20	Impervious Surfaces Not Directed to Downstream Dispersion Area	-	-	-	-	-	-	-	-	-	-	square feet
Result	21	Deficit of Effectively Treated Stormwater	0	0	-	-	-	-	-	-	-	-	cubic-feet

Summary Notes:

All fields in this summary worksheet are populated based on previous user inputs. If applicable, drainage basin elements that require revisions and/or supplemental information outside the scope of these worksheets are highlighted in orange and summairzed in the red text below. If all drainage basins achieve full compliance without a need for supplemental information, a green message will appear below.

-Congratulations, all specified drainage basins and BMPs are in compliance with stormwater pollutant control requirements. Include 11x17 color prints of this summary sheet and supporting worksheet calculations as part of the SWQMP submittal package.

False



LEGEND

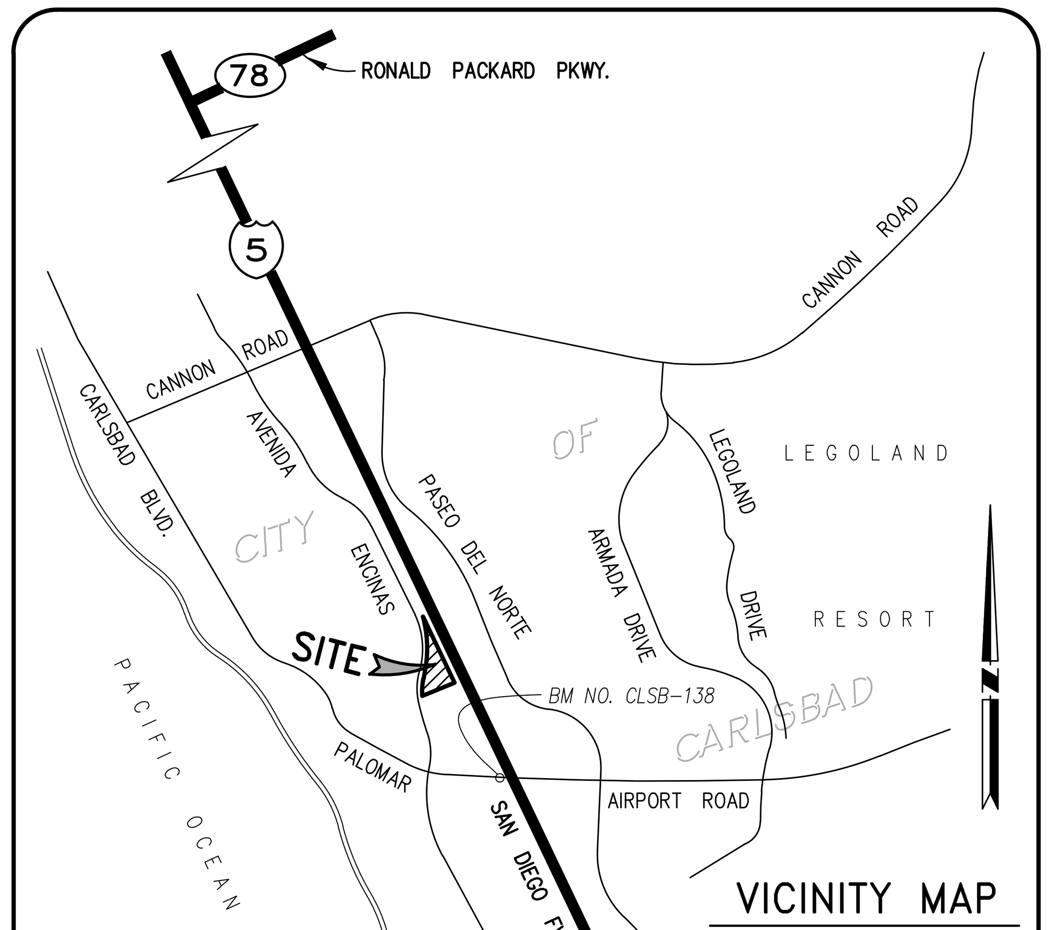
- LIMITS OF TOTAL TRIBUTARY AREA
- LIMITS OF DMA
- SOIL BORING

STRUCTURAL BMPs FOR POLLUTANT CONTROL MANAGEMENT

- T1 BIO-FILTRATION BASIN-1 (LINED)
- T2 BIO-FILTRATION BASIN-2 (LINED)

LAND COVER

- IMPERVIOUS – AC PAVEMENT
- IMPERVIOUS – CONCRETE
- IMPERVIOUS – BUILDING/TRASH ENCLOSURE
- PERVIOUS – LANDSCAPING
- PERVIOUS – SELF TREATING AREA
- PERMEABLE PAVERS



VICINITY MAP
NOT TO SCALE

STORM WATER QUALITY MANAGEMENT PLAN INFORMATION

1. HYDROLOGIC SOIL GROUP 'D'
2. DEPTH TO GROUNDWATER = 17 – 18 ft.
3. NO NATURAL HYDROLOGIC FEATURES EXIST WITHIN THIS PROJECT SITE
4. NO CRITICAL COARSE SEDIMENT YIELD AREAS EXIST DOWNSTREAM OF THIS PROJECT SITE

NOTICE TO CONTRACTOR

THE CONTRACTOR SHALL ASCERTAIN THE TRUE VERTICAL AND HORIZONTAL LOCATION AND SIZE OF ALL UTILITIES, PIPES, AND/OR STRUCTURES AND SHALL BE RESPONSIBLE FOR DAMAGE TO ANY PUBLIC OR PRIVATE UTILITIES, SHOWN OR NOT SHOWN HEREON.

IMPORTANT NOTICE

Section 4216 of the Government Code requires a Dig Alert Identification Number be issued before a "Permit to Excavate" will be valid. For your Dig Alert I.D. Number call Underground Service Alert CALL 811 Two working days before you dig.

REGISTERED PROFESSIONAL ENGINEER RANDY J. DECKER No. 81077 CIVIL STATE OF CALIFORNIA

DISTURBED AREA = 0.945 acres

*TOTAL TRIBUTARY AREA TO BASINS=0.950 acres

* INCLUDES 0.102 ACRES OF OFFSITE DRAINAGE OUTSIDE OF DISTURBED AREA (OFFSITE DRAINAGE AREA 1)

DRAINAGE MANAGEMENT AREA

* INCLUDES 0.102 ACRES OF OFFSITE DRAINAGE OUTSIDE OF DISTURBED AREA (OFFSITE DRAINAGE AREA 1)

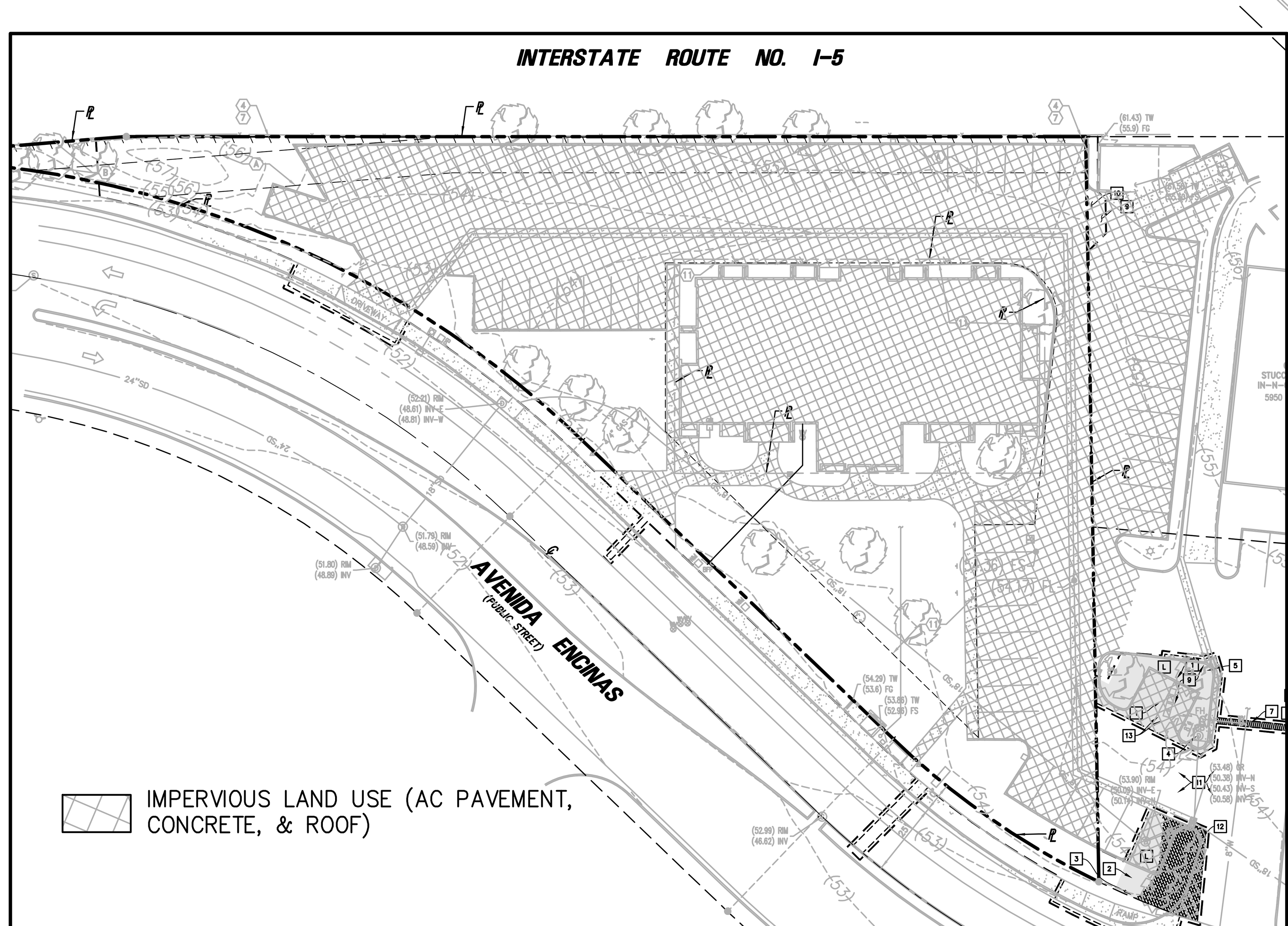
	SURFACE TYPE	AREA AC	PERVIOUS		IMPERVIOUS		PROPOSED BMP
DMA-1	AC/CONCRETE	0.639			0.518	81.1%	BIO-FILTRATION T1 BASIN-1
	LANDSCAPE		0.121	18.9%			
DMA-2	ROOF – PAVEMENT	0.311			0.180	57.9%	BIO-FILTRATION T2 BASIN-2
	LANDSCAPE		0.131	42.1%			

SELF-TREATING AREAS

	SURFACE TYPE	AREA AC	PERVIOUS		IMPERVIOUS		PROPOSED BMP
STA-1	LANDSCAPE	0.042	0.042	100.0%	–		N/A

OFFSITE DRAINAGE AREA 2

	SURFACE TYPE	AREA AC	PERVIOUS		IMPERVIOUS		PROPOSED BMP
2.1	AC PAVEMENT, LANDSCAPE	0.022	0.003	13.6%	0.019	86.4%	EXISTING STORM WATER CLARIFIER
2.2	PAVERS, LANDSCAPE	0.017	0.004	23.5%	0.013	76.5%	PERMEABLE PAVERS



EXISTING IMPERVIOUS AREA DETAIL
SCALE: 1"=40'

LID FEATURES

- SC-1 PREVENT ILLICIT DISCHARGES TO THE MS4
- SC-2 IDENTIFY THE STORM DRAIN SYSTEM USING STENCILING OR SIGNAGE
- SC-3 PROTECT OUTDOOR MATERIAL STORAGE AREAS FROM RAINFALL, RUN-ON, RUNOFF AND WIND DISPERSAL
- SC-5 PROTECT TRASH STORAGE AREAS FROM RAINFALL, RUN-ON, RUNOFF, AND WIND DISPERSAL
- SC-6 ADDITIONAL BMPS – POTENTIAL SOURCES OF RUNOFF POLLUTION
  - A. ON-SITE STORM DRAIN INLETS
  - D2. LANDSCAPE/OUTDOOR PESTICIDE USE
  - E. FOOD SERVICE
  - G. REFUSE AREAS
  - P. PLAZAS, SIDEWALKS, AND PARKING LOTS
- SD-3 MINIMIZE IMPERVIOUS AREA
- SD-5 DISPERSE IMPERVIOUS AREAS
- SD-6 COLLECT RUNOFF
- SD-6B PERMEABLE PAVERS
- SD-7 LANDSCAPE WITH NATIVE OR DROUGHT TOLERANT SPECIES

THIS PLAN IS:
PRELIMINARY
(NOT FOR CONSTRUCTION)

NO.	REVISIONS	DATE

Prepared by:
Joseph C. Truxaw and Associates, Inc.
Civil Engineers and Land Surveyors
1915 W. Orangewood Ave., Suite 101, Orange, CA 92868 (714) 935-0265 Truxaw.com

LOW IMPACT DEVELOPMENT
CHICK-FIL-A #4306
5850 AVENIDA ENCINAS
CITY OF CARLSBAD, STATE OF CALIFORNIA

DATE 06-28-21
DRAWN BY PJS
CHECKED BY RD/SMH
JOB NO. CFA18050
SHEET NO. 1 OF 2 SHEETS

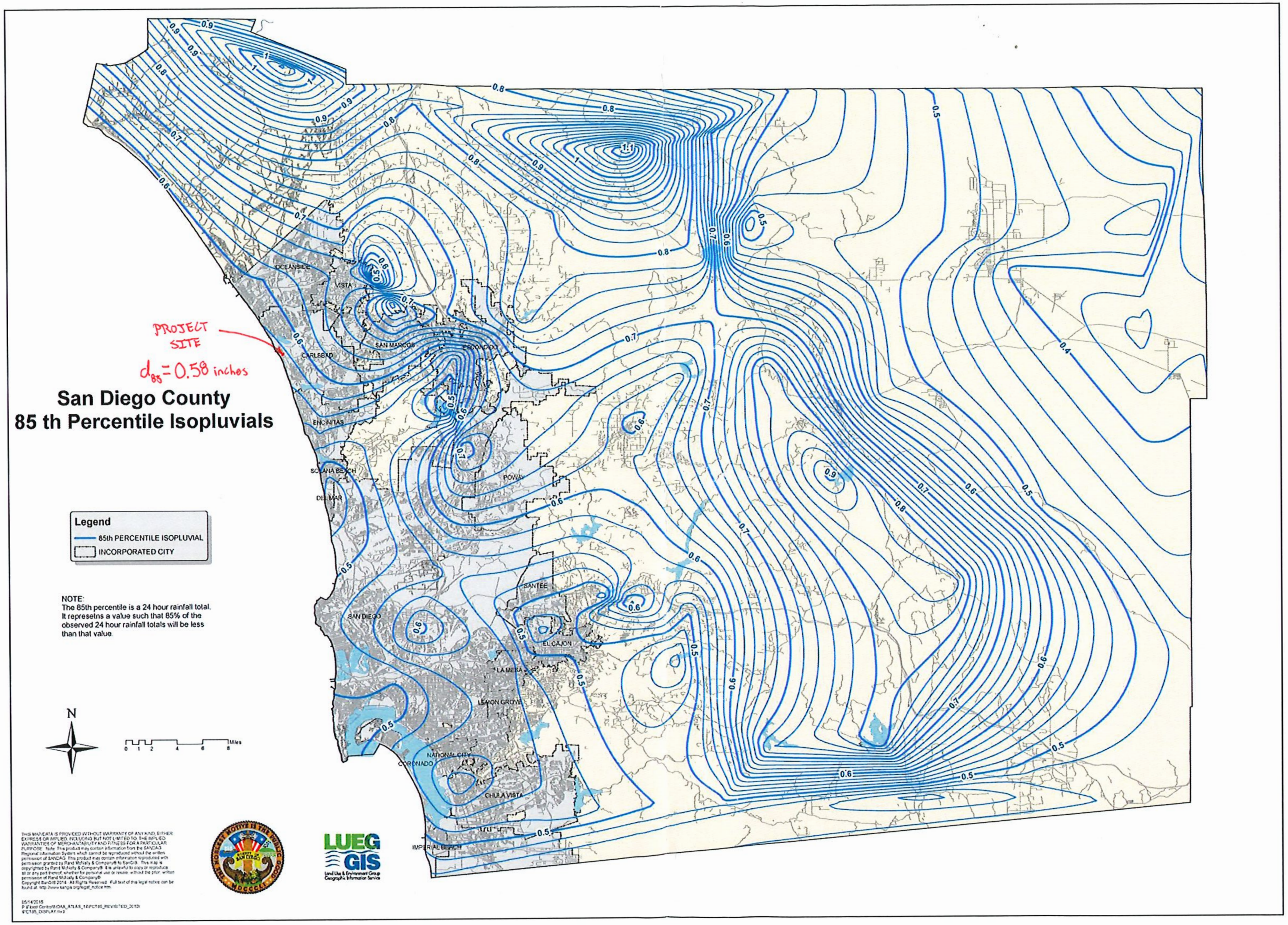


Figure B.1-1: 85th Percentile 24-hour Isopluvial Map

GILES
ENGINEERING ASSOCIATES, INC.
GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION MATERIALS CONSULTANTS

• Atlanta, GA
• Dallas, TX
• Los Angeles, CA
• Manassas, VA
• Milwaukee, WI

March 27, 2020

Chick-fil-A, Inc.
15635 Alton Parkway, Suite 350
Irvine, CA 92618

Attention: Ms. Beth Witt
Development Coordinator

Subject: Permeable Pavement Recommendations
Chick-fil-A Restaurant #4306
5850 Avenida Encinas
Carlsbad, California
Project No. 2G-1808005

Reference: Geotechnical Engineering Exploration and Analysis, Proposed Chick-fil-A Restaurant #4306, I-5 and Palomar FSU, 5850 Avenida Encinas, Carlsbad, California, prepared by Giles Engineering Associates, Inc., dated March 14, 2019, Project No. 2G-1808005

Dear Ms. Witt:

Giles Engineering Associates, Inc. (Giles) is pleased to present this report summarizing the results of our permeable pavement recommendations for the planned Chick-fil-A (#4306) project in Carlsbad, California. It is our understanding that the permeable pavement is planned at the exit and north turn lane in the southwestern area of the property with an approximate area of 30 ft. by 20 ft.

Soil and Base Section

For the permeable paver section, we recommend the following soil and base material: Subgrade prepared in accordance with the referenced geotechnical report, then then 6 inches of ASTM No. 2 base above, then 4 inches of ASTM No. 57 base, then 1 ½ to 2 inches of ASTM No. 8 base, then pavers, with minimum thickness of 3 $^1/_8$ inches. The subgrade, as graded, should maintain an adequate slope to drain. The soil and aggregate section should be reinforced, separated, and allowed to drain per the following recommendations:

Reinforcement of Soil and Base

We recommend that Tencate Geosynthetics, or equivalent be used within the above specified soil and base section for the permeable pavement as follows: If Tencate is the chosen soil reinforcement, we recommend that RS280i be placed between the soil subgrade and ASTM No. 2 stone base interface, and extend vertical along the curbline. Additionally, we recommend BXG120 to be placed between the ASTM No. 57 base and the ASTM No. 2 base. Both reinforcements should extend beneath the entire pavement section. If other reinforcement is chosen, please submit to our office for review.

1965 North Main Street • Orange, CA 92865
714/279-0817 • Fax 714/279-9687 • E-Mail losangeles@gilesengr.com

We have reviewed the Construction Notes and Sections Plan, Sheet 3 of 6, prepared by Truxaw and Associates, dated December 11, 2019, which has a permeable section detailed. This section is in substantial compliance with our geotechnical recommendations.

The conclusions, recommendations and opinions presented in this report are based on the geotechnical data obtained during the on-site investigations performed by this firm. The conclusions and recommendations contained herein represent our best professional judgment, and no warranty is expressed or implied.

We appreciate the opportunity to be of continued service on this project. If there are any questions concerning these test results or the associated recommendations, please contact our office at your convenience.

Respectfully Submitted,

Giles Engineering Associates, Inc.

REGISTERED PROFESSIONAL ENGINEER
JOHN LUKE MAIER
GE 3135
EXP. 12-31-21
GEOTECHNICAL
STATE OF CALIFORNIA

John L. Maier, P.E., G.E.
Branch Manager

Distribution: Chick-fil-A
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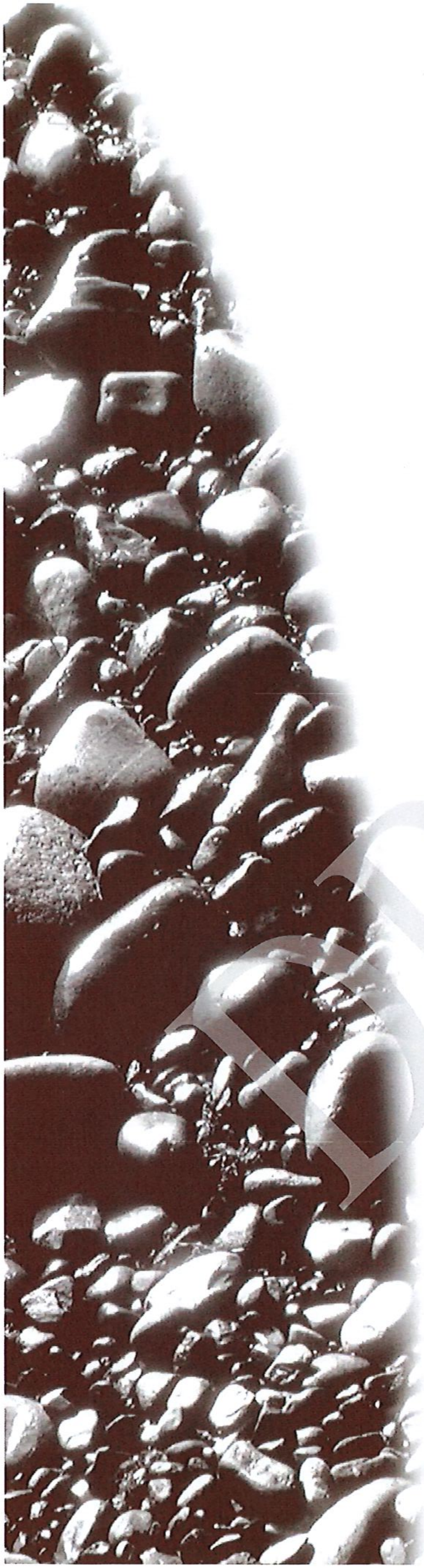

GREEN

Geotechnical Engineering Exploration and Analysis DRAFT

Proposed Chick-fil-A Restaurant #4306
I-5 and Palomar FSU
5850 Avenida Encinas
Carlsbad, California

Prepared for:

Chick-fil-A, Inc.
Irvine, California

Prepared by:

Giles Engineering Associates, Inc.

October 5, 2018
Project No. 2G-1808005

GILES
ENGINEERING ASSOCIATES, INC.

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ENGINEERING ASSOCIATES, INC.
GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION MATERIALS CONSULTANTS

- Atlanta, GA
- Baltimore, MD
- Dallas, TX
- Los Angeles, CA
- Manassas, VA
- Milwaukee, WI

October 5, 2018

Chick-fil-A, Inc.
15635 Alton Parkway, Suite 350
Irvine, California 92618

Attention: Ms. Beth Witt
Development Coordinator

Subject: Geotechnical Engineering Exploration and Analysis - Draft
Proposed Chick-fil-A Restaurant #4306
I-5 and Palomar FSU
5850 Avenida Encinas
Carlsbad, California
Project No. 2G-1808005

Dear Ms. Witt:

Giles Engineering Associates, Inc. (Giles) is pleased to present our *Geotechnical Engineering Exploration and Analysis* report prepared for the above-referenced project. Conclusions and recommendations developed from the exploration and analysis are discussed in the accompanying report.

We appreciate the opportunity to be of service on this project. If we may be of additional assistance, should geotechnical related problems occur or to provide construction observation and testing services, please do not hesitate to call at any time.

Respectfully submitted,

GILES ENGINEERING ASSOCIATES, INC.

Edgar L. Gatus, P.E.
Assistant Regional Manager

Distribution: Chick-fil-A, Inc.
Attn: Ms. Beth Witt (email: Beth.Witt@cfacorp.com)
Attn: Mr. Jennifer Daw (email: Jennifer.Daw@cfacorp.com)
Attn: Mr. Elizabeth Meloy (email: Elizabeth.Meloy@cfacorp.com)
Attn: Ms. Vicky Burke (email: Vicky.Burke@accesscfa.com)
(1 upload to Buzzsaw)

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I-5 AND PALOMAR FSU
5850 AVENIDA ENCINAS
CARLSBAD, CALIFORNIA
PROJECT NO. 2G-1808005

GEOTECHNICAL ENGINEERING EXPLORATION AND ANALYSIS - DRAFT

CHICK-FIL-A RESTAURANT #4306
I-5 AND PALOMAR FSU
5850 AVENIDA ENCINAS
CARLSBAD, CALIFORNIA
PROJECT NO. 2G-1808005

1.0 EXECUTIVE SUMMARY OUTLINE

The executive summary is provided solely for purposes of overview. Any party who relies on this report must read the full report. The executive summary omits a number of details, any one of which could be crucial to the proper application of this report.

Subsurface Conditions

- Site Class designation D is recommended for seismic design considerations.
- Our review of the Geology of San Diego Quadrangle indicates that the site is mapped as being underlain by Old Paralic Deposits consisting generally of poorly sorted, moderately permeable, reddish-brown, interfingered strand like, beach, estuarine and colluvial deposits composed of siltstone, sandstone and conglomerate.
- Possible fills were encountered within our test borings to depths of about 3 feet below existing ground surfaces and were noted to be moist, medium dense in relative density clayey sand and silty sand, and firm in comparative consistency sandy clay.
- Native soils encountered below the possible fills were generally moist, medium dense to dense silty sand and sand, and very stiff sandy clay.
- Old Paralic Deposits were encountered within test borings B-1 and B-4 to depths of about 18 to 20 feet below existing ground surface and generally consisted of very dense silty sandstone materials.
- Groundwater was encountered during our subsurface exploration to a depth of about 17 and 18 feet below existing grade within test borings B-1 and B-4.

