HEALTH RISK ASSESSMENT & ODOR ANALYSIS

OC LINK PROJECT

CITY OF ANAHEIM

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PROJECT NO. 17007

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TABLE OF CONTENTS

APPENDIX

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

ACSP	Anaheim Canyon Specific Plan
CalEEMod	California Emissions Estimator Model
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
DPM	Diesel particulate matter
EPA	Environmental Protection Agency
HAP	Hazardous Air Pollutants
MICR	Maximum Individual Cancer Risk
MMRP	Mitigation Monitoring and Reporting Program
MSAT	Mobile Source Air Toxics
NAAQS	National Ambient Air Quality Standards
NMOC	Nonmethane Organic Compounds
NSPS	New Source Performance Standards
OEHHA	Office of Environmental Health Hazard Assessment
PM	Particle Matter
PM10	Particles that are less than 10 micrometers in diameter
PM2.5	Particles that are less than 2.5 micrometers in diameter
PPM	Parts Per Million
SCAQMD	South Coast Air Quality Management District
TAC	Toxic Air Contaminants

1.0 INTRODUCTION

1.1 Purpose of Analysis and Study Objectives

This Health Risk Assessment and Odor Analysis has been completed to determine the potential cancer and non-cancer (acute and chronic) risks to the proposed residential apartment units as well as to determine if odor emissions to the proposed residential apartment units would exceed the thresholds specified in the *Mitigation Monitoring and Reporting Program No. 312* (MMRP No. 312) for Anaheim Canyon Specific Plan (ACSP) for the proposed OC Link Project (proposed project). The following is provided in this report:

- A description of the proposed project;
- A description of toxic air contaminants (TAC);
- A description of the modeling parameters utilized in this analysis;
- An analysis of TAC concentrations impacting the proposed residential uses and a comparison of the calculated cancer and acute non-cancer risks with the MMRP No. 312 for ACSP thresholds; and
- An analysis of the odors impacting the proposed residential uses and a comparison of the odor impacts with the MMRP No. 312 for ACSP thresholds

1.2 Site Location and Study Area

The proposed project is located within the Anaheim Pacificenter, which is located in the eastern portion of the City of Anaheim (City). The Anaheim Pacificenter is bounded by East La Palma Avenue and commercial uses to the north, North Tustin Avenue and commercial uses to the east, State Route 91 to the south, and the Metrolink Anaheim Canyon Station and multi-family residential uses to the west. The project study area is shown in Figure 1.

1.3 Proposed Project Description

The proposed project would involve the construction of up to 406 apartment units and 5,000 square feet of new retail. The apartment component of the project encompasses two (2) sites (Site 'A' and 'B') within the larger Anaheim Pacificenter development, which is presently developed with a mix of office, retail and hotel uses. Site 'A' is located in the northwest corner of Anaheim Pacificenter on approximately 2.5-acres and would be developed with 192 units. Site 'B' is located on the southwestern portion of Anaheim Pacificenter on approximately 3.1-acres and would be developed with 214 units with the option of increasing to 222 units if recreational amenities are shared between both sites. Site amenities will include both active and passive open space areas including pools, spas, sitting areas and landscaped areas. The project also includes 5,000-square feet of retail uses within the existing retail center located at the northeast corner of the site and adjacent to the intersection of La Palma Avenue and Tustin Avenue.

1.4 Anaheim Canyon Specific Plan Development Standards

The development of the proposed project falls under the Anaheim Canyon Specific Plan (ACSP) Mitigation Monitoring and Reporting Program (MMRP) No. 312. Many aspects of the ACSP serve to directly and indirectly reduce the air quality and odor impacts by and to development projects. Development of the proposed project would be consistent with the land use designations provided in the ACSP and would promote the goals and policies of the ACSP by providing multi-family residential uses in close proximity to the existing Metrolink Station, employment and commercial opportunities that will promote a walkable community. The Anaheim Canyon Specific Plan Draft Environmental Impact Report (ACSP DEIR) (City of Anaheim, 2015), analyzed the environmental impacts of buildout of the ACSP, which included analysis of up to 2,919 residential units within Development Area 3 that encompasses the project site and surrounding properties. The proposed project would consist of the development of up to 406 residential units, which is well below the 2,919 residential units analyzed for Development Area 3. As such, the proposed project is consistent with the development assumptions utilized in the ACSP DEIR and development of the proposed project would not cause any new or more severe air quality impacts than what were analyzed in the ACSP DEIR.

The ACSP DEIR analyzed criteria pollutant emissions from both construction and operational activities of the proposed 19,577,470 square feet of additional industrial and commercial uses and 2,607 additional residential units that would potentially be developed within the ACSP (the proposed project represents approximately 1.4 percent of total building area of ACSP). The calculated regional construction emissions from Table 5.2-8 of the ACSP DEIR is shown in Table A and the calculated regional operational emissions from Table 5.2-9 of the ACSP DEIR is shown in Table B.

Table A – ACSP DEIR Estimate of Regional Construction Emissions

Construction Phase[1,2]	Construction-Related Regional Emissions (pounds/day)[3,4]					
	VOC	**NOx**	**CO**	**SO_2**	**PM10**	**PM2.5**
Demolition	10	138	99	<1	30	8
Site Preparation[1]	5	58	44	<1	11	7
Grading[1]	7	81	53	<1	8	5
Building Construction	13	84	139	<1	16	6
Paving	2	26	16	<1	2	1
Architectural Coatings	217	4	15	<1	2	1
Worst-Case Day[5]	**256**	**390**	**366**	**1**	**69**	**29**
SCQAMD Standard	**75**	**100**	**550**	**150**	**150**	**55**
Significant?	**Yes**	**Yes**	No	No	No	No

Notes:
[1] Construction equipment mix is based on CalEEMod default construction mix. See ACSP DEIR's Appendix C for a list of assumptions on emissions generated on a worst-case day.
[2] Grading includes compliance with SCAQMD Rule 403 fugitive dust control measures. Measures include requiring an application of water at least twice per day to at least 80 percent of the unstabilized disturbed onsite surface areas, replacing disturbed ground cover quickly, and restricting speed on unpaved roads to less than 15 miles per hour. Modeling also assumes a VOC of 100 g/L for interior paints pursuant to SCAQMD Rule 1113.
[3] It is assumed that approximately 13,953,078 building square feet (50 percent) of the existing nonresidential structures would be demolished.
[4] The planned grade separation projects would occur as part of the OC Bridges Program and not a part of the Proposed Project. Therefore, potential short-term emissions associated with these planned projects are not accounted.
[5] Based on overlap of the Building Construction, Paving, and Architectural Coatings phases.
Source: ACSP DEIR Table 5.2-8. (City of Anaheim, 2015)

Table B – ACSP DEIR Maximum Daily Operational Phase Regional Emissions

Phase	Operation-Related Regional Emissions (pounds/day)					
	VOC	**NOx**	**CO**	**SO_2**	**PM10**	**PM2.5**
New Land Uses						
Area	940	3	218	0	5	5
Energy	12	107	88	1	8	8
Transportation	546	1,220	6,263	33	2,351	650
SCQAMD Regional Threshold	**55**	**55**	**550**	**150**	**150**	**55**
Significant?	**Yes**	**Yes**	**Yes**	No	**Yes**	**Yes**

Source: ACSP DEIR Table 5.2-9. (City of Anaheim, 2015)

Table A and Table B show that the significant air quality impacts would occur from both construction and operation of the new development that would occur from implementation of all foreseeable development as detailed in the ACSP. However, as detailed above the proposed project would account for approximately 1.4 percent of the proposed development in the ACSP and 1.4 percent of the emissions provided in Table A and Table B would be well below the SCAQMD's thresholds.

In order to address the significant air quality impacts found in the ACSP DEIR, the City adopted a Statement of Overriding Considerations that found the merits of the ACSP outweigh the significant air quality impacts created from the ACSP. The Statement of Overriding Considerations justified its decision in part through acknowledging the benefits of implementation of the proposed mitigation measures provided in the ACSP DEIR that would lessen the air quality impacts (although not to less than significant levels). The applicable air quality related mitigation measures from the ACSP DEIR for the development of residential projects within the ACSP are described below.

ACSP MMRP No. 312 Mitigation Measure AQ-1

Prior to issuance of grading, demolition or building plans, whichever occurs first, the property owner/developer shall provide a note on plans indicating that ongoing during grading and construction, contractors will use equipment that meets the following United States Environmental Protection Agency (EPA)-Certified emissions standards:

All off-road diesel-powered construction equipment greater than 50 horsepower shall meet the Tier 4 Final emission standards. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 4 diesel emissions control strategy for a similarly sized engine, as defined by CARB regulations.

ACSP MMRP No. 312 Mitigation Measure AQ-2

Prior to issuance of grading, demolition or building plans, whichever occurs first, the property owner/developer shall provide a list of all construction equipment proposed to be used on the project site. This list may be provided on the building plans. The construction equipment list shall state the makes, models, and numbers of the equipment; that the equipment shall be properly serviced and maintained in accordance with the manufacturer's recommendations; and, that all nonessential idling of construction equipment is restricted to five minutes or less in compliance with California Air Resources Board's Rule 2449.

ACSP MMRP No. 312 Mitigation Measure AQ-3

Prior to issuance of grading, demolition or building plans, whichever occurs first, the property owner/developer shall submit a dust control plan that implements the following measures during ground-disturbing activities, in addition to the existing requirements for fugitive dust control under South Coast Air Quality Management District Rule 403, to further reduce PM10 and PM2.5 emissions:

a) Following all grading activities, the construction contractor shall reestablish ground cover on the construction site through seeding and watering.

b) During all construction activities, the construction contractor shall sweep streets with Rule 1186–compliant, PM10-efficient vacuum units on a daily basis if silt is carried over to adjacent public thoroughfares or occurs as a result of hauling.

c) During all construction activities, the construction contractor shall maintain a minimum 24-inch freeboard on trucks hauling dirt, sand, soil, or other loose materials and tarp materials with a fabric cover or other cover that achieves the same amount of protection.

d) During all construction activities, the construction contractor shall water exposed ground surfaces and disturbed areas a minimum of every three hours on the construction site and a minimum of three times per day.

e) During all construction activities, the construction contractor shall limit onsite vehicle speeds on unpaved roads to no more than 15 miles per hour.

The Building Division shall verify compliance during normal construction site inspections.

ACSP MMRP No. 312 Mitigation Measure AQ-4

Prior to issuance of a building permit, the property owner/developer shall provide a note on plans indicating that:

a) All coatings and solvents will have a volatile organic compound (VOC) content lower than required under Rule 1113 (i.e., super compliant paints).

b) All architectural coatings shall be applied either by (1) using a high-volume, low-pressure spray method operated at an air pressure between 0.1 and 10 pounds per square inch gauge to achieve a 65 percent application efficiency; or (2) manual application using a paintbrush, hand-roller, trowel, spatula, dauber, rag, or sponge, to achieve a 100 percent applicant efficiency.

c) The construction contractor shall also use precoated/natural colored building materials, where feasible.

