4.3 AIR QUALITY

4.3 AIR QUALITY

INTRODUCTION

This section addresses potential impacts on air quality related to mobile source emissions, stationary source emissions, area source emissions, and odors. Federal and State air quality regulations and relevant Merced County General Plan policies are presented. The climate and air quality of the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD), in which the UCP area is located, are described. Information contained in this section has been derived from the SJVUAPCD, the Merced County General Plan, and background documentation.

Comment letters in response to the Notice of Preparation expressed concerns about the amount of future mobile source, area source, and stationary source emissions associated with implementation of the UCP. Impacts to biotic resources from changes in air quality was also revised in NOP comment letters.

ENVIRONMENTAL SETTING

California has been divided into 14 air basins by the California Air Resources Board (CARB) for purposes of monitoring air quality statewide. The UCP area is in the San Joaquin Valley Air Basin (SJVAB). The air basin is bordered by three mountain ranges: the Coast Ranges to the west, the Sierra Nevada to the east, and the Tehachapi Mountains to the south. At the northern boundary of the air basin, the Carquinez Strait, a sea-level gap within the Coast Ranges, extends to the west, providing a major source of ventilation for the San Joaquin Valley.

Merced County is located in the northern portion of the SJVAB and has relatively flat terrain. Some foothills leading to the Sierra Nevada are found in the eastern portion of the County; however, the majority of the County consists of level terrain where the primary land use is agriculture.

Regional Air Quality

Criteria air pollutants are classified in each air basin, county, or, in some cases, within a specific urbanized area. The classification is determined by comparing actual monitoring data with State and federal standards. If a pollutant concentration is lower than the standard, the pollutant is classified as "attainment" in that area. If an area exceeds the standard, the pollutant is classified as "non attainment." If there are not enough data available to determine whether the standard is exceeded in an area, the area is designated "unclassified."

The sources, health effects, ambient air pollutant concentrations, and classifications for the five key criteria pollutants in the SJVAB are discussed below. The Merced County emissions totals for the SJVAB are shown in Table 4.3-1.

TABLE 4.3-1

EMISSION INVENTORY FOR MERCED COUNTY (TONS PER YEAR)

Summary Category Name	TOG	ROG	CO	NO_x	SO_x	PM	PM_{10}
Stationary Sources							
Fuel Combustion	0.69	0.55	11.07	3.90	0.72	0.31	0.28
Waste Disposal	0.00	–	0.00	0.02	0.00	0.00	0.00
Cleaning and Surface Coatings	1.88	1.60	–	–	–	0.01	0.01
Petroleum Production	0.34	0.32	–	–	–	–	–
Industrial Processes	1.08	0.93	0.63	3.10	0.08	2.75	1.38
Total Stationary Sources	3.99	3.40	11.70	7.02	0.80	3.07	1.67
Area Wide Sources							
Solvent Evaporation	6.80	6.45	–	–	–	–	–
Miscellaneous Processes	108.96	12.40	72.19	0.87	0.02	87.74	47.16
Total Area-Wide Sources	115.76	18.85	72.19	0.87	0.02	87.74	47.16
Mobile Sources							
On-Road Motor Vehicles	12.96	11.84	143.01	20.32	0.35	0.53	0.53
Other Mobile Sources	2.75	2.45	15.89	10.90	1.10	0.65	0.65
Total Mobile Sources	15.72	14.30	158.90	31.22	1.45	1.19	1.17
Natural (Non-Anthropogenic) Sources							
Natural Sources	0.08	0.05	0.51	0.01	–	0.09	0.08
Total Natural sources	0.08	0.05	0.51	0.01	–	0.09	0.08
Total Merced in SJVAB	135.56	36.59	243.30	39.12	2.28	92.09	50.09

Note: Inventory amounts reported in tons per year.

Source: CARB http://www.arb.ca.gov.

Air quality is described in terms of emissions rate and concentration of emissions. An emissions rate is the amount of pollutant released into the atmosphere by a given source over a specified time period. Emissions rates are generally expressed in units such as pounds per hour (lbs/hr) or tons per year. Concentrations of emissions, on the other hand, represent the amount of pollutant in a given space at any time. Concentration is usually expressed in units such as micrograms per cubic meter, kilograms per metric ton, or parts per million.

There are four primary sources of air pollution within the SJVAB: motor vehicles, stationary sources, agricultural activities, and construction activities.

The air quality monitoring station nearest to the UCP area is the Merced City station. Table 4.3-2 summarizes air quality data from this monitoring station.

TABLE 4.3-2

AIR POLLUTANT DATA SUMMARY

Pollutant	Merced – Coffee Avenue		
	1997	1998	1999
Ozone (ppm)			
Highest 1-Hour	0.10	0.14	0.13
Days > State Standard	1	37	42.00
Days > Federal Standard	0	3	2.00
Carbon Monoxide (ppm)			
Highest 1-Hour	-----	-----	-----
Highest 8-Hour	-----	-----	-----
Nitrogen Dioxide (ppm)			
Highest 1-Hour	0.072	0.063	0.078
Annual	0.013	0.012	0.013
Particulate Matter < 10 µm (PM_{10}) (µg/m^3)			
Highest 24-Hour	-----	-----	134
Days > State Standard	-----	-----	14
Days > Federal Standard	-----	-----	0
Annual Geometric Mean	-----	-----	40.6
Annual Arithmetic Mean	-----	-----	47.7

Notes:

- PM_{10} data collected at the M Street Station.
- NO_x levels did not exceed State or federal standards during this period.

Source: CARB http://www.arb.ca.gov August 2001.

Existing Attainment Status

Ozone

Ozone is a secondary pollutant that forms as a result of the interaction between ultraviolet light, Reactive Organic Gases (ROG) and nitrogen oxide (NO_x). ROG and NO_x are primary pollutants that are emitted directly into the environment, generated by motor vehicle operation and emitted as exhaust. Secondary or indirect pollutants are formed in the atmosphere, usually as the result of a chemical reaction involving primary pollutants. The major effects of ozone and the other components of photochemical smog include reductions in plant growth and crop yield; chemical deterioration of various metals; and irritation of respiratory systems and eyes.

In addition to the adverse effects on human health noted in Table 4.3-3 ozone is the pollutant primarily responsible for damage to crops and natural vegetation in California. Ozone injury to plants can occur as either acute injury (i.e., tissue death or death of the whole plant) at moderate to high concentrations (0.15 parts per million (ppm) and above for two to eight hours), or as chronic injury (e.g., reduced crop yield or impaired ecosystem stability) resulting from repeated exposure to ozone at low to moderate concentrations (0.04 to 0.2 ppm for a few days to several months).

TABLE 4.3-3

STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards[a]	National Standards[b]		San Joaquin Valley State Status/ Classification	San Joaquin Valley National Status/ Classification
		Concentrations[c]	Primary[c,d]	Secondary[c,e]		
Photochemical Oxidants[f]	8-hour 1-hour[g]	-- 0.09 ppm	0.08 ppm 0.12 ppm	Same as Primary	Nonattainment/ Severe	Nonattainment/ Serious
Carbon Monoxide	8-hour 1-hour	9.0 ppm 20.0 ppm	9 ppm 35 ppm	Same as Primary	Attainment/ None	Attainment/ None
Nitrogen Dioxide	Annual Mean 1-hour	-- 0.25 ppm	0.053 pm --	Same as Primary	Attainment/ None	Attainment/ None
Sulfur Dioxide	Annual Mean 24-hour 3-hour 1-hour	-- 0.04 ppm -- 0.25 ppm	0.03 ppm 0.14 ppm -- --	-- -- 0.5 ppm --	Attainment/ None	Attainment/ None
Fine Particulate Matter (PM_{10})	Annual Mean Annual Geometric Mean 24-hour	-- 30 µg/m^3 50 µg/m^3	50 µg/m^3 -- 150 µg/m^3	Same as Primary -- Same as Primary	Nonattainment/ Serious	Nonattainment/ Serious
Fine Particulate Matter ($PM_{2.5}$)	Annual Mean 24-hour	-- --	15 µg/m^3 65 µg/m^3	Same as Primary	Not Designated/ None	Not Designated/ None

Notes:

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

a California standards, other than carbon monoxide, sulfur dioxide (1-hour), and fine particulate matter, are values that are not to be equaled or violated. The carbon monoxide, sulfur dioxide (1-hour), and fine particulate matter standards are not to be violated.

b National standards, other than ozone, the 24-hour $PM_{2.5}$, the PM_{10}, and those standards based on annual averages, are not to be exceeded more than once a year. The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or les than one. The 8-hour ozone standard is attained when the 3-year average of the annual fourth highest daily maximum concentration is less than 0.08 ppm. The 24-hour PM_{10} standard is attained when the 99th percentile of 24-hour PM_{10} concentrations in a year, averaged over 3 years, at the population-oriented monitoring site with the highest measured values in the area, is below 150 µg/m^3. The 24-hour $PM_{2.5}$ standard is attained when the 98th percentile of 24-hour $PM_{2.5}$ concentrations in a year, averaged over 3 years, at the population-oriented monitoring site with the highest measured values in the area, is below 65 µg/m^3. The annual average $PM_{2.5}$ standard is attained when the 3-year average of the annual arithmetic mean $PM_{2.5}$ concentrations, from single or multiple community oriented monitors is les than or equal to 15 µg/m^3.

c All measurements of air quality are to be corrected to a reference temperature of 25° C and a reference pressure of 760 mm of mercury (Hg) (1013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

d National Primary Standards: The levels of air quality deemed necessary by the federal government, with an adequate margin of safety, to protect the public health.

e National Primary Standards: The levels of air quality deemed necessary by the federal government, to protect the public welfare from any known or anticipated adverse effects to a pollutant.

f Measured as ozone.

g The 1-hour ozone standard will be replaced by the 8-hour standard on an area-by-area basis when the area has achieved 3 consecutive years of air quality data meeting the 1-hour standard.

Source: CARB http:///www.arb.ca.gov, August 2001

Based on the designation criteria established by Section 40921.5 of the California Health and Safety Code, the SJVAB is classified as severe nonattainment for ozone. Because the District is responsible for a severe nonattainment area, it is subject to stringent requirements in the California Clean Air Act (CCAA) and must apply all feasible measures to reduce emissions.

The causes of the violation of air quality standards for ozone are complex. Unlike many air pollutants, ozone is not emitted directly into the atmosphere, but is produced in the atmosphere by a complex series of photochemical reactions involving ROG and NO_x. No single source accounts for most of the ROG and NO_x emissions because many sources are spread throughout the basin. Because ozone formation requires energy from the sun, elevated concentrations of ozone occur mostly during the summer months.

Carbon Monoxide

Carbon monoxide (CO) is an odorless, invisible gas usually formed as the result of incomplete combustion of organic substances. High levels of CO can impair the transport of oxygen in the bloodstream, thereby aggravating cardiovascular disease and causing fatigue, headaches, and dizziness.

In contrast to ozone, CO is a localized problem because CO is a non-reactive pollutant with one major source, motor vehicles. Ambient CO distributions closely follow the spatial and temporal distributions of vehicular traffic, and are strongly influenced by meteorological factors such as wind speed and atmospheric stability.

