5.3 - Air Quality

5.3.1 - Introduction

This section describes the potential impacts on air quality resulting from the North Fork Village-1 (NFV-1) project. Information contained herein summarizes the air quality modeling data prepared by Michael Brandman Associates in 2006. The air quality analysis is based on the information and guidelines provided by the San Joaquin Valley Unified Air Pollution Control District (District) in their Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI), 2002 and the Technical Document, Guide for Assessing and Mitigating Air Quality Impacts, 2002. The modeling data is included in Appendix B, Air Quality/Noise, of this document, and incorporated in this section by reference.

Rio Mesa Area Plan and EIR

The RMAP identified policies for land use, circulation, and community design that promote air quality objectives of the County and District. The RMAP EIR analyzed local and regional air quality impacts resulting from RMAP implementation, and included an extensive list of mitigation measures to reduce local and regional air emissions. The EIR identified the direct and cumulative air quality impacts of RMAP implementation as significant and unavoidable.

5.3.2 - Existing Conditions

The project site is located in Madera County, which is in the San Joaquin Valley (SJV). The climate in the SJV area is classified as Mediterranean, with mild, wet winters and warm dry summers. The major climatic controls are the Pacific High Pressure System over the eastern Pacific Ocean and the local topography. The formation of a high-pressure area over the Great Basin Region to the east of the Sierra Nevada also affects the meteorology of the SJV area, primarily during the winter months.

The California Air Resources Board (CARB) has divided California into regional air basins according to topographic air drainage features. The San Joaquin Valley Air Basin (SJVAB), which is approximately 250 miles long and averages 35 miles wide, is the second largest air basin in the state. Air pollution is directly related to a region's topographic features. The SJVAB is defined by the Sierra Nevada mountains in the east (8,000 to 14,000 feet in elevation), the Coast Ranges in the west (averaging 3,000 feet in elevation), and the Tehachapi mountains in the south (6,000 to 8,000 feet in elevation). The valley is flat with a slight downward gradient to the northwest. The valley opens to the sea at the Carquinez Straits where the San Joaquin-Sacramento Delta empties into San Francisco Bay. The SJV, thus, could be considered a "bowl" open only to the north.

Although marine air generally flows into the basin from the San Joaquin River Delta, the region's topographic features restrict air movement through and out of the basin. The Coastal Range hinders wind access into the SJV from the west, the Tehachapi's prevent southerly passage of airflow, and the high Sierra Nevada range is a significant barrier to the east. These topographic features result in weak airflow, which becomes blocked vertically by high barometric pressure over the SJV. As a

result, the SJVAB is highly susceptible to pollutant accumulation over time. Most of the surrounding mountains are above the normal height of summer inversion layers (1,500-3,000 feet).

Local Climatology

Local climatological effects, including wind speed and direction, temperature, inversion layers, and precipitation and fog, can exacerbate the air quality problem in the SJVAB.

Wind Speed and Direction

Wind speed and direction play an important role in dispersion and transport of air pollutants. Wind at the surface and aloft can disperse pollution by mixing vertically and by transporting it to other locations. Ozone is classified as a "regional" pollutant in part because of the time required for ozone formation. Ozone precursors can be transported well away from the source area before ozone concentrations peak. Respirable particulate matter (PM_{10}) is also considered a regional pollutant in part because of its tendency to remain suspended in the air over long periods. Some other primary pollutants, for example, carbon monoxide (CO), are classified as "localized" pollutants in part because they tend to dissipate easily and therefore may form high concentrations when wind speed is low.

During the summer, wind speed and direction data indicate that summer wind usually originates at the north end of the SJV and flows in a south-southeasterly direction through the SJV, through Tehachapi pass, into the Southeast Desert Air Basin.

During the winter, wind speed and direction data indicate that wind occasionally originates from the south end of the SJV and flows in a north-northwesterly direction. Also during the winter months, the SJV experiences light, variable winds, less than 10 mph. Low wind speeds, combined with low inversion layers in the winter; create a climate conducive to high CO and PM_{10} concentrations.

Superimposed on this seasonal regime is the diurnal wind cycle. In the SJV, this cycle takes the form of a combination of sea breeze-land breeze and mountain-valley regimes. The sea breeze-land breeze regime has a sea breeze flowing into the SJV from the north during the day and a land breeze flowing out of the SJV at night. The mountain-valley regime has an upslope (mountain) flow during the day and a downslope (valley) flow at night. These phenomena add to the complexity of regional wind flow and pollutant transport within the SJVAB.

Temperature

Temperature and solar radiation are particularly important in the chemistry of ozone formation. Ozone is formed in a photochemical reaction requiring sunlight. Generally, the higher the temperature, the more ozone formed, since reaction rates increase with temperature. However, extremely hot temperatures can "lift" or "break" the inversion layer. Typically, if the inversion layer does not lift to allow the build up of contaminants to be dispersed into the Southeast Desert, the ozone levels will peak in the late afternoon, sometimes as late as 3 to 7 PM. If the inversion layer breaks and the resultant afternoon winds occur, the ozone will peak in the early afternoon and decrease in the

late afternoon as the contaminants are transported to the Southeast Desert. Temperature is not as important to formation of high CO or PM_{10} levels.

Whereas the SJVAB has an "inland Mediterranean" climate averaging over 260 sunny days per year. The project site is characterized by period of record historical climate information from the weather station located approximately two miles south at Friant Government Camp,[1] where the average monthly high temperature in the summer is 97.2 degrees Fahrenheit (°F), in the winter is 57.5 °F. The average monthly low temperature is 58.4 °F in the summer and 37.5 °F in the winter.

In winter, as the cyclonic storm track moves southward, the storm systems moving in from the Pacific Ocean bring a decidedly maritime influence to the SJV. The high mountains to the east prevent the cold, continental air masses of the interior from influencing the valley. Thus, winters are mild and humid. Temperatures below freezing are unusual. Average high temperatures in the winter are in the 50s, but highs in the 30s and 40s can occur on days with persistent fog and low cloudiness. The average daily low temperature is 45 ºF.

Temperature Inversions

The vertical dispersion of air pollutants in the SJV is limited by the presence of persistent temperature inversions. Because of expansional cooling of the atmosphere, air temperature usually decreases with altitude. A reversal of this atmospheric state, where the air temperature increases with height, is termed an inversion. Inversions can exist at the surface, or at any height above the ground. The height of the base of the inversion is known as the "mixing height." This is the level to which pollutants can mix vertically. Semi-permanent systems of high barometric pressure fronts frequently establish themselves over the SJVAB, deflecting low-pressure systems that might otherwise bring cleansing rain and winds.

Air above and below the inversion base does not mix because of differences in air density. Warm air above the inversion is less dense than below the base. The inversion base represents an abrupt density change where little exchange of air occurs. This phenomenon is similar to that of the abrupt density change that separates skim and whole milk. Inversion layers are significant in determining ozone formation and CO and PM_{10} concentrations. Ozone and its precursors will mix and react to produce higher concentrations under an inversion, and inversions trap and hold directly emitted pollutants such as CO. PM_{10} is both directly emitted and created in the atmosphere as a chemical reaction. Concentration levels are directly related to inversion layers due to the limitation of mixing space. There are two principal types of inversions that occur in the SJV: a surface or radiation inversion, and a subsidence inversion.

Surface inversions are formed when the ground surface becomes cooler than the air above it during the night. The earth's surface goes through a radiative process on clear nights, where heat energy is

[1] Data from the Western Regional Climate Center's Historical Climate Data. Available at www.wrcc.dri.edu/climatedata.html.

transferred from the ground to a cooler night sky. As the earth's surface cools during the evening hours, the air directly above it also cools, while air higher up remains relatively warm. The inversion is destroyed when heat from the sun warms the ground, which in turn heats the lower layers of air: this heating stimulates the ground-level air to float up through the inversion layer. Daytime temperature inversions during the summer are usually encountered 2,000 to 2,500 feet above the valley floor. Inversions are more persistent (stable) during the winter months. The daily cycle has overnight inversions occurring 500 to 1,000 feet above the valley floor.

Subsidence inversions occur as air is pushed downward by some mechanism, such as the movement of air over mountain ranges, or by differential pressure changes in the atmosphere. As this air moves downward, its pressure increases, causing its temperature to increase. The warm layer of air created by this phenomenon will descend to some relatively static elevation above the ground, creating a low inversion layer. This type of inversion is quite persistent, since heat from the ground does not reach the inversion base to break it up. This is common in high-pressure areas along the coast.

Precipitation and Fog

Precipitation and fog tend to reduce or limit some pollutant concentrations. Ozone needs sunlight for its formation, and clouds and fog block the required radiation. CO is slightly water-soluble so precipitation and fog tends to reduce CO concentrations in the atmosphere. PM_{10} is somewhat washed from the atmosphere with precipitation.

Precipitation in the SJV is strongly influenced by the position of the semi-permanent subtropical high-pressure belt located off the Pacific coast (Pacific High). In the winter, this high-pressure system moves southward, allowing Pacific storms to move through the SJV. These storms bring in moist, maritime air that produces considerable precipitation on the western, upslope side of the Coast Ranges. Significant precipitation also occurs on the western side of the Sierra Nevada. On the valley floor, however, there is some downslope flow from the Coast Ranges and the resultant evaporation of moisture from associated warming results in a minimum of precipitation. Nevertheless, the majority of the precipitation falling in the SJV is produced by those storms during the winter. Precipitation during the summer months is in the form of convective rain showers and is rare. It is usually associated with an influx of moisture into the SJV through the San Francisco area during an anomalous flow pattern in the lower layers of the atmosphere. Although the hourly rates of precipitation from these storms may be high, their rarity keeps monthly totals low.

