4.3 AIR QUALITY

The information presented in this air quality analysis is based on the Air Quality Impact Report prepared by Don Ballanti in April 2004, and the Greenhouse Gases supplemental Memorandum, prepared in July 2007. These reports are available for public review at the Solano Transportation Authority (STA), One Harbor Center, Suite 130, Suisun City, CA 94585, during regular business hours.

Methodology

The air quality analysis uses the Transportation Project-Level Carbon Monoxide Protocol (Protocol), dated December 1997, prepared by the Institute of Transportation Studies at the University of California at Davis. The Protocol was approved by the Metropolitan Transportation Commission (MTC) in Resolution No. 3075 on June 24, 1998 and by the United States Environmental Protection Agency (USEPA) on September 1, 1998. Use of this protocol was recommended by the Bay Area Interagency Conformity Task Force, which is the interagency consultation group established pursuant to USEPA's conformity regulation and the conformity State Implementation Plan (SIP) for the Bay Area.

The Protocol recognizes signalized surface street intersections as having a high potential for exposing the public to elevated concentrations of carbon monoxide (CO). Levels of CO are known to be directly related to traffic volumes and levels of congestion. Based on the traffic volume and Level of Service (LOS) analysis for future operation of signalized intersections along the North Connector Project (Project) corridor, Red Top Road/SR12/North Connector (intersection 1) and Abernathy Road/North Connector Road (intersection 29) were selected for analysis as worst-case intersections.

The Protocol includes a screening procedure that can provide conservative estimates of CO without having to run computer based models such as Emissions Factors (EMFAC) and the California LINE Source Dispersion Model (CALINE4). The screening procedure was based on EMFAC7G emission rates. However, as of June 2006, the EPA recommends using EMFAC2002 as the emissions model for conformity determinations. Use of the screening procedure is no longer acceptable for CO modeling studies after June 30, 2003.

The CALINE4 computer model was used to predict worst-case concentrations of CO at receptors located near the study intersections. Receptors were located at the four corners of the study intersections, approximately 10 feet from the road edge and approximately 33 feet in either direction from the corner, for a total of 12 receptors.

A separate model run was conducted to ascertain Project impacts on Fairfield Linear Park (Linear Park) which runs parallel to the East End of the Project. Concentrations were forecast at several distances from the center of a 1-kilometer (km) section of roadway using PM peak-hour traffic volumes for this road segment.

The procedures and assumptions used in modeling were based on the Protocol. The assumptions made in running the program were:

Windspeed:	0.5 meter per second
Wind Direction:	Worst Case
Roughness:	100 cm
Sigma Theta:	20 degrees
Temperature:	40 degrees Fahrenheit (°F)

The EMFAC2002 program was used to generate emissions factors utilizing the default vehicle mix for the Bay Area. As a worst-case assumption, emission factors were for a year 2004 vehicle mix.

The CALINE4 program procedure provides a worst-case estimate of one-hour concentrations of CO generated by vehicles. To calculate eight-hour concentrations, the one-hour projections were multiplied by a persistence factor of 0.7.

Another contributor to the total concentration of CO is the background level attributed to more distant vehicular traffic. Background concentrations were forecast using a methodology developed by the Bay Area Air Quality Management District (BAAQMD). Findings predicted a one-hour background level of 3.9 parts per million (PPM) in 2004.

EXISTING CONDITIONS

Air Quality Characteristics

Ambient air quality is affected by climatological conditions, topography, and the types and amounts of pollutants emitted. The following discussion describes relevant characteristics of the air basin and offers an overview of conditions affecting pollutant ambient air concentration in the basin.

The southern portion of Solano County, including the Project area, is part of the San Francisco Bay Area Air Basin (SFBAAB). Climatic conditions are strongly influenced by local topography and proximity to the Pacific Ocean and nearby bays. The Carquinez Strait is a major gap in the Coast Ranges that channels surface air flows between the SFBAAB and the Central Valley.

The climate in the Project area is dominated by the strength and position of the semi-permanent high-pressure center over the Pacific Ocean near Hawaii. This center creates warm summers, mild winters, and infrequent rainfall. It drives the daytime sea breeze and maintains comfortable humidity and ample sunshine. These same atmospheric processes combine periodically to restrict the ability of the atmosphere to disperse air pollution, particularly in heavily developed areas where air pollution reaches levels in excess of established clean air standards.