The Building Division shall verify compliance during normal construction site inspections.

ACSP MMRP No. 312 Mitigation Measure AQ-5

Prior to issuance of building permits, for residential development, the property owner/developer shall provide a note on building plans that indicates that all shared community barbeques will be electric powered barbeque units. These units shall be verified on site by the Building Division prior to issuance of a Certificate of Occupancy.

ACSP MMRP No. 312 Mitigation Measure AQ-6

Prior to issuance of a building permit, the property owner/developer shall show on plans that all applicant-provided appliances be Energy Star appliances (dishwashers, refrigerators, clothes washers, and dryers). Installation of Energy Star appliances shall be verified by the Building Division prior to issuance of a Certificate of Occupancy.

ACSP MMRP No. 312 Mitigation Measure AQ-7

Prior to issuance of building permits for new construction of residential development, the property owner/developer shall indicate on plans that garage and/or car port parking are electrically wired to accommodate a Level 2 (240 volt) electric vehicle charging. The location of the electrical outlets shall be specified on building plans, and proper installation shall be verified by the Building Division prior to issuance of a Certificate of Occupancy.

ACSP MMRP No. 312 Mitigation Measure AQ-10

Prior to issuance of building permits for new residential projects, the property owner/developer shall submit a health risk assessment (HRA) to the Planning Department.

The HRA shall be prepared in accordance with policies and procedures of the State of California's Office of Environmental Health Hazard Assessment (OEHHA) and the South Coast Air Quality Management District (SCAQMD).

If the HRA shows that the incremental cancer risk exceeds one in one hundred thousand (1.0E-05), PM concentrations would exceed 2.5 $\mu g/m^3$, or the appropriate noncancer hazard index exceeds 1.0, the following is required prior to issuance of building permits:

a) The HRA shall identify the level of high-efficiency Minimum Efficiency Reporting Value (MERV) filter required to reduce indoor air concentrations of pollutants to achieve the cancer and/or noncancer threshold.

b) Installation of high efficiency MERV filters in the intake of residential ventilation systems consistent with the recommendations of the HRA, shall be shown on plans. Heating, air conditioning, and ventilation (HVAC) systems shall be installed with a fan unit designed to force air through the MERV filter.

c) To ensure long-term maintenance and replacement of the MERV filters in the individual units, the property owner/developer shall record a covenant on the property that requires ongoing implementation of the actions below. The form of the covenant shall be approved by the City Attorney's Office prior to recordation.

    1. The property owner/developer shall provide notification to all future tenants or owners of the potential health risk for affected units and the increased risk of exposure to diesel particulates when windows are open.

    2. For rental units, the property owner/developer shall maintain and replace MERV filters in accordance with the manufacture's recommendations.

    3. For ownership units, the Homeowner's Association shall incorporate requirements for long-term maintenance in the Covenant Conditions and Restrictions and inform homeowners of their responsibility to maintain the MERV filter in accordance with the manufacturer's recommendations.

ACSP MMRP No. 312 Mitigation Measure AQ-11

For projects located within 1,000 feet of an industrial facility that emits substantial odors, which includes but is not limited to:

- Wastewater treatment plants
- Composting, greenwaste, or recycling facilities
- Fiberglass manufacturing facilities
- Painting/coating operations
- Large-capacity coffee roasters
- Food-processing facilities

The property owner/developer shall submit an odor assessment to the Planning Director prior to approval of any future discretionary action that verifies that the South Coast Air Quality Management District (SCAQMD) has not received three or more verified odor complaints. If the Odor Assessment identifies that the facility has received three such complaints, the applicant will be required to identify and demonstrate that Best Available Control Technologies for Toxics (T-BACTs) are capable of reducing potential odors to an acceptable level, including appropriate enforcement mechanisms. T-BACTs may include, but are not limited to, scrubbers at the industrial facility, or installation of Minimum Efficiency Reporting Value (MERV) filters rated as 14 or better at all residential units.

1.5 Mitigation Measures Required for the Proposed Project

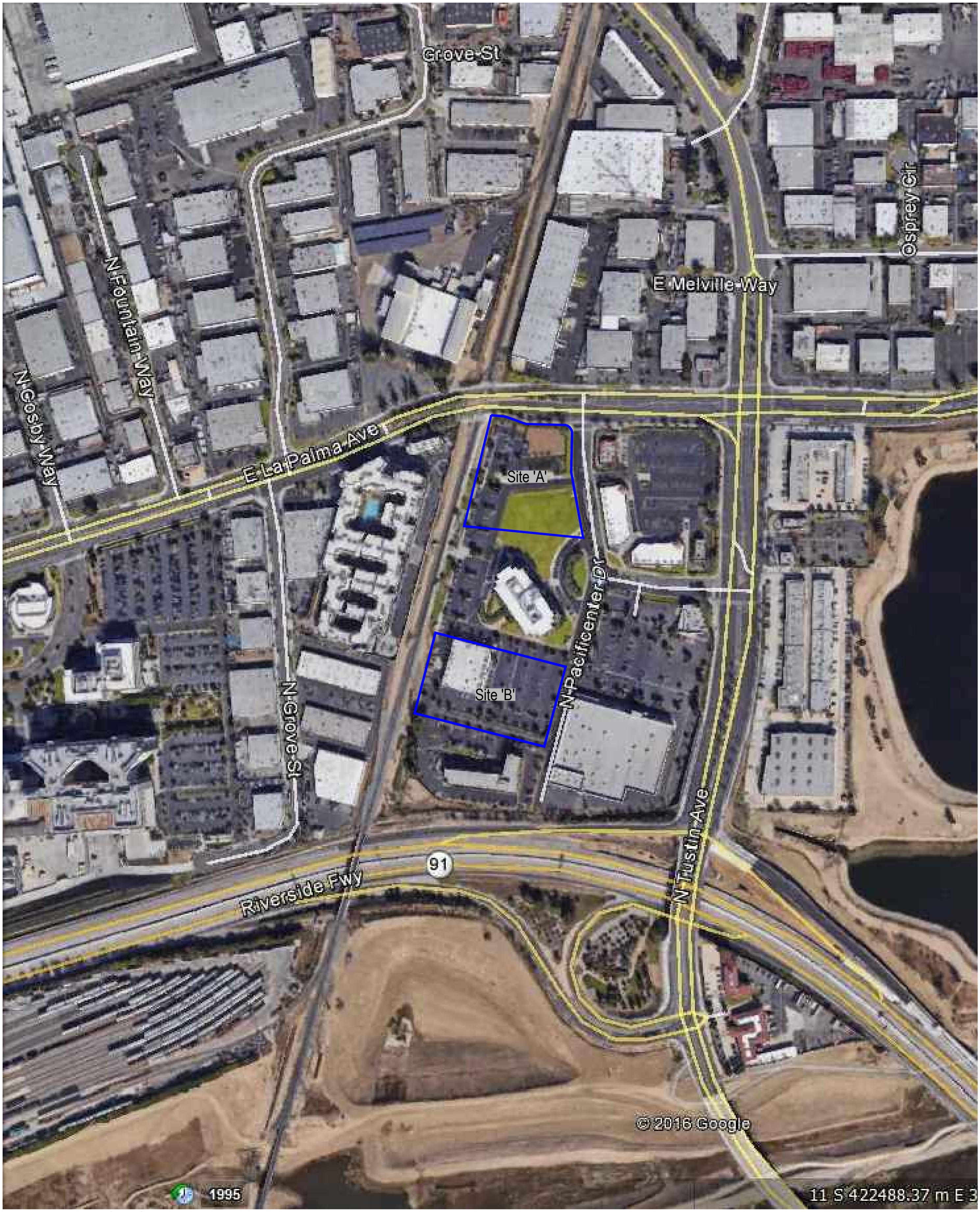
This analysis found through implementation of the following mitigation all cancer and non-cancer risks from toxic air contaminants and from odors impacts to the proposed residential apartment units would be reduced to less than significant levels.

Mitigation Measure 1:

The project applicant shall install a positive static pressure forced air heating, ventilation, and air conditioning (HVAC) system into all residential apartment units. Each HVAC system shall be required to install a high efficiency Minimum Efficiency Reporting Value (MERV) filter in the air intake for the HVAC system and the air intake shall be installed with a fan designed to force air through the MERV 13 filter and to create positive static pressure. A MERV 16 filter shall be utilized for all units located on the west side of Buildings 'A' and 'B'. All other residential units shall have MERV 13 filters. The installation of the MERV filters shall be incorporated into the mechanical plans for the proposed project.

To ensure long-term maintenance and replacement of the MERV filters in the individual units, the property owner shall record a covenant on the property that requires ongoing implementation of the action below. The form of the covenant shall be approved by the City's Attorney's Office prior to recordation:

1. The property owner shall provide notification to all future tenants of the potential health risks due to the increased risk of exposure to diesel particulates when windows are open.
2. The property owner shall maintain and replace MERV filters in accordance with the manufacture's recommendations.



SOURCE: Google Earth.

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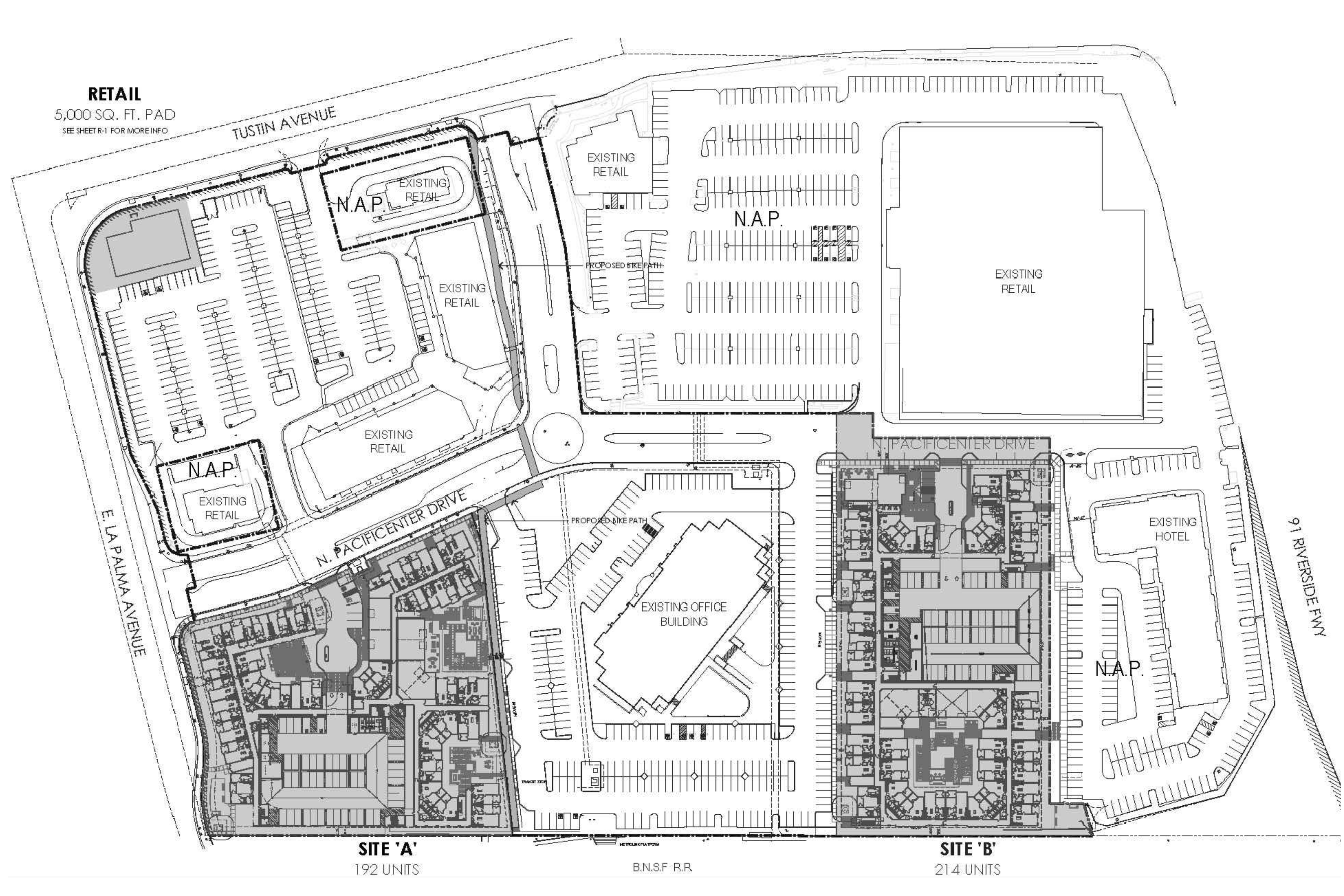
Figure 1
Project Local Study Area