Precipitation on the SJV floor and in the Sierra Nevada decreases from north to south. Stockton in the north receives about 20 inches of precipitation per year, Fresno in the center, receives about 10 inches per year, and Bakersfield at the southern end of the valley receives less than 6 inches per year. This is primarily because the Pacific storm track often passes through the northern part of the state while the southern part of the state remains protected by the Pacific High. Since 1971, precipitation at the Friant Government Camp, annually averaged 14.67 inches with 88 percent of the precipitation occurring between November and April.

The winds and unstable air conditions experienced during the passage of storms result in periods of low pollutant concentrations and excellent visibility. Between winter storms, high pressure and light winds allow cold moist air to pool on the SJV floor. This creates strong low-level temperature inversions and very stable air conditions and leads to the SJV's famous Tule Fogs. The formation of natural fog is caused by local cooling of the atmosphere until it is saturated (dew point temperature). This type of fog, known as radiation fog is more likely to occur inland. Cooling may also be accomplished by heat radiation losses or by horizontal movement of a mass of air over a colder surface. This second type of fog, known as advection fog, generally occurs along the coast.

Conditions favorable to fog formation are also conditions favorable to high concentrations of CO and PM_{10}. Ozone levels are low during these periods because of the lack of sunlight to drive the photochemical reaction. Maximum CO concentrations tend to occur on clear, cold nights when a strong surface inversion is present and large numbers of fireplaces are in use. A secondary peak in CO concentrations occurs during morning commute hours when a large number of motorists are on the road and the surface inversion has not yet broken.

The water droplets in fog, however, can act as a sink for CO and nitrogen oxides (NO_X), lowering pollutant concentrations. At the same time, fog could help in the formation of secondary particulates such as ammonium sulfate. These secondary particulates are believed to be a significant contributor of winter season violations of the PM_{10} and $PM_{2.5}$ standards.

Baseline Emission

The site has historically been used for cattle ranching. Dirt trails, water tanks, and water wells exist onsite. Air emissions associated with cattle include ammonia, methane, and fugitive dust. There are also existing, unpaved ranch roads on the project site that experience limited traffic. To provide the most conservative approach, these existing emissions have not been quantified and subtracted from project emissions.

Sensitive Receptors

Sensitive receptors are facilities that "house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Hospitals, schools, convalescent facilities, and residential areas are examples of sensitive receptors" (GAMAQI 2002). The NFV-1 project is located in a rural area with no existing sensitive receptors nearby.

Regional Ambient Air Quality

The California Air Resources Board (ARB) and local air districts operate a regional monitoring network that measures the ambient concentrations of the six criteria pollutants. The major pollutants of concern in the project area are ozone, CO, and particulate matter. Existing and probable future levels of air quality in the project area can generally be inferred from ambient air quality measurements conducted by the District and CARB at their monitoring stations. There are two monitoring stations within 15-miles of the project site. The closest site (13 miles south of the project site) is in Clovis on North Villa Road. The Clovis station monitors CO, ozone, PM_{10}, and $PM_{2.5}$.

Approximately 15 miles southwest of the project site is a monitoring station located on Chennault Avenue in Fresno that monitors CO and ozone. It should be noted that CO is a localized pollutant, consequently, concentrations measured in Fresno and Clovis would not be representative of the CO concentrations at the project site. Table 5.3-1 provides the latest three-year summary of monitoring data[2] for ozone, CO, PM_{10}, and $PM_{2.5}$ from these monitors and compares those data to the National Ambient Air Quality Standard (NAAQS) and the California Ambient Air Quality Standard (CAAQS).

Table 5.3-1: Regional Ambient Air Quality 2003-2005

Pollutant (Location)	CAAQS	NAAQS	2003	2004	2005
Ozone (Clovis)					
Highest 1-Hour Average (ppm)	0.09	0.12	**0.131**	**0.126**	**0.127**
Highest 8-Hour Average (ppm)		0.08	**0.105**	**0.103**	**0.096**
Days > State 1-Hour Standard			43	18	32
Days > Federal 1-Hour Standard			1	1	1
Days > Federal 8-Hour Standard			30	4	15
Ozone (Fresno)					
Highest 1-Hour Average (ppm)	0.09	0.12	**0.130**	**0.111**	**0.129**
Highest 8-Hour Average (ppm)		0.08	**0.112**	**0.095**	**0.103**
Days > State 1-Hour Standard			35	16	22
Days > Federal 1-Hour Standard			1	0	2
Days > Federal 8-Hour Standard			32	12	12
Carbon Monoxide (Clovis)					
Highest 8-Hour Average (ppm)	9.0	9	2.18	1.70	2.30
Days > Federal and/or State 8-Hour Standard			0	0	0
Carbon Monoxide (Fresno)					
Highest 8-Hour Average (ppm)	9.0	9	1.68	2.19	1.21
Days > Federal and/or State 8-Hour Standard			0	0	0
PM_{10} (Clovis)					
Highest State 24-Hour Average ($\mu g/m^3$)	50		**78**	**61**	**90**
Highest Federal 24-Hour Average ($\mu g/m^3$)		150	79	63	87
Days > State Standard			10	5	11
Days > Federal Standard			0	0	0
National Annual Average		50	36.3	31.4	33.5

[2] Data from CARB's California Air Quality Data web page at www.arb.ca.gov/aqd/aqdpage.htm

Table 5.3-1 (Cont.): Regional Ambient Air Quality 2003-2005

Pollutant (Location)	CAAQS	NAAQS	2003	2004	2005
State Annual Average	20		N/A	N/A	**33.8**
$PM_{2.5}$ (Clovis)					
Highest Federal 24-Hour Average		65	51.2	62.5	**77**
Days > Federal Standard			0	0	2
National Annual Average		15	N/A	**16.4**	**16.4**
State Annual Average	12		N/A	**16.4**	N/A

Notes:
The number of days that at least one measurement was greater than the level of the state or national standard is not necessarily the number of violations of the standard for the year since the hourly and eight-hour standards can be violated more than once per day.
1-hour federal ozone standard was in effect for these three monitoring years, even though it is now inapplicable
ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter
Bold = exceeds standard

When interpreting the data presented in Table 5.3-1, it is essential to understand the difference between an exceedance and a violation. An exceedance is any concentration that is higher than the level of the standard. In contrast, violations are a subset of the exceedances. A violation is any exceedance that is not affected by a highly irregular or infrequent event, and therefore, cannot be excluded from the area designation process. An area is designated as nonattainment for a pollutant if air quality data show that a State standard for the pollutant was violated at least once during the previous three calendar years. As explained above, exceedances that are affected by highly irregular or infrequent events are not considered violations of a State standard and are not used as a basis for designating an area as nonattainment.

Regulatory Setting

Air pollutants are regulated at the federal, state, air basin, and local level; each agency has a different degree of control. The United States Environmental Protection Agency (EPA) regulates at the federal level. CARB regulates at the state level. The District regulates at the air basin level.

Federal and State Regulatory Agencies

EPA handles global, international, national, and interstate air pollution issues and policies. EPA sets federal vehicle and stationary source emission standards, oversees approval of all State Implementation Plans (SIP), provides research and guidance in air pollution programs, and sets National Ambient Air Quality Standards (NAAQS), also known as federal standards. There are NAAQS for six common air pollutants, called criteria air pollutants, which were assigned resulting provisions of the Clean Air Act. The six criteria pollutants are ozone; particulate matter, both respirable (PM_{10}) and fine ($PM_{2.5}$), nitrogen dioxide, CO, lead, and sulfur dioxide. EPA is the regulatory authority charged with the enforcing the NAAQS.

CARB has overall responsibility for statewide air quality maintenance and air pollution prevention. The SIP for the State of California is administered by CARB. A SIP is a document prepared by each state describing existing air quality conditions and measures that will be taken to attain and maintain NAAQS. CARB also administers California Ambient Air Quality Standards (CAAQS), or state standards, for the ten air pollutants designated in the California Clean Air Act. The ten state air pollutants include the six federal criteria pollutants previously listed and, additionally, visibility reducing particulates (VRP), hydrogen sulfide, sulfates, and vinyl chloride. The criteria pollutants and the applicable CAAQS and NAAQS are displayed in Table 5.3-2. These standards establish the context for local air quality management plans. CARB is also responsible for providing technical support to California's 35 local air districts, overseeing local air district compliance with State and Federal law, approving local air plans, and submitting the SIP to the EPA. CARB also regulates mobile emission sources in California, such as construction equipment, trucks, and automobiles.

