3.1 AIR QUALITY

This section addresses the air quality conditions and potential future impacts in the proposed project study area. The study area is considered to be both the air quality adjacent and nearby the rail line and the regional air quality in the railroad corridor. The air quality conditions are based on evaluation of the potential construction-related (maintenance and repairs activities associated with the operations of the railroad, the three significant rehabilitation sites and new construction of the siding near Lombard) and operational-related (long-term) impacts, localized "hot spots", toxic compound effects, and odors associated with the proposed project. The evaluation addresses regulated criteria pollutants, GHG emissions and toxics (e.g., diesel particulate matter).

Project construction impacts to the air quality would be limited in nature since the rail line already exists in the proposed project area and would occur mainly from maintenance, rehabilitation and repair of existing track. Operational changes in air quality would be due to emissions from the rail operations combined with a reduction in mileage from freight-hauling trucks that are replaced by the proposed freight trains; affects of traffic circulation at signalized intersections and emissions generated by locomotives in the area.

3.1.1 Regulatory Setting

The regulatory setting is based on the information that was available in 2008 when the March 9, 2009 DEIR was under preparation.

3.1.1.1 Federal Regulations and Responsibilities

National Ambient Air Quality Standards (NAAQS) were established by the EPA in accordance with the federal CAA. The NAAQS were established for six pollutants, deemed "criteria" pollutants that are well documented for their human health affects and exist throughout the nation. These include ozone (O_3), carbon monoxide (CO), nitrogen dioxides (NO_2), sulfur dioxide (SO_2), particulate matter (for two sizes: aerodynamic diameters less than ten micrometers [PM_{10}] and less than 2.5 micrometers [$PM_{2.5}$]) and lead (Pb). Table 3.1-1 summarizes the standards for these criteria pollutants.

These standards were set as primary standards to protect human health and as secondary standards to protect property. The standards are based on pollution

concentrations averaged over specified time periods. Regulation towards attainment of these standards is conducted through the EPA, State and regional Air Districts.

3.1.1.2 State Regulations and Responsibilities

Based on the CAA, state agencies are empowered to enforce the federal standards and develop additional standards as deemed necessary to protect public health and the environment. The CARB was formed for this purpose and established the California Ambient Air Quality Standards (CAAQS), many of which are more stringent than the corresponding NAAQS (see Table 3.1-1). The CARB and the air districts operate numerous air quality monitoring stations throughout the state to collect data used to measure regional pollutant concentrations to determine the level of attainment with the standards. For regions found to be in non-attainment with the standards, the CARB develops a State Implementation Plan (SIP) which incorporates local non-attainment plans developed by air districts. The air districts are responsible for assuring that both federal and state standards are attained and maintained within their regions. Monitoring station data in the proposed project region are summarized in Section 3.1.1.2 (Environmental Setting).

Table 3.1-1
State and Federal Criteria Ambient Air Standards

Pollutant	Averaging Time	State Standard	Federal Standard
Ozone	1 hour 8 hour	0.09 ppm 0.070 ppm	--- 0.08 ppm
Carbon Monoxide	1 hour 8 hour	20 ppm 9 ppm	35 ppm 9 ppm
Nitrogen Dioxide	1 hour Annual	0.18 ppm 0.030 ppm	--- 0.053 ppm
Sulfur Dioxide	1 hour 3 hour 24 hour Annual	0.25 ppm --- 0.04 ppm ---	--- 0.5 ppm[b] 0.14 ppm 0.03 ppm
Particulate Matter (PM_{10})	24 hour Annual	50 $\mu g/m^3$ 20 $\mu g/m^3$	150 $\mu g/m^3$ ---[c]
Fine Particulate Matter ($PM_{2.5}$)	24 hour Annual	35 $\mu g/m^3$ 12 $\mu g/m^3$	35 $\mu g/m^3$ 15 $\mu g/m^3$
Lead	Monthly Quarterly	1.5 $\mu g/m^3$ ---	--- 1.5 $\mu g/m^3$

Notes: ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter
[a] – The state does not allow rounding to an integer value for this standard.
[b] – The federal standard is a secondary standard.
[c] – The federal standard has been revoked, effective December 17th, 2007.

Attainment/Non-Attainment Designations

The proposed project corridor traverses four counties, Mendocino, Sonoma, Marin and Napa, and two air basins, the North Coast Air Basin (NCAB) and the San Francisco Bay Area Air Basin (SFBAAB) (see Figure 2.2-1, Project Location Map). The NCAB encompasses the northern half of Sonoma County (north of Windsor), Mendocino and several other counties. The NSCAPCD regulates emissions in the southern portion of the NCAB (within the northern portion of Sonoma County). The MCAQMD regulates emission within Mendocino County portion of the NCAB. Air quality in the southern half of Sonoma County and all of Napa and Marin Counties is regulated by the BAAQMD.

The SFBAAB is currently designated as a non-attainment area for the federal eight-hour ozone standard and the one-hour state standard. In June 2004, the Bay Area was classified as a marginal non-attainment area for the federal eight-hour ozone standard. On January 20, 2005, the Sonoma County portion of the NCAB was designated as being in attainment for ozone on the state level. It was already in attainment at the federal level.

Both air basins are currently designated as non-attainment areas for the state PM_{10} standard. Both air basins are in attainment or are unclassified (i.e., sufficient data is not available to support a designation) for all other federal and state ambient air quality standards.

Air Quality Plans

The federal CAA requires non-attainment and maintenance areas to prepare air quality plans that include strategies for attaining and maintaining the federal standards. This is mirrored by the California CAA, which also requires plans for non-attainment areas that will specify strategies to attain state air quality standards. It is not uncommon for an area to have two sets of plans, one to meet the federal requirements and one to meet the state requirements. Plans are not required for areas in non-attainment of the California PM_{10} standard.

The regional air quality plans required to be developed for and submitted to the EPA under the federal CAA are the SIPs; SIPs describe the planning, regulations and control to be implemented by the local governments. These plans are submitted to the EPA,

reviewed by the EPA, and finalized in collaboration with the EPA in order to demonstrate methods to meet NAAQS for non-attainment areas.

- The NCAB is in attainment for all pollutants other than the state PM_{10} standard; therefore, it is not required to have an air quality plan.
- The SFBAAB is a non-attainment area for the federal eight-hour ozone standard. The SFBAAB has an unclassified designation for the state eight-hour ozone standard (BAAQMD, 2007).
- While the EPA revoked the federal 1-hour standard on June 15, 2005, the Bay Area remains a state non-attainment area for 1-hour ozone pollution (BAAQMD, 2007).

The BAAQMD, in cooperation with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG), has begun a process to update the Bay Area 2005 Ozone Strategy. The Ozone Strategy is a roadmap showing how the San Francisco Bay Area will achieve compliance with the state one-hour and eight-hour air quality standards for ozone as expeditiously as possible, and how the region will reduce transport of ozone and ozone precursors to neighboring air basins. The California CAA requires air districts to update their ozone plans on a triennial basis. The 2007 Ozone Strategy will review progress achieved in the 2004-2006 period, and establish control measures to be adopted in the 2007-2009 timeframe. Control strategies that resulted from the 2005 document included stationary source control measures implemented through Air District regulations; mobile source control measures implemented through incentive programs and other activities; and transportation control measures implemented through transportation programs in cooperation with MTC, local governments, transit agencies and others.

Since the proposed project results in improved rail service, it is anticipated to reduce the number of heavy-duty truck trips and ease traffic congestion along motor vehicle routes. For this reason, the proposed project falls in line with the aims of the BAAQMD's Ozone Strategy documents.

Project Conformity

In November 1993, EPA promulgated two sets of regulations under the federal CAA section 176(c) to implement the concept of conformity. First, on November 24, EPA

promulgated the Transportation Conformity Regulations, which apply to highways and mass transit. Then, on November 30, EPA promulgated a second set of regulations, known as the General Conformity Regulations, which apply to everything else.

