4.1 AIR QUALITY

4.1.1 INTRODUCTION

The Air Quality section of the EIR describes the effects of the proposed project on local and regional air quality. The section includes a discussion of existing air quality setting and applicable regulations, estimation of emissions that would be generated during the construction and operational phases of either the Preferred Site Plan or Alternative B, comparison of the project's emissions with relevant thresholds of significance, and identification of impacts and mitigation measures intended to reduce all impacts to the maximum extent feasible. The Air Quality section is primarily based on information, guidance, and analysis protocol provided by the Yolo-Solano Air Quality Management District (YSAQMD) per the *Handbook for Assessing and Mitigating Air Quality Impacts*,[1] as well as emissions projections obtained by means of the California Emissions Estimator Model (CalEEMod) version 2016.3.2.[2] In addition, the section uses information obtained from the *Davis General Plan*[3] and associated EIR.[4]

It should be noted that an analysis of the proposed project's impacts related to Greenhouse Gas Emissions and Energy is included in Section 4.3, of this EIR.

4.1.2 EXISTING ENVIRONMENTAL SETTING

The following information provides an overview of the existing environmental setting in relation to air quality within the proposed project area. The air basin characteristics, ambient air quality standards (AAQS), attainment status and regional air quality plans, local air quality monitoring, and sensitive receptors are discussed below.

Air Basin Characteristics

The City of Davis is located in Yolo County, which is within the Yolo-Solano portion of the Sacramento Valley Air Basin (SVAB), which is under the jurisdiction of the YSAQMD. Air quality in the SVAB is largely the result of the following factors: emissions, geography, and meteorology (wind, atmospheric stability, and sunlight). The Sacramento Valley is often described

1 Yolo-Solano Air Quality Management District. *Handbook for Assessing and Mitigating Air Quality Impacts*. July 11, 2007. Available at: http://www.ysaqmd.org/documents/CEQAHandbook2007.pdf. Accessed September 2016.

2 BREEZE Software, A Division of Trinity Consultants, in collaboration with South Coast Air Quality Management District and the California Air Districts. *California Emissions Estimator Model User's Guide Version 2016.3.2*. November 2017.

3 City of Davis. *Davis General Plan*. Adopted May 2001. Amended through January 2007.

4 City of Davis. *Program EIR for the City of Davis General Plan Update and Project EIR for Establishment of a New Junior High School*. January 2000.

as a bowl-shaped valley, with the SVAB being bounded by the North Coast Ranges on the west, the northern Sierra Nevada Mountains on the east, and the intervening terrain being flat.

The Sacramento Valley has a Mediterranean climate, characterized by hot, dry summers and mild, rainy winters. During the year, the temperature may range from 20 to 115 degrees Fahrenheit, with summer highs usually in the 90-degree Fahrenheit range and winter lows occasionally below freezing. Average annual rainfall is approximately 20 inches, with snowfall being very rare. The winds in the area are moderate in strength and vary from moist, clean breezes from the south to dry land flows from the north.[5] According to the Western Regional Climate Center, the prevailing wind direction throughout the year in the project area is from the south.[6]

The mountains surrounding the Sacramento Valley create a barrier to airflow, which can trap air pollutants in the valley when meteorological conditions are right and a temperature inversion exists. The highest frequency of air stagnation occurs in the autumn and early winter when large high-pressure cells lie over the valley. The lack of surface wind during such periods and the reduced vertical flow caused by less surface heating reduces the influx of outside air and allows air pollutants to become concentrated in the air. The surface concentrations of pollutants are highest when these conditions are combined with smoke from agricultural burning, which is regulated through YSAQMD permits, or when temperature inversions trap cool air, fog, and pollutants near the ground.

The ozone season (May through October) in the Sacramento Valley is characterized by stagnant morning air or light winds, with the Delta sea breeze arriving in the afternoon out of the southwest. Usually the evening breeze transports the airborne pollutants to the north out of the Sacramento Valley. However, during approximately half of the days from July to September, a phenomenon called the "Schultz Eddy" prevents such transport from occurring. Instead of allowing for the prevailing wind patterns to move north, carrying the pollutants out of the valley, the Schultz Eddy causes the wind pattern and pollutants to circle back southward. The Schultz Eddy effect exacerbates the pollution levels in the area and increases the likelihood of violating the federal and State air quality standards.

Ambient Air Quality Standards

The federal Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants, known as criteria pollutants, because the criteria air pollutants could be detrimental to human health and the environment. The criteria pollutants include particulate matter, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. Primary standards are the set of limits based on human health; and secondary standards are the set of limits intended to prevent environmental and property damage. States may also establish their own ambient air quality standards, provided the State standards are at least as stringent as the NAAQS. California has established California

[5] Yolo-Solano Air Quality Management District. *Handbook for Assessing and Mitigating Air Quality Impacts*. July 11, 2007. Available at: http://www.ysaqmd.org/documents/CEQAHandbook2007.pdf. Accessed September 2016.

[6] Western Regional Climate Center. *Prevailing Wind Direction*. Available at: http://www.wrcc.dri.edu/htmlfiles/westwinddir.html. Accessed September 2016.

Ambient Air Quality Standards (CAAQS) pursuant to Health and Safety Code Section 39606(b) and its predecessor statutes. The State of California has established air quality standards for some pollutants not addressed by federal standards, including hydrogen sulfide, sulfates, vinyl chloride, and visibility-reducing particles. The NAAQS and CAAQS summarized in Table 4.1-1 below, represent the maximum amount of a pollutant that can be present in outdoor air without harm to public health.[7] As shown in the table, in general, the CAAQS are more stringent, particularly for ozone and particulate matter, than the NAAQS.

Table 4.1-1
Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS	NAAQS	
			Primary	Secondary
Ozone	1 Hour	0.09 ppm	-	Same as primary
	8 Hour	0.070 ppm	0.075 ppm	
Carbon Monoxide	8 Hour	9 ppm	9 ppm	-
	1 Hour	20 ppm	35 ppm	
Nitrogen Dioxide	Annual Mean	0.030 ppm	53 ppb	Same as primary
	1 Hour	0.18 ppm	100 ppb	-
Sulfur Dioxide	24 Hour	0.04 ppm	-	-
	3 Hour	-	-	0.5 ppm
	1 Hour	0.25 ppm	75 ppb	-
Respirable Particulate Matter (PM_{10})	Annual Mean	20 ug/m^3	-	Same as primary
	24 Hour	50 ug/m^3	150 ug/m^3	
Fine Particulate Matter ($PM_{2.5}$)	Annual Mean	12 ug/m^3	12 ug/m^3	15 ug/m^3
	24 Hour	-	35 ug/m^3	Same as primary
Lead	30 Day Average	1.5 ug/m^3	-	-
	Calendar Quarter	-	1.5 ug/m^3	Same as primary
Sulfates	24 Hour	25 ug/m^3	-	-
Hydrogen Sulfide	1 Hour	0.03 ppm	-	-
Vinyl Chloride	24 Hour	0.010 ppm	-	-
Visibility Reducing Particles[1]	8 Hour	see note below	-	-

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

1. Statewide Visibility Reducing Particle Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

Source: California Air Resources Board. Ambient Air Quality Standards. June 4, 2013. Available at: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf. Accessed September 2016.

[7] California Air Resources Board. *Ambient Air Quality Standards (AAQS)*. July 2, 2013. Available at: http://www.arb.ca.gov/research/aaqs/aaqs.htm. Accessed September 2016.

A summary of the pollutants, their characteristics, health effects, and typical sources is provided in Table 4.1-2 below. Of the pollutants, particle pollution and ground-level ozone are the most widespread health threats.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TACs) are also a category of environmental concern. TACs are present in many types of emissions with varying degrees of toxicity. Public exposure to TACs can result from emissions from normal operations, as well as accidental releases. Common stationary sources of TACs include gasoline stations, dry cleaners, and diesel backup generators, which are subject to YSAQMD stationary source permit requirements. The other, often more significant, common source type is on-road motor vehicles, such as cars and trucks, on freeways and roads, and off-road sources such as construction equipment, ships, and trains.

Fossil fueled combustion engines, including those used in cars, trucks, and some pieces of construction equipment, release at least 40 different TACs. In terms of health risks, the most volatile contaminants are diesel particulate matter (DPM), benzene, formaldehyde, 1,3-butadiene, toluene, xylenes, and acetaldehyde. Gasoline vapors contain several TACs, including benzene, toluene, and xylenes. Diesel engines emit a complex mixture of air pollutants, including both gaseous and solid material. The solid material in diesel exhaust, DPM, is composed of carbon particles and numerous organic compounds, including over 40 known cancer-causing organic substances. Examples of such chemicals include polycyclic aromatic hydrocarbons, benzene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene. Diesel exhaust also contains gaseous pollutants, including volatile organic compounds and NO_X. Due to the published evidence of a relationship between diesel exhaust exposure and lung cancer and other adverse health effects, the California Air Resources Board (CARB) has identified DPM from diesel-fueled engines as a TAC. Although a variety of TACs are emitted by fossil fueled combustion engines, the cancer risk due to DPM exposure represents a more significant risk than the other TACs discussed above.[8]

More than 90 percent of DPM is less than one micrometer in diameter, and, thus, DPM is a subset of $PM_{2.5}$. As a California statewide average, DPM comprises about eight percent of $PM_{2.5}$ in outdoor air, although DPM levels vary regionally due to the non-uniform distribution of sources throughout the State. Most major sources of diesel emissions, such as ships, trains, and trucks, operate in and around ports, rail yards, and heavily-traveled roadways. Such areas are often located near highly populated areas. Thus, elevated DPM levels are mainly an urban problem, with large numbers of people exposed to higher DPM concentrations, resulting in greater health consequences compared to rural areas.

[8] California Air Resources Board. *Reducing Toxic Air Pollutants in California's Communities*. February 6, 2002.

