



**PUBLIC DRAFT**

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**PUBLIC DRAFT  
AIR QUALITY TECHNICAL STUDY  
NORTH COAST RAILROAD AUTHORITY  
RUSSIAN RIVER DIVISION  
FREIGHT RAIL PROJECT**

**Prepared for:**



**Prepared by:**



**2240 Northpoint Parkway  
Santa Rosa, California 95407**

**August 2008**



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**PUBLIC DRAFT  
AIR QUALITY TECHNICAL STUDY  
NORTH COAST RAILROAD AUTHORITY  
RUSSIAN RIVER DIVISION  
FREIGHT RAIL PROJECT**

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**ACRONYMS AND ABBREVIATIONS**

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ABAG	Association of Bay Area Governments
AHM	acutely hazardous material(s)
AQMD	Air Quality Management District
BAAQMD	Bay Area Air Quality Management District
BMP	Best Management Practice(s)
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> e	carbon dioxide equivalents
DEIR	Draft Environmental Impact Report
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HAPs	Hazardous Air Pollutants
LOS	Level of service
MCAQMD	Mendocino County Air Quality Management District
MEI	Maximally Exposed Individual
µg/m <sup>3</sup>	micrograms per cubic meter
mg/m <sup>3</sup>	milligrams per cubic meter
mph	miles per hour
MP	Milepost
MTC	Metropolitan Transportation Commission
NAAQS	National Ambient Air Quality Standards
NCRA	North Coast Railroad Authority
NCAB	North Coast Air Basin
NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	nitrogen oxides
NSCAPCD	Northern Sonoma County Air Pollution Control District
NWP	Northwestern Pacific Railroad



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## ACRONYMS AND ABBREVIATIONS

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O <sub>3</sub>	ozone
OEHHA	Office of Environmental Health Hazard Assessment
Pb	lead
PM	particulate matter
PM <sub>10</sub>	particulate matter equal to or less than 10 microns in aerodynamic diameter
PM <sub>2.5</sub>	particulate matter equal to or less than 2.5 microns in aerodynamic diameter
ppm	parts per million
REL	Reference Exposure Levels
RMP	Risk Management Plan
ROG	reactive organic gases
RRD	Russian River Division
SCAQMD	South Coast Air Quality Management District
SFBAAB	San Francisco Bay Area Air Basin
SIP	State Implementation Plan
SMART	Sonoma Marin Area Rail Transit
SO <sub>2</sub>	sulfur dioxide
SO <sub>x</sub>	sulfur oxides
SWPPP	Storm Water Pollution Prevention Plan
TAC	Toxic Air Contaminant
U.S.	United States
VOC	volatile organic compounds
WMP	waste management plan



## 1.0 INTRODUCTION AND PURPOSE

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### 1.1 INTRODUCTION

The North Coast Railroad Authority (NCRA) is proposing to resume rail service over the Russian River Division (RRD) of the Northwestern Pacific Railroad (NWP). The NWP is an existing railroad that has provided rail service dating back to the early 1900s. The RRD of the NWP is approximately 142 miles long extending from Willits in Mendocino County, California to Lombard, Napa County, California (See Figure 1-1). This rail corridor runs parallel to U.S. Highway 101 corridor through Mendocino, Sonoma, and Marin counties to Novato, California. At Ignacio, south of Novato, the rail corridor runs east/west along CA Highways 37 and 121 near the north shore of San Pablo Bay, to Lombard, north of the City of American Canyon, where the NWP connects to the currently operating California Northern Railroad.

NWP Co., NCRA's selected rail operator, proposes to resume the operations of freight service in the rail corridor from Willits to Lombard for transport of general freight to serve the communities in the rail corridor. In this rail corridor, NWP Co. may possibly also transport solid waste to landfills beyond the four-county area, replacing the truck hauling currently used for this service. The project does not propose the transport of hazardous waste, dangerous, highly flammable or explosive material. This area has historically been serviced by the railroad and this project will reestablish reliable and cost effective service to the businesses and public service entities within the service area, and resumes service to former customers whose businesses have been adversely impacted by the lack of service.

The need for a renewed reliable freight service in Mendocino, Sonoma, Marin, and Napa Counties is apparent by the rapidly growing congestion and truck traffic along U.S. Highway 101 from Willits to Novato, and on CA Highway 37 that connects U.S. Highway 101 in Novato to Interstate Highway 80 in Solano County. The capacity of the highway system to accommodate quick and cost-effective commercial truck traffic has not kept pace with the growth of travel demand in this area, and this trend is expected to continue in the future in spite of several major highway improvement projects that are currently in progress. Reestablishing the rail service will help reduce the truck traffic on the local highways and community roads. Movement of freight on rail is also measurably more fuel efficient than by trucks.