Transportation conformity is required to ensure that federal funding and approval are given to highway and transit projects that are consistent with ("conform to") the air quality goals established by a state or tribal air quality implementation plan. To conform to the implementation plans, the transportation activities can not cause new air quality violations, worsen existing violations, or delay timely attainment of the national ambient air quality standards. The transportation conformity rules apply to projects receiving federal funding or approval by the Federal Highway Administration (FHWA) or Federal Transit Administration (FTA).

The General Conformity Rule is applicable to major projects that do not fall under transportation conformity but still requires action of a federal agency. General conformity requires federal agencies to work with state, tribal and local governments in a non-attainment or maintenance area to ensure that federal actions conform to the initiatives established in the applicable state or tribal implementation plan. This is only applicable to projects that are considered major sources of regulated air emissions.

The proposed project will not receive federal funding or require approval through the FHWA or FTA and therefore does not trigger transportation conformity. The proposed project is not a major source of regulated air emissions. As a result, the conformity rules are not applicable for the proposed project. However, the proposed project will still conform to the air quality goals by meeting the applicable air district rules.

Diesel Regulations

In 1998, after a 10-year scientific assessment process, CARB identified diesel exhaust particulate as a toxic air contaminant (TAC). To follow up the listing of diesel exhaust particulate, CARB approved a “Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles” (“the Plan”) in 2000 that leads toward control measure requirements. CARB’s regulatory goal is to make diesel engines as clean as possible by establishing state-of-the-art technology requirements or emission standards to reduce diesel PM emissions. The goal of the Plan is to reduce

diesel PM emissions and the associated health risk by 75 percent by 2010 and 85 percent by 2020 (CARB, 2000).

However, because mobile sources (e.g. aircraft, ships, locomotives, and farm equipment) have the capability of crossing state lines, the authority to regulate their emissions is held solely by EPA. CARB has not received authority to regulate emissions from such sources.

As a result, the federal regulations for locomotive emission standards (Tier 0 through Tier 2) are the current basis for limiting emissions. In addition to the locomotive standards, there are diesel fuel requirements that will affect locomotives. In May 2004, as part of the Clean Air Non-road Diesel Rule, EPA finalized new requirements for non-road diesel fuel that will decrease the allowable levels of sulfur in fuel used in locomotives by 99 percent. These fuel reductions will result in a sulfur content of 15 parts per million (ppm) by 2012. The reduction in sulfur emissions will enable the application of modern pollution control technology to locomotives.

For full operations, the proposed project would utilize locomotives that operate on a three-engine platform with smaller diesel engines capable of meeting the Tier 3 off-road standards and allow for engine shut down during low load use. Because the Tier 3 off-road standards have a lower threshold for diesel particulate than the Tier 2 locomotive standard, and with operational flexibility, the proposed locomotives are considered a greater benefit for meeting the CARB's goals for diesel PM emission reductions.

Green House Gas Guidelines

California AB32 addresses the generation of green house gases. Since the air districts regulate stationary sources, at this point in time, there are not air quality regulations addressing GHG being implemented by the air district. GHG are addressed in the environmental review process prior to the start up of a project. There are also state and federal (proposed) regulations that require inventories of GHG at stationary sources.

The Governor's Office of Planning and Research (OPR) released preliminary draft CEQA Guidelines Amendments for Green House Gas Emissions in January 2009. The guidelines require that the lead agency must consider the following, where applicable, in assessing the significance of impacts from GHG, if any, on the environment:

- The extent to which the project could help or hinder attainment of the state's goals of reducing GHG.
- The extent to which the project may increase the consumption of fuels or other energy resources, especially fossil fuels that contribute to GHG emissions.
- The extent to which the project may result in increased energy efficiency of and a reduction in overall GHG emissions from an existing facility.
- The extent to which the project impacts or emissions exceed any threshold of significance that applies to the project.

A lead agency should make a good-faith effort, based on available information, to describe, calculate or estimate the amount of GHG emissions associated with a project, including emissions associated with energy consumption and vehicular traffic.

3.1.1.3 Air Pollutants of Concern

Ozone (O3)

In general, ozone is not emitted directly into the air, as it is very unstable and does not usually remain in its triatomic state. Instead, ozone is produced by a photochemical reaction (occurs in the presence of sunlight) between oxides of nitrogen and volatile organic compounds (VOCs). For this reason, oxides of nitrogen and VOCs are referred to as "ozone precursors" and are heavily regulated to control ozone formation. Ozone consists of three oxygen atoms, is a strong oxidant and is very unstable. It is a component of smog and is a strong respiratory irritant, can reduce lung function, aggravate asthma as well as lung and heart problems. Ozone has also been shown to result in crop damage, reductions in crop yields, as well as physical damage to rubber, some textiles and dyes (CAPCOA, 2007).

Ozone formation is typically greatest on warm, sunny days with little or no wind. It can be detected many miles from the source due to reaction time and/or the presence or lack of sunlight. The largest source of ozone precursors (both VOCs and oxides of nitrogen) are motor vehicles; however, major improvements in mobile source emission levels have yielded downward trends in ozone concentrations over time.

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

Particulate matter is typically grouped into two categories, coarse particles from 2.5 to 10 microns (or micrometers) in diameter (PM_{10}) and fine particles smaller than 2.5 microns in diameter ($PM_{2.5}$). Both are capable of traveling deep inside the lungs and can potentially enter the blood stream. Particulate matter can be generated by many sources, including but not limited to: power plants; steel mills; chemical plants; grading and construction activities; unpaved roads; parking lots; wood-burning stoves; natural processes (i.e. wind erosion); fireplaces; and automobiles (CAPCOA, 2007).

Exposure to particulate matter can lead to increased respiratory symptoms (airway irritation, coughing); aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. In addition, particulate matter can also be composed of a TAC (see following section on TACs). Particulate matter reduces visibility (exists as a haze).

Carbon Monoxide

Carbon monoxide (CO) is an odorless, colorless gas. It forms when the carbon in fuels does not completely burn. Vehicle exhaust contributes roughly 60 percent of all carbon monoxide emissions nationwide, and up to 95 percent in cities. Other sources include fuel combustion in industrial processes and natural sources such as wildfires. CO levels typically are highest during cold weather, because cold temperatures make combustion less complete and cause inversions that trap pollutants close to the ground (CAPCOA, 2007).

CO reduces the ability of blood to deliver oxygen to vital tissues, effecting the cardiovascular and nervous system. It also can impair vision, cause dizziness and even lead to unconsciousness or death (CAPCOA, 2007).

Toxic Air Contaminants (TACs)

As defined by CARB, TACs are those air pollutants that may cause or contribute to an increase in death or serious illness or may pose a present or future hazard to human health. A list of TACs is maintained by CARB; and the identification of such compounds is performed under consultation from the Office of Environmental Health Hazard Assessment (OEHHA). Several of the most common TACs include arsenic, benzene,

and formaldehyde. A similar list of federal Hazardous Air Pollutants (HAPs) is maintained by EPA; however, for the most part, it is not as extensive as CARB's TAC list.

One of the most recent compounds to be added to the TAC list is diesel exhaust particulate. In 1998, California identified diesel exhaust particulate as a TAC based on its potential to cause cancer and other adverse health effects. According to a CARB Fact Sheet, emissions from diesel engines are responsible for the majority of the potential airborne cancer risk in California. While diesel exhaust particulate is complemented by a wide variety of organic gases, some of which are also listed TACs, emphasis is placed on diesel exhaust particulate as it is documented as posing the greatest health risk.