Table 4.1-2
Summary of Criteria Air Pollutants

Pollutant	Characteristics	Health Effects	Major Sources
Ozone (O_3)	• A highly reactive gas consisting of three oxygen atoms • Often called photochemical smog • Produced by photochemical process involving the sun's energy • A secondary pollutant formed from a chemical reaction between ROG and NO_X emissions in the presence of sunlight • Levels are highest during summer and during the afternoon and early evening hours	• Eye irritation • Wheezing, chest pain, dry throat, headache, or nausea • Aggravated respiratory disease such as emphysema, bronchitis, and asthma	Combustion sources such as factories, automobiles, and evaporation of solvents and fuels.
Reactive Organic Gas (ROG)	• Reactive chemical gas composed of hydrocarbon compounds • Contributes to formation of smog and ozone through atmospheric chemical reactions	• Some compounds that make up ROG are toxic, such as the carcinogen benzene	Paints and solvents.
Oxides of Nitrogen (NO_X)	• Gaseous nitrogen compounds • Precursors to the formation of ozone and particulate matter • Nitrogen dioxide is major component • NO_X reacts with ROG to form smog	• Component of acid rain • Lung irritation • Lung damage • Chronic respiratory disease	Combustion of fossil fuels under high temperature and pressure, and motor vehicles.
Carbon Monoxide (CO)	• An odorless, colorless, highly toxic gas formed by the incomplete combustion of fuels • Emitted directly into the air • Primarily a winter pollution problem due to cold stagnant weather conditions	• Impairment of oxygen transport in the bloodstream • Impaired vision, reduced alertness, chest pain, and headaches • Reduction in mental and physical functions • Can be fatal in the case of very high concentrations	Automobile exhaust, combustion of fuels, and combustion of wood in woodstoves and fireplaces.
Nitrogen Dioxide (NO_2)	• A reddish-brown gas that discolors the air and is formed during combustion of fossil fuels under high temperature and pressure.	• Lung irrigation and damage • Increased risk of acute and chronic respiratory disease	Automobile and diesel truck exhaust, industrial processes, and fossil-fueled power plants.
Sulfur Dioxide	• A colorless, irritating gas • Has a rotten egg odor	• Aggravation of chronic obstruction lung disease	Combustion of sulfur-containing

(Continued on next page)

Table 4.1-2
Summary of Criteria Air Pollutants

Pollutant	Characteristics	Health Effects	Major Sources
(SO_2)	• Particles are a component of PM_{10}	• Increased risk of acute and chronic respiratory disease	fossil fuels from mobile sources, such as locomotives, shops, and off-road diesel equipment, and industrial processes, such as petroleum refining and metal processing.
Particulate Matter (PM_{10} and $PM_{2.5}$)	• A complex mixture of extremely small particles and liquid droplets • Made up of a number of components, including acids, organic chemicals, metals and soil or dust particles • Size of particles directly linked to potential for causing health impacts • Particles 10 micrometers in diameter or smaller (PM_{10}) can pass through the throat and nose and enter the lungs • USEPA groups particle pollution into three categories based on the size of the particles and where they are deposited: o "Inhalable coarse particles ($PM_{2.5-10}$)," which are found near roadways and dusty industries, are between 2.5 and 10 micrometers in diameter. $PM_{2.5-10}$ is deposited in the thoracic region of the lungs. o "Fine particles ($PM_{2.5}$)," which are found in smoke and haze, are 2.5 micrometers in diameter and smaller. $PM_{2.5}$ particles could be directly emitted from sources such as forest fires, or could form when gases emitted from power plants, industries, and automobiles react in the air. They penetrate deeply into the thoracic and alveolar regions of the lungs. o "Ultrafine particles (UFP)," which are very, very small	• Aggravation of chronic respiratory disease • Heart and lung disease • Coughing or difficulty breathing • Bronchitis • Chronic respiratory disease in children • Irregular heartbeat • Nonfatal heart attacks • Increased blood pressure	Combustion sources such as automobiles, power generation, industrial processes, and wood burning. Also from unpaved roads, farming activities, and fugitive windblown dust.

(Continued on next page)

Table 4.1-2
Summary of Criteria Air Pollutants

Pollutant	Characteristics	Health Effects	Major Sources
	particles (less than 0.1 micrometers in diameter) largely resulting from the combustion of fossil fuels, meat, wood, and other hydrocarbons. While UFP mass is a small portion of $PM_{2.5}$, their high surface area, deep lung penetration, and transfer into the bloodstream could result in disproportionate health impacts relative to their mass. UFP is not currently regulated separately, but is analyzed as part of $PM_{2.5}$. • PM_{10}, $PM_{2.5-10}$, and UFP include primary pollutants (emitted directly to the atmosphere) as well as secondary pollutants (formed in the atmosphere by chemical reactions among precursors)		
Lead	• A soft and chemically resistant metal • A natural constituent of air, water, and the biosphere • Is not created nor destroyed in the environment • As an air pollutant, lead is present in small particles • Present in many soils and could become re-suspended into the air	• Impaired blood formation and nerve conduction • Fatigue, anxiety, short-term memory loss, depression, loss of appetite, weakness, apathy, and miscarriage • Lesions of the neuromuscular system, circulatory system, brain, and gastrointestinal tract • Learning disabilities in children • Cancer	Industrial sources combustion of leaded gasoline, and contaminated soils.
Sulfates (SO_4^{2-})	• The fully oxidized ionic form of sulfur • Colorless gas • Occur in combination with metal and/or hydrogen ions • Sulfur compounds occur from combustion of petroleum fuels containing sulfur, where the sulfur is oxidized to SO_2 during the combustion process and converted to sulfate compounds in the atmosphere	• Aggravation of respiratory symptoms • Decrease in ventilatory function • Aggravation of asthmatic symptoms	Combustion of petroleum-derived fuels that contain sulfur.

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Table 4.1-2
Summary of Criteria Air Pollutants

Pollutant	Characteristics	Health Effects	Major Sources
	• Conversion of SO_2 to sulfates occurs rapidly and completely in urban areas	• Increased risk of cardio-pulmonary disease	
Hydrogen Sulfide (H_2S)	• A colorless, flammable gas with a rotten egg odor • Extremely hazardous in high concentrations, especially in enclosed spaces • Occurs naturally in crude petroleum, natural gas, and hot springs • Produced by bacterial breakdown of organic materials and human and animal wastes	• Irritation of the eyes, nose, throat, and respiratory system • Aggravation of asthmatic symptoms • Headaches, fatigue, irritability, insomnia, digestive disturbances, and weight loss • Nausea, vomiting, staggering, and excitability • High concentrations can cause shock, convulsions, inability to breathe, extremely rapid unconsciousness, coma, and death	Geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations.
Vinyl Chloride (C_2H_3Cl, or VCM)	• A colorless gas that does not occur naturally, but is formed when other substances such as trichloroethane, trichloroethylene, and tetrachloro-ethylene are broken down • Used to make polyvinyl chloride (PVC), which is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials	• Central nervous system effects, such as dizziness, drowsiness, and headaches • Liver damage • Cancer	Exhaust gases from factories that manufacture or process vinyl chloride, or evaporation from chemical waste storage areas.

Sources:

- *California Air Resources Board. California Ambient Air Quality Standards (CAAQS). Available at: http://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm. Accessed May 2018.*
- *Sacramento Metropolitan, El Dorado, Feather River, Placer, and Yolo-Solano Air Districts, Spare the Air website. Air Quality Information for the Sacramento Region. Available at: http://www.sparetheair.com/health.cfm?page=healthoverall. Accessed May 2018.*
- *California Air Resources Board. Glossary of Air Pollution Terms. Available at: http://www.arb.ca.gov/html/gloss.htm. Accessed May 2018.*

Due to the high levels of diesel activity, high volume freeways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic are identified as having the highest associated health risks from DPM. Construction-related activities also have the potential to generate concentrations of DPM from on-road haul trucks and off-road equipment exhaust emissions. Major distribution centers or other land uses that involve heavy truck traffic or idling, or substantial use of stationary diesel engines, are not located in the vicinity of the project site. However, Interstate 80 (I-80), a high-volume freeway, is located approximately 100 feet to the north of the proposed project site.

The size of diesel particulates that are of the greatest health concern are fine particles (i.e., $PM_{2.5}$) and ultrafine particles (UFPs), which are a subset of UFPs. UFPs have a small diameter (on the order of 0.1 micrometers).[9] The small diameter of UFPs imparts the particulates with unique attributes, such as high surface areas and the ability to penetrate deeply into lungs. Once UFPs have been deposited in lungs, the small diameter allows the UFPs to be transferred to the bloodstream. The high surface area of the UFPs also allows for a greater adsorption of other chemicals, which are transported along with the UFPs into the bloodstream of the inhaler, where the chemicals can eventually reach critical organs.[10] The penetration capability of UFPs may contribute to adverse health effects related to heart, lung, and other organ health.[11] UFPs are a subset of DPM and activities that create large amounts of DPM, such as the operations involving heavy diesel-powered engines, also release UFPs. Therefore, operations related to I-80 would involve UFP emissions. Considering that UFPs are a subset of DPM, and DPM is considered a subset of $PM_{2.5}$, estimations of either concentrations or emissions of $PM_{2.5}$ or DPM include UFPs.

Health risks from TACs are a function of both the concentration of emissions and the duration of exposure, which typically are associated with long-term exposure and the associated risk of contracting cancer. Health effects of exposure to TACs other than cancer include birth defects, neurological damage, and death. Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, State, and federal level. The identification, regulation, and monitoring of TACs is relatively new compared to that for criteria air pollutants that have established AAQS. TACs are regulated or evaluated on the basis of risk to human health rather than comparison to an AAQS or emission-based threshold.

Naturally Occurring Asbestos

Another concern related to air quality is naturally occurring asbestos (NOA). Asbestos is a term used for several types of naturally-occurring fibrous minerals, typically associated with serpentine and ultramafic rocks, found in many parts of California. The most common type of asbestos is chrysotile, but other types are also found in California. When rock containing asbestos is broken or crushed, asbestos fibers may be released and become airborne. Exposure to asbestos fibers may result in health issues such as lung cancer, mesothelioma (a rare cancer of the thin membranes lining the lungs, chest and abdominal cavity), and asbestosis (a non-cancerous lung disease which causes scarring of the lungs). Because asbestos is a known carcinogen, NOA is considered a TAC.