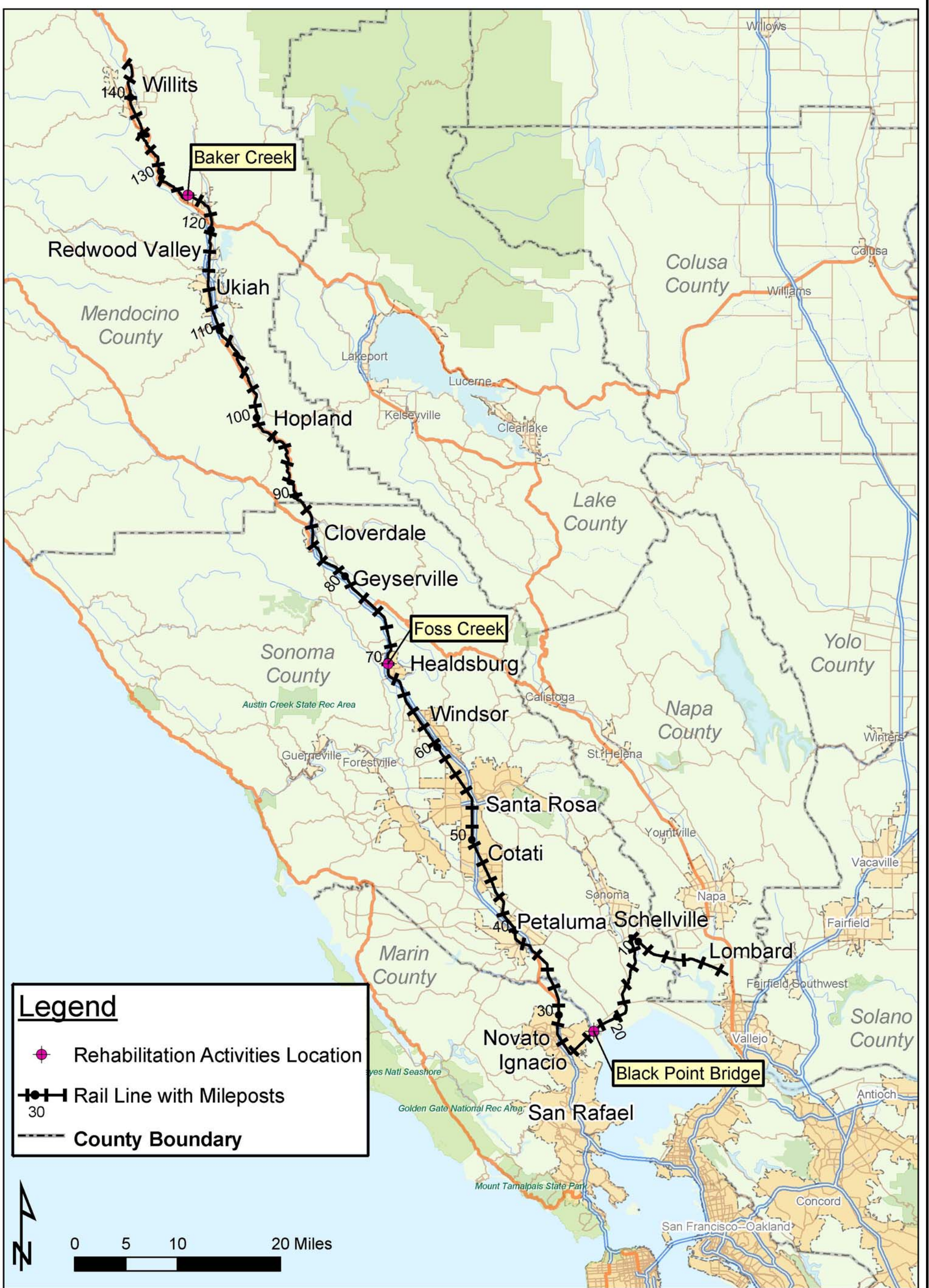
## 1.2 PURPOSE

Pursuant to the California Environmental Quality Act (CEQA) of 1970 (as amended), and California Administrative Code, Title 14, NCRA, the applicant for this proposed project, has prepared a Draft Environmental Impact Report (DEIR). This Air Quality Technical Study was performed to support the DEIR by evaluating the potential project impacts to the air quality. This is intended to show that sufficient consideration has been given to the preservation of air quality in the vicinity of the proposed project.

The study evaluates construction and operational impacts from regulated pollutants including carbon monoxide (CO), nitrogen oxides (NOx), reactive organic gases (ROG), and particulate matter with an aerodynamic diameter of less than 10 micrometers (PM<sub>10</sub>) and less than 2.5 micrometers (PM<sub>2.5</sub>). In addition, emissions of green house gas emission, termed as carbon dioxide equivalents (CO<sub>2e</sub>), were evaluated.

This technical study also addresses potential changes in local pollutant impacts for CO, diesel particulate and acrolein (an element of diesel exhaust).





**Legend**

- Rehabilitation Activities Location
- Rail Line with Mileposts
- County Boundary



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PROJECT LOCATION MAP

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NORTH COAST RAILROAD AUTHORITY  
RUSSIAN RIVER DIVISION  
FREIGHT RAIL PROJECT

**FIGURE**

1-1





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## 2.0 PROJECT DESCRIPTION

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### 2.1 PROPOSED PROJECT OPERATIONS

#### 2.1.1 Frequency and Size of Trains

The proposed project will include general railroad freight service (to and from customers along the line) and potential hauling of solid waste.

A start up phase of reestablishing freight service operation is anticipated to begin in 2008 and will consist of one train with three round trips per week (three north bound and three south bound). The number of cars per train is estimated to be fifteen cars.

As the freight service becomes established, it is anticipated that the economics of the region could support an increase in the number of trains to two round trips per day (two north bound and two south bound), six days a week. The number of cars per train is estimated to be 25 cars for one round trip and 60 cars for the other round trip. The 60-car train would go from Willits to Lombard. The other train would initiate with 10 cars in Willits and increase to up to 25 cars from Redwood Valley to Lombard.

Reestablishing freight service in the region may possibly involve the addition of a train providing solid waste hauling services for the area. Although speculative at this point, the train could run from Santa Rosa to the Cal Northern connection at Lombard. The solid waste services could involve one round trip per day (one north bound and one south bound), six days a week. The number of cars per train is estimated to be 60 cars. The railroad operator could load and unload highway trailers (completely enclosed) that contain solid waste on railroad flat cars using sidings and ramps. Although this potential is speculative, the impacts are being analyzed at this time so that the possible impacts can be considered.

The train size and volumes are based on an analysis by NWP Co., the operator of the rail line. Figure 2-1 provides a diagram of the total train movements associated with both general freight traffic and potential solid waste hauling. These are the train movements that will be analyzed in the DEIR.



## 2.1.2 Facilities

### 2.1.2.1 *Use of Existing NCRA Facilities Located Adjacent to the Railroad*

It is planned that NWP Co. will use some of the existing areas located within their potential rail customers' facilities for the parking of engines and rail cars, switching, and light running maintenance and fueling of diesel engines and support equipment. When necessary, the support equipment for the railroad will be upgraded or revitalized to assure reliability and compliance with current regulations.

If fueling along the line is necessary, it will be conducted by transferring fuel directly from a tanker truck to the railroad diesel locomotives. No above ground or underground storage tanks will be constructed. Tanker trucks will access the line along access roads that are present throughout the line. Fueling will be conducted in compliance with the applicable regulations, the Consent Decree, and in conformance with NWP Co.'s Best Management Practices (BMPs).

Light running maintenance includes minor servicing activities such as brake repair, minor engine repair, oil changes, and other minor scheduled servicing tasks. Servicing activities will involve storage and handling of relatively small amounts of petroleum-based hazardous materials, particularly oil, waste oil, grease, and small amounts of diesel fuel. These materials will be stored, handled, and disposed of in accordance with applicable regulations, and the Consent Decree. Anticipated work plans include a waste management plan (WMP), storm water pollution and prevention plan (SWPPP), and a spill contingency plan.

Locomotives and other heavy equipment will be transported to offsite railroad maintenance facilities for routine and major scheduled and non-scheduled repairs and servicing

### 2.1.2.2 *New Facilities*

Major scheduled and non-scheduled repairs and servicing will be conducted off the proposed project site in existing facilities; therefore, no additional maintenance yards or fueling stations will need to be constructed. Additional sidings are not necessary prior to the start-up of freight service except for the construction of a one mile siding between milepost (MP) 1 and MP 2 to allow interchange with the Cal Northern line near

