3-2 AIR QUALITY

Changes Since the Draft EIS/EIR

Subsequent to the release of the Draft EIS/EIR in April 2004, the Gold Line Phase II project has undergone several updates:

Name Change: To avoid confusion expressed about the terminology used in the Draft EIS/EIR (e.g., Phase I; Phase II, Segments 1 and 2), the proposed project is referred to in the Final EIS/EIR as the Gold Line Foothill Extension.

Selection of a Locally Preferred Alternative and Updated Project Definition: Following the release of the Draft EIS/EIR, the public comment period, and input from the cities along the alignment, the Construction Authority Board approved a Locally Preferred Alternative (LPA) in August 2004. This LPA included the Triple Track Alternative (2 LRT and 1 freight track) that was defined and evaluated in the Draft EIS/EIR, a station in each city, and the location of the Maintenance and Operations Facility. Segment 1 was changed to extend eastward to Azusa. A Project Definition Report (PDR) was prepared to define refined station and parking lot locations, grade crossings and two rail grade separations, and traction power substation locations. The Final EIS/EIR and engineering work that support the Final EIS/EIR are based on the project as identified in the Final PDR (March 2005), with the following modifications. Following the PDR, the Construction Authority Board approved a Revised LPA in June 2005. Between March and August 2005, station options in Arcadia and Claremont were added.

Changes in the Discussions: To make the Final EIS/EIR more reader-friendly, the following format and text changes have been made:

Discussion of a Transportation Systems Management (TSM) Alternative has been deleted since the LPA decision in August 2004 eliminated it as a potential preferred alternative.

Discussions of the LRT Alternatives have eliminated the breakout of the two track configurations used in the Draft EIS/EIR (Double Track and Triple Track). The Final EIS/EIR reports the impacts of a modified triple track configuration (2 LRT tracks and 1 freight track with two rail grade separations) but focuses on the phasing/geographic boundaries included in the LPA decisions.

Two LRT alternatives in the Final EIS/EIR are discussed under the general heading "Build Alternatives," and are defined as:

1. Full Build (Pasadena to Montclair) Alternative: This alternative would extend LRT service from the existing Sierra Madre Villa Station in Pasadena through the cities of Arcadia, Monrovia, Duarte, Irwindale, Azusa, Glendora, San Dimas, La Verne, Pomona, and Claremont, terminating in Montclair. The cities from Pasadena to Azusa are also referred to in the Final EIS/EIR as Segment 1. The cities from Glendora to Montclair are also referred to in the Final EIS/EIR as Segment 2. Key changes from the Draft EIS/EIR are the inclusion of Azusa in Segment 1, the elimination of the Pacific Electric right-of-way option between Claremont and Montclair, the inclusion of a 24-acre Maintenance and Operations facility in Irwindale (the site is smaller than in the Draft EIS/EIR), and the addition of two rail grade separations. Note that the Maintenance and Operations Facility is located in Segment 1 but is part of the Full Build Alternative. In other words, it would not be constructed as an element of the Build LRT to Azusa Alternative (described below). The length of the alternative is approximately 24 miles. One station (and parking) would be located in each city, except for Azusa, which would have

two. There are two options for the station locations in Arcadia and Claremont. Segment 1 would include 2 LRT tracks throughout and 1 freight track between the Miller Brewing Company in Irwindale and the eastern boundary of Azusa. The freight track that now exists west of Miller Brewing, which serves a single customer in Monrovia, would be removed from service following relocation of that customer by the City of Monrovia. Segment 2 would include two LRT tracks throughout and 1 freight track between the eastern boundary of Azusa and Claremont. In Claremont, the single freight track joins up with the double Metrolink tracks (which are also used for freight movement) and continues through to Montclair (and beyond). This alternative also includes two railroad grade separations (in Azusa and in Pomona) so that LRT tracks would pass above the at-grade freight track. These allow the LRT and freight services to operate independently (thus eliminating the time-constrained double track option discussed in the Draft EIS/EIR). Implementation of the alternative would include relocation of the existing freight track within the rail right-of-way, but there would be no changes in the service provided to customers. The alternative includes 8 new traction power substations in Segment 2, as well as the 8 in Segment 1.

2. Build LRT to Azusa Alternative: This alternative (also referred to as Segment 1) would extend LRT service from the existing Sierra Madre Villa Station in Pasadena through the cities of Arcadia, Monrovia, Duarte, Irwindale, and to the eastern boundary of Azusa. (The main change from the Draft EIS/EIR is the inclusion of the City of Azusa.) The length of the alternative is approximately 11 miles. One station (and parking facility) would be located in each city, except for Azusa, which would have two. There are two options for the station location in Arcadia. Segment 1 would include two LRT tracks throughout and 1 freight track between the Miller Brewing Company in Irwindale and the eastern boundary of Azusa. The freight track that now exists west of Miller Brewing, which serves a single customer in Monrovia, would be removed from service following relocation of that customer by the City of Monrovia. This alternative also includes the railroad grade separation in Azusa so that LRT tracks would pass above the at-grade freight track. This allows the LRT and freight services to operate independently (thus eliminating the time-constrained double track option discussed in the Draft EIS/EIR). Implementation of the alternative would include relocation of the existing freight track within the rail right-of-way, but there would be no changes in the service provided to customers. The alternative also includes 8 new traction power substations.

As in the Draft EIS/EIR, impact forecasts use 2025 conditions, except for traffic impacts, which reflects a 2030 forecast based on the recently adopted 2004 SCAG Regional Transportation Plan. Macroscale analysis is based on 2025 forecasts, which are driven by transportation model outputs; microscale analysis is based on 2030 forecasts, which are driven by the traffic impact analysis.

Summary of Impacts

The result of the mesoscale (regional) analysis is that proposed project alternatives would have a small effect on regional emission rates – the LRT alternative would slightly reduce emissions and the TSM alternative would increase emission rates by amounts that, with one exception, are not considered to be significant by the South Coast Air Quality Management District (SCAQMD). Only NO_x emissions are estimated to increase by an amount greater than the emission threshold (i.e., 62 pounds per day as compared with a threshold value of 55 pounds per day).

The result of the localized (microscale) analysis is that proposed project alternatives would not cause or exacerbate a violation of a state or national ambient air quality standard. During construction, the CEQA (SCAQMD) quarterly impact thresholds for NO_x and particulate matter would be exceeded and mitigation measures are required. However, even after mitigation measures are applied, impacts would remain significant.

3-2.1 Introduction

The proposed project alternatives would alter traffic conditions in the study area. Air quality, which is a general term used to describe pollutant levels in the atmosphere, will be affected by these changes. Potential air quality impacts could result from changes in traffic volumes and traffic patterns at congested locations near proposed transit stations and associated parking facilities.

This chapter assesses air quality impacts associated with the proposed alternatives. Air quality analyses were conducted to estimate the potential impacts associated with increased traffic volumes or changes in traffic patterns at congested intersections. In addition, changes in vehicular emissions generated in the study area as a result of the proposed alternatives were estimated, and determinations were made as to whether these changes conform to air quality regulatory requirements.

3-2.2 Applicable Pollutants

3-2.2.1 Criteria Pollutants

Individual air pollutants or "criteria pollutants," as described by the Environmental Protection Agency (EPA), are carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). Federal and state governments have established ambient air quality standards for these pollutants in order to protect public health. The sources of these pollutants, their effects on human health and the nation's welfare, and their final deposition in the atmosphere vary considerably. In the project area, ambient concentrations of CO, O_3, and NO_2 are primarily influenced by motor vehicle activity, while emissions of SO_2 are associated mainly with various stationary sources of emissions. Emissions of particulate matter are associated with stationary sources, and to a lesser extent, diesel-fueled mobile sources (heavy trucks and buses). Lead emissions, which historically were principally influenced by motor vehicle activity, have been substantially reduced due to the elimination of lead from gasoline.

The sources of these pollutants, their effects on human health and the nation's welfare, and their final deposition in the atmosphere vary considerably. A brief description of each pollutant is given below.