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9 South Coast Air Quality Management District. *Final 2012 Air Quality Management Plan.* December 2012.
10 Health Effects Institute. *Understanding the Health Effects of Ambient Ultrafine Particles*. January 2013.
11 South Coast Air Quality Management District. *Final 2012 Air Quality Management Plan*. December 2012.

Sources of asbestos emissions include: unpaved roads or driveways surfaced with ultramafic rock; construction activities in ultramafic rock deposits; or rock quarrying activities where ultramafic rock is present.

According to mapping prepared by the California Geological Survey, Yolo County is not in an area likely to contain NOA.[12] In addition, the project site is located in a developed area of the City and currently contains existing development, under which lies fill material. For the aforementioned reasons, NOA is not expected to be present at the project site.

For a discussion of the potential presence of asbestos within the existing structures at the project site, refer to Section VIII of the Initial Study prepared for the proposed project, included as Appendix C to this EIR.

Attainment Status and Regional Air Quality Plans

Areas not meeting the NAAQS presented in Table 4.1-1, above, are designated by the USEPA as nonattainment. Further classifications of nonattainment areas are based on the severity of the nonattainment problem, with marginal, moderate, serious, severe, and extreme nonattainment classifications for ozone. Nonattainment classifications for PM range from marginal to serious. The CAA requires areas violating the NAAQS to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The SIP contains the strategies and control measures for states to use to attain the NAAQS. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, rules, and regulations of air basins as reported by the agencies with jurisdiction over them. The USEPA reviews SIPs to determine if they conform to the mandates of the federal CAA amendments and would achieve air quality goals when implemented.

The CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA) of 1988. The CCAA classifies ozone nonattainment areas as moderate, serious, severe, and extreme based on severity of violations of CAAQS. For each nonattainment area classification, the CCAA specifies air quality management strategies that must be adopted. For all nonattainment areas, attainment plans are required to demonstrate a five-percent-per-year reduction in nonattainment air pollutants or their precursors, averaged every consecutive three-year period, unless an approved alternative measure of progress is developed. Air districts with air quality that is in violation of CAAQS are required to prepare an air quality attainment plan that lays out a program to attain the CCAA mandates.

Table 4.1-3 below presents the current attainment status of the jurisdictional area of the YSAQMD. As shown in the table, Yolo County is in attainment for all State and federal AAQS, with the exception of ozone, PM_{10}, and $PM_{2.5}$. At the federal level, the area is designated as severe nonattainment for the 8-hour ozone standard, nonattainment for the 24-hour $PM_{2.5}$ standard, unclassified/nonattainment for annual $PM_{2.5}$, and attainment or unclassified for all other criteria pollutants.

[12] California Department of Conservation, Division of Mines and Geology. *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos*. August 2000.

Table 4.1-3 Attainment Status		
	Designation/Classification	
Pollutant	**Federal Standards**	**State Standards**
Ozone – 1-Hour	Revoked in 2005	**Nonattainment**
Ozone – 8-Hour	**Severe Nonattainment**	**Nonattainment**
Carbon Monoxide	Attainment	Attainment
Nitrogen Dioxide	Unclassified/Attainment	Attainment
Sulfur Dioxide	Attainment (Pending)	Attainment
PM_{10}	Attainment	**Nonattainment**
$PM_{2.5}$ – 24-Hour	**Nonattainment**	No State Standard
$PM_{2.5}$ – Annual	Unclassified/**Nonattainment**	**Nonattainment**
Lead	Unclassified/Attainment	Attainment
Sulfates	No Federal Standard	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Visibility Reducing Particles	No Federal Standard	Unclassified

Sources:

- *YSAQMD. Ambient Air Quality Standards. Available at: https://www.ysaqmd.org/wp-content/uploads/2016/06/Attainment_Detailed.jpg. Accessed March 2018.*
- *California Air Resources Board. Air Quality Standards and Area Designations. Available at: https://www.arb.ca.gov/desig/desig.htm. Accessed March 2018.*

At the State level, the area is designated as a serious nonattainment area for the 1-hour ozone standard, nonattainment for the 8-hour ozone standard, nonattainment for the PM_{10} and $PM_{2.5}$ standards, and attainment or unclassified for all other State standards. Although the 1-Hour federal ozone standard has been revoked, on October 18, 2012, the USEPA officially determined that the Sacramento Federal Nonattainment Area (SFNA), which includes Sacramento and Yolo counties, Placer and El Dorado counties (except Lake Tahoe Basin portions), Solano County (eastern portion), and Sutter County (southern portion), attained the revoked 1-hour ozone NAAQS. The determination became effective November 19, 2012.[13]

Due to the nonattainment designations, the YSAQMD, along with the other air districts in the SVAB region, is required to develop plans to attain the federal and State standards for ozone and particulate matter. The air quality plans include emissions inventories to measure the sources of air pollutants, to evaluate how well different control measures have worked, and show how air pollution would be reduced. In addition, the plans include the estimated future levels of pollution to ensure that the area would meet air quality goals. Each of the attainment plans currently in effect are discussed in further detail in the Regulatory Context discussion of this section.

Local Air Quality Monitoring

Air quality is monitored by CARB at various locations to determine which air quality standards are being violated, and to direct emission reduction efforts, such as developing attainment plans and rules, incentive programs, etc. The nearest monitoring station to the City of Davis and the

[13] U.S. Environmental Protection Agency. *Air Actions in the Sacramento Metro Area.* October 3, 2012. Available at: http://www.epa.gov/region9/air/actions/sacto/index.html. Accessed March 2018.

proposed project site would be the Davis-UCD Campus station, located along Campbell Road between Hutchison Drive and Garrod Drive in Davis, approximately two miles west of the project site. The Davis-UCD Campus station does not have data available for $PM_{2.5}$ and PM_{10}; thus, the nearest station with such data was used, which was the Woodland-Gibson Road station located at 41929 Gibson Road in Woodland, approximately eight miles north of the project site. Table 4.1-4 presents the number of days that each criteria air pollutant standard was exceeded and/or the annual average mean concentrations for the years 2014 through 2016 for those pollutants for which monitoring data is available from the Davis-UCD Campus and Woodland-Gibson Road monitoring stations. The USEPA uses such data (air quality monitoring data for the most recent three-year period), as well as a number of other factors, in making final determinations regarding area designations.

Table 4.1-4
Air Quality Monitoring Data Summary for Project Area

Pollutant	Standard	Days Standard Exceeded During:		
		2014	2015	2016
Ozone	1-Hour State	0	0	0
	8-Hour State	0	1	1
	8-Hour Federal	0	0	0
PM_{10}[1]	24 Hour State	0	2	2
	Annual Mean State	17.4	21.8	19.7
	24 Hour Federal	0	0	0
$PM_{2.5}$[1]	Annual Mean State	*	7.6	6.4
	Annual Mean Federal	5.9	7.5	6.3
	24 Hour Federal	0	0	0
Nitrogen Dioxide	Annual Mean State	5	5	*
	1-Hour State	0	0	0
	1-Hour Federal	0	0	0

[1] Obtained from the Woodland-Gibson Road monitoring station.
* Data not available.

Source: California Air Resources Board. Aerometric Data Analysis and Management (ADAM): Top Four Summary. Available at: http://www.arb.ca.gov/adam/topfour/topfour1.php. Accessed March 2018.

Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others, due to the types of population groups or activities involved. Heightened sensitivity may be caused by health problems, proximity to the emissions source, and/or duration of exposure to air pollutants. Children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the effects of air pollution. Accordingly, land uses that are typically considered to be sensitive receptors include residences, schools, childcare centers, playgrounds, retirement homes, convalescent homes, hospitals, and medical clinics.

The existing nearby residential developments, to the south of the project site and opposite the project site along La Vida Way, would be considered the nearest sensitive receptors to the site.

The nearest existing school, which would be considered a sensitive receptor, to the project site is the Merryhill School, which is located adjacent to the southwest corner of the project site.

4.1.3 REGULATORY CONTEXT

Air quality is monitored and regulated through the efforts of various international, federal, State, and local government agencies. Agencies work jointly and individually to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies responsible for regulating and improving the air quality within the project area are discussed below.

Federal Regulations

The most prominent federal regulation is the FCAA, which is implemented and enforced by the USEPA.

FCAA and USEPA

The FCAA requires the USEPA to set NAAQS and designate areas with air quality not meeting NAAQS as nonattainment. The USEPA is responsible for enforcement of NAAQS for atmospheric pollutants and regulates emission sources that are under the exclusive authority of the federal government including emissions of greenhouse gases (GHGs). The USEPA's air quality mandates are drawn primarily from the FCAA, which was signed into law in 1970. Congress substantially amended the FCAA in 1977 and again in 1990. The USEPA has adopted policies consistent with FCAA requirements demanding states to prepare SIP that demonstrate attainment and maintenance of the NAAQS.

State Regulations

California has adopted a variety of regulations aimed at reducing air pollution emissions. The adoption and implementation of the key State legislation described in further detail below demonstrates California's leadership in addressing air quality. Only the most prominent and applicable California air quality-related legislation are included below; however, an exhaustive list and extensive details of California air quality legislation can be found at the CARB website (http://www.arb.ca.gov/html/lawsregs.htm).

CCAA and CARB

The CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing the CCAA. The CCAA requires that air quality plans be prepared for areas of the State that have not met the CAAQS for ozone, CO, NO_X, and SO_2. Among other requirements of the CCAA, the plans must include a wide range of implementable control measures, which often include transportation control measures and performance standards. In order to implement the transportation-related provisions of the CCAA, local air pollution control districts have been granted explicit authority to adopt and implement transportation controls. The CARB, California's air quality management agency, regulates and

oversees the activities of county air pollution control districts and regional air quality management districts. The CARB regulates local air quality indirectly using State standards and vehicle emission standards, by conducting research activities, and through planning and coordinating activities. In addition, the CARB has primary responsibility in California to develop and implement air pollution control plans designed to achieve and maintain the NAAQS established by the USEPA. Furthermore, the CARB is charged with developing rules and regulations to cap and reduce GHG emissions.