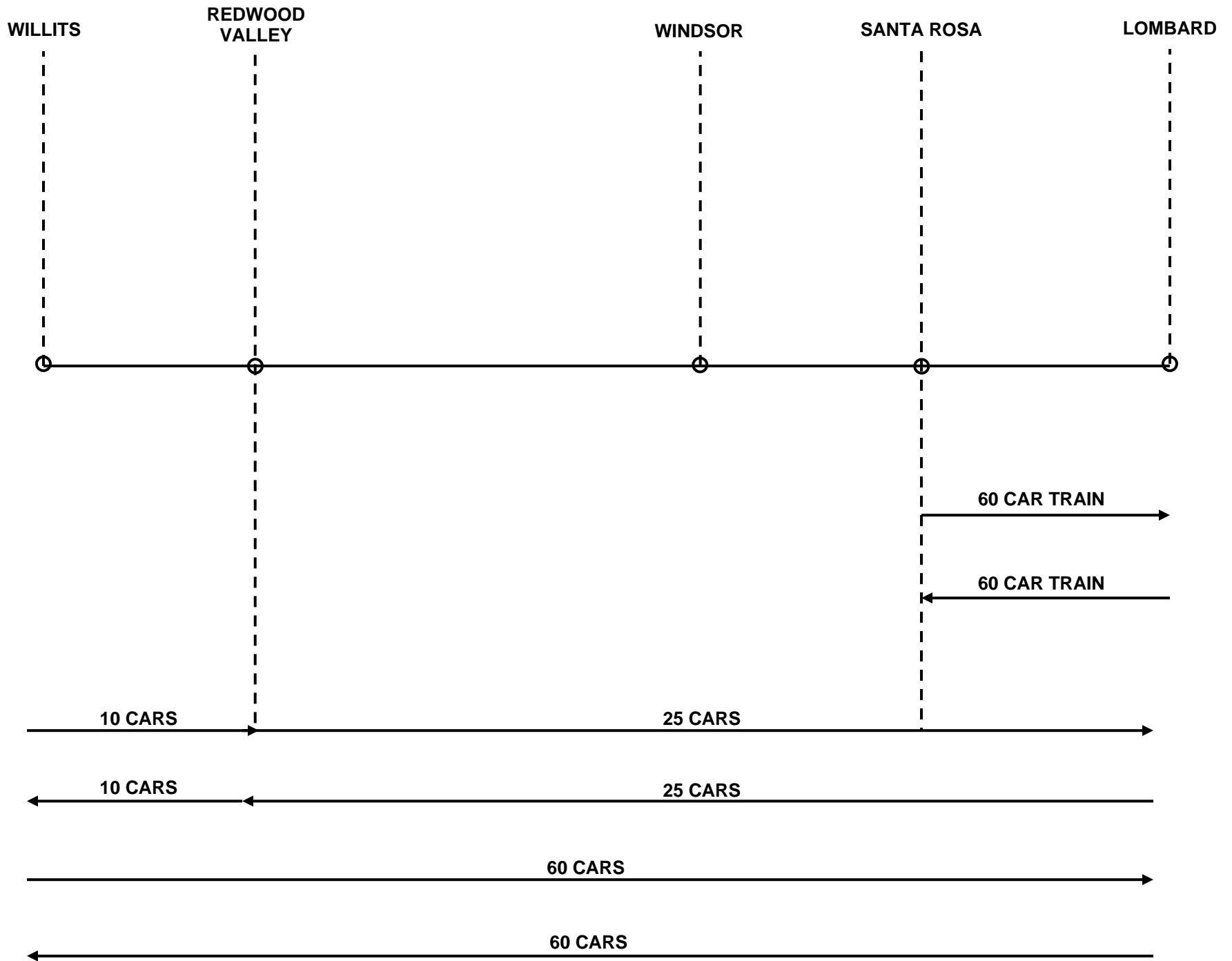


Lombard. It is anticipated that the addition will require permits for the importation of clean fill material by rail, construction of the embankment and rail line, and placement of the drainage box. This document is written assuming that NCRA begins freight service before Sonoma Marin Area Rail Transit (SMART) begins passenger service. If the SMART project is approved and funded, additional sidings to handle train meets would be necessary and are contemplated by SMART and its Environmental Impact Report (EIR).





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**NOTES:**

EACH LINE REPRESENTS A TRAIN

→ DENOTES OUTBOUND

← DENOTES INBOUND

NUMBER OF CARS DENOTES MAXIMUM



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PROPOSED TRAIN MOVEMENT

NORTH COAST RAILROAD AUTHORITY  
RUSSIAN RIVER DIVISION  
FREIGHT RAIL PROJECT

FIGURE

2-1



### 3.0 AIR POLLUTANTS OF CONCERN

#### 3.1 OZONE (O<sub>3</sub>)

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.

#### 3.2 FINE PARTICULATE MATTER (PM<sub>10</sub> AND PM<sub>2.5</sub>)

Particulate matter is typically grouped into two categories, coarse particles from 2.5 to 10 microns (or micrometers) in diameter (PM<sub>10</sub>) and fine particles smaller than 2.5 microns in diameter (PM<sub>2.5</sub>). 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 toxic air contaminant



(see following section on toxic air contaminants). Particulate matter reduces visibility (exists as a haze).

### **3.3 CARBON MONOXIDE (CO)**

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 CO 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, affecting the cardiovascular and nervous system. It also can impair vision, cause dizziness and even lead to unconsciousness or death (CAPCOA, 2007).

### **3.4 TOXIC AIR CONTAMINANTS (TACS)**

As defined by California Air Resources Board (CARB), toxic air contaminants (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 toxic air contaminants 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 the Environmental Protection Agency (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.



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## 4.0 REGULATORY CONTEXT

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### 4.1 FEDERAL REGULATIONS AND RESPONSIBILITIES

National Ambient Air Quality Standards (NAAQS) were established by the U.S. EPA in accordance with the federal Clean Air Act (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<sub>3</sub>), CO, nitrogen dioxides (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), particulate matter (for two sizes: aerodynamic diameters less than ten micrometers [PM<sub>10</sub>] and less than 2.5 micrometers [PM<sub>2.5</sub>]) and lead (Pb). Table 4.1-1 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 toward attainment of these standards is conducted through the EPA, State and regional Air Districts.

### 4.2 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. 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 4.1-1). The CARB and the regional 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 6 (Existing Air Quality).



**Table 4.1-1  
California and National Ambient Air Quality Standards**

Pollutant	Averaging Time	State Standard	Federal Standard
Ozone	1 hour	0.09 ppm	---
	8 hour	0.070 ppm	0.075 ppm
Carbon Monoxide	1 hour	20 ppm	35 ppm
	8 hour	9 ppm	9 ppm
Nitrogen Dioxide	1 hour	0.18 ppm	---
	Annual	0.030 ppm	0.053 ppm
Sulfur Dioxide	1 hour	0.25 ppm	---
	3 hour	---	0.5 ppm <sup>b</sup>
	24 hour	0.04 ppm	0.14 ppm
	Annual	---	0.03 ppm
Particulate Matter (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>
	Annual	20 µg/m <sup>3</sup>	---
Fine Particulate Matter (PM <sub>2.5</sub> )	24 hour	35 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>
	Annual	12 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>
Lead	Monthly	1.5 µg/m <sup>3</sup>	---
	Quarterly	---	1.5 µg/m <sup>3</sup>

Notes: ppm = parts per million; µg/m<sup>3</sup> = micrograms per cubic meter

<sup>a</sup> – The state does not allow rounding to an integer value for this standard.

<sup>b</sup> – The federal standard is a secondary standard (no primary standard exists).

<sup>c</sup> – The federal PM<sub>10</sub> standard has been revoked, effective December 17<sup>th</sup>, 2007.

### 4.3 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 1-1). The NCAB encompasses the northern half of Sonoma County (north of Windsor), Mendocino and several other counties. The Northern Sonoma County Air Pollution Control District (NSCAPCD) regulates emissions in the southern portion of the North Coast Air Basin (within the northern portion of Sonoma County). The Mendocino County Air Quality Management District (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 Bay Area Air Quality Management District (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<sub>10</sub> 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.

#### 4.4 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<sub>10</sub> standard.

The Regional air quality plans required to be developed for and submitted to the EPA under the federal CAA are called SIP's; SIP's 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 North Coast Air Basin is in attainment for all pollutants other than the state PM<sub>10</sub> standard; therefore, it is not required to have an air quality plan.
- The Bay Area Air Basin is a non-attainment area for the federal eight-hour ozone standard. The Bay Area Air Basin 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 Committee (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 subject 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, this project falls in line with the aims of the BAAQMD's Ozone Strategy documents.

#### **4.5 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 1993, EPA promulgated the Transportation Conformity Regulations, which apply to highways and mass transit. Then, on November 30 1993, 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 project will require an action of a federal transportation agency but is not a major source of regulated air emissions. As a result, the conformity rules are not applicable for the proposed project. However, the project will still conform to the air quality goals by meeting the applicable air district rules.

#### **4.6 DIESEL REGULATIONS**

In 1998, after a 10-year scientific assessment process, CARB identified diesel exhaust particulate as a 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 ppm by 2012. The reduction in sulfur emissions will enable the application of modern pollution control technology to locomotives.

The proposed project would utilize locomotives that operate on a three-engine platform with smaller diesel engines capable of meeting the Tier III off-road standards and allow for engine shut down during low load use. Because the Tier III 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.



## 5.0 METEOROLOGY AND TOPOGRAPHY

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### 5.1 OVERVIEW

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 topography and meteorology. 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.