~~The following air pollutants have been identified by the U.S. Environmental Protection Agency (EPA) as being of concern nationwide: carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO_x), photochemical oxidants, lead (Pb), sulfur dioxide (SO2), and particulate matter. In urban areas, ambient concentrations of CO, HC, and photochemical oxidants are predominantly influenced by motor vehicle activity; NO_x are emitted from both mobile and stationary sources; emissions of sulfur oxides (SO_x) are associated mainly with stationary sources; and missions of particulate matter are associated with stationary sources, and to a lesser extent, diesel-fueled mobile sources (heavy trucks and buses). Lead emissions, which historically were principally influenced by motor vehicle activity, have been substantially reduced due to the elimination of lead from gasoline~~

a. Carbon Monoxide

CO is a colorless and odorless gas that is generated in the urban environment primarily by the incomplete combustion of fossil fuels in motor vehicles. Prolonged exposure to high levels of CO can cause headaches, drowsiness, loss of equilibrium, or heart disease. CO concentrations can vary greatly over relatively short distances. Relatively high concentrations of CO are typically found near congested intersections, along heavily used roadways carrying slow-moving traffic, and in areas where atmospheric dispersion is inhibited by urban "street canyon" conditions. Consequently, CO concentrations must be predicted on a localized, or microscale, basis.

b. Ozone

O_3, a colorless toxic gas, enters the blood stream and interferes with the transfer of oxygen, depriving sensitive tissues in the heart and brain of oxygen. O_3 also damages vegetation by inhibiting their growth. Although O_3 is not directly emitted, it forms in the atmosphere through a chemical reaction between reactive organic compounds (ROC) and nitrogen oxides (NOx), which are emitted from industrial sources and from automobiles. Substantial O_3 formations generally requires a stable atmosphere with strong sunlight.

c. Nitrogen Dioxide

NO_2, a brownish gas, irritates the lungs. It can cause breathing difficulties at high concentrations. Like O_3, NO_2 is not directly emitted, but is formed through a reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as nitrogen oxides (NO_x) and are major contributors to ozone formation. NO_2 also contributes to the formation of PM_{10}, small liquid and solid particles that are less than 10 microns in diameter (see discussion of PM_{10} below). At atmospheric concentration, NO_2 is only potentially irritating. In high concentrations, the result is a brownish-red cast to the atmosphere and reduced visibility. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. Some increase in bronchitis in children (two and three years old) has also been observed at concentrations below 0.3 parts per million (ppm).

d. Particulate Matter

~~Particulate matter is a broad class of air pollutants that exist as liquid droplets or solids, with a wide range of sizes and chemical composition. Particulate matter is emitted by a variety of sources, both natural and man-made. Natural sources include the condensed and reacted forms of natural organic vapors, salt particles resulting from the evaporation of sea spray, wind-borne pollen, fungi, molds, algae, yeasts, rusts, bacteria, and debris from live and decaying plant and animal life, particles eroded from beaches, desert, soil and rock, particles from volcanic and geothermal eruptions and forest fires. Major man-made sources of particulate matter include the combustion of fossil fuels such as vehicular exhaust, power generation and home heating, chemical and manufacturing processes, all types of construction, agricultural activities, and wood-burning fireplaces.~~

~~Of particular health concern are those particles that are smaller than or equal to 10 microns (PM_{10}) in size and 2.5 microns ($PM_{2.5}$) in size. The principal health effects of airborne particulate matter are on the respiratory system. Regional emissions of PM_{10} are considered for this analysis. However, since diesel fueled vehicles are the principal localized mobile source of PM_{10} emissions and the project alternatives will not measurable affect diesel emissions, localized PM_{10} impacts were not considered.~~

~~Because the $PM_{2.5}$ standards are relatively new (i.e., effective September 16, 1997), the EPA is allowing time to build a nationwide monitoring network to collect and analyze the data needed to designate areas as to whether or not they meet these standards, as well as to develop implementation plans for areas that will be designated as not being in attainment for these standards. In addition, until a comprehensive $PM_{2.5}$ modeling system is promulgated by the EPA, compliance with national standards cannot be determined.~~

Particulate pollution is composed of solid particles or liquid droplets that are small enough to remain suspended in the air. In general, particulate pollution can include dust, soot, and smoke; these can be irritating but usually are not poisonous.

Particulate pollution also can include bits of solid or liquid substances that can be highly toxic. Of particular concern are those particles that are smaller than, or equal to, 10 microns (PM_{10}) and 2.5 microns ($PM_{2.5}$) in size.

PM_{10} refers to particulate matter less than 10 microns in diameter, about one/seventh the thickness of a human hair (Figure 3-2.1). Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter also *forms* when industry and gases emitted from motor vehicles undergo chemical reactions in the atmosphere. Major sources of PM_{10} include motor vehicles; wood burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning, industrial sources, windblown dust from open lands; and atmospheric chemical and photochemical reactions. Suspended particulates produce haze and reduce visibility. Additionally, PM_{10} poses a greater health risk than larger-sized particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections.

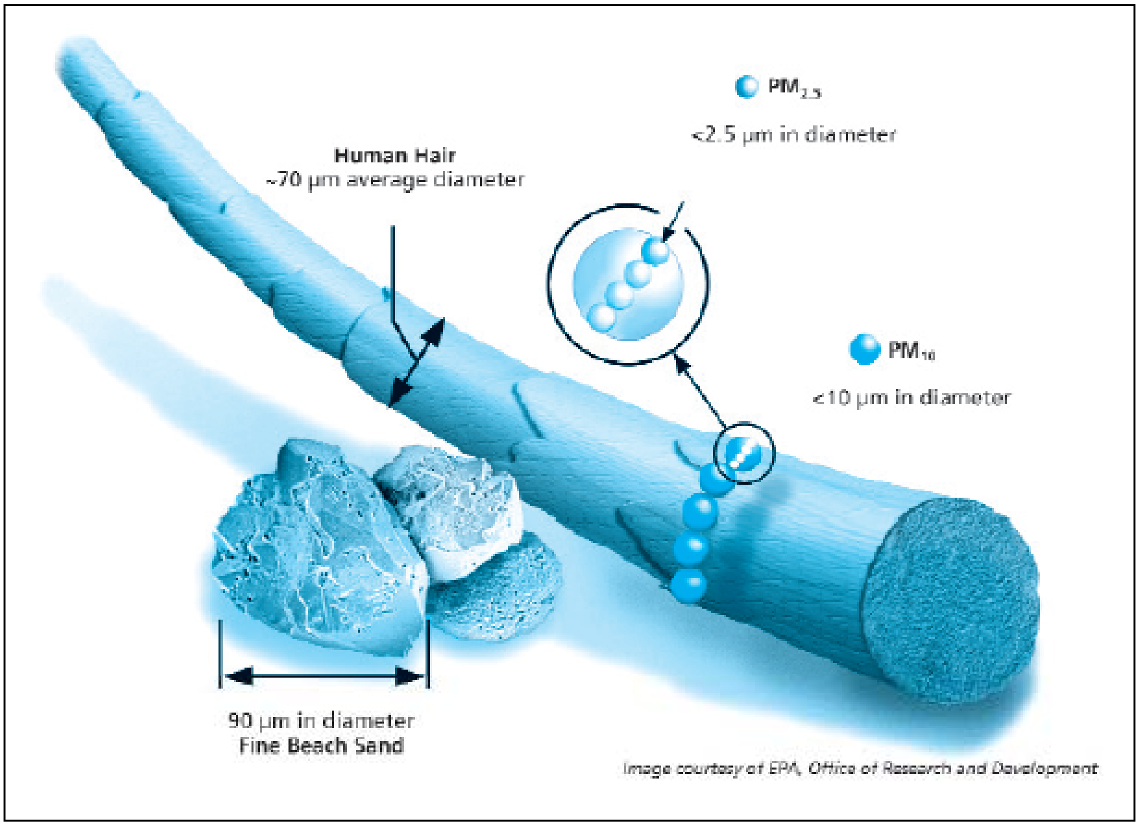

Figure 3-2.1: Relative Particulate Matter Size

Data collected through numerous nationwide studies indicates that most of the PM_{10} comes from:

- Fugitive dust
- Wind erosion
- Agricultural and forestry sources

A small portion of particulate matter is the product of fuel combustion processes. In the case of $PM_{2.5}$, the combustion of fossil fuels accounts for a significant portion of this pollutant. The main health effect of airborne particulate matter is on the respiratory system. $PM_{2.5}$ refers to particulates that are 2.5 microns or less in diameter, roughly 1/28th the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (from motor vehicles, power generation, industrial facilities), residential fireplaces and wood stoves. In addition, $PM_{2.5}$ can be formed in the atmosphere *from* gases such as sulfur dioxide, nitrogen oxides, and volatile organic compounds. Like PM_{10}, $PM_{2.5}$ can penetrate the human respiratory system's natural defenses and damage the respiratory tract when inhaled. Whereas, particles 2.5 to 10 microns in diameter tend to collect in the upper portion of the respiratory system, particles 2.5 microns or less are so tiny that they can penetrate deeper into the lungs and damage lung tissues.

