

## **2.10 AIR QUALITY**

The information below is summarized from the Air Quality Impact Report, April 2004. This report is available for public review at Caltrans District 4, 111 Grand Avenue, Oakland, CA 94610, and the Solano Transportation Authority, One Harbor Center, Suite 130, Suisun City, CA 94585 during normal business hours.

### **Regulatory Setting**

#### **Federal Requirements**

The primary 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 EPA. The EPA develops rules and regulations to preserve and improve air quality and delegates specific responsibilities to state and local agencies. The EPA has established national ambient air quality standards (NAAQS) for criteria pollutants. Criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), ozone (O<sub>3</sub>), PM<sub>10</sub>, particulate matter less than or equal to 2.5 microns in diameter (PM 2.5), and lead (Pb). O<sub>3</sub>, PM<sub>10</sub>, and PM 2.5 generally are considered to be regional pollutants because they or their precursors affect air quality on a regional scale. Pollutants such as CO, NO<sub>2</sub>, SO<sub>2</sub>, and Pb are considered to be local pollutants because they tend to accumulate in the air locally. PM<sub>10</sub> and PM 2.5 also are considered to be localized pollutants. Areas are classified as either "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.

Under Section 176(c) of the CAAA, the "conformity" provisions for federal projects are outlined. Federal actions are required to conform to the requirements of a SIP and must not jeopardize efforts for a region to achieve the NAAQS. Section 176 (c) also assigns primary oversight responsibility for conformity assurance to the Federal agency undertaking the project, not the EPA, State, or local agency. For there to be conformity, federally supported or funded activities must not (1) cause or contribute to any new air quality standard violation, (2) increase the frequency or severity of any existing standard violation, or (3) delay the timely attainment of any standard, interim emission reduction, or other SIP milestone aimed at bringing the region into attainment.

Specifically since the Bay Area is nonattainment (moderate) for ozone and is a CO maintenance area, projects with federal involvement are subject to the General Conformity regulations if they generate emissions of ozone precursor pollutants (i.e., reactive organic compounds and NO<sub>x</sub>) or CO in excess of 100 tons per year or the emissions are more than 10 percent of the nonattainment or maintenance area's emission inventory for the pollutant(s) of concern. Projects that are subject to the General Conformity regulations are required to mitigate or fully offset the emissions caused by the action, including both direct and indirect (e.g., traffic) emissions that the Federal agency has some control over.

#### **State Requirements**

The California Air Resources Board (CARB), which is part of the California EPA regulatory agency, develops air quality regulations at the state level. The state regulations mirror federal regulations by establishing industry-specific pollution controls

for criteria, toxic, and nuisance pollutants. California also requires area to develop plans and strategies for attaining state ambient air quality standards as set forth in the California CAA of 1988. CARB is also responsible for developing motor vehicle standards for California vehicles. See Table 2.10-1 for a description of state and federal ambient air quality standards.

### **Local and Regional Implementation of Federal Requirements**

At the local and regional levels, four agencies are responsible for ensuring that transportation projects meet state and federal air requirements. Those agencies include Caltrans, the Solano Transportation Authority, Solano County and the City of Fairfield.

### **Affected Environment**

#### **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, however, 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), about 4 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 station are 112° F and 18° F. Temperatures at the site are similar to the Fairfield-Suisun City area. The 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 area's rainfall derives from the fringes of mid-latitude storms, however, and 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, range between 60 and 85 inches annually.

During the day, especially in summer, winds are 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 2 to 4 mph develops from the Central Valley toward the ocean. After sunrise and after sunset, there is usually a period of light and disorganized flow as one flow regime dissipates and the replacing regime has not yet 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. The air stagnation at night during winter 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 AFB, approximately 2 miles northeast of the site. Wind data indicate that prevailing winds from February through November are from the southwest and west-southwest at a mean wind speed of 14 mph, and the December through January prevailing winds are from the north at a mean wind speed of 11.3 mph. Due to topographic differences between the landfill 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 any 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, by far, 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 steadily over the past decade, with steadily declining total volatile organic compounds (VOC) and nitrogen oxides (NO<sub>x</sub>) emissions over time. However, these reductions have not been enough to prevent exceedances 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 ( $\mu\text{g}/\text{m}^3$ ).

In early 1998 the San Francisco Bay Area Air Basin was classified as having attained all federal ambient air quality standards. On June 10, 1998, however, the U.S. Environmental Protection Agency (EPA) reclassified the Bay Area from “maintenance area” to nonattainment for ozone based on recent violations of the federal standards at several locations in the air basin. This reversed the air basin’s classification as a “maintenance area” for ozone in 1995. Reclassification required an update to the region’s federal air quality plan. The Bay Area remains a “maintenance area” for carbon monoxide. Under the California Clean Air Act, the San Francisco Bay Air Basin portion of Solano County is a nonattainment area for ozone and particulate matter less than or equal to 10 microns in diameter (PM<sub>10</sub>). The Bay Area is in non-attainment for California standards of PM<sub>2.5</sub> and in attainment for the National PM<sub>2.5</sub> standards. The county is either attainment or unclassified for other pollutants. The North Connector Project is in a federal ozone non-attainment area for which transportation control measures have been included in the State Implementation Plan (SIP). The Bay Area Air Quality Management District (BAAQMD) has jurisdiction over air quality issues throughout the county, administering air quality regulations developed at the federal, state, and local levels. Federal, state, and local air quality regulations applicable to the proposed project are described below.