Air Quality and Land Use Handbook

CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB Handbook) addresses the importance of considering health risk issues when siting sensitive land uses, including residential development, in the vicinity of intensive air pollutant emission sources including freeways or high-traffic roads, distribution centers, ports, petroleum refineries, chrome plating operations, dry cleaners, and gasoline dispensing facilities.[14] The CARB Handbook draws upon studies evaluating the health effects of traffic traveling on major interstate highways in metropolitan California centers within Los Angeles (I-405 and I-710), the San Francisco Bay, and San Diego areas. The recommendations identified by CARB, including siting residential uses a minimum distance of 500 feet from freeways or other high-traffic roadways, are consistent with those adopted by the State of California for location of new schools. Specifically, the CARB Handbook recommends, "Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day" (CARB 2005).

Importantly, the Introduction section of the CARB Handbook clarifies that the guidelines are strictly advisory, recognizing that: "[l]and use decisions are a local government responsibility. The Air Resources Board Handbook is advisory and these recommendations do not establish regulatory standards of any kind." CARB recognizes that there may be land use objectives as well as meteorological and other site-specific conditions that need to be considered by a governmental jurisdiction relative to the general recommended setbacks, specifically stating, "[t]hese recommendations are advisory. Land use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality of life issues" (CARB 2005).

Assembly Bill 1807

Assembly Bill (AB) 1807, enacted in September 1983, sets forth a procedure for the identification and control of TACs in California. CARB is responsible for the identification and control of TACs, except pesticide use, which is regulated by the California Department of Pesticide Regulation.

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

AB 2588

The Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588), California Health and Safety Code Section 44300 et seq., provides for the regulation of over 200 TACs, including DPM, and is the primary air contaminant legislation in California. Under the act, local air districts may request that a facility account for its TAC emissions. Local air districts then prioritize facilities on the basis of emissions, and high priority designated facilities are required to submit a health risk assessment and communicate the results to the affected public.

Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations

In 2002, the Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations (Title 17, Section 93105, of the California Code of Regulations) went into effect, which requires each air pollution control and air quality management district to implement and enforce the requirements of Section 93105 and propose their own asbestos ATCM as provided in Health and Safety Code section 39666(d).[15]

Senate Bill 656

In 2003, the Legislature passed Senate Bill (SB) 656 to reduce public exposure to PM_{10} and $PM_{2.5}$ above the State CAAQS. The legislation requires the CARB, in consultation with local air pollution control and air quality management districts, to adopt a list of the most readily available, feasible, and cost-effective control measures that could be implemented by air districts to reduce PM_{10} and $PM_{2.5}$ emissions. The CARB list is based on California rules and regulations existing as of January 1, 2004, and was adopted by CARB in November 2004. Categories addressed by SB 656 include measures for reduction of emissions associated with residential wood combustion and outdoor greenwaste burning, fugitive dust sources such as paved and unpaved roads and construction, combustion sources such as boilers, heaters, and charbroiling, solvents and coatings, and product manufacturing. Some of the measures include, but are not limited to, the following:

- Reduce or eliminate wood-burning devices allowed;
- Prohibit residential open burning;
- Permit and provide performance standards for controlled burns;
- Require water or chemical stabilizers/dust suppressants during grading activities;
- Limit visible dust emissions beyond the project boundary during construction;
- Require paving/curbing of roadway shoulder areas; and
- Require street sweeping.

Under SB 656, each air district is required to prioritize the measures identified by CARB, based on the cost effectiveness of the measures and their effect on public health, air quality, and emission reductions. Per SB 656 requirements, the PCAPCD amended their Rule 225 related to wood-

[15] California Air Resources Board. *2002-07-29 Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations*. June 3, 2015. Available at: http://www.arb.ca.gov/toxics/atcm/asb2atcm.htm. Accessed March 2018.

burning appliances to include conditions consistent with SB 656, including such conditions as the prohibition of the installation of any new, permanently installed, indoor or outdoor, uncontrolled wood-burning appliances.

Heavy-Duty Vehicle Idling Emission Reduction Program

On October 20, 2005, CARB approved a regulatory measure to reduce emissions of toxics and criteria pollutants by limiting idling of new and in-use sleeper berth equipped diesel trucks.[16] The regulation consists of new engine and in-use truck requirements and emission performance requirements for technologies used as alternatives to idling the truck's main engine. For example, the regulation requires 2008 and newer model year heavy-duty diesel engines to be equipped with a non-programmable engine shutdown system that automatically shuts down the engine after five minutes of idling, or optionally meet a stringent NO_X emission standard. The regulation also requires operators of both in-state and out-of-state registered sleeper berth equipped trucks to manually shut down their engine when idling more than five minutes at any location within California beginning in 2008. Emission producing alternative technologies such as diesel-fueled auxiliary power systems and fuel-fired heaters are also required to meet emission performance requirements that ensure emissions are not exceeding the emissions of a truck engine operating at idle.

In-Use Off-Road Diesel Vehicle Regulation

On July 26, 2007, CARB adopted a regulation to reduce DPM and NO_X emissions from in-use (existing), off-road, heavy-duty diesel vehicles in California.[17] Such vehicles are used in construction, mining, and industrial operations. The regulation is designed to reduce harmful emissions from vehicles by subjecting fleet owners to retrofit or accelerated replacement/repower requirements, imposing idling limitations on owners, operators, renters, or lessees of off-road diesel vehicles. The idling limits require operators of applicable off-road vehicles (self-propelled diesel-fueled vehicles 25 horsepower and up that were not designed to be driven on-road) to limit idling to less than five minutes. The idling requirements are specified in Title 13 of the California Code of Regulations.

Local Regulations

The following are the regulatory agencies and regulations pertinent to the proposed project on a local level.

YSAQMD

Various local, regional, State and federal agencies share the responsibility for air quality management in Yolo County. The YSAQMD operates at the local level with primary responsibility for attaining and maintaining the federal and State AAQS in Yolo County. The YSAQMD is tasked

[16] California Air Resources Board. *Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling*. October 24, 2013. Available at: http://www.arb.ca.gov/msprog/truck-idling/truck-idling.htm. Accessed March 2018.

[17] California Air Resources Board. *In-Use Off-Road Diesel Vehicle Regulation*. Available at: http://www.arb.ca.gov/msprog/ordiesel/ordiesel.htm. Accessed March 2018.

with implementing programs and regulations required by the FCAA and the CCAA, including preparing plans to attain federal and State AAQS. The YSAQMD works jointly with the USEPA, CARB, Sacramento Area Council of Governments (SACOG), other air districts in the region, county and city transportation and planning departments, and various non-governmental organizations to improve air quality through a variety of programs. Programs include the adoption of regulations, policies and guidance, extensive education and public outreach programs, as well as emission reducing incentive programs.

Nearly all development projects in the region have the potential to generate air pollutants that may increase the difficulty of attaining federal and State AAQS. Therefore, for most projects, evaluation of air quality impacts is required to comply with CEQA. In order to help public agencies evaluate air quality impacts, the YSAQMD has developed the *Handbook for Assessing and Mitigating Air Quality Impacts*.[18] The YSAQMD's handbook includes screening methodology and recommended thresholds of significance, including mass emission thresholds for construction-related and operational ozone precursors (ROG and NO_X) and PM_{10}. The YSAQMD's handbook also includes screening criteria for localized CO emissions and thresholds for new stationary sources of TACs. The YSAQMD's recommended thresholds of significance, as well as screening criteria and methodology, are discussed in further detail in the Standards of Significance section below.

YSAQMD Rules and Regulations

All projects under the jurisdiction of the YSAQMD are required to comply with all applicable YSAQMD rules and regulations. In addition, YSAQMD permit requirements apply to most industrial processes (e.g., manufacturing facilities, food processing), many commercial activities (e.g., print shops, drycleaners, gasoline stations), and other miscellaneous activities (e.g., demolition of buildings containing asbestos and aeration of contaminated soils). The YSAQMD regulations and rules include, but are not limited to, the following:

> Regulation II – Prohibition, Exceptions - Requirements
>
> Regulation II is comprised of prohibitory rules that are written to achieve emission reductions from specific source categories. The rules are applicable to existing sources as well as new sources. Examples of prohibitory rules include Rule 2.1 (Control of Emissions), Rule 2.28 (Cutback and Emulsified Asphalts), Rule 2.5 (Nuisance), Rule 2.11 (Particulate Matter Concentration), Rule 2.14 (Architectural Coatings), and Rule 2.40 (Wood Burning Appliances).

Air Quality Attainment Plans

Each of the attainment plans currently in effect for the SVAB are discussed in further detail below.

[18] Yolo-Solano Air Quality Management District. *Handbook for Assessing and Mitigating Air Quality Impacts*. July 11, 2007.

2013 Revisions to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan

The most recent attainment plan for the ozone NAAQS is the *2013 Revisions to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan* (2013 Ozone Attainment Plan),[19] which demonstrates how existing and new control strategies would provide the necessary future emission reductions to meet the federal NAAQS. The SVAB's attainment deadline is 2027. Because the project site is located within the nonattainment area for ozone, the project would be subject to the requirements set forth in the 2013 Ozone Attainment Plan, as enforced by YSAQMD through rules and regulations.

$PM_{2.5}$ Implementation/Maintenance Plan and Re-designation Request for Sacramento $PM_{2.5}$ Nonattainment Area

The Sacramento federal $PM_{2.5}$ Nonattainment Area attained the federal $PM_{2.5}$ health standards on December 31, 2011. The *$PM_{2.5}$ Implementation/Maintenance Plan and Re-designation Request for Sacramento $PM_{2.5}$ Nonattainment Area* ($PM_{2.5}$ Implementation/Maintenance Plan)[20] was prepared to show that the region has met the requirements and requests that the USEPA re-designate the area to attainment. The USEPA issued a final rule for Determination of Attainment for the Sacramento Nonattainment Area effective August 14, 2013. The $PM_{2.5}$ Implementation/Maintenance Plan would be adopted by the air districts within the nonattainment area, as well as the CARB, as a revision to the SIP. Contents of the $PM_{2.5}$ Implementation/Maintenance Plan include demonstration that the NAAQS was met and that all requirements have been met for a re-designation to attainment, specification of actions to be taken if the standards are violated in the future, and establishment of regional motor vehicle emission budgets.

Because the project site is located within the nonattainment area for $PM_{2.5}$, the proposed project would be subject to the requirements set forth in the $PM_{2.5}$ Implementation/Maintenance Plan, as enforced by YSAQMD through rules and regulations.