The nearest official precipitation station is the Fairfield Fire Station (Station No. 4-2934), located about four miles northeast of the site. Temperatures in Fairfield average 60°F annually, ranging from about 40° F on winter mornings to the mid-80s° F on summer afternoons. Daily and seasonal oscillations of temperature are small because of the moderating marine influence. The extreme temperatures recorded at the Fairfield Fire Station are 112° F and 18° F. Temperatures within the Project area are similar to those demonstrated in the Fairfield-Suisun City area.

Fairfield Fire Station records report a normal annual rainfall of 21 inches. The maximum recorded 24-hour rainfall is 4.35 inches. Rainfall is confined primarily to the rainy season, from early November to mid-April. Much of the rainfall in the area derives from the fringes of mid-latitude storms. A shift in the annual storm track of a few hundred miles can mean the difference between a very wet year and near-drought conditions. Evaporation data, interpolated from surrounding climatological stations, ranges between 60 and 85 inches annually.

During the day, especially in summer, winds originate from the southwest through west at 10 to 15 miles per hour (mph) as air is funneled through the Carquinez Strait and accelerates across the Project area in a Venturi-like effect. Winds increase during the daytime and reach peak speeds in the early evening hours. At night, especially in winter, the land becomes cooler than the water, and an offshore flow of two to four mph develops from the Central Valley toward the ocean. After sunrise and after sunset, there is usually a period of light and disorganized wind flow as one flow regime dissipates while the replacing regime has yet to become fully established. The net effect of the prevailing wind distribution is rapid ventilation in the daytime with clean marine air and corresponding good air quality. During winter, the air stagnation at night creates a strong potential for elevated air pollution levels. However, air draining from the Central Valley toward San Francisco is relatively unpolluted. Therefore, nocturnal air quality is usually good in the Project area.

The nearest reporting station with wind data is at Travis Air Force Base (Travis AFB), located approximately two miles northeast of the site. Wind data indicates that prevailing winds from February through November originate from the southwest and west-southwest at a mean wind speed of 14 mph, and December through January prevailing winds originate from the north at a mean wind speed of 11.3 mph. Due to topographic differences between the landfill (located on the Travis AFB) and the reporting station, localized wind conditions may vary at the site.

In addition to the winds that govern the horizontal rate and trajectory of air pollutants, the Bay Area experiences two characteristic temperature inversions that control the vertical depth through which pollutants can be mixed. The daytime onshore flow of marine air is capped by a massive dome of warm air that acts as a giant lid over the region. As clean marine air moves inland, pollutants are continually added from below without any dilution from above. As this layer slows down in inland valleys of the air basin and undergoes photochemical transformations under abundant sunlight, unhealthy levels of smog (mainly ozone) develop.

A second inversion forms at night as cool air pools in low elevations while the air aloft remains warm. Shallow radiation inversions are formed (especially in winter) that trap pollutants near intensive traffic sources, such as freeways and shopping centers, and form localized areas in violation of clean air standards. These areas are called “hot spots.” Although inversions are found during all seasons of the year, the summertime regional capping inversion and the localized winter radiation inversions are the most dominant.

The seasonal split in inversion intensity thus contributes significantly to the difference in air quality and climate occurring in the Bay Area during summer compared to winter. Because Fairfield is located in an area where turbulence associated with moderate summer winds dilutes air pollution levels, and where the winter offshore trajectory is from

lightly developed agricultural areas, baseline air quality at the Project site rarely exceeds clean air standards either during summer or winter.

According to the California Air Resources Board (CARB), air quality has been improving over the past decade with steadily declining total emissions of reactive organic gasses (ROG) and nitrogen oxides (NO_x). However, these reductions have not been enough to prevent exceedance of state and federal air quality standards under all meteorological conditions.