Table 5.3-2: State and Federal Ambient Air Quality Standards

Air Pollutant	Averaging Time	California Standard	National Standard	Most Relevant Effects
Ozone (O3)	1 Hour 8 Hour	0.09 ppm 0.070 ppm	— 0.08 ppm	(a) Short-term exposures: (1) Pulmonary function decrements and localized lung edema in humans and animals. (2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; (d) Property damage
Carbon Monoxide (CO)	1 Hour 8 Hour	20 ppm 9.0 ppm	35 ppm 9 ppm	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses
Nitrogen Dioxide (NO_2)	1 Hour Mean	0.25 ppm —	— 0.053 ppm	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration
Sulfur Dioxide (SO_2)	1 Hour 24 Hour Mean	0.25 ppm 0.04 ppm —	— 0.14 ppm 0.030 ppm	(a) Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma

Table 5.3-2 (Cont.): State and Federal Ambient Air Quality Standards

Air Pollutant	Averaging Time	California Standard	National Standard	Most Relevant Effects
Particulate Matter (PM_{10})	24 Hour Mean	50 µg/m^3 20 µg/m^3	150 µg/m^3 —	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; (b) Excess seasonal declines in pulmonary function, especially in children; (c) Increased risk of premature death from heart or lung diseases in elderly
Particulate Matter ($PM_{2.5}$)	24 Hour Mean	— 12 µg/m^3	35 µg/m^3 15 µg/m^3	
Sulfates	24 Hour	25 µg/m^3	—	(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) Property damage
Lead	30-day Quarter	1.5 µg/m^3 —	— 1.5 µg/m^3	(a) Increased body burden; (b) Impairment of blood formation and nerve conduction
Visibility Reducing Particles	Extinction coefficient greater than 0.23 kilometers		—	Visibility impairment (reduces visual range to less than 10 miles) on days when relative humidity is less than 70 percent, 8-hour average (10am - 6pm)

ppm = parts per million (concentration) µg/m^3 = micrograms per cubic meter
Mean = Annual Arithmetic Mean 30-day = 30-day average
Quarter = Calendar quarter.
Source: South Coast Air Quality Management District, 2003 Air Quality Management Plan. California Air Resources Board, Ambient Air Quality Standards, 2006.

San Joaquin Valley Air Pollution Control District (District)

The county or regional air districts are primarily responsible for regulating stationary emission sources at industrial and commercial facilities within their geographic area and for preparing the air quality plans that are required under the Federal Clean Air Act (FCAA) and California Clean Air Act (CCAA). The District is one of 35 districts established to protect air quality in California. Its jurisdiction is the western portion of Kern County and the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, and Tulare.

Air Quality Attainment Plans

For purposes of reaching attainment of the state and national air quality standards, the Extreme Ozone Attainment Demonstration Plan (Extreme OADP) and the 2003 PM10 Plan were published by the District and approved by CARB and the EPA. The Extreme OADP was prepared to fulfill the requirements of the Clean Air Act to attain the federal 1-hour ozone ambient air quality standards in the SJVAB by November 15, 2010. It identified control measures needed to reduce emissions and projects future air quality with implementation of those controls. Even though the 1-hour federal ozone standard was officially revoked June 15, 2005, applicable requirements in effect as of June 15, 2004 continue to apply under the anti-backsliding provisions of the Phase I rule implementing the federal 8-hour ozone standard. The District and CARB continue to implement the control measures needed to achieve emission reductions. The District has implemented some of the control measures as listed in the Extreme OADP as rules. The rules applicable to this project are identified below. The

emissions associated with vehicular traffic (mobile sources) are not subject to the District's permit requirements because mobile source emissions are regulated by the State; however, the District is responsible for overseeing efforts to improve air quality within the SJVAB.

The goal of the 2003 PM10 Plan is for the SJVAB to achieve the NAAQS for PM_{10}. The plan is designed to meet the requirements of the federal Clean Air Act and contains measures needed to attain the NAAQS at the earliest possible date. The document proposes many different types of control strategies for PM_{10}. According to the 2003 PM10 Plan, the control strategies are a collective effort between EPA, CARB, the District, and local government agencies. EPA is responsible for federal motor vehicles, certain off-road engines, trains, planes, ships, and fuel regulations. CARB regulates California vehicles, fuels, and consumer products. The District regulates stationary sources and has limited authority to implement transportation control measures and indirect source control programs. The local agencies possess authority to regulate land use, to implement transportation control measures, and to use their budget authority to implement measures that reduce emissions directly.

District Rules Applicable to Project

The District's Fugitive Dust Control rules contained in Regulation VIII are listed below.

- Rule 8011 (General Requirements) explains details of Regulation VIII.
- Rule 8021 (Construction, Demolition, Excavation, Extraction, And Other Earthmoving Activities)
- Rule 8031 (Bulk Materials)
- Rule 8041 (Carryout and Trackout)
- Rule 8061 (Paved and Unpaved Roads) On any unpaved road segment with 26 or more AADT, the owner/operator shall limit VDE to 20 percent opacity and comply with the requirements of a stabilized unpaved road by application and/or reapplication/maintenance of at least one of the following control measures, or shall implement an APCO-approved Fugitive PM_{10} Management Plan as specified in Rule 8011 (General Requirements): watering; uniform layer of washed gravel; chemical/organic dust stabilizers/suppressants in accordance with the manufacturer's specifications; roadmix; paving; any other method that can be demonstrated to the satisfaction of the APCO that effectively limits VDE to 20 percent opacity and meets the conditions of a stabilized unpaved road.

Rules that require project compliance include, but are not limited to the following:

- Rule 4101 (Visible Emissions) This rule prohibits emissions of visible air contaminants to the atmosphere and applies to any source operation that emits or may emit air contaminants. The applicant will be required to contact the District's Small Business Assistance Office for more information and instructions.

- Rule 4102 (Nuisance) applies to any source that emits or may emit air contaminants or other materials. In the event that the project or construction of the project creates a public nuisance, it could be in violation and be subject to District enforcement action.
- Rule 4601 (Architectural Coatings) limits volatile organic compounds from architectural coatings. This rule specifies architectural coatings storage, clean up, and labeling requirements.
- Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations)
- Rule 4902 limits emission of NO_X from residential water heaters.
- Rule 9510 (Indirect Source Review) requires that construction and operational emissions be mitigated by certain percentages on-site or by the payment of off-site emission reduction fees. The purposes of this rule are to: 1) fulfill the District's emission reduction commitments in the PM_{10} and Ozone Attainment Plans; 2) achieve emission reductions from the construction and use of development projects through design features and on-site measures; and 3) provide a mechanism for reducing emissions from the construction of and use of development projects through off-site measures. The rule applies to the proposed project because the project will have over 50 residential units and over 2,000 square feet of commercial space (Section 2.0 of Rule 9510). The District indicated that this rule would not apply to onsite fugitive dust generated from unpaved roads and construction on the project site. However, it would apply to the other sources of air emissions.
- Rule 3180 (Air Impact Assessment Application Fee) is to cover the District's costs for administering the requirements of Rule 9510.

District Guidance

The District prepared a Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI 2002). The GAMAQI is an advisory document that provides lead agencies, consultants, and project applicants with guidance and uniform procedures for addressing air quality in environmental documents. It recommends thresholds for determining significant impacts, discusses methodologies for estimating project emissions and impacts, and identifies mitigation measures that can be used to avoid or reduce air quality impacts. The GAMAQI is used in this analysis where appropriate.

Madera County Guidance

The Madera County General Plan Policy Document[3] (1995) Appendix B provides a compilation of policies and implementation programs located in various sections of the General Plan Policy Document that address air quality implication of transportation and development. This list of policies is included in its entirety in Appendix B, Air Quality/Noise and summarized below:

[3] Madera County General Plan Policy Document, Madera County, October 24, 1995

Land Use

The intent of these policies is that new development be centered in existing communities and designated new growth areas. Infill development and development contiguous to existing cities and unincorporated communities is encouraged. Higher density residential areas are to be located along major transportation corridors and transit routes, and residential subdivisions to be designed to provide well-connected internal and external street, bikeway, and pedestrian systems.

New commercial development should be designed to facilitate pedestrian circulation within and between commercial sites and nearby residential areas. New industrial development should have adequate infrastructure and services, convenient connections to regional transportation, adequate buffering from residential areas, and should be able to mitigate impacts on views, recreation areas, and the environment.

Planning for land use, infrastructure, and public facilities should be coordinated between the County cities, regional planning agencies, neighboring jurisdictions, and state and federal agencies. The County will encourage employment-generating uses in areas near existing and designated residential development, and support development and retention of primary wage-earner jobs within Madera County, to provide an alternative to commuting to Fresno.

Transportation and Circulation

The County will promote a balanced transportation system that provides alternatives to the automobile, including expanded transit, passenger rail, bikeways, and trails. Facilities to promote convenient transfers between travel modes will be provided, and coordinated agency planning for transit will be promoted. Transportation Control Measures (TCM) that increase average vehicle occupancy and divert automobile trips to alternative modes will be encouraged. Planning and funding for transit and improved passenger rail service are among the priorities.

The County will work with cities and neighboring jurisdictions to coordinate planning and development of the County's bikeways and multi-purpose trails. Schools should be located in areas with safe pedestrian and bicycle access. New bikeways should be linked with other bikeways, bicycle rest stops, and parks to provide safe and continuous bike routes, including routes along state highways that are separated from automobile traffic.

Transportation and traffic impacts studies for large new developments and large traffic generators will be required. The County shall work with other responsible agencies, including the Madera County Transportation Commission and the San Joaquin Valley Unified Air Pollution Control District, to develop other measures to reduce vehicular travel demand and meet air quality goals.

Agency Coordination and Review of New Developments

The County will encourage project proponents to consult early in the planning process regarding the applicability of countywide indirect and areawide source programs and transportation control measures (TCM) programs. Development proposals will be submitted to SJVUAPCD, local and

regional agencies for review and comment in compliance with CEQA California Environmental Quality Act (CEQA). Appropriate mitigation measures consistent with the SJVUAPCD's 1991 Air Quality Attainment Plan (or updated edition) will be identified and implemented.