SOURCE: Architects Orange.

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Figure 2
Proposed Site Plan

2.0 ATMOSPHERIC SETTING

The project site is located within the central portion of Orange County in the City of Anaheim, which is part of the South Coast Air Basin (Air Basin) that includes all of Orange County as well as the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. Orange County is located on a coastal plain with connecting broad valleys and low hills to the east. Regionally, the Air Basin is bounded by the Pacific Ocean to the southwest and high mountains to the east forming the inland perimeter. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. Occasional periods of strong Santa Ana winds and winter storms interrupt the otherwise mild weather pattern.

Although the Air Basin has a semi-arid climate, the air near the surface is typically moist because of the presence of a shallow marine layer. Except for infrequent periods when dry air is brought into the Air Basin by offshore winds, the ocean effect is dominant. Periods of heavy fog are frequent and low stratus clouds, often referred to as "high fog" are a characteristic climate feature.

Winds are an important parameter in characterizing the air quality environment of a project site because they determine the regional pattern of air pollution transport and control the rate of dispersion near a source. Daytime winds in Orange County are usually light breezes from off the coast as air moves regionally onshore from the cool Pacific Ocean. These winds are usually the strongest in the dry summer months. Nighttime winds in Orange County are a result mainly from the drainage of cool air off of the mountains to the east and they occur more often during the winter months and are usually lighter than the daytime winds. Between the periods of dominant airflow, periods of air stagnation may occur, both in the morning and evening hours. Whether such a period of stagnation occurs is one of the critical determinants of air quality conditions on any given day. The wind rose from the Anaheim Monitoring Station, which is the nearest monitoring station to the project site is shown in Figure 3.

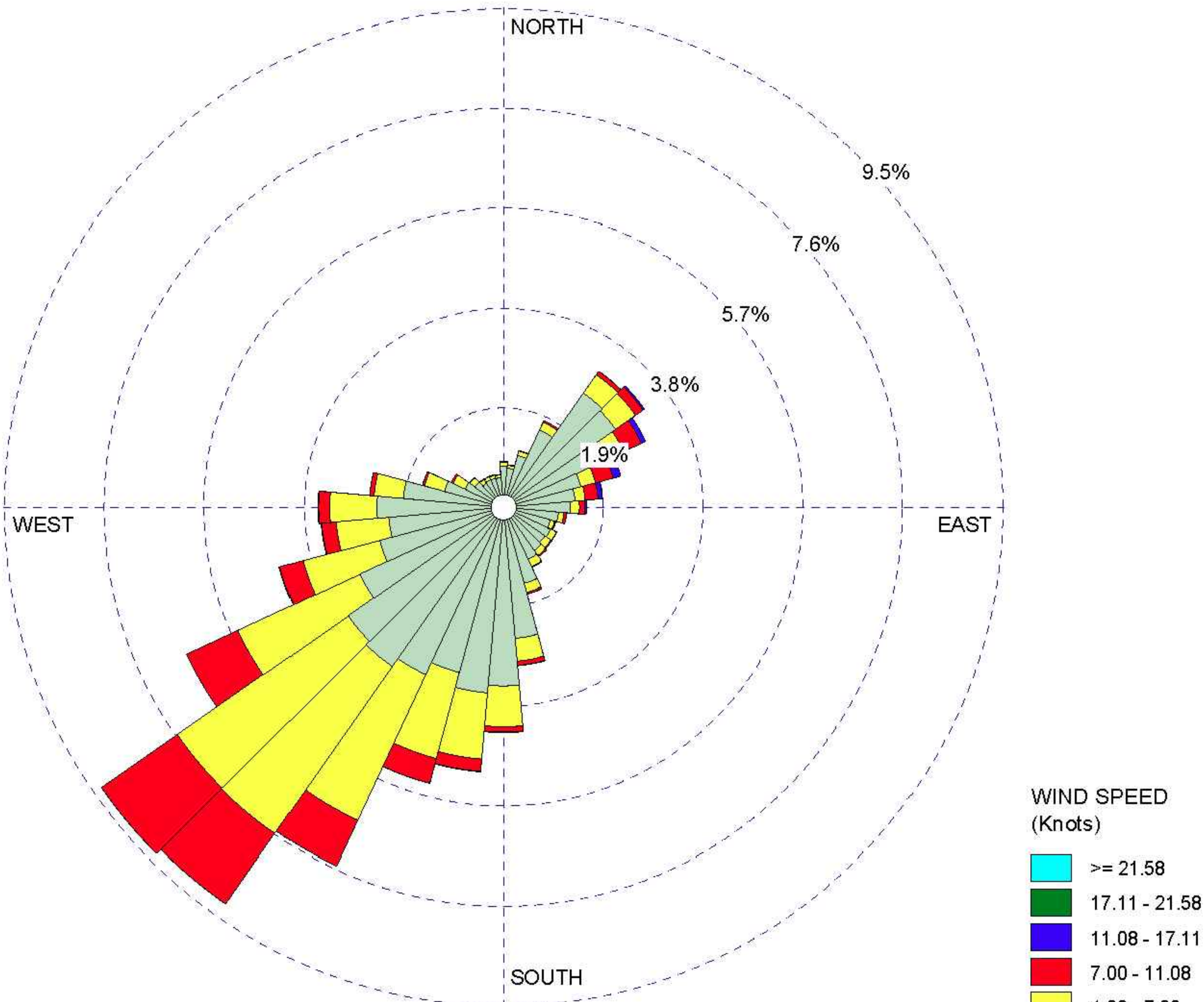
During the winter and fall months, surface high-pressure systems north of the Air Basin combined with other meteorological conditions, can result in very strong winds, called "Santa Ana Winds", from the northeast. These winds normally have durations of a few days before predominant meteorological conditions are reestablished. The highest wind speed typically occurs during the afternoon due to daytime thermal convection caused by surface heating. This convection brings about a downward transfer of momentum from stronger winds aloft. It is not uncommon to have sustained winds of 60 miles per hour with higher gusts during a Santa Ana Wind event.

The temperature and precipitation levels for the Anaheim Monitoring Station are shown below in Table C. Table C shows that August is typically the warmest month and December is typically the coolest month. Rainfall in the project area varies considerably in both time and space. Almost all the annual rainfall comes from the fringes of mid-latitude storms from late November to early April, with summers being almost completely dry.

Table C – Anaheim Monthly Climate Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Max. Temperature	70.0	70.0	72.4	74.7	77.1	80.1	85.2	87.1	86.5	81.2	75.4	69.7
Avg. Min. Temperature	47.5	48.2	50.4	52.8	57.3	60.5	64.2	64.5	62.7	57.7	51.8	46.9
Avg. Total Precipitation (in.)	3.34	3.47	1.86	0.83	0.53	0.15	0.07	0.01	0.10	0.72	0.99	2.02

Source: Source: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca0192



SOURCE: Anaheim Monitoring Station from 1/1/2006 to 12/31/2012.

VISTA ENVIRONMENTAL

Figure 3
Wind Rose from Anaheim Monitoring Station

3.0 TOXIC AIR CONTAMINANTS

Toxic air contaminants (TACs) is a term that is defined under the California Clean Air Act and consists of the same substances that are defined as Hazardous Air Pollutants (HAPs) in the Federal Clean Air Act. There are over 700 hundred different types of TACs with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least 40 different toxic air contaminants. The most important of these TACs, in terms of health risk, are diesel particulates, benzene, formaldehyde, 1,3-butadiene, and acetaldehyde. Public exposure to TACs can result from emissions from normal operations as well as from accidental releases. Health effects of TACs include cancer, birth defects, neurological damage, and death.

3.1 Diesel Particulate Matter

According to *The California Almanac of Emissions and Air Quality 2013 Edition*, the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important of which is diesel particulate matter (DPM). DPM is a subset of PM2.5 because the size of diesel particles are typically 2.5 microns and smaller. The identification of DPM as a TAC in 1998 led the California Air Resources Board (CARB) to adopt the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles in September 2000. The plan's goals are a 75-percent reduction in DPM by 2010 and an 85-percent reduction by 2020 from the 2000 baseline. Diesel engines emit a complex mixture of air pollutants, composed of gaseous and solid material. The visible emissions in diesel exhaust are known as particulate matter or PM, which includes carbon particles or "soot." Diesel exhaust also contains a variety of harmful gases and over 40 other cancer-causing substances. California's identification of DPM as a toxic air contaminant was based on its potential to cause cancer, premature deaths, and other health problems. Exposure to DPM is a health hazard, particularly to children whose lungs are still developing and the elderly who may have other serious health problems. Overall, diesel engine emissions are responsible for the majority of California's potential airborne cancer risk from combustion sources. The various pollutants within DPM that also cause acute and chronic health impacts are detailed below in Table D. Table D was developed through crosschecking all diesel emissions pollutants provided in San Diego Air Pollution Control District's (SDAPCD) Diesel Fired Engines Emissions Factor Table to the list of acute and chronic reference exposure levels provided at: http://oehha.ca.gov/air/allrels.html.

