Health Risk Assessment of the Rocklin Crossings Rocklin, California

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ACRONYMS AND ABBREVIATIONS

µm	Micrometer
CARB	California Air Resources Control Board
CEQA	California Environmental Quality Act
DPM	Diesel Particulate Matter
EPA	Environmental Protection Agency
g/hp-hr	Grams of emissions per hour per horsepower
g/hr	Grams of emissions per hour of idling
g/mi	Grams of emissions per mile traveled
IUR	Inhalation Unit Risk
OEHHA	California Office of Environmental Health Hazard Assessment
PCAPCD	Placer County Air Pollution Control District
TAC	Toxic Air Contaminants
VMT	Vehicle Miles Traveled

SECTION 1: INTRODUCTION

1.1 - Purpose

The purpose of this document is to assess the potential health risk impacts on local air quality associated with the operation of the Rocklin Crossings Project in Rocklin, California. The proposed project will consist of a number of emission sources that emit toxic air contaminants (TAC) specifically diesel particulate matter (DPM) from diesel truck traffic that will access the various project facilities comprising the project development.

These potential impacts are then compared to the applicable health risk significance threshold as prescribed by the Placer County Air Pollution Control District (PCAPCD) to assess the regulatory significance of these impacts.

1.2 - Methods of Analysis

This health risk assessment employed several mathematical modeling tools that are routinely used to perform such air quality assessments. These tools included:

- The U.S. Environmental Protection Agency (USEPA) Industrial Source Complex Model (ISC) model (USEPA 1995) which is the air dispersion modeling method approved by the California Air Resources Board (CARB) for such assessments;
- The CARB EMFAC2007 mobile emission source model (CARB 2006), which is used to calculate emissions from the various mobile sources that will access the project site during operation; and
- The California Office of Environmental Health Hazard Assessment (OEHHA) Tier I risk assessment methodology to estimate potential cancer risks from DPM emissions.

The above models and their assumptions are described in subsequent sections and appendices to this report.

1.3 - Executive Summary

This report contains the results of a detailed health risk assessment to determine the potential health risk impacts from the operation of the Rocklin Crossings Project on the local community. This assessment used methods approved by the USEPA, CARB, and the PCAPCD to derive the impact estimates. The assessment contained in this report supports the following conclusion with respect to the health risk assessment for toxic air contaminants from this project:

- The maximum predicted cancer risks associated with the toxic air contaminant emissions from the project are not expected to exceed the cancer risk threshold established by the PCAPCD at any existing sensitive receptor or at any sensitive receptor associated with the proposed Rocklin 60 residential development project. Therefore, the localized project-specific health risk impacts from toxic air contaminant emissions based on air dispersion modeling are considered to be *less than significant*.

SECTION 2: SETTING

2.1 - Project Location and Description

The proposed project will be located on approximately 52 acres on the east side of Interstate 80 near the intersection with Sierra College Boulevard in the City of Rocklin, California. The proposed development will consist of approximately 543,500 square feet (sq-ft) of leaseable space and will include 21 buildings ranging in size from 4,000 sq-ft to 222,000 sq-ft.