Although most people are exposed to some level of diesel exhaust particulate, the risk and hazards posed are based heavily upon the frequency and duration of exposure and the airborne concentration. For this reason, certain professions are more prone to airborne diesel exhaust particulate exposures, including but not limited to: railroad workers, truck and bus drivers, heavy equipment operators, diesel mechanics, dock workers, underground miners; and others who spend considerable amounts of time in proximity of diesel traffic.

3.1.1.4 Topography and Meteorology

Air quality levels in the project areas are dependent on not only the location of air pollution sources and the emitted pollutant quantities, but also, on meteorology and topography. The meteorology, in turn, is affected by the proximity of the project to the Pacific Ocean. Some meteorological parameters that can affect air quality include wind speed, wind direction, air temperature, rainfall and solar radiation.

Topography

The topography within the proposed project area can be characterized as complex terrain consisting of coastal mountains, inland valleys, bays, and associated flatlands. This array of topography combined with microclimatic factors results in a low potential for accumulation of pollutants near the coast and high potential in sheltered inland valleys. The proposed project area is located within the northeastern portion of the Bay Area and extends northwards to the inland mountains at Willits. The proposed project

lies within the central and southern portions of the NCAB and the northern portion of the SFBAAB. The northern portion of the proposed project area is located within semi-sheltered mountain valleys that have limited influence by the marine air currents resulting in greater potential for air pollution accumulation. The southern portion of the proposed project corridor from Petaluma to Lombard has the potential for lower air pollution levels due to its closeness to the ocean in southern Marin County and the closeness to the San Pablo Bay in southern Sonoma and Napa Counties. The potential lower air pollution levels are felt in the Petaluma Valley due to the Petaluma Gap, which allows marine air to travel into the area.

Meteorology

Temperature

The temperature pattern in the project vicinity is primarily influenced by the temperature of the seawater immediately off the coast. Because of the water temperatures, air temperatures over the land remain very cool during the summer, particularly during the night hours, and the warmest part of the year is found in late summer or in the fall. Warm season minimums average below 50°F at most points (Elford, 1964).

The mean daily maximum is estimated to be in the low 90s°F; however, high temperature readings can easily exceed 100°F along the project route. Winter temperatures are generally mild, although occasional cold spells have been recorded. The mean minimum temperature in January is generally in the mid- to high-30s°F over most of the project route. All-time lows have dropped to as low as 15°F to 20°F along the project route. Even during January, relatively warm temperatures are typical of the afternoons; the January mean daily maximum temperatures along the project route are generally in the mid-50s°F (Elford, 1964).

The vertical temperature gradient caused by inversions causes air pollutants to become trapped, minimizing vertical mixing and dilution. Inversions typically result in the highest air pollutant concentrations. Occasionally, and most typically in the winter, heat radiation from the earth's surface causes the air in contact with it to cool rapidly. Low wind speeds result in little mechanical turbulence to mix the air, resulting in a layer of warm air atop the cooler air next to the ground. These inversions tend to result in the shallowest mixing depths (approximately 50 to 100 meters). These radiation inversions

are usually accompanied by light winds and can result in a high pollution potential. An elevated inversion is more common in the summer and fall. It occurs when elevated temperatures accompany a subtropical high pressure zone, creating a warm ceiling to cool marine air drawn in from the Pacific Ocean by a heated low pressure region in the Central Valley (BAAQMD, 1999).

Precipitation

The project area is characterized by moderately wet winters and dry summers. Winter rains account for about 75 percent of the average annual rainfall. The amount of annual precipitation in the project area can range from approximately 16 inches in sheltered valleys to 40 inches in the mountains (BAAQMD, 1999).

During rainy periods, ventilation (rapid horizontal movement of air and injection of cleaner air) and vertical mixing are usually high, and thus pollution levels tend to be low. However, frequent dry periods do occur during the winter where mixing and ventilation are low and pollutant levels build up.

Wind

The dilution of air pollutants can be limited by periods of light winds or calms. Sheltered valleys also pose an added issue as light winds or calm periods can combine with diurnal airflows—wind directions changing between daytime and nighttime. Due to the size of the project area, wind directions and magnitudes can vary greatly; however, the predominant wind direction along the project is from the northwest—this would especially include the majority of Marin County and the Petaluma Valley. The winds through the Cotati Valley (which encompasses Santa Rosa) are calmer than those of the Petaluma Valley and are generally from the south or southeast; as it is subject to the same the same coastal windflows through the Petaluma Gap. Wind directions in most Sonoma County valleys tend to be from the south, especially in the winter. Based on limited information, the airflows in Mendocino County (e.g. Ukiah and Willits) are also generally from the southwest.

3.1.2 Environmental Setting

The environmental setting is based on the information that was available in 2008 when the March 9, 2009 DEIR was under preparation.

3.1.2.1 Air Quality Background Concentrations

CARB compiles ambient air quality data from monitoring stations in the state. The BAAQMD operates full-scale monitoring stations in Napa, Santa Rosa, and Vallejo, while the NSCAPCD has limited monitoring stations in Healdsburg, Cloverdale, Ukiah, and Willits. Data collected from the monitoring stations from 2002 through 2005 were used as an estimate of background air quality concentrations (CARB, 2004-2006). Table 3.1-2 presents the maximum pollutant concentrations found within the proposed project area during the 2004 to 2006 time period and the number of days a standard was exceeded.

There was one violation of the state one-hour standard for ozone at Vallejo in 2004, but no violations of the federal standard. The California eight-hour ozone standard was violated several times between 2004 and 2006. The California 24-hour PM_{10} standard was violated one time in 2004 and one time in 2005. Both of the violations occurred at the Vallejo site. All other monitored pollutants were below federal and state standards.

The CARB and local air districts do not monitor diesel PM separately from PM_{10} and $PM_{2.5}$ because there is no routine method for monitoring ambient concentrations. However, CARB has estimated average diesel PM concentrations for the most populous air basins based on emission inventory information and PM_{10} monitoring data. Using data available for the year 2000, CARB estimates that the Bay Area Air Basin has an annual average concentration of 1.6 micrograms/cubic meter. This is associated with a health risk of 480 excess cancer cases per million people exposed over a 70-year lifetime (CARB, 2006).

Table 3.1-2
Summary of Air Quality Monitoring Data for the Study Area
2002-2004

	State Standard	Federal Standard	Pollution Concentration by Year		
			2004	2005	2006
Ozone					
Highest 1-hour average, ppm	0.09	NA	**0.104**	0.091	0.096
Days over State Standard			1	0	0
Highest 8-hour average, ppm	0.070	0.08	0.077	0.070	0.072
Days over State/Federal Standard			2/0	1/0	1/0
Carbon Monoxide					
Highest 1-hour average, ppm	20.0	35	4.0	3.9	NA
Days over State/Federal Standard			0/0	0/0	0/0
Highest 8-hour average, ppm	9.0	9	3.4	3.1	2.9
Days over State/Federal Standard			0/0	0/0	0/0
Nitrogen Dioxide					
Highest 1-hour average, ppm	0.25	NA	0.056	0.070	0.055
Days over State Standard			0	0	0
Highest annual average, ppm	NA	0.053	0.012	0.011	0.012
Exceeds Standard			No	No	No
Particulate Matter (PM_{10})					
Highest 24-hour average, $\mu g/m^3$	50	150	**51.4**/50.8	**52.3**/49.4	33.0/31.0
Days over State/Federal Standard			1/0	1/0	0/0
Highest annual average, $\mu g/m^3$	20	Revoked	19.6/18.9	16.4/16.8	NA/14.5
Exceeds State/Federal Standard			No/No	No/No	No/No
Particulate Matter ($PM_{2.5}$)					
Highest 24-hour average, $\mu g/m^3$	35	35	39.7	43.8	25.4
Days over Standard			0	0	0
Highest annual average, $\mu g/m^3$	12	15	11.1	9.7	NA
Exceeds State/Federal Standard			No/No	No/No	No/No