Regional emissions of PM_{10} and $PM_{2.5}$ are considered for this analysis. While EPA is concerned with local $PM_{10/2.5}$ levels, no guidelines have been firmly established for their analysis. Though it is not expected that local $PM_{10}/PM_{2.5}$ levels will be affected by the project since diesel fueled vehicles are the principal localized mobile source of PM_{10} and $PM_{2.5}$ emissions and the project alternatives will not measurably affect diesel emissions, a qualitative PM10 assessment was conducted using the technical report *Particulate Matter and Transportation Projects, An Analysis Protocol* developed by UC-Davis and Caltrans (2/2005), recommended for use by Caltrans.

~~Hydrocarbons include a wide variety of volatile organic compounds, emitted principally from the storage, handling, and use of fossil fuels. NO_x constitute a class of compounds that include nitrogen dioxide (NO_2) and nitric oxide, both of which are emitted by motor vehicles and stationary sources. Both hydrocarbons and NO_x are of concern primarily because most of those compounds react in sunlight to form photochemical oxidants, including ozone. This reaction occurs comparatively slowly and ordinarily takes place far downwind from the site of actual pollutant emission. The effects of these pollutants are normally examined on an area wide, or mesoscale, basis.~~

e. Lead

Lead emissions are principally associated with industrial sources and motor vehicles using gasoline containing lead additives. As the availability of leaded gasoline has decreased, motor vehicle-related lead emissions have decreased resulting in a significant decline of concentrations of lead. Atmospheric lead concentrations in California are well below national standards. Lead concentrations are expected to continually decrease; therefore an analysis of lead from mobile sources is not warranted.

f. Sulfur Dioxide

High concentrations of SO_2 affect breathing and may aggravate existing respiratory and cardiovascular disease. SO_2 emissions are generated from the combustion of sulfur-containing fuels—oil and coal—largely from stationary sources such as coal and oil-fired power plants, steel mills, refineries, pulp and paper mills, and nonferrous smelters. In urban areas, especially in the winter, smaller stationery sources such as space heating contribute to elevated SO_2 levels. Although diesel-fueled heavy-duty vehicles also emit SO_2, transportation sources are not considered by EPA (and other regulatory agencies) to be significant sources of this pollutant that should be quantitatively evaluated in a mobile source impact analysis.

3-2.2.2 Non-Criteria Pollutants

Toxic air pollutants, also called air toxics, are those pollutants that cause or may cause cancer or other serious health effects. The primary sources of air toxic contaminants are commercial and industrial facilities. Examples of toxic air pollutants include benzene, which is found in gasoline; perchlorethlyene, which is emitted from some dry cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper by a number of industries. Examples of other air toxics include dioxin, asbestos, toluene, and metals such as cadmium, mercury, chromium, and lead compounds.

Diesel exhaust, which is produced when an engine burns diesel fuel and is commonly found throughout the environment, is emitted from a broad range of diesel engines: on-road diesel engines of trucks, buses and cars and off-road diesel engines that include locomotives, marine vessels and heavy duty equipment. Particulate matter from diesel-fueled engines has been identified as a toxic air contaminant (TAC) by the California Air Resources Board (CARB) and diesel particulate matter (DPM) is considered a TAC under California's air toxics program. DPM is a complex mixture of thousands of gases and fine particles (commonly known as soot) that contains more than 40 toxic air contaminants. These include many known or suspected cancer-causing substances, such as benzene, arsenic, formaldehyde, and nickel. The sizes of DPM that are of greatest health concern are those that are in the categories of fine and ultra fine particles. The composition of these particles may be composed of elemental carbon with adsorbed compounds such as organic compounds, sulfate, nitrate, metals and other trace elements.

As the project alternatives are not anticipated to measurably affect air toxic emissions on either a local or regional basis, an analysis of these emissions is not warranted.

3-2.2.3 Pollutants for Analysis

Pollutants that can be traced principally to motor vehicles are relevant to the evaluation of the project impacts; these pollutants include CO, ROC (due to their role in the formation of O_3), NO_x, O_3, PM_{10} and $PM_{2.5}$. Transportation sources account for a small percentage of regional emissions of SO_x and Pb; thus, a detailed analysis is not required. While EPA is concerned with $PM_{10}/_{2.5}$ levels, no guidelines have been firmly established for their analysis. Diesel fueled vehicles are the principal localized mobile source of $PM_{10/2.5}$ emissions and the project alternatives are not anticipated to measurably affect diesel emissions. However, for the purpose of this project, a qualitative PM_{10} assessment was conducted using the technical report *Particulate Matter and Transportation Projects, An analysis Protocol* developed by UC-Davis and Caltrans (2/2005), recommended for use by Caltrans.

HC and NO_X emissions from automotive sources are a concern primarily because they are precursors in the formation of ozone and particulate matter. Ozone is formed through a series of reactions, which occur in the atmosphere in the presence of sunlight. Since the reactions are slow and occur as the pollutants are diffusing downwind, elevated ozone levels often are found many miles from sources of the precursor pollutants. Therefore, the effects of HC and NO_X emissions generally are examined on a regional or "mesoscale" basis. PM_{10} also is examined on a regional basis.

One of the newer requirements by CEQA is to address the airborne impacts from both Naturally Occurring Asbestos (NOA) and structural asbestos. The project area will be studied to determine if it is a NOA area and if any structures containing asbestos will be disturbed.

CO impacts are localized. Even under the worst meteorological conditions and most congested traffic conditions, high concentrations are limited within a relatively short distance (300 – 600 feet) of heavily traveled roadways. Vehicle emissions are the major sources of CO. Gasoline cars and trucks are sources of 96% of the CO. Consequently, it is appropriate to predict concentrations of CO on a localized or "microscale" basis.

~~The air pollutants identified as being of concern that were considered for this analysis are as follows:~~

- ~~CO is the pollutant of concern for the localized air quality analysis of emissions from motor vehicles; and~~

- ~~Project-related changes in regional CO, NO_x, hydrocarbon, and PM_{10} emissions are considered to determine whether the proposed project alternatives will adversely affect the region's compliance with the ozone standards.~~

3-2.3 Air Quality Standards and Regulations

3-2.3.1 Standards

National Ambient Air Quality Standards (NAAQS) have been established for the following air pollutants: CO, NO_2, O_3, PM_{10}, $PM_{2.5}$, SO_2, and Pb. The "primary" standards have been established to protect the public health. The "secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare. The State of California has also established ambient air quality standards, known as the California Ambient Air Quality Standards (CAAQS). These standards are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles. The state and national standards are presented in **Table 3.2-1**. Because the CAAQS are more stringent than the NAAQS, they are used as the comparative standard in the analysis contained in this report.

3-2.3.2 Impact Criteria

In addition to the federal and state standards, the South Coast Air Quality Management District (SCAQMD), which is the air pollution control agency for Orange County and major portions of Los Angeles, San Bernardino and Riverside counties in Southern California, has established significance thresholds to measure the impact of estimated increments. The impacts from the construction and/or operation of a project that would increase emissions by less than these values are considered insignificant. These thresholds appear in **Table 3.2-2.**

TABLE 3.2-1

STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS

Polluant	Avertin Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
O_3	1 hour	0.09 ppm (180 ug/m^3)	Ultraviolet photometry	0.12 ppm (235 ug/m^3)[8]	Same as primary standard	Ultraviolet photometry
	8 hour	0.070 ppm (137 ug/m^3)*		0.08 ppm (157 g/m^3)[8]		
PM_{10}	24 hour	50 ug/m^3	Gravimetric or Beta Attenuation	150 ug/m^3	Same as primary standard	Inertial Separation and Gravimetric Analysis
	Annual arithmetic mean	20 ug/m^3		50 ug/m^3		
$PM_{2.5}$	24 hour	No Separate State Standard		65 ug/m^3	Same as primary standard	Inertial Separation and Gravimetric Analysis
	Annual arithmetic mean	12 ug/m^3	Gravimetric or Beta Attenuation	15 ug/m^3		