Through control measures adopted by State, local, and federal agencies and implemented by citizens, industry, and government, all areas in the SJVAB have attained the California CO standard. The request for redesignation of the last remaining area in the SJVAB designated nonattainment for CO standard (the Fresno Urbanized Area) to attainment was approved by CARB on September 24, 1998, and will become effective upon completion of the Office of Administrative Law evaluation.[1] The Office of Administrative Law has one year from submittal date to approve the request for redesignation.

Particulate Matter

Particulate matter can cause respiratory problems from small particles being inhaled deep into the lungs. Due to health impacts of breathing the particulates, the total suspended particulate standard was revised to reflect particulates that are small enough to be considered “inhalable” (i.e. 10 microns or less in size), referred to as PM_{10}.

Particulate matter is particles in the atmosphere resulting from many sources, including fume-producing industrial and agricultural operations, motor vehicle tires, combustion, atmospheric photochemical reactions and burned agricultural waste. It should be noted that agricultural activities, such as plowing, tilling and harvesting are exempt from air quality regulations.[2] Natural activities also introduce particulates into the atmosphere. Wind-raised dust is one such source.

The entire San Joaquin Valley is nonattainment for PM_{10}. The major components of PM_{10} are dust particles, nitrates, and sulfates. PM_{10} is directly emitted into the atmosphere as a by-product of fuel combustion, wind erosion of soil, and unpaved agricultural roads. Small particles are also created in the atmosphere through chemical reactions.

The United States Environmental Protection Agency (EPA) established $PM_{2.5}$ standards in recognition of increased concern over particulates 2.5 microns or less in diameter. According to information provided by EPA, designations for the new $PM_{2.5}$ standards by the EPA will begin in the year 2002 with attainment plans due by 2005 for regions that violate the standards. $PM_{2.5}$ measurements have begun to be conducted at three locations in the SJVAB to determine if the County is in attainment under the new federal $PM_{2.5}$ standards. A $PM_{2.5}$ monitoring network plan has been developed by the California Air Resources Board and local air districts in California, which includes a monitoring station in the City of Merced at M Street, the City of Stockton at Hazelton Avenue, and the City of Modesto at 14th Street. Data will be collected from these three monitoring stations for at least three years before a determination of attainment can be made.

Nitrogen Oxides

The SJVAB is in attainment with federal and State NO_x standards. Nitrogen oxide is an air quality concern because it acts as a respiratory irritant and is a precursor to O_3. Nitrogen oxides are produced by fuel combustion in industrial stationary sources, motor vehicles, ships, aircraft, and rail transit.

Sulfur Dioxide

Sulfur dioxide is a combustion product of sulfur or sulfur-containing fuels such as coal. This pollutant has in the past been well below the federal and State standards; therefore, it has not been recorded for the SJVAB.

Climate

In evaluating the effects of pollutant emissions on air quality, certain meteorological (weather) characteristics are critical. The following discussion describes those characteristics that would influence air quality conditions in the SJVAB. Weather factors with the most effect on air quality include precipitation, wind, and temperature. Precipitation and temperature affect the character of chemical reactions that take place in the atmosphere, while wind direction and speed affect atmospheric dispersion patterns.

The climate in Merced is typical of that found in the valley floor in northern and central California. In general, the climate typically includes cool, relatively mild winters, and hot, dry summers. The average annual summer temperature is above 71 degrees Fahrenheit, with days often over 100 degrees. Temperatures in winter are typically in the 50s during the day, with lows in the evenings in the 30s. Approximately 85 percent of the annual rainfall occurs between October and May, and measures approximately 12 inches.

Atmospheric inversions, during which temperature increases with elevation, often occur in winter. Heavy fog forms during this season, particularly in December and January. This reversal of normal conditions inhibits the dispersion of pollutants, which tend to accumulate close to the ground in the area of inversion, resulting in higher smog levels. Also contributing to this stagnation are the calm conditions in winter at night and early morning.

Wind

Northwesterly winds, or winds flowing up the valley to the southeast, prevail throughout the year. These winds are driven from the Pacific Ocean and enter the San Joaquin Valley through the Altamont Pass and the Carquinez Strait. Summer winds normally originate at the mouth of the San Joaquin Valley and flow to the south and southeast though the Tehachapi Pass into the desert areas of the southeast of the state. Winter winds that occur during December and January often reverse directions and flow down the valley to the northwest or become calm and variable. The most sustained winds tend to occur in the spring through the late summer where the predominant wind direction is from the northwest to the southeast. Average winds are most persistent in April through July when average unobstructed speeds are around eight miles per hour (mph). Wind speed bursts of 40 to 50 mph can occur with winter storms anytime between late October and late April.[3]

Dispersion Conditions

Dispersion of air pollutants in the northern portion of the San Joaquin Valley is limited by persistent inversions and low surface wind speeds. In the summer, subsiding air from the Pacific high pressure system produces a persistent regional scale inversion, regularly trapping pollutants and liming mixing. Morning air mixing heights tend to be lower than in the afternoon year round. Light surface winds, and the physical barriers of mountain ranges to the east and west, channel airflow and limit horizontal dispersion. The primary route of ventilation is southeast over the Tehachapi Mountains to the Mojave Desert. Multi-day periods of stagnation occur during summer and winter causing air pollutant levels to build up to peak concentrations.

Criteria Air Pollutants

The 1970 Clean Air Act (CAA) gave the EPA the authority to set federal ambient air quality standards. The CAA indicated the need for primary standards to protect public health and secondary standards to protect public welfare from effects such as visibility reduction, soiling, and nuisance. It also required that the federal standards be designed to protect those people most susceptible to respiratory distress, such as asthmatics, the elderly, very young children, people already weakened by illness, and persons engaged in strenuous work or exercise.

Currently, most of the effort to improve air quality in the United States and California is directed toward the control of five criteria air pollutants: ozone (O_3), CO, PM_{10}, NO_x, and sulfur dioxide (SO_2). Pollutants subject to federal ambient standards are referred to as "criteria" pollutants because the EPA publishes criteria documents to justify the choice of standards. The federal and State standards for the criteria pollutants of greatest concern in the SJVUAPCD are provided in Table 4.3-3. Table 4.3-4 provides a summary of the health effects associated with O_3, CO, PM_{10}.

Toxic Air Contaminants

In addition to the criteria air pollutants, another group of substances, called Toxic Air Contaminants (TACs) are known to be highly injurious, even in small quantities. TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic) adverse human health

effects (i.e., injury or illness). There are hundreds of substances that can be toxic when inhaled, but air quality standards have not been set for most of them.

TABLE 4.3-4

HEALTH EFFECTS SUMMARY OF THE MAJOR CRITERIA AIR POLLUTANTS

Air Pollutant	Adverse Effects
Ozone	$ Eye irritation $ Respiratory function impairment
Carbon Monoxide	$ Impairment of oxygen transport in the blood stream $ Aggravation of cardiovascular disease $ Impairment of central nervous system function $ Fatigue, headache, confusion, dizziness $ Can be fatal in the case of very high concentrations in enclosed places
Particulate Matter	$ May be inhaled and lodge in and irritate the lungs $ Increased risk of chronic respiratory disease with long exposure $ Altered lung function in children $ May produce acute illness with sulfur dioxide

Source: Bay Area Air Quality Management District.

TACs can be emitted from a variety of common sources, including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. Natural source emissions include windblown dust and wildfires. Farms, construction sites, and residential areas can add to air toxic emissions. Research facilities can also be a source of toxic air contaminants. TACs include both organic and inorganic chemical substances. Examples include certain chlorinated hydrocarbons, such as solvents, and certain metals and asbestos.

Merced County does not currently have a monitoring station for toxic air contaminants. Since the UCP area is undeveloped and consists of grazing land and agricultural fields, there are no known sources emitting TACs within the site. Similarly land surrounding the site is primarily agricultural, with some rural residential uses to the west. None of these existing land uses emit TACs.

Odors

There are four major elements involved in evaluating odor emissions: deductibility, recognition, intensity, and hedonic tone. Deductibility is the lowest concentration of an odorant that will elicit a sensory response; at this concentration there is an awareness of the presence of an added substance, but not necessarily an odor sensation. Recognition, however, is the minimum concentration that is recognized as having a characteristic odor quality be a segment of the population. Odor intensity refers to the perceived strength of the odor sensation, and odorant character is what the substance smells like (e.g. fishy, rancid, hay, sewer). Hedonic tone is a judgment of the relative pleasantness or unpleasantness of the odor, and is influenced by factors, such as subjective experience and frequency of occurrence. The apparent presence of an odor in ambient air depends on the properties of the substance emitted, its concentration in facility emissions, and the dilution of emission between the mission point and the receptor.

Existing odor sources in UCP area are limited to those associated with agricultural activities. Manure associated with cattle grazing on the northern portion of the UCP area is one source of odors. Produce grown in the southern portion of the UCP area, which can emit odors during times of harvest and spraying, is another source of odors.

Sensitive Receptors

Some individuals are considered more "sensitive" than others to air pollutants. The reasons for greater sensitivity than average include health problems, proximity to the emissions source, or duration of exposure to air pollutants. Land uses such as primary and secondary schools, hospitals, and convalescent homes are considered to be sensitive receptors to poor air quality because the very young, the old and the infirm are more susceptible to respiratory infections and other air quality-related health problems than the general public. Residential uses are considered sensitive because people in residential areas are often at home for extended periods of time, so they could be exposed to pollutants for extended periods. Recreational areas are considered moderately sensitive to poor air quality because vigorous exercise associated with recreation places a high demand on the human respiratory function.

Sensitive receptors nearest to the UCP area are located west of Lake Road in the Rural Residential Center. These homes are located on one-acre lots and are interspersed with fields of irrigated pasture. Hunt Farms is located within the UCP area and includes a residential home with stables and other agriculturally-related structures. There are no schools, hospitals, or convalescent homes located within one mile of the University Community. There are special-use guest homes within one mile of the UCP area, west of Lake Road.

REGULATORY SETTING

The SJVUAPCD is the agency responsible for attainment and maintenance of air quality standards in the air basin, including Merced County. The SJVUAPCD is also subject to the regulations and attainment goals and standards of the CARB and the California and U.S. Environmental Protection Agencies (EPAs). The Cal-EPA, CARB, local air districts and the federal EPA enforce the State and federal Clean Air Act standards. The federal and State standards are given in Table 4.3-3. The standards provide acceptable durations for specific federal and state pollutant levels in order to protect sensitive receptors from adverse health effects (indicated in Table 4.3-4).

Federal Regulations

Between 1987 and 1990, many states, including California, were in the process of implementing the EPA's interim policy. Non-attainment areas were given until the end of 1990 to revise their State Implementation Plans (SIP) to demonstrate attainment and maintenance. After submittal of the revised SIPs, the EPA classified non-attainment areas as near-term (i.e., attainment predicted in three to five years) or long-term (i.e., attainment more than five years away). In near-term non-attainment areas, pollutant emission reductions of three percent per year were to occur until standards are attained and standard maintenance for a period of ten years thereafter will have to be demonstrated.