Source: California Air Resources Board, 2002-2005
Note: **Bold** Values are in excess of applicable standard. NA = Not Applicable or Not Available

Bay Area Air Basin Monitoring Stations:
Napa – ozone, carbon monoxide, and nitrogen dioxide
Santa Rosa – ozone, carbon monoxide, nitrogen dioxide, PM_{10}, and $PM_{2.5}$
Vallejo – ozone, carbon monoxide, nitrogen dioxide, PM_{10}, and $PM_{2.5}$

North Coast Air Basin Monitoring Stations:
Cloverdale – PM_{10}
Healdsburg (Matheson Street) – PM_{10}
Healdsburg (Municipal Airport) – ozone
Ukiah (Gobbi Street) – ozone, carbon monoxide, and nitrogen dioxide
Ukiah (County Library) - PM_{10} and $PM_{2.5}$
Willits (Main Street) – ozone, carbon monoxide, and nitrogen dioxide
Willits (Firehouse) – PM_{10}

3.1.2.2 Existing Pollutant Sources

A variety of sources exist throughout the proposed project area, including: stationary sources, operating at fixed locations; mobile sources, such as automobiles, trucks, locomotives and construction equipment; and finally, area sources that release relatively small quantities of emissions over an area that cumulatively may amount to larger quantities (e.g. service station VOC emissions due to tank breathing losses, evaporation and spillage). The primary sources of particulate matter are wood combustion (e.g. fireplaces/woodstoves), fugitive dust from construction projects, motor vehicle emissions and industry. Because the majority of the proposed project is aligned along a major state transportation corridor, Highway 101, the bulk of existing VOC, oxides of nitrogen, and diesel particulate matter emissions in the study area are due to motor vehicle traffic.

3.1.2.3 Localized Sensitive Impacts

The size, location and nature of a project are contributing factors for determining whether it will result in localized air quality impacts. Projects can contribute to localized air quality impacts from direct project related emission sources as well as indirect sources (i.e., vehicle traffic) affected by the project. As the distance from these sources to public receptors decreases, the impacts typically increase. As a result, impacts on nearby sensitive receptors are of particular concern. Sensitive receptors are facilities that house or attract children, elderly, people with illnesses or others who are especially sensitive to the effects of air pollutants. Hospitals, schools, convalescent facilities, and residential areas are examples of sensitive receptors (BAAQMD, 1999).

The proposed project covers a railroad corridor that is quite large (approximately 142 linear miles) with a variety of land uses passing through several towns centered along major transportation routes (Highways 101 and 121). As a result, numerous sensitive receptor locations exist throughout the corridor typically found near the larger towns. A review of sensitive locations (non-residential) within one quarter mile of the railroad tracks and sidings indicates several parks, schools, hospitals, and convalescent centers are within the vicinity of the proposed project.

Impacts to residents living near the rail tracks is also of concern since these residents may be exposed to pollutants generated by the passing freight trains. Therefore, residences located adjacent to the track were identified as potential sensitive receptors.

Areas with large residential components near the project alignment are located in Novato, Petaluma, Cotati, Santa Rosa, Windsor, Healdsburg, Cloverdale, Ukiah, and Willits. Distance from the nearest residences to the rail tracks varies from 30 feet to over 100 feet with the majority in the range of 60 to 80 feet.

Because there are many identified sensitive receptors, a distance based assessment of the potential impacts was conducted to quantify the maximum hypothetical impacts based on maximum operations regardless of actual location or direction from the source to the receptor.

3.1.3 Impacts and Mitigation Measures

To evaluate the significance of the potential impacts of the proposed project emissions on air quality, the unmitigated project emissions are compared to significance thresholds. The significance thresholds are regulatory based values for which a project's unmitigated emissions are considered significant if exceeded. If the thresholds are exceeded then mitigation measures are evaluated for further consideration regarding potential impacts.

3.1.3.1 Significance Thresholds

The following sections describe the significance thresholds used by environmental permitting and planning personnel at the three local air districts with jurisdiction over portions of the project -- those include the BAAQMD, the NSCAPCD, and the MCAQMD.

In addition to the individual district specific thresholds to follow, the State CEQA Guidelines also detail the following as projects that may be deemed as having a significant impact on air quality:

- A project that will "violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations."

- A project that "conflicts with adopted environmental plans or goals of the community where it is located."
- A project that would "create a potential public health hazard or involve the use, production or disposal of materials which pose a hazard to people or animal or plant populations in the area affected."
- A project that would "have a substantial, demonstrable negative aesthetic effect."
- A project that would result in the creation of objectionable odors; or
- A project that would result in the alteration of air movement, moisture, or temperature, or change in climate, either locally or regionally.

BAAQMD CEQA Thresholds

According to the BAAQMD's CEQA Guidelines (BAAQMD, 1999), the following significance thresholds address impacts associated with: 1) project construction, 2) project operations, and 3) general/regional plans.

Project Construction

Construction-related emissions are generally short-term in duration, but may still cause adverse air quality impacts. Fine particulate matter (PM_{10}) is the pollutant of greatest concern with respect to construction activities. PM_{10} emissions can result from a variety of construction activities, including excavation, grading, demolition, vehicle travel on paved and unpaved surfaces, and vehicle and equipment exhaust. Construction related emissions can cause substantial increases in localized concentrations of PM_{10}. Particulate emissions from construction activities can lead to adverse health effects as well as nuisance concerns such as reduced visibility and soiling of exposed surfaces.

Construction emissions of PM_{10} can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions and other factors. Despite this variability in emissions, experience has shown that there are a number of feasible control measures that can be reasonably implemented to significantly reduce PM_{10} emissions from construction. The BAAQMD's approach to CEQA analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures rather than detailed quantification of emissions.

Project Operations

The BAAQMD describes the analysis of project operations as an evaluation of other "indirect sources" associated with a given land use project, especially motor vehicles traveling to and from the project. Significance thresholds discussed below address the impacts of these indirect source emissions on local and regional air quality. Thresholds are also provided for other potential impacts related to project operations, such as odors and TACs:

1. Local Carbon Monoxide (CO) Concentrations. Localized carbon monoxide concentrations should be estimated for projects in which: 1) vehicle emissions of CO would exceed 550 lb/day; 2) project traffic would impact intersections or roadway links operating at Level of Service (LOS) D, E or F or would cause LOS to decline to D, E or F, or 3) project traffic would increase traffic volumes on nearby roadways by 10% or more. A project contributing to CO concentrations exceeding the State Ambient Air Quality Standard of 9 ppm averaged over 8 hours and 20 ppm for 1 hour would be considered to have a significant impact.
2. Total Emissions. Total emissions from project operations should be compared to the thresholds provided in Table 3.1-4. Total operational emissions evaluated under this threshold should include all emissions from motor vehicle use associated with the project. A project that generates criteria air pollutant emissions in excess of the annual or daily thresholds in Table 3.1-3 would be considered to have a significant air quality impact.

Table 3.1-3
BAAQMD Thresholds of Significance
for Project Operations

Pollutant	ton/yr	lb/day	kgm/day
ROG	15	80	36
NOx	15	80	36
PM_{10}	15	80	36

Notes: ROG = reactive organic gases (or non-methane VOCs); ton/yr = ton(s) per year; lb/day = pound(s) per day; kgm/day = kilogram(s) per day.

3. Odors. Any project with the potential to frequently expose members of the public to objectionable odors would be deemed to have a significant impact. Odor impacts on residential areas and other sensitive receptors warrant the closest scrutiny, but consideration should also be given to other land uses where people may congregate, such as recreational facilities, worksites and commercial areas.