TABLE 3.2-1
STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS

Polluant	Avertin Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
CO	8 hour	9.0 ppm (10 mg/m^3)	Non-dispersive infrared photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8 hour (Lake Tahoe)	6 ppm (7 mg/m^3)		-	-	-
NO_2	Annual arithmetic mean	-	Gas phase chemilum-incescence	0.053 ppm (100 ug/m^3)	Same as primary standard	Gas Phase Chemilum-incescence
	1 hour	0.25 ppm (470 ug/m^3)		-		
Pb[9]	30 days average	1.5 ug/m^3	Atomic Absorption	-	-	High Volume Sampler and Atomic Absorption
	Calendar quarter	-		1.5 ug/m^3	Same as primary standard	
SO_2	Annual arithmetic mean	-	Ultraviolet Fluorescence	0.030 ppm (80 ug/m^3)	-	Spectro-photometry (Pararosoani-line method)
	24 hour	0.04 ppm (105 ug/m^3)		0.14 ppm (365 ug/m^3)	-	
	3 hour	N/A		-	0.5 ppm (1,300 ug/m^3)	
	1 hour	0.25 ppm (655 ug/m^3)		-	-	
Visibility reducing particles	8 hour (10 a.m. to 6 p.m., Pacific Standard Time)	Extinction coefficient of 0.23 per km-visibility of 10 mi (16 km) or more (0.07–30 mi [.011–48 km] or more for Lake Tahoe) due to particles when the relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No federal standards		
Sulfates	24 hour	25 ug/m^3	Ion Chromatography			
Hydrogen sulfide	1 hour	0.03 ppm (42 ug/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[9]	24 hour	0.01 ppm (26 ug/m^3)	Gas Chromatography			

TABLE 3.2-1

STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS

Polluant	Avertin Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]

This Concentration was approved by the Air Resources Board on April 28, 2005 and is expected to become effective in early 2006.

1. California standards for O_3, CO (except Lake Tahoe), SO_2 (1 and 24 hour), NO_2, suspended particulate matter-PM_{10}, $PM_{2.5}$, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 ug/m3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standards.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25^o C (77^o F) and a reference pressure of 760 mm (30 in) of mercury. Most measurements of air quality are to be corrected to a reference temperature of 25^o C (77^o F) and reference pressure measurements of air quality are to be corrected to a reference temperature of 25^o C (77^o F) and a reference pressure of 760 mm (30 in) of mercury (1,013.2 milibar [1 atmosphere]); ppm in this table refers to ppm volume, or micromoles of pollutant per mole of gas.
4. Any equivalent procedure that can be shown to the satisfaction of CARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by EPA.
8. U.S. EPA promulgated new federal 8-hour O_3 and $PM_{2.5}$ standards on July 18, 1997.
9. The ARB has identified lead and vinyl chloride as ‘toxic air contaminants’ with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Source: California Air Resources Board (5/6/05).

TABLE 3.2-2

SCAQMD DAILY EMISSIONS THRESHOLDS[1]

Criteria Pollutant	Construction Period	Operations Period
Carbon Monoxide	550	550
Reactive Organic Gas (ROG)	75	55
Nitrogen Oxides (NOx)	100	55
Sulfur Oxides (SOx)	150	150
Particulates (PM_{10})	150	150

[1] Expressed in pounds per day. The LRT Build Alternatives do not contain lead, hydrogen sulfide, or sulfate emissions sources; therefore emissions and concentrations related to these pollutants were not analyzed in this report.

Source: South Coast Air Quality Management District.

3-2.4 Existing Conditions and Regulatory Setting

3-2.4.1 Study Area Designation

The federal Clean Air Act (CAA) defines non-attainment areas as geographic regions that have been designated as not meeting one or more of the NAAQS. Air quality maintenance areas are regions that have recently attained compliance with the NAAQS. The portions of Los Angeles and San Bernardino Counties that contain the project study area are currently designated as a non-attainment area for ozone, carbon monoxide, and particulate matter (PM_{10} and $PM_{2.5}$). The area is classified as a federal and state attainment area for NO_2, SO_2, Pb and visibility reducing particles as applicable.

3-2.4.2 Conformity Requirements

The CAA requires that a State Implementation Plan (SIP) be prepared for each non-attainment area, and a maintenance plan be prepared for each former non-attainment area. A SIP is a state's plan on how it will meet the NAAQS under the deadlines established by the CAA. EPA's Transportation Conformity Rule requires metropolitan planning organizations, the Federal Highway Administration (FHWA), and Federal Transit Administration (FTA) to make conformity determinations on projects before they are approved. Transit projects that are funded or approved by the FTA must be found to conform. Since the proposed project is a non-exempt project under these regulations, it must be demonstrated that it would be consistent with the policies and purpose of the conforming transportation plan.

Conformity to the purpose of a SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS.

~~Several years of monitoring and planning will be required before EPA imposes local control measures based on the new air quality standards for O3 and~~ ~~$PM_{2.5}$~~~~. EPA is in the process of determining which areas are in attainment of the standard, and which ones will require new controls. States must submit their revised SIPs for achieving the new standards. These new standards will not require any new local controls until later in 2004 for O3 and 2005 for~~ ~~$PM_{2.5}$~~~~. The new air quality standards will not require conformity determination for transportation projects until the EPA approves the new SIPs. As the new transitional rules regarding evaluation and requirements for transportation projects have not been established, there are no current requirements for the evaluation of transportation projects with regard to these new standards.~~

3-2.4.3 South Coast Air Quality Management District

Because Southern California has one of the ~~worse~~ worst air quality problems in the nation, the SCAQMD was created by the 1977 Lewis Air Quality Management Act, which merged four county air pollution control agencies into one regional district to better address the issue of improving air quality in Southern California. The SCAQMD is the agency principally responsible for comprehensive air pollution control in the Basin. Specifically, the SCAQMD is responsible for monitoring air quality and planning, implementing, and enforcing programs designed to attain and maintain state and federal ambient air quality standards in the district. Programs developed include air quality rules and regulations that regulate stationary source emissions, including area sources and point sources and certain mobile source emissions. The SCAQMD is also responsible for establishing permitting requirements for stationary sources and ensuring that new, modified, or relocated stationary sources do not create net emissions increases and, therefore, are consistent with the region's air quality goals. The SCAQMD enforces air quality rules and regulations through a variety of means, including inspections, educational or training programs, or fines, when necessary.

The SCAQMD has jurisdiction over a 12,000 square mile area, commonly referred to as the South Coast Air Basin (SCAB). This area includes Orange County, Los Angeles County, the non-desert portion of western San Bernardino County, and the western and Coachella Valley portions of Riverside County. It is home to approximately half the population of the State of California. The SCAB is bounded by the Pacific Ocean to the west; by the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and the east; and by the San Diego County line to the south (**Figure 3.2-2**).

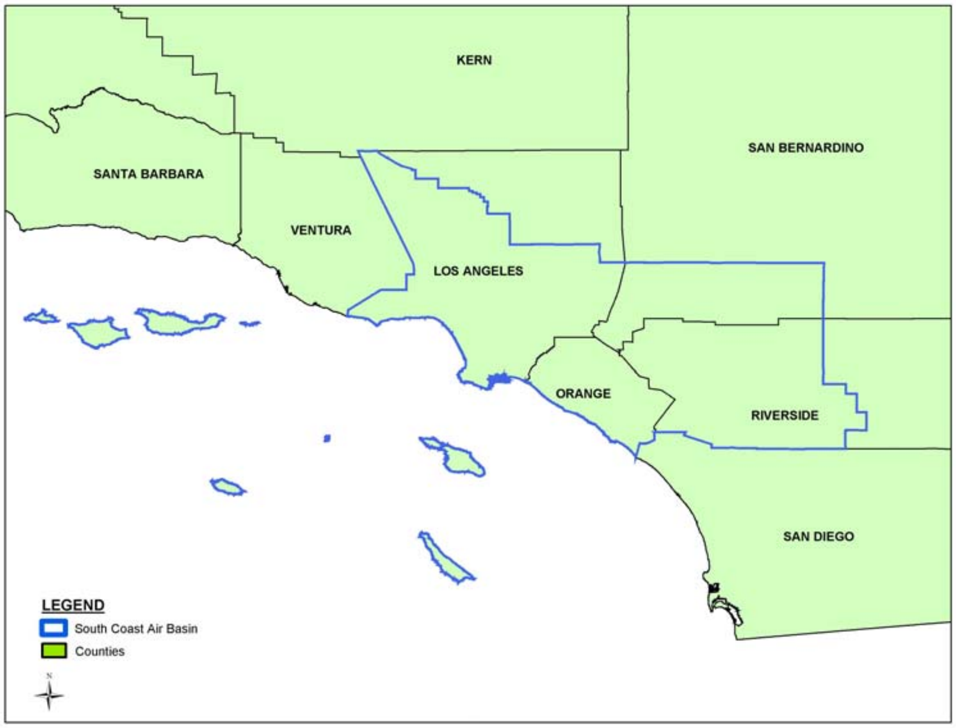

Figure 3.2-2: South Coast Air Basin

3-2.4.4 Air Quality Management Plan

Within the project area, the SCAQMD and the Southern California Association of Governments (SCAG) have responsibility for preparing the Air Quality Management Plan (AQMP), which address federal and state Clean Air Act requirements. The AQMP details goals, policies, and programs for improving air quality and establishes thresholds for daily source emission limits. <u>The AQMP is updated every 3 years.</u> Environmental review of individual projects within the region must demonstrate that daily construction and operational emissions thresholds as established by the SCAQMD would not be exceeded, nor would the number or severity of existing air quality violations.