The County will cooperate with other agencies and jurisdictions in the San Joaquin Valley to establish parallel air quality programs and implementation measures, and will support the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) in its development of improved ambient air quality monitoring. Comments from local and regional agencies on proposed projects that may affect regional air quality will be solicited and considered. The County will coordinate with other local, regional, and state agencies, including the SJVUAPCD and the California Air Resources board (ARB), in incorporating regional and state clean air plans into County planning and project review procedures. The County should ensure that General Plan population projections associated with the Madera County portion of the San Joaquin Valley Air Basin are used in the Federal Implementation Plan (FIP) and State Implementation Plan (SIP) for the San Joaquin Valley Air Basin.

New development shall pay fair share costs of transit equipment and facilities required to serve new projects. Large new developments are encouraged to dedicate land for and construct appropriate improvements for suitably located park-and-ride lots. Installation of low emitting, EPA-certified fireplace inserts and woodstoves, pellet stoves, or natural gas fireplaces are encouraged in new developments as an alternative to conventional woodburning fireplaces and appliances. Measures to control and reduce PM_{10} emissions will be required of new developments and County-maintained roads. Measures such as traffic signals coordination will be used to assure smooth flowing traffic conditions for major roadways, and intra- and inter-neighborhood connections where significant reductions in overall emissions can be achieved.

Attainment Status

Air basins can be classified as in attainment, which means that the area consistently stays below the national or state air quality standards. An air basin can also be classified as nonattainment for an air pollutant, which means that levels of an air pollutant consistently violate the standard or unclassified if there is insufficient data. As shown in Table 5.3-3, the SJVAB is currently in serious nonattainment for the eight-hour federal standard for ozone and PM_{10}. The area is also in nonattainment for the federal standard for $PM_{2.5}$. The area was in extreme nonattainment for the one-hour standard for ozone prior to the standard's revocation.

Table 5.3-3: San Joaquin Valley Air Basin Attainment Status

Pollutant	Federal Status	State Status
Ozone - One hour	No Federal Standard	Nonattainment/Severe
Ozone - Eight hour	Nonattainment/Serious	To be Determined*
PM_{10}	Nonattainment/Serious	Nonattainment[1]

Table 5.3-3 (Cont.): San Joaquin Valley Air Basin Attainment Status

Pollutant	Federal Status	State Status
$PM_{2.5}$	Nonattainment	No State Standard
CO	Unclassified/Attainment	Attainment
Nitrogen Dioxide	Unclassified/Attainment	Attainment
Sulfur Dioxide	Attainment	Attainment
Lead (Particulate)	No Designation	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility Reducing Particles	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Unclassified

Notes:
[1] On October 17, 2006, EPA published a Finding that the San Joaquin Valley was in attainment for PM_{10}. However, this Finding did not constitute a redesignation to attainment for the SJV. Redesignation will only occur after the development of an acceptable Maintenance Plan and other requirements of the CAA.
Source: San Joaquin Valley Air Pollution Control District. Valley Attainment Status. http://www.valleyair.org/aqinfo/attainment.htm (Accessed July 2006).

Pollutant Characteristics

Various health effects result from exposure to the criteria pollutants. Pollutant characteristics, mechanisms of pollutant origination, and health effects for the criteria pollutants and other pollutants of concern are described below.

Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 56 percent of all CO emissions nationwide. Other non-road engines and vehicles (such as construction equipment and boats) contribute about 22 percent of all CO emissions nationwide. Higher levels of CO generally occur in areas with heavy traffic congestion. In cities, 85 to 95 percent of all CO emissions may come from motor vehicle exhaust. Other sources of CO emissions include industrial processes (such as metals processing and chemical manufacturing), residential wood burning, and natural sources such as forest fires. Woodstoves, gas stoves, cigarette smoke, and unvented gas and kerosene space heaters are sources of CO indoors. The highest levels of CO in the outside air typically occur during the colder months of the year when inversion conditions are more frequent. The air pollution becomes trapped near the ground beneath a layer of warm air.

CO is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. The health threat from lower levels of CO is most serious for those who suffer from heart disease, like angina, clogged arteries, or congestive heart failure. For a person with heart disease, a single exposure to CO at low levels may cause chest pain and reduce that person's ability to exercise; repeated exposures may contribute to other

cardiovascular effects. Even healthy people can be affected by high levels of CO. People who breathe high levels of CO can develop vision problems, reduced ability to work or learn, reduced manual dexterity, and difficulty performing complex tasks. At extremely high levels, CO is poisonous and can cause death.

Motor vehicles are the dominant source of CO emissions in most areas. CO is described as having only a local influence because it dissipates quickly. High CO levels develop primarily during winter when periods of light winds combine with the formation of ground level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Because CO is a product of incomplete combustion, motor vehicles exhibit increased CO emission rates at low air temperatures. High CO concentrations occur in areas of limited geographic size sometimes referred to as hot spots. Since CO concentrations are strongly associated with motor vehicle emissions, high CO concentrations generally occur in the immediate vicinity of roadways with high traffic volumes and traffic congestion, active parking lots, and in automobile tunnels. Areas adjacent to heavily traveled and congested intersections are particularly susceptible to high CO concentrations.

The major source of CO in Madera County is from on-road vehicles, contributing 53.21 tons per day (tpd) in 2005, or 47 percent of the total CO emissions.[4] The second significant source of CO emission is from managed burning and disposal, which contributed 23.89 tpd in 2005, or 28 percent of the total CO emissions.

Ozone

Ozone is not emitted directly into the air, but is formed by a photochemical reaction in the atmosphere. Ozone precursors, which include reactive organic gases (ROG) and oxides of nitrogen (NO_X), react in the atmosphere in the presence of sunlight to form ozone. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer air pollution problem and often the effects of the emitted ROG and NO_X is felt a distance downwind of the emission sources. Ozone is subsequently considered a regional pollutant. Ground level ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and can cause substantial damage to vegetation and other materials.

Ozone is a very energetic combination of three oxygen atoms that releases its force as chemical energy when it encounters a surface. This energy can cause damage to biological systems (i.e., respiratory tract or vegetation). Ozone can cause headaches at levels greater than 0.15 ppm, chest pains at levels greater than 0.25 ppm, and cough and sore throat at levels greater than 0.30 ppm. Health effects of ozone can include the following: respiratory system irritation, reduction of lung function, asthma aggravation, inflammation and damage to lung cells, aggravation of chronic lung diseases, and permanent lung damage. Symptoms of ozone damage are not always present; therefore,

[4] California Air Resources Board. 2005 Estimated Annual Average Emissions, accessed in 2006. Available at http://www.arb.ca.gov/ei/ei.htm

caution should be taken when participating in outdoor activities requiring moderate or heavy exertion when ozone levels are high.

Reactive Organic Gases (ROG)

Reactive organic gases (ROG), also known as reactive organic compounds (ROC) and volatile organic compounds (VOC) consist of nonmethane hydrocarbons and oxygenated hydrocarbons. Hydrocarbons are organic compounds that contain only hydrogen and carbon atoms. Nonmethane hydrocarbons are hydrocarbons that do not contain the unreactive hydrocarbon, methane, therefore are attributed to the formation of ozone. Oxygenated hydrocarbons are hydrocarbons with oxygenated functional groups attached.

It should be noted that there are no state or national ambient air quality standard for ROG because they are not classified as criteria pollutants. They are regulated, however, as ROG are ozone precursors; therefore, a reduction in ROG emissions reduces certain chemical reactions that contribute to the formulation of ozone. ROG are also transformed into organic aerosols in the atmosphere, which contribute to higher PM_{10} and lower visibility. Although health-based standards have not been established for ROG, health effects can occur from exposures to high concentrations because of interference with oxygen uptake. In general, ambient ROG concentrations in the atmosphere are suspected to cause coughing, sneezing, headaches, weakness, laryngitis, and bronchitis.

The major source of ROG in Madera County is from natural sources, or biogenic sources, contributing 38.47 tpd in 2005, or 67 percent of the total ROG emissions.[4] The largest anthropogenic, or man-caused, contributors of ROG are on-road vehicles (4.77 tpd), other mobile sources (3.39 tpd), and miscellaneous processes, which is primarily farming operations and managed burning and disposal (5.38 tpd).

Oxides of Nitrogen

During combustion, oxygen reacts with nitrogen to produce nitrous oxides, or NO_X (NO, NO_2, NO_3, N_2O, N_2O_3, N_2O_4, and N_2O_5). This occurs primarily in motor vehicle internal combustion engines and fossil fuel-fired electric utility and industrial boilers. Natural sources of NO_X include lightning, soils, wildfires, stratospheric intrusion, and the oceans. Natural sources accounted for approximately seven percent of 1990 emissions of NO_X for the United States. Atmospheric deposition of NO_X occurs when atmospheric or airborne nitrogen is transferred to water, vegetation, soil, or other materials. Acid deposition involves the deposition of nitrogen and/or sulfur acidic compounds that can harm natural resources and materials.