4. Toxic Air Contaminants (TACs). Any project with the potential to expose sensitive receptors (including residential areas) or the general public to substantial levels of TACs would be deemed to have a significant impact. This applies to receptors locating near existing sources of TACs, as well as sources of TACs locating near existing receptors.

   Proposed development projects that have the potential to expose the public to TACs in excess of the following thresholds would be considered to have a significant air quality impact. These thresholds are based on the District's Risk Management Policy.

   Thresholds of Significance for TACs

   a. Probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in one million.

   b. Ground-level concentrations of non-carcinogenic TACs would result in a Hazard Index greater than 1 for the MEI.

5. Accidental Releases/Acutely Hazardous Air Emissions. The determination of significance for potential impacts from accidental releases of acutely hazardous materials (AHMs) should be made in consultation with the local administering agency of the Risk Management Plan (RMP). The county health department is usually the administering agency. A determination of significance regarding accidental releases of AHMs should be made for: 1) projects using or storing AHMs locating near existing receptors, and 2) development projects resulting in receptors locating near existing facilities using or storing AHMs.

6. Cumulative Impacts. Any proposed project that would individually have a significant air quality impact (see Thresholds of Significance for Impacts from Project Operations, above) would also be considered to have a significant cumulative air quality impact.

For any project that does not individually have significant operational air quality impacts, the determination of significant cumulative impact should be based on an evaluation of the consistency of the project with the local general plan and of the general plan with the regional air quality plan. (The appropriate regional air quality plan for the Bay Area is the most recently adopted Clean Air Plan.)

General/Regional Plans

Regarding plans, the State CEQA Guidelines, Section 15125(b), states that an EIR shall discuss "any inconsistencies between a proposed project and applicable general plans and regional plans. Such regional plans include, but are not limited to, the applicable Air Quality Management Plan (or State Implementation Plan)...." General Plans of cities and counties must show consistency with regional plans and policies affecting air quality to claim a less than significant impact on air quality. General plan amendments, redevelopment plans, specific area plans, annexations of lands and services, and similar planning activities should receive the same scrutiny as general plans with respect to consistency with regional air quality plans.

NSCAPCD CEQA Thresholds

The significance thresholds for NSCAPCD were obtained verbally from NSCAPCD air quality engineer, as a CEQA-related guidance document is not readily available from NSCAPCD.

Project Construction

According to NSCAPCD, the project construction thresholds are qualitative in nature and would parallel the control measures called for in the BAAQMD's CEQA Guidelines.

Project Operations

The following project operational thresholds (see Table 3.1-4) were also provided verbally by NSCAPCD.

Table 3.1-4
NSCAPCD Thresholds of Significance
for Project Operations

Pollutant	ton/yr
ROG	40
NOx	40
CO	100
PM_{10}	15

In addition, NSCAPCD explained that the risk associated with projects that involve the diesel exhaust emissions is of particular concern to NSCAPCD.

MCAQMD CEQA Thresholds

The MCAQMD maintains a Planning Program website that contains various documents for use in preparing CEQA documents.

Project Construction

Rule 430 of the existing MCAQMD Regulation 1 is applicable to all grading activities. It requires that the following airborne dust control measures be used during all construction operations, the grading of roads, or the clearing of land: 1) soil shall be watered; 2) posted speed limit of 10 MPH or less; 3) all track-out shall be removed promptly; 4) stockpiles must be treated to reduce dust; 5) no activities during high winds; 6) project site secured during non-work hours; and 7) operator shall keep a log of dust control measures.

The MCAQMD also plans to create a regulation to better enforce particulate matter releases from grading and construction projects. Such a regulation would require permits for projects with over 1 acre of disturbance. At the time this report was under preparation, the regulation modification requiring the aforementioned permits had been proposed (MCAQMD, 2005, 2007a,b).

Based on the limited construction activities associated with the proposed project and the fact that most activities will be limited to maintenance and repair of existing track, this requirement most likely will not apply.

Project Operations

The MCAQMD's indirect source rule came about in May 2003 amendments to Regulation 1 and is summarized in a guidelines document entitled "The Functioning of the MCAQMD Indirect Source Rule." The purpose of the MCAQMD's indirect source rule is to ensure that large development projects enact reasonable mitigation measures to reduce emissions. The definition of indirect source that would be subject to the rule is based upon the daily operational emissions. If the daily operational unmitigated emissions for the project exceed the daily thresholds contained in Table 3.1-5, the project would be subject to the indirect source rule. It requires the use of the "latest ARB approved version of URBEMIS [Urban Emissions Model] with the Mountain and Rural Counties default settings, or other ARB approved indirect source model" to determine the projected unmitigated emissions (MCAQMD, 2007c,d).

Table 3.1-5
MCAQMD Thresholds of Significance
for Project Operations

Pollutant	lb/day
ROG	180
NOx	42
CO	690
PM_{10}	80

Note: Per MCAQMD guidance, these values are based on unmitigated emissions.

3.1.3.2 Impact Assessment Methodology

Project Construction Impacts

The key concern of the BAAQMD and the other two local air districts during construction activities is that adequate abatement programs are in place and that they consist of appropriate control measures to minimize emissions. The proposed project will be using existing track for the majority of the proposed project. Construction activities may be involved with the maintenance and repair activities associated with the operations of the railroad, the three significant rehabilitation sites and the new construction for the Lombard siding. In addition, in accordance with the Novato Consent Decree, quiet zones will be constructed at certain agreed upon crossings between MP 28.5 and MP 21.9. Impacts associated with construction activities will be minimal due to the short

duration of time needed to repair and rehabilitate the track at any one site and to construct the new siding near Lombard.

The construction related impacts of the proposed project will be insignificant on the region. The mitigation measures will consist of BMPs that will comply with the Basic Control Measures detailed in the BAAQMD's CEQA Guidelines document (BAAQMD, 1999).

Project Operational Impacts

The evaluation of operational air quality impacts of the proposed project is based on NWP Co's. economic analysis which defined the number of trains/size and the affects of freight train operations within the study area. The study area is considered to be both the air quality adjacent and nearby the rail line and the regional air quality in the railroad corridor. Operational impacts include those associated with the addition of freight trains (traveling and idling at sidings), the affected local traffic at crossings along the rail corridor, the reduction of trucks hauling freight in the project area that will be displaced by the train operations, and support operations and equipment. The unmitigated emissions were quantified for the proposed project and have been subtotaled by the air district for purposes of comparing with the significance thresholds for each separate air district. The following operational scenarios were evaluated within the proposed project corridor:

- "Current" Project at limited operation (Start up);
- "Current" Project at full operation; and
- "Future" Project at full operation.

The impacts of the proposed project compared to existing and future no project conditions have also been evaluated. Based on the project impacts, mitigation strategies were then assessed. Details on the technical evaluations and emissions quantifications are provided in the Air Quality Technical Study for NCRA (Kleinfelder, 2008), located in Appendix D. Because the Air Quality Technical Study was based on conservative assumptions and addressed future operations, NCRA determined that it was not necessary to update the study for the recirculation of the DEIR.

Since the requirements of the Novato Consent Decree for the "use of environmentally friendly engines" are as conservative as or more conservative than the proposed project operating scenarios analyzed in the Air Quality Technical Study, additional evaluations of the potential air quality impacts associated with the Novato Consent Decree are not considered necessary.

Motor Vehicle Emissions

Emissions of CO, nitrogen oxides (NOx), reactive organic gases (ROG), CO2, $PM_{2.5}$, and PM_{10} from motor vehicles in the project area in the most recent year and a future year (25 years out) were calculated using the CARB-approved emission factor model EMFAC2007. The model was run for each air basin to account for regional traffic differences built into the EMFAC2007 model. Procedures outlined in the BAAQMD CEQA guidance were applied for seasonal variation affects to ozone and CO emissions.