The ambient air quality in a given area depends on the quantities of pollutants emitted within the area, transport of pollutants to and from surrounding areas, local and regional meteorological conditions, as well as the surrounding topography of the air basin. Air quality is described by the concentration of various pollutants in the atmosphere. Units of concentration are generally expressed in parts per million (ppm) or micrograms per cubic meter (µg/m3). Both the USEPA and the California Air Resources Board (CARB) have established air quality standards for criteria pollutants. These pollutants are referred to as "criteria" pollutants because they are considered the most prevalent air pollutants that are known to be hazardous to human health. There are also criteria documents available for each pollutant, including USEPA's National Ambient Air Quality Standards (NAAQS). Criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), particulate matter less than or equal to 10 microns in diameter PM_{10}, $PM_{2.5}$, and lead (Pb). O_3, PM_{10}, and $PM_{2.5}$ are generally considered to be regional pollutants because they or their precursors affect air quality on a regional scale. Pollutants such as CO, NO_2, SO_2, and Pb are considered to be local pollutants because they tend to accumulate in the air locally. PM_{10} and $PM_{2.5}$ are also considered to be localized pollutants.

In California, toxic air contaminants (TACs) are another group of pollutants of concern. There are several different types of TACs with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least forty different TACs. The most important, in terms of health risk are diesel particulate, benzene, formaldehyde, 1, 3-butadiene, and acetaldehyde. Some health effects resulting from exposure to TACs include cancer, birth defects, and neurological damage.

In early 1998, the SFBAAB was classified as having attained all federal ambient air quality standards. However, on June 10, 1998, the EPA reclassified the SFBAAB from "maintenance area" to being in nonattainment for ozone (O_3) based on recent violations of the NAAQS at several locations in the air basin. This reversed SFBAAB's classification as a "maintenance area" for O_3 in 1995. Reclassification required an update to the regional federal air quality plan. The Bay Area remains a "maintenance area" for CO. Under the California Clean Air Act (CCAA), the SFBAAB portion of Solano County is a nonattainment area for O_3 and particulate matter less than or equal to 10 microns in diameter (PM_{10}). Under California standards, the Bay Area is in non-attainment for particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$) and in attainment for the National $PM_{2.5}$ standards. Solano County is either in attainment or unclassified for other pollutants. The Project is in a federal ozone non-attainment area for which transportation control measures have been included in the State Implementation Plan (SIP) for satisfying NAAQS.

The BAAQMD has jurisdiction over air quality issues in western Solano County, administering air quality regulations developed at federal, state, and local levels. The air quality regulations applicable to the proposed Project are described below.

Greenhouse Gasses

The greenhouse effect is a natural process by which some of the radiant heat from the sun is captured in the lower atmosphere of the earth. The gases that help capture the heat are called greenhouse gases (GHGs). While GHGs are not traditionally considered air pollutants, all of these gases have been identified as causing the earth's atmosphere and oceans to warm above naturally occurring temperatures. Some GHGs occur naturally in the atmosphere, while others result from human activities (anthropogenic sources). Naturally occurring GHGs include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3). Certain human activities add to the levels of most of these natural occurring gases.

According to the 2006 California Climate Action Team Report (CCAT, 2006) the following climate change effects are predicted in California over the course of the next century:

- A diminishing Sierra snowpack declining by 70 percent to 90 percent, threatening the state's water supply.
- Increasing temperatures from 8 to 10.4 degrees F under the higher emission scenarios, leading to a 25 to 35 percent increase in the number of days ozone pollution levels are exceeded in most urban areas.
- Coastal erosion along the length of California and sea water intrusion into the Delta from a 4- to 33-inch rise in sea level. This would exacerbate flooding in already vulnerable regions.
- Increased vulnerability of forests due to pest infestation and increased temperatures.
- Increased challenges for the state's important agriculture industry from limited water shortage, increasing temperatures, and saltwater intrusion into the Delta.
- Increased electricity demand, particularly during the hot summer months.

In September 2006, the California legislature passed the California Global Warming Solutions Act (CGWSA), which was added to Health and Safety Code Section 38500 (also commonly referred to as Assembly Bill 32 [AB32]). The CGWSA states that global warming poses a serious threat to the economic well being, public health, natural resources, and the environment of California. Many scientists believe that anthropogenic emissions of GHGs (defined as CO2, CH4, N2O , hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) are having a significant impact on the global environment by accelerating or even causing global warming.