The EPA has concluded that the only form of NO_X that exists at a level to cause public health concerns is nitrogen dioxide (NO_2). NO_2 is a brown gas with a strong odor. The major source of NO_2 is oxidation of NO. Minor sources are fossil fuel combustion and biomass burning. As seen in Table 5.3-2, the California standard for NO_2 is 0.25 ppm. In urban regions, NO_2 levels range from 0.1 to 0.25 ppm. Those that may be more susceptible to NO_2 are people with pre-existing respiratory disease and children 5 to 12 years old. The health effects of greatest concern are mild changes in

airway responsiveness and pulmonary function. At unrealistic levels of NO_2, acute bronchitis (25 to 100 ppm) or death (150 ppm) can occur.

NO_X is also an ozone precursor. A precursor is defined by the District as "a directly emitted air contaminant that, when released into the atmosphere, forms or causes to be formed or contributes to the formation of a secondary air contaminant for which an ambient air quality standard has been adopted…" In the case of NO_X and ROG, once these pollutants are released into the atmosphere, they chemically react with one another in the presence of sunlight to form ozone.

The major sources of NO_X in Madera County include on-road vehicles, which contributes 10.2 tpd in 2005, or 34 percent of the total NO_X emissions in the county; industrial processes, which contributed 8.83 tpd, or 30 percent ; and other mobile sources, which contributed another 6.92 tpd, or 23 percent.[4]

Sulfur Dioxide

Sulfur dioxide (SO_2) is a colorless, pungent gas. At levels greater than 0.5 ppm, the gas has a strong odor. Sulfuric acid is formed from sulfur dioxide, which is an aerosol particle component that affects acid deposition. Anthropogenic, or human caused, sources include fossil-fuel combustion, mineral ore processing, and chemical manufacturing. Volcanic emissions are a natural source of sulfur dioxide. The gas can also be produced in the air by dimethylsulfide and hydrogen sulfide. SO_2 is removed from the air by dissolution in water, chemical reactions, and transfer to soils and ice caps. Although SO_2 concentrations have been reduced to levels well below state and federal standards, further reductions are needed because SO_2 is a precursor to sulfate and PM_{10}. Sulfates are a particulate formed through the photochemical oxidation of SO_2.

Sulfur dioxide is a soluble gas; therefore, it can be absorbed in the mucous membranes of the respiratory tract and nose. Sensitive populations are those with heart or lung disease, the elderly, and children. Long-term exposure of high levels of SO_2 can cause irritation of existing cardiovascular disease, respiratory illness, and changes in the defenses in the lungs. When people with asthma are exposed to high levels of SO_2 for a short time during moderate activity, effects may include wheezing, chest tightness, or shortness of breath. At levels greater than 1.5 ppm, respiratory infections and bronchiolar constrictions can occur.

The major source of sulfur oxides (SO_X) in Madera County are from industrial processes, which contributes 0.74 tpd, or over 50 percent of the total SO_X emissions for Madera County in 2005. In particular, the industrial processes category is primarily divided between glass processing and agricultural processing.4

Lead

Lead (Pb) is a solid heavy metal that can exist in air pollution as an aerosol particle component. An aerosol is a collection of solid, liquid, or mixed-phase particles suspended in the air. It was first regulated as an air pollutant in 1976. Leaded gasoline was first marketed in 1923 and was used in motor vehicles until around 1970. The exclusion of lead from gasoline helped to decrease emissions

of lead in the United States from 219,000 to 4,000 short tons per year between 1970 and 1997. Even though leaded gasoline has been phased out in most countries, some still use leaded gasoline. Lead-ore crushing, lead-ore smelting, and battery manufacturing are currently the largest sources of lead in the atmosphere in the United States. Other sources are from dust from soils contaminated with lead-based paint, solid waste disposal, and crustal physical weathering. Lead can be removed from the atmosphere by way of sinks, i.e., deposition to soils, ice caps, oceans, and thorough inhalation.

Lead accumulates in bones, soft tissue, and blood and can affect the kidneys, liver, and nervous system. The more serious effects of lead poisoning include behavior disorders, mental retardation, and neurological impairment. Low levels of lead in fetuses and young children can result in nervous system damage, which can cause learning deficiencies and low intelligence quotients (IQs). Lead may also contribute to high blood pressure and heart disease.

Lead concentrations once exceeded the state and federal air quality standards by a wide margin, but have not exceeded the standards at any regular monitoring station since 1982. Lead is no longer an additive to normal gasoline, which is the main reason the concentration of lead in the air is low. Some competition vehicles still use leaded gasoline, though the U.S. EPA has been working with the suppliers of fuel for competition vehicles in an attempt to phase out leaded gasoline.[5]

Particulate Matter (PM_{10} and $PM_{2.5}$)

Particle pollution is a mixture of microscopic solids and liquid droplets suspended in air. This pollution, also known as particulate matter, is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, soil or dust particles, and allergens (such as fragments of pollen or mold spores).

Particulate matter can be divided up into two size categories: PM_{10} and $PM_{2.5}$. PM_{10} refers to particulate matter that is 10 microns or less in diameter, (1 micron is one-millionth of a meter) and is sometimes referred to as inhalable or coarse particulate matter. $PM_{2.5}$ refers to particulate matter that is 2.5 microns or less in diameter and is referred to as fine particulate matter. The size of particles is directly linked to their potential for causing health problems. Small particles pose the greatest health problems, because they can get deep into your lungs, and some may even get into your bloodstream. Both PM_{10} and $PM_{2.5}$ are small enough to bypass the body's defense mechanisms and become lodged in the lungs. In fact, $PM_{2.5}$ is small enough to reach the alveoli, the portion of the lung where the oxygen/carbon dioxide exchange occurs. Exposure to such particles can affect both your lungs and your heart. Larger particles are of less concern, although they can irritate your eyes, nose, and throat.

Particulate matter originates from a variety of stationary and mobile sources. Stationary sources include fuel combustion for electrical utilities, residential space heating, and industrial processes; construction and demolition; metals, minerals, and petrochemicals; wood products processing; mills and elevators used in agriculture; erosion from tilled lands; waste disposal and recycling. Mobile or

[5] U.S. EPA. Draft Report on Alkyl-Lead: Sources, Regulations, and Options. October 1999.

transportation-related sources include particulate matter from highway vehicles and non-road vehicles and fugitive dust from paved and unpaved roads. Soil dust consists of the minerals and organic material found in soil being lifted up into the air by winds. Fugitive dust is defined as the following:

> Any solid particulate matter entrained in the ambient air, which is caused by anthropogenic or natural activities, which is emitted into the air without first passing through a stack or duct designed to control flow, including, but not limited to, emissions caused by movement of soil, vehicles, equipment, and windblown dust. This excludes particulate matter emitted directly in the exhaust of motor vehicles, from other fuel combustion devices, portable brazing, soldering, or welding equipment, and from pile drivers.[6]

Pathophysiological effects from PM or its constituents could include the following: direct pulmonary effects; cardiovascular and other systemic effects secondary to lung injury; direct effects on the heart; and mutagenic or genotoxic effects. Some components of PM are more toxic than other components. Studies imply that some metals, diesel exhaust particles, ultra-fine particles, and bioaerosols contribute to harmful health effects.

The primary sources of PM_{10} in Madera County are farming operations, paved and unpaved road dust, and managed burning and disposal. Farming operations contributed 4.39 tpd, or 23 percent of the total PM_{10} in Madera County in 2005 but paved and unpaved road dust combined for a total of 6.33 tpd, or 33 percent of the total PM_{10}. The primary source of $PM_{2.5}$ in Madera County is from managed burning and disposal, contributing 2.44 tpd, or 31 percent to the total $PM_{2.5}$ in Madera County for 2005.[4]

Diesel Particulate Matter

Diesel exhaust is a mixture of many particles and gases that is produced when an engine burns diesel fuel. Many compounds found in diesel exhaust are carcinogenic, including sixteen that are classified as possibly carcinogenic by the International Agency for Research on Cancer.[7] Diesel particulate matter (DPM) includes the particle-phase particles in diesel exhaust. Components of DPM include elemental and organic carbon. Elemental carbon is carbon that has had hydrogen taken from it. Organic carbon contains molecules containing carbon and hydrogen, and can also contain oxygen, sulfur, and nitrogen.

Exposure to diesel exhaust can cause immediate health effects. Some of the health effects include eye, nose, and throat irritation as well as cough, nausea, and phlegm. The elderly, children, people with allergies, and those with asthma, emphysema, and chronic heart and lung disease are more susceptible to the effects of DPM.

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[6] San Joaquin Valley Air Pollution Control District. Rule 8011, Section 3.22.

[7] California Environmental Protection Agency. Office of Environmental Health Hazard Assessment. Executive Summary for the "Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant." 1998.

Visibility Reducing Particles

Visibility reducing particles (VRP) are suspended particulates that reduce visibility. Visibility is the distance through the air that can be seen without the use of instrumental assistance. The distance that can be seen is limited by the amount of gases and aerosol particles in the way. Looking up vertically into the sky, one can see a greater distance compared with looking across the horizon because there are fewer particles blocking the view. Without pollution effects in the western United States, a natural visual range is 140 miles, and in the eastern United States, the range would be 90 miles.[8] In 1999, the visibility range in the West was 33 to 90 miles and in the East 14 to 24 miles.[8] The EPA implemented a Regional Haze Rule in 1999 to attempt to protect visibility in 156 Class I national parks and wilderness areas in the United States. The regulation requires States to establish goals for improving their areas and work together with other States as the pollution is often transported over long distances.[8] The closest Class I Areas to the project site are Yosemite National Park, approximately 50 miles north of the project and Sequoia National Park, which is approximately 60 miles west-southwest of the project.