For displaced trucks, the EMFAC2007 emission factors were multiplied by the equivalent haul distance that the freight trains would haul freight. Additional truck operations that would be reduced as a result of displaced truck transport, including idling, traveling on secondary roads (local congestion), start-up, hot soak, etc. were not quantified.

Freight Train Locomotives

Air pollutant emissions from the proposed freight train locomotives were calculated based on using diesel as a fuel source. For startup, it is assumed a temporary existing locomotive meeting Tier 0 standards will be used. For full operations, the locomotives proposed will utilize a multi-engine platform that meet the Tier 3 off road standards. The emissions were quantified by multiplying the power ratings, operating times and emission rates for each train. The hours were calculated based upon travel distances and speeds. The power ratings are based on load, grade and speed requirements. The emission rates are based on manufacturer data where available, mass balance (SO_2) based on fuel standards, and the California Climate Action Registry General Reporting Guidelines for diesel combustion (CO_2).

Localized CO Impact Analysis

Localized carbon monoxide concentrations should be estimated for projects in which: 1) vehicle emissions of CO would exceed 550 lb./day; 2) project traffic would impact intersections or roadway links operating at LOS D, E or F or would cause LOS to decline to D, E or F, or 3) project traffic would increase traffic volumes on nearby roadways by 10% or more. The proposed project will not generate additional traffic, but will affect existing and future traffic by causing additional queuing delays at grade crossings or nearby intersections next to the crossings. As a result, a CO hot spots analysis was conducted by identifying the intersection with the greatest impact from the project (See Section 3.10 Transportation) and utilizing the CAL3QHC model to quantify the CO concentrations. Background CO concentrations were then added to the modeled concentrations for comparison with the CO standards. This was conducted for current and future full operations.

Toxic Air Contaminant (TAC) Impact Analysis

To address concerns on TAC impacts to nearby sensitive receptors, a screening analysis was conducted to quantify concentrations that were then used to calculate a Hazard Index or Cancer Risk by applying published reference exposure levels. The toxics assessed include diesel particulate matter and acrolein. These compounds are both a concern for chronic affects from long term exposure (lifetime). Acrolein also has an acute affect that was evaluated.

3.1.3.3 Impact Summary

A detailed analysis of the proposed project impacts is provided in the Air Quality Technical Study for NCRA (Kleinfelder, 2008), located in Appendix D.

Emissions from Operations

The air quality impacts from the proposed project operations are found to be a net benefit to the regional air quality.

The proposed project will not violate any air quality standards or contribute substantially to an existing or projected air quality violation.

The proposed project will result in a net decrease in regional emissions and therefore will not violate any air quality standards or contribute substantially to any possible ozone or PM standard violations that may occur in the region.

Tables 3.1-6 to 3.1-8 show the resulting emissions by air district compared to the corresponding air districts significance thresholds for start-up, first year of full operations and future operations.

Table 3.1-6
Start-up
Emission Summary by Air District

Pollutant	lbs/day				Thresholds of Significance	
	Start up Train	Traffic Queue	Displaced Truck Travel	Total	lb/day	Percent of Threshold
BAAQMD Operations						
Criteria Pollutant Emissions						
ROG	5.28	0.040	8.919	-3.597	80	-4%
CO	14.08	0.242	61.646	-47.320	NA	NA
NOx	94.63	0.215	162.087	-67.243	80	-84%
SOx	1.69	0.000	0.177	1.517	NA	NA
PM-10	3.52	0.003	5.613	-2.089	80	-3%
PM-2.5	3.24	0.003	5.158	-1.916	NA	NA
Toxics Emissions						
Diesel PM	3.521	0.003	5.613	-2.089	NA	NA
Green House Gas Emissions						
CH4	0.028	0.002	0.477	-0.447	NA	NA
CO2	5268.923	17.144	18042.194	-12756.127	NA	NA
CO_2-e	5269.513	17.180	18052.211	-12765.518	NA	NA
Pollutant	**tons/year**				**Thresholds of Significance**	
	Start up Train	**Traffic Queue**	**Displaced Truck Travel**	**Total**	**tons/year**	**Percent of Threshold**
Criteria Pollutant Emissions						
ROG	0.412	0.003	0.696	-0.281	15	-2%
CO	1.099	0.019	4.808	-3.691	NA	NA
NOx	7.381	0.017	12.643	-5.245	15	-35%
SOx	0.132	0.000	0.014	0.118	NA	NA
PM-10	0.275	0.000	0.438	-0.163	15	-1%
PM-2.5	0.253	0.000	0.402	-0.149	NA	NA
Toxics Emissions						
Diesel PM	0.275	0.000	0.438	-0.163	NA	NA
Green House Gas Emissions						
CH4	0.002	0.000	0.037	-0.035	NA	NA
CO2	410.976	1.337	1407.291	-994.978	NA	NA
CO_2-e	411.022	1.340	1408.072	-995.710	NA	NA

Table 3.1-7
Current Full Operations (2009)
Emission Summary by Air District

Pollutant	lbs/day				Thresholds of Significance	
	Train	Traffic Queue	Displaced Truck Travel	Total	lb/day	Percent of Threshold
MCAQMD Operations						
Criteria Pollutant Emissions						
ROG	1.399	0.114	51.527	-50.014	180	-28%
CO	22.858	0.665	364.129	-340.607	690	-49%
NOx	67.174	0.575	929.637	-861.888	42	-2052%
SOx	3.592	0.000	1.147	2.446	NA	NA
PM-10	1.633	0.002	33.826	-32.191	80	-40%
PM-2.5	1.502	0.002	31.103	-29.599	NA	NA
Toxics Emissions						
Diesel PM	1.633	0.002	33.826	-32.191	NA	NA
Green House Gas Emissions						
CH4	0.060	0.004	2.508	-2.445	NA	NA
CO2	11168.712	42.048	120008.900	-108798.140	NA	NA
CO_2-e	11169.962	42.128	120061.574	-108849.484	NA	NA
NSCAPCD Operations						
Criteria Pollutant Emissions						
ROG	0.075	0.010	3.503	-3.417	40	-9%
CO	1.233	0.059	24.752	-23.460	100	-23%
NOx	3.622	0.051	63.193	-59.520	40	-149%
SOx	0.194	0.000	0.078	0.116	40	0.3%
PM-10	0.088	0.000	2.299	-2.211	15	-15%
PM-2.5	0.081	0.000	2.114	-2.033	NA	NA
Toxics Emissions						
Diesel PM	0.088	0.000	2.299	-2.211	NA	NA
Green House Gas Emissions						
CH4	0.003	0.000	0.171	-0.167	NA	NA
CO2	602.254	3.742	8157.723	-7551.727	NA	NA
CO_2-e	602.321	3.749	8161.303	-7555.233	NA	NA

Table 3.1-7 (Continued)
Current Full Operations (2009)
Emission Summary by Air District

Pollutant	lbs/day				Thresholds of Significance	
	Train	Traffic Queue	Displaced Truck Travel	Total	lb/day	Percent of Threshold
BAAQMD Operations						
Criteria Pollutant Emissions						
ROG	2.798	0.557	80.210	-76.006	80	-95%
CO	45.693	3.406	548.614	-495.271	NA	NA
NOx	134.281	3.067	1449.831	-1306.259	80	-1633%
Sox	7.180	0.002	1.700	6.049	NA	NA
PM-10	3.264	0.042	49.507	-45.918	80	-57%
PM-2.5	3.003	0.039	45.576	-42.274	NA	NA
Toxics Emissions						
Diesel PM	3.264	0.042	49.507	-45.918	NA	NA
Green House Gas Emissions						
CH4	0.119	0.025	4.250	-3.840	NA	NA
CO2	22326.446	243.259	173520.381	-101150.776	NA	NA
CO_2-e	22328.945	243.684	173609.621	-101231.417	NA	NA
Pollutant	**tons/year**				**Thresholds of Significance**	
	Train	**Traffic Queue**	**Displaced Truck Travel**	**Total**	**tons/year**	**Percent of Threshold**
Criteria Pollutant Emissions						
ROG	0.436	0.087	12.513	--11.857	15	-79%
CO	7.128	0.531	85.584	-77.262	NA	NA
NOx	20.948	0.479	226.174	-203.776	15	-1359%
SOx	1.120	0.000	0.265	0.944	NA	NA
PM-10	0.509	0.007	7.723	-7.163	15	-48%
PM-2.5	0.468	0.006	7.110	-6.595	NA	NA
Toxics Emissions						
Diesel PM	0.509	0.007	7.723	-7.163	NA	NA
Green House Gas Emissions						
CH4	0.019	0.004	0.663	-0.599	NA	NA
CO2	3482.926	37.933	27069.179	-15779.521	NA	NA
CO_2-e	3483.315	38.015	27083.101	-15792.101	NA	NA