The Clean Air Act (CAA) of 1990 requires emission controls on factories, businesses, and automobiles. The CAA affects automobiles by lowering the limits on hydrochloric acid (HCl) and NO_x emissions,

requiring the increased use of alternative-fuel cars, on-board canisters to capture vapors during refueling and extending emission-control warranties. The 1990 CAA reduces airborne toxins by requiring factories to install "maximum achievable control technology" and installing urban pollution control programs. The 1990 CAA also reduces acid rain production by cutting sulfur dioxide emissions for coal-burning power plants.

In July of 1997, the EPA adopted a $PM_{2.5}$ standard in recognition of increased concern over particulate matter 2.5 microns or less in diameter. Ending several years of litigation, EPA's $PM_{2.5}$ regulations were upheld by the United States Supreme Court on February 27, 2001. According to information provided by the EPA, designations for the new $PM_{2.5}$ standards by the EPA will begin in the year 2002 with attainment plans due by 2005 for regions that violate the standard. $PM_{2.5}$ measurements have not yet been conducted to determine if the County is in attainment under the new federal $PM_{2.5}$ standards. A $PM_{2.5}$ monitoring network plan has been developed by the California Air Resources Board and local air districts in California, and data is in the process of being collected.

Toxic Air Contaminants

Regulation of TACs is achieved through federal and State controls on individual sources. The 1990 federal CAA Amendments offer a comprehensive plan for achieving significant reduction in both mobile and stationary source emissions of certain designated TACs. All major stationary sources of designated TACs are required to obtain an operating permit under Title V of the Amendments.

The Air Toxics Hot Spots Information and Assessment Act of 1987, California Health and Safety Code Section 44300 et seq, provides for the regulation of over 200 air toxics and is the primary air contaminant legislation in the state. Under the act, local air districts may request that a facility account for its TAC emissions. Local air districts then prioritize facilities on the basis of emissions, and high-priority designated facilities are required to submit a health risk assessment and communicate the results to the affected public. The TAC control strategy involves reviewing new sources to ensure compliance with required emission controls and limits, maintaining an inventory of existing sources of TACs, and developing new rules and regulations to reduce TAC emissions.

State Regulations

The State of California has had its own ambient air quality standards for many years. These ambient standards are, in general, more stringent than the existing federal standards for the criteria air pollutants.

Until the California Clean Air Act (CCAA) was signed into law on January 2, 1989, the State standards were not required to be attained by any specific date. This legislation required areas that exceed the California ambient air quality standards to plan for the eventual attainment of the standards. Areas have been designated as attainment or nonattainment with respect to the ambient air quality standards. The time given to various areas would depend upon the severity of air quality problems. The California Health and Safety Code Section 40914(A) requires that districts design a plan to achieve an annual reduction in district-wide emissions of five percent or more for each nonattainment criteria pollutant or its precursor, averaged every consecutive three-year period.

California's state air quality management agency, CARB, regulates mobile emissions sources, and oversees the activities of county APCDs and regional AQMDs. The CARB regulates local air quality indirectly by establishing vehicle emission standards, by conducting research activities, and through its planning and coordinating activities.

Regional Regulations

San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD)

The SJVUAPCD is the primary agency responsible for planning, implementing, and enforcing federal and State ambient standards in the San Joaquin Valley. In order to demonstrate the area's ability to eventually meet the standards, the SJVUAPCD maintains the region's State Implementation Plan (SIP) for ozone. The SIP is a compilation of plans and regulations that govern how the region and state will comply with the federal CAA requirements to attain and maintain the federal ozone standard. Because of the ozone violations, the SJVUAPCD prepared the 1991 *Air Quality Attainment Plan* (AQAP) and the subsequent 1994 *Ozone Attainment Demonstration Plan* (OADP). Maintenance of the ozone standard is required to be addressed every three years in revisions of the plan. The OADP includes the specific measures to reduce ground level ozone by reducing emissions of ozone precursors. The most recent update of the OADP was adopted on March 15, 2001. No State plan is required to meet state PM_{10} standards.

The air quality management plan measures for reducing emissions of reactive organic compounds and nitrogen oxides affect all source categories. Emissions limitations are imposed upon sources of air pollutants by rules and regulations promulgated by the federal, state, or local agencies. The SJVUAPCD regulates stationary sources through its permitting and compliance programs and is responsible for implementing stationary source performance standards and other requirements of federal and State laws. Mobile sources of air pollutants are largely controlled by federal and state agencies through emission performance standards and fuel formulation requirements. Smaller sources and emitting activities that are distributed areawide (such as fuel combustion for residential heating, use of consumer products, or emissions from construction activities) are regulated by a combination of state and local programs. The SJVUAPCD manages indirect sources (such as emissions from transportation and energy demand) through participation in the environmental review process and distribution of guidance to local jurisdictions for indirect source control.

Generally, when the air district prepares attainment plans or updates attainment plans, future emissions are based on population projects provided by local Council of Governments. The population estimates are incorporated into Regional Transportation Plans, which are then used by the air district to estimate the amount of future emissions in the air basin. With regard to Merced, the Merced County Association of Governments provides the SJVUAPCD with projected population estimates for future years.

SJVUAPCD Plans and Regulations

The *Air Quality Attainment Plan* of 1991, the *Ozone Attainment Demonstration Plan* of 1994, and subsequent plan revisions address the state and federal Clean Air Act requirements to attempt to bring the San Joaquin Valley Air Basin into compliance with the ambient air quality standards. These plans provide for region-wide emission reductions of five percent per year averaged over consecutive three-year periods. The CCAA grants air districts explicit statutory authority to adopt indirect source regulations

and transportation control measures, including measures to encourage or require the use of ride-sharing, flexible work hours, or other measures which reduce the number of length of vehicle trips.

The 1991 *Air Quality Attainment Plan* for the San Joaquin Valley Air Basin identifies eleven Transportation Control Measures (TCMs) as "reasonably available" in the San Joaquin Valley Air Basin. The following TCMs are included in the Plan:

- Traffic Flow Improvements,
- Public Transit,
- Passenger Rail Support/Facilities,
- Rideshare Program,
- Suburban Park and Ride Lots,
- Bicycling Program,
- Trip Reduction Programs,
- Telecommunications, and
- Alternative Work Schedules.

In 1998, SJVUAPCD published the *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI). It is an advisory document that provides local jurisdictions with procedures for addressing air quality in environmental documents. The guide provides methods for assessing air quality impacts, thresholds of significance adopted by the air district, and recommended mitigation measures.

Local jurisdictions are also encouraged by the SJVUAPCD to incorporate air quality elements in local plans. In 1994, SJVUAPCD published the *Air Quality Guidelines for General Plans*, which provides assistance for developing policies and implementation strategies at the local level that will be consistent with regional efforts to manage air quality. A key recommendation of these guidelines is to incorporate air quality considerations when developing land use and transportation plans. Examples of this would be considering transportation demand (and motor vehicle emissions) that would be associated with land use patterns or considering land use compatibility of agricultural and industrial uses with uses that would be "sensitive" to localized air quality conditions.

Rules promulgated by the SJVUAPCD directly influence activities necessary to develop communities. Construction activities can generate PM_{10} emissions from the movement of soil, use of heavy equipment, bulk materials handling, asphalt paving and other related activities. Dust or PM_{10}, emissions from construction activities can be adequately controlled at the source. SJVUAPCD Regulation VIII, Fugitive Dust Prohibitions, requires reducing PM_{10} emissions from construction activities. Residential wood burning is regulated by SJVUAPCD Rule 4901, which specifies installation of only specially certified wood burning appliances.

As previously, stated, the SJVUAPCD also regulates facilities that emit toxic air contaminants (TAC). The SJVUAPCD administers the region's Toxic Air Contaminant Control program, which is intended to reduce the public exposure to TACs from stationary sources in the region.

Merced County Association of Governments

The SJVUAPCD has entered into a memorandum of understanding with the Merced County Association of Governments and Council of Fresno County Governments. This memorandum of understanding ensures a coordinated approach in the development and implementation of the transportation plans required by the CCAA and the CAA.

Local Regulations

Merced County General Plan

Although the Merced County General Plan does not contain an air quality element, there are policies presented in other elements of the General Plan that address air quality. Following are air quality-related policies in the General Plan that apply to the UCP:

Circulation Element

Policies:

7. Encourage the construction of Class I, II, or III bike routes as designated in the overall Merced County Bikeway Plan and in Community Specific Plans.

8. Support efforts by the Merced County Associations of Governments (MCAG) and other public entities to improve public transportation.

10. Encourage and develop programs which promote the use of ridesharing, car-pooling and vanpooling.

Open Space/Conservation Element

Policies:

18. Encourage, when appropriate, the use of solar and other renewable energy resources for residential, commercial, industrial and public building applications.

19. New subdivision lots should be oriented to allow for both passive and active solar design and technology and to minimize energy losses.

20. Rural land uses, which involve a high volume of vehicle traffic, should be located adjacent to major roadways to reduce access distances.

24. Evaluate potential air quality impacts through the environmental review of all development projects which may significantly increase air emissions.

25. The County will assist in voluntary efforts to improve air quality through regional cooperation and will resist efforts to create additional State air pollution mandates which are contrary to the overall goals of the General Plan.

26. All development projects will be reviewed for compliance with applicable regional air quality plans.

27. In planning of new SUDPs, the County should encourage the use of innovative technologies to improve air quality, such as incorporation of facilities for zero emission vehicles into project design.

PLAN ELEMENTS

Following are proposed UCP policies addressing air quality. These policies primarily require compliance and coordination with the SJVUAPCD rules and guidelines for mitigation air quality impacts. These air quality policies also focus on regional planning and coordination as opposed to site-specific air quality policies. They also incorporate policies from other resource areas such as transportation, land use, and energy.

Air Quality Policies

AQ 1.1: Determine air quality effects of projects using analysis methods and significance criteria recommended by the SJVUAPCD. This would help to ensure impacts identified during CEQA review are consistently and fairly mitigated with feasible, implementable, and cost effective strategies.

AQ 1.2: Work with the City of Merced and other jurisdictions and agencies to address cross-jurisdictional and regional transportation and air quality issues. Encourage staff planners to participate in activities of neighboring jurisdictions and regional agencies. The aim would be to examine congestion in other jurisdictions caused by University Community projects, effects of projects on viability of regional transit and pedestrian-oriented projects, progress of jurisdictions to construct segments regional bikeway plans, proposed land use or circulation changes that would alter traffic flow or increase urban sprawl in jurisdictions.

AQ 2.1: Integrate planning efforts by considering air quality when planning land use and transportation systems and considering air quality and mobility when reviewing any proposed change to the land use pattern.

AQ 2.2: Develop a congestion management plan to reduce motor vehicle trips, as defined by the UCP's transportation policies (T 7.1 to 7.4). These include policies for (a) the provision of grid streets and "flexible corridors" that provide travel-mode options and future capacity and (b) street design standards for bicyclists, pedestrians, and traffic calming.

AQ 2.3: Establish land use pattern, densities, and pedestrian-enhanced infrastructure, in accordance with Land Use policies, to encourage the use of alternative transportation modes and reduce

the length and number of motor vehicle trips. These encompass policies to manage the density and intensity of development; develop a planned "heart" of the community, parklands, pedestrian-oriented mixed use districts, neighborhood convenience commercial, neighborhood schools, and centralized large-scale commercial and office uses in village centers with appropriate transportation services; as well as compact and orderly outward expansion of contiguous development and infrastructure through "land use phasing" and urban limit lines.