According to the California Office of Environmental Health and Hazards Assessment (OEHHA), no acute risk has been found to be directly created from DPM, so there is no acute AREL assigned to DPM. However, as detailed in Table D, other TAC emissions associated with diesel exhaust do have an acute REL assigned to them. In order to account for the acute risk from all TAC emissions associated with diesel emissions, a hypothetical acute REL was calculated for DPM through multiplying each TAC with an acute REL to its diesel weight fraction and then adding together the results, which resulted in a hypothetical acute AREL of 137 for diesel emissions.

Table D – Diesel Emission Pollutants that Cause Acute and Chronic Health Impacts

TAC	TAC Potency Factors ($\mu g/m^3$)[1] Acute REL[2]	TAC Potency Factors ($\mu g/m^3$)[1] Chronic REL	Percent of DPM Emission Rate[3]	Target Organ Systems
1,3-Butadiene	660	140	0.51%	Development
Acetaldehyde	470	140	1.84%	Eyes, respiratory system (sensory irritation)
Acrolein	2.5	0.35	0.08%	Eyes, respiratory system

TAC	TAC Potency Factors (µg/m³)[1]		Percent of DPM Emission Rate[3]	Target Organ Systems
	Acute REL[2]	Chronic REL		
Arsenic	0.2	0.015	0.004%	Reproductive/developmental, cardiovascular system, nervous system
Benzene	27	3	0.44%	Hematologic system, immune system, reproductive/developmental
Cadmium	--	0.02	0.004%	kidney, respiratory system
Chlorobenzene	--	1,000	0.0005%	Eyes, respiratory system
Chromium (hexavalent)	--	0.2	0.001%	Respiratory system, hematologic system
Copper	100	--	0.01%	Respiratory system
Ethyl benzene	--	5	0.03%	Liver, kidney, developmental
Formaldehyde	55	9	4.07%	Eyes, immune system, respiratory
Hexane	--	200	0.06%	Nervous system
Hydrogen Chloride	2,100	9	0.44%	Eyes, respiratory system
Manganese	--	0.09	0.01%	Nervous system
Mercury	0.6	0.03	0.005%	Reproductive/developmental
Naphthalene	--	9	0.05%	Respiratory system
Nickel	0.2	002	0.01%	Immune system, respiratory system
Propylene	--	3000	1.10%	Respiratory System
Selenium	--	20	0.01%	Liver, cardiovascular system, nervous system
Toluene	37000	300	0.25%	Nervous system, eyes, respiratory system, reproductive/developmental
Xylene	22000	700	0.10%	Eyes, nervous and respiratory systems
DPM	--	5	--	Respiratory system

Notes:
[1] Potency factors obtained from: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
[2] REL = Reference Exposure Level
[3] Percentage of DPM Emission Rate calculated by dividing the pollutant's pounds per 1,000 gallons rate by the PM2.5 pounds per 1,000 gallons rate provided by the SDAPCD
Sources: SDAPCD, 2011 and OEHHA, 2014.

3.2 Asbestos

Asbestos is listed as a TAC by CARB and as a Hazardous Air Pollutant by the EPA. Asbestos occurs naturally in mineral formations and crushing or breaking these rocks, through construction or other means, can release asbestiform fibers into the air. Asbestos emissions can result from the sale or use of asbestos-containing materials, road surfacing with such materials, grading activities, and surface mining. The risk of disease is dependent upon the intensity and duration of exposure. When inhaled, asbestos fibers may remain in the lungs and with time may be linked to such diseases as asbestosis, lung cancer, and mesothelioma. The nearest likely locations of naturally occurring asbestos, as identified in the *General Location Guide for Ultramafic Rocks in California*, prepared by the California Division of Mines and Geology, is located in Santa Barbara County. The nearest historic asbestos mine to the project site, as identified in the *Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California,* prepared by U.S. Geological Survey, is located at Asbestos Mountain, which is approximately 65 miles northwest of the project site in the San Jacinto Mountains. Due to the distance to the nearest natural occurrences of asbestos, the project site is not likely to contain asbestos.

3.3 TAC Regulatory Setting

The TACs emissions from the proposed project are addressed through the efforts of various federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to reduce TACs through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies responsible for improving TACs are discussed below.

Federal and State

The United States Environmental Protection Agency (EPA) is responsible for setting and enforcing the National Ambient Air Quality Standards (NAAQS) for atmospheric pollutants. There are national standards for six common "criteria" air pollutants including ozone, nitrogen dioxide, carbon monoxide, particulate matter (PM_{10} and $PM_{2.5}$), lead, and sulfur dioxide, which were identified from provisions of the Clean Air Act of 1970. California, under the California Clean Air Act, has also defined a set of health protective California Ambient Air Quality Standards (CAAQS).

Besides the "criteria" air pollutants, there is another group of substances found in ambient air referred as Hazardous Air Pollutants (HAPs) under the Federal Clean Air Act and Toxic Air Contaminants (TACs) under the California Clean Air Act. These contaminants tend to be localized to their sources and are found in relatively low concentrations in ambient air. They are regulated at the federal, state and regional levels, due to their potential of causing adverse health effects from exposure to low concentrations for long periods of time. HAPs are the air contaminants identified by the EPA as known or suspected to cause cancer, serious illness, birth defects, or death. Many of the contaminants originate from human activities, such as fuel combustion and solvent use. Mobile Source Air Toxics (MSATs) are a subset of the 188 identified HAPs. Of the 21 different HAPs that constitute the MSATs, there are six primary HAPs identified that include diesel exhaust, benzene, formaldehyde, acetaldehyde, acrolein, and 1, 3-butadiene. While vehicle miles traveled in the United States is anticipated to increase by 64 percent between 2000 and 2020, emissions of MSATs are anticipated to decrease between 57 and 67 percent as a result of efforts to control mobile source emissions.

The CARB Statewide comprehensive air toxics program was established in the early 1980s. The TAC Identification and Control Act (Assembly Bill 1807, Tanner 1983 [AB 1807]) created California's program to reduce exposure to air toxics. The Air Toxics "Hot Spots" Information and Assessment Act (Assembly Bill 2588, Connelly 1987 [AB 2588]) supplements the AB 1807 program by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

AB 1807, requires the CARB to identify and control TACs. In selecting substances, the CARB must consider "the risk of harm to the public health, amount or potential amount of emissions, manner of, and exposure to, usage of the substance in California, persistence in the atmosphere, and ambient concentrations in the community." AB 1807 also requires the CARB to use available information gathered from the AB 2588 program to include in the prioritization of compounds. In 1992, the Hot Spots Act was amended by Senate Bill 1731, to require facilities that pose a significant health risk to reduce their risk through a risk management plan.

In 2000, the CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled engines and vehicles. The goal of the plan is to reduce PM emissions and the associated health risks by 75 percent by 2010 and 85 percent by 2020. The plan provides a roadmap that identifies steps CARB will be taking to develop specific regulations to reduce diesel particulate matter (DPM) emissions.

As a result of controls on motor vehicles, fuels, stationary sources, and consumer products, the public's exposure to air toxics has decreased dramatically. Between the early 1990's and today, the decrease in statewide average health risk ranged from approximately 20 percent from formaldehyde to approximately 90 for perchlorethylene. 1,3-butadiene and benzene have also seen significant decreases of 80 to 85 percent as a result of CARB's mobile source control program. In addition dioxins have been reduced by 99 percent in that time period, however that is primarily due to CARB's restrictions on medical waste incinerators.

CCR Title 13, Section 2025 - On-Road Diesel Truck Fleets

On December 12, 2008 the CARB adopted Resolution 08-43, which limits NOx, PM10 and PM2.5 emissions from on-road diesel truck fleets that operate in California. On October 12, 2009 Executive Order R-09-010 was adopted that codified Resolution 08-43 into Section 2025, title 13 of the California Code of Regulations. This regulation requires that by the year 2023 all commercial diesel trucks that operate in California shall meet model year 2010 (Tier 4 Final or Tier 4f) or latter emission standards. In the interim period, this regulation provides annual interim targets for fleet owners to meet. By January 1, 2017, 80 percent of a truck fleet is required to have installed Best Available Control Technology (BACT) for NOx emissions and 100 percent of a truck fleet installed BACT for PM10 emissions. This regulation also provides a few exemptions including a delayed implementation rate for truck fleets of three or fewer trucks, exemptions for agricultural trucks that drive less than 1,000 miles per year, and a onetime per year 3-day pass for trucks registered outside of California. All diesel trucks that utilize public roads in California are required to comply with CCR Title 13, Section 2025.

CCR Title 13, Section 2485 - Commercial Vehicle Idling and Auxiliary Power Systems

On October 20, 2005 the CARB approved regulatory measures including the adoption of Title 13, Chapter 9, Article 8, Section 2485 of the California Code of Regulations (CCR) (Section 2485), which regulates idling activities and auxiliary power systems (APS) in commercial vehicle vehicles with a vehicle weight rating of greater than 10,000 pounds. On December 5, 2014, the OAL approved new Amendments Section 2485, which became effective on January 1, 2015, and now all APS systems operated in California are required to meet the model year 2007 or newer emissions standards and all new APS systems are required to meet the Tier 4f emission standards and by 2023 all APS systems operating in California will be required to meet the Tier 4f emissions standards. Section 2485 also restricts vehicle idling to no more than five minutes at any one location and restricts the operation of an APS to no more than five minutes in any location within 100 feet of a sensitive receptor.

Regional

The South Coast Air Quality Management District (SCAQMD) is the agency principally responsible for comprehensive air pollution control for the South Coast Air Basin (Air Basin). The SCAQMD is responsible for regulating emissions primarily from stationary sources and certain areawide and indirect sources, but has no authority over motor vehicle emissions and other non-stationary sources of TAC emissions. To that end, as a regional agency, the SCAQMD works directly with the Southern California Association of Governments (SCAG), county transportation commissions, and local governments and cooperates actively with all federal and state agencies. The SCAQMD with coordination of SCAG is also responsible for developing, updating and implementing the Air Quality Plans for the Air Basin. In addition, the SCAQMD has prepared the *Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis*, August 2003, which sets forth recommended thresholds of significance, analysis methodologies, and provides guidance on mitigating significant TAC impacts.

In order to determine the Air Basin-wide risks associated with major airborne carcinogens, the SCAQMD conducted the Multiple Air Toxics Exposure Study (MATES) studies. According to the SCAQMD's 2014 MATES-IV study, the cancer risk at the project site is 1,027 per million persons. In comparison, the average cancer risk for the Air Basin is 367 per million persons. However it should be noted that the MATES-IV study analyzed the Air Basin based on four square kilometer grids, which does not provide precise results at the locations of the proposed residential apartments.

In order to provide a perspective of risk, it is often estimated that the incidence in cancer over a lifetime for the U.S. population ranges between 1 in 3 to 4 and 1 in 3, or a risk of about 300,000 per million persons. The previous 2008 MATES-III study referenced a Harvard Report on Cancer Prevention, which estimated that of cancers associated with known risk factors, about 30 percent were related to tobacco, about 30 percent were related to diet and obesity, and about 2 percent were associated with environmental pollution related exposures that includes hazardous air pollutants.