### 5.2 TOPOGRAPHY

The topography within the 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 project lies within the central and southern portions of the North Coast Air Basin and the northern portion of the San Francisco Bay Area Air Basin. The northern portion of the proposed project corridor 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.

### 5.3 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).

#### **5.4 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.



## 5.5 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 coastal wind flows 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.



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## 6.0 EXISTING AIR QUALITY

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### 6.1 EXISTING AIR QUALITY LEVELS

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. The NSCAPCD has limited monitoring stations in Healdsburg, Cloverdale, Ukiah, and Willits. Data collected from the monitoring stations from 2004 through 2006 were used as an estimate of background air quality concentrations (CARB, 2004-2006). Table 6.1-1 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<sub>10</sub> 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<sub>10</sub> and PM<sub>2.5</sub> 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<sub>10</sub> 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 6.1-1  
Summary of Air Quality Monitoring Data for the Study Area, 2004-2006**

	State Standard	Federal Standard	Pollution Concentration by Year		
			2004	2005	2006
<b>Ozone</b>					
Highest 1-hour average, ppm Days over State Standard	0.09	NA	<b>0.104</b> 1	0.091 0	0.096 0
Highest 8-hour average, ppm Days over State/Federal Standard	0.070	0.08	0.077 2/0	0.070 1/0	0.072 1/0
<b>Carbon Monoxide</b>					
Highest 1-hour average, ppm Days over State/Federal Standard	20.0	35	4.0 0/0	3.9 0/0	NA 0/0
Highest 8-hour average, ppm Days over State/Federal Standard	9.0	9	3.4 0/0	3.1 0/0	2.9 0/0
<b>Nitrogen Dioxide</b>					
Highest 1-hour average, ppm Days over State Standard	0.25	NA	0.056 0	0.070 0	0.055 0
Highest annual average, ppm Exceeds Standard	NA	0.053	0.012 No	0.011 No	0.012 No
<b>Particulate Matter (PM<sub>10</sub>)</b>					
Highest 24-hour average, µg/m <sup>3</sup> Days over State/Federal Standard	50	150	<b>51.4/50.8</b> 1/0	<b>52.3/49.4</b> 1/0	33.0/31.0 0/0
Highest annual average, µg/m <sup>3</sup> Exceeds State/Federal Standard	20	Revoked	19.6/18.9 No/No	16.4/16.8 No/No	NA/14.5 No/No
<b>Particulate Matter (PM<sub>2.5</sub>)</b>					
Highest 24-hour average, µg/m <sup>3</sup> Days over Standard	35	35	39.7 0	43.8 0	25.4 0
Highest annual average, µg/m <sup>3</sup> Exceeds State/Federal Standard	12	15	11.1 No/No	9.7 No/No	NA 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<sub>10</sub>, and PM<sub>2.5</sub>
- Vallejo – ozone, carbon monoxide, nitrogen dioxide, PM<sub>10</sub>, and PM<sub>2.5</sub>

**North Coast Air Basin Monitoring Stations:**

- Cloverdale – PM<sub>10</sub>
- Healdsburg (Matheson Street) – PM<sub>10</sub>
- Healdsburg (Municipal Airport) – ozone
- Ukiah (Gobbi Street) – ozone, carbon monoxide, and nitrogen dioxide
- Ukiah (County Library) - PM<sub>10</sub> and PM<sub>2.5</sub>
- Willits (Main Street) – ozone, carbon monoxide, and nitrogen dioxide
- Willits (Firehouse) – PM<sub>10</sub>



## 6.2 EXISTING POLLUTANT SOURCES

A variety of sources exist throughout the 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 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.

## 6.3 AIR POLLUTION SENSITIVE LAND USES

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. The identified nearby sensitive receptors are summarized in Appendix A.



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. Details of this evaluation approach and results are provided in Sections 9 and 10.



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## 7.0 SIGNIFICANCE THRESHOLDS

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### 7.1 OVERVIEW

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 proposed 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.

### 7.2 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 and regional plans.



### 7.2.1 Project Construction

Construction-related emissions are generally short-term in duration, but may still cause adverse air quality impacts. Fine particulate matter (PM<sub>10</sub>) is the pollutant of greatest concern with respect to construction activities. PM<sub>10</sub> 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<sub>10</sub>. 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<sub>10</sub> 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<sub>10</sub> 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.

### 7.2.2 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 toxic air contaminants:

1. Local CO Concentrations. Localized CO 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 parts per million (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 7.1-1. 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 7.1-1 would be considered to have a significant air quality impact.

**Table 7.1-1  
BAAQMD Thresholds of Significance  
for Project Operations**

Pollutant	ton/yr	lb/day	kgm/day
ROG	15	80	36
NO <sub>x</sub>	15	80	36
PM <sub>10</sub>	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. TACs. Any project with the potential to expose sensitive receptors (including residential areas) or the general public to substantial levels of toxic air contaminants would be deemed to have a significant impact. This applies to receptors locating near existing sources of toxic air contaminants, as well as sources of toxic air contaminants locating near existing receptors.

Proposed development projects that have the potential to expose the public to toxic air contaminants 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.



The BAAQMD thresholds of significance for toxic air contaminants include:

- a. Probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in one million.
  - b. Ground-level concentrations of non-carcinogenic toxic air contaminants 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 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 acutely hazardous materials (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.)

### 7.2.3 General and 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.

### 7.3 NSCAPCD CEQA THRESHOLDS

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

#### 7.3.1 Project Construction

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

#### 7.3.2 Project Operations

The following project operational thresholds were also provided verbally by an NSCAPCD representative and are consistent with the New Source Review significance thresholds.

**Table 7.2-1  
NSCAPCD Thresholds of Significance  
for Project Operations**

<b>Pollutant</b>	<b>ton/yr</b>
ROG	40
NO <sub>x</sub>	40
CO	100
PM <sub>10</sub>	15

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

### 7.4 MCAQMD CEQA THRESHOLDS

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



#### 7.4.1 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 miles per hour (mpg) 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 prepared, 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 refurbishment of existing track, this requirement may or may not apply. Regardless, best management practices for emission reduction will be employed as appropriate for construction activities.

#### 7.4.2 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 7.3-1, 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 7.3-1  
MCAQMD Thresholds of Significance  
for Project Operations**

<b>Pollutant</b>	<b>lb/day</b>
ROG	180
NOx	42
CO	690
PM <sub>10</sub>	80

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



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## 8.0 CONSTRUCTION EMISSIONS AND IMPACTS

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### 8.1 OVERVIEW

Emissions of air pollutants from construction activities may be generated from several activities. The most common sources of emissions include construction equipment exhaust, mechanical disturbances, and wind blown dust. These are generally short term or intermittent in nature and therefore would not be expected to have long term impacts. Potential construction emissions of particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) would be generated in the greatest quantity and are a primary concern since it could cause short term annoyances to members of the public. Exhaust emissions of ozone precursors (NO<sub>x</sub> and ROG) are also of concern since portions of the region for which the proposed project will be located have been challenged in maintaining ozone attainment (e.g., the southern portion of the Bay Area Air Basin). Localized CO or diesel exhaust impacts are also considered.

### 8.2 METHODOLOGY

The BAAQMD, NSCAPCD and MCAPCD all recommend that construction emissions be addressed qualitatively rather than quantifying the emissions and ambient air concentrations. This qualitative approach places an emphasis on identifying and implementing an adequate abatement program. The air districts consider construction emission to be insignificant for a project if adequate abatement procedures are in place. The BAAQMD provides a list of recommended measures to minimize emissions during construction that will be used as a basis for mitigation for NCRA's construction activities as applicable.