Site Development

- The proposed site development will include the demolition of existing building for the construction of a new Chick-fil-A single-story building and site improvements that include new concrete walkways, parking stalls, driveways, drive thru lane, and trash enclosure.
- Building Area: Due to the presence of variable strength characteristics of the near surface soils and likely disturbance of site soils during clearing operations, it is recommended that the soils within the proposed new building and an appropriate distance beyond (5 feet minimum) be over-excavated to a depth of at least 2 feet below existing grade or planned grade and 1 foot below bottom of footings, whichever is greater. The soils exposed at the base of this recommended over-excavation should be examined by the geotechnical engineer to document that the soils are suitable for building support. Prior to placement of fill, the exposed surfaces approved for fill placement should be scarified to a depth of at least 12 inches, moisture conditioned and then recompacted to at least 90% of the maximum dry density as determined by Modified Proctor (ASTM D 1557-00).
- Due to the presence of dense to very dense onsite soils some excavation difficulties should be expected.

Building Foundation

- Shallow spread footing foundation systems or turned-down slabs may be designed for a maximum, net allowable soil pressure of 3,000 psf soil bearing pressure supported on newly placed structural compacted fill.
- Minimum reinforcing in the strip footings is recommended to consist of four No. 5 bars (2 top and 2 bottom).

Building Floor Slab

- It is recommended that on grade slab be a minimum 4-inch thick slab-on-grade or turned-down slab, underlain by properly prepared subgrade.
- Minimum slab reinforcing recommended consisting of No. 3 rebars spaced at 18 inches on center, each way.

Parking Improvement

- Asphalt Pavements: 3 inches of asphaltic concrete underlain by 5 and 8 inches of base course aggregate in parking stalls and driveways, respectively.
- Portland Cement Concrete: 6 inches in thickness underlain by 4 inches of base course in high stress areas such as entrance/exit aprons, trash enclosure-loading zone, and the drive through area.

GREEN - **This site has been given a Green designation to indicate that there are no significant geotechnical related construction or recognized problems foreseen which are unusual or not typical to this general area.**

2.0 SCOPE OF SERVICES

This report provides the results of the *Geotechnical Engineering Exploration and Analysis* that Giles Engineering Associates, Inc. ("Giles") conducted regarding the proposed development. The *Geotechnical Engineering Exploration and Analysis* included several separate, but related, service areas referenced hereafter as the Geotechnical Subsurface Exploration Program, Geotechnical Laboratory Services, and Geotechnical Engineering Services. The scope of each service area was narrow and limited, as directed by our client and in consideration of the proposed project. The scope of each service area is briefly explained in this report.

Geotechnical-related recommendations for design and construction of the foundation and ground-bearing floor slab for the proposed building are provided in this report. Geotechnical-related recommendations are also provided for the proposed parking lot. Site preparation recommendations are also given; however, those recommendations are only preliminary since the means and methods of site preparation will depend on factors that were unknown when this report was prepared. Those factors include the weather before and during construction, the water table at the time of construction, subsurface conditions that are exposed during construction, and finalized details of the proposed development.

Giles conducted a *Phase 1 Environmental Site Assessment* for the subject site. The results of that assessment will be provided under separate cover (2E-1808009).

3.0 SITES AND PROJECT DESCRIPTION

3.1 Site Description

The proposed Chick-fil-A site is currently an active two-story office building, about 10,977 square feet, and located at 5850 Avenida Encinas, in the city of Carlsbad, California.. The roughly triangular shaped property is bounded on the north and west by Avenida Encinas, on the south by In-N-Out restaurant, and on the east by the I-5 freeway. The existing building is situated within the central portion of the site and bordered with parking stalls and drive ways to the north, east and south sides, and landscape area to the west by Avenida Encinas.

Based upon a review of the ALTA/NSPS Land Title Survey prepared by Joseph Truxaw and Associates, elevations at the site range from El. 56 feet to El. 58 feet. The site is relatively level and slopes to the northwest by the adjacent street (Avenida Encinas). The subject property is situated at approximately latitude of 33.1255° North and longitude of -117.3247° West.

The site is currently covered with asphalt pavement, curbs and few landscape planters that contain shrubs and trees. Other existing site improvements include asphalt pavement along with curbs and gutter, concrete v-gutter, concrete walkways, lighting poles, chain linked fence, trash enclosure, landscape areas containing grass, shrubs and trees, and underground utilities.

3.2 Proposed Project Description

The proposed development includes the demolition of existing building for the construction of a new, single-story Chick-fil-A restaurant building with drive through lane to be located along the westerly portion of the site (parking area) adjacent to I-5 freeway and within a portion of the easterly side of the existing building (Figure 1). Although detailed building plans are not yet ready for our review, the new building will be a single-story wood-frame structure, 3,201 square feet, with no basement or underground levels to be located within the northern end of the property. We were not provided with specific loading information for this project at the time of this report; however, based on previous Chick-fil-A projects, we expect maximum combined dead and live loads supported by the bearing walls and columns of 2 to 3 kips per lineal foot (klf) and 40 to 50 kips, respectively. The live load supported by the floor slab is expected to be a maximum of 100 pounds per square foot (psf).

Other planned improvements include new parking lot, menu board signs, outdoor dining area, a playground area, concrete walkways and planter areas, and a trash enclosure. Parking lot improvement within the property will include curbs and gutters, and underground utilities.

Preliminary project information did not indicate the planned finished floor elevation for the proposed building. However, it is anticipated that the finish floor elevation of the new building will be constructed at elevation El 57.0. Therefore, site grading is anticipated to include only minor cut and fill (up to 1 foot) in order to establish the necessary site grade to accommodate the assumed floor elevation, exclusive of site preparation or over-excavation requirements necessary to create a stable site suited for the proposed development.

The traffic loading on the proposed parking lot improvement is understood to predominantly consist of automobiles with occasional heavy trucks resulting from deliveries and trash removal. The parking lot pavement sections have been designed on the basis of daily traffic intensity equivalent to five 18-kip single axle loads and 1,500 automobiles within the main drive lanes and only automobiles of a lesser intensity within the parking stalls. Pavement designs are based on a 20-year design period. Therefore, the parking lot pavement sections have been designed on the basis of a Traffic Index (TI) of 4.0 for the automobile traffic parking stalls (light duty) and a TI of 5.0 for drive lane areas (medium duty).

4.0 SUBSURFACE EXPLORATION

4.1 Subsurface Exploration

Our subsurface exploration consisted of the drilling of six (6) exploratory test borings to depths of about 5 to 35½ feet below existing ground surfaces. The approximate test boring locations are shown in the Test Boring Location Plan (Figure 1). The Test Boring Location Plan and Test Boring Logs (Records of Subsurface Exploration) are enclosed in Appendix A. Field and laboratory test procedures and results are enclosed in Appendix B and C, respectively. The terms and symbols used on the Test Boring Logs are defined on the General Notes in Appendix D.

Our subsurface exploration included the collection of relatively undisturbed samples of subsurface soil materials for laboratory testing purposes. Bulk samples consisted of composite soil materials obtained at selected depth intervals from the borings. Relatively undisturbed samples were collected (per ASTM D-3550) using a 3-inch outside-diameter, modified California split-spoon soil sampler (CS) lined with 1-inch high brass rings. The sampler was driven with successive 30-inch drops of a hydraulically operated, 140-pound automatic trip hammer. Blow counts for each 6-inch driving increment were recorded on the field exploration logs. The central portions of the driven core samples were placed in sealed containers and transported to our laboratory for testing.

Where deemed appropriate, standard split-spoon tests (SS), also called Standard Penetration Test (SPT), were also performed at selected depth intervals in accordance with the American Society for Testing Materials (ASTM) Standard Procedure D 1586. This method consists of mechanically driving an unlined standard split-barrel sampler 18 inches into the soil with successive 30-inch drops of the 140-pound automatic trip hammer. Blow counts for each 6-inch driving increment were recorded on the exploration logs. The number of blows required to drive the standard split-spoon sampler for the last 12 of the 18 inches was identified as the uncorrected standard penetration resistance (N). Disturbed soil samples from the unlined standard split-spoon samplers were placed in plastic containers and transported to our laboratory for testing.

4.2 Subsurface Conditions

The subsurface conditions as subsequently described have been simplified somewhat for ease of report interpretation. A more detailed description of the subsurface conditions at the test boring locations is provided by the logs of the test borings enclosed in Appendix A of this report.

Pavement

Existing pavement encountered within our test borings consisted of approximately 2½ to 5 inches thick asphalt concrete over 4½ to 5 inches of aggregate base. No aggregate base was noted within test borings B-2, B-3 and B-4. Based on our visual observation, the existing asphalt pavement is in fair to poor condition.

Soil

Our review of the Geology of San Diego Quadrangle indicates that the site is mapped as being underlain by Old Paralic Deposits consisting generally of poorly sorted, moderately permeable, reddish-brown, interfingered strand like, beach, estuarine and colluvial deposits composed of siltstone, sandstone and conglomerate.

Possible fills were encountered within our test borings to depths of about 3 feet below existing ground surfaces and were noted to be moist, medium dense in relative density clayey sand and silty sand, and firm in comparative consistency sandy clay.

Native soils encountered below the possible fills were generally moist, medium dense to dense silty sand and sand, and very stiff sandy clay.

Old Paralic Deposits were encountered within test borings B-1 and B-4 to depths of about 18 to 20 feet below existing ground surface and generally consisted of very dense silty sandstone materials.

<u>Groundwater</u>

Groundwater was encountered during our subsurface investigation to depths of about 17 and 18 feet below existing grade. However, fluctuations of the groundwater table, localized zones of perched water, and rise in soil moisture content should be anticipated during and after the rainy season. Irrigation of landscape areas on or adjacent to the site can also cause fluctuations of local or shallow perched groundwater levels.

4.3 Photoionization Detector (PID) Screening

Soil samples taken from our subsurface exploration were screened with a Photoionization Detector (PID) to check for the possible presence of volatile vapors. No volatile vapors were detected during the screening of soil samples collected from any of the borings with a PID. Additionally, no odors detected or stains observed that might suggest some form of contamination. PID field-screening results are included on the soil boring logs.

4.4 Infiltration Testing

It is our understanding that an on-site below grade storm water infiltration system is being considered for the subject site. Therefore, percolation tests were performed to assess the infiltration characteristics of the site soils.

Two percolation tests (designated as B-5 and B-6) were conducted and involved the drilling of the test boring utilizing a hollow-stem auger drill rig with an outside diameter of approximately 8 inches. The percolation test procedure by City of San Diego BMP Design Manual (2018) was used in our percolation tests.

The approximate percolation test boring locations are shown in the Test Boring Location Plan (Figure 1). A perforated 2-inch diameter pvc pipe was installed inside each of the test boring with gravel placed below and on the sides of the perforated pipe. The percolation tests involved presoaking the boring and filling the test holes with water, recording the drop in water surface with time, and refilling the holes with water. The results of the percolation test are presented on the following table.

The drop in water level over time is the percolation rate at the test location. The percolation rates were reduced to account for the discharge of water from both the sides and bottom of the boring. The formula below was used to calculate for the infiltration rate.

Infiltration Rate = $\Delta H\ (60r)\ /\ \Delta t\ (r + 2H_{avg})$

Where: r is the radius of the test hole (in)
ΔH is the change in height over the time interval (in)
Δt is the time interval (min)
Havg is the average head height over the time interval

The design infiltration rate noted below has not been reduced to account for a factor safety (FS).

TABLE 1 – PERCOLATION TEST RESULTS				
Test Hole	**Test Depth[1] (feet)**	**Percolation Rate (in/hr)**	**Infiltration Rate (in/hr)**	**Soil Type**
B-5	5.0	0.48	0.05	Clayey Sand
B-6	5.0	0.00	0.00	Sandy Clay

1) Depth is referenced to the existing surface grade at the test location.

It should be noted that the infiltration rate of the on-site soils represents a specific area and depth tested and may fluctuate throughout other parts of the site.

Based on the results of the infiltration, it is our opinion that an on-site stormwater infiltration system is not suitable due to very low infiltration rates obtained during our testing.

5.0 LABORATORY TESTING

Several laboratory tests were performed on selected samples considered representative of those encountered in order to evaluate the engineering properties of on-site soils. The following are brief descriptions of our laboratory test results.

In Situ Moisture and Density

Tests were performed on select samples from the test borings to determine the subsoils dry density and natural moisture contents in accordance with Test Method ASTM 2216-05. The results of these tests are included in the Test Boring Logs enclosed in Appendix A.

Sieve Analysis

Sieve Analyses including Passing No. 200 sieve were performed on selected samples from various depths within Test Borings B-1 and B-5 to assist in soil classification and aid in the liquefaction analysis. These tests were performed in accordance with Test Method ASTM D 1140-00 (Reapproved 2006) and ASTC C 1369-96. The results of the sieve analysis are graphically presented as Figure 2 and passing no. 200 results are presented in Test Boring Logs.

Expansion

To evaluate the expansive potential of the near surface soils encountered during our subsurface exploration, a composite sample collected from Test Boring B-1 (1 to 5 feet) was subjected to Expansive Index (EI) testing in accordance with Test Method ASTM D 4829-08a. The result of our expansion index (EI) test indicates that the near surface sample has a *very low* expansion potential (EI= 14).

Consolidation Test

Settlement prediction under anticipated load was made on the basis of one-dimensional consolidation test. These tests were performed in general accordance with Test Method ASTM D 2435 and ASTM D5333. The test sample was inundated at 2,000 psf pressure in order to evaluate the sudden increase in moisture condition (collapse potential). Result of this test indicated that the tested on-site soils exhibit a slight degree of collapse (1.25%) potential. The Consolidation test curve, Figure 3 is included in Appendix A.

Soluble Sulfate Analysis and Soil Corrosivity

A representative sample of the near surface soils which may contact shallow buried utilities and structural concrete was performed to determine the corrosion potential for buried ferrous metal conduits and the concentrations present of water soluble sulfate which could result in chemical attack of cement. The following table presents the results of our laboratory testing.

Parameter	**B-2** **1 to 5 feet**
pH	7.48
Chloride	134 ppm
Sulfate	0.0162%
Resistivity	800 ohm-cm

The chloride content of the near-surface soils was determined for a selected sample in accordance with California Test Method No. 422. The results of this test indicated that tested on-site soil has a Low exposure to chloride. The results of limited in-house testing of soil pH and resistivity were determined in accordance with California Test Method No. 643 and indicated that on-site soil is moderately alkaline with respect to pH and soil resistivity was found to possess a severe degree of corrosivity.

These test results have been evaluated in accordance with criteria established by the Cast Iron Pipe Research Association, Ductile Iron Pipe Research Association, the American Concrete Institute and the National Association of Corrosion Engineers. The test results on a near surface bulk sample from the site generally indicate that tested on-site soils have severe corrosive potential when in contact with ferrous materials. Therefore, special protection for underground cast iron pipe or ductile pipe may be warranted depending on the actual materials in contact with the pipe. We recommend that a corrosion engineer review these results in order to provide specific recommendations for corrosion protection as well as appropriate recommendations for other types of buried metal structures.

Corrosivity testing also included determination of the concentrations of water-soluble sulfates present in the tested soil sample in accordance with California Test Method No. 417. Our laboratory test data indicated that near surface soils contain approximately 0.0162 percent of water soluble sulfates. Based on the 2016 California Building Code (CBC), concrete that may be exposed to sulfate containing soils shall comply with the provisions of ACI 318-05, Section 4.3. Therefore, according to Table 4.3.1 of the ACI 318-05, a low exposure to sulfate corrosivity can be expected for concrete placed in contact with the tested on-site soils. No special sulfate resistant cement is considered necessary for concrete which will be in contact with the tested on-site soils.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our subsurface exploration and laboratory testing, the planned development for the subject site is considered feasible from a geotechnical point of view provided the following conclusions and recommendations are incorporated in the design and project specifications.

Conditions imposed by the proposed improvement have been evaluated on the basis of the engineering characteristics of the subsurface materials encountered during our subsurface investigation and their anticipated behavior both during and after construction. Conclusions and recommendations, along with site preparation recommendations and construction considerations are discussed in the following sections of this report.

Impact of Site on Stability of Adjacent Properties

It is our opinion that the proposed grading and construction for the subject site will not affect adversely impact the stability of adjoining properties provided that grading and construction are performed in accordance with the recommendations provided herein and in accordance with local code guidelines.

6.1 Seismic Design Considerations

Faulting/Seismic Design Parameters

Research of available maps published by the California Geological Survey (CGS) indicates that the subject site is not located within an Alquist-Priolo Earthquake Fault Zone. The potential for fault rupture through the site is, therefore, considered to be low. The site may however be subject to strong groundshaking during seismic activity. The proposed structure should be designed in accordance with the current version of the 2016 California Building Code (CBC) and applicable local codes. Based on the results of our subsurface exploration, a Site Class D is recommended for design.

According to the maps of known active fault near-source zones (ICBO, 1998) to be used with the 2016 CBC, the Rose Canyon, Newport Inglewood, Coronado Bank and Elsinore faults are the closest known active faults and are located about 4.11, 4.11, 20.04 and 23.55 miles, respectively, to the site.

The Newport Inglewood Fault would probably generate the most severe site ground motions at the site with an anticipated maximum moment magnitude (Mw) of 7.50.

The proposed structure should be designed in accordance with the current version of the 2016 California Building Code (CBC) and applicable local codes. Within the International Code Council's 2015 International Building Code (IBC), the five-percent damped design spectral response accelerations at short periods, S_{DS}, and at 1-second period, S_{D1}, are used to determine the seismic design base shear. These parameters, which are a function of the site's seismicity and soil, are also used as parts of triggers for other code requirements. The following values are determined by using the USGS published U.S. Seismic Design Maps program based upon the 2016 CBC referenced ASCE 7 (with July 2013 errata).

CBC 2016, Earthquake Loads	
Site Class Definition (Table 1613.5.2)	D
Mapped Spectral Response Acceleration Parameter, S_s (Figure 1613.3.1(1) for 0.2 second)	1.160
Mapped Spectral Response Acceleration Parameter, S_1 (Figure 1613.3.1(2) for 1.0 second)	0.446
Site Coefficient, F_a (Table 1613.3.3 (1) short period)	1.036
Site Coefficient, F_v (Table 1613.3.3 (2) 1-second period)	1.554
Adjusted Maximum Considered Earthquake Spectral Response Acceleration Parameter, S_{MS} (Eq. 16-37)	1.202
Adjusted Maximum Considered Earthquake Spectral Response Acceleration Parameter, S_{M1} (Eq. 16-38)	0.693
Design Spectral Response Acceleration Parameter, S_{DS} (Eq. 16-39)	0.801
Design Spectral Response Acceleration Parameter, S_{D1} (Eq. 16-40)	0.462

Liquefaction

A site liquefaction evaluation consistent with the guidelines contained in CDMG Special Publication 117A along with a report by Southern California Earthquake Center (SCEC) has been performed as part of the current investigation. Our site-specific probabilistic seismic hazard analysis was derived using data published by the United States Geological Survey (USGS).

Based on 2016 CBC, Section 1803.5.12, Seismic Design Categories D through F, the peak ground acceleration shall be determined in accordance with Section 11.8.3 of ASCE 7. The predominant earthquake magnitude of 6.72 was obtained from the USGS Interactive Deaggregation web site using 2% probability of exceedance in 50 years. The mean peak ground acceleration for the site used in our liquefaction analysis was determined to be 0.482g.

Our liquefaction analysis was performed using the computer program Liquefypro (version 5) developed by Civil Tech Software. The program is based on the most recent publications of the NCEER Workshop and SP117 Implementation. Corrected SPT blow counts based upon hammer energy ratio, borehole diameter and sampling method were used in analysis calculations. Although groundwater was encountered at a depth of about 17 to 18 feet below existing ground surfaces during our drilling operations, groundwater of 10 feet was used in our liquefaction analysis. The liquefiable layers at the location of boring B-1 are presented graphically in Plate A1 of Appendix A. The computer output files are also included.

In order to estimate the amount of post-earthquake settlement, methods proposed by Tokimatsu and Seed (1987) were used for the settlement calculations. Based on our analysis and under the current site conditions, we estimate that the maximum total seismic-induced ground settlement at the site would be negligible (0.01 inch) and therefore, not significant to the proposed development.

6.2 Site Improvement Recommendations

The following recommendations for site development have been based upon the assumed floor elevation and foundation bearing grades and the conditions encountered at the test boring locations.

Site Clearing

Clearing and demolition operations should include the removal of all landscape vegetation and existing structural features such as asphaltic concrete pavement, concrete curb and gutters within the area of the proposed new building and site improvements. Existing pavement within areas of proposed development should be removed or processed to a maximum 3-inch size and stockpiled for use as compacted fill or stabilizing material for the new development. Processed asphalt may be used as fill, sub-base course material, or subgrade stabilization material beyond the building perimeter. Processed concrete or existing base may be used as fill, sub-base course material, or subgrade stabilization material both within and outside of the building perimeter. Due to the moisture sensitivity, the pavement is recommended to remain in-place as long as possible to help protect the subgrade from construction traffic disturbance.

All soils disturbed by the demolition of the existing improvements should be removed to expose a competent subgrade, as determined by the project geotechnical engineer. Debris resulting from the demolition and clearing operations should be legally exported from the site.

Existing Utilities

All existing utilities should be located. Utilities that are not reused should be capped off and removed or properly abandoned in-place in accordance with local codes and ordinances. The excavations made for removed utilities that are in the influence zone of new construction are recommended to be backfilled with structural compacted fill. Underground utilities, which are to be reused or abandoned in-place, are recommended to be evaluated by the structural engineer and utility backfill is recommended to be evaluated by the geotechnical engineer, to determine their potential effect on the new improvement. If any existing utilities are to be preserved, grading operations must be carefully performed so as not to disturb or damage the existing utility.

Building Area

Due to the presence of variable strength characteristics of the near surface soils and likely disturbance of site soils during clearing operations, it is recommended that the soils within the proposed new building area and an appropriate distance beyond (5 feet minimum) be over-excavated to a depth of at least 2 feet below existing grade or planned grade and 1 foot below bottom of footings, whichever is greater. The soils exposed at the base of this recommended over-excavation should be examined by the geotechnical engineer to document that the soils are suitable for building support. Prior to placement of fill, the exposed surfaces approved for fill placement should be scarified to a depth of at least 12 inches, moisture conditioned and then recompacted to at least 90% of the maximum dry density as determined by Modified Proctor (ASTM D 1557-00). A representative of the project geotechnical engineer should be present on site during grading operations to verify proper placement and adequate compaction of all fills.

Proofroll and Compact Subgrade

The subgrades within the new pavement area should be proofrolled in the presence of the geotechnical engineer with appropriate rubber-tire mounted heavy construction equipment or a loaded dump truck to detect very loose/soft yielding soil which should be removed to a stable subgrade. Following proofrolling and completion of any necessary overexcavation, the subgrades should be scarified to a depth of at least 8 inches, moisture conditioned and recompacted to at least 90 percent of the Modified Proctor maximum dry density. In accordance with the enclosed Guide Specifications and in the event that new pavement is constructed within the site, the top 12 inches of the pavement subgrade soils should be compacted to at least 95 percent of the Modified Proctor maximum density, or, 5 percent higher than the underlying fill materials. Low areas and excavations may then be backfilled in lifts with suitable very low to low expansive structural compacted fill.

The selection, placement and compaction of structural fill should be performed in accordance with the project specifications. The Guide Specifications included in Appendix D (Modified Proctor) of this report should be used as a minimum in developing the project specifications. The need may arise to recompact the floor slab and pavement subgrades immediately prior to construction due to the effects of weather and construction traffic on a previously prepared subgrade.

Reuse of On-site Soil

On-site material may be reused as structural compacted fill within the proposed building and pavement improvement area provided they are moisture conditioned and compacted as recommended, and do not contain oversized materials, significant quantities of organic matter, or other deleterious materials. Care should be used in controlling the moisture content of the soils to achieve proper compaction for pavement support. All subgrade soil compaction as well as the selection, placement and compaction of new fill soils should be performed in accordance with the project specifications under engineering controlled conditions.

Import Structural Fill

Any soil imported to the site (if required) for use as structural fill should consist of very low expansive soils (EI less than 21). Material designated for import should be submitted to the project geotechnical engineer no less than three working days prior to placement for evaluation.

In addition to expansion criteria, soils imported to the site should exhibit adequate characteristics for the recommended pavement support characteristics and soluble sulfate content.

Subgrade Protection

The near surface soils that are expected to comprise the subgrade are sensitive to water. Unstable soil conditions will develop if these soils are exposed to moisture increases or are disturbed (rutted) by construction traffic. The site should be graded to prevent water from ponding within construction areas and/or flowing into excavations. Accumulated water must be removed immediately along with any unstable soil. Foundation concrete should be placed and excavations backfilled as soon as possible to protect the bearing grade. The degree of subgrade instability and associated remedial construction is dependent, in part, upon precautions taken by the contractor to protect the subgrade during site development.

Silt fences or other appropriate erosion control devices should be installed in accordance with local, state and federal requirements at the perimeter of the development areas to control sediment from erosion. Since silt fences or other erosion control measures are temporary structures, careful and continuous monitoring and periodic maintenance to remove accumulated soil and/or replacement should be anticipated.

Fill Placement

Material for engineered fill should be moisture conditioned and compacted in accordance with the specifications, be free of organic material, debris, and other deleterious substances, and should not contain fragments greater than 3 inches in maximum dimension. On-site excavated soils that meet these requirements may be used to backfill the excavated pavement areas.