4.0 MODELING PARAMETERS AND ASSUMPTIONS

The dispersion modeling utilized for analyzing TAC emissions in this analysis has been based on the recommended methodology described in *Health Risk Assessments for Proposed Land Use Projects* (CAPCOA Guidance), prepared by CCAPCOA, July 2009 and *Air Toxics Hot Spots Program Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments* (OEHHA Guidance), prepared by OEHHA, February 2015. Important issues that affect the dispersion modeling include the following: 1) Model Selection, 2) Source Treatment, 3) Meteorological Data, and 4) Receptor Grid. Each of these issues are addressed below.

5.1 Model Selection

The AERMOD View Version 9.3.0 Model was used for all dispersion modeling. Key dispersion modeling options selected include the regulatory default option and urban modeling option for Orange County with a population of 3,010,759. Flagpole receptor height was set to 0 meters. AERMAP was run with a 1 degree USGS DEM Map of Santa Ana.

Meteorological Data

Meteorological data from SCAQMD's Anaheim monitoring site was selected for this modeling application. Five full years of meteorological data was collected at the Anaheim Monitoring Station that included 2006, 2007, 2008, 2009, and 2012. The SCAQMD processed the data for input to the model. The data was obtained at: http://www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/aermod-table-1

Receptor Grid

Discrete receptors were placed on each side of the two proposed apartment buildings (Site 'A' and Site 'B'). Figure 4 shows the locations of the sources and receptors modeled in the AERMOD model.

5.2 Emissions Assumptions

This assessment focused on estimating potential health risk impacts to the residents of the project from TAC emissions from the nearby industrial facilities, railroad emissions, and on-road diesel vehicle emissions located within a quarter mile (1,320 feet) of the project site.

Stationary Source Emissions

The SCAQMD requires all facilities that utilize stationary equipment that emit air emissions or TACs to obtain an air permit, and the details of each air permit can be found at: http://www.aqmd.gov/webappl/pubinfo/mapviewer.aspx. Air permits are required for chrome plating operations, facilities that use Hexavalent Chromium, dry cleaning facilities, gas stations, and from any industrial facility that releases TACs. Table E provides a list of all facilities that have an air permit within a quarter mile of the proposed residential uses.

Table E – Facilities within a Quarter Mile with a SCAQMD Air Permit

Facility Name	Facility Address	Distance from Project (feet)	Facility Sources of TAC Emissions
Cleaners Plus[3]	1071 N Tustin Avenue, #107	85[1]	Dry cleaning/executive rug plants with perchloroethylene dry cleaning equipment and compress and condense vapor recovery unit

Facility Name	Facility Address	Distance from Project (feet)	Facility Sources of TAC Emissions
Carl's Jr Restaurant #615[3]	Tustin Avenue & La Palma Avenue	95[1]	Eating place with natural gas integrated catalyst charbroiler, natural gas charbroiler, and electrostatic precipitator
R.B.S. Auto	1040 N Grove Street	165[1]	Air conditioning fluid (CFC-12) recovery
Anvil Arts	1137 N Fountain Way	210[1]	Paint and solvent spray booth
General Electric Company	3601 E La Palma Avenue	220[1]	Electrical equipment and supplies with drying ovens, baking ovens, waste oil/water separator, impregnating equipment, burn-off furnace, natural gas kiln, rubber curing oven, electrostatic precipitators, abrasive blasting equipment, burn-off furnace, and baghouse
The Flame Broiler[3]	1039 N Tustin Avenue	390[2]	Restaurant with natural gas charbroiler
Anaheim Hills Auto Body	1070 Grove Street	450[1]	Auto body shop
Mechanized Enterprises	1021 N Grove Street	490[2]	N/A
Bitetto Motorsport Performance	1011 N Grove Street	540[2]	N/A
Advanced Tech Plating	1061 N Grove Street	580[2]	Plating and polishing facility with nickel plating line tanks, negative air machine, sulfuric/phosphoric acid- anodizing tank, and other plating tanks
Pacific Utility Products	3703 Melville Way	590[1]	Baking oven and powder coating system spray booth
SRS Ventures, Inc./Prestige Collision Auto	3470 E La Palma Avenue	630[1]	Top and body repair/paint shop with automotive spray booths, paint and solvent spray booth, and baking oven
M.V. Mktg, Inc., M. Angelos Paint and Body	1133 N Tustin Avenue	660[1]	Paint and body shop
Chevallier Auto Body	1133 N Tustin Avenue	660[1]	Top and body repair/paint shop with paint and solvent spray booth
R & M Food Services, Inc.	1074 N Tustin Avenue	670[1]	Eating places with natural gas charbroiler
Anglers Marine	3475 E La Palma Avenue	700[1]	N/A
X Cell Circuit Technology	1166 N Grove Street	740[1]	Electric components
Aircraft Repair/Overhaul Service, ARO SE	1186 N Grove Street	740[1]	Airports/Flying fields servicer with drying ovens, paint and solvent spray booths, and vacuum metalizing
Minolta Business Systems, Inc.	1120 N Tustin Avenue	850[1]	N/A
Quad/Graphics	1174 N Grove Street	920[1]	Lithographic heat set printing press
Kaiser Permanente	3460 E La Palma Avenue	930[2]	General medical/surgical hospital with natural gas only boilers and emergency diesel electricity generators
Aquarian Coatings Corp	1140 Tustin Avenue	980[1]	Metal coating/allied services with paint and solvent spray booths, powder coating system

Facility Name	Facility Address	Distance from Project (feet)	Facility Sources of TAC Emissions
			spay booths, powder coating ovens and baking ovens
Environmental Management & Construction	1126 Fountain Way	990[1]	Air, water and solid waste management waste management
Precision Photography	1150 N Tustin Avenue	1,060[1]	Photography studio
Moyes Custom Furniture	3431 E La Palma Avenue	1,170[2]	Wood household furniture with paint and solvent spray booth
D & E Precision Sheet Metal	3431 E La Palma Avenue	1,170[2]	N/A
Limos by Moonlight	1173 N Grove Street	1,190[1]	Automotive services provider with automotive spray booth

Notes:
[1] Facility is closet to Site 'A' of the proposed project.
[2] Facility is closest to Site 'B' of the proposed project.
[3] Facility is located on the greater Pacificenter development.
Source: SCAQMD, 2014.

The SCAQMD requires that any new stationary source of emissions that would result in a facility increasing its emissions by one pound per day is subject to SCAQMD's New Source Review (NSR) and Regulation XX. NSR requires facilities to utilizes the best available control technologies (BACT) to reduce emissions and provides a regulatory process to ensure compliance, which includes calculating the facilities total emissions of each pollutant. The SCAQMD provides these facility emissions at: http://www3.aqmd.gov/webappl/fim/prog/search.aspx. Of the facilities listed in Table E, only Anaheim Hills Auto Body is required to report their TAC emissions, which is located as near as 450 feet west of the project Site A at 1070 Grove Street.

The other facilities listed in Table E, either do not produce TAC emissions or produce only negligible amounts of TACs that would not alter the findings of this analysis. Several sources of TAC emission data were accessed to identify and quantify the estimated TAC emissions from the identified facility. These sources included the Annual Emission Reports that facilities are required to submit to the SCAQMD annually, listing the quantities of various emissions from their stationary source operations.

Anaheim Hills Auto Body Stationary Source Emissions

The Annual Emissions Reports for Anaheim Hills Auto Body facility were examined for the years 2010, 2014, and 2015 which are the most current three years of data available in the FIND database. The Annual Emission Reports for the Anaheim Hills Auto Body facility are provided in Appendix A. Based on this examination, an inventory of maximum annual TAC emissions from the facility was derived and is shown in Table F. Table F also shows which TACs are evaluated for cancer risk and for chronic and acute non-cancer health effects.

Table F – Anaheim Hills Auto Body Inventory of Stationary TAC Emissions

Toxic Air Contaminant	Annual Emissions (pounds per year)[1]	TAC Potency factors (µ g/m3)[2]		
		Cancer	Acute REL[3]	Chronic REL[3]
Ammonia	23.040		3200	200
Benzene	0.010	0.000029	27	3
Formaldehyde	0.021	0.000006	55	9
Naphthalene	0.002	0.000034		9
PAH (total with components not reported)	0.000	0.000006		9

Notes:
[1] Based on the facility's Maximum Annual Emissions Report to the SCAQMD for the years 2010, 2014, and 2015.
[2] Potency factors obtained from http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
[3] REL = Reference Exposure Level
Source: SCAQMD, 2015; OEHHA, 2015.

In order to simplify the analysis, each TAC pollutant was converted to a DPM equivalent emission rate, through multiplying each TAC emissions by a ratio of the TAC's cancer potency factor to the cancer potency factor for DPM of 0.0003 $\mu g/m^3$ in order to derive a DPM equivalent cancer risk. The DPM conversion calculations for the Anaheim Hills Auto Body facility is provided in a spreadsheet in Appendix A, which calculated a total DPM equivalent cancer risk annual emission rate of 7.818E-08 grams per second, a non-cancer acute emission rate of 0.001 grams per second, and a non-cancer chronic emission rate of 0.045 grams per second.

The Anaheim Hills Auto Body facility was modelled in the AERMOD model as a point source, with a release height of 30 feet, a temperature of 366 K, a stack inside diameter of 1.0 meter, and a velocity of 5 meters per second.

Diesel Vehicle Emissions

The diesel vehicle emissions created from La Palma Avenue and Tustin Avenue have been calculated through use of the vehicle trip rates provided in *Anaheim Canyon Specific Plan Draft Environmental Impact Report No. 348* (ACSP DEIR), prepared by PlaceWorks, May 2015 and for State Route 91, the vehicle trip rates were obtained from *2015 Annual Average Daily Truck Traffic on the California State Highway System*, prepared by Caltrans which found SR-91currently has 231,000 ADT and from the *Westbound State Route 91 Lane Extension and Auxiliary Lane Reconstruction Initial Study with Proposed Mitigated Negative Declaration,* prepared by Caltrans, November 2010 the traffic on SR-91 is anticipated to increase by 13.8 percent over the next 20 years, which results in 262,878 ADT. The traffic volumes utilized in this analysis were based on General Plan buildout conditions and are shown in Table G.

In order to determine the percentage of vehicles that are diesel-powered, the *California, Texas & Florida Lead U.S. in High-Mileage Diesel & Hybrid Passenger Vehicles,* prepared by The Diesel Technology Forum, June 4, 2014, was utilized, which found that diesel vehicles represent 1.85 percent of all vehicles in California, and that 95 percent of heavy trucks are powered by diesel and approximately 50 percent of light trucks are powered by diesel. The diesel vehicles ADTs for the nearby roadways is shown in Table G.