Benzene

Benzene is a colorless, highly flammable, volatile organic compound. Benzene is found in low concentrations in gasoline. Benzene is emitted from gasoline service stations (fuel evaporation), motor vehicle exhaust, tobacco smoke, and from burning oil and coal. Tobacco smoke contains benzene and accounts for nearly half the national exposure to benzene. Benzene is also used as a solvent for paints, inks, oils, waxes, plastic, and rubber.

The U.S. EPA has classified benzene as a Group A human carcinogen. Short-term exposure of high doses from inhalation of benzene may cause dizziness, drowsiness, headaches, eye irritation, skin irritation, and respiratory tract irritation, and at higher levels, unconsciousness can occur. Long-term occupational exposure of high doses by inhalation has caused blood disorders, including aplastic anemia and lower levels of red blood cells.[9]

Vinyl Chloride

Vinyl chloride, or chloroethene, is a chlorinated hydrocarbon and a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites due to microbial breakdown of chlorinated solvents. In 1978, CARB established the state ambient air quality standard for vinyl chloride because it is a known carcinogen. As a carcinogen, CARB could not recommend any safe level of exposure to vinyl chloride, other than zero. The standard was set at 0.01 ppm for a 24-hour duration because that was the lowest level that could be detected at that time. In 1990, CARB identified vinyl chloride as a toxic air contaminant. Vinyl chloride is formed when other substances such as trichloroethane, trichloroethylene, and tetrachloroethylene are broken down.

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[8] U.S. Environmental Protection Agency. Fact Sheet. Final Regional Haze Regulations for Protection of Visibility in National Parks and Wilderness Areas. 1999. Available at http://www.epa.gov/oar/visibility/facts.pdf

[9] U.S. Environmental Protection Agency. Technology Transfer Network, Air Toxics Website. Benzene. Revised 2000.

This can occur when plastics containing these substances are left to decompose in solid waste landfills. Vinyl chloride is also formed in manufacturing of PVC. PVC is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

The project is not expected to generate or be exposed to vinyl chloride because its residential uses do not use the chemicals processes that create this pollutant and its commercial uses typically would not produce this pollutant. As the proposed project wastewater treatment plant will utilize a Membrane Bioreactor Plant (MBR) which is an aerobic treatment system, H_2S will not be a byproduct of wastewater treatment plant operations. Therefore, it is not assessed in this report.

Hydrogen Sulfide

Hydrogen sulfide (H_2S) is a flammable, colorless, poisonous gas that smells like rotten eggs. Hydrogen sulfide and other reduced sulfur compounds form by the anaerobic decomposition of manure. Some types of bacteria found in animal and human by-products produce hydrogen sulfide during reduction of sulfur-containing compounds, such as proteins. Manure storage tanks, ponds, anaerobic lagoons, and land application sites are the primary sources of hydrogen sulfide emissions where sulfur is present in manure. Anthropogenic sources include the combustion of sulfur containing fuels (oil and coal) and organic matter that undergoes putrefaction. It is used in the production of heavy water for nuclear reactors, the manufacture of chemicals, in metallurgy, and as an analytical reagent. High levels of hydrogen sulfide can cause immediate respiratory arrest. It can irritate the eyes and respiratory tract and cause symptoms like headache, nausea, vomiting, and cough. Long exposure to hydrogen sulfide can cause pulmonary edema.

The project is not expected to generate or be exposed to hydrogen sulfide because its residential uses do not typically generate this pollutant in any substantial quantity and its commercial uses typically would not produce this pollutant. Therefore, hydrogen sulfide is not assessed in this report.

Greenhouse Gases

Global warming is an average rise in the earth's temperature, which can cause changes in climate. Greenhouse gases help to regulate the climate by absorbing infrared radiation in the atmosphere and allowing incoming solar radiation to pass through the atmosphere. Some greenhouse gases include water vapor, methane, carbon dioxide, nitrous oxide, ozone, halogenated fluorocarbons, perfluorinated carbons, and hydrofluorocarbons.

5.3.3 - Thresholds of Significance

The California Environmental Quality Act (CEQA) and the District have established air pollution thresholds for projects to be evaluated, and to assist lead agencies in determining a project's significance.

CEQA Significance Thresholds

Appendix G of the CEQA Guidelines states that a significant effect on air quality would occur when a project would:

a) Conflict with or obstruct implementation of the applicable air quality plan;

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard;

d) Expose sensitive receptors to substantial pollutant concentrations;

e) Create objectionable odors affecting a substantial number of people.

District Significance Thresholds, Regulations, and Rules

The project area is in federal non-attainment for ozone and PM_{10} and $PM_{2.5}$. Nitrogen oxides (NO_X) and reactive organic gases (ROG) are regulated as ozone precursors. A precursor is defined by the District as "a directly emitted air contaminant that, when released into the atmosphere, forms or causes to be formed, or contributes to, the formation of a secondary air contaminant for which an ambient air quality standard has been adopted…" In the case of NO_X and ROG, once these pollutants are released into the atmosphere, they chemically react with one another in the presence of sunlight to form ozone. Inversions and the surrounding mountains concentrate ozone in the valley by trapping it from both vertical and horizontal dispersion.

The District established significance thresholds for ROG and NO_X and has published them in their GAMAQI. The District has established criteria for determining the significance of two pollutant emissions during project operations. The District also requires large projects to quantify and compare construction-related emissions of ROG and NO_X with the following thresholds. A project with construction-related or operation-related emissions that exceed any of the following thresholds for the following precursor emissions of ozone would be considered significant:

- Reactive Organic Gases (ROG) - 10 tons/year
- Oxides of Nitrogen (NO_X) - 10 tons/year

Estimated CO concentrations that exceed the 1-hour or 8-hour CAAQS would be considered a significant impact.

5.3.4 - Project Impacts

Impact 5.3-1:	**Short-term construction-phase air quality impacts may result from exhaust from the use of heavy equipment, worker vehicles, and haul trucks. PM_{10} impacts associated with airborne dust may occur during site grading and soil movement. (Threshold b.)**

Emissions produced during grading and construction activities are short-term in the sense that they occur only during construction. Construction of the NFV-1 project would produce PM_{10}, CO, ROG, NO_X, and negligible amounts of SO_X. Although the District does not require quantification of short-

term construction emissions, an analysis was conducted to verify potential emissions. Compliance with the District's Regulation VIII and the local zoning code are required and will reduce particulate emission impacts to levels that are considered less than significant.

Construction activities are a source of dust (PM_{10}) emissions that can have a substantial temporary impact on local air quality. Fugitive dust emissions are associated with land clearing, ground excavation, cut and fill operations, and truck travel on unpaved roads. Dust emissions vary substantially from day to day, depending on the level of activity, the specific operations, and weather conditions. Construction activity will also result in exhaust emissions from diesel-powered heavy equipment. Exhaust emissions from construction include emissions associated with the transport of machinery and supplies to and from the site and emissions from the onsite equipment.

Construction emission analysis was performed using the URBEMIS 2002, Version 8.7.0, emissions inventory model. URBEMIS is a California-specific computer model that is owned and modified by the local air pollution control districts and air quality management districts in the State of California. URBEMIS estimates construction, area source, and operational emissions from potential land uses, using the most recent approved version of relevant CARB emissions models and emission factors and/or District-specific emission factors; and estimates emissions reductions. The model divides construction into two periods: 1) site preparation, and 2) the building/finishing period. The project is a specific-plan-level project that does not have specific construction parameters. Default URBEMIS parameters were used to generate a reasonable estimation, however, more specific air quality analyses should be conducted for projects derived from this specific plan. For the purpose of this program-level EIR, it was assumed that construction activity would be evenly distributed throughout the eighteen years of the NFV-1 project. These averaged emissions assume that all equipment will be running concurrently and for 8 hours per day, 22 days per month for the entire year. The resultant unmitigated emissions are presented in Table 5.3-4. It is important to note that this estimation assumes an even distribution of construction activity and is not representative of emissions that may occur on a project-specific basis. Future projects, which are a result of this program-level EIR, would have the requirement to generate their own air quality analysis to estimate project specific construction emissions. *This is a less than significant impact.*

Table 5.3-4: Unmitigated Project Short-Term Emission Generation

Pollution Source	Emissions (tons per year)				
	NO_X	CO	ROG	SO_X	PM_{10}
Grading Operations	0.38	0.50	0.06	NG[1]	0.12
Building Construction	6.13	8.06	2.88	NG[1]	0.24
Asphalt Application	0.09	0.10	0.02	NG[1]	NG[1]
Emissions Totals (tons per year)	**6.60**	**8.66**	**2.96**	**>0.01**	**0.37**

Notes:
[1] Criteria pollutants that have estimated negligible values are designated NG (negligible emissions).
See Appendix B for model output report.

Impact 5.3-2: **Operational air quality impacts may result from motor vehicles traveling to and from the area, the combustion of natural gas for space and water heating, and consumer products. (Thresholds b and d.)**

The predicted emissions associated with vehicular traffic (mobile sources) are not subject to the District's permit requirements because mobile source emissions are regulated by the State; however, the District is responsible for overseeing efforts to improve air quality within the SJVAB and is responsible for some of the vehicle activity within the air basin. The District reviews land use changes to evaluate the potential impact on air quality. The District has established a significance level for reactive organic gases (ROG) and oxides of nitrogen (NO_X) of 10 tons per year for each pollutant.