All fill should be placed in 8-inch-thick maximum loose lifts, moisture conditioned and then compacted in accordance with recommendation herein and with the enclosed "Guide Structural Fill Specifications". A representative of the geotechnical engineer should be present on-site during grading operations to verify proper placement and compaction of all fill, as well as to verify compliance with the other geotechnical recommendations presented herein.

6.3 Construction Considerations

Construction Dewatering

As mentioned previously, groundwater was encountered at depths of about 17 and 18 feet below existing grade during our subsurface investigation. In the event that shallow perched water is encountered, filter sump pumps placed within pits in the bottoms of excavations are expected to be the most feasible method of construction dewatering.

Soil Excavation

Some slope stability problems may be encountered for shallow unbraced excavations considering the nature of the subsoils. All excavations must be performed in accordance with CAL-OSHA requirements, which is the responsibility of the contractor. Shallow excavations may be adequately sloped for bank stability while deeper excavations or excavations where adequate back sloping cannot be performed may require some form of external support such as shoring or bracing.

Due to the presence of dense to very dense on-site soils at shallow depths, some difficulty may be encountered during excavation with conventional equipment. The use of specialized excavation equipment may be necessary.

6.4 Foundation Recommendations

Vertical Load Capacity

Upon completion of the building pad preparation, the proposed structure may be supported by a shallow foundation system. The foundation system may consist of either independently constructed spread footings or monolithically constructed foundation and floor slab thereby using a turned-down slab construction technique. Foundations may be designed for a maximum, net, allowable soil-bearing pressure of 3,000 pounds per square foot (psf). Minimum foundation widths for walls and columns should be 16 and 24 inches, respectively, regardless of the calculated soil bearing pressure. The recommended allowable soil bearing pressure may be increased by one-third for short term wind and/or seismic loads.

Reinforcing

The recommended minimum quantity of longitudinal reinforcing for geotechnical considerations within continuous strip footing is four No. 5 bars (2 top and 2 bottom) continuous through column pads within the strip footings. The recommended quantity of longitudinal reinforcing pertains to a minimum 12-inch thick and a maximum 24-inch wide footing pad; additional reinforcing may be necessary if a thinner or wider footing pad is used to develop equivalent rigidity. Conventional reinforcing is considered suitable in isolated column pad footings. The final design of the foundations as well as determination of the actual quantity of steel reinforcing and the footing dimensions should be performed by the structural engineer.

Lateral Load Resistance

Lateral load resistance will be developed by a combination of friction acting at the base of foundations and slabs and the passive earth pressure developed by footings below grade. Passive pressure and friction may be used in combination, without reduction, in determining the total resistance to lateral loads. A one-third increase in the passive pressure value may be used for short duration wind or seismic loads.

A coefficient of friction of 0.35 may be used with dead load forces for footings placed on competent native soil and/or newly placed compacted fill soil. An allowable passive earth pressure of 250 psf per foot of footing depth (pcf) below the lowest adjacent grade may be used for the sides of footings placed against newly placed structural fill. The maximum recommended allowable passive pressure is 2,000 psf.

Bearing Material Criteria

Soil suitable to serve as the foundation bearing grade should exhibit at least a loose relative density (average N value of at least 10) for non-cohesive soils or possess a stiff consistency (average unconfined compressive strength of 1.50 tsf) for cohesive soils for the recommended 3,000 psf allowable soil bearing pressure. For design and construction estimating purposes, suitable bearing soils are expected to be encountered at nominal foundation depths following the recommended site preparation activities. However, field testing by the Geotechnical Engineer within the foundation bearing soils is recommended to document that the foundation support soils possess the minimum strength parameters noted above. If unsuitable bearing soils are encountered, they should be recompacted in-place, if feasible, or excavated to a suitable bearing soil subgrade and to a lateral extent as defined by Item No. 3 of the enclosed Guide Specifications, with the excavation backfilled with structural compacted fill to develop a uniform bearing grade.

Foundation Embedment

The California Building Code (CBC) requires a minimum 12-inch foundation embedment depth. However, it is recommended that exterior foundations extend at least 18 inches below the adjacent exterior grade for bearing capacity consideration. Interior footings may be supported at nominal depth below the floor. All footings must be protected against weather and water damage during and after construction, and must be supported within suitable bearing materials.

Estimated Foundation Settlement

Post-construction total and differential static movement (settlement) of a shallow foundation system designed and constructed in accordance with the recommendations provided in this report are estimated to be less than ¾ and ½ inch, respectively, for static conditions. The estimated differential movement is anticipated to result in an angular distortion of less than 0.002 inches per inch on the basis of a minimum clear span of 20 feet. The maximum estimated total and differential movement is considered within tolerable limits for the proposed structure provided it is considered in the structural design.

6.5 Floor Slab Recommendations

Subgrade

The floor slab subgrade should be prepared in accordance with the appropriate recommendations presented in the Site Development Recommendations section of this report. Foundation, utility trenches and other below-slab excavations should be backfilled with structural compacted fill in accordance with the project specifications.

Design

The floor of the proposed building may be designed and constructed as a conventional slab-on-grade supported on a properly prepared subgrade. If desired, the floor slab may be poured monolithically with perimeter foundations where the foundations consist of thickened sections thereby using a turned-down slab construction technique. The minimum slab reinforcing for geotechnical considerations is recommended to consist of No. 3 rebars at 18 inches on center, each way. Based on the recommended reinforcing and the assumed live loading, the slab is recommended to be a minimum of 4 inches in thickness. A qualified structural engineer should perform the actual design of the slab to ensure proper thickness and reinforcing. If desired, a Subgrade Modulus of 150 pci may be used for floor slab design.

The floor slab is recommended to be underlain by a 4 inch thick layer of granular material. A minimum 10-mil synthetic sheet should be placed below the floor slab to serve as a vapor retarder where required to protect moisture sensitive floor coverings (i.e. tile, or carpet, etc.). It is recommended that a structural engineer or architect specify the vapor retarder location with careful consideration of concrete curing and the effects of moisture on future flooring materials. The vapor retarder is recommended to be in accordance with ASTM E 1745-11, which is entitled: *Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs*. The sheets of the vapor retarder material should be evaluated for holes and/or punctures prior to placement and the edges overlapped and taped. If materials underlying the synthetic sheet contain sharp, angular particles, a layer of coarse sand (Sand Equivalent>30) approximately 2 inches thick or a geotextile should be provided to protect it from puncture. An additional 2-inch thick layer of coarse sand may be needed between the slab and the vapor retarder to promote proper curing. Proper curing techniques are recommended to reduce the potential for shrinkage cracking and slab curling.

Estimated Movements

Post-construction total and differential movements of the floor slab designed and constructed in accordance with the recommendations provided in this report are estimated to be less than ½ and ⅓ inch, respectively. Movements on the order of those estimated for foundations should be expected when the foundation and floor slab are structurally connected or constructed monolithically. The estimated differential movement is anticipated to occur across the short dimension of the structure. The maximum total and differential movement is considered within tolerable limits for the proposed structure, provided that the structural design adequately considers this distortion.

6.6 Retaining Wall Recommendations (If Required)

It is possible that retaining walls may be needed for this site. The retaining wall(s) may be supported by conventional shallow spread footings designed for an allowable soil bearing pressure of 3,000 psf. A higher allowable soil bearing pressure may be possible, but that determination should be based on a review of the locations and details of the planned wall and foundation elevations.

Design of walls should incorporate an adequate factor-of-safety against both over-turning and sliding (FS=1.5). The overturning resultant should also fall within the center third (kern) of the retaining wall footing for stability, or the design must be re-evaluated with a reduced bearing area.

Static Lateral Earth Pressures

Retaining walls should be designed to resist the applicable lateral earth pressures. On-site soil materials may be used as backfill behind walls, provided they are confirmed to have very low expansive characteristic and allow for a drainage layer as discussed in subsequent paragraphs. For on-site soils and/or imported soils (EI less than 21) to be used as backfill materials, an active earth pressure of 35 pounds per cubic foot (equivalent fluid pressure) should be used assuming a level adjacent backfill and drained conditions. For walls to be restrained at the top, an at-rest pressure of 55 pcf should be used for design. All retaining walls should be supplied with a proper subdrain system. All walls should be designed to support any adjacent structural surcharge loads imposed by other nearby walls or footings and vehicles in addition to the above recommended active earth pressure.

Crushed rock or clean sand and gravel exhibiting a sand equivalent of 30 or greater may also be used for retaining wall backfill. If these materials are used as backfill within the active zone, the retaining wall may be designed for an active earth pressure of 30 pounds per cubic foot (equivalent fluid pressure) and 45 pounds per cubic foot for at rest pressure.

Drainage and Damp-proofing

Retaining walls are recommended to be designed for drained earth pressures and therefore, adequate drainage should be provided behind the walls. This can be accomplished by installing subdrains at the base of the walls. Wall footing-drains should consist of a system of filter material and perforated pipe. The perforated pipe system should consist of 4-inch diameter, schedule 40, PVC pipe or equivalent, embedded in 1 cubic foot of Class II Permeable Material (CALTRANS Standard Specifications, latest edition) or equivalent per lineal foot of pipe. Alternatively, ¾-inch open graded gravel or crushed rock enveloped in Mirafi 140 geofabric or equivalent may be used instead of the

Class II Permeable Material. The pipe should be placed at the base of the wall, and then routed to a suitable area for discharge of accumulated water. Wall backfill should be protected against infiltration of surface water. Backfill adjacent to walls should be sloped so that surface water drains freely away from the wall and will not pond. Damp-proofing of walls below-grade is recommended especially where moisture control is required by an approved waterproofing compound or covered with similar material to inhibit infiltration of moisture through the walls.

Wall Backfill

Retaining wall backfill behind the drainage layers should consist of low expansive soils with an E.I. less than 51, as determined by ASTM D 4829-03 method. Wall backfill should not contain organic material, rubble, debris, and rocks or cemented fragments larger than 3 inches in greatest dimension. A 1 foot thick low-expansive cohesive layer or pavement should be placed at the surface to help prevent surface water intrusion. A geotextile or filter fabric should be placed between the granular drainage layers and adjacent soils (excavated face or compacted materials) to prevent fines from migrating into the drainage layers.

Backfill should be placed in lifts not exceeding 8 inches in thickness, moisture conditioned and mechanically compacted throughout to at least 90 percent of the maximum dry density as determined by Modified Proctor (ASTM D 1557). Retaining walls should be properly braced prior to placement and compaction of backfill should be performed with extreme care not to damage the walls.

6.7 New Pavement

The following recommendations for the new pavement are intended for vehicular traffic associated with the restaurant development within the subject property.

New Pavement Subgrades

Following completion of the recommended subgrade preparation procedures, the subgrade in areas of new pavement construction are expected to consist of existing on-site soil that exhibit a very low to low expansion potential. An R-value of 20 has been assumed in the preparation of the pavement design. It should however, be recognized that the City of Carlsbad may require a specific R-value test to verify the use of the following design. It is recommended that this testing, if required, be conducted following completion of rough grading in the proposed pavement areas so that the R-value test results are indicative of the actual pavement subgrade soils. Alternatively, a minimum code pavement section may be required if a specific R-value test is not performed. To use this R-value, all fill added to the pavement subgrade must have pavement support characteristics at least equivalent to the existing soils, and must be placed and compacted in accordance with the project specifications.

Asphalt Pavements

The following table presents recommended thicknesses for a new flexible pavement structure consisting of asphaltic concrete over a granular base, along with the appropriate CALTRANS specifications for proper materials and placement procedures. An alternate pavement section has been provided for use in parking stall areas due to the anticipated lower traffic intensity in these areas. However, care must be used so that truck traffic is excluded from areas where the thinner pavement section is used, since premature pavement distress may occur. In the event that heavy vehicle traffic cannot be excluded from the specific areas, the pavement section recommended for drive lanes should be used throughout the parking lot.

ASPHALT PAVEMENTS

Materials	Thickness (inches)		CALTRANS Specifications
	Parking Stalls (TI=4.0)	Drive Lanes (TI=5.0)	
Asphaltic Concrete Surface Course (b)	1	1	Section 39, (a)
Asphaltic Concrete Binder Course (b)	2	2	Section 39, (a)
Crushed Aggregate Base Course	5	8	Section 26, Class 2 (R-value at least 78)

NOTES:
(a) Compaction to density between 95 and 100 percent of the 50-Blow Marshall Density
(b) The surface and binder course may be combined as a single layer placed in one lift if similar materials are utilized.

Pavement recommendations are based upon CALTRANS design parameters for a twenty-year design period and assume proper drainage and construction monitoring. It is, therefore, recommended that the geotechnical engineer monitors and tests subgrade preparation, and that the subgrade be evaluated immediately before pavement construction.

Portland Concrete Pavements

Portland Cement Concrete pavements are recommended in areas where traffic is concentrated such as the entrance/exit aprons as well as areas subjected to heavy loads such as the trash enclosure loading zone. The preparation of the subgrade soils within concrete pavement areas should be performed as previously described in this report. Portland Cement Concrete pavements in high stress areas are recommended to be at least 6 inches thick containing No. 3 bars at 18-inch on-center both ways placed at mid-height. The pavement should be constructed in accordance with Section 40 of the CALTRANS Standard Specifications. A minimum 4-inch thick layer of base course (CALTRANS Class 2) is recommended below the concrete pavement. This base course should be compacted to at least 95% of the material's maximum dry density.

The maximum joint spacing within all of the Portland Cement Concrete pavements is recommended to be 15 feet to control shrinkage cracking. Load transfer reinforcing is recommended at construction joints perpendicular to traffic flow if construction joints are not properly keyed. In this event, ¾-inch diameter smooth dowel bars, 18 inches in length placed at 12 inches on-center are recommended where joints are perpendicular to the anticipated traffic flow. Expansion joints are recommended only where the pavement abuts fixed objects such as light standard foundations. Tie bars are recommended at the first joint within the perimeter of the concrete pavement area. Tie bars are recommended to be No. 4 bars at 42-inch on-center spacings and at least 48 inches in length.

General Considerations

Pavement recommendations assume proper drainage and construction monitoring and are based on traffic loads as indicated previously. Pavement designs are based on either PCA or CALTRANS design parameters for twenty (20) year design period. However, these designs are also based on a routine pavement maintenance program and significant asphalt concrete pavement rehabilitation after about 8 to 10 years, in order to obtain a reasonable pavement service life.

6.8 Recommended Construction Materials Testing Services

The report was prepared assuming that Giles will perform Construction Materials Testing (CMT) services during construction of the proposed development. In general, CMT services are recommended (and expected) to at least include observation and testing of foundation and pavement support soil and other construction materials. It might be necessary for Giles to provide supplemental geotechnical recommendations based on the results of CMT services and specific details of the project not known at this time.

6.9 Basis of Report

This report is based on Giles' proposal, which is dated August 17, 2018 and is referenced by Giles' proposal number 2GEP-1808006. The actual services for the project varied somewhat from those described in the proposal because of the conditions that were encountered while performing the services and in consideration of the proposed project.

This report is strictly based on the project description given earlier in this report. Giles must be notified if any parts of the project description or our assumptions are not accurate so that this report can be amended, if needed. This report is based on the assumption that the facility will be designed and constructed according to the codes that govern construction at the site.

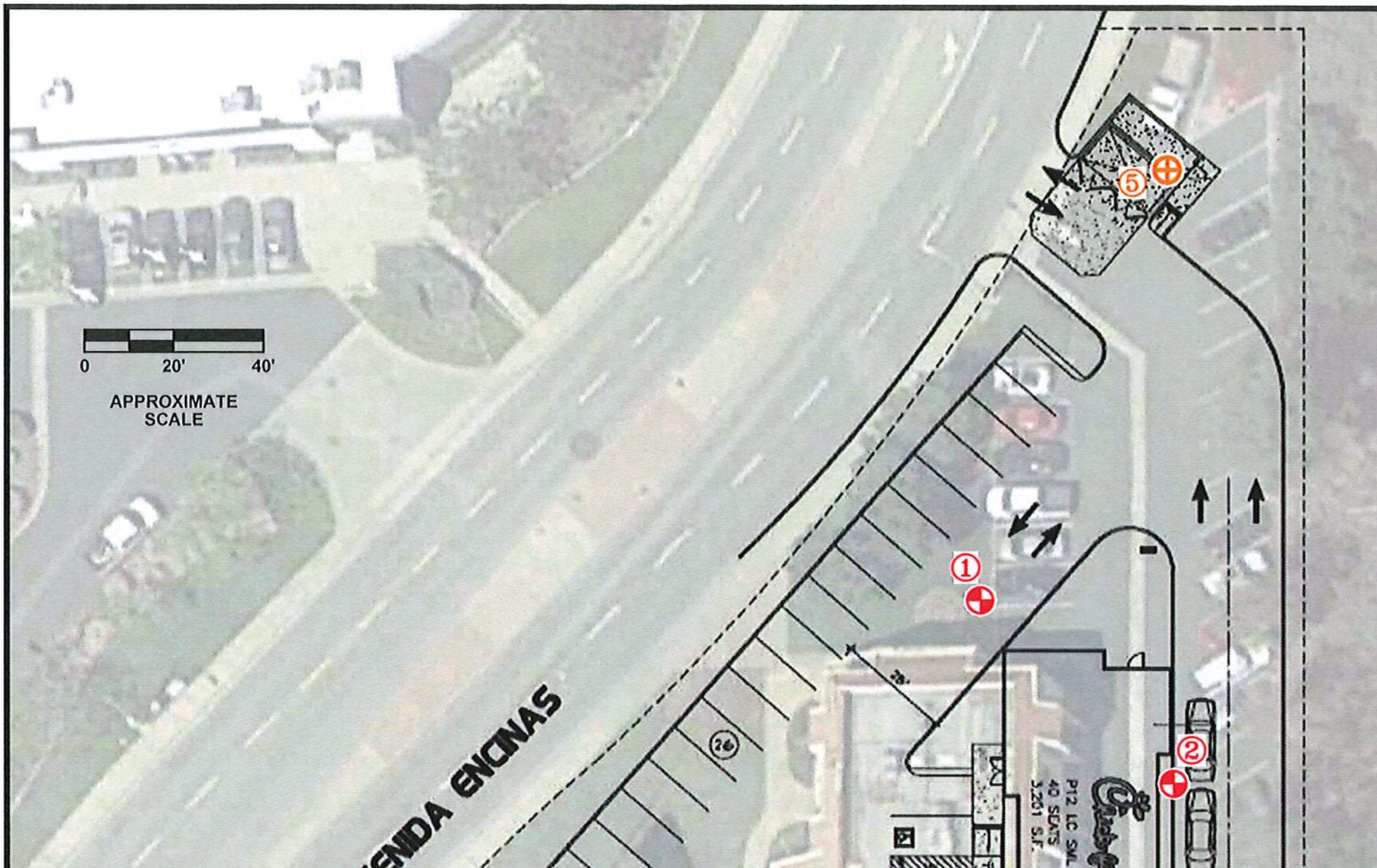
The conclusions and recommendations in this report are based on estimated subsurface conditions as shown on the *Records of Subsurface Exploration*. Giles must be notified if the subsurface conditions that are encountered during construction of the proposed development differ from those shown on the *Records of Subsurface Exploration* because this report will likely need to be revised. General comments and limitations of this report are given in the appendix.

APPENDIX A

FIGURES AND TEST BORING LOGS

The Test Boring Location Plan contained herein was prepared based upon information supplied by *Giles'* client, or others, along with *Giles'* field measurements and observations. The diagram is presented for conceptual purposes only and is intended to assist the reader in report interpretation.

The Test Boring Logs and related information enclosed herein depict the subsurface (soil and water) conditions encountered at the specific boring locations on the date that the exploration was performed. Subsurface conditions may differ between boring locations and within areas of the site that were not explored with test borings. The subsurface conditions may also change at the boring locations over the passage of time.



LEGEND:

①	GEOTECHNICAL TEST BORING
⑤	GEOTECHNICAL TEST BORING / PERCOLATION TEST BORING

N
W E
S

NOTES:

1.) TEST BORING LOCATIONS ARE APPROXIMATE.

2.) BASE MAP DEVELOPED FROM THE "PRELIMINARY SITE PLAN" (SHEET PSP-17), REV. 8-3-18, PREPARED BY CRHO ARCHITECTS.

GILES ENGINEERING ASSOCIATES, INC.
1965 N. MAIN STREET
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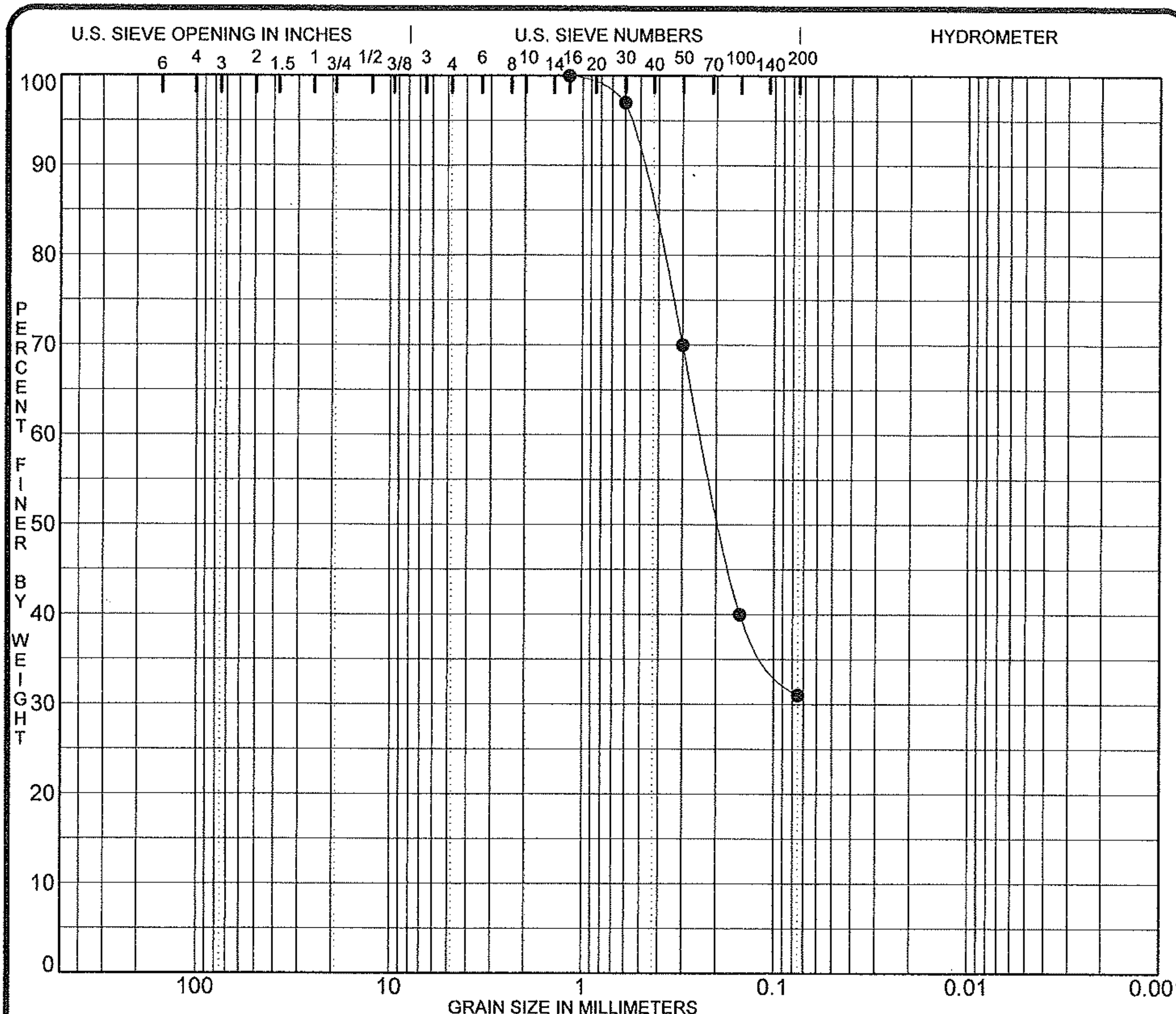
FIGURE 1
TEST BORING LOCATION PLAN
PROPOSED CHICK-FIL-A RESTAURANT NO. 04306
I-5 AND PALOMAR FSU
5850 AVENIDA ENCINAS
CARLSBAD, CALIFORNIA

DESIGNED	DRAWN	SCALE	DATE	REVISED
ELG	Jdid	approx. 1"=40'	10-01-18	--
PROJECT NO.: 2G-1808005			CAD No. 2g1808005-blp	



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	B-5	3.5	**Clayey Sand to Silty Sand**						

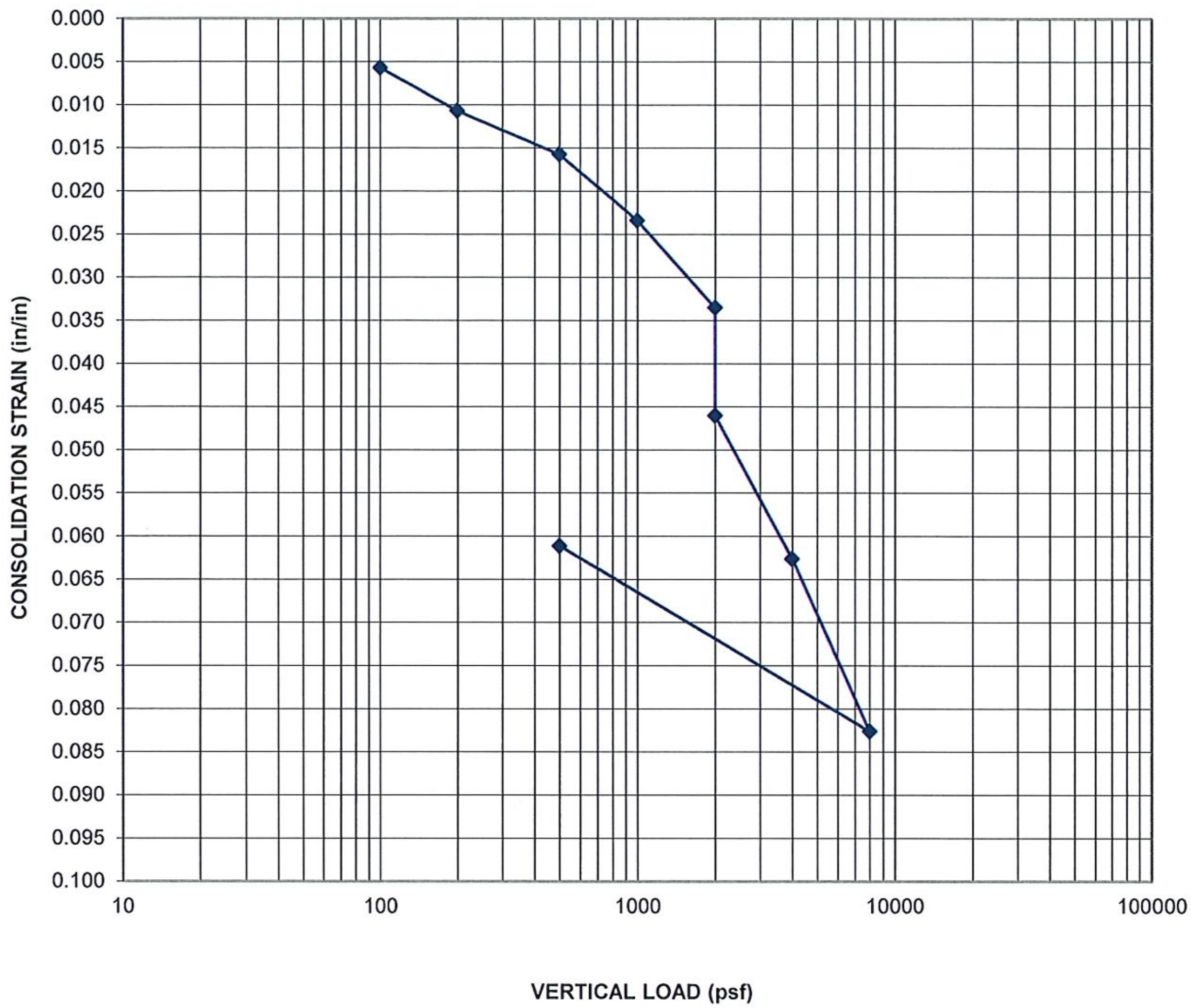
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-5**	**3.5**	**1.18**	**0.24**			**0.0**	**69.0**	**31.0**	

PROJECT **Proposed CFA #4306 - Carlsbad, CA** JOB NO. **2G-1808005**
FIGURE 2 DATE **10/4/18**

GRADATION CURVES

Giles Engineering Associates, Inc

CONSOLIDATION / COLLAPSE TEST ASTM D2435/ASTM D5333



Classification	Clayey Sand		
Boring No.	B-3		
Sample No.	2-CS	Initial Moisture Content (%)	11.2
Depth (ft.)	3.0	Final Moisture Content (%)	15.5
Elevation		Natural Density (pcf)	123.4
Liquid Limit		Initial Dry Density (pcf)	110.9
Plastic Limit		Final Dry Density (pcf)	119.4
Specimen Diameter (in.)	2.42	Collapse @ 2000 psf	1.25%
Initial Specimen Thickness (in.)	1.00		

Sample inundated at 2000 psf pressure

Project:	CFA Carlsbad
Client:	Chick-fil-A
Project No.:	2G-1808005
Figure No.:	3

GILES ENGINEERING ASSOCIATES, INC.