The CGWSA requires that the state reduce emissions of GHG to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased-in beginning in 2012. To effectively implement the cap, CGWSA directs CARB to develop appropriate regulations and establish a mandatory reporting system to track and monitor GHG emission levels.

The CGWSA mandates that by January 1, 2008, CARB must determine what the statewide GHG emissions level was in 1990 and approve a statewide GHG emissions limit that is equivalent to the level to be achieved by 2020. On or before January 1,

2011, CARB must adopt GHG emission limits and emission reduction measures by regulation to achieve the maximum technologically feasible and cost-effective reductions in GHG emissions in furtherance of achieving the statewide GHG emissions limit, to become operative beginning on January 1, 2012.

The BAAQMD has prepared a GHG emissions inventory using 2002 as the base year. The BAAQMD estimated that 85.4 million tons of CO2-equivalent GHG gases were emitted from anthropogenic sources in the Bay Area in 2002. Fossil fuel consumption in the transportation sector (on-road motor vehicles) accounted for approximately 43 percent of these emissions. Stationary sources, including industrial and commercial sources, power plants, oil refineries, and landfills were responsible for approximately 49 percent of emissions. Construction and mining equipment was estimated to account for approximately two percent (or about 1.7 million tons) of the total anthropogenic GHG emissions (BAAQMD, 2006).

REGULATORY SETTING

Federal and State Requirements

United States Environmental Protection Agency (USEPA)
The principle legislation that governs federal air quality regulations is the Clean Air Act Amendments of 1990 (CAAA). The CAAA delegates primary responsibility for clean air to the USEPA, which develops rules and regulations to preserve and improve air quality and delegates specific responsibilities pertaining to management of air quality to state and local agencies. 42 U.S.C. § 176(c). Areas are classified as either being in "attainment" or "nonattainment" with respect to state and federal ambient air quality standards. These classifications are made by comparing actual monitored air pollutant concentrations to state and federal standards. States found to be in "nonattainment" for criteria pollutants are required to develop State Implementation Plans (SIPs) describing how they will satisfy National Ambient Air Quality Standards (NAAQS). The CAAA sets deadlines for states to achieve attainment of federal ambient air quality standards and establishes guidelines for attaining NAAQS.

California Air Resources Board (CARB)
The CARB is a subdivision of the California Environmental Protection Agency (Cal/EPA), is the agency responsible for coordinating both state and federal air pollution control programs in California, including SIPs. The state regulations mirror federal regulations by establishing industry-specific pollution controls for criteria, toxic, and nuisance pollutants. California also requires areas to develop plans, including regional SIPs, and strategies for attaining state ambient air quality standards as set forth under the California Clean Air Act (CCAA) of 1988. CARB forwards SIP revisions to the USEPA for approval and publication in the Federal Register. CARB is also responsible for developing motor vehicle standards for California vehicles. Table 4.3-1 describes both state and federal ambient air quality standards.

Table 4.3-1. State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standard	Attainment Status	State Standard	Attainment Status
Ozone	1-hour 8-hour	0.08 ppm	Non-attainment	0.09 ppm 0.070 ppm*	Non-attainment -----
Carbon Monoxide	1-hour 8-hour	35.0 ppm 9.0 ppm	Attainment Attainment	20.0 ppm 9.0 ppm	Attainment Attainment
Nitrogen Dioxide	Annual 1-hour	0.053 ppm n/a	Attainment -----	n/a 0.25 ppm	----- Attainment
Sulfur Dioxide	Annual 24-hour 1-hour	0.03 ppm 0.14 ppm n/a	Attainment Attainment -----	n/a 0.04 ppm 0.25 ppm	----- Attainment Attainment
PM_{10}	Annual 24-hour	50 µg/m* 150µg/m*	Attainment Unclassified	20 µg/m* 50 µg/m*	Non-attainment Non-attainment
$PM_{2.5}$	Annual 24-Hour	15 µg/m* 65 µg/m*	Attainment Attainment	12 µg/m* N/A	Non-attainment N/A

ppm=parts per million µg/m3=micrograms per cubic meter
* This standard was approved by the Air Resources Board on April 28, 2005 and is expected to become effective in early 2006.