AQ 2.4: Design streetscapes, housing, and village centers to improve access by pedestrians and bicyclists. Land Use policies provide a structure that maximizes pedestrian activity and transit use.

AQ 2.5: Implement a transportation infrastructure that provides opportunity for reduced trip lengths and minimized new trips while anticipating a multi-modal system in accordance with Transportation policies. This should include internal and regional public transit systems, supporting transit infrastructure and amenities (shelters, benches, bus turnouts, route signs, park and ride lots, and so on), multi-modal connections to regional transportation system (airports and passenger rail facilities), a comprehensive system of bikeways, required bicycle storage and parking at appropriate sites, and infrastructure for telecommunication facilities.

AQ 2.6: Require the installation of electrical outlets in residential garages and commercial and office parking structures/lots for the use of electrical vehicles.

AQ 2.7: Comply with SJVUAPCD published guidelines and mitigation measures for analyzing and mitigating air quality impacts related to development of the University Community.

AQ 3.1: Adequately separate or buffer sensitive uses from sources of odors and dust. Require new point sources of pollution, including sources of odors and dust, to be located an adequate distance from sensitive receptors.

AQ 4.1: Implement energy conservation policies defined in the Energy policy section of the University Community Plan.

AQ 5.1: Implement measures to reduce dust and particulates created during construction activities including limiting traffic on unpaved roads, installing erosion control measures to prevent silt runoff onto public roads, use of wheel washers for construction vehicles, installation of windbreaks, suspension of excavation and grading during high winds, and similar techniques.

AQ 5.2: Promote the use of alternative fuel construction equipment, where feasible, and the use of low emission on-site stationary equipment.

AQ 5.3: Limit the hours of operation of heavy duty construction equipment and the amount of construction equipment in use at any time.

AQ 5.4: Curtail construction activities during periods of high ambient air pollution concentration.

AQ 6.1: Require the installation of low-emitting, EPA-certified wood-burning appliances or natural gas fireplaces in residential developments.

AQ 7.1: Identify opportunities for and encourage the procurement and use of alternative fuel vehicle fleets by large employers in the University Community and UC Merced. Collaborate with UC Merced on an alternative fuel vehicle shuttle system servicing the campus, the University Community, and the City of Merced.

Transportation Policies

T 4.1: Create a complete, interconnected bicycle and pedestrian circulation system that serves both commuter and recreational travel, and provides access to major destinations.

T 4.2: Work with UC Merced to establish convenient pedestrian and bicycle access routes to and through Campus.

T 4.3: Install amenities to serve bicyclists and pedestrians, such as secure and convenient bicycle parking and shaded seating areas at public facilities.

T 4.4: Establish bicycle parking standards for new development.

T 4.5: Work with the transit provider to encourage transit-bicycle transfers by installing bike racks on buses.

T 5.1: Provide high-frequency transit services that seamlessly connect major destinations, including the UC Merced campus. Encourage convenient transfers between transit and other modes of travel.

T 5.2: Work proactively with local and regional transit providers to coordinate transit service. Work with transit providers, the regional Air Pollution Control District, and public utility providers to encourage actions that reduce pollution from transit vehicles (such as purchasing vehicles that use alternative fuels, and providing fueling/charging stations).

T 5.3: Establish a transit hub at the interface between the town center and campus core for timed-transfers between local campus/Community transit service and regional transit connections serving the City of Merced, the rest of Merced County, and major interregional destinations.

T 5.4: Work with UC Merced to design a transit fare policy and transit pass system that provides maximum incentives for transit ridership for University students and employees.

T 5.5: Establish development standards, such as inclusion of handicap-accessible bus stops and shelters, to make transit attractive. Require development to fund its share of necessary transit facilities.

T 5.6: Establish a County/City/University transportation clearinghouse and website that provides information on local transit services and alternative travel options.

T 7.1: Encourage non-residential developments to offer telecommute and flexible work-hour opportunities, and provide employee incentives for using transit, ridesharing, bicycling and walking.

T 7.2: Locate parking at strategic intercept points to minimize driving into and through central areas of the Community and Campus. Serve remote parking with frequent transit shuttles.

T 7.3: Promote ridesharing through public information and outreach.

T 7.4: Encourage non-residential developments to provide amenities for bicyclists, including showers and changing facilities.

Land Use

LU 4.1: Concentrate land uses to minimize impacts on natural environmental resources and agricultural uses, and maximize the efficiency of supporting infrastructure, community/ pedestrian activity, and transit use.

LU 4.3: Site and design land uses and buildings to maximize the Community's quality of life, including the establishment of pedestrian-oriented mixed use districts and residential neighborhoods that reflect the traditional qualities of Merced, while providing opportunities for innovative and creative forms of development.

LU 4.4: Locate the highest development densities within and adjacent to the Town Center and primary transit corridors and stations to support community activity and transit use. Prioritize areas adjacent to the Town Center and campus as housing locations for UC Merced students, faculty, and staff.

LU 5.8: Develop the Town Center with the highest densities in the University Community to reinforce its role as the "heart" of the community and foster pedestrian and transit use, according to the following standards:

- Retail and office uses (free-standing) — minimum floor area ratio (FAR) of 0.4 and maximum of 3.0 (one to six stories)
- Mixed use (housing/retail or office) — minimum FAR of 1.5 and maximum 3.0, with a minimum FAR of 0.35 and maximum of 1.0 for retail or office components (three to six stories)
- Residential — minimum of 18 and maximum of 32 units per net acre (two to four stories)
-

LU 5.16 Develop and design public streetscapes to enhance pedestrian activity including the integration of landscape, street furniture, signage, lighting, public art, distinctive paving materials, and other amenities. Local and/or campus artists should be involved in the design of streetscapes, in lieu of

the exclusive use of traditional "catalogue" elements, to impart a distinctive character and enhance ownership by the community.

Agricultural Resources

A 2.2: Enforce the County of Merced's Right-to-Farm Ordinance for the University Community that requires nonagricultural residents be made aware of local agricultural operations, their practices, and the potential agriculturally related impacts (noise, odors, dust, and so on).

A 2.3: Provide materials such as brochures and pamphlets to all future residents of the University Community informing them about the effects of agricultural activities that states residents within the University Community may be subject to inconveniences or discomfort arising from the use of agricultural chemicals, such as fertilizers and pesticides; and from the pursuit of agricultural operations including but not limited to, plowing, spraying, and burning which occasionally may generate dust, smoke, noise and odor.

A 4.1: Establish an adequate open space buffer at the southern and eastern edges of the University Community planning area. This buffer will accommodate passive uses such as open space, parks, certified organic farming, natural preserves, or treated wastewater storage.

IMPACTS AND MITIGATION MEASURES

Method of Analysis

Construction Emissions

PM_{10} emissions from grading and trucking activities are qualitatively discussed using the emission rate presented in URBEMIS7G (2000) of 10 lbs/day/acre of PM_{10}, unmitigated. Mobile source construction PM_{10}, ROG, NO_x and CO emissions are also qualitatively discussed. Because site-specific information is not available, calculations from individual construction vehicles and sites are not possible. It is also unknown how many acres would be under construction during any given day. PM_{10} emissions can vary considerably depending on factors such as the level of activity, the specific operations taking place, and weather and soil conditions. The SJVUAPCD emphasizes implementation of effective and comprehensive control measures rather than detailed quantification of construction emissions.[4] Gasoline and diesel powered heavy duty mobile construction equipment would be expected to contribute NO_x, ROG, and CO emissions.

Operational Emissions

Vehicle emissions associated with development of the UCP area were calculated with BURDEN7G using daily vehicle miles traveled (VMT) from the traffic report planned for this DEIR. Development of the campus would result in community-related growth, regardless of whether the existing UCP boundary is the chosen location. If the existing UCP boundary does not accommodate the growth associated with the campus, then dispersed pockets of growth would occur throughout the County. Therefore, the Baseline and cumulative without project scenarios for this analysis assume that the UCP would not be developed, but that growth associated with the campus would occur elsewhere in the County.

According to the traffic analysis, the proposed UCP would generate approximately 127,000 daily vehicle trips at Buildout. Of the 127,000 trips, 67 percent or 85,000 trips would remain internal to the UCP area and Campus. The remaining 33 percent or 42,000 trips would be external to the UCP area.

Using the above information and an average trip length of 3 miles for internal trips and 9.81 miles for external trips, it was calculated that the daily VMT of 255,000 would occur within the UCP area and 126,000 would occur for trips external to the UCP area. The above information was then used to estimate emissions using BURDEN7G. All modeling outputs are located in Appendix C.

The CARB has recently released EMFAC2000, which is an updated emissions inventory model that takes into account recent air pollution control regulations and their effect on future emissions. However, consultation with the SJVUAPCD has identified BURDEN7G as the preferred model for this analysis.[5] Because BURDEN7G model does not account for recently adopted air pollution control regulations that reduce emissions generated by mobile vehicles, the estimated emissions from BURDEN7G are slightly higher than those estimated using EMFAC2000. BURDEN7G also only has emission inventories up to the year 2020, while this analysis relies on the year 2025. However, future emissions associated with mobile sources are anticipated to decrease every year due to advancements in technology allowing for cleaner cars and increased air emission regulations, so future emissions associated with 2020 would be higher than those associated with 2025. As a result, although BURDEN7G may not have the most recent emission inventory data, it would provide for the most conservative air quality analysis.

Area Sources

Area source emissions include fireplaces, woodstoves, consumer products, natural gas and landscaping equipment. Emissions from consumer products, natural gas and landscaping equipment were obtained using URBEMIS7G. All model outputs are located in Appendix C. Fireplace emissions associated with the project are qualitatively discussed. Because project–specific information was not available for future schools, commercial and industrial land uses, emissions were only modeled using the number and type of future residential homes, and square footage of facilities as provided in Table 2-1 in Chapter 2, Project Description.

Stationary Sources

Stationary sources are non-mobile facilities, such as industries, businesses and research facilities, that emit criteria air pollutants and toxic air contaminants. Stationary sources are regulated and permitted by the SJVUAPCD. Issuance by the SJVUAPCD of a permit to operate is dependent upon emission levels emitted, retrofitting equipment, and/or replacing equipment. Potential impacts on receptors are qualitatively discussed because the type, size, and number of such sources cannot be determined at this time. Impacts associated with future school sites and toxic air contaminants are addressed in Chapter 4.7, Hazards and Hazardous Materials.

Additional Baseline Assumptions

The above setting information constitutes a portion of the baseline condition for the UCP. However, as discussed in Section 4.0, Introduction to the Analysis, the UCP will be adopted only after adoption of the UC Merced Long Range Development Plan. Therefore, concurrent development of the UC Merced campus and the University Community is assumed and the UC Merced campus is assumed in the baseline conditions. The existing conditions on the UC Merced campus site and anticipated conditions at buildout of the UC Merced campus are discussed below.

Construction activities associated with the development of the UC Merced campus would include grading, earthmoving, and vehicle trips that are anticipated to result in short-term emission of fugitive dust and other air pollutants. In addition, daily operation of the campus would include vehicle trips, maintenance activities, and research uses that are anticipated to result in the long-term emission of air pollutants. Please refer to the UC Merced LRDP EIR for a complete description of setting and LRDP elements related to air quality.