-GEOTECHNICAL, ENVIRONMENTAL, AND CONSTRUCTION MATERIALS-

1965 NORTH MAIN STREET, ORANGE, CALIFORNIA

OFFICE: 714-279-0817 FAX : 714-279-9687

BORING NO. & LOCATION: B-1	# TEST BORING LOG	**GILES ENGINEERING ASSOCIATES, INC.**
SURFACE ELEVATION: 56.5 feet	PROPOSED CHICK-FIL-A RESTAURANT #4306	
COMPLETION DATE: 09/11/18	5850 AVENIDA ENCINAS CARLSBAD, CA	
FIELD REP: TREVOR SLAZAS	PROJECT NO: 2G-1808005	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
Approximately 2.5 inches of asphaltic concrete over 4.5 inches of aggregate base		55								
Brown Clayey fine Sand - Moist (Possible Fill)			1-SS	18				13	BDL	P_{200}=40%
Gray fine Sand, some Silt, some layers of Silty Sand - Moist (Native)	5	50	2-SS	20				13	BDL	P_{200}=23%
Light Brown Silty Sand to fine to medium Sand, trace Silt - Moist	10	45	3-SS	32				13	BDL	P_{200}=20%
	15	40	4-SS	51				14	BDL	
Light Yellowish Silty Sandstone - Moist (Old Paralic Deposits)	20	35	5-SS	50/3"				16	BDL	P_{200}=27%
	25	30	6-SS	50/6"				15	BDL	
	30	25	7-SS	50/5"				15	BDL	P_{200}=23%
	35		8-SS	50/4"				10	BDL	

Groundwater encountered at 18 feet
Boring Terminated at about 35.5 feet (EL. 21')

Water Observation Data	Remarks:
Water Encountered During Drilling: 18'	SS = Standard Penetration Test
Water Level At End of Drilling:	BDL - Below Detection Level
Cave Depth At End of Drilling:	
Water Level After Drilling:	
Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: B-2	TEST BORING LOG	
SURFACE ELEVATION: 57 feet	PROPOSED CHICK-FIL-A RESTAURANT #4306	GILES ENGINEERING ASSOCIATES, INC.
COMPLETION DATE: 09/11/18	5850 AVENIDA ENCINAS CARLSBAD, CA	
FIELD REP: TREVOR SLAZAS	PROJECT NO: 2G-1808005	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
Approximately 4 inches of asphaltic concrete										
Light Brown Clayey Sand - Moist (Possible Fill)		55	1-SS	11				17	BDL	
Brown Clayey fine Sand - Moist (Native)			2-CS	48				14	BDL	Dd=124.9 pcf
	5									
Light Brown Silty Sand to fine Sand with Silt - Moist		50	3-CS	53				8	BDL	Dd=104.5 pcf
			4-CS	63				12	BDL	Dd=116.8 pcf
	10									

No groundwater encountered
Boring Terminated at about 10 feet (EL. 47')

Water Observation Data	Remarks:
Water Encountered During Drilling: None	CS = California Split Spoon
Water Level At End of Drilling:	SS = Standard Penetration Test
Cave Depth At End of Drilling:	BDL - Below Detection Level
Water Level After Drilling:	
Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: B-3	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 56.8 feet	PROPOSED CHICK-FIL-A RESTAURANT #4306	
COMPLETION DATE: 09/11/18	5850 AVENIDA ENCINAS CARLSBAD, CA	
FIELD REP: TREVOR SLAZAS	PROJECT NO: 2G-1808005	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
Approximately 5 inches of asphaltic concrete										
Brown Clayey fine Sand - Moist (Possible Fill)		55	1-SS	9				20	BDL	
Brown to Light Brown Clayey fine Sand - Moist (Native)			2-CS	27				17	BDL	Dd=111.0 pcf
	5									
Yellowish Brown fine Sand to Silty fine Sand, some iron oxide staining - Moist		50	3-CS	40				8	BDL	Dd=112.3 pcf
			4-CS	46				13	BDL	Dd=104.7 pcf
	10									

No groundwater encountered
Boring Terminated at about 10 feet (EL. 46.8')

	Water Observation Data	Remarks:
	Water Encountered During Drilling: None	CS = California Split Spoon
	Water Level At End of Drilling:	SS = Standard Penetration Test
	Cave Depth At End of Drilling:	BDL - Below Detection Level
	Water Level After Drilling:	
	Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: B-4	TEST BORING LOG	
SURFACE ELEVATION: 57.5 feet	PROPOSED CHICK-FIL-A RESTAURANT #4306	GILES ENGINEERING ASSOCIATES, INC.
COMPLETION DATE: 09/11/18	5850 AVENIDA ENCINAS CARLSBAD, CA	
FIELD REP: TREVOR SLAZAS	PROJECT NO: 2G-1808005	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
Approximately 5 inches of asphaltic concrete										
Brown Clay fine Sand - Moist (Possible Fill)		55	1-SS	15				17	BDL	
Light Brown fine Sand, trace of Clay, some layers of Silty Sand - Moist (Native)	5		2-SS	25				10	BDL	
		50								
Brown fine Sand, trace to little Silt - Moist	10		3-SS	30				10	BDL	
		45								
	15		4-SS	35				16	BDL	
		40								
Yellowish Brown Silty Sandstone - Moist (Old Paralic Deposits)	20		5-SS	50/5"				11	BDL	

Groundwater encountered at 17 feet
Boring Terminated at about 21.5 feet (EL. 36')

Water Observation Data	Remarks:
Water Encountered During Drilling: 17'	SS = Standard Penetration Test
Water Level At End of Drilling:	BDL - Below Detection Level
Cave Depth At End of Drilling:	
Water Level After Drilling:	
Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: B-5	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 56.3 feet	PROPOSED CHICK-FIL-A RESTAURANT #4306	
COMPLETION DATE: 09/11/18	5850 AVENIDA ENCINAS CARLSBAD, CA	
FIELD REP: TREVOR SLAZAS	PROJECT NO: 2G-1808005	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
Approximately 3 inches of asphaltic concrete over 5 inches of aggregate base										
Brown Clayey fine Sand to Silty fine Sand - Moist (Possible Fill to Native)		55.0								
			1-SS	17				14	BDL	
	2.5									
		52.5								
			2-SS	38				7	BDL	P_{200}=30%
	5.0									

No groundwater encountered
Boring Terminated at about 5 feet (EL. 51.3')

	Water Observation Data	Remarks:
∇	Water Encountered During Drilling: None	SS = Standard Penetration Test
∇	Water Level At End of Drilling:	BDL - Below Detection Level
	Cave Depth At End of Drilling:	
▼	Water Level After Drilling:	
	Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: B-6	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 56.4 feet	PROPOSED CHICK-FIL-A RESTAURANT #4306	
COMPLETION DATE: 09/11/18	5850 AVENIDA ENCINAS CARLSBAD, CA	
FIELD REP: TREVOR SLAZAS	PROJECT NO: 2G-1808005	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
Approximately 4 inches of asphaltic concrete over 5 inches of aggregate base										
Brown fine Sandy Clay - Moist (Possibble Fill to Native)		55.0	1-SS	5				25	BDL	
	2.5	52.5	2-SS	18				22	BDL	
	5.0									

No groundwater encountered
Boring Terminated at about 5 feet (EL. 51.4')

	Water Observation Data	Remarks:
∇	Water Encountered During Drilling: None	SS = Standard Penetration Test
▼	Water Level At End of Drilling:	BDL - Below Detection Level
	Cave Depth At End of Drilling:	
▼	Water Level After Drilling:	
	Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

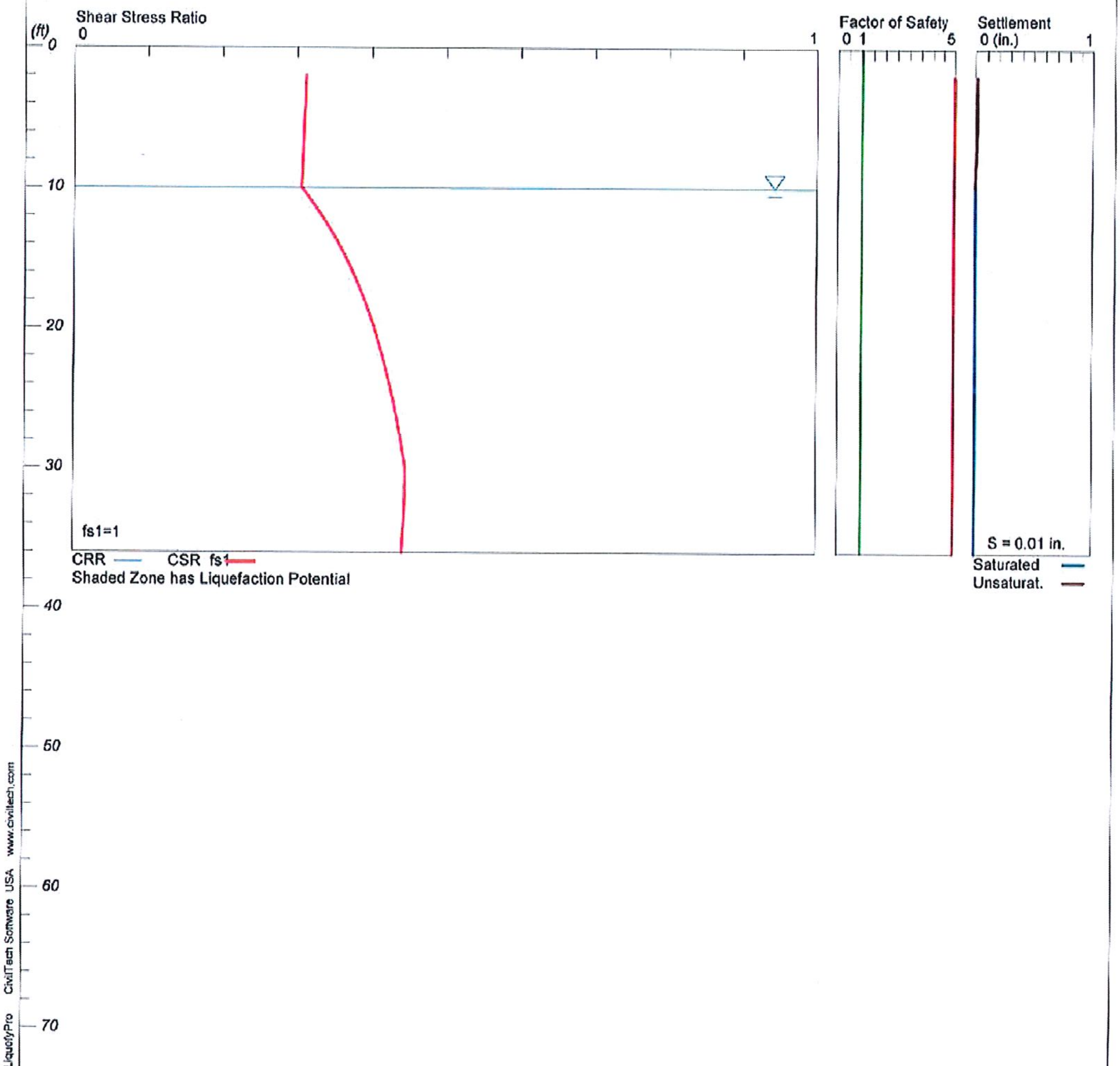
GILES LOG REPORT 2G-1808005.GPJ GILES.GDT 10/5/18

LIQUEFACTION ANALYSIS

CFA #4306 - Carlsbad, CA

Hole No.=B-1 *Water Depth=10 ft*

Magnitude=6.72
Acceleration=0.482g



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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: UNTITLED
Title: CFA #4306 - Carlsbad, CA
Subtitle: 2G-1808005, 5850 Avenida Encinas

Surface Elev.=
Hole No.=B-1
Depth of Hole= 36.00 ft
Water Table during Earthquake= 10.00 ft
Water Table during In-Situ Testing= 18.00 ft
Max. Acceleration= 0.48 g
Earthquake Magnitude= 6.72

Input Data:
Surface Elev.=
Hole No.=B-1
Depth of Hole=36.00 ft
Water Table during Earthquake= 10.00 ft
Water Table during In-Situ Testing= 18.00 ft
Max. Acceleration=0.48 g
Earthquake Magnitude=6.72
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu/Seed
3. Fines Correction for Liquefaction: Idriss/Seed
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio,   Ce = 1.25
7. Borehole Diameter,   Cb= 1
8. Sampling Method,   Cs= 1.2
9. User request factor of safety (apply to CSR) ,   User= 1
   Plot one CSR curve (fs1=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
2.00	18.00	120.00	15.00
5.00	20.00	120.00	15.00
10.00	32.00	120.00	10.00
15.00	51.00	120.00	5.00
20.00	50.00	120.00	5.00
25.00	50.00	120.00	5.00
30.00	50.00	120.00	5.00
35.00	50.00	120.00	4.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.01 in.
Total Settlement of Saturated and Unsaturated Sands=0.01 in.
Differential Settlement=0.006 to 0.008 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
2.00	2.65	0.31	5.00	0.00	0.01	0.01
2.50	2.65	0.31	5.00	0.00	0.01	0.01
3.00	2.65	0.31	5.00	0.00	0.01	0.01
3.50	2.65	0.31	5.00	0.00	0.01	0.01
4.00	2.65	0.31	5.00	0.00	0.01	0.01
4.50	2.65	0.31	5.00	0.00	0.01	0.01
5.00	2.65	0.31	5.00	0.00	0.01	0.01
5.50	2.65	0.31	5.00	0.00	0.01	0.01
6.00	2.65	0.31	5.00	0.00	0.01	0.01
6.50	2.65	0.31	5.00	0.00	0.01	0.01
7.00	2.65	0.31	5.00	0.00	0.01	0.01
7.50	2.65	0.31	5.00	0.00	0.00	0.00
8.00	2.65	0.31	5.00	0.00	0.00	0.00
8.50	2.65	0.31	5.00	0.00	0.00	0.00
9.00	2.65	0.31	5.00	0.00	0.00	0.00
9.50	2.65	0.31	5.00	0.00	0.00	0.00
10.00	2.65	0.31	5.00	0.00	0.00	0.00
10.50	2.65	0.31	5.00	0.00	0.00	0.00
11.00	2.65	0.32	5.00	0.00	0.00	0.00
11.50	2.65	0.33	5.00	0.00	0.00	0.00
12.00	2.65	0.33	5.00	0.00	0.00	0.00
12.50	2.65	0.34	5.00	0.00	0.00	0.00
13.00	2.65	0.35	5.00	0.00	0.00	0.00
13.50	2.65	0.35	5.00	0.00	0.00	0.00
14.00	2.65	0.36	5.00	0.00	0.00	0.00
14.50	2.65	0.36	5.00	0.00	0.00	0.00
15.00	2.65	0.37	5.00	0.00	0.00	0.00
15.50	2.65	0.37	5.00	0.00	0.00	0.00
16.00	2.65	0.37	5.00	0.00	0.00	0.00
16.50	2.65	0.38	5.00	0.00	0.00	0.00
17.00	2.65	0.38	5.00	0.00	0.00	0.00
17.50	2.65	0.39	5.00	0.00	0.00	0.00
18.00	2.65	0.39	5.00	0.00	0.00	0.00
18.50	2.65	0.39	5.00	0.00	0.00	0.00
19.00	2.65	0.40	5.00	0.00	0.00	0.00
19.50	2.65	0.40	5.00	0.00	0.00	0.00
20.00	2.65	0.40	5.00	0.00	0.00	0.00
20.50	2.65	0.41	5.00	0.00	0.00	0.00
21.00	2.65	0.41	5.00	0.00	0.00	0.00
21.50	2.65	0.41	5.00	0.00	0.00	0.00
22.00	2.65	0.41	5.00	0.00	0.00	0.00
22.50	2.65	0.42	5.00	0.00	0.00	0.00
23.00	2.65	0.42	5.00	0.00	0.00	0.00
23.50	2.65	0.42	5.00	0.00	0.00	0.00
24.00	2.65	0.42	5.00	0.00	0.00	0.00
24.50	2.65	0.43	5.00	0.00	0.00	0.00
25.00	2.65	0.43	5.00	0.00	0.00	0.00
25.50	2.65	0.43	5.00	0.00	0.00	0.00
26.00	2.65	0.43	5.00	0.00	0.00	0.00
26.50	2.65	0.43	5.00	0.00	0.00	0.00
27.00	2.65	0.44	5.00	0.00	0.00	0.00
27.50	2.65	0.44	5.00	0.00	0.00	0.00
28.00	2.65	0.44	5.00	0.00	0.00	0.00
28.50	2.65	0.44	5.00	0.00	0.00	0.00

29.00	2.65	0.44	5.00	0.00	0.00	0.00
29.50	2.65	0.44	5.00	0.00	0.00	0.00
30.00	2.65	0.45	5.00	0.00	0.00	0.00
30.50	2.65	0.45	5.00	0.00	0.00	0.00
31.00	2.65	0.45	5.00	0.00	0.00	0.00
31.50	2.65	0.45	5.00	0.00	0.00	0.00
32.00	2.65	0.45	5.00	0.00	0.00	0.00
32.50	2.65	0.45	5.00	0.00	0.00	0.00
33.00	2.65	0.44	5.00	0.00	0.00	0.00
33.50	2.65	0.44	5.00	0.00	0.00	0.00
34.00	2.65	0.44	5.00	0.00	0.00	0.00
34.50	2.65	0.44	5.00	0.00	0.00	0.00
35.00	2.65	0.44	5.00	0.00	0.00	0.00
35.50	2.65	0.44	5.00	0.00	0.00	0.00
36.00	2.65	0.44	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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1 atm (atmosphere) = 1 tsf (ton/ft2)

CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

APPENDIX B

FIELD PROCEDURES

The field operations were conducted in general accordance with the procedures recommended by the American Society for Testing and Materials (ASTM) designation D 420 entitled "Standard Guide for Sampling Rock and Rock" and/or other relevant specifications. Soil samples were preserved and transported to *Giles'* laboratory in general accordance with the procedures recommended by ASTM designation D 4220 entitled "Standard Practice for Preserving and Transporting Soil Samples." Brief descriptions of the sampling, testing and field procedures commonly performed by *Giles* are provided herein.

GENERAL FIELD PROCEDURES

Test Boring Elevations

The ground surface elevations reported on the Test Boring Logs are referenced to the assumed benchmark shown on the Boring Location Plan (Figure 1). Unless otherwise noted, the elevations were determined with a conventional hand-level and are accurate to within about 1 foot.

Test Boring Locations

The test borings were located on-site based on the existing site features and/or apparent property lines. Dimensions illustrating the approximate boring locations are reported on the Boring Location Plan (Figure 1).

Water Level Measurement

The water levels reported on the Test Boring Logs represent the depth of "free" water encountered during drilling and/or after the drilling tools were removed from the borehole. Water levels measured within a granular (sand and gravel) soil profile are typically indicative of the water table elevation. It is usually not possible to accurately identify the water table elevation with cohesive (clayey) soils, since the rate of seepage is slow. The water table elevation within cohesive soils must therefore be determined over a period of time with groundwater observation wells.

It must be recognized that the water table may fluctuate seasonally and during periods of heavy precipitation. Depending on the subsurface conditions, water may also become perched above the water table, especially during wet periods.

Borehole Backfilling Procedures

Each borehole was backfilled upon completion of the field operations. If potential contamination was encountered, and/or if required by state or local regulations, boreholes were backfilled with an "impervious" material (such as bentonite slurry). Borings that penetrated pavements, sidewalks, etc. were "capped" with Portland Cement concrete, asphaltic concrete, or a similar surface material. It must, however, be recognized that the backfill material may settle, and the surface cap may subside, over a period of time. Further backfilling and/or re-surfacing by *Giles'* client or the property owner may be required.

FIELD SAMPLING AND TESTING PROCEDURES

Auger Sampling (AU)

Soil samples are removed from the auger flights as an auger is withdrawn above the ground surface. Such samples are used to determine general soil types and identify approximate soil stratifications. Auger samples are highly disturbed and are therefore not typically used for geotechnical strength testing.

Split-Barrel Sampling (SS) – (ASTM D-1586)

A split-barrel sampler with a 2-inch outside diameter is driven into the subsoil with a 140-pound hammer free-falling a vertical distance of 30 inches. The summation of hammer-blows required to drive the sampler the final 12-inches of an 18-inch sample interval is defined as the "Standard Penetration Resistance" or N-value is an index of the relative density of granular soils and the comparative consistency of cohesive soils. A soil sample is collected from each SPT interval.

Shelby Tube Sampling (ST) – (ASTM D-1587)

A relatively undisturbed soil sample is collected by hydraulically advancing a thin-walled Shelby Tube sampler into a soil mass. Shelby Tubes have a sharp cutting edge and are commonly 2 to 5 inches in diameter.

Bulk Sample (BS)

A relatively large volume of soils is collected with a shovel or other manually-operated tool. The sample is typically transported to *Giles'* materials laboratory in a sealed bag or bucket.

Dynamic Cone Penetration Test (DC) – (ASTM STP 399)

This test is conducted by driving a 1.5-inch-diameter cone into the subsoil using a 15-pound steel ring (hammer), free-falling a vertical distance of 20 inches. The number of hammer-blows required to drive the cone 1¾ inches is an indication of the soil strength and density, and is defined as "N". The Dynamic Cone Penetration test is commonly conducted in hand auger borings, test pits and within excavated trenches.

- Continued -

Ring-Lined Barrel Sampling – (ASTM D 3550)

In this procedure, a ring-lined barrel sampler is used to collect soil samples for classification and laboratory testing. This method provides samples that fit directly into laboratory test instruments without additional handling/disturbance.

Sampling and Testing Procedures

The field testing and sampling operations were conducted in general accordance with the procedures recommended by the American Society for Testing and Materials (ASTM) and/or other relevant specifications. Results of the field testing (i.e. N-values) are reported on the Test Boring Logs. Explanations of the terms and symbols shown on the logs are provided on the appendix enclosure entitled "General Notes".

APPENDIX C

LABORATORY TESTING AND CLASSIFICATION

The laboratory testing was conducted under the supervision of a geotechnical engineer in accordance with the procedures recommended by the American Society for Testing and Materials (ASTM) and/or other relevant specifications. Brief descriptions of laboratory tests commonly performed by *Giles* are provided herein.

LABORATORY TESTING AND CLASSIFICATION

Photoionization Detector (PID)

In this procedure, soil samples are "scanned" in *Giles'* analytical laboratory using a Photoionization Detector (PID). The instrument is equipped with an 11.7 eV lamp calibrated to a Benzene Standard and is capable of detecting a minute concentration of **certain** Volatile Organic Compound (VOC) vapors, such as those commonly associated with petroleum products and some solvents. Results of the PID analysis are expressed in HNu (manufacturer's) units rather than actual concentration.