In August of 2003 the SCAQMD adopted the 2003 AQMP. The ARB adopted the plan on October 23, 2003. The AQMP addressed CCAA requirements, which are intended to bring the SCAQMD into compliance with federal and state air quality standards. The 2003 AQMP points to the urgent need for additional emission reductions (beyond those incorporated in the 1997/99 Plan) from all sources, specifically those under the jurisdiction of the California Air Resources Board and the US EPA, which account for approximately 80 percent of the ozone precursor emissions in the Basin.

The 2003 AQMP addresses several state and federal planning requirements and incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes and new air quality modeling tools. The 2003 AQMP is consistent with and builds upon the approaches taken in the 1997 AQMP and the 1999 Amendments to the Ozone SIP for the SCAB for the attainment of the federal ozone air quality standard. The 2003 AQMP updates the demonstration of attainment with the federal standards for O_3 and PM_{10}; replaces the 1997 attainment demonstration for the federal CO standard and provides a basis for a maintenance plan for CO for the future; and updates the maintenance plan for the federal NO_2 standard that the SCAB has met since 1992.

3-2.4.5 Regional Transportation Plan / Regional Transportation Improvement Program

Under the Clean Air Act Amendments of 1990 (CAAA), the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), and the Transportation Equity Act for the 21st Century (TEA-21), proposed transportation projects must be derived from a long-range transportation plan (LRP) or regional transportation plan (RTP) that conforms with the state air quality plans as outlined in the State Implementation Plan (SIP). The SIP sets forth the state's strategies for achieving air quality standards. Projects must also conform to state air quality plans in nonattainment and maintenance areas.

The Southern California Association of Governments (SCAG), as the federally designated Metropolitan Planning Organization (MPO) for most of Southern California, is required to adopt and periodically update a long-range transportation plan and develop an RTP and Regional Transportation Implementation Plan (RTIP) for Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial Counties. The purpose of the 2004 RTP is to present a plan built on regional consensus that is flexible and also meets federal and State requirements, one of which is that it cover a period of at least 20 years into the future. The 2004 RTP addresses the transportation needs from 2004 to 2030. The RTP is updated every three years. The Gold Line Foothill Extension is listed as a recommended major transit investment in the 2004 RTP.

Transportation investments in the SCAG region that receive federal transportation funds must be consistent with the RTP and must be included in the RTIP when ready for funding. As the programming document for funds, the RTIP complements the corresponding years of the RTP and must be updated every two years. SCAG's RTIP is a six-year program and is coordinated with the State Transportation Improvement Program (STIP) every two years.

The 2004 RTIP was adopted by SCAG's Regional Council on September 2, 2004 and was approved by federal agencies on October 4, 2004.

~~The Regional Transportation Plan (RTP) is a 20-year transportation plan for six counties within the Southern California region (Ventura, Los Angeles, Orange, San Bernardino, Riverside, and Imperial counties). The RTP provides long-term solutions to the region's transportation needs under a framework that meets mobility, air quality regulations, and other regional goals. The RTP is a critical document for projects to qualify for future federal, state, and local funding sources. SCAG revises the RTP every three years. The last updated plan was adopted by SCAG in April 2001, and reflects changes in regional demographics, environmental factors, land-use forecasts, technology, and sub-regional planning. The next update is scheduled for adoption in April 2004. The Gold Line Phase II Extension is listed as a recommended major transit investment in the draft 2004 plan.~~

3-2.4.6 Local Meteorology and Monitored Ambient Air Quality Levels

The nature of the surrounding atmosphere is an important element in the consideration of ambient air quality in an area. The project is located in the SCAB. The SCAB, which is an area of high air pollution potential due to its climate and topography, experiences warm summers, mild winters, infrequent rainfall, light winds, and moderate humidity. In addition, the mountains and hills within the area contribute to the variation of rainfall, temperature, and winds throughout the region. The region experiences frequent temperature inversions. Temperature inversions prevent air close to the ground from mixing with the air above it. As a result, air pollutants are trapped near the ground. During the summer, an upper layer of warm air mass forms over the cool marine layer, preventing air pollutants from dispersing upward. In addition, hydrocarbons and nitrogen dioxide react under strong sunlight, creating smog. Light, daytime winds, predominantly from the west, further aggravate the condition by driving the air pollutants inland, toward the mountains.

The SCAQMD monitors air quality conditions at 37 locations throughout the SCAB. For the purposes of this report, data from the Pasadena South Wilson Street and Azusa monitoring stations were used to characterize existing conditions in the vicinity of the study area, and to establish a baseline for estimating future conditions both with and without the Project Build Alternatives. The Pasadena South Wilson Street Station air monitor is located along a secondary roadway approximately 1.25 miles from the 210 Freeway and 1.0 mile from the 110 Freeway. The Azusa air monitoring station is located on N. Todd Avenue and W. 8th Street, approximately 0.75 miles from the 210 Freeway and 0.20 miles for W. Foothill Boulevard (Route 66). A summary of the data recorded at these stations is presented in **Table 3.2-3** for existing levels of carbon monoxide, ozone, nitrogen dioxide, and particulate matter.

TABLE 3.2-3

AMBIENT AIR QUALITY MONITORING DATA (2002 – 2004)

Air Pollutant	Standard/ Exceedance	Pasadena – South Wilson Avenue			Azusa		
		2002	2003	2004	2002	2003	2004
Carbon Monoxide (CO)	Max.8-hour Concentration (ppm)	4.05	3.730	3.46	2.39	2.54	1.95
	# Days>Federal 8-hour Std. of >9 ppm	0	0	0	0	0	0
	# Days>California 8-hour Std. of >9.0 ppm	0	0	0	0	0	0
Ozone (O3)	Max. 1-hour Concentration (ppm)	0.137	0.152	0.130	0.136	0.150	0.134
	Max. 8-hour Concentration (ppm)	0.101	0.108	0.102	0.102	0.124	104
	# Days>Federal 1-hour Std. of >0.12 ppm	3	7	1	5	11	21028
	# Days>Federal 8-hour Std. Of >0.08 ppm	10	28	10	11	21	0
	# Days>California 1-hour Std. Of >0.09 ppm	23	44	27	26	40	0
Nitrogen Dioxide (NO2)	Max. 1-hour Concentration (ppm)	0.154	0.140	0.117	0.121	0.120	.104
	Annual Arithmetic Mean (ppm)	0.033	0.032	0.027	0.033	0.029	.020
	# Days>California 1-hour Std. of >0.25 ppm	0	0	0	0	0	0
Suspended Particulates (PM10)	Year Coverage*	NM	NM	NM	98	99	79
	Max. 24-hour Concentration (µg/m3)	NM	NM	NM	91.0	119.0	83.0
	#Days>Fed. 24-hour Std. of>150 µg/m3	NM	NM	NM	0	0	0
	#Days>California 24-hour Std. of>50 µg/m3	NM	NM	NM	22	20	3
	National Annual Average (µg/m3)	NM	NM	NM	46	44	35
Suspended Particulates (PM2.5)	Max. 24-hour Concentration (µg/m3)	57.8	89.0	59.4	72.4	121.2	75.6
	#Days>Fed. 24-hour Std. of>65 µg/m3	0	1	0	1	3	1
	National Annual Average (µg/m3)	20.3	18.6	16.6	20.7	19.3	18.4

Source: California Air Resources Board, 2002, 2003, 2004.

* Year coverage indicates how extensive monitoring was during the time of year when high pollutant concentrations were expected.

NM: Pollutant not monitored

3-2.5 CO Microscale Analysis

3-2.5.1 Methodology

The following calculation methods and estimation models were utilized in estimating air quality concentration and project impacts: SCAQMD construction emissions calculation formulas, the CARB EMFAC2002 Version 2.2 emissions factor model, the USEPA CAL3QHC dispersion model and the technical report *Particulate Matter and Transportation Projects, An Analysis Protocol* developed by UC-Davis and Caltrans (2/2005).