### 8.3 IMPACTS

The proposed project will be using existing track for the majority of the project. The rail line will go through a rehabilitation process to restore the rail line to Class 2/3 safety standards and inspection and maintenance procedures will be implemented to maintain the rail line to Class 2/3 safety standards. In the areas of the rehabilitation, the construction-related activities and equipment would include diesel operated vehicles and disturbed surfaces. Impacts will be minimal due to the short duration of time needed to repair the track. The construction activities will be mitigated according to the



Basic Control Measures detailed in the BAAQMD's CEQA Guidelines document (BAAQMD, 1999) which would qualify the potential construction impacts as less than significant.



## 9.0 OPERATIONAL EMISSIONS AND IMPACTS

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### 9.1 OVERVIEW

The evaluation of operational air quality impacts of the proposed project are based on the affects of freight train operations within the proposed project area. This includes 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 proposed project area that will be displaced by the train operations, and support operations and equipment. The emissions were quantified for the proposed project and have been subtotaled by 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 year 2008);
- “Current” Project at full operation (2009); and
- “Future” Project at full operation (2033).

The impacts of the proposed project compared to existing and future no project conditions have also been evaluated. Based on the proposed project impacts, mitigation strategies were then assessed.

### 9.2 METHODOLOGY

Each source of emissions was separately evaluated for each operating scenario using applicable procedures for quantifying the emissions. Appendix B provides the detailed calculations and overall emission summaries. A description of the emission quantification and basis for each source type and operating scenario follows.

#### 9.2.1 Motor Vehicle Emissions

Emissions of CO, NO<sub>x</sub>, ROG, CO<sub>2</sub>, PM<sub>2.5</sub>, and PM<sub>10</sub> from motor vehicles in the proposed project area in the current startup, full operation and future year (25 years out) were calculated using the CARB approved emission factor model EMFAC2007. The model was run for each operating year assessed to account for the variation in vehicle fleet mix and emission factors since the model assumes vehicle emissions improve in



the future. The model was also run separately 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 CO and ozone emissions (i.e., winter and summer conditions respectively). Temperature values used were based on the maximum average winter and summer temperature records obtained from the Western Regional Climate Center. A summary of the temperature data is provided with the emission calculations in Appendix B.

The EMFAC2007 model was completed separately for assessing displaced trucks and overall vehicles affected by train crossings (queued traffic) since the traffic mix for displaced trucks is different than for queued traffic at the crossings. As a result, the displaced truck emission factors were limited to heavy duty trucks since only heavy duty trucks will be displaced and the queued traffic emission factors were based on the entire vehicle fleet mix (per the model defaults by region) since the traffic queued at a crossing can be any kind of vehicle. The EMFAC2007 output files for displaced trucks are provided in Appendix C-1 and for traffic queuing in Appendix C-2. Table 9.2-1 summarizes the emission factors for displaced trucks by year and air basin.

**Table 9.2-1  
EMFAC2007 Emission Factors for Displaced Trucks**

Air Basin	Bay Area Air Basin			North Coast Air Basin		
	2008	2009	2033	2008	2009	2033
Pollutant	gr/mi	gr/mi	gr/mi	gr/mi	gr/mi	gr/mi
ROG	8.04E-01	7.55E-01	1.88E-01	7.71E-01	7.19E-01	1.84E-01
CO	5.56E+00	5.16E+00	1.23E+00	5.57E+00	5.08E+00	1.21E+00
NOx	1.46E+01	1.36E+01	1.85E+00	1.40E+01	1.30E+01	1.73E+00
SOx	1.60E-02	1.60E-02	1.60E-02	1.60E-02	1.60E-02	1.60E-02
PM <sub>10</sub>	5.06E-01	4.66E-01	8.50E-02	5.17E-01	4.72E-01	8.30E-02
PM <sub>2.5</sub>	4.65E-01	4.29E-01	7.80E-02	4.75E-01	4.34E-01	7.60E-02
CO <sub>2</sub>	1.63E+03	1.63E+03	1.69E+03	1.67E+03	1.67E+03	1.69E+03
CH <sub>4</sub>	4.30E-02	4.00E-02	1.00E-02	3.80E-02	3.50E-02	9.00E-03

Notes: Based on Heavy Duty Trucks.

The displaced trucks emission factors are based on traveling emissions at an average estimated speed of 45 miles per hour. This rate of speed was chosen since EMFAC generally predicts higher emissions at higher and lower speeds. Emission reductions from truck idling, traveling on secondary roads (local congestion), start-up, hot soak,





etc. were not evaluated. Based on these considerations, the quantification of displaced truck emission factors is considered to be conservative since not all aspects of truck operations were evaluated.

The traveling truck emission factors derived from EMFAC2007 were then multiplied by the equivalent haul distance along the freight corridor and the number of displaced trucks to estimate the total emissions that would be offset by hauling freight by train. Because the rail line is generally paralleled by highways, the travel distance for trucks were considered to be the same as the trains. The number of displaced trucks were based on dividing the load weight of the train cars by 24 tons (typical “heavy duty” truck load capacity). For merchandise, this is estimated to be 4 trucks per one train car. For solid waste, the trains will haul the truck trailers directly at a 1 to 1 ratio per train car.

Table 9.2-2 summarized the resulting emission factors for queued traffic by study year, vehicle type and air basin.

**Table 9.2-2  
EMFAC2007 Emission Factors for Traffic Queuing**

Air Basin	Bay Area Air Basin			North Coast Air Basin		
Year	2008	2009	2033	2008	2009	2033
Pollutant	gr/idle-hr	gr/idle-hr	gr/idle-hr	gr/idle-hr	gr/idle-hr	gr/idle-hr
ROG	6.88E-01	6.22E-01	4.80E-01	1.47E+00	1.44E+00	1.11E+00
CO	4.15E+00	3.81E+00	3.30E+00	8.45E+00	8.43E+00	7.29E+00
NOx	3.69E+00	3.61E+00	3.50E+00	8.37E+00	7.29E+00	7.29E+00
SOx	3.00E-03	3.00E-03	3.00E-03	6.00E-03	5.00E-03	5.00E-03
PM-10	5.50E-02	5.80E-02	1.90E-02	1.33E-01	2.60E-02	2.60E-02
PM-2.5	5.10E-02	5.30E-02	1.80E-02	1.23E-01	2.40E-02	2.40E-02
CO2	2.94E+02	2.84E+02	2.64E+02	6.28E+02	5.33E+02	5.33E+02
CH4	3.00E-02	3.00E-02	2.30E-02	6.50E-02	4.80E-02	4.80E-02

Note: Based on “idling” emissions. Previous versions of EMFAC did not provide “idling” emissions in which 2.5 mph speed was recommended. However, since EMFAC2007 estimates idling emissions, these were used instead.

For queued traffic, the EMFAC2007 emission factors were based on idling emissions and multiplied by the overall idling period for all affected traffic that would be queued at each crossing. The queue times by crossings differ based on train speed, length, and traffic volumes. The traffic volumes are based on the traffic analysis of the top 25 affected intersection conducted by Dowling Associates (Dowling Technical



Memorandum Dated May 2008). Calculations showing the delay times by crossing, traffic volumes and total queuing time are provided in Appendix B.

9.2.2 Freight Train Locomotive Emissions

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 the N-Viromotive (or similar) multi-engine platform that meet the Tier III off road standards (see Appendix D). The emissions were quantified by multiplying the power ratings, operating times, and emission rates for each train. The trains will operate in two modes: travel mode and idling mode. For each mode, as applicable, the hours of operation were calculated based upon travel distances and speeds or idling periods. The power ratings are based on load, grade and speed requirements. The emission rates are based on manufacturer data where available, mass balance (SO<sub>2</sub>) based on fuel standards, and the California Climate Action Registry General Reporting Guidelines for diesel combustion (CO<sub>2</sub>).