Table 3.1-8
Future Full Operations (2033)
Emission Summary by Air District

Pollutant	lbs/day				Thresholds of Significance	
	Train	Traffic Queue	Displaced Truck Travel	Total	lb/day	Percent of Threshold
MCAQMD Operations						
Criteria Pollutant Emissions						
ROG	1.399	0.131	13.186	-11.656	180	-6%
CO	22.858	0.863	86.930	-63.209	690	-9%
NOx	67.174	0.863	123.909	-55.871	42	-133%
SOx	3.592	0.001	1.147	2.446	NA	NA
PM-10	1.633	0.003	5.948	-4.312	80	-5%
PM-2.5	1.502	0.003	5.447	-3.942	NA	NA
Toxics Emissions						
Diesel PM	1.633	0.003	5.948	-4.312	NA	NA
Green House Gas Emissions						
CH4	0.060	0.006	0.645	-0.580	NA	NA
CO2	11168.712	63.105	120985.621	-109753.804	NA	NA
CO_2-e	11169.962	63.224	120999.166	-109765.979	NA	NA
NSCAPCD Operations						
Criteria Pollutant Emissions						
ROG	0.075	0.013	0.896	-0.808	40	-2%
CO	1.233	0.083	5.909	-4.593	100	-5%
NOx	3.622	0.083	8.423	-4.717	40	-12%
SOx	0.194	0.000	0.078	0.116	40	0.3%
PM-10	0.088	0.000	0.404	-0.316	15	-2%
PM-2.5	0.081	0.000	0.370	-0.289	NA	NA
Toxics Emissions						
Diesel PM	0.088	0.000	0.404	-0.316	NA	NA
Green House Gas Emissions						
CH4	0.003	0.001	0.044	-0.040	NA	NA
CO2	602.254	6.076	8224.116	-7615.786	NA	NA
CO_2-e	602.321	6.088	8225.037	-7616.628	NA	NA

Table 3.1-8 (Continued)
Future Full Operations (2033)
Emission Summary by Air District

Pollutant	lbs/day				Thresholds of Significance	
	Train	Traffic Queue	Displaced Truck Travel	Total	lb/day	Percent of Threshold
BAAQMD Operations						
Criteria Pollutant Emissions						
ROG	2.798	0.750	19.973	-15.577	80	-19%
CO	45.693	5.135	130.992	-75.920	NA	NA
NOx	134.281	5.236	196.753	-51.011	80	-64%
Sox	7.180	0.004	1.700	6.051	NA	NA
PM-10	3.264	0.028	9.030	-5.456	80	-7%
PM-2.5	3.003	0.025	8.287	-4.999	NA	NA
Toxics Emissions						
Diesel PM	3.264	0.028	9.030	-5.456	NA	NA
Green House Gas Emissions						
CH4	0.119	0.034	1.062	-0.644	NA	NA
CO2	22326.446	5604.469	179240.665	-101509.750	NA	NA
CO_2-e	22328.945	5605.176	179262.975	-101523278	NA	NA

Pollutant	tons/year				Thresholds of Significance	
	Train	Traffic Queue	Displaced Truck Travel	Total	tons/year	Percent of Threshold
Criteria Pollutant Emissions						
ROG	0.436	0.117	3.116	-2.430	15	-16%
CO	7.128	0.801	20.435	-11.843	NA	NA
NOx	20.948	0.817	30.693	-7.958	15	-53%
SOx	1.120	0.001	0.265	0.944	NA	NA
PM-10	0.509	0.004	1.409	-0.851	15	-6%
PM-2.5	0.468	0.004	1.293	-0.780	NA	NA
Toxics Emissions						
Diesel PM	0.509	0.004	1.409	-0.851	NA	NA
Green House Gas Emissions						
CH4	0.019	0.005	0.166	-0.100	NA	NA
CO2	3482.926	61.884	27961.544	-16647.935	NA	NA
CO_2-e	3483.315	61.994	27965.024	-16650.045	NA	NA

The Air Quality Technical Study shows that the affects of displacing existing truck traffic with the type of locomotive proposed for the project full operating scenario results in a net decrease in emissions. This is due to utilizing the multi-engine platform for the planned freight locomotive that meets Tier 3 off-road emission standards and allows for engine shutdowns based on power needs. This type of locomotive exceeds the current locomotive engine standards and allows for displacement of greater emissions from the equivalent number of trucks needed to haul the same quantity of freight. The decrease in emission for future operations (25 years) will not realize as much of a decrease as current operations as truck engines are expected to have lower emissions in the future with new technological advances in emission controls. However, the net effect still shows a benefit.

Emissions Associated with Localized Traffic

The proposed project will cause increases to localized CO emissions. The project will not result in additional traffic, but will cause localized emissions to increase due to increased traffic delays at or near grade crossings. The Traffic Analysis Report shows that project operations will not add substantially to the localized traffic delays or lower the LOS (See Section 3.10 Transportation). An evaluation of the emission concentrations for the worst case intersection for current and future project operations indicates that the ambient CO concentrations will not exceed state or federal CO standards. Details of this evaluation are included in the NCRA Air Quality Technical Study (Kleinfelder, 2008). Therefore, it is unlikely that the proposed project will cause a violation of the CO standards or have substantial contributions to a future violation. Table 3.1-9 provides a summary of the results compared with the standards.

Table 3.1-9
Summary of CO impacts

Averaging Time	Concentration (mg/m^3)	Background (mg/m^3)	Total (mg/m^3)	CAAQS (mg/m^3)	NAAQS (mg/m^3)
1-hr	0.60	4.6	5.2	23	40
8-hr	0.45	3.9	4.4	10	10

Toxic Air Contaminants (TACs)

The proposed project may expose sensitive receptors to some additional pollutants of which TACs are the primary concern. This increase may affect nearby or adjacent sensitive receptors located near the railroad corridor or sidings. A review of sensitive receptors within a ¼ mile area of influence of the railroad was conducted and shows that sensitive receptors exist adjacent to the proposed project right-of-way. A conservative (erring on the high side) screening evaluation on the health risk from diesel particulate and acrolein was therefore conducted based on the maximum emissions release and nearest distances to sensitive receptors along the railroad or sidings. The result of this analysis shows that, at worst case conditions, the health risks from the project emissions is less than significant. Details of this evaluation are included in the NCRA Air Quality Technical Study (Kleinfelder, 2008). Table 3.1-10 summarizes the potential impacts compared to the standards.