Moisture Content (w) (ASTM D 2216)

Moisture content is defined as the ratio of the weight of water contained within a soil sample to the weight of the dry solids within the sample. Moisture content is expressed as a percentage.

Unconfined Compressive Strength (qu) (ASTM D 2166)

An axial load is applied at a uniform rate to a cylindrical soil sample. The unconfined compressive strength is the maximum stress obtained or the stress when 15% axial strain is reached, whichever occurs first.

Calibrated Penetrometer Resistance (qp)

The small, cylindrical tip of a hand-held penetrometer is pressed into a soil sample to a prescribed depth to measure the soils capacity to resist penetration. This test is used to evaluate unconfined compressive strength.

Vane-Shear Strength (qs)

The blades of a vane are inserted into the flat surface of a soil sample and the vane is rotated until failure occurs. The maximum shear resistance measured immediately prior to failure is taken as the vane-shear strength.

Loss-on-Ignition (ASTM D 2974; Method C)

The Loss-on-Ignition (L.O.I.) test is used to determine the organic content of a soil sample. The procedure is conducted by heating a dry soil sample to 440°C in order to burn-off or "ash" organic matter present within the sample. The L.O.I. value is the ratio of the weight loss due to ignition compared to the initial weight of the dry sample. L.O.I. is expressed as a percentage.

Particle Size Distribution (ASTB D 421, D 422, and D 1140)

This test is performed to determine the distribution of specific particle sizes (diameters) within a soil sample. The distribution of coarse-grained soil particles (sand and gravel) is determined from a "sieve analysis," which is conducted by passing the sample through a series of nested sieves. The distribution of fine-grained soil particles (silt and clay) is determined from a "hydrometer analysis" which is based on the sedimentation of particles suspended in water.

Consolidation Test (ASTM D 2435)

In this procedure, a series of cumulative vertical loads are applied to a small, laterally confined soil sample. During each load increment, vertical compression (consolidation) of the sample is measured over a period of time. Results of this test are used to estimate settlement and time rate of settlement.

Classification of Samples

Each soil sample was visually-manually classified, based on texture and plasticity, in general accordance with the Unified Soil Classification System (ASTM D-2488-75). The classifications are reported on the Test Boring Logs.

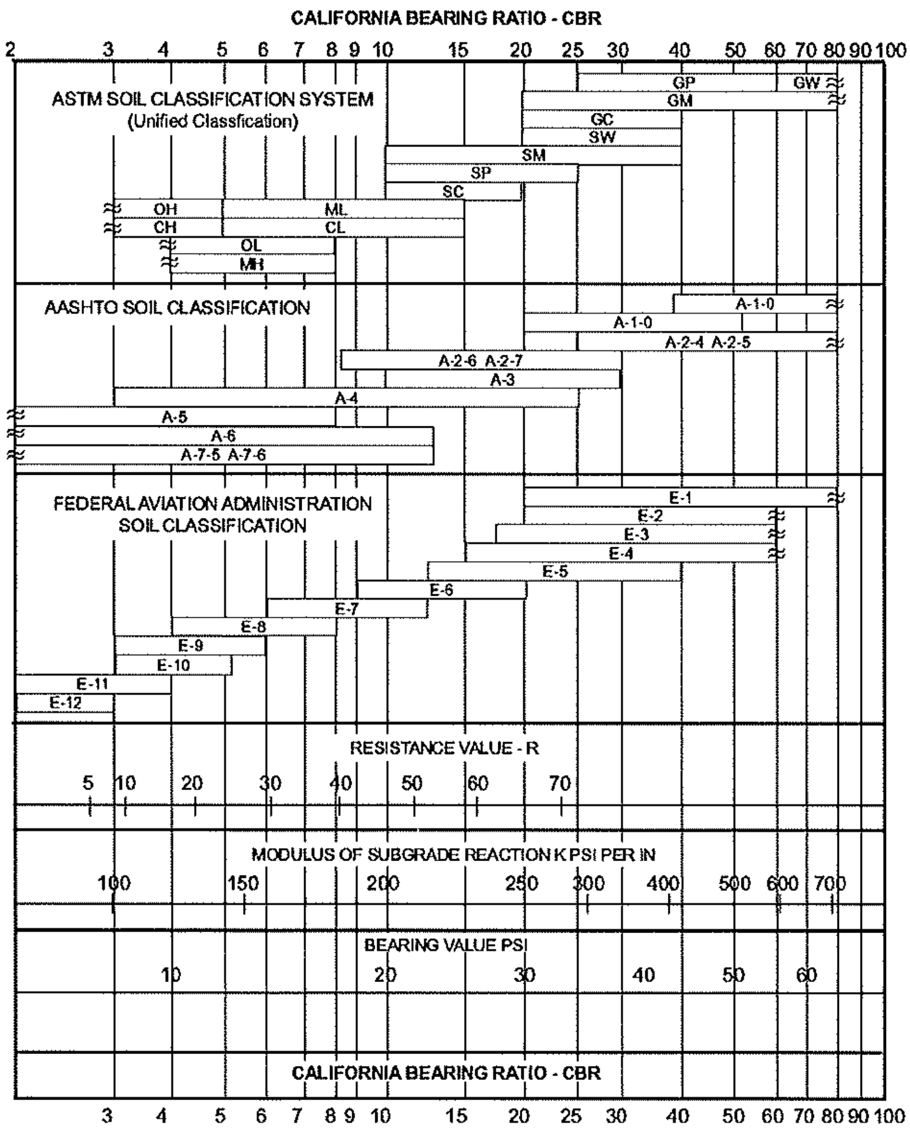
Laboratory Testing

The laboratory testing operations were conducted in general accordance with the procedures recommended by the American Society for Testing and Materials (ASTM) and/or other relevant specifications. Results of the laboratory tests are provided on the Test Boring Logs or other appendix enclosures. Explanation of the terms and symbols used on the logs is provided on the appendix enclosure entitled "General Notes."

California Bearing Ratio (CBR) Test ASTM D-1833

The CBR test is used for evaluation of a soil subgrade for pavement design. The test consists of measuring the force required for a 3-square-inch cylindrical piston to penetrate 0.1 or 0.2 inch into a compacted soil sample. The result is expressed as a percent of force required to penetrate a standard compacted crushed stone.

Unless a CBR test has been specifically requested by the client, the CBR is estimated from published charts, based on soil classification and strength characteristics. A typical correlation chart is below.



APPENDIX D

GENERAL INFORMATION

GUIDE SPECIFICATIONS FOR SUBGRADE AND PREPARATION FOR FILL, FOUNDATION, FLOOR SLAB AND PAVEMENT SUPPORT; AND SELECTION, PLACEMENT AND COMPACTION OF FILL SOILS USING MODIFIED PROCTOR PROCEDURES

1. Construction monitoring and testing of subgrades and grades for fill, foundation, floor slab and pavement; and fill selection, placement and compaction shall be performed by an experienced soils engineer and/or his representatives.

2. All compacted fill, subgrades, and grades shall be (a) underlain by suitable bearing material, (b) free of all organic frozen, or other deleterious material, and (c) observed, tested and approved by qualified engineering personnel representing an experienced soils engineer. Preparation of subgrades after stripping vegetation, organic or other unsuitable materials shall consist of (a) proofrolling to detect soft, wet, yielding soils or other unstable materials that must be undercut, (b) scarifying top 6 to 8 inches, (c) moisture conditioning the soils as required, and (d) recompaction to same minimum in-situ density required for similar material indicated under Item 5. Note: Compaction requirements for pavement subgrade are higher than other areas. Weather and construction equipment may damage compacted fill surface and reworking and retesting may be necessary for proper performance.

3. In overexcavation and fill areas, the compacted fill must extend (a) a minimum 1 foot lateral distance beyond the exterior edge of the foundation at bearing grade or pavement at subgrade and down to compacted fill subgrade on a maximum 0.5(H):1(v) slope, (b) 1 foot above footing grade outside the building, and (c) to floor subgrade inside the building. Fill shall be placed and compacted on a 5(H):1(V) slope or must be stepped or benched as required to flatten if not specifically approved by qualified personnel under the direction of an experienced soils engineer.

4. The compacted fill materials shall be free of deleterious, organic, or frozen matter, shall contain no chemicals that may result in the material being classified as "contaminated", and shall be low-expansive with a maximum Liquid Limit (ASTM D-423) and Plasticity Index (ASTM D-424) of 30 and 15, respectively, unless specifically tested and found to have low expansive properties and approved by an experienced soils engineer. The top 12 inches of compacted fill should have a maximum 3 inch particle diameter and all underlying compacted fill a maximum 6 inch diameter unless specifically approved by an experienced soils engineer. All fill material must be tested and approved under the direction of an experienced soils engineer prior to placement. If the fill is to provide non-frost susceptible characteristics, it must be classified as a clean GW, GP, SW or SP per Unified Soils Classification System (ASTM D-2487).

5. For structural fill depths less than 20 feet, the density of the structural compacted fill and scarified subgrade and grades shall not be less than 90 percent of the maximum dry density as determined by Modified Proctor (ASTM D-1557) with the exception of the top 12 inches of pavement subgrade which shall have a minimum in-situ density of 95 percent of maximum dry density, or 5 percent higher than underlying structural fill materials. Where the structural fill depth is greater than 20 feet, the portion below 20 feet should have a minimum in-place density of 95 percent of its maximum dry density or 5 percent higher than the top 20 feet. Cohesive soils shall not vary by more than -1 to +3 percent moisture content and granular soil ±3 percent from the optimum when placed and compacted or recompacted, unless specifically recommended/approved by the soils engineer observing the placement and compaction. Cohesive soils with moderate to high expansion potentials (PI>15) should, however, be placed, compacted and maintained prior to construction at a 3±1 percent moisture content above optimum moisture content to limit future heave. Fill shall be placed in layers with a maximum loose thickness of 8 inches for foundations and 10 inches for floor slabs and pavements, unless specifically approved by the soils engineer taking into consideration the type of materials and compaction equipment being used. The compaction equipment should consist of suitable mechanical equipment specifically designed for soil compaction. Bulldozers or similar tracked vehicles are typically not suitable for compaction.

6. Excavation, filing, subgrade grade preparation shall be performed in a manner and sequence that will provide drainage at all times and proper control of erosion. Precipitation, springs, and seepage water encountered shall be pumped or drained to provide a suitable working platform. Springs or water seepage encountered during grade/foundation construction must be called to the soils engineer's attention immediately for possible construction procedure revision or inclusion of an underdrain system.

7. Non-structural fill adjacent to structural fill should typically be placed in unison to provide lateral support. Backfill along walls must be placed and compacted with care to ensure excessive unbalanced lateral pressures do not develop. The type of fill material placed adjacent to below grade walls (i.e. basement walls and retaining walls) must be properly tested and approved by an experienced soils engineer with consideration for the lateral pressure used in the wall design.

8. Wherever, in the opinion of the soils engineer or the Owner's Representatives, an unstable condition is being created either by cutting or filling, the work should not proceed into that area until an appropriate geotechnical exploration and analysis has been performed and the grading plan revised, if found necessary.

GENERAL COMMENTS

The soil samples obtained during the subsurface exploration will be retained for a period of thirty days. If no instructions are received, they will be disposed of at that time.

This report has been prepared exclusively for the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. Copies of this report may be provided to contractor(s), with contract documents, to disclose information relative to this project. The report, however, has not been prepared to serve as the plans and specifications for actual construction without the appropriate interpretation by the project architect, structural engineer, and/or civil engineer. Reproduction and distribution of this report must be authorized by the client and *Giles.*

This report has been based on assumed conditions/characteristics of the proposed development where specific information was not available. It is recommended that the architect, civil engineer and structural engineer along with any other design professionals involved in this project carefully review these assumptions to ensure they are consistent with the actual planned development. When discrepancies exist, they should be brought to our attention to ensure they do not affect the conclusions and recommendations provided herein. The project plans and specifications may also be submitted to *Giles* for review to ensure that the geotechnical related conclusions and recommendations provided herein have been correctly interpreted.

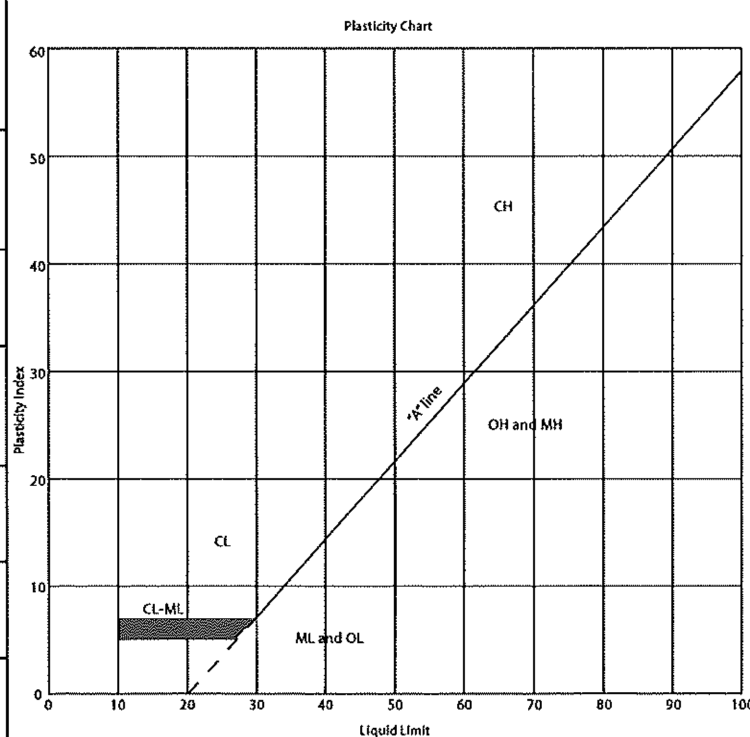
The analysis of this site was based on a subsoil profile interpolated from a limited subsurface exploration. If the actual conditions encountered during construction vary from those indicated by the borings, *Giles* must be contacted immediately to determine if the conditions alter the recommendations contained herein.

The conclusions and recommendations presented in this report have been promulgated in accordance with generally accepted professional engineering practices in the field of geotechnical engineering. No other warranty is either expressed or implied.

ARACTERISTICS AND RATINGS OF UNIFIED SOIL SYSTEM CLASSES FOR SOIL CONSTRUCTION *								
ion istics	Max. Dry Density Standard Proctor (pcf)	Compressibility and Expansion	Drainage and Permeability	Value as an Embankment Material	Value as Subgrade When Not Subject to Frost	Value as Base Course	Value as Temporary Pavement	
							With Dust Palliative	With Bituminous Treatment
-tired, steel ller	125-135	Almost none	Good drainage, pervious	Very stable	Excellent	Good	Fair to poor	Excellent
-tired, steel ller	115-125	Almost none	Good drainage, pervious	Reasonably stable	Excellent to good	Poor to fair	Poor	
r light	120-135	Slight	Poor drainage, semipervious	Reasonably stable	Excellent to good	Fair to poor	Poor	Poor to fair
tired or	115-130	Slight	Poor drainage, impervious	Reasonably stable	Good	Good to fair **	Excellent	Excellent
-tired or	110-130	Almost none	Good drainage, pervious	Very stable	Good	Fair to poor	Fair to poor	Good
-tired or	100-120	Almost none	Good drainage, pervious	Reasonably stable when dense	Good to fair	Poor	Poor	Poor to fair
r sheepsfoot	110-125	Slight	Poor drainage, impervious	Reasonably stable when dense	Good to fair	Poor	Poor	Poor to fair
tired or	105-125	Slight to medium	Poor drainage, impervious	Reasonably stable	Good to fair	Fair to poor	Excellent	Excellent
-tired or	95-120	Slight to medium	Poor drainage, impervious	Poor stability, high density required	Fair to poor	Not suitable	Poor	Poor
oot or rubber-	95-120	Medium	No drainage, impervious	Good stability	Fair to poor	Not suitable	Poor	Poor
oot or rubber-	80-100	Medium to high	Poor drainage, impervious	Unstable, should not be used	Poor	Not suitable	Not suitable	Not suitable
oot or rubber-	70-95	High	Poor drainage, impervious	Poor stability, should not be used	Poor	Not suitable	Very poor	Not suitable
oot roller	80-105	Very high	No drainage, impervious	Fair stability, may soften on expansion	Poor to very poor	Not suitable	Very poor	Not suitable
oot roller	65-100	High	No drainage, impervious	Unstable, should not be used	Very poor	Not suitable	Not suitable	Not suitable
		Very high	Fair to poor drainage	Should not be used	Not suitable	Not suitable	Not suitable	Not suitable

pendix A - Characteristics of Soil, Groups Pertaining to Roads and Airfields, and Appendix B - Characteristics of Soil Groups Pertaining to Embankments
emorandum 357, U.S. Waterways Ixperiment Station, Vicksburg, 1953.

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D-2487)

Major Divisions			*Group Symbols*	*Typical Names*	*Laboratory Classification Criteria*		
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 size)	Clean gravels (little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent: GW, GP, SW, SP; More than 12 percent: GM, GC, SM, SC; 5 to 12 percent: *Borderline* cases requiring dual symbols[b]	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			GP	Poorly graded gravels, gravel-sand mixtrues, little or no fines		Not meeting all gradation requirements for GW	
		Gravels with fines (appreciable amount of fines)	GM[a] d / u	Silty gravels, gravel-sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Limits plotting within shaded area, above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-clay mixtures		Atterberg limits above "A" line or P.I. greater than 7	
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines		$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			SP	Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW	
		Sands with fines (Appreciable amount of fines)	SM[a] d / u	Silty sands, sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Limits plotting within shaded area, above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures		Atterberg limits above "A" line or P.I. greater than 7	
Fine-grained soils (More than half material is smaller than No. 200 sieve size)	Silts and clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity			
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays			
			OL	Organic silts and organic silty clays of low plasticity			
	Silts and clays (Liquid limit 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 silts			
Highly organic soils			Pt	Peat and other highly organic soils			

[a]Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits, suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u is used when L.L. is greater than 28.

[b]Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group sympols. For example GW-GC, well-graded gravel-sand mixture with clay binder.

Giles Engineering Associates, Inc.

GENERAL NOTES

SAMPLE IDENTIFICATION

All samples are visually classified in general accordance with the Unified Soil Classification System (ASTM D-2487-75 or D-2488-75)

DESCRIPTIVE TERM (% BY DRY WEIGHT)

Trace:	1-10%
Little:	11-20%
Some:	21-35%
And/Adjective	36-50%

PARTICLE SIZE (DIAMETER)

Boulders:	8 inch and larger
Cobbles:	3 inch to 8 inch
Gravel:	coarse - ¾ to 3 inch
	fine – No. 4 (4.76 mm) to ¾ inch
Sand:	coarse – No. 4 (4.76 mm) to No. 10 (2.0 mm)
	medium – No. 10 (2.0 mm) to No. 40 (0.42 mm)
	fine – No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt:	No. 200 (0.074 mm) and smaller (non-plastic)
Clay:	No 200 (0.074 mm) and smaller (plastic)

SOIL PROPERTY SYMBOLS

Dd:	Dry Density (pcf)
LL:	Liquid Limit, percent
PL:	Plastic Limit, percent
PI:	Plasticity Index (LL-PL)
LOI:	Loss on Ignition, percent
Gs:	Specific Gravity
K:	Coefficient of Permeability
w:	Moisture content, percent
qp:	Calibrated Penetrometer Resistance, tsf
qs:	Vane-Shear Strength, tsf
qu:	Unconfined Compressive Strength, tsf
qc:	Static Cone Penetrometer Resistance (correlated to Unconfined Compressive Strength, tsf)
PID:	Results of vapor analysis conducted on representative samples utilizing a Photoionization Detector calibrated to a benzene standard. Results expressed in HNU-Units. (BDL=Below Detection Limit)
N:	Penetration Resistance per 12 inch interval, or fraction thereof, for a standard 2 inch O.D. (1⅜ inch I.D.) split spoon sampler driven with a 140 pound weight free-falling 30 inches. Performed in general accordance with Standard Penetration Test Specifications (ASTM D-1586). N in blows per foot equals sum of N-Values where plus sign (+) is shown.
Nc:	Penetration Resistance per 1¾ inches of Dynamic Cone Penetrometer. Approximately equivalent to Standard Penetration Test N-Value in blows per foot.
Nr:	Penetration Resistance per 12 inch interval, or fraction thereof, for California Ring Sampler driven with a 140 pound weight free-falling 30 inches per ASTM D-3550. Not equivalent to Standard Penetration Test N-Value.

DRILLING AND SAMPLING SYMBOLS

SS:	Split-Spoon
ST:	Shelby Tube – 3 inch O.D. (except where noted)
CS:	3 inch O.D. California Ring Sampler
DC:	Dynamic Cone Penetrometer per ASTM Special Technical Publication No. 399
AU:	Auger Sample
DB:	Diamond Bit
CB:	Carbide Bit
WS:	Wash Sample
RB:	Rock-Roller Bit
BS:	Bulk Sample
Note:	Depth intervals for sampling shown on Record of Subsurface Exploration are not indicative of sample recovery, but position where sampling initiated

SOIL STRENGTH CHARACTERISTICS

COHESIVE (CLAYEY) SOILS

COMPARATIVE CONSISTENCY	BLOWS PER FOOT (N)	UNCONFINED COMPRESSIVE STRENGTH (TSF)
Very Soft	0 - 2	0 - 0.25
Soft	3 - 4	0.25 - 0.50
Medium Stiff	5 – 8	0.50 - 1.00
Stiff	9 – 15	1.00 - 2.00
Very Stiff	16 – 30	2.00 - 4.00
Hard	31+	4.00+

NON-COHESIVE (GRANULAR) SOILS

RELATIVE DENSITY	BLOWS PER FOOT (N)
Very Loose	0 - 4
Loose	5 - 10
Firm	11 - 30
Dense	31 - 50
Very Dense	51+

DEGREE OF PLASTICITY	PI
None to Slight	0 - 4
Slight	5 - 10
Medium	11 - 30
High to Very High	31+

DEGREE OF EXPANSIVE POTENTIAL	PI
Low	0 - 15
Medium	15 - 25
High	25+

Important Information About Your
Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

ASFE
The Best People on Earth

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(410) 636-9320

ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

[This is the cover sheet for Attachment 2.]