9.2.2.1 Travel Mode

The NCRA trains will travel from various starting and ending points depending on the type of freight being hauled. For purposes of calculating the air emissions, the overall operations were divided into a total of four train configurations based on destination (actual operations is a total of 3 trains) and freight type (general merchandise or solid waste). Table 9.2-3 summarizes the trains and destinations for start up, current full operations and future full operations:

**Table 9.2-3  
Freight Train Operations Basis**

Train # Configuration	Operating Cities	Max. Train Size and Type	Trips/Day /Week	Ave. Engine Load (Full)	Ave. Engine Load (empty)
<b>Start-up Operation</b>					
1	Lombard to Windsor	10-car Merchandise	1/3	60%	40%
<b>Full Operation</b>					
1	Redwood to Willits	10-car Merchandise	1/6	60%	40%
2	Lombard to Redwood	25-car Merchandise	1/6	60%	40%
3	Lombard to Willits	60-car Merchandise	1/6	70%	25%
4	Lombard to Santa Rosa	60-car Solid Waste	1/6	60%	40%



Emissions were quantified for all four trains based on the locomotive load factor, maximum allowable travel speeds and manufacturer emission rates where available.

#### 9.2.2.2 *Idling Mode*

When SMART operations start up there is a possibility that freight trains may encounter commuter trains. When NCRA freight trains will encounter commuter trains, they will pull off at sidings to allow a pass-by. A single pass-by is expected to only last a few minutes but not more than 15 minutes in duration. During this time, the NCRA locomotive will be operated in an idling mode. At idling mode, the locomotive engine set will operate at the lowest throttle notch setting which would result in two of the three engines shutting down and the third engine operating at a 2.1% load rating. The resulting emissions would be significantly lower than idling all three engines, or operating a conventional locomotive with a single large engine, since a smaller total engine displacement consumes less fuel (resulting in lower emissions). This would be expected to reduce potential health risks from diesel particulate matter on sensitive receptors near the location of the sidings where idling would occur.

The emissions during idling were quantified by assuming the locomotive would idle at the sidings for a maximum of 15 minutes in which only one of the three engines are running at idle mode. As a conservative evaluation, it was assumed that an NCRA train would have to allow up to 5 passes for each direction of travel where SMART trains could be encountered. Detailed calculations using these assumptions are provided in Appendix B.

#### 9.2.2.3 *Switching Mode*

Train car switching will be conducted at existing facilities by existing locomotives. The NCRA trains will not be used for switching purposes. They will only pick up and drop off freight cars at the locations of facilities for purposes of moving materials along the railroad corridor. Therefore, switching mode emission calculations are not considered applicable for this study.



### 9.2.3 Support Equipment Emissions

#### 9.2.3.1 *Solid Waste Loading and Unloading Facilities*

Rail transport of solid waste within the southern portion of the project area is being proposed as part of the reasonably foreseeable project operations. Solid waste is currently transported in enclosed trailers by trucks on local roads and highways. The rail transport would utilize the same enclosed truck trailers by placing them on flat cars designed to transport truck trailers.

NWP Co. has not entered into a contractual agreement with the County in regards to a solid waste loading and unloading facility. However, in order to make this air analysis conservative, the following scenario was assumed and incorporated into the quantification of the proposed project emissions.

It was assumed that two sidings would be utilized for loading and offloading the solid waste containers. Half of the 60 car train would be set-out at each siding (e.g. 30 cars per siding). The 30 cars would then be broken into two cuts where a portable ramp will be moved against each cut. A small yard tractor will back up to the ramps, couple on to the trailers, and drive them off the train to an adjacent marshalling yard from where they would be distributed to the various Sonoma County transfer stations. The cars and ramps would remain in their positions throughout the day until the departing train arrives, with the cars having been reloaded as loaded trailers become available.

The yard tractors would not operate continuously, but as needed based on availability of trailers and movement needs. As a conservative estimate, it is assumed the yard tractors operate for 5 minutes for each trailer moved. Emission factors for a general purpose utility tractor, as provided in the South Coast Air Quality Management District (SCAQMD) CEQA guidance, were used as a basis for calculating the emissions (provided in Appendix B). These emissions will only occur within the BAAQMD since that is where the solid waste transfer stations will be served.

#### 9.2.3.2 *General Support Equipment*

Additional equipment may be utilized to support operations. These may include maintenance vehicles/equipment, forklifts, and other medium to heavy sized equipment. The use of this support equipment is generally non-routine and occurs for a short



duration. Therefore, the affects of non-routine support equipment are expected to be insignificant.

### 9.3 IMPACTS

The air quality impacts from the proposed project operations are found to be a net benefit to the regional air quality for each year of study. Tables 9.3-1, 9.3-2 and 9.3-3 show the resulting emissions by air district compared to the corresponding air district's significance thresholds for start-up (2008), first year of full operation (2009) and future operations 25 years from start-up (2033).



**Table 9.3-1  
Start-up (2008)  
Emission Summary by Air District**

Pollutant	lbs/day				Thresholds of Significance	
	Start up Train	Traffic Queue	Displaced Truck Travel	Total	lb/day	%of Threshold
<b>BAAQMD Operations</b>						
<b>Criteria Pollutant Emissions</b>						
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
<b>Toxics Emissions</b>						
Diesel PM	3.521	0.003	5.613	-2.089	NA	NA
<b>Green House Gas Emissions</b>						
CH4	0.028	0.002	0.477	-0.447	NA	NA
CO2	5268.923	17.144	18042.194	-12756.127	NA	NA
CO <sub>2</sub> -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	%of Threshold
<b>Criteria Pollutant Emissions</b>						
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
<b>Toxics Emissions</b>						
Diesel PM	0.275	0.000	0.438	-0.163	NA	NA
<b>Green House Gas Emissions</b>						
CH4	0.002	0.000	0.037	-0.035	NA	NA
CO2	410.976	1.337	1407.291	-994.978	NA	NA
CO <sub>2</sub> -e	411.022	1.340	1408.072	-995.710	NA	NA



**Table 9.3-2  
Current Full Operations (2009)  
Emission Summary by Air District**

Pollutant	lbs/day				Thresholds of Significance	
	Train Total	Traffic Queue Total	Total Disp Truck Travel	Total	lb/day	%of Threshold
<b>MCAQMD Operations</b>						
<b>Criteria Pollutant Emissions</b>						
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
<b>Toxics Emissions</b>						
Diesel PM	1.633	0.002	33.826	-32.191	NA	NA
<b>Green House Gas Emissions</b>						
CH4	0.060	0.004	2.508	-2.445	NA	NA
CO2	11168.71 2	42.048	120008.90 0	-108798.140	NA	NA
CO <sub>2</sub> -e	11169.96 2	42.128	120061.57 4	-108849.484	NA	NA
<b>NSCAPCD Operations</b>						
<b>Criteria Pollutant Emissions</b>						
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
<b>Toxics Emissions</b>						
Diesel PM	0.088	0.000	2.299	-2.211	NA	NA
<b>Green House Gas Emissions</b>						
CH4	0.003	0.000	0.171	-0.167	NA	NA
CO2	602.254	3.742	8157.723	-7551.727	NA	NA
CO <sub>2</sub> -e	602.321	3.749	8161.303	-7555.233	NA	NA