Vehicle emissions have been estimated for the project using the URBEMIS 2002 computer model (version 8.7.0). This model predicts ROG, NO_X, CO, SO_X, and PM_{10} emissions from motor vehicle traffic associated with new or modified land uses. Emissions were estimated for the buildout year of 2025 and, pursuant to the *GAMAQI*, since the buildout is greater than five years, emissions were estimated for the mid-project year of 2015. Again, the assumption was made that construction of the project would occur evenly over the duration of the project. Due to this project being program-level, several assumptions were made in order to estimate emissions. The commercial/office and the commercial portion of the mixed-use land uses were assumed to have a 0.25 floor to area ratio (FAR) as required in the Rio Mesa Area Plan. The commercial/office land use was assumed to have equal distribution of commercial and office. The mixed-use land use was assumed to be half residential and half commercial. Appendix B, Air Quality/Noise, contains the URBEMIS 2002 modeling results. As shown in Table 5.3-5 and Table 5.3-6, the major long-term impact to air quality will be emissions primarily caused by motor vehicles traveling to and from the project site.

Area source emissions result from fuel and personal product use. The URBEMIS 2002 computer model (version 8.7.0) predicted emissions from natural gas usage, landscape maintenance, fireplaces and woodstoves, and the consumption of consumer products. Total predicted mid term emissions for the proposed project, including mobile source emissions and area source emissions, are shown in Table 5.3-5 below and total predicted full buildout emissions for the proposed project, including mobile source emissions and area source emissions, are shown in Table 5.3-5 below.

Table 5.3-5: Project Generated Mid Term (2015) Emissions

Source	ROG Ton/Year	NO_X Ton/Year	CO Ton/Year	SO_X Ton/Year	PM_{10} Ton/Year
Mobile Source Emissions	22.95	24.72	255.26	0.27	24.07
Area Source Emissions	19.70	3.65	51.14	0.16	8.04
Total	**42.65**	**28.37**	**306.40**	**0.43**	**32.11**
Significance Level	10	10	N/A	N/A	N/A
Over threshold	Yes	Yes	—	—	—
Source: URBEMIS2002 (Appendix B Air Quality/Noise).					

Table 5.3-6: Project Generated Full Buildout (2025) Emissions

Source	ROG Ton/Year	NO_X Ton/Year	CO Ton/Year	SO_X Ton/Year	PM_{10} Ton/Year
Mobile Source Emissions	26.06	24.50	274.66	0.61	54.05
Area Source Emissions	44.27	8.20	114.59	0.36	18.09
Total	**70.33**	**32.70**	**389.25**	**0.97**	**72.14**
Significance Level	10	10	N/A	N/A	N/A
Over threshold	Yes	Yes	—	—	—
Source: URBEMIS2002 (Appendix B Air Quality/Noise).					

A comparison of project generated long-term emissions with the thresholds of significance reveals that ROG and NO_X emissions attributable to this project are considered significant at both the mid-term and at full buildout. As shown in the table, the primary sources of NO_X, CO, and PM_{10} emissions are from vehicles. However, ROG emissions are primarily from vehicular sources in the mid-term but at full buildout, the cleaning of the vehicle fleet due to the natural attrition of older polluted vehicles, result in the ROG emissions from architectural coatings and other evaporative sources being the primary source of ROG. *This is a significant and unavoidable impact that was documented in the Rio Mesa Area Plan EIR.*

Impact 5.3-3: Traffic associated with the Project may create localized concentrations of carbon monoxide (hot-spots). (Threshold d.)

Carbon monoxide (CO) emissions are a function of vehicle idling time and under normal meteorological conditions depend on traffic flow conditions. CO transport is extremely limited as it dispenses rapidly with distance from the source. Under certain extreme meteorological conditions, however, CO concentrations close to a congested roadway or intersection may reach unhealthful levels, affecting sensitive receptors (residents, schoolchildren, hospital patients, the elderly, etc.). Typically, high CO concentrations are associated with roadways or intersections operating at an unacceptable Level of Service (LOS). According to the CO Protocol published by the California Department of Transportation (Caltrans), the LOS at an intersection producing a hot spot is at E or worse during the peak hour. Therefore, modeling would be required if an intersection was at E or worse. This document can be found on the Caltrans Website at: http://www.dot.ca.gov/hq/_env/air/coprot.htm. Peters Engineering Group prepared a traffic study for Proposed NFV-1 Specific Plan (Appendix B Air Quality/Noise). The study indicates that after mitigation, the predicted LOS does not warrant a CO Hot Spot analysis for project related intersections, as all intersections operate at an LOS of D or better after implementation of the improvements identified in Sections 5.1 and 6.1 (Appendix B, Air Quality/Noise). Therefore, no significant CO concentrations will result due to vehicular traffic. *This is a less than significant impact.*

Impact 5.3-4: Diesel emissions from construction equipment and future increased traffic may create objectionable odors. (Threshold e.)

Diesel emissions from construction equipment operating on the project site may create temporary objectionable odors. These odors would be limited to the project site. In addition, the mitigation measures would reduce diesel exhaust to a level that would not affect a substantial number of people. In the long-term, increased traffic will be the primary source of air emissions. In general, vehicles are a mobile source of emissions and thus are not a source of prolonged objectionable odors; however, vehicles will idle at project area intersections. Improved fuel standards and cleaner vehicle fleets have reduced the generation of vehicle related objectionable odors. Therefore, construction and operation of the proposed project are not anticipated to create significant objectionable odors. *This is a less than significant impact.*

Impact 5.3-5: The Project may result in the generation of hazardous air contaminants. (Threshold d.)

The project consists of residential and commercial land uses. The generation of hazardous air pollutants is generally associated with certain types of industrial and agricultural activities. Therefore, the project is not expected to result in the generation of substantial hazardous air pollutants. *This is a less than significant impact.*

Impact 5.3-6: The Project may conflict with or obstruct implementation of the San Joaquin Valley Air Pollution Control District's air quality plans. (Threshold a.)

As stated in Table 5.3-1, Attainment Status, the SJVAB is in nonattainment for ozone, PM_{10}, and $PM_{2.5}$. The Extreme OADP and the 2003 PM10 Plan contains performance standards and emission reduction targets necessary to attain the state and federal AAQS. The plans will be complied with by two methods: 1) following District rules and regulations; and 2) comparing the mobile emissions estimated for the project with the emissions used in the plans to determine the reduction targets.

The project will comply with all applicable District rules and regulations, including but not limited to Rules 8010, 8020, 8070, 9510, and 3180. The project will also comply with a rule suggested in the Ozone OADP as a further study project. Rule 4092 would restrict NO_X emissions from residential water heaters. Proposed mitigation will require the installation of low NO_X water heaters to reduce NO_X emissions from the project.

The Extreme OADP and the 2003 PM10 Plan developed emissions projections for a future development scenario derived from land use, population growth projections, and employment characteristics defined in consultation with local governments. According to the CARB's transportation performance standards, the rate of growth in vehicle miles traveled (VMT) and trips should be held to the rate of population growth. Compliance with this performance standard for residential projects is one way suggested by the CARB of showing compliance with the growth assumptions used in the Extreme OADP and the 2003 PM10 Plan. If the total VMT generated by the NFV-1 project at build-out is at or below that predicted by the Extreme OADP and the 2003 PM10

Plan, then the proposed project's mobile emissions is consistent with the Extreme OADP and the 2003 PM10 Plan.

It is assumed that the existing and future pollutant emissions computed in the SJVAB attainment plans were based on land uses from area general plans. The NFV-1 project's land use designation, density, vehicle trips, and VMT will be compared to those in the Madera County General Plan which included designations of the Rio Mesa Area Plan (RMAP). If the NFV-1 project has less density, vehicle trips, and vehicle miles traveled, the project complies with the Extreme OADP and the 2003 PM10 Plan.

The RMAP designates approximately 3,994 residential units on 2,087 acres in the area of the NFV-1 project, with a resulting gross area density of 1.9 units per acre. Within approximately the same area as defined by these zones, the NFV-1 project identifies 2,966 residential units on 2,238 acres, with a resulting gross area density of 1.3 units per acre. This represents a reduction of 998 residential units from the RMAP. The RMAP also designates 15 acres as Village Core (Commercial) and an additional 10 acres as Neighborhood Commercial, for a total of 25 Commercial acres within the zones that define the proposed project site. The NFV-1 Specific Plan designates approximately 76 acres as Mixed-Use and 62 acres as Commercial/Office. The RMAP's proportion of residential to commercial was extremely weighted towards residential. The NFV-1 Specific Plan creates a higher potential for good jobs/housing balance, which is consistent with goals of the SJVAPCD's attainment plans. Therefore, it is appropriate to conclude that the proposed project complies with the Extreme OADP and the 2003 PM10 Plan. *This is a less than significant impact.*

5.3.5 - Cumulative Impacts

Impact 5.3-7:	**The Project, when combined with other development in the area, may have a cumulative impact on the regional air quality. (Threshold c.)**

The County of Madera is expected to experience significant growth in population and vehicle usage over the next twenty years. Increased population and vehicle usage will have a potential effect on the air quality in the region. *The NFV-1 project together with other related projects in the area will contribute significant adverse cumulative air quality effects in Madera County.*

5.3.6 - Mitigation Measures

Rio Mesa Area Plan and the EIR

The RMAP contains 17 measures to mitigate the impact construction effects on air quality. The measures are:

1. Control fugitive dust during construction activities by watering or chemical stabilization of unpaved surfaces during earth moving operations.
2. During the pre-construction process, all material excavated or graded should be sufficiently watered to prevent excessive amounts of dust. Watering should occur at least twice a day with complete coverage, preferably in the late morning and after work is done

for the day. All material transport off-site should be either sufficiently watered or securely covered to prevent excessive amounts of dust.