Standards of Significance

The following standards of significance are based on the Appendix G of the CEQA Guidelines, standards presented in the SJVUAPCD's Guide to Assessing and Mitigating Air Quality Impacts, and recommendations from the SJVUAPCD's CEQA compliance staff. The SJVUPACD has published thresholds for NO_x and ROG; however, the District has not adopted any thresholds for PM_{10}. As previously stated, the SJVUAPCD does not require Lead Agencies to provide detailed quantification of PM_{10} associated with construction emissions. If the Lead Agency complies with the SJVUPACD's rule Regulation VIII for dust control, and other feasible dust control mitigation measures, then the impact is considered by the SJVUAPCD to be fully mitigated, and is therefore less than significant.

For the purposes of this EIR, impacts are considered significant if the proposed UCP would:

- Conflict with or obstruct implementation of applicable air quality plans, including SJVUAPCD's *Guide to Assessing and Mitigating Air Quality Impacts*;

- Violate an existing air quality standard or contribute substantially to an existing or projected air quality violation. For impacts where emissions are quantified, exceed the following thresholds from the San Joaquin Valley Unified Air Pollution Control District:[6]

  NO_x: 10 tons/year, or
  ROG: 10 tons/year,

- Result in a cumulatively considerable net increase in any criteria air pollutant for which the project region is non-attainment;

- Expose sensitive receptors to substantial pollutant concentrations; or

- Create objectionable odors affecting a substantial number or people.

Since there are no ambient standards for toxic air contaminants, evaluation of impacts is based upon assumptions used in health risk analyses. Evaluation of significant cancer risk would follow regulations promulgated by the California Health and Welfare Agency under Proposition 65, which defines a significant cancer risk as any risk exceeding ten in one million.

Evaluation of significant non-carcinogenic (chronic and acute) health risks are based on changes in ground level concentrations of pollutants emitted from stationary sources that would exceed the relevant non-cancer effect criterion. For the purposes of this EIR, the non-cancer effect criterion is a hazard index greater than 1.0.

Project-Specific Impacts and Mitigation Measures

4.3-1 Project-related construction activities would generate PM_{10}.

Applicable Regulations: SJVUAPCD's Regulation VIII

Significance: Significant

Mitigation Included in the UCP: Policy AQ 5.1

Significance After Mitigation Included in the UCP: Less than Significant

Additional Mitigation: Mitigation Measure 4.3-1

Compliance with the following SJVUAPCD mitigation measure listed in Table 6-3 of the GAAMAQI would further reduce dust created during construction activities:

Limit traffic speeds on unpaved roads to 15 mph.

Residual Significance: Less than Significant

Baseline Plus Buildout

Construction activities associated with implementation of the UCP would include clearing, grading, trenching, and other activities that result in the generation of dust. As previously noted, the UCP area is currently designated as serious non-attainment for the State PM_{10} standard. Using the most recent emission factor available from URBEMIS7G (2000), approximately ten lbs of PM_{10} would be generated from every acre disturbed. At the present time, it is unknown how many acres of land would be disturbed for construction activities on any given day within the UCP. However, if multiple projects are being constructed at the same time within the UCP area, a considerable amount of PM_{10} could be generated exposing sensitive receptors to substantial pollutant concentrations. In addition, the State 24-hour PM_{10} standards could be violated.

Implementation of the AQ 5.1, which requires measures to reduce construction particulate matter and is in accordance with SJVUAPCD standards, would minimize the amount of PM_{10} generated during construction activities. Furthermore, all construction activities would be required to comply with the most current version of the SJVUPACD's Regulation VIII, which requires that dust control measures be implemented during construction activities. In addition, based on consultation with the SJVUAPCD, limiting speeds to 15 mph on unpaved roads is recommended to further reduce the magnitude of this impact. Compliance with the mitigation measure, UPC Air Quality Policies, and Regulation VIII would reduce construction-related PM_{10} emissions to a less-than-significant level.

Baseline Plus 2015

The amount of PM_{10} generated under this scenario would be the same as buildout of the Plan, because it is assumed that the same amount of acreage could be graded on any given day. As discussed above, UCP policies and additional mitigation would reduce construction-related PM_{10} emissions to a less-than-significant level.

4.3-2 Construction activities would generate NO_x, ROG and CO emissions.

Applicable Regulations: None

Significance: Significant

Mitigation Included in the UCP: Policies AQ 5.2 through 5.4

Significance After Mitigation Included in the UCP: Significant

Additional Mitigation: Mitigation Measures 4.3-2 Construction contracts shall include the following specifications:

- *Minimize idling time to a maximum of ten minutes when construction equipment is not in use;*
- *Employ construction activity management techniques such as extending the construction period outside the ozone season of May through October, reducing the number of hours of construction and scheduling construction activities during off peak hours.*
- *Tuning engines to manufacturer's specifications;*
- *When feasible, schedule equipment usage to avoid simultaneous use of equipment.*

Residual Significance: Significant and Unavoidable

Baseline Plus Buildout

Implementation of the UCP would result in NO_x, ROG, and CO emissions generated by the use of mobile construction equipment for development within the UCP as well as for off-site improvements such as roadway or infrastructure improvements. Construction equipment is frequently diesel-fueled, which generates more pollutants than construction equipment that uses gasoline. Emission factors associated with various types of construction equipment are depicted in Table 4.3-5. Given the size of the UCP area,

TABLE 4.3-5

EMISSION FACTORS FOR HEAVY-DUTY CONSTRUCTION EQUIPMENT

Equipment Type	Reactive Organic Compounds	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
DIESEL					
Tracked Tractor	0.12	1.26	0.35	0.14	0.11
Wheeled Tractor	0.19	1.27	3.59	0.09	0.14
Wheeled Dozer	0.19	4.17	1.79	0.35	0.17
Scraper	0.28	3.84	1.26	0.46	0.41
Motor Grader	0.04	0.71	0.51	0.09	0.06
Wheeled Loader	0.25	1.89	0.57	0.18	0.17
Tracked Loader	0.10	0.83	0.20	0.08	0.06
Off-Highway Truck	0.19	4.17	1.79	0.45	0.26
Roller	0.07	0.86	0.30	0.07	0.05
Miscellaneous	0.15	1.69	0.68	0.14	0.14
GASOLINE					
Wheeled Tractor	0.5	0.43	9.52	0.02	0.02
Motor Grader	0.56	0.32	12.10	0.02	0.02
Wheeled Loader	0.7	0.52	15.60	0.02	0.03
Roller	0.79	0.36	13.40	0.02	0.03
Miscellaneous	0.73	0.41	17.00	0.02	0.03

Note: Emission factors are reported in lbs per hour.

Source: URS, U.C. Merced LRDP, Draft Environmental Impact Report, August 2001.

and the intensity of land uses that could occur within the UCP area, construction activities would generate substantial quantities of NO_x, ROG, and CO emissions, and could exceed the SJVUAPCD thresholds of 10 tons/year for ROG and NO_x. Furthermore, the San Joaquin Valley, including the UCP area is currently designated as non-attainment for ozone at both the Federal and State levels.

In addition to exhaust from construction equipment, the use of architectural coatings and asphalt paving generate emissions. These additional activities could result in the generation of ROGs. NO_x and ROG are ozone precursors and ultimately result in the creation of ozone.

It is anticipated that construction activities will be ongoing until full buildout of the project, so there would be the potential for elevated ambient levels of toxic air contaminant from the diesel equipment exhaust particulates. However, rather than quantifying and assessing the significance of the impacts, the approach should be to mitigate the impact by reducing emissions from all construction equipment by implementing the above mitigation measures.

UCP Policies AQ 5.2 through 5.4 would reduce construction emissions by promoting the use of alternative-fuel construction equipment, limiting the hour of use of heavy duty construction equipment

and the amount of equipment used at any one time, and curtailing construction activities during periods of high ambient pollutant concentrations. In addition to AQ 5.2 through 5.4, the Air District has presented project specific mitigation measures that would further reduce the magnitude of this impact. Although these measures would reduce the magnitude of the impact, it would remain significant and unavoidable, because they are unlikely to reduce emissions below District thresholds for most construction projects.

Baseline Plus 2015 Scenario

Daily construction-related emissions associated with the Baseline Plus 2015 Scenario would be similar to the Baseline Plus Buildout Scenario the amount of daily construction would likely be the same. Therefore, these emissions would be a significant impact, even with the policies and mitigation measures discussed above.

4.3-3 Project-related traffic would increase CO concentrations at specific intersections.

Applicable Regulations: None

Significance: Buildout: Significant
2015: Less than Significant

Mitigation Included in the UCP: Policies AQ 2.2, 2.4, 2.5; LU 4.1, 4.3, 5.8 and 5.16

Significance After Mitigation in the UCP: Buildout: Less than Significant
2015: Less than Significant

Additional Mitigation: None

Residual Significance: Buildout: Less than Significant
2015: Less than Significant

Baseline Plus Buildout Scenarios

Traffic volumes at various intersections would increase due to traffic generated by the University Community Plan. Increased traffic volumes and increased idling times at intersections can result in CO violations. Based on existing traffic data, there are roadway segments that would operate at an LOS of D or worse. Where two roadway segments, that operate at an LOS of D or worse, intersect the possibility of a CO violation exists due to traffic congestion and prolonged vehicle idling. CO violations could also occur at "T" intersections, where only one portion is operating at an LOS D or worse.

As indicated in the traffic analysis, in Table 4.14-7, there are four intersections; Bellevue/and G Street, Yosemite Avenue/Lake Road, G Street/ Cardella Road, and Highway 59/ Olive Avenue that could have CO violations since the roadway segments operate at an LOS of E or F, resulting in a significant impact.

However, given that the County is currently designated as attainment for CO, that the largest average daily traffic volumes and peak hour traffic volumes associated with the UCP area would not occur until

buildout (i.e. 2025 or later), and that, due to advancements in technology, the vehicle fleet during the year 2025 would emit substantially fewer CO emissions, localized CO hotspots would not occur.

Implementation of Policy AQ 2.2, which would reduce motor vehicle trips through the provision of grid streets, flexible corridors, and designing streets for bicyclists, pedestrians, and traffic calming, Policy AQ 2.4, which would require that the plan design streetscapes, housing, and village centers to improve access to pedestrians and bicyclists, and Policy AQ 2.5, which would provide the opportunity for reduced vehicle trip lengths and minimizes new vehicle trips, would reduce traffic, thereby reducing CO levels at intersections. Implementation of Policies LU 4.1, 4.3, 5.8, and 5.16 would maximize pedestrian activity and transit use and minimize the use of automobiles.

For the above reasons, and with implementation of the identified UCP policies, this impact would be reduced to a less than significant level.

Baseline Plus 2015 Scenarios

Because there would be less development during the year 2015, there would be no roadway segments that would operate at an LOS of D or worse. Therefore, CO impacts under the baseline plus 2015 scenario would be less than significant.

4.3-4 Operational emissions associated with the UCP area would exceed SJVUAPCD standards.