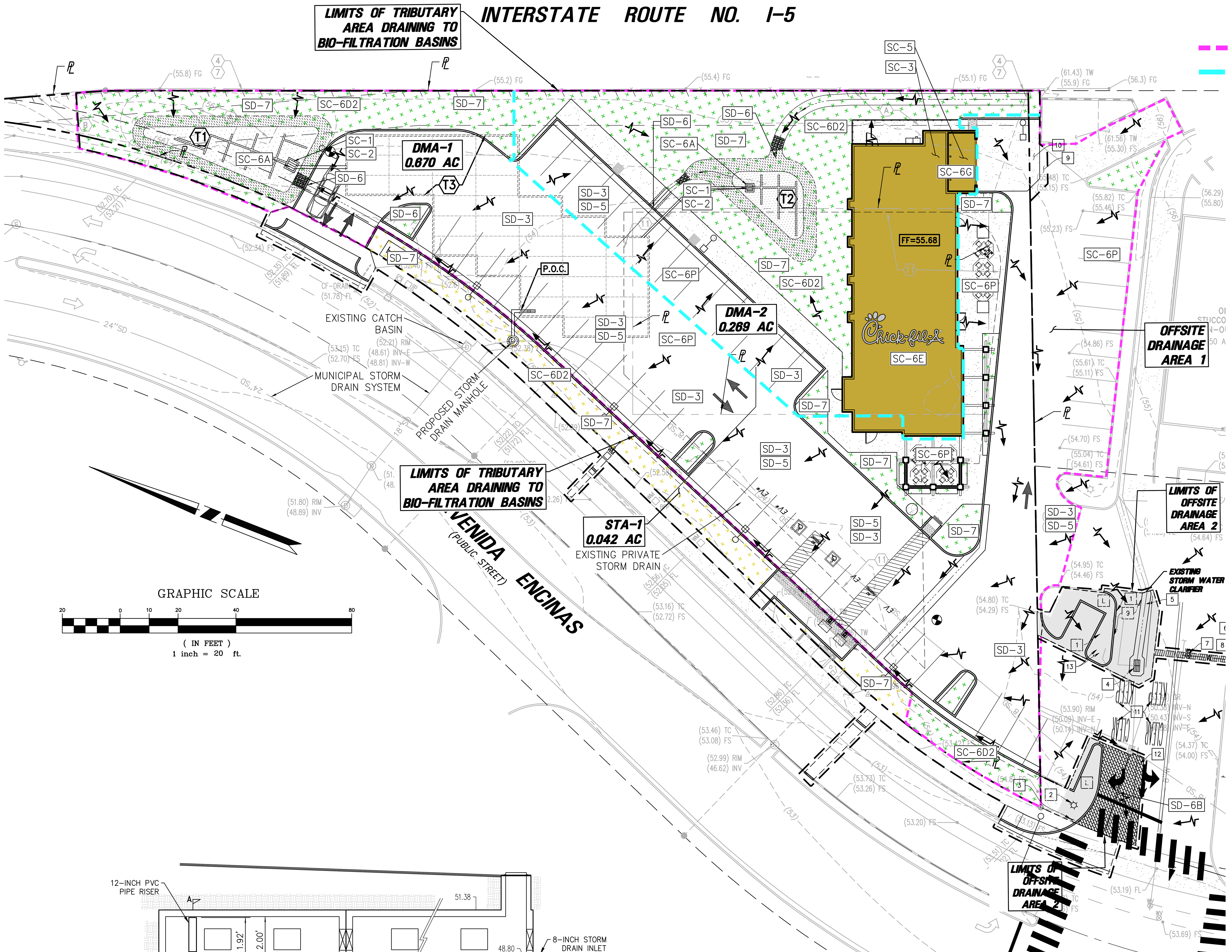
Indicate which Items are Included behind this cover sheet:

Attachment Sequence	**Contents**	**Checklist**
Attachment 2a	Hydromodification Management Exhibit (Required)	X 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.	X 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.	X Not performed ☐ Included
Attachment 2d	Flow Control Facility Design and Structural BMP Drawdown Calculations (Required) See Chapter 6 and Appendix G of the BMP Design Manual	X Included

Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:

X Underlying hydrologic soil group
X Approximate depth to groundwater
X Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
X Critical coarse sediment yield areas to be protected (if present)
X Existing topography
X Existing and proposed site drainage network and connections to drainage offsite
X Proposed grading
X Proposed impervious features
X Proposed design features and surface treatments used to minimize imperviousness
X Point(s) of Compliance (POC) for Hydromodification Management
X Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
X Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)



LEGEND

LIMITS OF TOTAL TRIBUTARY AREA

LIMITS OF DMA

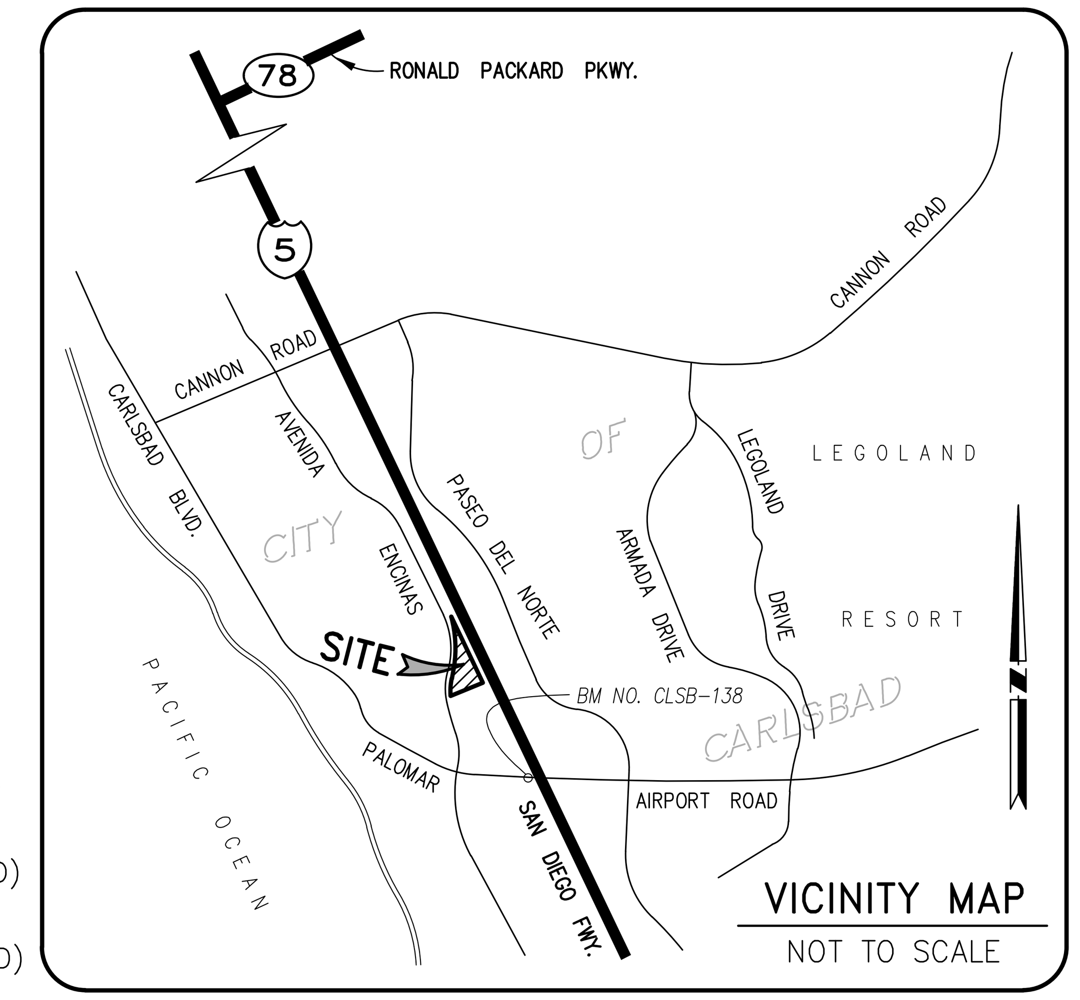
SOIL BORING

STRUCTURAL BMPs FOR HYDROMODIFICATION MANAGEMENT

- T1 BIO-FILTRATION BASIN-1 (LINED)
- T2 BIO-FILTRATION BASIN-2 (LINED)
- T3 STORM CAPTURE VAULTS

LAND COVER

- IMPERVIOUS – AC PAVEMENT
- IMPERVIOUS – CONCRETE
- IMPERVIOUS – BUILDING/TRASH ENCLOSURE
- PERVIOUS – LANDSCAPING
- PERVIOUS – SELF TREATING AREA



VICINITY MAP
NOT TO SCALE

NOTICE TO CONTRACTOR

THE CONTRACTOR SHALL ASCERTAIN THE TRUE VERTICAL AND HORIZONTAL LOCATION AND SIZE OF ALL UTILITIES, PIPES, AND/OR STRUCTURES AND SHALL BE RESPONSIBLE FOR DAMAGE TO ANY PUBLIC OR PRIVATE UTILITIES, SHOWN OR NOT SHOWN HEREON.

IMPORTANT NOTICE

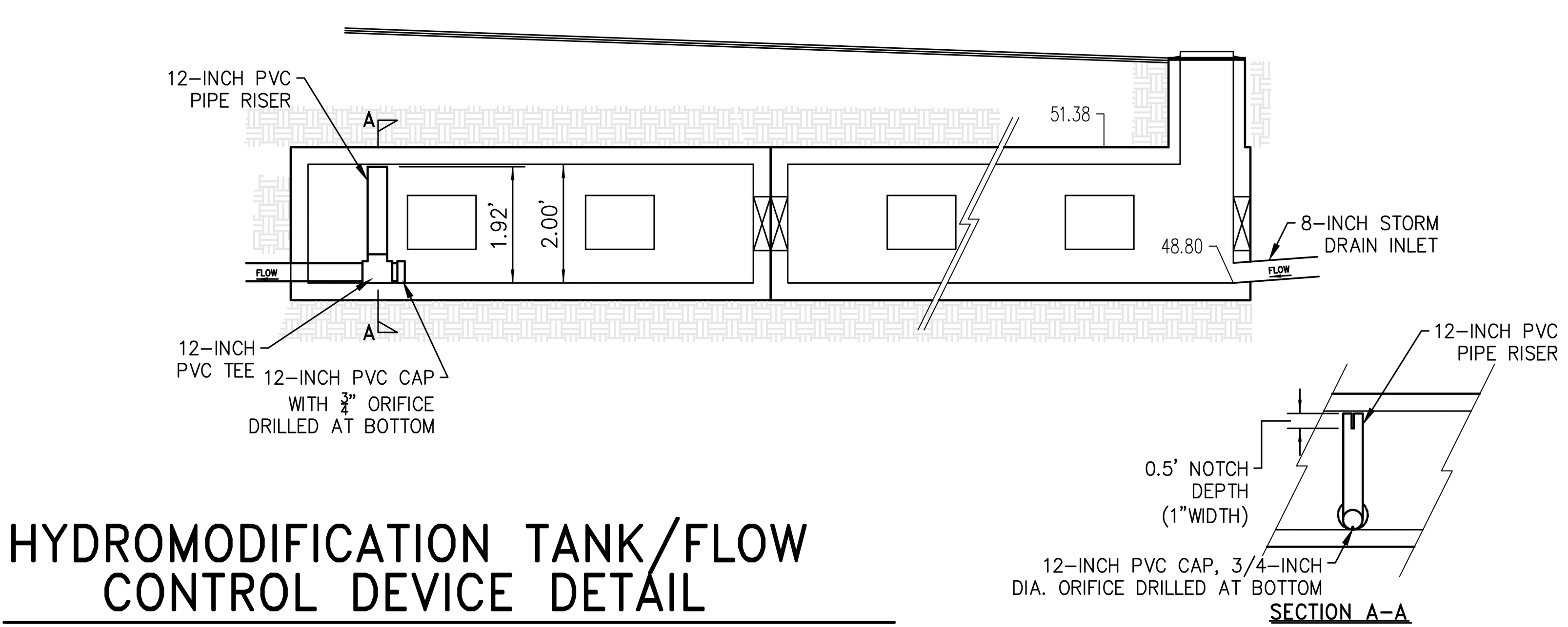
Section 4216 of the Government Code requires a Dig Alert Identification Number be issued before a "Permit to Excavate" will be valid. For your Dig Alert I.D. Number call Underground Service Alert CALL 811 Two working days before you dig.

HYDROMODIFICATION MANAGEMENT PLAN INFORMATION

1. HYDROLOGIC SOIL GROUP 'D'
2. DEPTH TO GROUNDWATER = 17 – 18 ft.
3. NO NATURAL HYDROLOGIC FEATURES EXIST WITHIN THIS PROJECT SITE
4. NO CRITICAL COARSE SEDIMENT YIELD AREAS EXIST DOWNSTREAM OF THIS PROJECT SITE

LID FEATURES

- SC-1 PREVENT ILLICIT DISCHARGES TO THE MS4
- SC-2 IDENTIFY THE STORM DRAIN SYSTEM USING STENCILING OR SIGNAGE
- SC-3 PROTECT OUTDOOR MATERIAL STORAFE AREAS FROM RAINFALL, RUN-ON, RUNOFF AND WIND DISPERSAL
- SC-5 PROTECT TRASH STORAGE AREAS FROM RAINFALL, RUN-ON, RUNOFF, AND WIND DISPERSAL
- SC-6 ADDITIONAL BMPS – POTENTIAL SOURCES OF RUNOFF POLLUTION
  - A. ON-SITE STORM DRAIN INLETS
  - D2. LANDSCAPE/OUTDOOR PESTICIDE USE
  - E. FOOD SERVICE
  - G. REFUSE AREAS
  - P. PLAZAS, SIDEWALKS, AND PARKING LOTS
- SD-3 MINIMIZE IMPERVIOUS AREA
- SD-5 DISPERSE IMPERVIOUS AREAS
- SD-6B PERMEABLE PAVERS
- SD-6 COLLECT RUNOFF
- SD-7 LANDSCAPE WITH NATIVE OR DROUGHT TOLERANT SPECIES



HYDROMODIFICATION TANK/FLOW CONTROL DEVICE DETAIL

NOT TO SCALE

THIS PLAN IS:
PRELIMINARY
(NOT FOR CONSTRUCTION)

NO.	REVISIONS	DATE

Prepared by:
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REGISTERED PROFESSIONAL ENGINEER RANDY J. DECKER No. 81077 CIVIL STATE OF CALIFORNIA

HYDROMODIFICATION MANAGEMENT PLAN
CHICK-FIL-A #4306
5850 AVENIDA ENCINAS
CITY OF CARLSBAD, STATE OF CALIFORNIA

DATE 06-28-21
DRAWN BY PJS
CHECKED BY RD/SMH
JOB NO. CFA18050
SHEET NO. 2 OF 2 SHEETS

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Critical Coarse Sediment Yield Areas Exhibit
5850 Avenida Encinas, Carlsbad, CA

SDHM 3.1

PROJECT REPORT

General Model Information

Project Name:	CFA18050(2)
Site Name:	CFA I-5 & Palomar
Site Address:	5850 Avenida Encinas
City:	Carlsbad
Report Date:	7/8/2021
Gage:	OCEANSID
Data Start:	10/01/1959
Data End:	09/30/2004
Timestep:	Hourly
Precip Scale:	1.000
Version Date:	2020/04/07

POC Thresholds

Low Flow Threshold for POC1:	10 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
D,NatVeg,Flat	0.939
Pervious Total	0.939
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.939

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

DMA-1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
D,NatVeg,Flat	0.121
Pervious Total	0.121
Impervious Land Use	acre
IMPERVIOUS-FLAT	0.518
Impervious Total	0.518
Basin Total	0.639

Element Flows To:

Surface	Interflow	Groundwater
Surface Biofilter 1	Surface Biofilter 1	

Basin 2

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
D,NatVeg,Flat	0.131
Pervious Total	0.131
Impervious Land Use	acre
IMPERVIOUS-FLAT	0.18
Impervious Total	0.18
Basin Total	0.311

Element Flows To:

Surface	Interflow	Groundwater
Surface Biofilter 2	Surface Biofilter 2	

Routing Elements

Predeveloped Routing

Mitigated Routing

Biofilter 1

Bottom Length:	38.95 ft.
Bottom Width:	20.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	ESM
Material thickness of second layer:	1
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Underdrain used	
Underdrain Diameter (feet):	6
Orifice Diameter (in.):	6
Offset (in.):	3
Flow Through Underdrain (ac-ft.):	17.402
Total Outflow (ac-ft.):	18.299
Percent Through Underdrain:	95.1

Discharge Structure
Riser Height: 0.5 ft.
Riser Diameter: 27.1 in.
Element Flows To:
Outlet 1 Outlet 2
Storm Capture 1

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0179	0.0000	0.0000	0.0000
0.0403	0.0179	0.0002	0.0000	0.0000
0.0807	0.0179	0.0004	0.0000	0.0000
0.1210	0.0179	0.0006	0.0000	0.0000
0.1613	0.0179	0.0009	0.0000	0.0000
0.2016	0.0179	0.0011	0.0000	0.0000
0.2420	0.0179	0.0013	0.0000	0.0000
0.2823	0.0179	0.0015	0.0000	0.0000
0.3226	0.0179	0.0017	0.0000	0.0000
0.3630	0.0179	0.0019	0.0000	0.0000
0.4033	0.0179	0.0022	0.0000	0.0000
0.4436	0.0179	0.0024	0.0000	0.0000
0.4840	0.0179	0.0026	0.0000	0.0000
0.5243	0.0179	0.0028	0.0000	0.0000
0.5646	0.0179	0.0030	0.0000	0.0000
0.6049	0.0179	0.0032	0.0000	0.0000
0.6453	0.0179	0.0035	0.0000	0.0000
0.6856	0.0179	0.0037	0.0000	0.0000
0.7259	0.0179	0.0039	0.0000	0.0000
0.7663	0.0179	0.0041	0.0000	0.0000
0.8066	0.0179	0.0043	0.0000	0.0000
0.8469	0.0179	0.0045	0.0000	0.0000
0.8873	0.0179	0.0048	0.0000	0.0000
0.9276	0.0179	0.0050	0.0000	0.0000
0.9679	0.0179	0.0052	0.0000	0.0000
1.0082	0.0179	0.0054	0.0000	0.0000
1.0486	0.0179	0.0056	0.0000	0.0000
1.0889	0.0179	0.0058	0.0000	0.0000
1.1292	0.0179	0.0061	0.0000	0.0000

1.1696	0.0179	0.0063	0.0000	0.0000
1.2099	0.0179	0.0065	0.0000	0.0000
1.2502	0.0179	0.0067	0.0000	0.0000
1.2905	0.0179	0.0069	0.0000	0.0000
1.3309	0.0179	0.0071	0.0000	0.0000
1.3712	0.0179	0.0074	0.0000	0.0000
1.4115	0.0179	0.0076	0.0000	0.0000
1.4519	0.0179	0.0078	0.0000	0.0000
1.4922	0.0179	0.0080	0.0000	0.0000
1.5325	0.0179	0.0083	0.0000	0.0000
1.5729	0.0179	0.0086	0.0000	0.0000
1.6132	0.0179	0.0089	0.0000	0.0000
1.6535	0.0179	0.0092	0.0000	0.0000
1.6938	0.0179	0.0095	0.0000	0.0000
1.7342	0.0179	0.0098	0.0000	0.0000
1.7745	0.0179	0.0101	0.0000	0.0000
1.8148	0.0179	0.0104	0.0000	0.0000
1.8552	0.0179	0.0107	0.0000	0.0000
1.8955	0.0179	0.0110	0.0000	0.0000
1.9358	0.0179	0.0113	0.0000	0.0000
1.9762	0.0179	0.0116	0.0000	0.0000
2.0165	0.0179	0.0119	0.0000	0.0000
2.0568	0.0179	0.0122	0.0000	0.0000
2.0971	0.0179	0.0125	0.0000	0.0000
2.1375	0.0179	0.0128	0.0000	0.0000
2.1778	0.0179	0.0131	0.0000	0.0000
2.2181	0.0179	0.0134	0.0000	0.0000
2.2585	0.0179	0.0137	0.0000	0.0000
2.2988	0.0179	0.0140	0.0000	0.0000
2.3391	0.0179	0.0143	0.0000	0.0000
2.3795	0.0179	0.0146	0.0000	0.0000
2.4198	0.0179	0.0149	0.0000	0.0000
2.4601	0.0179	0.0152	0.0000	0.0000
2.5000	0.0179	0.0155	0.0000	0.0000

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
2.5000	0.0179	0.0155	0.0000	0.0902	0.0000
2.5403	0.0179	0.0162	0.0000	0.0902	0.0000
2.5807	0.0179	0.0169	0.0000	0.0950	0.0000
2.6210	0.0179	0.0176	0.0000	0.0974	0.0000
2.6613	0.0179	0.0184	0.0000	0.0999	0.0000
2.7016	0.0179	0.0191	0.0000	0.1023	0.0000
2.7420	0.0179	0.0198	0.0000	0.1047	0.0000
2.7823	0.0179	0.0205	0.0000	0.1071	0.0000
2.8226	0.0179	0.0213	0.0000	0.1096	0.0000
2.8630	0.0179	0.0220	0.0000	0.1120	0.0000
2.9033	0.0179	0.0227	0.0000	0.1144	0.0000
2.9436	0.0179	0.0234	0.0000	0.1168	0.0000
2.9840	0.0179	0.0241	0.0000	0.1193	0.0000
3.0243	0.0179	0.0249	0.0000	0.1217	0.0000
3.0646	0.0179	0.0256	0.0000	0.1241	0.0000
3.1049	0.0179	0.0263	0.0000	0.1265	0.0000
3.1453	0.0179	0.0270	0.0000	0.1289	0.0000
3.1856	0.0179	0.0277	0.0000	0.1314	0.0000
3.2259	0.0179	0.0285	0.0051	0.1338	0.0000
3.2663	0.0179	0.0292	0.0056	0.1362	0.0000
3.3066	0.0179	0.0299	0.0068	0.1386	0.0000

3.3469	0.0179	0.0306	0.0081	0.1411	0.0000
3.3873	0.0179	0.0314	0.0095	0.1435	0.0000
3.4276	0.0179	0.0321	0.0111	0.1459	0.0000
3.4679	0.0179	0.0328	0.0128	0.1483	0.0000
3.5082	0.0179	0.0335	0.0147	0.1508	0.0000
3.5486	0.0179	0.0342	0.0168	0.1532	0.0000
3.5889	0.0179	0.0350	0.0190	0.1556	0.0000
3.6292	0.0179	0.0357	0.0214	0.1580	0.0000
3.6696	0.0179	0.0364	0.0240	0.1605	0.0000
3.6700	0.0179	0.0364	0.0268	0.1605	0.0000

Surface Biofilter 1

Element Flows To:

Outlet 1	Outlet 2
Storm Capture 1	Biofilter 1

Biofilter 2

Bottom Length: 18.20 ft.
Bottom Width: 20.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 1
Material type for second layer: GRAVEL
Material thickness of third layer: 0
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 6
Orifice Diameter (in.): 6
Offset (in.): 3
Flow Through Underdrain (ac-ft.): 6.575
Total Outflow (ac-ft.): 6.841
Percent Through Underdrain: 96.11
Discharge Structure
Riser Height: 0.5 ft.
Riser Diameter: 27.1 in.
Element Flows To:
Outlet 1 Outlet 2
Storm Capture 1

Biofilter Hydraulic Table

Stage(feet)	**Area(ac.)**	**Volume(ac-ft.)**	**Discharge(cfs)**	**Infilt(cfs)**
0.0000	0.0084	0.0000	0.0000	0.0000
0.0495	0.0084	0.0001	0.0000	0.0000
0.0989	0.0084	0.0002	0.0000	0.0000
0.1484	0.0084	0.0004	0.0000	0.0000
0.1978	0.0084	0.0005	0.0000	0.0000
0.2473	0.0084	0.0006	0.0000	0.0000
0.2967	0.0084	0.0007	0.0000	0.0000
0.3462	0.0084	0.0009	0.0000	0.0000
0.3956	0.0084	0.0010	0.0000	0.0000
0.4451	0.0084	0.0011	0.0000	0.0000
0.4945	0.0084	0.0012	0.0000	0.0000
0.5440	0.0084	0.0014	0.0000	0.0000
0.5934	0.0084	0.0015	0.0000	0.0000
0.6429	0.0084	0.0016	0.0000	0.0000
0.6923	0.0084	0.0017	0.0000	0.0000
0.7418	0.0084	0.0019	0.0000	0.0000
0.7912	0.0084	0.0020	0.0000	0.0000
0.8407	0.0084	0.0021	0.0000	0.0000
0.8901	0.0084	0.0022	0.0000	0.0000
0.9396	0.0084	0.0024	0.0000	0.0000
0.9890	0.0084	0.0025	0.0000	0.0000
1.0385	0.0084	0.0026	0.0000	0.0000
1.0879	0.0084	0.0027	0.0000	0.0000
1.1374	0.0084	0.0029	0.0000	0.0000
1.1868	0.0084	0.0030	0.0000	0.0000
1.2363	0.0084	0.0031	0.0000	0.0000
1.2857	0.0084	0.0032	0.0000	0.0000
1.3352	0.0084	0.0033	0.0000	0.0000
1.3846	0.0084	0.0035	0.0000	0.0000
1.4341	0.0084	0.0036	0.0000	0.0000
1.4835	0.0084	0.0037	0.0000	0.0000

1.5330	0.0084	0.0039	0.0000	0.0000
1.5824	0.0084	0.0041	0.0000	0.0000
1.6319	0.0084	0.0042	0.0000	0.0000
1.6813	0.0084	0.0044	0.0000	0.0000
1.7308	0.0084	0.0046	0.0000	0.0000
1.7802	0.0084	0.0047	0.0000	0.0000
1.8297	0.0084	0.0049	0.0000	0.0000
1.8791	0.0084	0.0051	0.0000	0.0000
1.9286	0.0084	0.0053	0.0000	0.0000
1.9780	0.0084	0.0054	0.0000	0.0000
2.0275	0.0084	0.0056	0.0000	0.0000
2.0769	0.0084	0.0058	0.0000	0.0000
2.1264	0.0084	0.0059	0.0000	0.0000
2.1758	0.0084	0.0061	0.0000	0.0000
2.2253	0.0084	0.0063	0.0000	0.0000
2.2747	0.0084	0.0065	0.0000	0.0000
2.3242	0.0084	0.0066	0.0000	0.0000
2.3736	0.0084	0.0068	0.0000	0.0000
2.4231	0.0084	0.0070	0.0000	0.0000
2.4725	0.0084	0.0071	0.0000	0.0000
2.5000	0.0084	0.0072	0.0000	0.0000

Biofilter Hydraulic Table

Stage(feet)	**Area(ac.)**	**Volume(ac-ft.)**	**Discharge(cfs)**	**To Amended(cfs)**	**Infilt(cfs)**
2.5000	0.0084	0.0072	0.0000	0.0421	0.0000
2.5495	0.0084	0.0077	0.0000	0.0421	0.0000
2.5989	0.0084	0.0081	0.0000	0.0449	0.0000
2.6484	0.0084	0.0085	0.0000	0.0463	0.0000
2.6978	0.0084	0.0089	0.0000	0.0477	0.0000
2.7473	0.0084	0.0093	0.0000	0.0491	0.0000
2.7967	0.0084	0.0097	0.0000	0.0505	0.0000
2.8462	0.0084	0.0101	0.0000	0.0519	0.0000
2.8956	0.0084	0.0105	0.0000	0.0532	0.0000
2.9451	0.0084	0.0110	0.0000	0.0546	0.0000
2.9945	0.0084	0.0114	0.0000	0.0560	0.0000
3.0440	0.0084	0.0118	0.0000	0.0574	0.0000
3.0934	0.0084	0.0122	0.0000	0.0588	0.0000
3.1429	0.0084	0.0126	0.0000	0.0602	0.0000
3.1923	0.0084	0.0130	0.0000	0.0616	0.0000
3.2418	0.0084	0.0134	0.0027	0.0630	0.0000
3.2912	0.0084	0.0139	0.0030	0.0644	0.0000
3.3407	0.0084	0.0143	0.0038	0.0657	0.0000
3.3901	0.0084	0.0147	0.0046	0.0671	0.0000
3.4396	0.0084	0.0151	0.0055	0.0685	0.0000
3.4890	0.0084	0.0155	0.0066	0.0699	0.0000
3.5385	0.0084	0.0159	0.0077	0.0713	0.0000
3.5879	0.0084	0.0163	0.0090	0.0727	0.0000
3.6374	0.0084	0.0167	0.0104	0.0741	0.0000
3.6868	0.0084	0.0172	0.0119	0.0755	0.0000
3.7363	0.0084	0.0176	0.0136	0.0769	0.0000
3.7857	0.0084	0.0180	0.0154	0.0782	0.0000
3.8352	0.0084	0.0184	0.0173	0.0796	0.0000
3.8846	0.0084	0.0188	0.0194	0.0810	0.0000
3.9341	0.0084	0.0192	0.0216	0.0824	0.0000
3.9835	0.0084	0.0196	0.0239	0.0838	0.0000
4.0330	0.0084	0.0201	0.0264	0.0843	0.0000
4.0824	0.0084	0.0205	0.0291	0.0843	0.0000
4.1319	0.0084	0.0209	0.0319	0.0843	0.0000