Assembly Bill 32, The California Climate Solutions Act of 2006 (AB 32)
The California Climate Solutions Act of 2006 (AB 32) charges Cal/EPA with promulgating regulations that cap “greenhouse gas” (GHG) emissions from stationary sources, to reduce emissions with an enforcement mechanism to ensure that the reductions are achieved, and to disclose how the emissions cap is satisfied. AB 32 also includes provisions ensuring that businesses and consumers are not unfairly affected by emissions reduction requirements.

AB 32 requires that statewide GHG emissions from stationary sources be reduced to 1990 levels by the year 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in beginning in 2012. AB 32 directs CARB to develop appropriate regulations for enforcing the emissions cap and establishing a mandatory reporting system to track and monitor GHG emissions levels. AB 32 applies solely to stationary emissions sources and does not enforce requirements for mobile or area emissions sources.

Regional and Local Implementation of Federal and State Requirements
At the regional and local levels, three agencies are responsible for ensuring that transportation projects meet federal and state air quality requirements. These agencies include the Bay Area Air Quality Management District (BAAQMD), Solano County, and the City of Fairfield.

Bay Area Air Quality Management District (BAAQMD)

Air quality management in the SFBAAB is the responsibility of the BAAQMD. The BAAQMD is responsible for bringing and/or maintaining air quality in the SFBAAB in compliance with federal and state standards. Specifically, the BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the SFBAAB and to develop and implement attainment strategies to ensure that future emissions will not violate federal and state standards.

Clean Air Plans

Air districts periodically prepare and update plans to achieve the goal of healthy air. Typically, a plan will analyze emissions inventories (estimates of current and future emissions from industry, motor vehicles, and other sources) and combine that information with air monitoring data (used to assess progress in improving air quality) and computer modeling simulations to test future strategies to reduce emissions in order to achieve air quality standards. Air quality plans usually include measures to reduce air pollutant emissions from industrial facilities, commercial processes, motor vehicles, and other sources. Bay Area plans are prepared with the cooperation of the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG). Ozone Attainment Demonstrations are prepared for the national ozone standard and Clean Air Plans are prepared for the California ozone standard.
The Bay Area 2001 Ozone Attainment Plan is the current federal air quality plan. It was prepared by the BAAQMD, the MTC, and the ABAG. This plan was a revision to the portion of California's SIP to achieve the national ozone standard applicable to the Bay Area. The plan was approved by CARB and on November 30, 2001, CARB submitted the 2001 Plan to the USEPA. The USEPA is currently reviewing the plan.

The BAAQMD, in cooperation with the MTC and ABAG, is preparing the Bay Area 2007 Ozone Strategy. The Ozone Strategy is a roadmap showing how the San Francisco Bay Area will achieve compliance with the state one-hour air quality standard for ozone and how the region will reduce transport of ozone and ozone precursors to neighboring air basins.

BAAQMD Rules and Regulations

The BAAQMD is responsible for limiting the amount of emissions that can be generated throughout the SFBAAB by stationary sources. Specific rules and regulations have been adopted that limit the emissions that can be generated by various uses and/or activities and identify specific pollution reduction measures that must be implemented in association with various uses and activities. These rules regulate not only the emissions of federal and state criteria pollutants, but also emissions of toxic and acutely hazardous materials. The rules are also subject to ongoing refinement by the BAAQMD. Emissions sources subject to these rules are regulated through the BAAQMD permitting process. This permitting process allows the BAAQMD to monitor the amount of stationary emissions being generated and this information is used in developing the Clean Air Plan (CAP). Stationary emission sources that would be constructed as part of the Project may be subject to the BAAQMD rules and regulations.

BAAQMD CEQA Guidelines

In April 1996, the BAAQMD prepared its BAAQMD CEQA Guidelines as a guidance document to provide lead government agencies, consultants, and project proponents with uniform procedures for assessing air quality impacts and preparing the air quality sections of environmental documents for projects subject to CEQA. The CEQA

Guidelines were revised by the BAAQMD in December 1999. This document describes the criteria that the BAAQMD uses when reviewing and commenting on the adequacy of environmental documents, such as this EIR. The BAAQMD CEQA Guidelines recommend thresholds for use in determining whether projects would have significant adverse environmental impacts, identify methodologies for predicting project emissions and impacts, and identify measures that can be used to avoid or reduce air quality impacts. These guidelines are further discussed below.