## **Impacts**

### **Operational Impacts**

Possible impacts from the project would be concentrated at newly constructed intersections where automobiles would be idling while stopped at stoplights or stop signs. In addition to CO, the primary operational emissions associated with the proposed project are PM<sub>10</sub> and O<sub>3</sub> precursors emitted as vehicle exhaust. The project would affect emissions of these pollutants by changing operating conditions for vehicles. The project would improve levels of service for traffic, resulting in reduced delay and higher average speeds when compared to the No Build condition. Reducing delay (and idling) would have a beneficial impact on emissions of all regional pollutants. A slightly higher average speed would be expected to reduce slightly the rate of emission of ROG, increase slightly the emission of NO<sub>x</sub>, and not affect the rate of emission of PM<sub>10</sub>. Given the volume of traffic on the affected roads, the magnitude of these changes would be quite small. Project impacts on regional air quality are considered to be less than significant.

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.<sup>1</sup> 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 analysis for future operation of signalized intersections along the project corridor. The following three

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<sup>1</sup> 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.

intersections were selected for analysis because they would experience the highest traffic volumes:

1. Red Top Road/SR12/North Connector,
2. Suisun Valley Road/North Connector
3. Abernathy Road/North Connector Road

As shown in Table 2.10-2, the CO levels would not exceed standards at any of the intersections.

**Table 2.10-1: State and Federal Ambient Air Quality Standards**

Pollutant	Averaging Time	Federal Primary Standard	Attainment Status	State Standard	Attainment Status
Ozone	1-hour	0.08 ppm	Non-attainment	0.09 ppm	Non-attainment
	8-hour			0.070 ppm*	-----
Carbon Monoxide	1-hour	35.0 ppm	Attainment	20.0 ppm	Attainment
	8-hour	9.0 ppm	Attainment	9.0 ppm	Attainment
Nitrogen Dioxide	Annual	0.053 ppm	Attainment	n/a	-----
	1-hour	n/a	-----	0.25 ppm	Attainment
Sulfur Dioxide	Annual	0.03 ppm	Attainment	n/a	-----
	24-hour	0.14 ppm	Attainment	0.04 ppm	Attainment
	1-hour	n/a	-----	0.25 ppm	Attainment
PM <sub>10</sub>	Annual	50 µg/m <sup>3</sup>	Attainment	20 µg/m <sup>3</sup>	Non-attainment
	24-hour	150µg/m <sup>3</sup>	Unclassified	50 µg/m <sup>3</sup>	Non-attainment
PM <sub>2.5</sub>	Annual	15 µg/m <sup>3</sup>	Attainment	12 µg/m <sup>3</sup>	Non-attainment
	24-Hour	65 µg/m <sup>3</sup>	Attainment	N/A	N/A

ppm=parts per million µg/m<sup>3</sup>=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.

**Table 2.10-2: 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)
SR 12/Red Top Road/North Connector	8.7	6.1
Suisun Valley Road/North Connector	10.0	7.0
Abernathy Road/North Connector	7.7	5.4
Most Stringent Standard	20.0	9.0

As indicated in Table 2.10-2, the CO concentrations do not meet or exceed the most stringent standard. Since the project is located in an attainment area for the federal PM10 ambient air quality standard, no PM10 “hot spot” analysis is required

A separate model was conducted to ascertain project impacts on the Fairfield Linear Park, which parallels a portion of the proposed project in the East End. Concentrations were forecast at several distances from the center of a 1-kilometer section of roadway using PM peak hour traffic volumes for this stretch of road. The results for parkland impacts showed a worst-case concentration of 1.1 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 standards.

### **Construction Impacts**

Construction is a source of dust and exhaust emissions, which can have substantial temporary impacts on local air quality (i.e., exceed state air quality standards for PM10). 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 the earthmoving activity would occur in the West End. While construction activities in this area would be likely to have the greatest potential to create dust and exhaust emissions it would be relatively distant from sensitive land uses.

Construction activities in the Central Section would be limited to minor grading to realign the existing roads. In addition, most land uses in this area are commercial/office uses which are less sensitive.

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, oxides of nitrogen, CO, and particulates. Most pollution 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<sup>2</sup> in the West and East Ends 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 being proposed for the area between Dan Wilson Creek and Suisun Creek and Suisun Creek that could include residential uses. The proposed project is referred to as

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<sup>2</sup> The BAAQMD defines sensitive receptors as facilities where sensitive receptors population groups (children, the elderly, the acutely ill and the chronically ill) are likely to be located).

the Fairfield Corporate Commons project. However, predicted concentrations of carbon monoxide at sensitive receptors near the project were found to not exceed the ambient state/federal standards after completion of the project.

Temporary construction related increases in particulate on existing residential development and other sensitive receptors are not anticipated to have significant impacts because the residences are located at a sufficient distance from the proposed project.

During construction the various diesel-powered vehicles and equipment in use on the site would create odors. These odors are temporary and not likely to be noticeable much beyond the project boundaries. The potential for diesel odors impacts is less-than-significant.

### **Transportation Conformity**

The proposed action is located in an area designated nonattainment for the federal O<sub>3</sub> precursor standards. Because O<sub>3</sub> precursors are regional pollutants, the proposed action must be evaluated under the transportation conformity requirements described earlier.

The current Regional Transportation Plan, known as Transportation 2030, was adopted by the Metropolitan Transportation Commission on Feb. 23, 2005. On March 17, 2005, the Federal Highway Administration (FHWA) and Federal Transit Administration determined that the 2030 Regional Transportation Plan (RTP) conforms to the purposes of the State Implementation Plan.

The North Connector 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 and scope in the RTP and TIP listings. Therefore, the project meets the regional tests for conformity with the SIP.

### **Avoidance, Minimization, and Mitigation Measures**

**Impact AIR1 Construction Emissions:** Temporary increases in construction-related PM10 emissions would occur during grading and construction activities.

**Mitigation AIR1** 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.

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