4.1813	0.0084	0.0213	0.0348	0.0843	0.0000
4.2308	0.0084	0.0217	0.0379	0.0843	0.0000
4.2802	0.0084	0.0221	0.0411	0.0843	0.0000
4.3297	0.0084	0.0225	0.0562	0.0843	0.0000
4.3791	0.0084	0.0229	0.0562	0.0843	0.0000
4.4286	0.0084	0.0234	0.0562	0.0843	0.0000
4.4780	0.0084	0.0238	0.0562	0.0843	0.0000
4.5000	0.0084	0.0240	0.0562	0.0843	0.0000

Surface Biofilter 2

Element Flows To:

Outlet 1	Outlet 2
Storm Capture 1	Biofilter 2

Storm Capture 1

Dimensions
Depth: 2 ft.
Length: 540 ft.
Width: 7 ft.
Infiltration On
Infiltration rate: 0.05
Infiltration safety factor: 1
Total Volume Infiltrated (ac-ft.): 9.093
Total Volume Through Riser (ac-ft.): 16.043
Total Volume Through Facility (ac-ft.): 25.136
Percent Infiltrated: 36.18
Total Precip Applied to Facility: 0
Total Evap From Facility: 0
Discharge Structure
Riser Height: 1.92 ft.
Riser Diameter: 12 in.
Notch Type: Rectangular
Notch Width: 0.080 ft.
Notch Height: 0.500 ft.
Orifice 1 Diameter: 0.75 in. Elevation:0 ft.
Element Flows To:
Outlet 1 Outlet 2

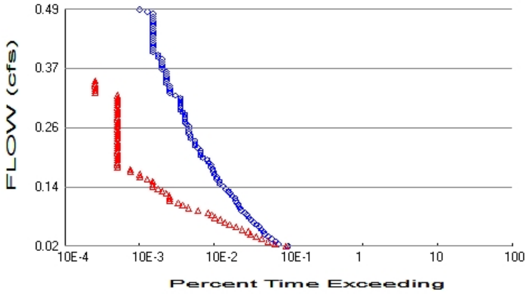
SCapture Hydraulic Table

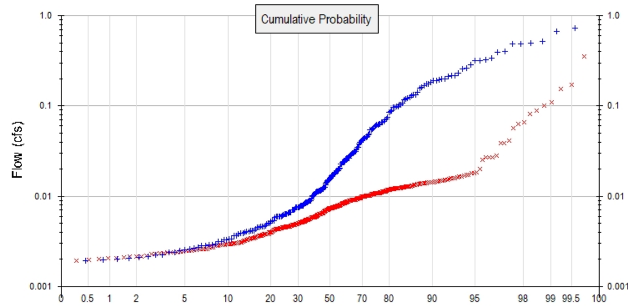
Stage(feet)	**Area(ac.)**	**Volume(ac-ft.)**	**Discharge(cfs)**	**Infilt(cfs)**
0.0000	0.086	0.000	0.000	0.000
0.0222	0.086	0.001	0.002	0.004
0.0444	0.086	0.003	0.003	0.004
0.0667	0.086	0.005	0.003	0.004
0.0889	0.086	0.007	0.004	0.004
0.1111	0.086	0.009	0.005	0.004
0.1333	0.086	0.011	0.005	0.004
0.1556	0.086	0.013	0.006	0.004
0.1778	0.086	0.015	0.006	0.004
0.2000	0.086	0.017	0.006	0.004
0.2222	0.086	0.019	0.007	0.004
0.2444	0.086	0.021	0.007	0.004
0.2667	0.086	0.023	0.007	0.004
0.2889	0.086	0.025	0.008	0.004
0.3111	0.086	0.027	0.008	0.004
0.3333	0.086	0.028	0.008	0.004
0.3556	0.086	0.030	0.009	0.004
0.3778	0.086	0.032	0.009	0.004
0.4000	0.086	0.034	0.009	0.004
0.4222	0.086	0.036	0.009	0.004
0.4444	0.086	0.038	0.010	0.004
0.4667	0.086	0.040	0.010	0.004
0.4889	0.086	0.042	0.010	0.004
0.5111	0.086	0.044	0.010	0.004
0.5333	0.086	0.046	0.011	0.004
0.5556	0.086	0.048	0.011	0.004
0.5778	0.086	0.050	0.011	0.004
0.6000	0.086	0.052	0.011	0.004
0.6222	0.086	0.054	0.012	0.004

0.6444	0.086	0.055	0.012	0.004
0.6667	0.086	0.057	0.012	0.004
0.6889	0.086	0.059	0.012	0.004
0.7111	0.086	0.061	0.012	0.004
0.7333	0.086	0.063	0.013	0.004
0.7556	0.086	0.065	0.013	0.004
0.7778	0.086	0.067	0.013	0.004
0.8000	0.086	0.069	0.013	0.004
0.8222	0.086	0.071	0.013	0.004
0.8444	0.086	0.073	0.014	0.004
0.8667	0.086	0.075	0.014	0.004
0.8889	0.086	0.077	0.014	0.004
0.9111	0.086	0.079	0.014	0.004
0.9333	0.086	0.081	0.014	0.004
0.9556	0.086	0.082	0.014	0.004
0.9778	0.086	0.084	0.015	0.004
1.0000	0.086	0.086	0.015	0.004
1.0222	0.086	0.088	0.015	0.004
1.0444	0.086	0.090	0.015	0.004
1.0667	0.086	0.092	0.015	0.004
1.0889	0.086	0.094	0.015	0.004
1.1111	0.086	0.096	0.016	0.004
1.1333	0.086	0.098	0.016	0.004
1.1556	0.086	0.100	0.016	0.004
1.1778	0.086	0.102	0.016	0.004
1.2000	0.086	0.104	0.016	0.004
1.2222	0.086	0.106	0.016	0.004
1.2444	0.086	0.108	0.017	0.004
1.2667	0.086	0.109	0.017	0.004
1.2889	0.086	0.111	0.017	0.004
1.3111	0.086	0.113	0.017	0.004
1.3333	0.086	0.115	0.017	0.004
1.3556	0.086	0.117	0.017	0.004
1.3778	0.086	0.119	0.017	0.004
1.4000	0.086	0.121	0.018	0.004
1.4222	0.086	0.123	0.018	0.004
1.4444	0.086	0.125	0.019	0.004
1.4667	0.086	0.127	0.021	0.004
1.4889	0.086	0.129	0.023	0.004
1.5111	0.086	0.131	0.026	0.004
1.5333	0.086	0.133	0.028	0.004
1.5556	0.086	0.135	0.032	0.004
1.5778	0.086	0.136	0.035	0.004
1.6000	0.086	0.138	0.038	0.004
1.6222	0.086	0.140	0.042	0.004
1.6444	0.086	0.142	0.046	0.004
1.6667	0.086	0.144	0.050	0.004
1.6889	0.086	0.146	0.055	0.004
1.7111	0.086	0.148	0.059	0.004
1.7333	0.086	0.150	0.063	0.004
1.7556	0.086	0.152	0.068	0.004
1.7778	0.086	0.154	0.073	0.004
1.8000	0.086	0.156	0.078	0.004
1.8222	0.086	0.158	0.083	0.004
1.8444	0.086	0.160	0.088	0.004
1.8667	0.086	0.162	0.093	0.004
1.8889	0.086	0.163	0.098	0.004
1.9111	0.086	0.165	0.103	0.004

1.9333	0.086	0.167	0.122	0.004
1.9556	0.086	0.169	0.177	0.004
1.9778	0.086	0.171	0.253	0.004
2.0000	0.086	0.173	0.345	0.004

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.939
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.252
Total Impervious Area: 0.698

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.192823
5 year	0.337038
10 year	0.490837
25 year	0.677956

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.017371
5 year	0.062286
10 year	0.103935
25 year	0.187245

Duration Flows
The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0193	385	366	95	Pass
0.0240	287	257	89	Pass
0.0288	263	209	79	Pass
0.0336	233	173	74	Pass
0.0383	209	145	69	Pass
0.0431	192	122	63	Pass
0.0479	184	114	61	Pass
0.0526	170	95	55	Pass
0.0574	158	78	49	Pass
0.0622	147	64	43	Pass
0.0669	135	55	40	Pass
0.0717	124	48	38	Pass
0.0764	118	41	34	Pass
0.0812	109	37	33	Pass
0.0860	101	33	32	Pass
0.0907	93	24	25	Pass
0.0955	88	18	20	Pass
0.1003	84	15	17	Pass
0.1050	81	13	16	Pass
0.1098	78	10	12	Pass
0.1145	76	10	13	Pass
0.1193	70	10	14	Pass
0.1241	65	9	13	Pass
0.1288	62	8	12	Pass
0.1336	57	7	12	Pass
0.1384	53	6	11	Pass
0.1431	48	6	12	Pass
0.1479	47	6	12	Pass
0.1527	43	5	11	Pass
0.1574	43	4	9	Pass
0.1622	40	4	10	Pass
0.1669	39	3	7	Pass
0.1717	38	3	7	Pass
0.1765	36	2	5	Pass
0.1812	36	2	5	Pass
0.1860	34	2	5	Pass
0.1908	32	2	6	Pass
0.1955	28	2	7	Pass
0.2003	26	2	7	Pass
0.2050	26	2	7	Pass
0.2098	26	2	7	Pass
0.2146	24	2	8	Pass
0.2193	22	2	9	Pass
0.2241	22	2	9	Pass
0.2289	22	2	9	Pass
0.2336	19	2	10	Pass
0.2384	19	2	10	Pass
0.2432	18	2	11	Pass
0.2479	18	2	11	Pass
0.2527	18	2	11	Pass
0.2574	18	2	11	Pass
0.2622	17	2	11	Pass
0.2670	16	2	12	Pass

0.2717	16	2	12	Pass
0.2765	16	2	12	Pass
0.2813	16	2	12	Pass
0.2860	15	2	13	Pass
0.2908	14	2	14	Pass
0.2955	14	2	14	Pass
0.3003	14	2	14	Pass
0.3051	14	2	14	Pass
0.3098	14	2	14	Pass
0.3146	14	2	14	Pass
0.3194	12	2	16	Pass
0.3241	10	1	10	Pass
0.3289	10	1	10	Pass
0.3337	10	1	10	Pass
0.3384	10	1	10	Pass
0.3432	9	1	11	Pass
0.3479	9	1	11	Pass
0.3527	9	0	0	Pass
0.3575	9	0	0	Pass
0.3622	9	0	0	Pass
0.3670	9	0	0	Pass
0.3718	8	0	0	Pass
0.3765	8	0	0	Pass
0.3813	8	0	0	Pass
0.3860	8	0	0	Pass
0.3908	8	0	0	Pass
0.3956	7	0	0	Pass
0.4003	7	0	0	Pass
0.4051	6	0	0	Pass
0.4099	6	0	0	Pass
0.4146	6	0	0	Pass
0.4194	6	0	0	Pass
0.4242	6	0	0	Pass
0.4289	6	0	0	Pass
0.4337	6	0	0	Pass
0.4384	6	0	0	Pass
0.4432	6	0	0	Pass
0.4480	6	0	0	Pass
0.4527	6	0	0	Pass
0.4575	6	0	0	Pass
0.4623	6	0	0	Pass
0.4670	6	0	0	Pass
0.4718	6	0	0	Pass
0.4765	6	0	0	Pass
0.4813	6	0	0	Pass
0.4861	5	0	0	Pass
0.4908	4	0	0	Pass

Water Quality

POC 2

POC #2 was not reported because POC must exist in both scenarios and both scenarios must have been run.

POC 3

POC #3 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

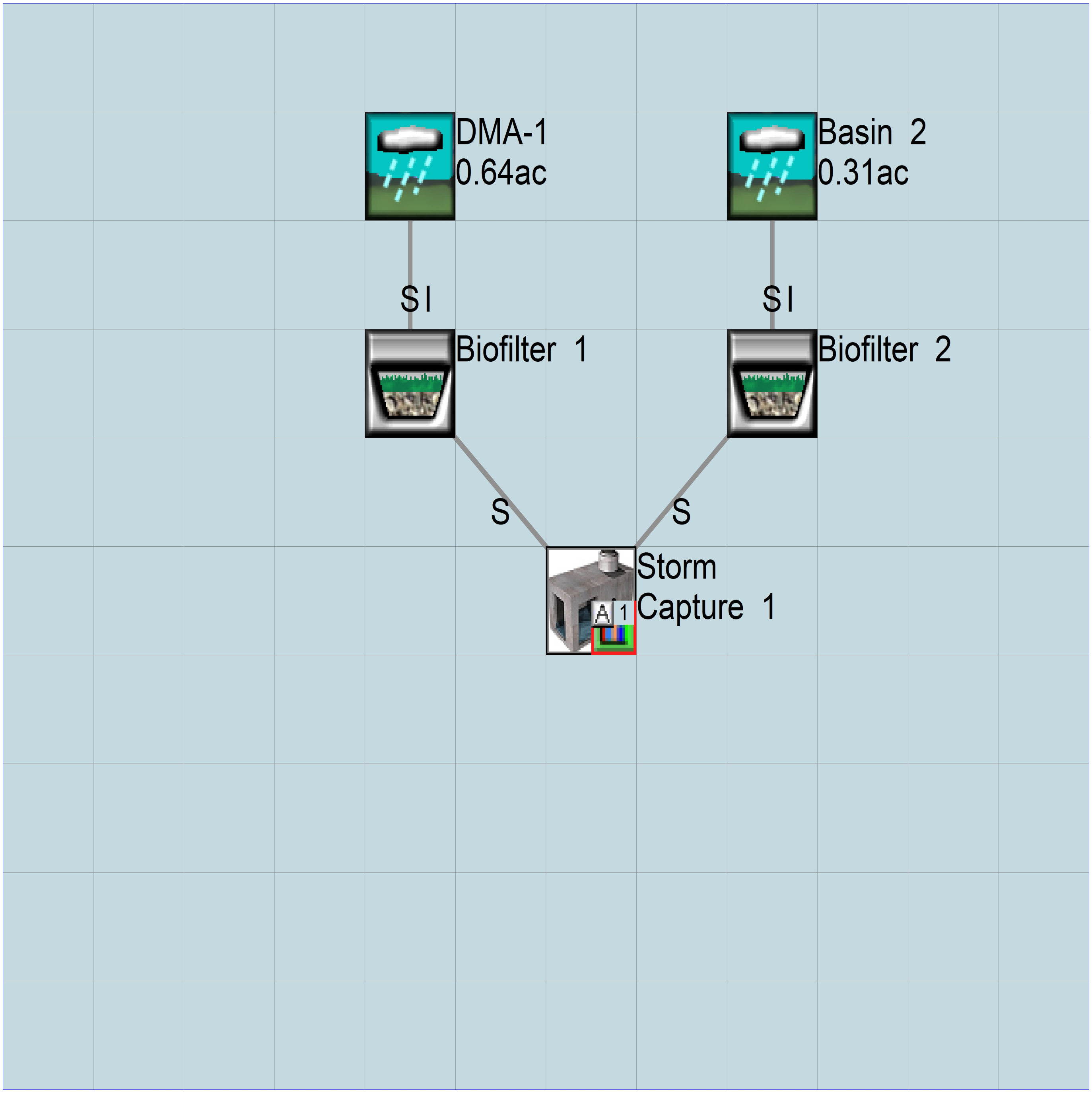
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic

Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1959 10 01        END    2004 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   CFA18050(2).wdm
MESSU      25   PreCFA18050(2).MES
           27   PreCFA18050(2).L61
           28   PreCFA18050(2).L62
           30   POCCFA18050(2)1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:60
      PERLND      40
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                    MAX                   1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                            User  t-series Engl Metr ***
                                             in  out           ***
   40      B,Urban,Flat          1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   40         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   40         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   40         0    1    1    1    0    0    0    0    1    1    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   40             0         4      0.07        50      0.05       2.5     0.915
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   40             0         0         2         2         0      0.05      0.05
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                     ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   40             0       0.6      0.03         1       0.3         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   40       0.6  0.6  0.6  0.6  0.7  0.7  0.7  0.7  0.7  0.6  0.6  0.6
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   40       0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   40             0         0      0.15         0         1      0.05         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                      in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2
```

```
  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  40                       0.935     COPY   501     12

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                           in  out                           ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                      ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
```

```
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP
WDM     22 IRRG     ENGL    0.7       SAME PERLND  40     EXTNL  SURLI

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1959 10 01        END    2004 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN      1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   CFA18050(2).wdm
MESSU      25   MitCFA18050(2).MES
           27   MitCFA18050(2).L61
           28   MitCFA18050(2).L62
           30   POCCFA18050(2)1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:60
      PERLND      28
      IMPLND       1
      GENER        2
      RCHRES       1
      RCHRES       2
      GENER        4
      RCHRES       3
      RCHRES       4
      RCHRES       5
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Storm Capture  1            MAX                      1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    2        24
    4        24
  END OPCODE
  PARM
    #    #         K ***
    2             0.
    4             0.
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                           User  t-series Engl Metr ***
                                           in  out           ***
   28      D,NatVeg,Flat          1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***
```

```
  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   28         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   28         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   28         0    1    1    1    0    0    0    0    1    1    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   28             0       3.3      0.03       100      0.05       2.5     0.915
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   28             0         0         2         2         0      0.05      0.05
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                               ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   28             0       0.6      0.04         1       0.3         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   28       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   28       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1    0
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
              ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   28             0         0      0.01         0       0.4      0.01         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                      in  out           ***
    1      IMPERVIOUS-FLAT        1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
  END ACTIVITY
```

```
  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    1
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            100      0.05     0.011       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                <--Area-->     <-Target->   MBLK   ***
<Name>   #                <-factor->     <Name>   #   Tbl#   ***
DMA-1***
PERLND  28                     0.121     RCHRES   1      2
PERLND  28                     0.121     RCHRES   1      3
IMPLND   1                     0.518     RCHRES   1      5
Basin  2***
PERLND  28                     0.131     RCHRES   3      2
PERLND  28                     0.131     RCHRES   3      3
IMPLND   1                      0.18     RCHRES   3      5

******Routing******
RCHRES   2                         1     RCHRES   5      6
RCHRES   2                               COPY     1     16
RCHRES   1                         1     RCHRES   5      7
RCHRES   1                               COPY     1     17
RCHRES   1                         1     RCHRES   2      8
RCHRES   4                         1     RCHRES   5      6
RCHRES   4                               COPY     1     16
RCHRES   3                         1     RCHRES   5      7
RCHRES   3                               COPY     1     17
RCHRES   3                         1     RCHRES   4      8
RCHRES   5                         1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1
GENER    2 OUTPUT TIMSER      .0002778     RCHRES   1     EXTNL  OUTDGT 1
GENER    4 OUTPUT TIMSER      .0002778     RCHRES   3     EXTNL  OUTDGT 1


<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK
```

```
RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                          in  out                            ***
    1     Surface Biofilte-020    2    1    1    1   28    0    1
    2     Biofilter  1            1    1    1    1   28    0    1
    3     Surface Biofilte-022    2    1    1    1   28    0    1
    4     Biofilter  2            1    1    1    1   28    0    1
    5     Storm Capture  1-025    2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
    4         1    0    0    0    0    0    0    0    0    0
    5         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR   *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
    4         4    0    0    0    0    0    0    0    0    0    1    9
    5         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                      ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1        0  1  0  0    4  5  0  0  0       0  1  0  0  0       2  1  2  2  2
    2        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
    3        0  1  0  0    4  5  0  0  0       0  1  0  0  0       2  1  2  2  2
    4        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
    5        0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1             1      0.01       0.0       0.0       0.0       0.0
    2             2      0.01       0.0       0.0       0.0       0.0
    3             3      0.01       0.0       0.0       0.0       0.0
    4             4      0.01       0.0       0.0       0.0       0.0
    5             5       0.1       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
         *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1           0          4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2           0          4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3           0          4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    4           0          4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    5           0          4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
```

```
***                          addr
***                        <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol2   RCHRES   2 VOL              4
  UVQUAN v2m2   GLOBAL     WORKSP  1        3
  UVQUAN vpo2   GLOBAL     WORKSP  2        3
  UVQUAN v2d2   GENER    2 K       1        3
*** User-Defined Variable Quantity Lines
***                          addr
***                        <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol4   RCHRES   4 VOL              4
  UVQUAN v2m4   GLOBAL     WORKSP  3        3
  UVQUAN vpo4   GLOBAL     WORKSP  4        3
  UVQUAN v2d4   GENER    4 K       1        3
*** User-Defined Target Variable Names
***                  addr or                       addr or
***                 <------>                      <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m2    1 WORKSP  1         1.0 QUAN
  UVNAME  vpo2    1 WORKSP  2         1.0 QUAN
  UVNAME  v2d2    1 K       1         1.0 QUAN
*** User-Defined Target Variable Names
***                  addr or                       addr or
***                 <------>                      <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m4    1 WORKSP  3         1.0 QUAN
  UVNAME  vpo4    1 WORKSP  4         1.0 QUAN
  UVNAME  v2d4    1 K       1         1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   2                               v2m2            =  1107.31
*** Compute remaining available pore space
  GENER   2                               vpo2            =  v2m2
  GENER   2                               vpo2           -=  vol2
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo2 < 0.0) THEN
  GENER   2                               vpo2            =  0.0
END IF
*** Infiltration volume
  GENER   2                               v2d2            =  vpo2
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   4                               v2m4            =  517.77
*** Compute remaining available pore space
  GENER   4                               vpo4            =  v2m4
  GENER   4                               vpo4           -=  vol4
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo4 < 0.0) THEN
  GENER   4                               vpo4            =  0.0
END IF
*** Infiltration volume
  GENER   4                               v2d4            =  vpo4
END SPEC-ACTIONS
FTABLES
  FTABLE      2
   63    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.017883  0.000000  0.000000
  0.040330  0.017883  0.000216  0.000000
  0.080659  0.017883  0.000433  0.000000
  0.120989  0.017883  0.000649  0.000000
  0.161319  0.017883  0.000865  0.000000
  0.201648  0.017883  0.001082  0.000000
  0.241978  0.017883  0.001298  0.000000
```

0.282308	0.017883	0.001515	0.000000
0.322637	0.017883	0.001731	0.000000
0.362967	0.017883	0.001947	0.000000
0.403297	0.017883	0.002164	0.000000
0.443626	0.017883	0.002380	0.000000
0.483956	0.017883	0.002596	0.000000
0.524286	0.017883	0.002813	0.000000
0.564615	0.017883	0.003029	0.000000
0.604945	0.017883	0.003246	0.000000
0.645275	0.017883	0.003462	0.000000
0.685604	0.017883	0.003678	0.000000
0.725934	0.017883	0.003895	0.005120
0.766264	0.017883	0.004111	0.005645
0.806593	0.017883	0.004327	0.006796
0.846923	0.017883	0.004544	0.008085
0.887253	0.017883	0.004760	0.009519
0.927582	0.017883	0.004976	0.011102
0.967912	0.017883	0.005193	0.012840
1.008242	0.017883	0.005409	0.014738
1.048571	0.017883	0.005626	0.016800
1.088901	0.017883	0.005842	0.019031
1.129231	0.017883	0.006058	0.021436
1.169560	0.017883	0.006275	0.024019
1.209890	0.017883	0.006491	0.026783
1.250220	0.017883	0.006707	0.029734
1.290549	0.017883	0.006924	0.032875
1.330879	0.017883	0.007140	0.036210
1.371209	0.017883	0.007357	0.039743
1.411538	0.017883	0.007573	0.043476
1.451868	0.017883	0.007789	0.047413
1.492198	0.017883	0.008006	0.051557
1.532527	0.017883	0.008305	0.055911
1.572857	0.017883	0.008604	0.060477
1.613187	0.017883	0.008904	0.065256
1.653516	0.017883	0.009203	0.070249
1.693846	0.017883	0.009502	0.075453
1.734176	0.017883	0.009802	0.080860
1.774505	0.017883	0.010101	0.086436
1.814835	0.017883	0.010400	0.120216
1.855165	0.017883	0.010699	0.120216
1.895495	0.017883	0.010999	0.120216
1.935824	0.017883	0.011298	0.120216
1.976154	0.017883	0.011597	0.120216
2.016484	0.017883	0.011897	0.120216
2.056813	0.017883	0.012196	0.120216
2.097143	0.017883	0.012495	0.120216
2.137473	0.017883	0.012795	0.120216
2.177802	0.017883	0.013094	0.120216
2.218132	0.017883	0.013393	0.120216
2.258462	0.017883	0.013693	0.120216
2.298791	0.017883	0.013992	0.120216
2.339121	0.017883	0.014291	0.120216
2.379451	0.017883	0.014590	0.120216
2.419780	0.017883	0.014890	0.120216
2.460110	0.017883	0.015189	0.120216
2.500000	0.017883	0.025420	0.120216

END FTABLE 2
FTABLE 1
31 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.017883	0.000000	0.000000	0.000000		
0.040330	0.017883	0.000721	0.000000	0.090162		
0.080659	0.017883	0.001442	0.000000	0.095010		
0.120989	0.017883	0.002164	0.000000	0.097435		
0.161319	0.017883	0.002885	0.000000	0.099859		
0.201648	0.017883	0.003606	0.000000	0.102283		
0.241978	0.017883	0.004327	0.000000	0.104707		
0.282308	0.017883	0.005049	0.000000	0.107131		
0.322637	0.017883	0.005770	0.000000	0.109555		

0.362967	0.017883	0.006491	0.000000	0.111979
0.403297	0.017883	0.007212	0.000000	0.114403
0.443626	0.017883	0.007934	0.000000	0.116828
0.483956	0.017883	0.008655	0.000000	0.119252
0.524286	0.017883	0.009376	0.090729	0.121676
0.564615	0.017883	0.010097	0.393444	0.124100
0.604945	0.017883	0.010818	0.813776	0.126524
0.645275	0.017883	0.011540	1.324073	0.128948
0.685604	0.017883	0.012261	1.909104	0.131372
0.725934	0.017883	0.012982	2.557879	0.133797
0.766264	0.017883	0.013703	3.261166	0.136221
0.806593	0.017883	0.014425	4.010432	0.138645
0.846923	0.017883	0.015146	4.797350	0.141069
0.887253	0.017883	0.015867	5.613548	0.143493
0.927582	0.017883	0.016588	6.450513	0.145917
0.967912	0.017883	0.017310	7.299574	0.148341
1.008242	0.017883	0.018031	8.151957	0.150766
1.048571	0.017883	0.018752	8.998863	0.153190
1.088901	0.017883	0.019473	9.831606	0.155614
1.129231	0.017883	0.020194	10.64175	0.158038
1.169560	0.017883	0.020916	11.42130	0.160462
1.170000	0.017883	0.020924	12.16288	0.160489

END FTABLE 1
FTABLE 4
52 4

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.008356	0.000000	0.000000		
0.049451	0.008356	0.000124	0.000000		
0.098901	0.008356	0.000248	0.000000		
0.148352	0.008356	0.000372	0.000000		
0.197802	0.008356	0.000496	0.000000		
0.247253	0.008356	0.000620	0.000000		
0.296703	0.008356	0.000744	0.000000		
0.346154	0.008356	0.000868	0.000000		
0.395604	0.008356	0.000992	0.000000		
0.445055	0.008356	0.001116	0.000000		
0.494505	0.008356	0.001240	0.000000		
0.543956	0.008356	0.001364	0.000000		
0.593407	0.008356	0.001488	0.000000		
0.642857	0.008356	0.001612	0.000000		
0.692308	0.008356	0.001736	0.000000		
0.741758	0.008356	0.001860	0.002714		
0.791209	0.008356	0.001983	0.003042		
0.840659	0.008356	0.002107	0.003770		
0.890110	0.008356	0.002231	0.004600		
0.939560	0.008356	0.002355	0.005536		
0.989011	0.008356	0.002479	0.006582		
1.038462	0.008356	0.002603	0.007742		
1.087912	0.008356	0.002727	0.009021		
1.137363	0.008356	0.002851	0.010423		
1.186813	0.008356	0.002975	0.011950		
1.236264	0.008356	0.003099	0.013607		
1.285714	0.008356	0.003223	0.015397		
1.335165	0.008356	0.003347	0.017323		
1.384615	0.008356	0.003471	0.019388		
1.434066	0.008356	0.003595	0.021595		
1.483516	0.008356	0.003719	0.023948		
1.532967	0.008356	0.003890	0.026447		
1.582418	0.008356	0.004062	0.029096		
1.631868	0.008356	0.004233	0.031895		
1.681319	0.008356	0.004405	0.034842		
1.730769	0.008356	0.004576	0.037934		
1.780220	0.008356	0.004748	0.041136		
1.829670	0.008356	0.004919	0.056173		
1.879121	0.008356	0.005091	0.056173		
1.928571	0.008356	0.005262	0.056173		
1.978022	0.008356	0.005434	0.056173		
2.027473	0.008356	0.005605	0.056173		
2.076923	0.008356	0.005777	0.056173		