AIR QUALITY IMPACTS ANALYSIS

Significance Criteria

California Environmental Quality Act (CEQA)

Appendix G of the State CEQA Guidelines identifies environmental issues to be considered when determining whether projects could have a significant effect on the environment.

The Project would have a significant impact if it would:

- Conflict with or obstruct implementation of an applicable air quality plan,
- Violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation,
- Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in nonattainment under an applicable federal or state ambient air quality standard,
- Expose sensitive receptors to substantial pollutant concentrations, or
- Create objectionable odors affecting a substantial number of people.

The CEQA Guidelines state that where available, the significance criteria established by an applicable air quality management or air pollution control district may be relied upon to make these determinations. The BAAQMD has established thresholds of significance that are to be used in assessing project-related air quality impacts within the BAAQMD. The thresholds for construction and operations include:

- Contribute to carbon monoxide (CO) concentrations that exceed the State Ambient Air Quality Standard of 9 ppm averaged over 8 hours or 20 ppm for 1 hour.
- Generate criteria air pollutant emissions in excess of the BAAQMD annual or daily thresholds. The current thresholds are 15 tons/year or 80 pounds (lb)/day for reactive organic gases (ROG), nitrogen oxides (NOx) or PM_{10}. Any project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact.
- Expose sensitive receptors or the general public to substantial levels of Toxic Air Contaminants (TACs).

Furthermore, based on the fact that the Project is the construction of a roadway, the Project would have a significant impact if it would:

- Substantially increase greenhouse gas (GHG) emissions.

Issues Not Discussed Further

Conflict with or obstruct implementation of an applicable air quality plan.
Applicable air quality plans include the Bay Area Clean Air Plan (CAP) and the 2005 Bay Area Ozone Strategy, both produced by BAAQMD. The 2007 Bay Area Ozone Strategy is currently under development. The Project would be considered in conflict with or an obstruction to implementation of both these plans if it was determined that the Project was inconsistent with growth assumptions in the CAP as pertains to population, employment, or regional increase in Vehicle Miles Traveled (VMT). The Project would not result in an increase in area population or regional employment and is accounted for in the current Regional Transportation Plan (RTP), known as Transportation 2030, adopted by the Metropolitan Transportation Commission on February 23, 2005. Therefore, the Project would not be inconsistent with any of the growth assumptions made in either the CAP or the Bay Area Ozone Strategy nor obstruct implementation of any of the proposed control measures contained in either plan. There are no impacts related to this topic.

Substantially increase GHG emissions.
No state agency or air district in California, including BAAQMD, has identified a significance threshold for GHG emissions or a methodology for analyzing air quality impacts related to GHG emissions. The state has identified 1990 emission levels as a goal through adoption of AB32. To meet this goal, California would need to generate lower levels of GHG emissions than current levels. However, no standards have yet been adopted quantifying 1990 emission targets. It is recognized that for most projects there is no simple metric available to determine if a single project would help or hinder meeting the AB32 emission goals. In addition, at this time AB32 only applies to stationary source emissions. Consumption of fossil fuels in the transportation sector accounted for over 40 percent of the total GHG emissions in California in 2004. Current standards for reducing vehicle emissions considered under AB1493 call for "the maximum feasible reduction of GHG's emitted by passenger vehicles and light-duty trucks and other vehicles," and do not provide a quantified target for GHG emissions reductions for vehicles.

The Project is a transportation improvement that does not generate any new vehicle trips. It would, however, change the operating conditions for vehicles during the peak traffic periods. During the off-peak hours, when volume is well below capacity, the Project would not affect vehicle operating conditions.

The California vehicle emissions model, EMFAC-2007, documents that CO2 emissions from vehicles vary with speed. Emissions are relatively high at low speed rates and decline rapidly with increasing speed to about 45 miles per hour. The per-mile CO2 emission rate at 45 mph is approximately 32 percent of that at 5 mph. Above 45 mph emission rates increase slowly. At 65 mph the CO2 emission rate is about 42 percent of that at 5 mph.