2016 Triennial Assessment and Plan Update

In addition to the federal attainment plans discussed above for meeting NAAQS, the CCAA requires air districts to endeavor to achieve and maintain the CAAQS and develop plans for attainment. Yolo County meets the CAAQS for sulfur dioxide, nitrogen dioxide, and carbon monoxide, but is designated nonattainment for the State ozone and particulate matter standards. The CCAA requires districts that do not meet the State ozone standard to

[19] Sacramento Metropolitan Air Quality Management District. *2013 Revisions to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan.* September 26, 2013.

[20] Sacramento Metropolitan Air Quality Management District. *$PM_{2.5}$ Implementation/Maintenance Plan and Re-designation Request for Sacramento $PM_{2.5}$ Nonattainment Area*. October 24, 2013.

adopt an Air Quality Attainment Plan and to submit progress reports to the CARB every three years.[21] In July 2016, the YSAQMD adopted the 2016 Triennial Assessment and Plan Update.[22] The 2016 Triennial Assessment and Plan Update analyzes and summarizes data from the years 2012 through 2014, while also forecasting future emissions and reviewing efforts made by YSAQMD to improve air quality.

The YSAQMD is not required to prepare an attainment plan for PM_{10} or $PM_{2.5}$; however, the YSAQMD continues to work to reduce particulate emissions through rules affecting stationary sources, the construction industry, and the YSAQMD's agricultural burning program. The YSAQMD also works with the CARB to identify measures that can, where possible, reduce both ozone and particulate emissions. The YSAQMD has been proactive in attempts to implement the most readily available, feasible, and cost-effective measures that can be employed to reduce emissions of PM.

Because the proposed project site is located within the nonattainment area for State ozone and PM standards, the project would be subject to any requirements set forth in the 2016 Triennial Assessment and Plan Update or YSAQMD efforts related to PM emissions, as enforced by YSAQMD through rules and regulations.

City of Davis General Plan

The following applicable goals related to air quality are from the Air Quality chapter of the City's General Plan.

Goal AIR 1. Maintain and strive to improve air quality.

Policy AIR 1.1 Take appropriate measures to meet the AQMD's goal for improved air quality.

In addition, the Transportation Element of the City's General Plan includes the following applicable goals, performance objectives, and policies related to air quality emissions.

Goal #2 The Davis transportation system will evolve to improve air quality, reduce carbon emissions, and improve public health by encouraging usage of clean, energy-efficient, active (i.e. human powered), and economically sustainable means of travel.

Performance Objective #2.2 Reduce vehicle miles traveled (VMT) 39 percent by 2035.

[21] Yolo-Solano Air Quality Management District. *Planning for Ozone Standards*. Available at: https://www.ysaqmd.org/plans-data/ozone/. Accessed May 2018.

[22] Yolo-Solano Air Quality Management District. *Triennial Assessment and Plan Update*. March 11, 2016.

Policy TRANS 1.6	Reduce carbon emissions from the transportation system in Davis by encouraging the use of non-motorized and low carbon transportation modes.
Policy TRANS 1.7	Promote the use of electric vehicles and other low-polluting vehicles, including Neighborhood Electric Vehicles (NEV).
Policy TRANS 1.8	Develop and maintain a work trip-reduction program designed to reduce carbon emissions, criteria pollutants, and local traffic congestion.
Policy TRANS 3.3	Require new development to be designed to maximize transit potential.
Policy TRANS 4.4	Provide pedestrian and bicycle amenities.
Policy TRANS 4.5	Establish and implement bicycle parking standards for new developments and significant redevelopment.

South Davis Specific Plan

Goals, objectives, and policies from the Air Quality section of the South Davis Specific Plan are provided below.

Goal		Provide clean air in the City of Davis and in the South Davis vicinity for the health of Davis citizens.
	Objective	Continue to make progress toward attainment of air quality standards as required by the Clean Air Act.
	Policy	Implement the Reasonable Extra Efforts Program (REEP).

4.1.4 IMPACTS AND MITIGATION MEASURES

The standards of significance and methodology utilized to analyze and determine the proposed project's potential project-specific and cumulative impacts related to air quality emissions are described below. A discussion of the project's impacts, as well as mitigation measures where necessary, is also presented. It should be noted that the proposed project includes two development scenarios. The Preferred Site Plan would include development of the site with multi-family rental units only, while Alternative B would include single-family homes along La Vida Way, at the western portion of the site, and multi-family units throughout the remainder of the site in a similar configuration as the Preferred Site Plan. Therefore, as applicable, this chapter presents analysis for either the most intensive project alternative or buildout of either project.

Standards of Significance

Based on the recommendations of YSAQMD, City of Davis standards, and consistent with Appendix G of the CEQA Guidelines, the proposed project would result in a significant impact related to air quality if the project would result in any of the following:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

Further discussion of each of the above thresholds is provided below.

Issues Not Discussed Further

The Initial Study prepared for the proposed project (see Appendix C) determined that development of the proposed project would result in a less-than-significant impact with mitigation incorporated related to the following:

- Create objectionable odors affecting a substantial number of people;

For the reasons cited in the Initial Study, the impacts discussed above are not analyzed further in this EIR.

Criteria Pollutant Emissions and TAC Emissions

Table 4.1-5 below presents the YSAQMD's recommended thresholds of significance, which are expressed in tons per year (tons/yr) for ROG and NO_X and pounds per day (lbs/day) for PM_{10}.

Table 4.1-5
YSAQMD Thresholds of Significance

Pollutant	Construction Thresholds	Operational Thresholds
ROG	10 tons/yr	10 tons/yr
NO_X	10 tons/yr	10 tons/yr
PM_{10}	80 lbs/day	80 lbs/day

Source: YSAQMD. Handbook for Assessing and Mitigating Air Quality Impacts. July 11, 2007.

In addition to the thresholds of significance presented above for criteria air pollutants, YSAQMD has also developed thresholds for potential exposure of the public to TACs from new stationary sources. Exposure of the public to TACs from new stationary sources in excess of the following thresholds would be considered a significant impact:

- Probability of contracting cancer for the Maximally Exposed Individual (MEI) equals to 10 in one million or more; and
- Ground-level concentrations of non-carcinogenic TACs would result in a Hazard Index equal to 1 for the MEI or greater.

The nearby Sacramento Metropolitan Air Quality Management District (SMAQMD) and Bay Area Air Quality Management District (BAAQMD) also recommend the industry standard thresholds of an increased cancer risk of 10 in one million and a Hazard Index greater than 1 for project-level TAC impacts from stationary sources. Although the YSAQMD has established thresholds for exposure to TACs from new stationary sources, a threshold for exposure of the public to mobile TAC emissions does not currently exist. In the absence of a specified threshold for assessing impacts of mobile sources of TACs on a sensitive land use, the industry standard is to use the stationary source threshold of an increase in cancer risks of 10 in one million and a Hazard Index greater than 1, which is the standard that has been used throughout the State for similar health risk analyses. Off-road construction equipment used during project-related construction activities would be considered a potential mobile source of TAC emissions. Accordingly, the City, as lead agency has selected to use the YSAQMD's stationary source TAC emissions thresholds listed above for the purposes of determining cancer risk of exposing sensitive receptors to construction-related mobile source TAC emissions.

The CARB Handbook provides recommendations for siting new sensitive land uses near existing sources typically associated with significant levels of TAC emissions. However, the California Supreme Court decision in the case of *California Building Industry Association v. Bay Area Air Quality Management District (2015) 62 Cal. 4th 369* clarified that CEQA does not require lead agencies to analyze the impact of existing environmental conditions on a project's future users or residents unless the project will exacerbate the existing environmental hazards or conditions. This limits the CEQA analysis of impacts from existing sources that emit odors and TACs on new receptors from a proposed development project, unless the situation is specifically required to be analyzed by statute (such as a school). While existing sources that emit odors and TACs may not be considered a CEQA impact, local jurisdictions have the authority to protect the public health, safety, and welfare of their communities through their police powers.[23] While not required pursuant to CEQA, in order to address potential public health impacts, the nearby SMAQMD is currently recommending that proposed developments that could expose receptors to existing sources that emit odors and TACs be analyzed and exposure reduced as part of the lead agency's planning process instead. In recognition of the recommendations from the nearby SMAQMD, the City of Davis, as lead agency, has chosen to prepare a full health risk assessment to evaluate the health risks posed to future residents as a result of the project site's proximity to ongoing freeway operations. Detailed analysis and modeling results related to DPM emissions from I-80 operations are included as Appendix E to this EIR.

[23] California Constitution, Article XI, Section 7. Available at: http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=CONS&sectionNum=SEC.%207.&article=XI. Accessed May 2018.

The YSAQMD recommends the use of screening thresholds to assess a project's potential to create an impact through the creation of CO hotspots. A violation of the CO standard could occur if either of the following criteria is true of any street or intersection affected by the mitigated project:[24]

- The project would reduce peak-hour level of service (LOS) on one or more streets or at one or more intersections to an unacceptable LOS (typically LOS E or F); or
- The project would increase a traffic delay by 10 or more seconds on one or more streets or at one or more intersections in the project vicinity where a peak hour LOS of F currently exists.

If either or both of the above criteria are met by the mitigated project, YSAQMD recommends performing a full CO Protocol Analysis. If the results of the CO Protocol Analysis indicate a potential impact related to CO could occur, such as in instances where a project would worsen operations at a signalized intersection operating at LOS E or LOS F, YSAQMD directs Lead Agencies to perform CO dispersion modeling analysis using a modeling program such as CALINE-4. The CALINE-4 dispersion model can estimate local CO concentrations at intersections based on traffic estimates and lane configurations. Once the CO concentrations at affected intersections are estimated, the CO concentration must then be compared to the one hour and eight hour AAQS for CO. If the local CO concentration estimated using CALINE-4 exceeds either the one or eight hour AAQS for the affected intersection, then a significant impact would result; however, if the localized CO concentrations are shown to be below the applicable AAQS, the project would not result in an impact related to localized CO concentrations.