3. During the pre-construction process, all clearing, grading, earthmoving or excavation activities should cease during periods of high winds greater than a 30 mph average over one hour.

4. Provide rerouting or rapid clean-up of temporary sources of mud and dirt on unpaved roads. Also, street sweeping of roads adjacent to the project site should be done to reduce fugitive dust from traffic.

5. Transported materials in haul trucks should be covered or wetted, and provide at least six inches of freeboard space from the top of the transport container sides. Haul trucks should be covered and trucks should be washed off before leaving the construction site. Posted speed limit on construction site should be 15 mph.

6. In order to reduce pollutant emissions from construction equipment; they should be properly maintained and tuned.

7. Whenever feasible, require parking lots and paved roads to be constructed first.

8. To minimize traffic related impacts from construction, construction personnel should be encouraged to ride share or use mass transit.

9. Provide strict supervision of traffic to insure that only construction access roads are used. Parking for construction personnel should not interfere with traffic flow. A flag person should be provided during times when construction affects roadways and one lane in each direction should remain open.

10. Major grading within each phase of development should be coordinated to the extent feasible so that nearby uses are not already occupied when the site preparation grating occurs, or that more aggressive dust control is used when major grating does occur adjacent to already completed development.

11. Where acceptable to the fire department, weed control should be accomplished by mowing instead of discing, thereby leaving the ground undisturbed and with protective covering. The area disturbed by clearing, earthmoving or excavation activities should be minimal at all times.

12. During construction process, construction should not occur when the average wind speed is greater than 15 mph. Provide temporary windscreen fencing if necessary.

13. During rough grading and construction, access to the site should require an apron to be built into the project site from the adjoining paved roadways. The apron should be paved or have a petroleum-based palliative applied.

14. All areas with vehicle traffic should be watered periodically or have petroleum-based palliatives applied for stabilization of dust emissions. Road stabilization should be maintained for the duration of the activity.

15. All inactive areas of 7 days or more shall be soil stabilized using chemical agents approved in the Regulation VIII Rules. Inactive areas can also be seeded and watered until grass growth is evident to effectively stabilize the disturbed area and limit visible dust emissions.

16. Any stored bulk materials or storage pile outdoors undisturbed within 7 calendar days should be stabilized with water, by covering or chemically stabilized to limit visible dust emissions.

17. During rough grading and construction, streets including shoulders adjacent to the project site should be swept at least once per day to reduce fugitive dust from traffic, or as required by governing body, to remove silt which may have accumulated from construction activities.

The RMAP contains 23 measures to mitigate the impact operational effects on air quality. The measures are:

1. All future development projects will be required to analyze project and cumulative air quality impacts.

2. Non-residential projects should establish maximum bicycle access to and within the project, and provide secure bicycle facilities such as bicycle parking, bicycle racks, and storage lockers, as well as shower/locker rooms.

3. Commercial and/or industrial development should provide sufficient service establishments within the office areas, such as restaurants, copy centers, etc. to minimize the number and length of trips to obtain these common services. Provide other transit to readily accessible to site. Establish delivery services in retail facilities. Deliveries should be scheduled outside peak commute hours.

4. Provide traffic signal synchronization where feasible to improve traffic flow.

5. Each future development proposal/project should be reviewed in terms of the Rio Mesa Area Plan jobs/housing balance ratio. A balanced ratio will help to reduce vehicle trips between work and home.

6. Provide energy conserving street lighting.

7. Project should provide incentives for working and living within the local area by providing a mixture of land uses, services, as well as, entertainment such as residential, commercial offices, restaurants, retail stores, shopping areas, banks, movie theaters, neighborhood parks, etc.

8. Peak period traffic congestion is primarily due to high single occupant vehicle (SOV). In order to relieve congestion during peak periods, encourage flexible work hours, carpooling/vanpooling, and use of transit and use of passenger rail services and other mass transportation services.

9. The project should provide trees around the area. Tree planting provides several air quality benefits such as reducing carbon monoxide, anchoring soil and providing windbreaks, and conserving energy by providing shade. Trees should be drought tolerant.

10. Provide mass transit accommodations such as bus turnout lanes, park and ride lots, and bus shelters. The project should provide mini busses and shuttles for individuals working in the same buildings. The project should provide incentives for living and working in the local area. These incentives shall be determined on a project-by-project basis.

11. Design parking supply limits by reducing the number of parking spaces, and set aside spaces to accommodate carpool/vanpool vehicles. Also, impose a parking fee to control the parking demand through a parking management program. Consideration for parking supply limits should include all parking facilities for large commercial centers with high number of employees.

12. Provide park and ride lots near heavily vehicle and rail corridors, as well as the periphery of the commercial/office area. The lots near the heavily traveled corridors should also provide convenient meeting spots for shoppers and recreational users. Park and ride lots outside the commercial/office area must be conveniently and comfortable linked to the commercial/office employment and shopping sites via regularly scheduled shuttles.

13. As part of the Rio Mesa Area Plan, implementation of commercial and industrial areas development should establish a Transportation Management Association (TMA) program that create incentives for employees to rideshare. Rideshare programs consist of rideshare coordinators, public awareness/relations programs, employer programs and parking programs. (Services to the rideshare programs include the formation of vanpools with company vehicles or subsidy and encourage public transit, when available, with free transit passes. Job on site should subsidize transit passes and accommodate “unusual” work schedules to allow for transit schedules. Provide validation of transit ticket to provide free return trip). Evaluate the potential for subscription bus or shuttle service for areas where there are large concentrations of employees.

14. Reduce travel by alternative modes of communications. Telecommunications include the use of telephones, computer video cameras, and satellite work centers. This form of telecommunications includes full or part time, and can involve working at home.

15. Use of low emission alternatively fueled vehicles to replace gasoline or diesel.

16. In order to reduce the total project vehicle miles traveled (VMT) and vehicle trips (VT); the TCM plan should be implemented. A contractor-sponsored program should be made a condition on any permits. The TCM includes public transit, rideshare program, passenger rail services, carpooling/vanpooling, transit and traffic flow improvements, and trip reduction programs. Studies have suggested that a comprehensive area wide program for ride sharing can reduce work trips and VMT by up to 10 percent.

17. The commercial office areas should establish maximum bicycle access to and within the project, and provide secure bicycle facilities such as bicycle parking, bicycle racks and storage lockers, as well as shower/locker rooms.

18. Commercial developments should include parking supply limits to reduce the number of parking spaces, and set aside spaces to accommodate car pool/can pool vehicles. Provide priority parking for employees who ride share. Also, impose a parking fee to control the parking demand through the parking management program. Consideration for parking supply limits should include all parking facilities for large commercial center with high numbers of employees.

19. For freeway and highway capacity enhancements, provide High Occupancy Vehicle Land Systems (HOV). This will reduce the demand for highway space and shift the demand to transit and carpooling. Implement pricing of a toll road facility which allows for free or reduced tolls for HOV.

20. Where transit services exist, in residential as well as commercial areas, construct bus turnouts and loading areas with shelters. Where transit does not exist, provide future easement for bus turnouts and shelters.

21. The buildings in the project should be oriented to maximize passive solar cooling and heating when practicable. In addition, overall building design should include as many energy-conserving features as possible. On example is adequate insulation in the roof and walls.

22. Provide residents with natural gas lines or electrical outlets to the backyard to encourage use of natural gas or electrical barbecues. Also, provide low nitrogen oxide emitting and/or high efficiency water heaters.

23. In residential areas, provide park and ride lots or commuter lots with easy access to residents. Also, provide bicycle paths and ensure residents easy access to these paths. Also, encourage the use of electric vehicles for onsite and offsite travel.

24. Encourage use of photo-voltaic solar panels for each building.

The NFV-1 Specific Plan is consistent with the mitigation measures contained in the RMAP EIR where applicable. In some cases, the SJVAPCD has adopted new or amended regulations that are

more stringent than were in effect at the time the RMAP EIR was adopted, so the impacts would be lessened for NFV-1 compared to the level expected at that time.

Additional Project Mitigation Measures

The following measures are added to reduce the significant impacts of the proposed project.

AQ-1 The project applicant shall comply with San Joaquin Valley Air Pollution Control District Rule 9510 and implement control measures. District Rule 9510 requires that development projects meeting certain criteria to implement control measures and/or purchase emissions offsets to mitigate NO_X and PM_{10} emissions associated with the project's construction and operation. Compliance with Rule 9510 is separate from the CEQA process, although the control measures used to comply with Rule 9510 may be used to mitigate CEQA impacts.

AQ-2 Wood burning fireplaces and wood stoves shall be prohibited within the development. The use of natural gas fireplaces shall be allowed if desired.

5.3.7 - Level of Significance After Mitigation

The air quality impacts of increased population and vehicle activity will remain cumulatively significant and findings of overriding consideration are necessary.