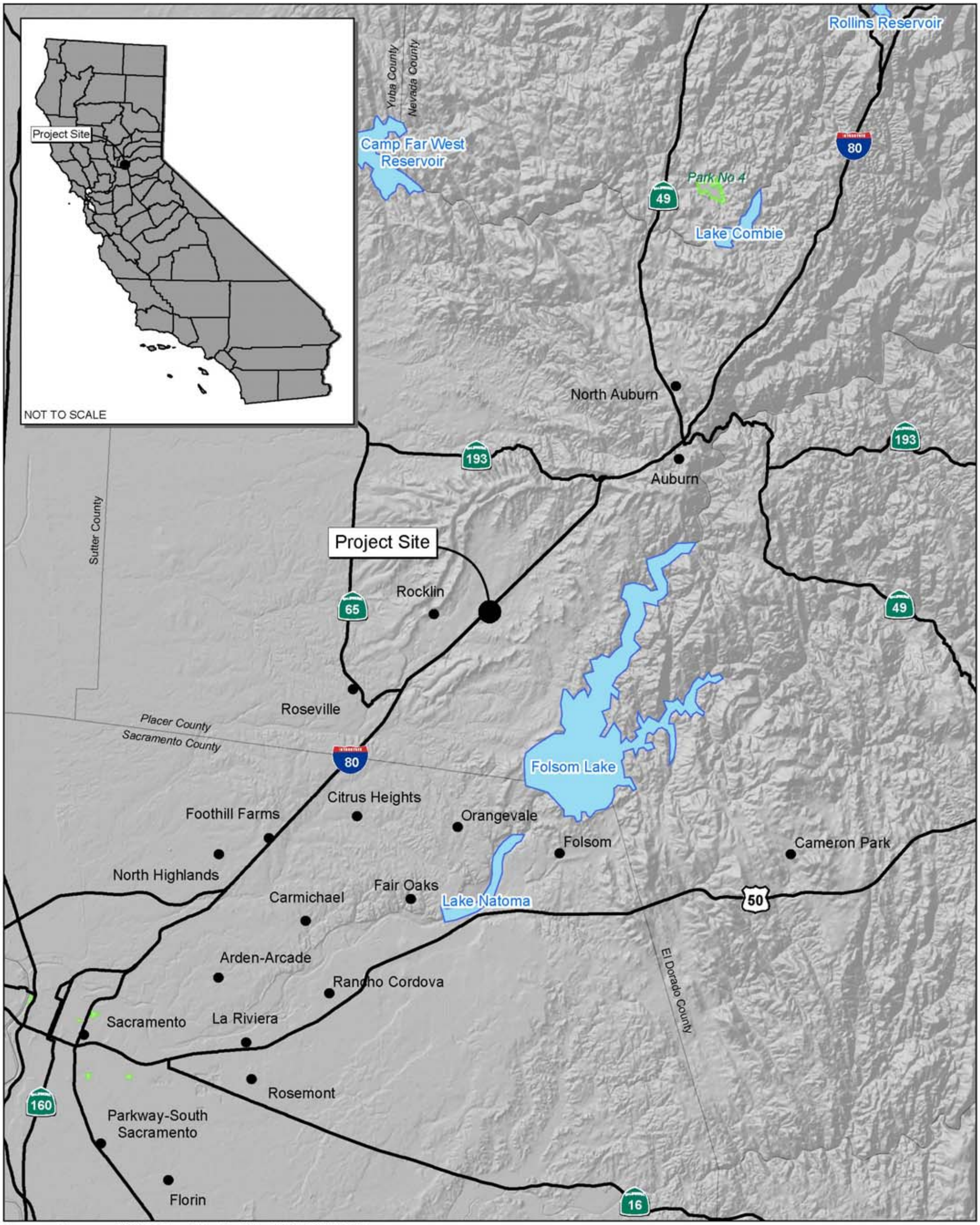
The area surrounding the project is presently largely undeveloped in all directions out to at least 0.5 mile with few exceptions. Sierra College is located about 0.5 miles to the southwest. A residential area is located about 0.15 mile to the north of the project across Interstate 80. A residence is located immediately to the south of the project's southern boundary. In addition, there are a few isolated residences located to the east of the project. Otherwise the areas to the east, west, and south are vacant and consist of varying stands of trees and scrub brush.

Exhibit 1 provides a regional view of the site location, while Exhibit 2 displays a local aerial view. Exhibit 3 provides a project site plan.

Table 1 provides a facility listing of the proposed development.

2.2 - Sensitive Receptors

Individuals who are more sensitive to toxic exposures than the general population are considered sensitive receptors. Sensitive receptors may include young children and chronically ill individuals. Such individuals may reside at residences and medical care facilities such as nursing homes and residential care facilities. Currently, the nearest sensitive receptor is located at a residence immediately south of the project's southern boundary. However, a large residential project known as Rocklin 60 is planned for development in the area immediately to the east of the Rocklin Crossings project. If this project comes to fruition, the closest receptors will be approximately 10 meters from the Rocklin Crossings' eastern property line at the rear of the Wal-Mart and Home Depot buildings.



Source: Census 2000 Data, The CaSIL, MBA GIS 2007.