GHG Emissions

The project's impacts related to GHG emissions, global climate change, and energy are addressed in Section 4.3, Greenhouse Gas Emissions and Energy, of this EIR.

Method of Analysis

The analysis protocol and guidance provided by the YSAQMD's *Handbook for Assessing and Mitigating Air Quality Impacts* was used to analyze the proposed project's air quality impacts, including screening criteria and pollutant thresholds of significance. Details regarding the methodology and assumptions used for the proposed project's air quality impact analysis are provided below.

Construction Emissions

The short-term construction emissions related to buildout of the Preferred Site Plan and Alternative B were estimated separately using the California Emissions Estimator Model (CalEEMod) version 2016.3.2 software - a statewide model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify air quality emissions from land use projects. The model applies inherent default values for various land uses, including trip

[24] Yolo-Solano Air Quality Management District. *Handbook for Assessing and Mitigating Air Quality Impacts* [p. 21]. July 11, 2007.

generation rates based on the ITE Manual, vehicle mix, trip length, average speed, etc. However, where project-specific data was available, such data was input into the model. Although the Preferred Site Plan and Alternative B include different site plans, much of the construction information related to the length of the overall construction period, intensity of demolition, and site preparation would remain the same. Therefore, based on information provided by the project applicant and the project engineer, the following assumptions were made for the construction modeling:

- Construction was assumed to commence in January 2019 and would occur over approximately 15 months;
- 53,000 sf of on-site existing structures would be demolished;
- An estimated 3,500 cubic yards of material would be exported during the site preparation phase associated with vegetation and building removal; and
- A total of 7.4 acres would be disturbed during the grading phase.

The results of emissions estimations were compared to the standards of significance discussed above in order to determine the associated level of impact. All CalEEMod modeling results are included in Appendix F to this EIR.

Construction-Related DPM Emissions

As discussed in the Existing Environmental Setting section above, fossil fueled combustion engines, including those used in some pieces of construction equipment release various TACs, including DPM, benzene, formaldehyde, 1,3-butadiene, toluene, xylenes, and acetaldehyde. Although a variety of TACs are emitted by fossil fueled combustion engines, the cancer risk due to DPM exposure represents a more significant risk than the other TACs discussed above.[25] Therefore, the potential health effects resulting from construction activities related to implementation of the proposed project were estimated based on emissions of the TAC with the most significant health risk, DPM, which includes UFPs and is considered a subset of $PM_{2.5}$.

The $PM_{2.5}$ (assumed to encompass both DPM and UFP) concentration associated with short-term construction activities resulting from implementation of the proposed project under the aforementioned construction assumptions, at the maximally exposed sensitive receptor nearest to the site, has been estimated using the American Meteorological Society/Environmental Protection Agency (AMS/EPA) Regulatory Model (AERMOD) dispersion model. The associated cancer risk and non-cancer hazard index were calculated using the CARB's Hotspot Analysis Reporting Program Version 2 (HARP 2) Risk Assessment Standalone Tool (RAST), which calculates the cancer and non-cancer health impacts using the risk assessment guidelines of the 2015 Office of Environmental Health Hazard Assessment (OEHHA) Guidance Manual for Preparation of Health

[25] California Air Resources Board. *Reducing Toxic Air Pollutants in California's Communities*. February 06, 2002.

Risk Assessments.[26] The modeling was performed in accordance with the USEPA's User's Guide for the AMS/EPA Regulatory Model – AERMOD[27] and the 2015 OEHHA Guidance Manual.

The CalEEMod results for average annual unmitigated construction exhaust $PM_{2.5}$ emissions from the most intensive project option, between the Preferred Site Plan and Alternative B, were used to calculate the emission rate applied in AERMOD. Construction activities were assumed to occur seven days per week and restricted to the hours between 7:00 AM and 7:00 PM Monday through Friday and between the hours of 8:00 AM and 8:00 PM Saturdays and Sundays per Chapter 24 of the City's Municipal Code, Noise Regulations. The construction exhaust emissions were modeled in AERMOD as a series of volume sources located throughout the site where improvements are proposed. A receptor grid using flagpole receptors was applied to AERMOD at the surrounding sensitive receptor locations (i.e., Merryhill School, residences opposite the project site across La Vida Way, and residences south of the project site). The AERMOD analysis relied on data from the meteorological station at the Sacramento International Airport, approximately 10 miles northeast of the project site.

The maximum annual average and maximum one-hour average concentrations from AERMOD were applied to HARP 2 RAST to calculate the cancer risk and non-cancer hazard index, respectively, to the maximally exposed resident in the area surrounding the project site. The 2015 OEHHA Guidance Manual recommends that the exposure period for short-term activities involving TAC emissions (i.e., construction activities) lasting more than six months be evaluated for the duration of such activities.

Construction activities related to the proposed project are assumed to occur over approximately 15 months. Considering OEHHA's guidance for exposure periods resulting from short-term activities involving TAC emissions, the exposure period within HARP 2 RAST was set to 1.67 years, with exposure conservatively assumed to occur for 365 days per year. The 2015 OEHHA Guidance Manual recommends that the fraction of time spent at home be used for a residential receptor based on the assumption that exposure at nearby residences is not occurring away from home. However, in addition to residences near the proposed project site, schools and businesses exist in the project area. Therefore, the possibility exists that residents of nearby residences could work or attend school in proximity to the project site, which would result in exposure to pollutants from construction both at the nearby residences and at the nearby school or place of work. Considering the proximity of the project site to the aforementioned uses, the HARP 2 RAST modeling was adjusted to assume that sensitive receptors would be exposed to construction related emissions during a 12-hour per day work period, in compliance with Chapter 24 of the City's Municipal Code, Noise Regulations.

The resultant cancer and non-cancer health risks associated with construction-related DPM emissions were compared to the standards of significance discussed above in order to determine

[26] Office of Environmental Health Hazard Assessment. *Air Toxics Hot Spots Program Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments* [pg. 8-18]. February 2015.

[27] U.S. Environmental Protection Agency. *User's Guide for the AMS/EPA Regulatory Model (AERMOD)*. December 2016.

the associated level of impact. The AERMOD and HARP 2 RAST modeling results are included in Appendix F to this EIR.

Operational Emissions

The proposed project's operational emissions of criteria pollutants were estimated using CalEEMod. Based on the construction information provided by the project applicant, the proposed project is anticipated to be fully operational by 2021. The modeling performed for the proposed project included compliance with YSAQMD rules and regulations (i.e., low-VOC [volatile organic compounds] paints and low-VOC cleaning supplies).

The project-specific trip generation and VMT data provided by KD Anderson & Associates, Inc. for full buildout of the proposed project was also applied to the project modeling.[28] According to Section 4.7, Transportation and Circulation, of this EIR, the daily trip generation rates for both the Preferred Site Plan and the Alternative B Site Plan were determined based on the Davis Travel Demand Model network, and the SACMET Regional Travel Model to estimate project-specific operational VMT. Combining the trip generation rates and VMT estimation allowed for a more accurate estimation of the transportation-related emissions that would result from implementation and operation of either project alternative.

Although the Preferred Site Plan would include 225 total units, the analysis presented within this EIR assumes that the Preferred Site Plan would only include 222 units, a difference of three units. While operation of the three additional units would have the potential to increase emissions of criteria pollutants, such emissions would not be considered a substantial increase from the emissions estimated for operation of a 222 unit project. For instance, as discussed in a Memorandum prepared by KD Anderson & Associates, Inc. regarding the effect of the three additional units on the traffic study prepared for the proposed project, KD Anderson & Associates, Inc. concluded that the three additional units would not be anticipated to result in any substantial changes to the anticipated daily VMT of the proposed project.[29] Considering that mobile emissions sources often comprise the largest source of emissions related to operations of a proposed project, because the addition of three units would not substantially effect project related VMT, the three units would not be anticipated to substantially effect operational emissions from the proposed project. As such, while the analysis of this chapter is based on 222 units being included within the Preferred Site Plan, the inclusion of three additional units would not be considered a substantial and would not have the potential to alter the conclusions presented in this EIR.

The results of emissions estimations were compared to the standards of significance discussed above in order to determine the associated level of impact. All CalEEMod modeling results are included in Appendix F to this EIR.

[28] KD Anderson & Associates, Inc. *Traffic Impact Analysis For 3820 Chiles Road, Davis, CA*. May 1, 2018.
[29] KD Anderson & Associates, Inc. *Memorandum: Unit Increase – 3820 Chiles Road*. May 30, 2018.

Project-Specific Impacts and Mitigation Measures

The following discussion of air quality emissions impacts are based on implementation of the proposed project in comparison to existing conditions and the standards of significance presented above.

4.1-1 Violate any air quality standard or contribute substantially to an existing or projected air quality violation during construction. Based on the analysis below, the impact is *less than significant*.

During construction of either the Preferred Site Plan or Alternative B, various types of equipment and vehicles would temporarily operate on the project site. Construction exhaust emissions would be generated from construction equipment, vegetation clearing and earth movement activities, construction workers' commute, and construction material hauling for the entire construction period. The aforementioned activities would involve the use of diesel- and gasoline-powered equipment that would generate emissions of criteria pollutants. Project construction activities also represent sources of fugitive dust, which includes PM_{10} and $PM_{2.5}$ emissions.

The maximum unmitigated construction emissions have been estimated using CalEEMod for both the Preferred Site Plan and Alternative B, separately. The construction modeling assumptions are described in the Method of Analysis section above. The estimated construction-related emissions for both the Preferred Site Plan and Alternative B are presented separately in Table 4.1-6.

Table 4.1-6
Maximum Unmitigated Project Construction-Related Emissions

Pollutant	Project Emissions	YSAQMD Threshold of Significance
Preferred Site Plan		
ROG	1.82 tons/yr	10 tons/yr
NO_X	4.92 tons/yr	10 tons/yr
PM_{10}	21.54 lbs/day	80 lbs/day
Alternative B		
ROG	1.72 tons/yr	10 tons/yr
NO_X	4.99 tons/yr	10 tons/yr
PM_{10}	21.54 lbs/day	80 lbs/day

Source: CalEEMod, April 2018 (see Appendix F).