Table 3.1-10
Toxic Air Contaminant Risk Summary

Compound	Averaging Time	Maximum Concentration ($\mu g/m^3$)	Cancer Unit Risk $(\mu g/m^3)^{-1}$	Cancer Risk (per million)	REL ($\mu g/m^3$)	Hazard Index
Diesel Particulate	Chronic (Annual)	0.01048	3.4E-04	3.144	NA	NA
Acrolein	Acute (1-hr)	0.00029	NA	NA	0.19	0.0015
	Chronic (Annual)	0.00003	NA	NA	0.06	0.0005

Odors

The proposed project would result in limited diesel fuel exhaust that could cause odors near operating locomotives. While the locomotives are traveling, the impacts are expected to be insignificant as the duration of time for odors to be emitted will be short and the movement of the train will cause the emissions to quickly dissipate. While the locomotives are stationary, the running exhaust emission may cause odors to accumulate near the locomotive.

The locomotives will require idling along sidings to allow other trains to pass. The duration of idling is expected to be only a few minutes, but could be as much as 15 minutes during peak rail usage by commuter trains. In order to minimize potential accumulation of exhaust odors, the locomotive will operate at a lower power level during idling in which 2 of the 3 diesel engines will shut down and the 3rd unit will operate at idle mode resulting in only a 0.7% overall load rating.

If solid waste is transported, it will be in enclosed containers. Therefore odors associated with the hauling of solid waste would not present a significant impact.

Air Quality Plans

The proposed project will not conflict with or obstruct implementation of any applicable air quality plans. Since the proposed project does not exceed any significance threshold and will comply with applicable air quality regulations, the impacts are not considered to interfere or obstruct any applicable air quality plans.

Greenhouse Gases

The proposed project will result in a decrease in GHG emissions. GHG are considered to contribute to global warming by absorbing infrared radiation and trapping heat in the atmosphere. Because this is a global effect, it is difficult to ascertain the effects from an individual project. Six gases have been recognized as GHG as identified by the Kyoto protocol and include carbon dioxide (CO2), methane (CH4), nitrous oxide (N20), fluorinated hydrocarbons (HFCs and PFCs) and sulfur hexafluoride (SF6). Each of these gases has a different global warming potential (GWP). For example, CO_2 has a GWP of 1.0, CH4 a GWP of 21 and N2O a GWP of 310. Therefore, to calculate overall GHG gas intensity (expressed in terms of carbon dioxide equivalents, or CO_2e), the GWPs must be accounted for. The net project GHG intensity expressed as CO_2e is summarized in the NCRA Air Quality Technical Study (Kleinfelder, 2008).

The proposed project results in a net decrease in GHG due to the effects of displacing truck traffic for hauling freight. The future project emission will realize a greater decrease in GHG even though newer trucks will replace older trucks. It sounds counterintuitive that newer trucks would result in an increase in GHG emission, but due to the focus on criteria pollutant emission reductions (ROG, PM and NOx), the vehicle engines are expected to run more efficiently thus resulting in increased CO_2 emissions.

According to the USEPA, a typical 2-person household generates about 41,500 pounds of CO_2 per year or about 21 tons (www.epa.gov/climatechange/emissions/ind_calculator.html). The net reduction in CO_2e emission from the proposed project for future operations (year 2033) is about 41,390 tons per year or equivalent to approximately 1,970 households.

3.1.3.4 Impact Summary

The proposed project will result in additional pollutant emission from the locomotives, support equipment and affected traffic at grade crossings (accounting for future growth). However, the project will result in a net decrease in pollutant emissions due to displacing existing truck traffic hauling freight on roadways with a more efficient means of hauling freight by rail using state of the art locomotives. As a result, the project does not result in a cumulatively considerable net increase in pollutant emissions.

The proposed project will not create significant odors affecting a substantial number of people. The proposed project will result in limited diesel fuel exhaust that could cause odors near operating locomotives. While the locomotives are traveling, the impacts are expected to be insignificant as the duration of time for odors to be emitted will be short and the movement of the train will cause the emissions to quickly dissipate. While the locomotives are stationary, the running exhaust emission may cause odors to accumulate near the locomotive.

The locomotives may require idling along sidings to allow other trains to pass. The duration of idling is expected to be only a few minutes. In order to minimize potential accumulation of exhaust odors, the locomotive will operate at a lower power level during idling.

Solid waste is being considered as a potential cargo. The rail cars transporting solid waste will be completely contained and will therefore not result in a significant odor impact.

3.1.3.5 Impacts and Mitigation Measures

Rehabilitation and Construction Activities

Bakers Creek

Impact AQ-BC1: The proposed project would generate dust and other criteria air pollutant emissions during rehabilitation activities. These activities may utilize gasoline and diesel power equipment. ***[Less Than Significant with Mitigation Measure AQ-BC1]***

Mitigation AQ-BC1: Gasoline and diesel powered equipment shall be used for relatively short periods and shall meet the applicable CARB emission standards. Dust mitigation shall also be employed as necessary and in accordance with air quality regulations and NCRA's BMPs. Therefore the impacts from rehabilitation activities are considered to be less than significant after mitigation.

Foss Creek

Impact AQ-FC1: The proposed project would generate dust and other criteria air pollutant emissions during rehabilitation activities. These activities may utilize gasoline and diesel power equipment. ***[Less Than Significant with Mitigation Measure AQ-FC1]***

Mitigation AQ-FC1: Gasoline and diesel powered equipment shall be used for relatively short periods and shall meet the applicable CARB emission standards. Dust mitigation shall also be employed as necessary and in accordance with air quality regulations and NCRA's BMPs. Therefore the impacts from rehabilitation activities are considered to be less than significant after mitigation.

Black Point Bridge

Impact AQ-BP1: The proposed project would generate dust and other criteria air pollutant emissions during rehabilitation activities.

Project related construction will be limited to the rehabilitation of the existing bridge electrical and mechanical systems. These activities may utilize gasoline and diesel power equipment. ***[Less Than Significant with Mitigation Measure AQ-BP1]***

Mitigation AQ-BP1: Gasoline and diesel powered equipment shall be used for relatively short periods and shall meet the applicable CARB emission standards. Dust mitigation shall also be employed as necessary and in accordance with air quality regulations and NCRA's BMPs. Therefore, the impacts from construction related activities are considered to be less than significant after mitigation.

Lombard Siding (MP 1.0 – MP 2.0)

Impact AQ-LS1: Construction of the siding from MP 1.0 to MP 2.0 will include grading, placement of track ballast and clean fill, placement of 5,300 feet of new track, extending a culvert, reestablishing drainage ditches, widening an existing timber deck bridge, the embankment, and constructing culverts. The construction activities that will be necessary to construct the siding for the interchange with the Cal Northern line between MP 1.0 and MP 2.0, could cause an adverse air quality impact. ***[Less Than Significant with Mitigation Measure AQ-S1]***

Mitigation AQ-LS1: Maintenance and construction activities related to the operations of the railroad will be conducted in accordance with air quality regulations and NCRA's BMPs.

Novato Consent Decree (MP 35.5 – MP 18.7)

Impact AQ-NCD1: Construction of the quiet zones would generate dust and other criteria air pollutant emissions from the use of gasoline and diesel powered equipment. [Less Than Significant with Mitigation AQ-NCD1].

Mitigation AQ-NCD1: Construction activities and the use of gasoline and diesel powered equipment shall be used for relatively short periods and shall meet applicable CARB emission standards. Dust mitigation shall also be employed as necessary and in accordance with air quality regulations and NCRA's BMPs. Therefore, the impacts from these minor construction activities are considered less than significant after mitigation.

Operations

As discussed in Section 3.1.3.4 Impact Summary, the operations of the proposed project do not result in significant impacts to air quality.

Impact AQ-OP1: The routine and emergency maintenance activities that will be necessary to allow for safe and efficient operations of the railroad, such as bridge repair, brush cutting, and grade crossing signal maintenance, could cause an adverse air quality impact. ***[Less Than Significant with Mitigation Measure AQ-OP1]***

Mitigation AQ-OP1: Maintenance activities related to the operations of the railroad will be conducted in accordance with air quality regulations and NCRA's BMPs.

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