3-2.5.2 Analysis Years

Analyses were conducted for 2004 existing conditions and for ~~2025~~ 2030 under future conditions with and without the proposed alternatives. The existing year results are used in conjunction with the results of the future No-Build year to illustrate the predicted air quality trends at the study locations without the project.

3-2.5.3 Background Values

Air quality modeling is used to predict pollutant concentrations resulting from emissions from motor vehicles using roadways immediately adjacent to the locations at which predictions are being made. Background levels must be added to these values to account for pollutants entering the area from other sources upwind of the receptors.

A one-hour CO background level of ~~3.7~~ 3.9 ppm and an eight-hour background level of ~~2.7~~ 2.5 ppm were added to the mobile source results at each analysis site. These values are the second-highest one-hour and eight-hour readings from the Azusa air monitoring station for the years ~~2001 – 2003~~ 2002 – 2004.

3-2.5.4 Traffic Data

Traffic data for this analysis was derived from traffic counts and other information developed as part of an overall traffic analysis for the project. The microscale CO analysis was performed based on data from this analysis for the PM peak traffic periods. This is the period when maximum traffic volumes occur on local streets and when the greatest traffic and air quality impacts of the proposed project are expected. The worst-case traffic volume was selected from all of the build alternatives and used to represent the future air quality levels with the LRT Build Alternatives.

3-2.5.5 Microscale Modeling

The microscale mobile source analysis was conducted using the following procedures and assumptions:

a. Vehicular Emissions

Vehicular Emissions were estimated using CARB's EMFAC2002 (April 2003) emission factor program. EMFAC2002 is a mobile source emission estimate program that provides current and future estimates of emissions from highway motor vehicles. The latest in the EMFAC series, EMFAC2002, was designed by the CARB to address a wide variety of air pollution modeling needs. This latest version incorporates updated information on basic emission rates, more realistic driving patterns, separation of start and running emissions, improved correction factors, and changing fleet composition. It also includes the effects of new regulations that have been recently promulgated.

b. Dispersion Model

Mobile source models are the basic analytical tools used to estimate CO concentrations expected under given traffic, roadway geometry, and meteorological conditions. The mathematical expressions and formulations that comprise the various models attempt to describe an extremely complex physical phenomenon as closely as possible. The dispersion modeling program used in this study for estimating pollutant concentrations near roadway intersections is the CAL3QHC (Version 2.0) dispersion model developed by the EPA and released in 1992.

CAL3QHC is a Gaussian model recommended in the *EPA Guidelines for Modeling Carbon Monoxide from Roadway Intersections* (EPA-454/R-92-005). Gaussian models assume that the dispersion of pollutants downwind of a pollution source follow a normal distribution from the center of the pollution source.

Different emission rates occur when vehicles are stopped (idling), accelerating, decelerating, and moving at different average speeds. CAL3QHC simplifies these different emission rates into two components:

- Emissions when vehicles are stopped (idling) during the red phase of a signalized intersection
- Emissions when vehicles are in motion during the green phase of a signalized intersection

The CAL3QHC (Version 2.0) air quality dispersion model has undergone extensive testing by the EPA and has been found to provide reliable estimates of inert (nonreactive) pollutant concentrations resulting from motor vehicle emissions. A complete description of the model is in the *User's Guide to CAL3QHC version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations near Roadway Intersections* (EPA-454/R-92-006).

c. Site Selection

Analysis sites were selected through a screening analysis based on overall intersection volumes, changes in intersection volumes, and changes in level of service (LOS) estimates. Intersections that demonstrate a traffic LOS of A, B or C passed the screening test (i.e., they are not expected to cause a violation of the NAAQS). Intersections, which demonstrate a LOS of D or worse, were considered to have the potential to cause a violation of the NAAQS and thus failed the screening analysis. Of the sites that failed this initial screen, those with the highest volumes, proximity to major roadways and sensitive receptors and of community concern were chosen for detailed analysis. One hundred and fifty three ~~twenty two~~ intersections were subject to this screening analysis based on future traffic conditions with and without the project. These are the intersections within the study area that are expected to be affected by the project. For geographical representation, one site near each proposed station was chosen, based on the screening criteria described. A representative Park and Ride location was also analyzed in addition to these sites.

Based on the results of the screening analysis, CO levels were estimated at 12 locations within the defined study area. These sites and the cities they are located in are listed in **Table 3.2-4**. Receptors were chosen at each site in accordance with the guidelines found in the EPA's *Guideline for Modeling Carbon Monoxide from Roadway Intersections* (EPA-454/R-92-005).

TABLE 3.2-4
AIR QUALITY ANALYSIS SITES

Intersection	City
Sierra Madre Blvd & Foothill Blvd	Pasadena
Santa Anita Ave & Huntington Dr.	Arcadia
Myrtle Ave & Central	Monrovia
Buena Vista St & Duarte Rd	Duarte
Irwindale Ave & Foothill Blvd	Irwindale
Azusa & 9th	Azusa
Glendora Ave & Alosta Ave (Route 66)	Glendora
SR 57 NB & Arrow Highway & Bonita	San Dimas
White Ave & Arrow Highway	La Verne
Towne Ave & Arrow Highway	Pomona
Indian Hill Blvd & Arrow Highway	Claremont
Monte Vista & Arrow Highway	Montclair

Source: Parsons Brinckerhoff, 2005.

d. Receptor Sites

The locations at which pollutant concentrations are estimated are known as "receptors." Following guidelines established by the EPA, receptors were located where the maximum projected total concentration is likely to occur and where the general public (or any significant segment thereof) is likely to have access. For this analysis, receptors were distributed along sidewalks near the major roadway links surrounding each analysis site. The exact placement of these receptors was determined on the basis of traffic conditions (roadways with high volumes and low vehicle speeds), roadway geometry (including the potential cumulative impacts of several roadway links with adjacent parking lot contributions), and the potential location of queued traffic (identified on the basis of locations of high existing and future volume-to-capacity [V/C] ratios).

e. Meteorological Conditions

The transport and concentration of pollutants emitted from motor vehicles are influenced by three principal meteorological factors: wind direction, wind speed, and the atmosphere's temperature profile. The values for these parameters were chosen for this analysis to maximize pollutant concentrations at each prediction site (that is, to establish a conservative, worst-case situation).

- **Wind Direction**. Maximum CO concentrations normally are found when the wind is assumed to blow parallel to a roadway adjacent to the receptor location. At complex intersections, it is difficult to predict which wind angle will result in maximum concentrations. Therefore, the approximate wind angle that would result in maximum pollutant concentrations at each receptor location was used in the analysis. All wind angles from 0° to 360° (in 5° increments) were considered.
- **Wind Speed**. CO concentrations are greatest at low wind speeds. A conservative wind speed of one meter per second (2.2 miles per hour) was used to predict CO concentrations during peak traffic periods.

- **Temperature and Profile of the Atmosphere**. An ambient temperature of 45° F, a "mixing" height (the height in the atmosphere to which pollutants rise) of 1000 meters, and neutral atmospheric stability (stability class D) conditions were used in estimating microscale CO concentrations.

The CO levels estimated by the model are the maximum concentrations which could be expected to occur at each air quality receptor site analyzed, given the assumed simultaneous occurrence of a number of worst-case conditions: peak-hour traffic conditions, conservative vehicular operating conditions, low wind speed, low atmospheric temperature, neutral atmospheric conditions, and maximizing wind direction.

f. Persistence Factor

Persistence factors take account of the fact that over 8 hours (as distinct from a single hour), vehicle volumes will fluctuate downward from the peak, vehicle speeds may vary, and meteorological conditions including wind speeds and wind direction will change, to some degree, as compared to the conservative assumptions used for the single maximizing hour.

Peak eight-hour concentrations of CO were obtained by multiplying the highest estimated peak one-hour CO estimates by ~~0.73~~ 0.69. This factor was derived following the methodology in Caltrans' CO Protocol, which recommends rationing 10 years worth of 1-hour and 8-hour monitored data. Monitoring data for ~~1993-2003~~ 1995-2004 from the Azusa station was used to derive this factor.