Table G – Nearby Roadways Average Daily Traffic Volumes and Vehicle Mixes

Roadway	ADTs	All Vehicles (ADT) Automobiles	All Vehicles (ADT) Medium Trucks	All Vehicles (ADT) Heavy Trucks	Diesel Vehicles (ADT)[1] Automobiles	Diesel Vehicles (ADT)[1] Medium Trucks	Diesel Vehicles (ADT)[1] Heavy Trucks
La Palma Avenue[2]	32,800	31,816	787	197	589	394	187
Tustin Avenue[2]	83,100	80,607	1,994	499	1,491	997	474
State Route 91[3]	262,878	245,791	9,928	7,159	4,547	4,964	6,802

Notes:
[1] 1.85% of Autos, 50% of Medium Trucks and 95% of Heavy Trucks calculated to be diesel-powered (The Diesel Technology Forum, 2014)
[2] ADTs and vehicle mixes obtained from City of Anaheim, 2015
[3] SR-91 ADTs and vehicle Mixes obtained from Caltrans, 2014 and Caltrans, 2010.

Cancer Risk Emissions Factors

Since, cancer risk is determined over three exposure time periods (the third trimester of a pregnancy to 2 years of age, 2 to 16 years, and 16 to 30 years) mobile source emissions were calculated based on the annual average emission factors from different model years for each of the three time exposure periods associated with evaluating exposures to residential populations. The proposed project expects an initial occupancy in 2019. Therefore, for the assessment of health risks to sensitive/residential receptors, the DPM emissions factors derived from the CARB EMFAC model as diesel PM10 were developed as an average of truck fleet emission factors from the Project's initial occupancy year of 2019 to 2021, 2022 to 2036, and 2037 to 2048. This averaging of emissions takes into account the fact that emissions from diesel vehicles are expected to significantly decline in future years as a result of vehicle turnover and implementation of existing mobile source emission control rules in place from the CARB. The vehicle speeds for each class of vehicle were based on the posted speed limits on La Palma Avenue and Tustin Street and SR-91. The cancer risk PM10 emission factors assumed in the assessment are shown in Table H and the EMFAC2014 model printouts are provided in Appendix B.

Table H – EMFAC2014 DPM Emission Rates

Vehicle Class	Speed (mph)	EMFAC2014 PM10 Running Emissions Rates (grams/mile) 2019-2021	2022-2036	2037-2048
La Palma Avenue and Tustin Avenue				
Non-Trucks	45	0.0150	0.0050	0.0015
Truck 1	45	0.0163	0.0102	0.0061
Truck 2	45	0.0331	0.0043	0.0037
State Route 91				
Non-Trucks	65	0.0192	0.0062	0.0015
Truck 1	65	0.0188	0.0104	0.0054
Truck 2	55	0.0384	0.0038	0.0035

Source: EMFAC2014.

In order to simplify the modeling, the non-trucks, Trucks 1, and Trucks 2 PM10 emissions from the analyzed roadways were combined and analyzed as a single line volume source in AERMOD. The line volume source for La Palma Avenue was modeled with an 80 foot width (24 meters), Tustin Avenue was modeled with a 116 foot width (35 meters), and SR-91 was modeled with a 92 foot width (28 meters) which are the distances between the outside lanes. All roadways were modeled with a 6-foot height. The cancer PM10 emission rates entered into the AERMOD model are shown below in Table I. The road source emissions were determined by calculating the time each vehicle takes to cross the road length and then multiplying that amount of time by the daily operations for each vehicle class and dividing it by 24 hours in order to determine the percent of daily running time. The daily running time was then multiplied by the EMFAC2014 emissions rates that are detailed above and were converted to grams per second.

Table I – Roadway Cancer Risk Emissions Rates used in the AERMOD Model

Source ID	Description	Diesel Vehicles Daily Trips[1]	PM10 Emission Rate (grams/second)[2]		
			2019-2021	2022-2036	2037-2048
LAPALMA	La Palma Non-Trucks	589	4.93E-05	1.66E-05	4.99E-06
	La Palma Trucks 1	394	3.57E-05	2.23E-05	1.33E-05
	La Palma Trucks 2	187	6.13E-05	3.12E-05	3.06E-05
	La Palma Total Emissions		**1.46E-04**	**7.01E-05**	**4.89E-05**
TUSTIN	Tustin Non-Trucks	1,491	1.43E-04	4.82E-05	1.45E-05
	Tustin Trucks 1	997	1.04E-04	6.50E-05	3.88E-05
	Tustin Trucks 2	474	1.78E-04	9.06E-05	8.91E-05
	Tustin Total Emissions		**4.26E-04**	**2.04E-04**	**1.42E-04**
SR91	SR-91 Non-Trucks	4,547	7.59E-04	2.43E-04	5.89E-05
	SR-91 Trucks 1	4,964	8.08E-04	4.46E-04	2.32E-04
	SR-91 Trucks 2	6,802	3.50E-03	1.46E-03	1.44E-03
	SR-91 Total Emissions		**5.07E-03**	**2.15E-03**	**1.73E-03**

Notes:
[1] Diesel Vehicles Daily Trips obtained from Table G above.
[2] Emission Rates calculated by converting the EMFAC emissions factors to grams per second and multiplying by percent running time (time of travel for one vehicle across roadway * daily vehicle trips / 24 hours)

Non-Cancer (Acute and Chronic) Risk Emissions Factors

Since, the non-cancer acute and chronic exposure time periods range from one hour to over one year, the opening year 2019 emissions rates were utilized from the EMFAC2014 model. The non-cancer risk PM10 emission factors assumed in the assessment are detailed in Appendix B and shows that for La Palma Avenue and Tustin Avenue non-trucks create 0.0171 grams per mile, Trucks 1 create 0.0172 grams per mile, and Trucks 2 create 0.0517 grams per mile for SR-91 non-trucks create 0.0220 grams per mile, Trucks 1 create 0.0201 grams per mile, and Trucks 2 create 0.0615 grams per mile. All other parameters were the same as what were used for the cancer risk emissions factors and the results. The non-cancer PM10 emission rates entered into the AERMOD model are shown below in Table J.

Table J – SR-91 Non-Cancer Risk Emissions Rates used in the AERMOD Model

Source ID	Description	Daily Vehicle Operations[1]	PM10 Emission Rate[2] (grams/second)
LAPALMA	La Palma Non-Trucks	589	5.62E-05
	La Palma Trucks 1	394	3.77E-05
	La Palma Trucks 2	187	8.07E-05
	La Palma Total Emissions		1.75E-04
TUSTIN	Tustin Non-Trucks	1,491	1.63E-04
	Tustin Trucks 1	997	1.10E-04
	Tustin Trucks 2	474	2.35E-04
	Tustin Total Emissions		5.08E-04
SR91	SR-91 Non-Trucks	4,547	8.68E-04
	SR-91 Trucks 1	4,964	8.66E-04
	SR-91 Trucks 2	6,802	4.87E-03
	SR-91 Total Emissions		6.60E-03

Notes:
[1] Diesel Vehicles Daily Trips obtained from Table G above.
[2] Emission Rates calculated by converting the EMFAC emissions factors to grams per second and multiplying by percent running time (time of travel for one vehicle across roadway * daily vehicle trips / 24 hours)

It should be noted that the acute analysis is based on the worst-case 1-hour concentrations of TAC emissions, which would most likely occur during the peak travel periods on the nearby roadways, however neither Caltrans nor the City provide this detail of data in their traffic volumes, so it is not possible to compute. It should also be noted that as detailed below in Section 6.1, the acute risks would have to be in the range of 285 times higher before they would be considered significant so any minor changes in traffic volumes would not result in a change to significance levels.

Railroad Emissions

The BNSF Railroad that runs adjacent to the west side of the project site is utilized for both freight trains and Metrolink commuter trains. Metrolink's Anaheim Canyon Station is also located adjacent to the west side of the project site, which results in all Metrolink trains coming to a complete stop at this location and idling for approximately one minute while passengers load and unload the trains.

According to www.metrolinktrains.com the Anaheim Canyon Station is part of the Inland Empire – Orange County Metrolink Line, which has 8 trains per day traveling to Orange County and 8 trains per day traveling to the Inland Empire, that results in 16 Metrolink trains that pass by the project site each weekday that were modelled in the AERMOD model. According to www.railroadforums.com there are four daily freight trains that pass by the project site on the BNSF Railroad that were also modelled in the AERMOD model. The railroad emissions have been analyzed separately for locomotive running and idling.

Locomotives Running Emissions

The locomotives running emission rates were obtained from *Health Risk Assessment for the Central Maintenance Facility*, prepared for Metrolink, November 2014, which found that by the year 2017 the Metrolink engine fleet will consist of 20 Tier 4 locomotives (Model F125) with 4,700 horsepower and 32 Tier 2 locomotives (Models F59PHI, MP36PH-3C and 59PH Repowered) with 3,000 to 3,600 horsepower. The Metrolink fleet of locomotives in 2017 will have an average of 3,827 horsepower and an average emission rate of 109 grams of DPM per hour per locomotive at Notch 3, which is the anticipated average power level that trains will operate in the vicinity of the project site.

The emission rates of the freight trains operated by BNSF on the railroad are unknown, so in order to provide a worst-case analysis, it was assumed that the BNSF locomotives were Tier 0 locomotives (Model F59PH) operating at Notch 3 that produces 213 grams of DPM per hour.

The locomotive running emissions were analyzed as a line volume source in AERMOD that is 435 meters long with a plume height of 5.6 meters, a plume width of 4.0 meters and an initial vertical dimension of 2.60 meters. A summary of the locomotive running emissions parameters are provided in Table K. The locomotive running emissions were determined by calculating the time each train takes to cross the 435 meters of analyzed rail line and then multiplying that amount of time by the daily train operations and dividing it by 24 hours in order to determine the percent of daily running time. The daily running time was then multiplied by the emissions rate of 213 grams of DPM per hour. The emission rate was then converted to grams per second for use in the AERMOD model.

Table K – Locomotive Running Emissions used in the AERMOD Model

Source ID	Description	Daily Operations[1]	Train Speed (MPH)	DPM Emission Rates[2] (grams/second)
TRAINS	Metrolink Trains	16	30	1.82E-04
	Freight Trains	6	30	1.33E-04
	Total Trains Running Emissions			**3.15E-04**

Notes:
[1] Obtained from www.metrolinktrains.com and www.railroadforums.com
[2] Emission rates obtained from Metrolink, 2014.

Locomotive Idling Emissions

The Metrolink locomotives idling emissions rates were obtained from Metrolink (Metrolink, 2014), which found by the year 2017 the average DPM idling emission rate for the Metrolink fleet will be 10.3 grams per hour. From site observations of Metrolink train stops at Anaheim Canyon Station, it was observed that the loading/unloading activities takes less than a minute. In order to provide a conservative analysis, it was assumed that each Metrolink train idles at Anaheim Canyon Station for one minute.