Applicable Regulations: None

Significance: Significant

Mitigation Included in the UCP: Policies AQ 2.4, 2.5, 2.6, 6.1, and 7.1; LU 4.1, 4.3, 5.8, and 5.16

Significance After Mitigation Included in the UCP: Significant

Additional Mitigation: Mitigation Measure 4.3-4

(a) Outdoor electrical outlets shall be installed in the front and backyards of all housing units.

(b) Use solar or low emission water heaters.

(c) Orient buildings to take advantage of solar heating and natural cooling and use passive solar design.

(d) Increase wall and attic insulation.

Residual Significance: Significant and Unavoidable

Baseline Plus Buildout Scenario

Total Operational Emissions

Total operational emissions associated with the UCP area would exceed the SJVUAPCD thresholds of 10 lbs/day for ROG and NO_x and could expose sensitive receptors to substantial pollutant concentrations. As indicated in Table 4.3-6, vehicle emissions and area source emissions associated with the UCP area could result in a total of 107.11 tons per year of ROG and 84.56 tons per year of NO_x. Total emissions would also include those emissions from fireplaces, wood burning stoves and electricity generation. Although the above UCP policies and mitigation measures would reduce the magnitude of the impact, operational emissions would still exceed the SJVUAPCD's thresholds for ROG and NO_x and could expose sensitive receptors to substantial pollutant concentrations resulting in a significant and unavoidable impact. Each source of operational emissions is discussed below.

TABLE 4.3.6

UCP OPERATIONAL EMISSIONS

Pollutant	Natural Gas	Landscaping Equipment	Consumer Products	Mobile Emissions	Total
2015 Scenario					
ROG	0.28	0.04	10.29	28.05	38.66
CO	1.57	0.40	-	56.41	58.38
NO_x	3.70	0.01	-	12.86	16.57
PM_{10}	0.01	-	-	0.95	0.96
SO_x	-	0.01	-	0.72	0.73
Buildout Scenario					
ROG	3.05	0.35	103.71	97.8	107.11
CO	16.78	3.74	-	196.9	217.42
NO_x	39.57	0.09	-	44.9	84.56
PM_{10}	0.08	-	-	3.3	3.38
SO_x	-	0.13	-	2.5	2.63

NOTE : Emission reported in tons per year.

Source: EIP Associates. URBEMIS7G July 15, 2001.

Vehicle Emissions

As buildout of the UCP area occurs, the number of vehicles, vehicle trips and associated emissions would increase. Currently the site, with the exception of Hunt Farms Headquarters, is used for grazing and agricultural purposes. It is estimated that development of the UCP area will result in approximately 97.8 tons per year of ROGs and 44.9 tons per year of NO_x (see Table 4.3-7). ROG and NO_x vehicle emissions associated with the UCP area would exceed adopted SJVUAPCD threshold of 10 tons per year and would contribute to an existing air quality problem.

TABLE 4.3-7

UCP MOBILE SOURCE EMISSIONS

Pollutant	SJVUAPCD Thresholds	Baseline Plus Buildout	Baseline Plus 2015
ROG	10	97.8	28.05
CO	-	196.9	56.41
NO_x	10	44.5	12.86
PM_{10}	-	3.3	0.95
SO_x	-	2.5	0.72

Notes: Emissions reported in tons per year.

Source: EIP Associates. July 15, 2001.

UCP Policy AQ 2.4 would require that the streetscapes, housing, and village centers to be designed to improve access for pedestrians and bicyclists. Policy 2.5 would reduce the amount of mobile source criteria air pollutants by providing transportation infrastructure (e.g., park-and-ride lots, public transit facilities, bus turnouts and shelters) that would reduce reliance on automobiles. Policy AQ 2.6 would require installation of electrical outlets in residential, commercial and office garages. Policy AQ 7.1 would identify opportunities for and encourage procurement and use of alternative fuel vehicle fleets. Implementation of Policies LU 4.1, 4.3, 5.8 and 5.16 would maximize pedestrian activity and transit use, and minimize the use of mobile vehicles, which would also reduce the generation of mobile source air pollutants.

Implementation of the above policies would reduce the magnitude of emissions associated with mobile sources by encouraging alternative forms of transportation; however, the impact would remain significant and unavoidable because the success of the transportation plans is unknown and development of the UCP area would still result in an increase in mobile source emissions, contributing to an existing air quality problem.

Fireplaces and Wood Burning Stoves

Development of the UCP area would result in the construction of approximately 4,648 multi-family and 6,968 single-family homes. These homes could be equipped with fireplaces or wood-burning stoves, which would generate criteria air emissions. Fireplaces and wood-burning stoves generate significant quantities of ROG, NO_x, CO and PM_{10} during the winter seasons, thereby contributing to an existing air quality problem. Given the number of homes projected to be constructed in the UCP area, the emissions associated with use of wood-burning stoves and fireplaces could exceed adopted thresholds.

Implementation Policy AQ 6.1, which would limit installation of fireplaces and wood-burning stoves by requiring low-emitting, EPA-certified wood-burning appliances or natural gas fireplaces, would ensure compliance with the SJVUAPCD mitigation requirements listed in the District's Guide to Assessing and Mitigating Air Quality Impacts. Although the UCP would comply with the SJVUAPCD recommendations, and implementation of Policy AQ 6.1 would reduce the amount of pollutants generated by fireplaces and wood burning stoves, emissions from these sources would still exceed the SJVUAPCD's adopted thresholds.

Area Source Emissions

URBEMIS7G was used to model area source emissions associated with the use of landscaping equipment, natural gas and consumer products. Landscaping emissions are generated through the use of gas powered equipment such as lawn mowers and leaf blowers. The use of natural gas in homes and consumer products such as aerosol sprays also generate emissions. Using information provided in the project description and trip generation rates provided in the traffic analysis, these area source emissions were modeled to estimate the tons of pollutants created in one year. These sources would result in approximately 107 tons/year of ROG, 40 tons/year of NO_x and .08 tons/year of PM_{10}, exceeding the SJVUAPCD thresholds for ROG and NO_x (see Table 4.3-6).

Use of electricity could also increase air emissions, depending on the source (e.g., hydro, gas, coal). The source of electricity cannot be determined, and could include one or more sources, which could be located throughout California (or even outside of the state). No pollutant-emitting electricity generation facilities are planned within the UCP area. For these reasons, emissions to electricity cannot be quantified at this time.

Although Policy AQ 6.1 and Mitigation Measure 4.3-5, requiring outdoor electrical outlets, which would enable the use of electrical landscaping equipment, this would not reduce the emissions to a level that is below the District's thresholds.

Baseline Plus 2015 Scenario

Total Operational Emissions

As indicated in Table 4.3-6 during the year 2015, operational emissions associated with the UCP area would result in a total of 38.66 tons/year of ROG and 16.57 tons per year of NO_x. Total emissions would include these sources as well as fireplaces, woodstoves and electricity generation. These emissions would exceed the SJVUAPCD thresholds. As with the build out scenario, UCP policies and mitigation measures would reduce the magnitude of the impact, however, operational emissions would still exceed the SJVUAPCD's thresholds of 10 tons per year and could expose sensitive receptors to substantial pollutant concentrations. Therefore, this impact would remain significant and unavoidable.

Vehicle Emissions

By the year 2015, its anticipated that approximately 1,152 residences, 71,000 square feet of retail uses and 30,000 square feet of office uses would be developed in the Town Center and Residential Villages 1 and 2. Although emissions associated with this development would be less than those created during 2025 (see Table 4.3-7), they would still exceed the SJVUAPCD's thresholds, resulting in a significant impact. Development in the Town Center and Residential Villages 1 and 2 would generate approximately 28.05 tons per year of ROG and 12.86 tons per year of NO_x. Implementation of the policies described above would reduce the magnitude of the impact, however not below SJVUAPCD thresholds.

Fireplaces and Wood burning Stoves

Assuming that most of these homes are equipped with fireplaces or wood burning stoves, the use of these devices would generate ROG, NO_x, CO and PM_{10} emissions during the winter seasons, thereby contributing to an existing air quality problem. Even with implementation of Policy AQ 6.1, the number of homes occupied by year 2015 would result in the generation of substantial air pollutants, adding to an existing air quality problem.

Area Source Emissions

In addition to the homes, the development and occupancy of office and retail space would generate emissions associated with landscaping equipment. Homes would result in the use of consumer products, natural gas and landscaping equipment. URBEMIS7G was used to model these emissions, and, as shown in Table 4.3-6, during 2015 these area source emissions would generate approximately 10.6 tons/year of ROG and 3.71 tons/year of NO_x. Because these area source emissions would include the emissions from fireplaces and wood burning stoves in addition to the calculated emissions above, the amount of ROG and NO_x emissions generated would exceed the district's thresholds.

As with Buildout, the above mitigation measure would reduce the emissions associated with the use of gas powered landscaping equipment; however, the emissions associated with consumer products, natural gas, fireplaces and woodburning stoves would still exceed the district's thresholds.

4.3-5 Future residents of the UCP area could be exposed to pesticide spray drift from adjacent agricultural operations.

Applicable Regulations: California Code of Regulations Title 3, Division 6

Significance: Less than Significant

Mitigation Included in the UCP: Policy A 4.1

Significance After Mitigation Included in the UCP: Less than Significant

Additional Mitigation: None required

Residual Significance: Less than Significant

Baseline Plus Buildout Scenario

Intensive agricultural operations currently occur on the southern portion of the UCP area, and on lands south and east of the UCP area. At times, these operations can require the aerial application of pesticides. There has been concern that these pesticides could drift into the UCP area and affect future residents. Pesticides are broadly defined, and include a wide array of products such as herbicides, rodenticides, fungicides, and some fertilizers.

The type, timing, method, and amount of pesticides applied depend upon the type of crop being grown, the season, weather conditions, and the pests involved. Pesticides can be applied during the spring, summer, fall, or even late winter. Many pesticides are applied at ground level; however, if fields become inaccessible due to mud or crop growth, then aerial application of pesticides is used. The application of aerial pesticides is regulated by Title 3, Division 6, of the California Code of Regulations (CCR) and is implemented by the Merced County Agricultural Commissioners Office.[7] The CCR has specific guidelines governing application of individual pesticides. Pesticides are only applied aerially during calm weather conditions with equipment that allows the pesticides to be dropped straight down.[8] The Merced County Agricultural Commissioner's office is the entity responsible for enforcing and monitoring pesticide application. Local farmers are required to register the type and amount of pesticides they use for their crops with the Agricultural Commissioner's Office. Because the application of pesticides is regulated, the normal use of pesticides would not result in spray drift affecting residents of the UCP area. Furthermore, as discussed in Policy A 4.1, Agricultural Resources, construction of a buffer along the southern portion of the UCP boundary would distance future residents from agricultural activities. Therefore, this would be a less-than-significant impact.

Baseline Plus 2015 Scenario

Development associated with the year 2015 would be located in the northern portion of the UCP area. Future development in the Town Center and Residential Villages 1 and 2 would be located north of existing agricultural activities within the UCP area that require the application of pesticides. However, as discussed above, pesticide use is regulated by CCR Title 3, Division 6, which would ensure that spray drift does not occur. This would be a less-than-significant impact.

4.3-6 Future residents could be exposed to toxic air contaminants (TAC) from stationary sources within the UCP area.