3-2.6 PM_{10} Microscale Analysis

3-2.6.1 Methodology

Transportation conformity regulations require an evaluation of the impact of transportation projects on the concentration of PM_{10}. While EPA is concerned with $PM_{10}/_{2.5}$ levels, no guidelines have been firmly established for their analysis. However, for the purpose of this project, a qualitative PM_{10} assessment was conducted using the technical report *Particulate Matter and Transportation Projects, An analysis Protocol* developed by UC-Davis and Caltrans (2/2005), recommended for use by Caltrans. The protocol includes a four part methodology to screen projects unlikely to contribute to exceedances of the PM_{10} air quality standard. These four parts are:

- A “project comparison” approach for maintenance areas.
- A “project comparison” approach for nonattainment areas.
- A “threshold screening” analysis that takes advantage of real-world measurements of the contribution of roadways to observed PM_{10} concentrations.
- A “relocate and reduce, build vs. no build” approach that assesses whether a project will spatially reallocate traffic to reduce hot spot problems.

Diesel fueled vehicles are the principal localized mobile source of $PM_{10/2.5}$ emissions and the project alternatives are not anticipated to measurably affect diesel emissions. The project may however increase localized traffic near proposed station locations and grade crossings. As such the PM_{10} analysis focused on potential intersection impacts. The “threshold screening” approach was used for this analysis. This approach takes into compares monitored levels with established threshold levels to determine if the project has the potential to cause a hot-spot violation. Detailed information regarding this analysis can be found in the Air Quality Technical Report in the Appendices

3-2.7 Regional Emissions Analysis

The regional or mesoscale analysis of a project determines the project's overall impact on regional air quality levels. The analysis was performed for CO, NO_X, ROC, and PM_{10} to determine whether the proposed project alternatives would improve or degrade regional air quality. Emissions were based on daily estimates of VMT and vehicle hours traveled (VHT) in the study area for future No-Build conditions and the proposed Build alternatives. Emission estimate for the No-Build Alternative were used as a baseline to compare with the Project Build Alternatives.

3-2.8 Results of the CO Microscale Analysis

3-2.8.1 No-Build Alternative

The results of the mobile source analysis for existing conditions and the No-Build alternative, which are provided in **Table 3.2-5**, are that no CO concentrations are estimated to exceed the State's 1-hour or 8-hour standard of 20 ppm or 9 ppm, respectively. Detailed information regarding this analysis can be found in the Air Quality Technical Report in the Appendices.

TABLE 3.2-5
HIGHEST ESTIMATED CO CONCENTRATIONS (PPM) – NO-BUILD ALTERNATIVE[1]

	One-Hour Concentration		Eight-Hour Concentration	
Intersection	**Existing**	**No-Build**	**Existing**	**No-Build**
Sierra Madre Blvd & Foothill Blvd	6.30	4.20	4.16	2.71
Santa Anita Ave & Huntington Dr.	5.90	4.20	3.88	2.71
Myrtle Ave & Central	6.90	4.50	4.57	2.91
Buena Vista St & Duarte Rd	5.20	4.00	3.40	2.57
Irwindale Ave & Foothill Blvd	5.90	4.30	3.88	2.78
Azusa & 9th	4.30	3.90	2.78	2.50
Glendora Ave & Alosta Ave (Route 66)	5.80	4.10	3.81	2.64
SR57 NB & Arrow Highway & Bonita	6.00	4.20	3.95	2.71
White Ave & Arrow Highway	6.00	4.20	3.95	2.71
Towne Ave & Arrow Highway	6.00	4.40	3.95	2.85
Indian Hill Blvd & Arrow Highway	5.50	4.10	3.60	2.64
Monte Vista & Arrow Highway	5.30	4.10	3.47	2.64
State Standard	20.0		9.0	

[1] Expressed in parts per million (ppm)
Includes background concentration of 3.9 ppm and 2.5 ppm for the 1-hour and 8-hour averaging period, respectively.
Source: Parsons Brinckerhoff, 2005.

3-2.8.2 Build Alternative

The results of the mobile source analysis for the future No-Build and Full Build LRT alternatives, which are provided in **Table 3.2-6**, are that no CO concentrations are estimated to exceed the State's 1-hour or 8-hour standard of 20 ppm or 9 ppm, respectively. Intersections which had traffic mitigation applied to them were analyzed with and without the proposed mitigation as shown in **Table 3.2-7**. Detailed information regarding this analysis can be found in the Air Quality Technical Report in the Appendices.

TABLE 3.2-6
HIGHEST ESTIMATED CO CONCENTRATIONS (PPM) – LRT ALTERNATIVES[1]

Intersection	One-Hour Concentration		Eight-Hour Concentration	
	No-Build	LRT Alternatives*	No-Build	LRT Alternatives*
Sierra Madre Blvd & Foothill Blvd	4.20	4.30	2.71	2.78
Santa Anita Ave & Huntington Dr.	4.20	4.20	2.71	2.71
Myrtle Ave & Central	4.50	4.50	2.91	2.91
Buena Vista St & Duarte Rd	4.00	4.00	2.57	2.57
Irwindale Ave & Foothill Blvd	4.30	4.30	2.78	2.78
Azusa & 9th	3.90	3.90 / 3.90	2.50	2.50 / 2.50
Glendora Ave & Alosta Ave (Route 66)	4.10	4.10 / 4.10	2.64	2.64 / 2.64
SR57 NB & Arrow Highway & Bonita	4.20	4.20 / 4.20	2.71	2.71 / 2.71
White Ave & Arrow Highway	4.20	4.20 / 4.20	2.71	2.71 / 2.71
Towne Ave & Arrow Highway	4.40	4.40	2.85	2.85
Indian Hill Blvd & Arrow Highway	4.10	4.10	2.64	2.64
Monte Vista & Arrow Highway	4.10	4.10 / 4.10	2.64	2.64 / 2.64
State Standard	20.0		9.0	

[1] Expressed in parts per million (ppm)
Includes background concentration of 3.9 ppm and 2.5 ppm for the 1-hour and 8-hour averaging period, respectively.
* Unmitigated / Mitigated Traffic Scenario results
Source: Parsons Brinckerhoff, 2005.

3-2.8.3 Park and Ride Lots

Potential impacts from the proposed park and ride facilities were estimated based on a microscale analysis of a worst-case facility. For this analysis, a 1,000 space, 3 level parking facility was analyzed during the PM peak period. Emission factors were obtained using the EMFAC2002 Version2.2 model. Dispersion analysis was done using the CAL3QHC model. A representative receptor was placed 15 feet from the closest traveled way within the facility.

The result of this analysis is that a peak one-hour contribution from the parking lot is 0.3 ppm. This will not cause or violate a standard at any of the microscale analysis sites evaluated.

3-2.9 Results of the PM_{10} Microscale Analysis

3-2.9.1 No-Build Alternative

The No-Build Alternative does not involve any changes to the future conditions due to the project; therefore, no new local PM_{10} air quality impacts would occur.

3-2.9.2 Build Alternatives

Following the guidance in the technical report "Particulate Matter and Transportation Projects, an Analysis Protocol" a PM_{10} analysis was conducted following the protocol's "Threshold 3" analysis. The guidance examines both the 24 hour and annual PM_{10} estimated levels. Both levels were found to conform to the applicable standard. The project did not exceed the screening thresholds and is not anticipated to cause or exacerbate a violation of the PM_{10} 24-hour or annual standard.

3-2.10 Results of the Regional Analysis

The results of the regional (mesoscale) analysis for the future No-Build and Build Alternatives are provided in **Table 3.2-7**. These results are as follows:

- The LRT Alternative will decrease CO, NO_x, ROG, and PM_{10} emissions by approximately 0.04 percent.

TABLE 3.2-7
REGIONAL ESTIMATES (YEAR 2025)

Measure	ALTERNATIVE	
	No-Build	BUILD
VMT	449,198,594	449,016,273
Speed	15.84	15.86
Regional Emissions (Pounds per Day)		
CO	1,697,688	1,696,999
NOx	241,678	241,580
ROG	122,820	122,770
PM_{10}	64,382	64,355
Percent Change from No-Build (Pounds per Day)		
CO	na	-0.04% (-689)
NOx	na	- 0.04% (-98)
ROG	na	-0.04% (-50)
PM_{10}	na	-0.04% (-27)
Source: Parsons Brinckerhoff, 2004.		

3-2.11 Regulatory Compliance

The result of the localized (microscale) CO and PM_{10} analyses is that proposed project alternatives will not cause or exacerbate a violation of a state or national ambient air quality standard.