**Table 9.3-2 (Continued)  
Current Full Operations (2009)  
Emission Summary by Air District**

Pollutant	lbs/day				Thresholds of Significance	
	Train Total	Traffic Queue Total	Total Disp Truck Travel	Total	lb/day	%of Threshold
<b>BAAQMD Operations</b>						
<b>Criteria Pollutant Emissions</b>						
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
<b>Toxics Emissions</b>						
Diesel PM	3.264	0.042	49.507	-45.918	NA	NA
<b>Green House Gas Emissions</b>						
CH4	0.119	0.025	4.250	-3.840	NA	NA
CO2	22326.44 6	243.259	173520.38 1	-101150.776	NA	NA
CO <sub>2</sub> -e	22328.94 5	243.684	173609.62 1	-101231.417	NA	NA
Pollutant	tons/year				Thresholds of Significance	
	Train Total	Traffic Queue Total	Total Disp Truck Travel	Total	tons/year	%of Threshold
<b>Criteria Pollutant Emissions</b>						
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
<b>Toxics Emissions</b>						
Diesel PM	0.509	0.007	7.723	-7.163	NA	NA
<b>Green House Gas Emissions</b>						
CH4	0.019	0.004	0.663	-0.599	NA	NA
CO2	3482.926	37.933	27069.179	-15779.521	NA	NA
CO <sub>2</sub> -e	3483.315	38.015	27083.101	-15792.101	NA	NA





**Table 9.3-3  
Future Full Operations (2033)  
Emission Summary by Air District**

Pollutant	lbs/day				Thresholds of Significance	
	Train Total	Traffic Queue Total	Total Disp Truck Travel	Total	lb/day	%of Threshold
<b>MCAQMD Operations</b>						
<b>Criteria Pollutant Emissions</b>						
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
<b>Toxics Emissions</b>						
Diesel PM	1.633	0.003	5.948	-4.312	NA	NA
<b>Green House Gas Emissions</b>						
CH4	0.060	0.006	0.645	-0.580	NA	NA
CO2	11168.712	63.105	120985.62 1	-109753.804	NA	NA
CO <sub>2</sub> -e	11169.962	63.224	120999.16 6	-109765.979	NA	NA
<b>NSCAPCD Operations</b>						
<b>Criteria Pollutant Emissions</b>						
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
<b>Toxics Emissions</b>						
Diesel PM	0.088	0.000	0.404	-0.316	NA	NA
<b>Green House Gas Emissions</b>						
CH4	0.003	0.001	0.044	-0.040	NA	NA
CO2	602.254	6.076	8224.116	-7615.786	NA	NA
CO <sub>2</sub> -e	602.321	6.088	8225.037	-7616.628	NA	NA



**Table 9.3-3 (Continued)  
Future Full Operations (2033)  
Emission Summary by Air District**

Pollutant	lbs/day				Thresholds of Significance	
	Train Total	Traffic Queue Total	Total Disp Truck Travel	Total	lb/day	%of Threshold
<b>BAAQMD Operations</b>						
<b>Criteria Pollutant Emissions</b>						
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
<b>Toxics Emissions</b>						
Diesel PM	3.264	0.028	9.030	-5.456	NA	NA
<b>Green House Gas Emissions</b>						
CH4	0.119	0.034	1.062	-0.644	NA	NA
CO2	22326.446	5604.469	179240.665	-101509.750	NA	NA
CO <sub>2</sub> -e	22328.945	5605.176	179262.975	-101523278	NA	NA
Pollutant	tons/year				Thresholds of Significance	
	Train Total	Traffic Queue Total	Total Disp Truck Travel	Total	tons/year	%of Threshold
<b>Criteria Pollutant Emissions</b>						
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
<b>Toxics Emissions</b>						
Diesel PM	0.509	0.004	1.409	-0.851	NA	NA
<b>Green House Gas Emissions</b>						
CH4	0.019	0.005	0.166	-0.100	NA	NA
CO2	3482.926	61.884	27961.544	-16647.935	NA	NA
CO <sub>2</sub> -e	3483.315	61.994	27965.024	-16650.045	NA	NA



The analysis shows that the affects of displacing existing truck traffic with the type of locomotives proposed for the full operating scenarios results in a net decrease in emissions. This is due to utilizing the multi-engine platform for the planned freight locomotive that meets Tier III 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 since 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.



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## 10.0 LOCALIZED CO IMPACT ANALYSIS

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### 10.1 OVERVIEW

Localized CO 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 the existing or future traffic by causing additional queuing delays at grade crossings or nearby intersections next to the crossings. Although the affected vehicle emissions are not expected to exceed 550 pounds per day, the LOS has not been defined at railroad crossings. As a result, the potential CO impacts were further assessed.

### 10.2 METHODOLOGY

The potential CO impacts were assessed by conducting a hot spots analysis on the intersection with the greatest traffic delay from the project as identified in the traffic study conducted by Dowling Associates (Dowling Technical Memorandum, May 2008). The CAL3QHC model was used to quantify the CO concentrations. Since CAL3QHC addresses free flow and queuing traffic, but normal free flow traffic already exists without the trains, only the queuing traffic were assessed.

The calculated grade crossing delays provided in the traffic study were used to derive a worst case combination of operations causing the greatest amount of theoretical traffic delay. This is based on an intersection along SR 12/121 Carneros Highway in Sonoma, California where the track curves and crosses the highway twice. Because of this configuration, the total delay time was considered to be the time the crossing guard closes at the first crossing and when the crossing guard opens after the trains has passed the second crossing. The total delay time for all the vehicles were based on the peak 15-minute traffic volumes. Therefore, assuming the peak traffic volume theoretically occurs at any time a train passes is conservative. In addition, because three different trains may be operating in this area, it was further conservatively assumed that all three crossed in the same hour of time (one after the other), resulting in a worst case theoretical impact on traffic that was then modeled to estimate CO concentrations.



The 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. See Appendix E for the Cal3QHC CO hot spot modeling files and outputs.

### 10.3 IMPACTS

The proposed 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 Dowling Technical Memorandum (May, 2008) shows that project operations will not add substantially to the localized traffic delays or lower the level of service. An evaluation of the emission concentrations for the worst case intersection for current and future project operations indicates that the ambient 1-hour CO concentrations will be approximately 0.6 milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ). With a 1-hour background concentration of 4 parts per million (ppm) or  $4.58 \text{ mg}/\text{m}^3$  at standard temperature and pressure, the total CO concentration is approximately  $5.2 \text{ mg}/\text{m}^3$ . The 8-hour concentration was estimated by factoring the 1-hour concentration by a persistence factor of 0.7 to get a value of 460 micrograms per cubic meter. With an 8-hr background of 3.9 ppm ( $4.47 \text{ mg}/\text{m}^3$ ) was added to get a total 8-hour CO concentration value of approximately 4,500 micrograms per cubic meter. Both the estimated 1-hour and 8-hour CO concentrations are well below the California state and USEPA federal standards. Table 10.3-1 summarizes the results compared with the standards. Because the worst case combination of operations on traffic delay was assessed, it is unlikely that the proposed project will cause a violation of the CO standards or have substantial contributions to a future violation.

**Table 10.3-1  
Summary of CO impacts**

<b>Averaging Time</b>	<b>Concentration (<math>\text{mg}/\text{m}^3</math>)</b>	<b>Background (<math>\text{mg}/\text{m}^3</math>)</b>	<b>Total (<math>\text{mg}/\text{m}^3</math>)</b>	<b>CAAQS (<math>\text{mg}/\text{m}^3</math>)</b>	<b>NAAQS (<math>\text{mg}/\text{m}^3</math>)</b>
1-hr	0.60	4.6	5.2	23	40
8-hr	0.45	4.5	5.0	10	10



## 11.0 TOXIC AIR CONTAMINANT IMPACT ANALYSIS

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### 11.1 OVERVIEW

Toxic air contaminant emission impacts on sensitive receptors was evaluated. The impacts from diesel particulate matter and acrolein are of primary concern since they have low thresholds of risk.