As shown in the table, the maximum unmitigated construction-related emissions resulting from implementation of either the Preferred Site Plan or Alternative B would be below the applicable thresholds of significance. Furthermore, emissions from implementation of either the Preferred Site Plan or Alternative B would be would be substantively similar, with only minor differences in total emissions related to implementation of either alternative. Therefore, the construction-related emissions resulting from implementation of either of the proposed project's site plan options would not result in a contribution to the

region's nonattainment status of ozone or PM and would not violate an air quality standard or contribute substantially to an existing or projected air quality violation.

All projects within the YSAQMD, including both the Preferred Site Plan and Alternative B, are required to comply with all YSAQMD rules and regulations for construction, including Rule 2.1 (Control of Emissions), Rule 2.28 (Cutback and Emulsified Asphalts), Rule 2.5 (Nuisance), Rule 2.14 (Architectural Coatings), and Rule 2.11 (Particulate Matter Concentration). The rules and regulations are not readily applicable in CalEEMod and are, therefore, not included in the project-specific modeling. Because compliance with the rules and regulations would likely result in some additional reduction in emissions, construction emissions from either the Preferred Site Plan or Alternative B would likely be slightly reduced from what is presented in Table 4.1-6 due to compliance with the rules and regulations. In addition, recognition of YSAQMD recommendations, the City requires, as a standard Condition of Approval, that all projects implement best management practices to reduce dust emissions and avoid localized health impacts. Best management practices for dust could include, but are not limited to, the following:

- Watering of all active construction sites at least twice daily;
- Maintenance of at least two feet of freeboard in haul trucks;
- Covering of all trucks hauling dirt, sand, or loose materials;
- Application of non-toxic binders to exposed areas after cut and fill operations and hydroseeding of area, as applicable and/or necessary;
- Application of chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days), as applicable and/or necessary;
- Planting of vegetative ground cover in disturbed areas as soon as possible;
- Covering of inactive storage piles;
- Sweeping of streets if visible soil material is carried out from the construction site;
- Treatment of accesses to distance of 100 feet from the paved road with a six- to 12-inch layer of wood chips or mulch; and
- Treatment of accesses to a distance of 100 feet from the paved road with a six-inch layer of gravel.

Compliance with the aforementioned rules and regulations related to construction, as well as implementation of best management practices for dust, would help to minimize emissions generated during construction activities.

Conclusion

Because implementation of either the Preferred Site Plan or Alternative B would result in construction-related emissions below the applicable thresholds of significance and would comply with applicable YSAQMD rules, regulations, and best management practices for dust, construction activities associated with development of the proposed project would result in a ***less-than-significant*** impact to air quality.

Mitigation Measure(s)
None required.

4.1-2 Violate any air quality standard or contribute substantially to an existing or projected air quality violation during operations, and a conflict with or obstruction of implementation of applicable air quality plans. Based on the analysis below, the impact is *less than significant.*

Operational emissions of criteria pollutants would be generated from both mobile and stationary sources during operation of either the Preferred Site Plan or Alternative B. Day-to-day activities, such as future resident vehicle trips to and from the project site, would make up the majority of such operational emissions. Furthermore, emissions would also occur from area sources such as architectural coatings, landscape maintenance equipment exhaust, and consumer products (e.g., deodorants, detergents, hair spray, cleaning products, spray paint, insecticides, floor finishes, polishes, etc.).

As discussed above, due to the nonattainment designations of the area, YSAQMD has developed plans to attain the State and federal standards for ozone and particulate matter. The plans include the 2013 Ozone Attainment Plan, the $PM_{2.5}$ Implementation/Maintenance Plan, and the 2012 Triennial Assessment and Plan Update. Adopted YSAQMD rules and regulations, as well as the thresholds of significance, have been developed with the intent to ensure continued attainment of AAQS, or to work towards attainment of AAQS for which the area is currently designated nonattainment, consistent with applicable air quality plans. Thus, by exceeding the YSAQMD's mass emission thresholds for operational emissions of ROG, NO_X, or PM_{10}, a project would be considered to conflict with or obstruct implementation of the YSAQMD's air quality planning efforts.

The maximum unmitigated operational emissions from both the Preferred Site Plan and Alternative B have been estimated separately using CalEEMod. As discussed in the Method of Analysis section above, the project-specific VMT data provided by KD Anderson & Associates was applied to CalEEMod. The resultant emissions estimated for operation of Preferred Site Plan and Alternative B are presented separately in Table 4.1-7.

Table 4.1-7
Maximum Unmitigated Project Operational Emissions

Pollutant	Project Emissions	YSAQMD Thresholds of Significance
Preferred Site Plan		
ROG	1.39 tons/yr	10 tons/yr
NO_X	2.87 tons/yr	10 tons/yr
PM_{10}	5.42 lbs/day	80 lbs/day
Site Plan B		
ROG	1.23 tons/yr	10 tons/yr
NO_X	2.55 tons/yr	10 tons/yr
PM_{10}	4.73 lbs/day	80 lbs/day

Source: CalEEMod, April 2018 (see Appendix F).

As shown in the table above, maximum unmitigated operational emissions of ROG, NO_X, and PM_{10} from implementation of either the Preferred Site Plan or Site Plan B would be below the applicable YSAQMD thresholds of significance. Accordingly, the proposed project would not violate an air quality standard or contribute substantially to an existing or projected air quality violation. Therefore, the proposed project would be considered to result in a ***less-than-significant*** impact related to air quality.

Mitigation Measure(s)
None required.

4.1-3 Expose sensitive receptors to substantial pollutant concentrations. Based on the analysis below and with the implementation of mitigation, the impact is *less than significant.*

The major pollutants of concern are localized CO emissions and TAC emissions, which are addressed separately in detail below.

Localized CO Emissions

Localized concentrations of CO are related to the levels of traffic and congestion along streets and at intersections. Implementation of the proposed project would increase traffic volumes on streets near the project site; therefore, the project would be expected to increase local CO concentrations. Concentrations of CO approaching the ambient air quality standards are only expected where background levels are high, and traffic congestion levels are high. The YSAQMD's preliminary screening methodology for localized CO emissions provides a conservative indication of whether project-generated vehicle trips would result in the generation of CO emissions that would contribute to an exceedance of AAQS. Per the YSAQMD screening methodology, if either of the following results at any street or intersection affected by a project, after implementation of mitigation,[30] the project has the potential to result in localized CO emissions that could violate CO standards:

- The project would reduce peak-hour level of service (LOS) on one or more streets or at one or more intersections to an unacceptable LOS (typically LOS E or F); or
- The project would increase a traffic delay by 10 or more seconds on one or more streets or at one or more intersections in the project vicinity where a peak hour LOS of F currently exists.

As discussed in Section 4.7 of this EIR, Transportation and Circulation, neither implementation of the Preferred Site Plan or Alternative B would result in increased traffic causing a reduction in peak-hour LOS from acceptable to unacceptable LOS or an increase in traffic delay by more than 10 seconds at an intersection otherwise anticipated to experience a peak hour LOS of F. Therefore, the proposed project would not meet the

[30] Yolo-Solano Air Quality Management District. *Handbook for Assessing and Mitigating Air Quality Impacts* [p. 21]. July 11, 2007. Available at: http://www.ysaqmd.org/documents/CEQAHandbook2007.pdf. Accessed April 2017.

foregoing CO screening thresholds, and, as a result, the increase in traffic related to buildout of either the Preferred Site Plan or Alternative B would not result in excess CO emissions under existing or cumulative traffic conditions.

Consequently, the proposed project is not expected to generate localized CO emissions that would contribute to an exceedance of AAQS nor would the project expose sensitive receptors to substantial concentrations of localized CO.

TAC Emissions

The proposed project would be located near existing sources of TAC emissions, and project construction and operation could involve new emissions of TACs. Potential sources of TAC emissions associated with the proposed project are further addressed below.

Existing Sources of TAC Emissions

The only existing source of TAC emissions in the vicinity of the project site is I-80 to the north. Current operations along I-80 involve TAC emissions, particularly DPM emissions and UFP emissions from the use of diesel-powered and gasoline powered engines. The proposed project would not alter the existing operations associated with I-80, but would involve siting new residential units in proximity to the existing emissions associated with I-80. As discussed previously, the recent California Supreme Court decision in the case of *California Building Industry Association v. Bay Area Air Quality Management District (2015) 62 Cal. 4th 369* clarified that the CEQA does not require lead agencies to analyze the impact of existing environmental conditions on a project's future users or residents unless the project would exacerbate the existing environmental hazards or conditions. The proposed project would not exacerbate the existing emissions associated with I-80. Thus, the analysis of TACs from existing sources is outside of the scope of CEQA and is not included in this section of the EIR. However, the City, as lead agency, has elected to conduct an analysis of the existing source of TACs on future residents of the proposed project. The analysis is included as Appendix E to this EIR.

New Sources of TAC Emissions

The CARB Handbook provides recommendations on siting new sources of TACs near existing sensitive receptors. Operational-related emissions of TACs are typically associated with stationary diesel engines or land uses that involve heavy truck traffic or idling. The residential development proposed as part of either the Preferred Site Plan or Alternative B within the project would not involve long-term operation of any stationary diesel engines or other major on-site stationary source of TACs.

Construction-related activities have the potential to generate concentrations of TACs, specifically DPM, from on-road haul trucks and off-road equipment exhaust emissions. However, construction is temporary and occurs over a relatively short duration in comparison to the operational lifetime of the proposed project. While methodologies for conducting health risk assessments are associated with long-term exposure periods (e.g.,

over a 30-year period), construction activities associated with the proposed project would occur over an approximately 15-month period. Nonetheless, given the project's proximity to existing sensitive receptors, the potential impacts on nearby sensitive receptors associated with DPM from construction activities at the project site has been evaluated.