The locomotive idling emissions were analyzed as a point source in AERMOD with a release height of 4.6 meters, a stack diameter of 0.666 meters, an exit velocity of 3.73 meters per second, an exit temperature of 351 Kelvin, which were the same parameters utilized by Metrolink (Metrolink, 2014). The locomotive idling emission rate utilized in this analysis was calculated based on converting the 10.3 grams per hour DPM idling emission rate to grams per second and then multiplying by the 16 Metrolink trips that would each operate 1 minute per day. This resulted in an emission rate of 3.179E-05 grams per second that was entered into the AERMOD model.

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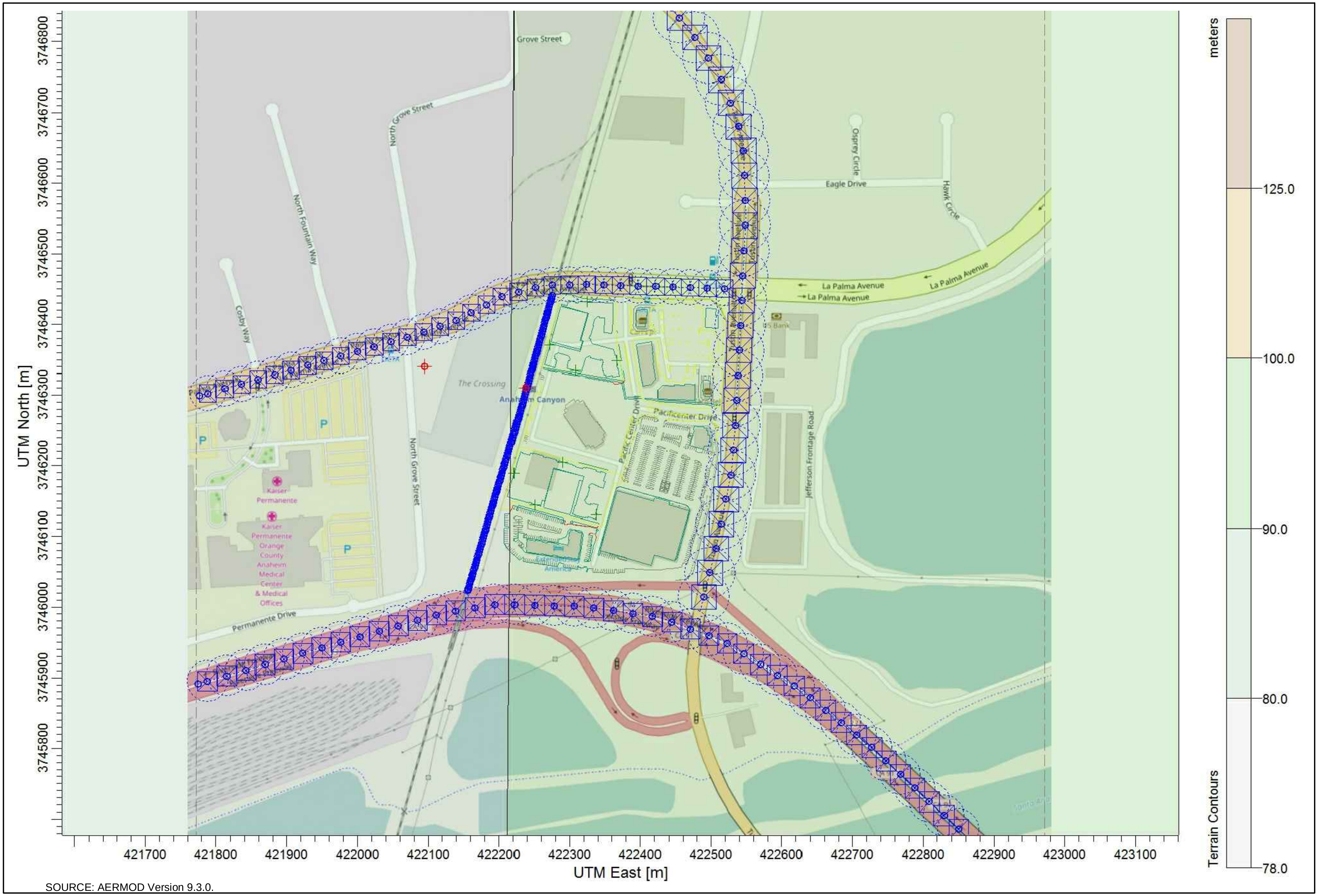

SOURCE: AERMOD Version 9.3.0.

N

VISTA ENVIRONMENTAL

Figure 4
Air Dispersion Model Emission Sources and Receptor Locations

6.0 PROJECT IMPACTS

This section assesses the potential health risks from TAC concentrations and odor impacts at the proposed residential apartment units.

6.1 Health Risks Associated with TAC Emissions

Health risks from TACs are twofold. First, TACs are carcinogens according to the State of California. Second, short-term acute and long-term chronic exposure to TACs can cause health effects to the respiratory system. Each of these health risks is discussed below.

Cancer Risks

According to the OEHHA Guidance, the cancer risk should be calculated using the following formula:

[Dose-inh (mg/(Kg-day)] * [Oral Slope Factor (kg-day)/mg]*[$1x10^6$] * Age Sensitivity Factor * Fraction of Time at Home = Potential Cancer Risk

Where:
Oral Slope Factor = 1.1
Age Sensitivity Factor = 10 for 3rd trimester to 2 years; 3 for 2 to 16 years; and 1 for 16 to 29.75 years
Fraction of Time at Home = 0.85 for 3rd trimester to 2 years; 0.72 for 2 to 16 years; and 0.73 for 16 to 70 years
Dose-inh = (C_{air} * DBR * A * EF * ED * 10^6) / AT

Where:

C_{air}	[Concentration in air ($\mu g/m^3$)] = (Calculated by AERMOD Model)
DBR	[Daily breathing rate (L/kg body weight – day)] = 867 for 3rd trimester to 2 years; 572 for 2 to 16 years and 233 for 16 to 69.75 years.
A	[Inhalation absorption factor] = 1
EF	[Exposure frequency (days/year)] = 350 for residential uses
ED	[Exposure duration (years)] = 30 for residential uses
10^6	[Micrograms to milligrams conversion]
AT	[Average time period over which exposure is averaged in days] = 25,550

The OEHHA guidance recommends that Age Sensitivity Factors be utilized, which includes a 10-fold multiplier to infants (3rd trimester to age 2), a 3-fold increase in exposure for children (ages 2 to 16 years old), and an exposure factor of 1 for ages 16 and older. The OEHHA guidance also recommends separate breathing rates for each age group and the SCAQMD recommends utilizing the 90^{th} percentile breathing rates for the 3^{rd} trimester to 2 years and the 80^{th} percentile breathing rates for all older persons. The 90^{th} percentile breathing rates for 3rd trimester is 333 and for 0 to 2 years is 934. In order to simplify the analysis, the 3rd trimester and 0 to 2 year breathing rates were time-weighted averaged together, which resulted in a breathing rate of 867. The 80^{th} percentile breathing rate for 2 to 16 years is 572 and for 16 to 30 years is 261. The OEHHA guidance also recommends utilizing the Fraction of Time at Home in the in the calculation, since exposure to TAC emissions from the proposed project is not occurring when not at home. The OEHHA developed these calculations from analyzing over 175,000 trips in a survey and determined that only 0.68 percent of these trips overlap with the EF (days per year when residents are on vacation).

According to the above formula, the potential cancer risk for residential receptors equates to C_{air} * 3,336 for 3^{rd} trimester to age 2, C_{air} * 559 for ages 2 to 16, and C_{air} * 86.1 for ages 16 to 29.75. Table L provides a summary of the calculated diesel emission concentrations for each side of the two proposed apartment buildings. The AERMOD model run printouts for years 2019-2021 is provided in Appendix C, for years 2022-2036 is provided in Appendix D, and for years 2037-2048 is provided in Appendix E.

Table L – Cancer Risks at the Proposed Residential Apartments Prior to Mitigation

Building	Side of Building	Receptor Location[1]		Annual PM10 Concentration (µg/m³)			Cancer Risk Per 100,000 People[2]
		X	Y	2019-2021	2022-2036	2037-2048	
Site 'A'	North Side	422,325	3,746,432	0.0605	0.0375	0.0258	2.6
	East Side	422,367	3,746,349	0.0541	0.0307	0.0172	2.2
	South Side	422,308	3,746,335	0.0679	0.0446	0.0307	3.0
	West Side	422,272	3,746,371	0.1293	0.1075	0.0950	6.4
Site 'B'	North Side	422,290	3,746,205	0.0849	0.0486	0.0254	3.5
	East Side	422,338	3,746,131	0.1063	0.0511	0.0153	4.1
	South Side	422,251	3,746,144	0.1167	0.0659	0.0327	4.8
	West Side	422,221	3,746,189	0.1592	0.1209	0.0960	7.5
ACSP MMRP No.312 Mitigation Measure AQ-10 Threshold							**1.0**
Exceed Threshold?							**Yes**

Notes:
[1] Receptor location based on World Geodetic System 1984 (WGS84), Universal Transverse Mercator (UTM).
[2] Cancer risk based on a residential receptor cancer risk of: C_{air} (2019-2021) * 3,336 * 2.25 years + C_{air} (2022-2036) * 559 * 14 years + C_{air} (2037-2048) *86.1 * 13.75 years.
Source: Calculated from ISC-AERMOD View Version 9.3.0.

Table L shows that the calculated cancer risks at all sides of the two proposed residential apartment buildings would range between 2.2 and 7.5 per 100,000 people. This would exceed the cancer risk threshold of 1.0 per 100,000 persons provided in Mitigation Measure AQ-10 from the ACSP MMRP No. 312. Per Mitigation Measure AQ-10 requirements, all residential developments that exceed the 1.0 per 100,000 persons cancer risk threshold, shall identify the level of high-efficiency Minimum Efficiency Reporting Value (MERV) filter required to reduce indoor air concentrations of pollutants to achieve the cancer threshold.

According to *Status of Research on Potential Mitigation Concepts to Reduce Exposure to Nearby Traffic Pollution,* prepared by CARB, August 23, 2012, research has shown that homes with positive static pressure HVAC systems with MERV 13 air filters result in a 80 percent reduction in fine particles (PM10) when compared to outdoor levels of PM10 and MERV 16 air filters result in a 95 percent reduction in fine particles (PM10) when compared to outdoor levels of PM10. Table M shows the cancer risks at the proposed residential apartment buildings with installation of MERV 13 and MERV 16 air filters.