The Project would primarily affect operating speeds during peak hours when average speeds currently fall well below 45 mph (refer to section 4.2 Transportation). To the extent that the Project increases average vehicle speeds and decreases vehicle idling, it would slightly reduce generation of CO2 during peak traffic periods.

No attempt has been made to quantify the effect of the Project on generation of CO2 emissions. Quantifying the Project's effect would require that average vehicle speed be defined at a level of detail, both spatially (over the entire area affected by the Project) and temporally (over the entire day), which is not practical. It is known, however, that the overall impact of the Project on GHG would be beneficial (would reduce GHG emissions) and that the net reduction in emissions would be quite small. Therefore, there are no impacts related to the generation of GHG.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Less than Significant Impacts

Net increases of any criteria pollutants for which the Project region is in nonattainment under an applicable federal or state ambient air quality standard.
Possible impacts, if any, arising from the Project would be concentrated at newly constructed intersections where motor vehicles would be idling while waiting at stoplights. In addition to CO, the primary operational emissions associated with the proposed Project are PM_{10} and O_3 precursors emitted as vehicle exhaust. The Project would affect emissions of these pollutants by changing operating conditions for motor vehicles. Overall, the Project would improve the LOS and reduce delays at nine intersections, maintain similar LOS and delay at fifteen intersections, and cause a slight increase in delay at four intersections when compared to conditions under the No-Build Alternative. Taken as a whole, reduction in delay and idling associated with implementation of the Project would have a beneficial impact on emissions of all regional pollutants. A slightly higher average speed would be expected to slightly reduce the rate of emission of reactive organic gases (ROG), increase slightly the emission of NO_x, and not affect the rate of emission of PM_{10}. Given the volume of traffic on the affected roads, the magnitude of these changes would be quite small. Therefore, impacts on regional air quality arising from the Project are considered to be less than significant.

Contributions to carbon monoxide (CO) concentrations that exceed the State Ambient Air Quality Standard of 9 ppm averaged over 8 hours or 20 ppm for 1 hour.
The Transportation Project-Level Carbon Monoxide Protocol recognizes signalized surface street intersections as having a high potential to expose the public to elevated concentrations of CO.[1] Levels of CO are known to be directly related to traffic volumes and levels of congestion.

The following two intersections were selected for analysis because they would experience the highest traffic volumes which would equate to the highest levels of CO being generated:

1. Red Top Road/SR12/North Connector
2. Abernathy Road/North Connector Road

As shown in Table 4.3-2 below, the CO levels at these intersections would not exceed State ambient air quality standards.

[1] Vincente J Garza; Peter Granly; Daniel Sperling, Transportation Project-Level Carbon Monoxide Protocol, Institute of Transportation Studies, University of California, Davis; Report UCD-ITS-RR-97-21, December 1997.

Table 4.3-2. Projected Worst-Case Carbon Monoxide Concentrations at New/Modified Major Intersections, in Parts Per Million

Intersection	1-Hour Averaged Concentration (PPM)	8-Hour Averaged Concentration (PPM)
SR12/Red Top Road/North Connector	8.7	6.1
Abernathy Road/North Connector	7.7	5.4
Most Stringent Standard	20.0	9.0

Source: Don Ballanti, updated 2007.

Since the Project is located in an attainment area for the federal PM_{10} ambient air quality standard, no PM_{10} "hot spot" analysis is required.

The existing Fairfield Linear Park is currently located immediately north of I-80. To ascertain whether the Project would impact the air quality of the existing park as well as the new multi-use path that is proposed as part of the Project in the East End, a separate CO analysis was conducted.

CO concentrations were forecast at several distances from the center of a 1-kilometer section of the North Connector using PM peak-hour traffic volumes for this road segment. The results showed a worst-case concentration of 1.1 Parts Per Million (PPM) at a distance of 60 feet from the roadway edge and a worst-case concentration of 0.5 PPM at a distance of 300 feet from the roadway edge. These concentrations do not exceed State Ambient Air Quality Standards.[2] Therefore, impacts related to contributions to CO concentrations that exceed the State Ambient Air Quality Standards are considered to be less than significant.