```
 2.126374  0.008356  0.005948  0.056173
 2.175824  0.008356  0.006120  0.056173
 2.225275  0.008356  0.006291  0.056173
 2.274725  0.008356  0.006463  0.056173
 2.324176  0.008356  0.006634  0.056173
 2.373626  0.008356  0.006806  0.056173
 2.423077  0.008356  0.006977  0.056173
 2.472527  0.008356  0.007149  0.056173
 2.500000  0.008356  0.011886  0.056173
 END FTABLE  4
 FTABLE      3
  42    5
    Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
     (ft)   (acres) (acre-ft)   (cfs)     (cfs)    (ft/sec)    (Minutes)***
 0.000000  0.008356  0.000000  0.000000  0.000000
 0.049451  0.008356  0.000413  0.000000  0.042130
 0.098901  0.008356  0.000826  0.000000  0.044907
 0.148352  0.008356  0.001240  0.000000  0.046296
 0.197802  0.008356  0.001653  0.000000  0.047685
 0.247253  0.008356  0.002066  0.000000  0.049074
 0.296703  0.008356  0.002479  0.000000  0.050463
 0.346154  0.008356  0.002893  0.000000  0.051852
 0.395604  0.008356  0.003306  0.000000  0.053241
 0.445055  0.008356  0.003719  0.000000  0.054630
 0.494505  0.008356  0.004132  0.000000  0.056019
 0.543956  0.008356  0.004545  0.220835  0.057407
 0.593407  0.008356  0.004959  0.683479  0.058796
 0.642857  0.008356  0.005372  1.291254  0.060185
 0.692308  0.008356  0.005785  2.012784  0.061574
 0.741758  0.008356  0.006198  2.827810  0.062963
 0.791209  0.008356  0.006612  3.719715  0.064352
 0.840659  0.008356  0.007025  4.672998  0.065741
 0.890110  0.008356  0.007438  5.672260  0.067130
 0.939560  0.008356  0.007851  6.701818  0.068519
 0.989011  0.008356  0.008264  7.745651  0.069907
 1.038462  0.008356  0.008678  8.787553  0.071296
 1.087912  0.008356  0.009091  9.811421  0.072685
 1.137363  0.008356  0.009504  10.80165  0.074074
 1.186813  0.008356  0.009917  11.74359  0.075463
 1.236264  0.008356  0.010331  12.62413  0.076852
 1.285714  0.008356  0.010744  13.43226  0.078241
 1.335165  0.008356  0.011157  14.15972  0.079630
 1.384615  0.008356  0.011570  14.80175  0.081019
 1.434066  0.008356  0.011983  15.35779  0.082407
 1.483516  0.008356  0.012397  15.83232  0.083796
 1.532967  0.008356  0.012810  16.23562  0.084259
 1.582418  0.008356  0.013223  16.58469  0.084259
 1.631868  0.008356  0.013636  17.08966  0.084259
 1.681319  0.008356  0.014050  17.45899  0.084259
 1.730769  0.008356  0.014463  17.82067  0.084259
 1.780220  0.008356  0.014876  18.17515  0.084259
 1.829670  0.008356  0.015289  18.52284  0.084259
 1.879121  0.008356  0.015702  18.86413  0.084259
 1.928571  0.008356  0.016116  19.19935  0.084259
 1.978022  0.008356  0.016529  19.52882  0.084259
 2.000000  0.008356  0.016713  19.85283  0.084259
 END FTABLE  3
 FTABLE      5
  92    5
    Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
     (ft)   (acres) (acre-ft)   (cfs)     (cfs)    (ft/sec)    (Minutes)***
 0.000000  0.086777  0.000000  0.000000  0.000000
 0.022222  0.086777  0.002020  0.002275  0.004375
 0.044444  0.086777  0.003967  0.003218  0.004375
 0.066667  0.086777  0.005896  0.003941  0.004375
 0.088889  0.086777  0.007824  0.004551  0.004375
 0.111111  0.086777  0.009752  0.005088  0.004375
 0.133333  0.086777  0.011681  0.005574  0.004375
 0.155556  0.086777  0.013609  0.006020  0.004375
 0.177778  0.086777  0.015537  0.006436  0.004375
```

0.200000	0.086777	0.017466	0.006826	0.004375
0.222222	0.086777	0.019394	0.007196	0.004375
0.244444	0.086777	0.021323	0.007547	0.004375
0.266667	0.086777	0.023251	0.007883	0.004375
0.288889	0.086777	0.025179	0.008204	0.004375
0.311111	0.086777	0.027108	0.008514	0.004375
0.333333	0.086777	0.029036	0.008813	0.004375
0.355556	0.086777	0.030964	0.009102	0.004375
0.377778	0.086777	0.032893	0.009382	0.004375
0.400000	0.086777	0.034821	0.009654	0.004375
0.422222	0.086777	0.036750	0.009919	0.004375
0.444444	0.086777	0.038678	0.010176	0.004375
0.466667	0.086777	0.040606	0.010428	0.004375
0.488889	0.086777	0.042535	0.010673	0.004375
0.511111	0.086777	0.044463	0.010913	0.004375
0.533333	0.086777	0.046391	0.011148	0.004375
0.555556	0.086777	0.048320	0.011377	0.004375
0.577778	0.086777	0.050248	0.011603	0.004375
0.600000	0.086777	0.052177	0.011824	0.004375
0.622222	0.086777	0.054105	0.012041	0.004375
0.644444	0.086777	0.056033	0.012254	0.004375
0.666667	0.086777	0.057962	0.012463	0.004375
0.688889	0.086777	0.059890	0.012669	0.004375
0.711111	0.086777	0.061818	0.012872	0.004375
0.733333	0.086777	0.063747	0.013072	0.004375
0.755556	0.086777	0.065675	0.013268	0.004375
0.777778	0.086777	0.067604	0.013462	0.004375
0.800000	0.086777	0.069532	0.013653	0.004375
0.822222	0.086777	0.071460	0.013841	0.004375
0.844444	0.086777	0.073389	0.014027	0.004375
0.866667	0.086777	0.075317	0.014210	0.004375
0.888889	0.086777	0.077245	0.014391	0.004375
0.911111	0.086777	0.079174	0.014570	0.004375
0.933333	0.086777	0.081102	0.014747	0.004375
0.955556	0.086777	0.083031	0.014921	0.004375
0.977778	0.086777	0.084959	0.015094	0.004375
1.000000	0.086777	0.086887	0.015264	0.004375
1.022222	0.086777	0.088816	0.015433	0.004375
1.044444	0.086777	0.090744	0.015600	0.004375
1.066667	0.086777	0.092672	0.015765	0.004375
1.088889	0.086777	0.094601	0.015928	0.004375
1.111111	0.086777	0.096529	0.016090	0.004375
1.133333	0.086777	0.098458	0.016250	0.004375
1.155556	0.086777	0.100386	0.016409	0.004375
1.177778	0.086777	0.102314	0.016566	0.004375
1.200000	0.086777	0.104243	0.016721	0.004375
1.222222	0.086777	0.106171	0.016875	0.004375
1.244444	0.086777	0.108099	0.017028	0.004375
1.266667	0.086777	0.110028	0.017180	0.004375
1.288889	0.086777	0.111956	0.017330	0.004375
1.311111	0.086777	0.113885	0.017478	0.004375
1.333333	0.086777	0.115813	0.017626	0.004375
1.355556	0.086777	0.117741	0.017772	0.004375
1.377778	0.086777	0.119670	0.017917	0.004375
1.400000	0.086777	0.121598	0.018061	0.004375
1.422222	0.086777	0.123526	0.018232	0.004375
1.444444	0.086777	0.125455	0.019359	0.004375
1.466667	0.086777	0.127383	0.021147	0.004375
1.488889	0.086777	0.129312	0.023376	0.004375
1.511111	0.086777	0.131240	0.025957	0.004375
1.533333	0.086777	0.133168	0.028835	0.004375
1.555556	0.086777	0.135097	0.031973	0.004375
1.577778	0.086777	0.137025	0.035342	0.004375
1.600000	0.086777	0.138953	0.038920	0.004375
1.622222	0.086777	0.140882	0.042688	0.004375
1.644444	0.086777	0.142810	0.046630	0.004375
1.666667	0.086777	0.144738	0.050732	0.004375
1.688889	0.086777	0.146667	0.054984	0.004375
1.711111	0.086777	0.148595	0.059374	0.004375
1.733333	0.086777	0.150524	0.063893	0.004375

```
  1.755556  0.086777  0.152452  0.068532  0.004375
  1.777778  0.086777  0.154380  0.073284  0.004375
  1.800000  0.086777  0.156309  0.078140  0.004375
  1.822222  0.086777  0.158237  0.083096  0.004375
  1.844444  0.086777  0.160165  0.088143  0.004375
  1.866667  0.086777  0.162094  0.093277  0.004375
  1.888889  0.086777  0.164022  0.098492  0.004375
  1.911111  0.086777  0.165951  0.103783  0.004375
  1.933333  0.086777  0.167879  0.122333  0.004375
  1.955556  0.086777  0.169807  0.177208  0.004375
  1.977778  0.086777  0.171736  0.253351  0.004375
  2.000000  0.086777  0.173664  0.345629  0.004375
  2.022222  0.086777  0.175592  0.451047  0.004375
  END FTABLE  5
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1              RCHRES   1     EXTNL  PREC
WDM      2 PREC     ENGL    1              RCHRES   3     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5            RCHRES   1     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7            RCHRES   2     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.5            RCHRES   3     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7            RCHRES   4     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   5 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   5 HYDR   O      1 1        1      WDM   1001 FLOW     ENGL      REPL
RCHRES   5 HYDR   O      2 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   5 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     12.1      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        6
RCHRES     ROFLOW                          RCHRES         INFLOW
  END MASS-LINK    6

  MASS-LINK        7
RCHRES     OFLOW  OVOL   1                 RCHRES         INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    8
```

```
  MASS-LINK        16
RCHRES     ROFLOW                         COPY           INPUT  MEAN
  END MASS-LINK    16

  MASS-LINK        17
RCHRES     OFLOW  OVOL   1                COPY           INPUT  MEAN
  END MASS-LINK    17

END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

ERROR/WARNING ID: 238 1

The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:
DATE/TIME: 1962/ 6/30 24: 0

RCHRES : 1

RELERR	STORS	STOR	MATIN	MATDIF
-1.000E+00	0.00000	0.0000E+00	0.00000	3.0232E-12

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR is the storage of material in the processing unit (land-segment or reach/reservior) at the end of the present interval.
STORS is the storage of material in the pu at the start of the present printout reporting period.
MATIN is the total inflow of material to the pu during the present printout reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the present printout reporting period.

ERROR/WARNING ID: 238 1

The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:
DATE/TIME: 1962/ 6/30 24: 0

RCHRES : 3

RELERR	STORS	STOR	MATIN	MATDIF
-1.000E+00	0.00000	0.0000E+00	0.00000	3.2730E-12

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR is the storage of material in the processing unit (land-segment or reach/reservior) at the end of the present interval.
STORS is the storage of material in the pu at the start of the present printout reporting period.
MATIN is the total inflow of material to the pu during the present printout reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the present printout reporting period.

ERROR/WARNING ID: 238 1

The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:

```
DATE/TIME: 1963/ 6/30 24: 0

RCHRES :    1

RELERR       STORS        STOR       MATIN      MATDIF
-1.000E+00     0.00000  0.0000E+00     0.00000  3.5313E-12

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR  is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or
reach/reservior) at the end of the present interval.
STORS  is the storage of material in the pu at the start of the present
printout reporting period.
MATIN  is the total inflow of material to the pu during the present printout
reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the
present printout reporting period.
```

```
ERROR/WARNING ID:   238   1

The continuity error reported below is greater than 1 part in 1000 and is
therefore considered high.

Did you specify any "special actions"?  If so, they could account for it.

Relevant data are:
DATE/TIME: 1963/ 6/30 24: 0

RCHRES :    3

RELERR       STORS        STOR       MATIN      MATDIF
-1.000E+00     0.00000  0.0000E+00     0.00000  3.8232E-12

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR  is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or
reach/reservior) at the end of the present interval.
STORS  is the storage of material in the pu at the start of the present
printout reporting period.
MATIN  is the total inflow of material to the pu during the present printout
reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the
present printout reporting period.
```

```
ERROR/WARNING ID:   238   1

The continuity error reported below is greater than 1 part in 1000 and is
therefore considered high.

Did you specify any "special actions"?  If so, they could account for it.

Relevant data are:
DATE/TIME: 1971/11/30 24: 0

RCHRES :    1

RELERR       STORS        STOR       MATIN      MATDIF
-1.000E+00     0.00000  0.0000E+00     0.00000  4.5340E-12

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR  is (STOR-STORS) - MATDIF.
```

REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or reach/reservior) at the end of the present interval.
STORS is the storage of material in the pu at the start of the present printout reporting period.
MATIN is the total inflow of material to the pu during the present printout reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the present printout reporting period.

ERROR/WARNING ID: 238   1

The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:
DATE/TIME: 1971/11/30 24: 0

RCHRES :   3

RELERR	STORS	STOR	MATIN	MATDIF
-1.000E+00	0.00000	0.0000E+00	0.00000	4.9087E-12

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or reach/reservior) at the end of the present interval.
STORS is the storage of material in the pu at the start of the present printout reporting period.
MATIN is the total inflow of material to the pu during the present printout reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the present printout reporting period.

ERROR/WARNING ID: 238   1

The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:
DATE/TIME: 1976/ 6/30 24: 0

RCHRES :   1

RELERR	STORS	STOR	MATIN	MATDIF
-1.000E+00	0.00000	0.0000E+00	0.00000	1.1948E-11

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or reach/reservior) at the end of the present interval.
STORS is the storage of material in the pu at the start of the present printout reporting period.
MATIN is the total inflow of material to the pu during the present printout reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the present printout reporting period.

ERROR/WARNING ID: 238   1

The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:
DATE/TIME: 1976/ 6/30 24: 0

RCHRES :   3

RELERR	STORS	STOR	MATIN	MATDIF
-1.000E+00	0.00000	0.0000E+00	0.00000	1.2936E-11

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or reach/reservior) at the end of the present interval.
STORS is the storage of material in the pu at the start of the present printout reporting period.
MATIN is the total inflow of material to the pu during the present printout reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the present printout reporting period.

ERROR/WARNING ID: 238   1

The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:
DATE/TIME: 1977/ 7/31 24: 0

RCHRES :   1

RELERR	STORS	STOR	MATIN	MATDIF
-1.000E+00	0.00000	0.0000E+00	0.00000	1.4557E-11

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or reach/reservior) at the end of the present interval.
STORS is the storage of material in the pu at the start of the present printout reporting period.
MATIN is the total inflow of material to the pu during the present printout reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the present printout reporting period.

The count for the WARNING printed above has reached its maximum.

If the condition is encountered again the message will not be repeated.

ERROR/WARNING ID: 238   1

The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:

```
DATE/TIME: 1977/ 7/31 24: 0

RCHRES :    3

RELERR       STORS        STOR       MATIN      MATDIF
-1.000E+00     0.00000  0.0000E+00     0.00000  1.5760E-11

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR  is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or
reach/reservior) at the end of the present interval.
STORS  is the storage of material in the pu at the start of the present
printout reporting period.
MATIN  is the total inflow of material to the pu during the present printout
reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the
present printout reporting period.
```

```
The count for the WARNING printed above has reached its maximum.

If the condition is encountered again the message will not be repeated.
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1995/ 1/ 4 21: 0

RCHRES:     5

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1          V2         VOL
92 7.5648E+03 7648.8      7773.1
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1995/ 1/ 4 21: 0

RCHRES:     5

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A           B           C      RDEP1      RDEP2  COUNT
0.0000E+00 7560.0     -1.875E+04    2.4800  2.4800E+00      2
```

Disclaimer

Legal Notice

Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

ATTACHMENT 3
Structural BMP Maintenance Information

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 3 must identify:

- ☐ Typical maintenance indicators and actions for proposed structural BMP(s) based on Section 7.7 of the BMP Design Manual

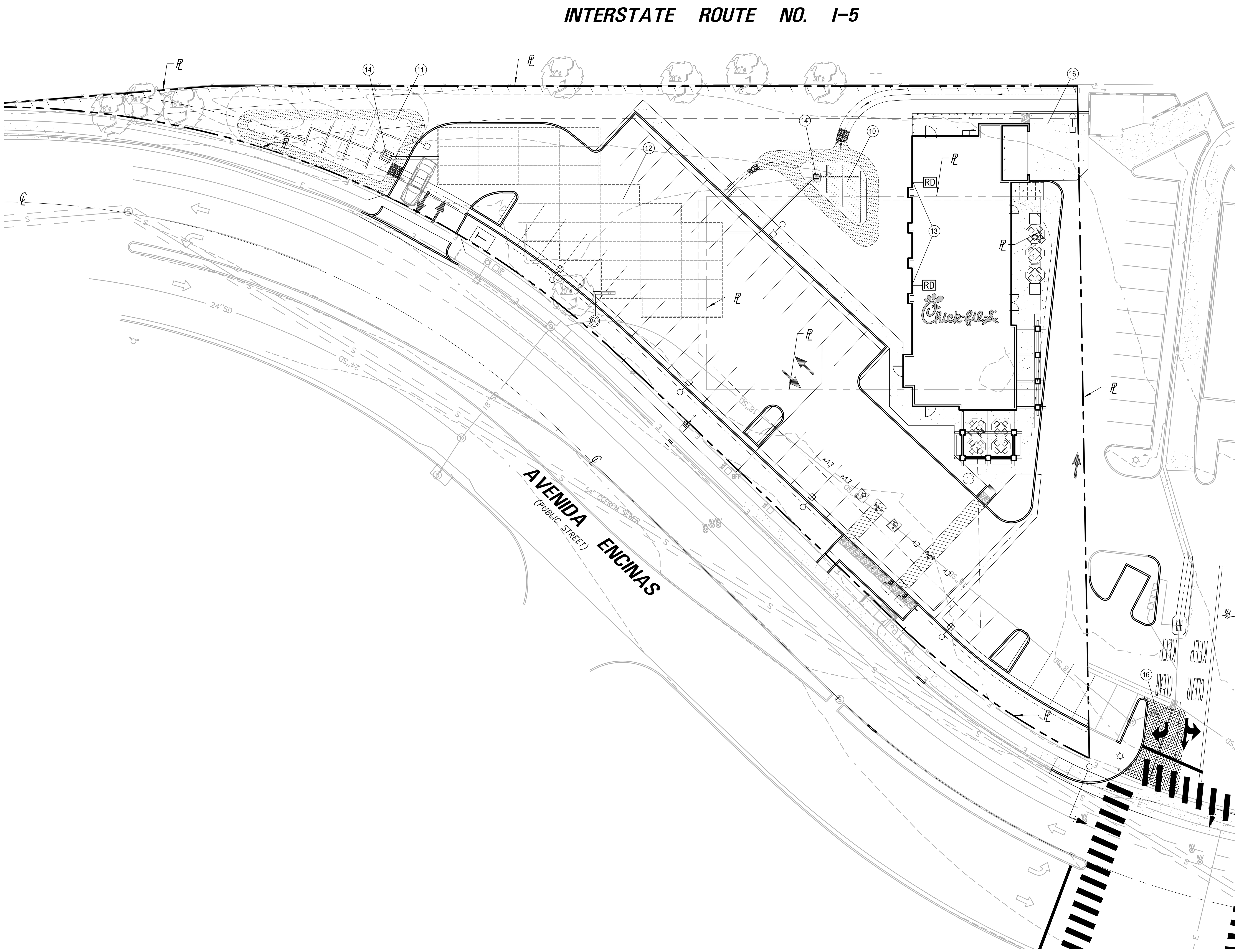
Final Design level submittal:

Attachment 3 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 for BMPs subject to siltation or heavy trash(e.g., silt level posts or other markings shall be included in all BMP components that will trap and store sediment, trash, and/or debris, so that the inspector may determine how full the BMP is, and the maintenance personnel may determine where the bottom of the BMP is . If required, posts or other markings shall be indicated and described on structural BMP plans.)
- ☐ 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 4
City standard Single Sheet BMP (SSBMP) Exhibit

[Use the City's standard Single Sheet BMP Plan.]



SWMP NO. PENDING

PARTY RESPONSIBLE FOR MAINTENANCE:

NAME TBD (STORE OPERATOR)

ADDRESS 5850 AVENIDA ENCINAS
CARLSBAD, CA

CONTACT TBD

PHONE NO. TBD

PLAN PREPARED BY:

NAME RANDY J. DECKER

SIGNATURE

COMPANY JOSEPH C. TRUXAW & ASSOCIATES, INC.

ADDRESS 1915 W. ORANGEWOOD AVE, SUITE 101
ORANGE, CA 92868

PHONE NO. (714) 935-0265

CERTIFICATION

BMP NOTES:

1. THESE BMPS ARE MANDATORY TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS OR THESE PLANS.
2. NO CHANGES TO THE PROPOSED BMPS ON THIS SHEET WITHOUT PRIOR APPROVAL FROM THE CITY ENGINEER.
3. NO SUBSTITUTIONS TO THE MATERIAL OR TYPES OR PLANTING TYPES WITHOUT PRIOR APPROVAL FROM THE CITY ENGINEER.
4. NO OCCUPANCY WILL BE GRANTED UNTIL THE CITY INSPECTION STAFF HAS INSPECTED THIS PROJECT FOR APPROPRIATE BMP CONSTRUCTION AND INSTALLATION.
5. REFER TO MAINTENANCE AGREEMENT DOCUMENT.
6. SEE PROJECT SWMP FOR ADDITIONAL INFORMATION.

BMP TABLE

BMP ID #	BMP TYPE	SYMBOL	CASQA NO.	QUANTITY	DRAWING NO.	SHEET NO.(S)	INSPECTION * FREQUENCY	MAINTENANCE * FREQUENCY
HYDROMODIFICATION & TREATMENT CONTROL								
10 11	BIORETENTION AREA		TC-32	1,143 SF.	-	-	QUARTERLY	SEMI-ANNUALLY
HYDROMODIFICATION								
12	STORM CAPTURE VAULTS		MP-50	36	-	-	QUARTERLY	SEMI-ANNUALLY
LOW IMPACT DESIGN (L.I.D.)								
13	ROOF DRAIN TO LANDSCAPING	RD	SD-11	2	-	-	QUARTERLY	SEMI-ANNUALLY
14 15	INLET FILTER		TC-50	2	-	-	QUARTERLY	SEMI-ANNUALLY
SOURCE CONTROL								
16	TRASH ENCLOSURE		SD-32	1	-	-	WEEKLY	MONTHLY
14 15	STENCILS	NO DUMPING DRAINS TO OCEAN	SD-13	2	-	-	ANNUALLY	ANNUALLY
16	PERVIOUS PAVEMENT		SD-20	2	-	-	QUARTERLY	SEMI-ANNUALLY

DATE	INITIAL	REVISION DESCRIPTION	DATE	INITIAL	DATE	INITIAL
ENGINEER OF WORK			OTHER APPROVAL		CITY APPROVAL	

SHEET 1 — CITY OF CARLSBAD, ENGINEERING DEPARTMENT — SHEETS 1

SINGLE SHEET BMP SITE PLAN

CHICK-FIL-A, #4306
5850 AVENIDA ENCINAS

RECORD COPY

INITIAL DATE

PROJECT NO. -

DRAWING NO. -