Although construction of the Preferred Site Plan and Alternative B would result in substantively similar construction emissions, as shown in Table 4.1-6 above, the differences in site plans resulted in slightly different construct emissions estimations. In terms of DPM, construction of the Preferred Site Plan was estimated to result in slightly higher concentrations of DPM than construction of Alternative B. To provide a worst-case scenario for exposure of existing sensitive receptors to construction emissions, emissions from the Preferred Site Plan were used in the analysis of construction health risks. Accordingly, should Alternative B be implemented, emissions and exposure of sensitive receptors to DPM would be anticipated to be slightly lower than the levels presented within this chapter. Further details regarding the construction DPM analysis assumptions are described in the Method of Analysis section above. As described, the increase in cancer risk and non-cancer hazard index was calculated for the maximally exposed individual. Based on the modeling results, the maximum emissions concentration is expected to occur at the residences to the south the project site. Because the project site is in proximity to existing residences and a preschool, which are both considered sensitive receptors, the maximally exposed individual was assumed to be an individual that resides at a residence where the maximum emission concentration would occur and also works at the nearby preschool. Thus, the individual would be exposed to emissions during all hours of construction activity and would represent the worst-case condition.

Based on the construction DPM modeling results, the implementation of the Preferred Site Plan would result in increases in cancer risk and non-cancer hazard index at the maximally exposed resident as shown in Table 4.1-8 below.

Table 4.1-8
Maximum Cancer Risk and Hazard Index Associated with Preferred Site Plan Construction DPM

	Cancer Risk (per million persons)	**Non-Cancer Hazard Index**
At Maximally Exposed Receptor	15.41	0.14
Thresholds of Significance	*10*	*1.0*
Exceed Thresholds?	**YES**	**NO**

Sources: CalEEMod, AERMOD, and HARP 2 RAST, May and July 2018 (see Appendix F).

As shown in Table 4.1-8, implementation of the Preferred Site Plan would result in a hazard index below the applicable YSAQMD threshold of significance. However, the anticipated concentration of DPM due to construction of the proposed project would result in an increased risk of cancer of 15.41 cases per one million persons at the maximally exposed receptor. It should be noted that while construction activity related to implementation of Alternative B would likely be less intense than the activity related to implementation of the Preferred Site Plan, construction of Alternative B is still anticipated to result in a cancer

risk in excess of the YSAQMD's threshold of significance. As a result, buildout of the Preferred Site Plan or Alternative B would exceed the YSAQMD's recommended threshold for increased cancer risk being used for this analysis.

It should be noted that while the above discussion of impacts related to the emission of TACs during construction focuses on DPM, construction activity would result in the limited emission of other pollutants, such as polycyclic aromatic hydrocarbons, benzene, formaldehyde, acetaldehyde, acrolein, 1,3-butadiene, and toluene. However, the CARB has determined the most significant health risk posed by diesel powered engines is DPM,[31] which has a cancer risk potency factor that is an order of magnitude higher than the next most significant TAC, benzene.[32] As such, estimation of the potential human health risk from construction-related DPM represents the majority of potential health risks that could result from implementation of the proposed project and any potential health risk from other TACs would be much lower than the health risk posed by DPM emissions.

Construction Related Emission of Asbestos or Lead

As discussed in the Initial Study prepared for the proposed project (see Appendix C), given the age of the existing structure, asbestos containing material (ACM) and lead-based paint (LBP) may be present within the existing structure. When airborne, both asbestos and lead are considered TACs. Thus, demolition of the existing structure would have the potential to emit TACs, should ACM or LBP be present within the existing structure. However, the Initial Study prepared for the proposed project included Mitigation Measure VIII-1, which requires that demolition of the existing structure comply with all federal, State, YSAQMD, and local regulations regarding LBP and ACMs. Compliance with Mitigation Measure VIII-1 would ensure that construction activity resulting from implementation of the proposed project would not result in the emission of asbestos or lead.

Conclusion

Based on the above analysis, construction activities related to the proposed project would have the potential to result in DPM concentrations that could result in an increased cancer risk for nearby residents in excess of the applicable threshold of significance. Therefore, the proposed project would have the potential to result in the exposure of sensitive receptors to substantial concentrations of DPM, and a ***significant*** impact would result.

Mitigation Measure(s)

Implementation of the following mitigation measure for both the Preferred Site Plan and Alternative B would reduce the construction-related exhaust emissions of $PM_{2.5}$ as shown

[31] California Air Resources Board. *Reducing Toxic Air Pollutants in California's Communities*. February 06, 2002.

[32] Ralph Propper, Patrick Wong, Son Bui, Jeff Austin, William Vance, Alvaro Alvarado, Bart Croes, and Dongmin Luo. Environmental Science & Technology, 49 (19), 11329-11339, DOI: 10.1021/acs.est.5b02766. *Ambient and Emission Trends of Toxic Air Contaminants in California*. 2015.

in Table 4.1-9.[33] Because emissions of $PM_{2.5}$ are a metric for DPM emissions, and DPM emissions are the TAC of concern, by reducing $PM_{2.5}$ emissions to the levels presented in Table 4.1-9, the mitigation below would reduce the anticipated DPM concentration and the associated cancer risk at the maximally exposed receptor.[34]

Table 4.1-9
Preferred Site Plan Construction Exhaust $PM_{2.5}$ Emissions

Year	Unmitigated (Tons/yr)	Mitigated[1] (Tons/yr)
2019	0.2462	0.0125
2020	0.0167	0.00092

[1] The use of EPA Tier 4 engines was applied to all construction equipment used on the project site in this modeling scenario. Tier 4 engines reduce the amount of PM emissions, including DPM, from equipment.

Source: CalEEMod, May 2018 (Appendix F)

With implementation of the following mitigation measure, the cancer risk at the maximally exposed receptor associated with the proposed project's construction activity would be reduced from an increase of 15.41 cases in one million persons to an increase of 4.72 cases in one million persons, which would be below the applicable threshold of significance of an increase of 10 cases in one million persons. Therefore, implementation of the following mitigation measure would reduce the above impact to a *less-than-significant* level.

4.1-3 *Prior to approval of any grading plans, the project applicant shall show on the plans via notation that the contractor shall ensure that all off-road diesel-powered equipment over 25 horsepower to be used in the construction of the project (including owned, leased, and subcontractor equipment) shall meet California Air Resources Board (CARB) Tier 4 emissions standards or cleaner. The plans shall be submitted for review and approval to the Department of Community Development and Sustainability. In addition, all off-road equipment working at the construction site must be maintained in proper working condition according to manufacturer's specifications. Idling shall be limited to 5 minutes or less in accordance with the Off-Road Diesel Fueled Fleet Regulation as required by CARB.*

Portable equipment over 50 horsepower must have either a valid District Permit to Operate (PTO) or a valid statewide Portable Equipment Registration Program (PERP) placard and sticker issued by CARB.

Idling shall be limited to five minutes or less for all on-road related and/or delivery trucks in accordance with CARB's On-Road Heavy-Duty Diesel

[33] Environmental Protection Agency of New South Wales. *Reducing Emissions from Non-road Diesel Engines* [pg. 16]. Available at: http://www.epa.nsw.gov.au/resources/air/140586NonrdDiesInfoRpt.pdf. Accessed May 26, 2017.

[34] California Environmental Protection Agency. *Overview: Diesel Exhaust and Health*. Available at: https://www.arb.ca.gov/research/diesel/diesel-health.htm. Accessed February 2017.

Vehicles (In-Use) Regulation. Clear Signage regarding idling restrictions should be placed at the entrances to the construction site.

Cumulative Impacts and Mitigation Measures

A project's criteria pollutant emissions may be individually limited, but cumulatively considerable when taken in combination with past, present, and future development projects. The geographic context for the proposed project's cumulative air quality analysis includes the City of Davis and surrounding areas within the SVAB.

4.1-4 Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors). Based on the analysis below, the project's incremental contribution to this significant cumulative impact is *less than cumulatively considerable.*

The proposed project is within an area currently designated as nonattainment for Ozone, PM_{10}, and $PM_{2.5}$. By nature, air pollution is largely a cumulative impact. Thus, the proposed project, in combination with other proposed and pending projects in the region would significantly contribute to air quality effects within the SVAB, resulting in an overall significant cumulative impact. However, any single project is not sufficient enough in size to, alone, result in nonattainment of AAQS. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's contribution to the cumulative impact is considerable, then the project's incremental impact on air quality would be considered significant. In developing thresholds of significance for air pollutants, YSAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds that project's emissions would be cumulatively considerable, resulting in a significant adverse air quality impact to the region's existing air quality conditions.

Implementation of either the Preferred Site Plan or Alternative B would result in construction-related and operational emissions below YSAQMD's thresholds of significance, as presented under Impacts 4.2-1 and 4.2-2. Therefore, based on the project's consistency with YSAQMD's thresholds of significance, the proposed project would not be anticipated to result in an incrementally significant contribution to the cumulatively significant impact.

The YSAQMD is part of the SFNA for ozone. The YSAQMD, in concert with other air districts within the SFNA, has adopted a regional 8-hour Ozone Attainment and Regional Further Progress Plan to demonstrate the region's attainment of the 2008 federal ozone standard. The plan relies on growth estimates provided by SACOG and included in the MTP/SCS. Growth forecasts within the MTP/SCS are based on growth estimates from general plans for cities and counties within the SACOG area. Using such general plan estimates, the MTP/SCS identified growth forecasts for the SACOG region, and identified

the project site as within an Established Community that would experience a range of low to high density residential, commercial, office, and industrial uses.[35] The proposed project includes a requested entitlement for a General Plan Land Use Amendment from General Commercial to Residential High Density, or, under Alternative B, Residential High Density and Residential Medium Density. Although the proposed project includes a request for redesignation of the project site, the proposed development would fall within SACOG's growth estimates for Established Communities within the City of Davis. Thus, development of the proposed project would not exceed the growth estimates anticipated within the regional 8-hour Ozone Attainment and Regional Further Progress Plan, and both site plans included in the proposed project would be considered consistent with the overall goals within SACOG's MTP/SCS. The MTP/SCS integrates land use and transportation planning to achieve improvements in air quality through a reduction in the use of single-passenger vehicles. Thus, the proposed project would result in operational emissions below YSAQMD's thresholds, while also contributing to regional air quality emission reductions related to implementation of the MTP/SCS. Therefore, the proposed project's incremental contribution to cumulative regional air quality impacts would be ***less than cumulatively considerable***.

Mitigation Measure(s)
None required.

[35] Sacramento Area Council of Governments. *2016 Metropolitan Transportation Plan Sustainable Communities Strategy* [Appendix E-3, pg. 148]. February 18, 2016.