Cumulatively considerable net increases of any criteria pollutant for which the Project region is in nonattainment under an applicable federal or state ambient air quality standard.
The Project is located in an area designated as being in nonattainment for federal O_3 precursor standards. Because O_3 precursors are regional pollutants, the proposed Project must be evaluated under the transportation conformity requirements previously described.

As stated above, the current Regional Transportation Plan (RTP), known as Transportation 2030, was adopted by the Metropolitan Transportation Commission in 2005. The same year, FHWA and Federal Transit Administration (FTA) determined that the 2030 RTP conforms to the purposes of California's SIP.

The Project is contained in the conforming RTP and 2005 TIP, and the design concept and scope proposed are substantially the same as the design concept adopted by the Metropolitan Transportation Commission (MTC) and scope in the RTP and TIP listings. MTC conducts an air quality conformity analysis of the RTP and TIP projects. Since the Project is included in the RTP and TIP, it meets the regional tests for conformity with the SIP and does not result in a cumulatively considerable net increase of any criteria

[2] As part of the Project, the Linear Park would be replaced by a multi-use path on the north side of the North Connector alignment. Future air quality conditions along this path are anticipated to be the same or better than the existing Linear Park, as the path would be a greater distance from I-80.

pollutant for which the Project region is in nonattainment under an applicable federal or state ambient air quality standard. Therefore, impacts related to cumulative increases of any criteria pollutant for which the Project region is in nonattainment are considered to be less than significant.

Creation of objectionable odors.
During construction, the various diesel-powered vehicles and equipment in use on the site would create odors. However, these odors would be temporary and are not likely to be noticeable beyond the boundaries of the Project site. Therefore, impacts related to the creation of objectionable odors is considered to be less than significant.

Significant and Potentially Significant Impacts and Mitigation Measures

4.3-1: The Project could potentially result in temporary increases in construction-related PM_{10} emissions during grading and construction activities. This is considered a potentially significant adverse impact.

Construction is a source of dust (PM_{10}) and exhaust emissions, which can have substantial temporary impacts on local air quality (i.e., exceed state air quality standards for PM_{10}). Such emissions would result from earthmoving and use of heavy equipment, as well as land clearing, ground excavation, cut and fill operations, and the construction of roadways. Dust emissions can vary substantially from day to day, depending on the level of activity, the specific operations, and the existing weather.

The majority of earthmoving activity for the Project would occur in the West End. While construction activities in this area would likely have the greatest potential to create dust and exhaust emissions it would be relatively distant from sensitive land uses.

Most of the East End is on level agricultural land with the road just above the existing ground. There would be limited grading and minor access requirements for the intersecting farm roads. Construction impacts for this end of the Project would be generally less than other portions of the Project, but would occur fairly close to scattered existing development.

Trucks and construction equipment emit hydrocarbons, NOx, CO, and particulates. However, most pollution generated by construction activities would consist of wind-blown dust generated by excavation, grading, hauling, and various other construction activities. The impacts from the above activities would vary from day to day as construction progresses.

The proposed Project may temporarily expose sensitive receptors in the West End and East End to increases in particulate matter concentrations during construction. There are sensitive receptors located approximately 500 feet from the proposed alignment in the West End and scattered homes are located in the East End. There is one mixed use Project that has been approved in the area between Dan Wilson Creek and Suisun Creek that could include residential uses. This project is referred to as the Fairfield Corporate Commons Project. However, predicted concentrations of CO at sensitive receptors near the Project were found to not exceed the ambient state/federal standards after completion of the Project.

Exposure and potential exposure of sensitive receptors on the West End and East End to construction-related PM_{10}, is considered a significant impact.

> **Mitigation 4.3-1:** The contractor shall be required to minimize or eliminate dust through the application of water or dust palliatives during construction and must use Caltrans Special Provisions and Standard Specifications, which include requirements to minimize or eliminate dust through the application of water or dust palliatives during Project construction. Implementation of this measure would reduce the potential exposure of sensitive receptors to dust (PM_{10}) to a less-than-significant level.

Significance After Mitigation: Less than significant.