The result of the mesoscale (regional) analysis is that proposed project alternatives will have a small affect on regional emission rates – the LRT alternative will slightly reduce emissions rates. ~~by amounts that, with one exception, are not considered to be significant by the SCAQMD. Only NOx emissions are estimated to increase by an amount greater than the emission threshold (i.e., 62 pounds per day as compared with a threshold value of 55 pounds per day).~~

Prior to the approval of the selected alternative by the Federal Transit Administration, an analysis will have to be conducted to demonstrate that this alternative will comply with EPA's Conformity Rule.

3-2.12 Construction-Period Impacts

3-2.12.1 No-Build

Only the construction-period impacts from projects in the No-Build Alternative would be for the Eastside LRT Extension, which would be likely to exceed the CEQA quarterly impact thresholds set by the South Coast Air Quality Management District. These impacts are addressed in the Draft Supplemental Environmental Impact Statement (EIS)/Draft Subsequent Environmental Impact Report (FTA and LACMTA 2001). Other elements of the No-Build Alternative are small-scale in nature and duration and not likely to exceed the quarterly thresholds.

3-2.12.2 Build Alternatives

The proposed Build Alternatives would generate pollutant emissions from the following construction activities: 1) the demolition of existing structures, 2) excavation related to preparation of track beds and installation of rail, 3) welding related to continuously welded rail (CWR) operations, 4) mobile emissions related to construction worker travel to and from project sites, 5) mobile emissions related to the delivery and hauling of construction supplies and debris to and from project sites, and 6) stationary emissions related to fuel consumption by on-site construction equipment.

Table 3.2-8 presents the estimated worst-case daily emissions associated with each construction phase. As indicated in the table, NO_x and PM_{10} emissions are estimated to exceed SCAQMD significance thresholds during the construction period. Short-term dust nuisance impacts would also occur as a result of construction activity. The primary zone of dust deposition impact is generally less than 100 feet from the source.

TABLE 3.2-8
DAILY CONSTRUCTION EMISSONS[1]

	Duration [2]	CO	ROG	NOx	$S0_2$	PM10
SCAQMD Threshold		550	75	100	150	150
Continuously welded rail (CWR) operation	26	44	14	99	11	12
Platform and rail installation	26	54	10	76	5	493
Simultaneous CWR and platform installation [3]	26	98	24	175	16	505
Potential Threshold Violation?		No	No	Yes	No	Yes

[1] Expressed in pounds per day. Daily emissions were derived using the applicable emission factors and formulas found in the SCAQMD CEQA Handbook, Appendix to Chapter 9.
[2] Expressed in months.
[3] Worst-case NO_x emissions are expected to occur during simultaneous CWR and rail installation activities.
Source: Parsons Brinckerhoff, 2004.

Although the construction period will last about four to five years, air quality impacts would still be localized and short-term. This is because construction equipment, and, therefore, air quality impacts, would move throughout the six-mile project alignment area. Thus, impacts on individual receptor locations within the area that may be affected by the proposed project would be short-term. Furthermore, because of the nature of construction activity and the phased construction schedule, some days will experience a higher level of construction activity (which in turn generates a higher level of emissions), while others will not.

Asbestos has also become a pollutant of concern in regard to demolition and soil disturbance. Asbestos minerals occur in rock and soil as the result of natural geologic processes, often in veins near earthquake faults in the coastal ranges and the foothills of the Sierra Nevada Mountains and other areas of California. Naturally occurring asbestos (NOA) takes the form of long, thin, flexible, separable fibers. Natural weathering or human disturbance can break NOA down to microscopic fibers, easily suspended in air. When inhaled, these thin fibers irritate tissues and resist the body's natural defenses.

Asbestos is a known human carcinogen. It causes cancers of the lung and the lining of internal organs, as well as asbestosis and pleural disease that inhibit lung function. The United States Environmental Protection Agency (U.S. EPA) is working to address concerns about potential effects of NOA in a number of areas in California.

The California Geological Survey identifies ultramafic rocks in California to be the source of NOA, and in August of 2000 they published a report titled *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos.*[1] According to the map on the third page of this document, the counties in which this project is located, Los Angeles and San Bernardino, do not contain ultramafic rocks and therefore are not a Naturally Occurring Asbestos (NOA) area.

In addition to NOA, airborne asbestos impacts could occur with the demolition of existing structures that contain asbestos. Structures may be demolished when the project is constructed. An asbestos study of all structures slated for demolition will be conducted. SCAQMD's Rule 1403 - Asbestos emissions from demolition/renovation activities (see Appendix B – Air Quality) will be followed for all relevant activities.

a. Significance of Impacts

Air quality impacts during construction are potentially significant.

b. Mitigation

The construction contract for the selected alternative will require specific stipulations that the contractor must follow to meet criteria included in MTA's Systems Design Criteria and Standards, Volumes I through IV, to minimize adverse affects during construction. Best Management Practices (BMP) to control fugitive dust emissions in accordance with AQMD Rule 403 will also be required. In addition to these regulatory requirements, the following construction-phase air quality mitigation measures will also apply:

A-1 All land clearing/earth-moving activity areas shall be watered to control dust as necessary to remain visibly moist during active operations.

A-2 All construction roads internal to the construction site that have a traffic volume of more than 50 daily trips by construction equipment, or 150 total daily trips for all vehicles,

[1] Available at ftp://ftp.consrv.ca.gov/pub/dmg/pubs/ofr/ofr_2000-019.pdf

shall be surfaced with base material or decomposed granite.

A-3 Streets shall be swept as needed during construction, but not more frequently than hourly, if visible soil material has been carried onto adjacent public paved roads.

A-4 Construction equipment shall be visually inspected prior to leaving the site and loose dirt shall be washed off with wheel washers as necessary.

A-5 Water three times daily or non-toxic soil stabilizers shall be applied, according to manufacturers' specifications, as needed to reduce off-site transport of fugitive dust from all unpaved staging areas and unpaved road surfaces.

A-6 Traffic speeds on all unpaved roads shall not exceed 15 mph.

A-7 All equipment shall be properly tuned and maintained in accordance with manufacturer's specifications.

A-8 General contractors shall maintain and operate construction equipment so as to minimize exhaust emissions. During construction, trucks and vehicles in loading and unloading queues would have their engines turned off when not in use, to reduce vehicle emissions. Construction emissions should be phased and scheduled to avoid emissions peaks and discontinued during second-stage smog alerts.

A-9 Establish an on-site construction equipment staging area and construction worker parking lots, located on either paved surfaces or unpaved surfaces subject to soil stabilization.

A-10 Use electricity from power poles, rather than temporary diesel or gasoline powered generators if or where feasible.

A-11 Use on-site mobile equipment powered by alternative fuel sources (i.e., methanol, natural gas, propane or butane) as feasible.

A-12 Develop a construction traffic management plan that includes, but is not limited to: (1) consolidating truck deliveries; (2) providing a rideshare or shuttle service for construction workers; and (3) providing dedicated turn lanes for movement of construction trucks and equipment on-and off-site.

Implementation of the above-mentioned mitigation measures is anticipated to result in a significant reduction in airborne particulate (PM_{10}) emissions; however, reductions in CO, ROG, NOx, and SOx emissions would be negligible. The estimated PM_{10} emissions reduction for each major construction phase is presented in **Table 3.2-9**.

TABLE 3.2-9
CONSTRUCTION PHASE DAILY PM_{10} EMISSIONS[1]

	Without Mitigation	With Mitigation	Net Benefit
Continuously Welded Rail (CWR)Operations	12	12	0
Platforms and Rail Installation	493	181	-315
Simultaneous CWR and Rail Installation	505	193	-315

[1] Expressed in pounds per day.
Source: Parsons Brinckerhoff.

As indicated above, even with application of best available control measures, PM_{10} emissions are anticipated to exceed the SCAQMD significance threshold of 150 ppm during the at- grade platforms and rail installation construction phases. Similarly, NO_x emissions are anticipated to exceed the SCAQMD significance threshold of 100 lb/day during periods of simultaneous continuously welded rail operations and rail installation. These short-term air quality impacts would be significant and unavoidable. Dust nuisance impacts are also anticipated to remain after application of best available control measures, although to a lesser extent. ~~During preliminary engineering, MTA will continue to investigate alternative techniques to reduce temporary air quality impacts.~~

c. Significance of Impacts Remaining After Mitigation

Although mitigation would be provided to the greatest extent feasible, short-term PM_{10} and NO_x emissions and dust nuisance impacts generated by construction activities would remain significant after mitigation. <u>Under CEQA, the Construction Authority would need to consider a Statement of Overriding Considerations as part of project approval.</u>

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