Applicable Regulations: Air Toxics Hot Spots Information and Assessment Act (Assembly Bill 2588)

Significance: Less than Significant

Mitigation Included in the UCP: Policy AQ 3.1

Significance After Mitigation Included in the UCP: Less than Significant

Additional Mitigation: None required

Residual Significance: Less than Significant

Baseline Plus Buildout Scenario

Development of the UCP area could include industrial sources, such as research and design facilities and wastewater treatment plants. These industrial sources could generate TACs. The type or size of facilities that could emit TACs is not presently known. Nor is information currently available on the types of

contaminants that could be emitted from potential sources. Therefore, a quantitative estimate of TACs is not possible, and potential affects would be analyzed qualitatively.

As previously stated in the Regulatory Setting, the SJVUAPCD regulates and permits all stationary sources emitting toxic air contaminants pursuant to the Air Toxics Hot Spots Information and Assessment Act (Assembly Bill 2588). The review and permitting standards for these facilities are based on public safety levels, as well as federal regulatory requirements. Further, Policy AQ 3.1 requires that such uses be located at an adequate distance from sensitive receptors. Because these facilities would be required to comply with the SJVUAPCD rules and regulations, the amount of TACs would not be substantial.

Baseline Plus 2015 Scenario

It is anticipated that no industrial or research and development facilities would be constructed by the year 2015; however, that is only based on a projection of uses that are likely to be built. These types of facilities could be built by 2015. As discussed above, any new facilities must obtain a permit from the SJVUAPCD, and Policy AQ 3.1 requires that such uses be located at an adequate distance from sensitive receptors. Therefore, future residents would not be exposed to substantial TAC emissions. This would be a less-than-significant impact.

4.3-7 Future residents could be exposed to odors from sources within the UCP area.

Applicable Regulations: None

Significance: Significant

Mitigation Included in the UCP: Policies AQ 3.1, A 2.2, and A 4.1

Significance After Mitigation Included in the UCP: Less than Significant

Additional Mitigation: None required

Residual Significance: Less than Significant

Baseline Plus Buildout Scenario

Future uses within the UCP area could produce odors and dust from existing and future land uses. Typical odor producing uses include wastewater treatment plants, gas stations, restaurants, and heavy industrial sources.

Wastewater generated in the UCP would be managed in one of three ways. During the initial phases of development, wastewater would be collected in a conventional gravity sewer system. During the summer, the wastewater would be pumped to a seasonal water recycling plant located on the UCP site for treatment and reuse-on site. During the winter, when no recycled water demand exists on the UCP property, the wastewater would flow to a local wastewater treatment facility. In the last three phases of development, it is assumed that approximately 1,500 single-family homes with total flow of 210,000

gallons per day would be served by decentralized wastewater treatment systems. Use of these wastewater facilities could generate offensive odors.

Substances that produce odors through the wastewater treatment process commonly include hydrogen sulfide, ammonia, and certain organic compounds containing nitrogen and sulfur that have not been completely oxidized. Odors occur in fresh or incompletely treated wastewater and liquid process sidestreams, or raw sludge, screenings, grit, and skimmings containing malodorous matter and emissions from treatment processes. Aside from odors associated with normal treatment processes, other sources of objectionable odors would be general cleaning activities, anaerobic conditions in treatment units or sewer lines, or the use of solvents.

Major sources of odors at wastewater treatment plants typically include the headworks, digesters, and sludge drying beds. Depending upon the design of the wastewater treatment plant, odors associated with operation of the headworks could be significantly reduced and the odors generated with overall operation of the plant could range from moderate to negligible.

During periods when there are high winds, odors generated by treatment plants are usually diluted. However, during calm conditions, potential odors impact are high because dilution is minimized. Given the lack of design information for the future wastewater treatment plant and related wastewater facilities, it is possible that future UCP residents to could exposed to offensive odors from these sources.

Implementation of UCP Air Quality Policy 3.1, which would apply to the wastewater treatment plant, requires new stationary sources of pollution and potential odor sources to be located an adequate distance from sensitive receptors, which would reduce the likelihood that residents would be exposed to objectionable odors. With implementation of this policy, odors impacts from the wastewater treatment plant would not be offensive to sensitive receptors.

Portions of the UCP area are underlain by permeable soils suitable for year-round dispersal of treated water via subsurface drip irrigation. Portions of the development in Residential Villages 2, 3 and 4 are anticipated to be served by decentralized wastewater treatment and disposal systems. Wastewater would be treated in advanced process units equipped with filters to reduce the organics and suspended solids in wastewater. The effluent would then be conveyed to a satellite ultra-violet (UV) disinfection systems. Disposal of the effluent from the UV system would be via subsurface drip emitters located in the front yards of single-family residential homes.[9] With proper managements and routine care of the system, and given that the effluent is disposed of via subsurface irrigation, odors would not be offensive to sensitive receptors.

Odors would be generated by the cultivation of agricultural crops, restaurants and gas stations. Odors associated with restaurants are subjective and perception of these odors vary from person to person. Odors associated with gas stations and restaurants are minimized since the odors dissipate quickly after being released into the air. Residents located adjacent to these land uses are generally buffered from odors due to development of streets, other buildings, and landscaping which provides an adequate distance between the neatest receptor and the odor source. Therefore, odors associated with these types of land uses would not be offensive to sensitive receptors.

Development of the UCP area is not anticipated to generate dust above and beyond that associated with construction activities. There would be no land uses (e.g., mining, excavating, hauling activities) within the UCP area that would continually produce dust. Because the UCP would not result in offensive odors, this impact would be less than significant.

Baseline Plus 2015 Scenario

The wastewater treatment plant is expected to be operating by 2015 and decentralized treatment systems may be in use at that time. As discussed above, implementation of Policy AQ 3.1 would provide a buffer between the wastewater treatment plant and future residents to minimize odor impacts. This policy would mitigate potential odors impacts associated with the wastewater treatment plant to a less-than-significant level.

As Villages 1 and 2 develop, residents could be exposed to odors and dust emanating from ongoing agricultural activities on Hunt Farms. These odors would be typical of agricultural operations and could generally include odors associated with the application of fertilizers and decomposing produce. Dust would be generated by agricultural activities such as tilling, harvesting, and plowing. Exposure to these odors and dust associated with agricultural activities on Hunt Farms could be considered offensive by affected sensitive receptors. Policy A 2.2 requires that all future residents be made aware of local agricultural operations, their practices, and the potential agriculturally-related impacts (noise, odors, dust, etc.), pursuant to the Merced County Right-to-Farm ordinance, which states that residents should be prepared to accept inconveniences associated with agricultural activities. Implementation of the above policies would ensure that potential residents understand and accept possibility of agricultural odors.

4.3-8 Future residents of the UCP area could be exposed to odors and dust from adjacent land uses.

Applicable Regulations: None

Significance: Significant

Mitigation Included in the UCP: Policies A 2.2 and A 4.1

Significance After Mitigation Included in the UCP: Less than Significant

Additional Mitigation: None required

Residual Significance: Less than Significant

Baseline Plus Buildout Scenario

Agricultural activities south and east of the UCP area can produce odors, particularly those odors associated with produce and livestock. There are no livestock facilities, such as dairies, within a one-mile radius of the UCP area that would expose future residents to odors. However, the smell of produce, particularly remains of tomatoes or other unharvested produce, could adversely affect residents located in

the vicinity of these agricultural fields. In addition, agricultural activities generate dust when activities such as plowing, tilling and harvesting occur. Dust could migrate to the UCP area and affect residents.

Policy A 4.1 would require a buffer north of Yosemite Avenue to reduce exposure of UCP area residents to agricultural operations, such as dust and odors from agricultural activities that occur south of the UCP area. As previously stated, the application of aerial pesticides is regulated by Title 3, Division 6, of the California Code of Regulations (CCR) and is implemented by the Merced County Agricultural Commissioners Office.[10] The CCR has specific guidelines governing application of individual pesticides. Pesticides are only applied aerially during calm weather conditions with equipment that allows the pesticides to be dropped straight down.[11] The Merced County Agricultural Commissioner's office is the entity responsible for enforcing and monitoring pesticide application. Local farmers are required to register the type and amount of pesticides they use for their crops with the Agricultural Commissioner's Office. Furthermore, Policy A 2.2 would require that all future residents be made aware of local agricultural operations, their practices, and the potential agriculturally-related impacts (noise, odors, dust, etc.), pursuant to the Merced County Right-to-Farm ordinance, which informs residents that they should be prepared to accept inconveniences associated with agricultural activities. Implementation of the above policies would minimize odor and dust impacts to a less-than-significant level.

Baseline Plus 2015 Scenario

Development through year 2015 would be located in the northern portion of the UCP area. As a result, residents would be located at a distance sufficient far from agricultural activities that occur south of Yosemite Avenue and east of the Fairfield Canal (outside of the UCP area) and would not be affected by agricultural operations outside of the UCP area. This would be a less-than-significant impact.

Cumulative Impacts and Mitigation Measures

The cumulative context for this analysis is Merced County and all development that will occur within the County by 2015 and 2025.[12]

4.3-9 Project emissions, in combination with UC Merced and other development in the County, could contribute to the degradation of air quality.

Applicable regulations: None

Significance: Significant

Mitigation Included in the UCP: Policies AQ 4.1, 4.3, 5.1, 5.2, 5.3, T 4.2, 4.3, 4.4, 4.5, 5.5, 5.6, 7.1, 7.2, 7.3, and 7.4

Significance after Mitigation Included in the UCP: Significant

Additional Mitigation: None

Residual Significance: Significant and Unavoidable

Cumulative Buildout Scenario

Development in the existing University Community SUDP, including associated population growth and traffic, was accounted for in the Merced County Association of Governments Regional Transportation Plan (RTP) and population projections.[13] The RTP and population projections are used by the San Joaquin Valley Unified Air Pollution Control District to prepare the air quality attainment plans to bring the San JoaquinValley into compliance with federal and State standards for ozone and PM_{10}. Because MCAG accounted for population and traffic growth associated with the UCP in its most recent RTP, emissions associated with the UCP were also included in future emission estimates by the SJVUAPCD.

The SJVUAPCD adopted the 1994 *Ozone Attainment Plan*, which aims to bring the air basin into compliance with federal ozone standards by the year 2005, and the 1997 *PM_{10} Attainment Plan*, which aims to bring the air basin into compliance with federal PM_{10} standards by 2006. Based on current air quality data and future development trends, the air basin is not anticipated to be in attainment for these criteria pollutants by the year 2006. In addition, with future development in the San Joaquin Valley the amount of air pollutants generated is expected to increase beyond existing levels due to an increase in emissions from construction activities, motor vehicles, and stationary sources.

Although the emissions were accounted for by MCAG and in air quality planning documents, the proposed UCP would still contribute emissions to an existing and future air quality problem. Furthermore, the amount of pollutants associated with implementation of the UCP would be substantial because the UCP consists of multiple land use and encompasses a large area. Implementation of the policies listed above would encourage alternative forms of transportation and reduce traffic congestion and would reduce construction and area source emissions. However, even with implementation of all mitigation measures and UCP policies, the UCP, in combination with other development, would contribute to air quality problems in the San Joaquin Valley. Therefore, cumulative air quality impacts would remain significant and unavoidable.