Table M – Mitigated Cancer Risks at the Proposed Residential Apartments

Building	Side of Building	Receptor Location[1] X	Receptor Location[1] Y	Cancer Risk Per 100,000 People Unmitigated	MERV 13 Filters[2]	MERV 16 Filters[3]
Site 'A'	North Side	422,325	3,746,432	**2.6**	0.5	0.1
	East Side	422,367	3,746,349	**2.2**	0.4	0.1
	South Side	422,308	3,746,335	**3.0**	0.6	0.1
	West Side	422,272	3,746,371	**6.4**	**1.3**	0.3
Site 'B'	North Side	422,290	3,746,205	**3.5**	0.7	0.2
	East Side	422,338	3,746,131	**4.1**	0.8	0.2
	South Side	422,251	3,746,144	**4.8**	1.0	0.2
	West Side	422,221	3,746,189	**7.5**	**1.5**	0.4
	ACSP MMRP No.312 Mitigation Measure AQ-10 Threshold			**1.0**	**1.0**	**1.0**
			Exceed Threshold?	**Yes**	**Yes**	**No**

Notes:
[1] Receptor location based on World Geodetic System 1984 (WGS84), Universal Transverse Mercator (UTM).
[2] MERV 13 filters provides 80 percent reduction in fine particles (CARB, 2012)
[3] MERV 16 filters provides 95 percent reduction in fine particles (CARB, 2012)
Source: Calculated from ISC-AERMOD View Version 9.3.0.

Table M shows that if MERV 16 air filters are installed in all residential apartments that are on the west side of Buildings 'A' and 'B' and MERV 13 air filters are installed in all other residential apartment units in Buildings 'A' and 'B', the cancer risk at the proposed residential apartments would be reduced to within the 1.0 per 100,000 person cancer risk threshold.

Mitigation Measure 1 has been provided that would require that the project applicant to install forced air heating, air conditioning and ventilation (HVAC) systems with a high efficiency Minimum Efficiency Reporting Value (MERV) filter of MERV 16 for all units on the west side of Buildings 'A' and 'B' and MERV 13 filters for all other units in Buildings 'A' and 'B'. With implementation of Mitigation Measure 1, the proposed project would conform with Mitigation Measure AQ-10 from the ACSP MMRP No. 312.

Non-Cancer Risks

In addition to the cancer risk from exposure to TACs there is also the potential TAC exposure may result in adverse health impacts from acute and chronic illnesses as well as from PM2.5 concentration, which are detailed below.

Chronic Health Impacts

Chronic health effects are characterized by prolonged or repeated exposure to a TAC over many days, months, or years. Symptoms from chronic health impacts may not be immediately apparent and are often irreversible. The chronic hazard index is based on the most impacted sensitive receptor from the proposed project and is calculated from the annual average concentrations of DPM. The relationship for non-cancer chronic health effects is given by the equation:

$$HI_{DPM} = C_{DPM} / REL_{DPM}$$

Where,
HI_{DPM} = Hazard Index; an expression of the potential for non-cancer health effects.

C_{DPM} = Annual average diesel particulate matter concentration in µg/m^3.
REL_{DPM}= Reference Exposure Level (REL) for diesel particulate matter; the DPM concentration at which no adverse health effects are anticipated.

The REL_{DPM} is 5 µg/m^3. The OEHHA, as protective for the respiratory system has established this concentration. The AERMOD model found that the highest annual concentration at the proposed residential apartment units is 0.179 µg/m^3 for DPM equivalent chronic non-cancer risk emissions. The resulting Hazard Index is:

$$HI_{DPM} = 0.179 / 5 = 0.036$$

The criterion for significance provided in Mitigation Measure AQ-10 from the ACSP MMRP No. 312 is a Chronic Hazard Index increase of greater than 1.0. Therefore, the proposed residential apartment units would not be exposed to non-cancer chronic health risks from TAC emissions and would meet the requirements of Mitigation Measure AQ-10.

Acute Health Impacts

Acute health effects are characterized by sudden and severe exposure and rapid absorption of a TAC. Normally, a single large exposure is involved. Acute health effects are often treatable and reversible. The acute hazard index is calculated from the maximum hourly concentrations of DPM at the point of maximum impact (PMI) on the project site, which has been calculated with the AERMOD model and the parameters detailed above in Section 4.0. The relationship for non-cancer acute health effects is given by the equation:

$$AHI = C / AREL$$

Where,
AHI = Acute Hazard Index; an expression of the potential for non-cancer health effects.
C = Maximum hourly concentration of DPM in µg/m^3.
AREL = Acute Reference Exposure Level.

No acute risk has been found to be directly created from DPM, so there is no AREL assigned to DPM, however in order to provide a DPM equivalent AREL, the ARELs from all of the other TACs that are emitted in diesel exhaust were added together based on their diesel weighting shown above in Table D. This resulted in a diesel emission weighted equivalent AREL of 137 µg/m^3. The AERMOD model found that the highest 1-hour concentration at the proposed residential apartment units is 0.48 µg/m^3 for DPM equivalent acute non-cancer risk emissions and Appendix F provides the DPM equivalent emission concentration calculation printouts from the AERMOD model. The resulting Hazard Index is:

$$AHI = 0.48 / 137 = 0.0035$$

The criterion for significance provided in Mitigation Measure AQ-10 from the ACSP MMRP No. 312 is an Acute Hazard Index increase of greater than 1.0. Therefore, the proposed residential apartment units would not be exposed to non-cancer acute health risks from TAC emissions and would meet the requirements of Mitigation Measure AQ-10.

PM2.5 Concentrations

The final significance threshold examined relates to the maximum annual concentration PM2.5 concentrations in the vicinity of the proposed residential apartment units. As detailed above for the chronic health impacts analysis, the AERMOD model found that the highest annual concentration at the proposed residential apartment units is 0.179 µg/m^3 DPM equivalent PM10 emissions. Since PM2.5 is a subset of PM10 emissions, it is not possible for PM2.5 emissions to exceed PM10 emissions levels. The criterion for significance provided in Mitigation Measure AQ-10 from the ACSP MMRP No. 312 is a PM2.5 concentration level of 2.5 $\mu g/m^3$. Therefore, the proposed residential apartment units would not be exposed to significant PM2.5 concentrations and would meet the requirements of Mitigation Measure AQ-10.

6.2 Odor Impacts from Nearby Industrial Facilities

Individual responses to odors are highly variable and can result in a variety of effects. Generally, the impact of an odor results from a variety of factors such as frequency, duration, offensiveness, location, and sensory perception. The frequency is a measure of how often an individual is exposed to an odor in the ambient environment. The intensity refers to an individual's or group's perception of the odor strength or concentration. The duration of an odor refers to the elapsed time over which an odor is experienced. The offensiveness of the odor is the subjective rating of the pleasantness or unpleasantness of an odor. The location accounts for the type of area in which a potentially affected person lives, works, or visits; the type of activity in which he or she is engaged; and the sensitivity of the impacted receptor.

Sensory perception has four major components: detectability, intensity, character, and hedonic tone. The detection (or threshold) of an odor is based on a panel of responses to the odor. There are two types of thresholds: the odor detection threshold and the recognition threshold. The detection threshold is the lowest concentration of an odor that will elicit a response in a percentage of the people that live and work in the immediate vicinity of the project site and is typically presented as the mean (or 50 percent of the population). The recognition threshold is the minimum concentration that is recognized as having a characteristic odor quality, this is typically represented by recognition by 50 percent of the population. The intensity refers to the perceived strength of the odor. The odor character is what the substance smells like. The hedonic tone is a judgment of the pleasantness or unpleasantness of the odor. The hedonic tone varies in subjective experience, frequency, odor character, odor intensity, and duration.

Mitigation Measure AQ-11 from the ACSP MMRP No. 312 requires that all residential projects located within 1,000 feet of an industrial facility that emits substantial odors to submit an odor assessment and provides the following list of potential odor generating facilities:

- Wastewater treatment plants
- Composting, greenwaste, or recycling facilities
- Fiberglass manufacturing facilities
- Painting/coating operations
- Large-capacity coffee roasters
- Food-processing facilities

Mitigation Measure AQ-11 requires that if the SCAQMD has received three or more verified odor complaints from any odor producing facilities that are located within 1,000 feet of the project site, than the project applicant is required to implement Best Available Control Technologies for Toxics (T-BACTs) that are capable of reducing potential odors to an acceptable level.

SCAQMD's Facility Information Detail (FIND) website was utilized to access SCAQMD's Compliance database that provides notices on verified odor complaints, in order to determine if any of the nearby industrial facilities have received three or more verified odor complaints. Table N provides a list of the facilities that are located within 1,000 feet of the proposed residential apartment units that meet the above criteria of potential odor generating facilities. Table N also shows the number of verified odor complaints received by SCAQMD for each listed facility.

Table N – Potential Nearby Odor Emitting Facilities and Number of Complaints

Facility Name	Facility Address	Distance from Project (feet)	Facility Activities	No. of Verified Odor Complaints Received by SCAQMD[1]
Anvil Arts	1137 N Fountain Way	210[2]	Paint and solvent spray booth	0
Anaheim Hills Auto Body	1070 Grove Street	450[2]	Auto body shop	0
Advanced Tech Plating	1061 N Grove Street	580[3]	Plating and polishing facility with nickel plating line tanks, negative air machine, sulfuric/phosphoric acid- anodizing tank, and other plating tanks	0
Pacific Utility Products	3703 Melville Way	590[2]	Baking oven and powder coating system spray booth	0
SRS Ventures, Inc./Prestige Collision Auto	3470 E La Palma Avenue	630[2]	Top and body repair/paint shop with automotive spray booths, paint and solvent spray booth, and baking oven	0
M.V. Mktg, Inc., M. Angelos Paint and Body	1133 N Tustin Avenue	660[2]	Paint and body shop	0
Chevallier Auto Body	1133 N Tustin Avenue	660[2]	Top and body repair/paint shop with paint and solvent spray booth	0
Aircraft Repair/Overhaul Service, ARO SE	1186 N Grove Street	740[2]	Airports/Flying fields servicer with drying ovens, paint and solvent spray booths, and vacuum metalizing	0
Aquarian Coatings Corp	1140 Tustin Avenue	980[2]	Metal coating/allied services with paint and solvent spray booths, powder coating system spay booths, powder coating ovens and baking ovens	0

Notes:
[1] No. of verified odor complaints obtained from http://www3.aqmd.gov/webappl/fim/prog/search.aspx
[2] Facility is closet to Site 'A' of the proposed project.
[3] Facility is closest to Site 'B' of the proposed project.
Source: SCAQMD, 2016.

Table N shows that none of the potential odor generating facilities that are located within 1,000 feet of the proposed residential apartment buildings have received any verified odor complaints as recorded by SCAQMD. The criterion for significance provided in Mitigation Measure AQ-11 from the ACSP MMRP No. 312 is three or more odor complaints from a facility within 1,000 feet of the project site. Therefore, the proposed residential apartment units would not be exposed to significant odor impacts and would meet the requirements of Mitigation Measure AQ-11.

7.0 REFERENCES

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APPENDIX A

Anaheim Hills Auto Body TAC Emissions Estimates

APPENDIX B

EMFAC2014 Model Printouts

APPENDIX C

AERMOD Model Years 2019-2021 PM10 Cancer Risk Printouts

APPENDIX D

AERMOD Model Years 2022-2036 PM10 Cancer Risk Printouts

APPENDIX E

AERMOD Model Years 2037-2048 PM10 Cancer Risk Printouts

APPENDIX F

AERMOD Model PM10 Non-Cancer Risk Printouts