### 11.2 METHODOLOGY

To address concerns on diesel particulate matter and acrolein 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 (REL). These compounds are a concern for chronic affects from long term exposure (lifetime). Acrolein also has an acute affect that was evaluated. The ISCST3 model was utilized for the evaluation for traveling and idling trains. Appendix F includes the model files.

A review of nearby sensitive receptors was conducted for receptors within  $\frac{1}{4}$  mile of the operations or emission sources. A full list of all receptors identified is provided in Appendix A. Because of the number of sensitive receptors along the railroad, a distance based evaluation was conducted rather than receptor specific modeling.

For traveling trains, this was done by arranging a  $\frac{1}{4}$  mile section of track with a grid of receptors along both sides extending out to  $\frac{1}{4}$  mile. This arrangement of source and receptor locations was then modeled for 4 directional configurations; north to south, east to west, northeast to southwest and northwest to southeast. This was then modeled with ISC using met data for three cities along the route with the maximum number of train operations (between Lombard and Santa Rosa where there is an overlap in three of the four train configurations). This combination was evaluated to confirm the maximum potential impacts were identified without bias from the location of the receptor or direction of travel which can be influenced by the meteorology. This approach is more critical of long term impacts due to the regional meteorological conditions and source receptor locations.

For idling trains, a point source was used to evaluate the exhaust stack of the train engine as it sits in idle at a single location. A grid of receptors surrounding this point



source was applied to evaluate the impacts surrounding the location of an idling train. The meteorological data set found to result in the worst case impact for traveling trains was then applied. It was assumed the trains would idle at a single location for 15 minutes per pass twice a day for each train for a total of 90 minutes of idling at a single location. This was then annualized by multiplying by 6 days of operation a week and 52 weeks a year for a total of 468 annual idling hours per siding. Detailed calculations are provided in Appendix B.

### 11.3 IMPACTS

Impacts from toxic air contaminants on nearby sensitive receptors was also found to be less than significant for both traveling and idling trains. Table 11.3-1 summarizes the impacts. As shown the impacts result in a Hazard Index less than 1 (acrolein) and a risk of cancer of less than 10 in a million (diesel particulate) for any location and combination of operations beyond 30 feet. No receptors less than 30 feet were identified; therefore, it is concluded that the toxic impacts are less than significant.

**Table 11.3-1  
Toxic Air Contaminant Risk Summary**

Compound	Averaging Time	Maximum Concentration (µg/m <sup>3</sup> )	Cancer Unit Risk (µg/m <sup>3</sup> ) <sup>-1</sup>	Cancer Risk (per million)	REL (µg/m <sup>3</sup> )	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





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## 12.0 ODORS

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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 3<sup>rd</sup> 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 would not present a significant impact.



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## 13.0 CUMULATIVE IMPACTS

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### 13.1 OVERVIEW

A cumulative impact is created as a result of the combination of the project evaluated in an EIR together with other projects causing related impacts. The purpose of this analysis is to disclose significant cumulative impacts resulting from proposed project in combination with other projects or conditions, and to indicate the severity of the impacts and their likelihood of occurrence. The CEQA Guidelines require that EIRs discuss the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable," meaning that the project's incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects. CEQA Guidelines Sections 15130(a) and (b) state:

- a. An EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable, as defined in Section 15065(c). Where a Lead Agency is examining a project with an incremental effect that is not "cumulatively considerable," a Lead Agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.
  - As defined in Section 15355, a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. An EIR should not discuss impacts which do not result in part from the project evaluated in the EIR.
  - When the combined cumulative impact associated with the project's incremental effect and the effects of other projects is not significant, the EIR shall briefly indicate why the cumulative impact is not significant and is not discussed in further detail in the EIR. A lead agency shall identify facts and analysis supporting the Lead Agency's conclusion that the cumulative impact is less than significant.
  - An EIR may determine that a project's contribution to a significant cumulative impact will be rendered less than cumulatively considerable and thus is not significant. A project's contribution is less than cumulatively considerable if



- the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact. The Lead Agency shall identify facts and analysis supporting its conclusion that the contribution will be rendered less than cumulatively considerable.
- b. The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact. The following elements are necessary to an adequate discussion of significant cumulative impacts:
- 1) Either:
    - A list of past, present, and probable future projects producing related or cumulative impacts including, if necessary, those projects outside the control of the agency, or
    - A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency.

In accordance with these requirements, the analysis of cumulative effects in relation to air emissions focuses on concurrent operations of the proposed project with other existing or probable projects that may cause related impacts will occur approximately in the same timeframe, and impact the same region. As such, this analysis evaluates the cumulative impacts associated with other projects within the proposed project area considered to have a potential for significantly contributing to potential cumulative air impacts. Based on review of similar past, present and probable future projects, overlapping operations of the proposed SMART commuter trains occurring between Ignacio to Cloverdale were identified as having potential for contributing to cumulative air impacts.



The evaluation of air quality impacts for the proposed project already addresses cumulative impacts due to the affects on local traffic and regional freight shipping in conjunction with the proposed project. This is because the transportation model used as a basis for the proposed project air quality analysis addresses cumulative development and growth assumptions for the region. Thus, analysis of the emissions of the proposed project includes a forecast of planned development and growth that includes emissions from affected motor vehicles in the study area. The analysis shows the proposed freight operations will displace existing on-road heavy duty diesel trucks resulting in a net benefit due to a larger reduction in future truck emissions than the emissions generated by the proposed freight locomotives. The analysis further indicates that local traffic affected by the passing trains will have an insignificant impact near the crossings.

The other projects that were identified as having a potentially cumulative impact contribution were considered to be less than significant or a net benefit on air quality due to the proposed project affects, as discussed in Section 4.0 of the DEIR.

## 13.2 METHODOLOGY

An evaluation on the potential overlapping operations of the SMART regional transportation operations with the NCRA freight operations has been conducted by SMART as documented in the SMART Draft, Final and Draft Supplemental EIRs. These documents are available at <http://www.sonomamarintrain.org/index.php/docs/eir/>. The methodology conducted in the SMART EIR is consistent with the CEQA Guidelines. However, as a safer approach, in order to show that the cumulative impacts address all probable future operations, the analysis conducted by SMART assumed a larger scale freight operation than proposed for the NCRA project. Specifically, the SMART cumulative analysis assumed operations of two additional trains that are not currently anticipated for the proposed NCRA project operations. As a result, the SMART analysis is considered highly conservative indicating greater potential cumulative impacts than would be anticipated if the analysis applied the proposed NCRA project as described in the NCRA DEIR. Although the SMART analysis is overly conservative, and because the CEQA guidelines state that the level of details required for a cumulative analysis do not need to be as specific as the project analysis, NCRA is accepting the evaluation conducted by SMART as adequate for addressing cumulative impacts.



### 13.3 IMPACTS

The cumulative impact analysis, as evaluated by SMART, indicates that the cumulative impacts will be less than significant. Because the analysis is considered overly conservative, the cumulative impacts with the basis of the proposed NCRA project, as described in the NCRA DEIR would show even less of a cumulative impact. Therefore, the conclusion for cumulative impacts for combined overlapping operations of both SMART commuter transportation and NCRA freight operations are considered less than significant.



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## 14.0 PROJECT CONFORMITY

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



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