2015 Cumulative Scenario

The cumulative impacts during 2015 are anticipated to be similar to the above. Although, less development would have occurred by 2015, the project in combination with other development would still contribute emissions to an existing air quality problem, resulting in a significant and unavoidable impact.

4.3-10 Project-generated traffic, in combination with other cumulative development, would increase CO levels at local intersections.

Applicable Regulations: None

Significance: Less than Significant

Mitigation Included in the UCP: Policies AQ 2.4 and 2.5; Policies LU 4.1, 4.3, 5.8, and 5.16; Policies T 7.1, 7.3, and 7.4.

Significance After Mitigation Included in the UCP: Less than Significant

Additional Mitigation: None required

Residual Significance: Less than Significant

Cumulative Buildout Scenario

Use of vehicles associated with the UCP area during the year 2025 would result in an increase in traffic congestion at certain intersections. Increased traffic congestion and prolonged idling times can result in CO violations. Traffic data indicates that during the year 2025, there are several road segments that would be operating at an LOS of D, E and F. Where two road segments operating at an LOS of D or worse meet, there is the possibility for a CO violation to occur within an intersection. It would be speculative to quantitatively analyze CO impacts in intersections given that this impact would occur in 2025 and such analysis requires detailed road and intersection design that is not currently available. The LOS associated with precise intersection operations would vary and would depend upon technological advances and road improvements that occur prior to 2025. Furthermore, CO emissions from automobiles are improving dramatically as technological advances allow for more efficient engines. Due to the improvement in technology which would result in less CO being produced from idling cars, and a decrease in the future background concentration of CO levels, no CO violations are anticipated to occur during the year 2025 , resulting in a less-than-significant impact.

2015 Cumulative Scenarios

CO impacts during 2015 would be similar to the Cumulative Buildout Scenario. During 2015 traffic data indicates that there are several road segments that would be operating at an LOS of D, E and F. Because future CO emissions are likely to low and because the background concentration would be lower, no CO violations are anticipated to occur during the year 2015, resulting in a less-than-significant impact.

4.3-11 Operational emissions would exceed ROG, NO_x and CO standards.

Applicable Regulations: None

Significance: Significant

Mitigation Included in the UCP: Policies AQ 2.4 and 2.5, LU 4.1, 4.3, 5.8, and 5.16

Significance After Mitigation Included in the UCP: Significant

Additional Mitigation: None

Residual Significance: Significant and Unavoidable

Cumulative Buildout Scenario

As buildout of the UCP area, UC Merced campus, Campus parkway and other development in the County occurs, the number of vehicle trips, vehicle miles traveled, and associated emissions would increase. Currently the site, with the exception of Hunt Farms headquarters, is used for grazing and agricultural purposes, which emit relatively few emissions. Using BURDEN7G and using traffic data provided in Appendix C, it is estimated that during the year buildout of the UCP area, the UC Merced campus and Campus Parkway would generate 124 tons per year of ROG and 110 tons per year of NO_x more than the No Project-No Parkway scenario. Cumulative emissions from mobile sources for various scenarios are presented in Table 4.3-8. Development of the UCP area in combination with other development in the County would result in a significant cumulative impact to air emissions. As presented in Table 4.3-9, when area source and stationary source emissions are taken into account, development of the UCP and Campus would result in an estimated total of 367.1 tons per year of ROG and 189.2 tons per year of NO_x.

TABLE 4.3-8

CUMULATIVE BUILDOUT SCENARIO MOBILE EMISSIONS

	Scenario A	Scenario B	Scenario C	Scenario D	Net Difference		
Pollutant	**No Project - No Parkway**	**No Project, Southern Parkway**	**Buildout Campus Only, No Parkway**	**Buildout of Campus and UCP and Parkway**	**D - A**	**D - B**	**D - C**
ROG	1,785	1,781	1,810	1909	124	128	99
CO	20,889	20,852	21,170	21367	478	515	197
NO_x	6,267	6,256	6,333	6377	110	121	44
PM_{10}	252	252	252	256	4	4	4
SO_x	263	263	266	270	7	7	4

Note: Emissions reported in tons per year.

Source: EIP Associates and URS, July 2001. BURDEN7G

TABLE 4.3-9

CUMULATIVE EMISSIONS FROM UCP AND CAMPUS

Pollutant	Area Source and Stationary Source Emissions From UCP and Campus	Mobile Source Emissions from UCP, Campus and Parkway	Total Emissions Associated with UCP, Campus and Parkway
ROG	243.1	124	367.1
CO	177.8	478	655.8
NO_x	79.2	110	189.2
PM_{10}	21.0	4	25

Note: Emissions reported in tons per year.

Source: EIP Associates and URS, August, 2001.

Implementation of Policy AQ 2.4, which requires that the plan design streetscapes, housing, and village centers to improve access to pedestrians and bicyclists, and Policy AQ 2.5, which provides the

opportunity for reduced vehicle trip lengths and would minimize new vehicle trips, would reduce the amount of mobile source criteria air pollutants created during buildout of the UCP area. Implementation of Policies LU 4.1, 4.3, 5.8 and 5.16 would maximize pedestrian activity and transit use, and minimize the use of mobile vehicles, which would also reduce the generation of mobile source air pollutants.

Additional mitigation measures that promote alternative forms of transportation and promote pedestrian activities are presented to further reduce the magnitude of this impact.

Implementation of the above policies and mitigation measures would reduce the magnitude of emissions associated with mobile sources by encouraging alternative forms of transportation; however, the impact would remain significant and unavoidable because the success of the transportation plans is unknown and development of the UCP area would still result in an increase in mobile source emissions, contributing to an existing air quality problem.

2015 Cumulative Scenario

By the year 2015 it is anticipated that approximately 1,152 residences, 71,000 square feet of retail and 30,000 square feet of office uses would be developed in the Town Center and Residential Villages 1 and 2. Although cumulative emissions associated with this development would be less than those created at Buildout, when considered in combination with other development in the County, including the UC Merced Campus and Campus Parkway, the emissions generated would contribute to an existing air quality problem and would exceed the SJVUAPCD's thresholds of 10 tons per year for ROG and NO_x.

4.3-12 Development in the UCP area in conjunction with UC Merced and other cumulative development in the vicinity, could generate unacceptable cumulative TAC health risks.

Applicable regulations: California Health and Safety Code Section 44300.

Significance: Less than Significant

Mitigation Included in the UCP: None

Significance After Mitigation Included in the UCP: Less than Significant

Additional Mitigation: None required

Residual Significance: Less than Significant

Cumulative Buildout Scenario

Campus and Community

Development of the University Community could include industrial sources, such as research and design facilities and wastewater treatment plants. These sources could generate TACs. However, due to regulations pertaining to TACs from stationary sources and the types of sources in the Community, the amount of TACs from these sources would not be substantial. TACs could be emitted from the Central

Plant, campus boilers, and research facilities that would be developed under the 2001 LRDP. However the size and type of facilities to be constructed in the UCP area and campus is not currently known and a quantitative estimate of these emissions would be speculative.

Health risk assessments have been prepared for several of the UC campuses, including UC Davis and UC Berkeley. These risk assessments are based on data from on-site sources of TACs, the amount of laboratory square footage that is built or proposed on campus, estimates of hazardous chemical usage based on survey data, and physiochemical properties and intrinsic toxicity of the chemicals involved. The health risk analysis prepared for UC Davis shows that with the amount of projected laboratory square footage that is built or proposed on campus under the current UC Davis LRDP, the estimated cancer risk is 0.47 in one million. Similarly, a recent health risk assessment was conducted for UC Berkeley and estimated a cancer risk of 1.30 in one million. A significant cancer risk is defined as any risk exceeding ten in one million.

Based upon the analysis described above of TACs emitted from other UC campuses, and the small quantity of TACs that would be expected from the types of sources anticipated in the UCP area, combined emissions of TACs is not expected to result in a significant localized health risk that exceeds ten in one million. Thus, this cumulative impact is less than significant.

Other Cumulative Impacts

As explained in the previous paragraph, a small quantity of TACs from University Community development might combine with TACs from campus operations. No other known sources of toxic air contaminants are present within a sufficiently proximate radius that such emissions would combine with localized emissions of toxic air contaminants from campus operations. The only other known potential source of TACs near the campus would be from agricultural operations on lands south and east of the proposed University Community area. At times, these operations can require the aerial application of pesticides. The application of aerial pesticides is regulated by the California Code of Regulations and is implemented by the Merced County Agricultural Commissioners Office. Pursuant to these regulations, pesticides are applied aerially during calm weather conditions with equipment that allows the pesticides to be dropped straight down. Due to the existing regulations on the application of pesticides and the distance between the agricultural operations and the campus, the aerial pesticides would not result in spray drift affecting residents of the campus or community. Accordingly, this cumulative impact is less than significant.

2015 Cumulative Scenario

Cumulative TAC impacts during 2015 are anticipated to be less than those associated with Buildout due to the fact that less development would have occurred and therefore, fewer facilities emitting TACs would be constructed and operating. However, the UC Merced campus would have an estimated student enrollment of 8,650 and an on-campus resident population of up to 4,678 along with the necessary infrastructure and buildings. As a result, multiple facilities emitting TACs, such as laboratories or facilities hazardous waste, could be in operation, exposing future residents and students to TAC levels that could exceed adopted thresholds. However, as discussed in the Cumulative Buildout Scenario, TAC emissions would be regulated, and are expected to be well below the ten in one million risk threshold. Therefore, cumulative TAC emissions during 2015 would result in a less-than-significant impact.

ENDNOTES

1. San Joaquin Valley Unified Pollution Control District, *Adopted California Clean Air Act Triennial Progress Report and Plan Revision, 1995-1997*.

2. John Cadrett, San Joaquin Valley Unified Air Pollution Control District, Air Quality Planner, personal communication, July 10, 2001.

3. California Air Resources Board, *California Surface Wind Climatology*, Aerometeric Data Division, June 1984, reprinted February 1994.

4. San Joaquin Valley Unified Air Pollution Control District, *Guide for Assessing and Mitigating Air Quality Impacts*, August, 1998, page 40.

5. Letter to the San JoaquinValley Unified Air Pollution Control District summarizing results of consultation meeting held April 9, 2001, April 9, 2001.

6. San Joaquin Valley Unified Air Pollution Control District, *Guide for Assessing and Mitigating Air Quality Impacts*, August 20, 1998.

7. California Code of Regulations, Title 3 Section 6000-6920 http://www.cdpr.ca.gov/docs/inhouse/calcode/010202.html, February 28, 2001.

8. Milford Esau, Merced County Agricultural Commissioner's Office, personal communication, May 30, 2001.

9. Nolte Planning and Engineering, *Merced University Community Planning Area-Wastewater Collection, Treatment, Disposal, and Reuse Conceptual Plan*-Technical Memorandum, June 15, 2001.

10. California Code of Regulations, Title 3, Sections 6000-6920 http://www.cdpr.ca.gov/docs/inhouse/calcode/010202.html, February 28, 2001.

11. Milford Esau, Merced County Agricultural Commissioner's Office, personal communication, May 30, 2001.

12. John Cadrett, San Joaquin Valley Unified Air Pollution Control District, air quality planner, personal communication, July 6, 2001.

13. Merced County Association of Governments, Regional Transportation Plan, www.mcag.cog.ca.us.