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5 2.5 0 5 Miles

Exhibit 1
Regional Location Map

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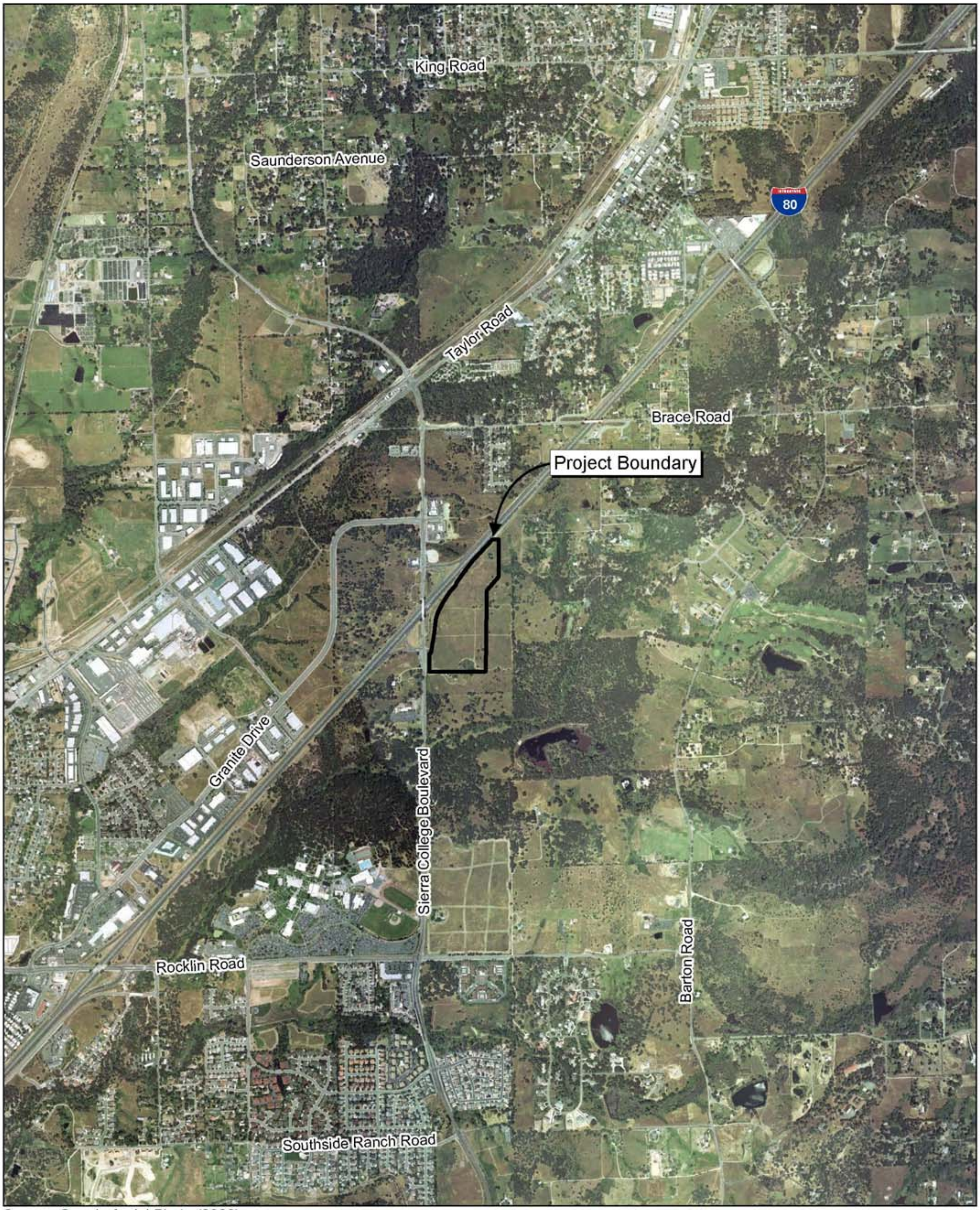
ROCKLIN CROSSINGS PROJECT



Source: Google Aerial Photo (2006).

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2,000 1,000 0 2,000 Feet

Exhibit 2
Local Vicinity Aerial Map

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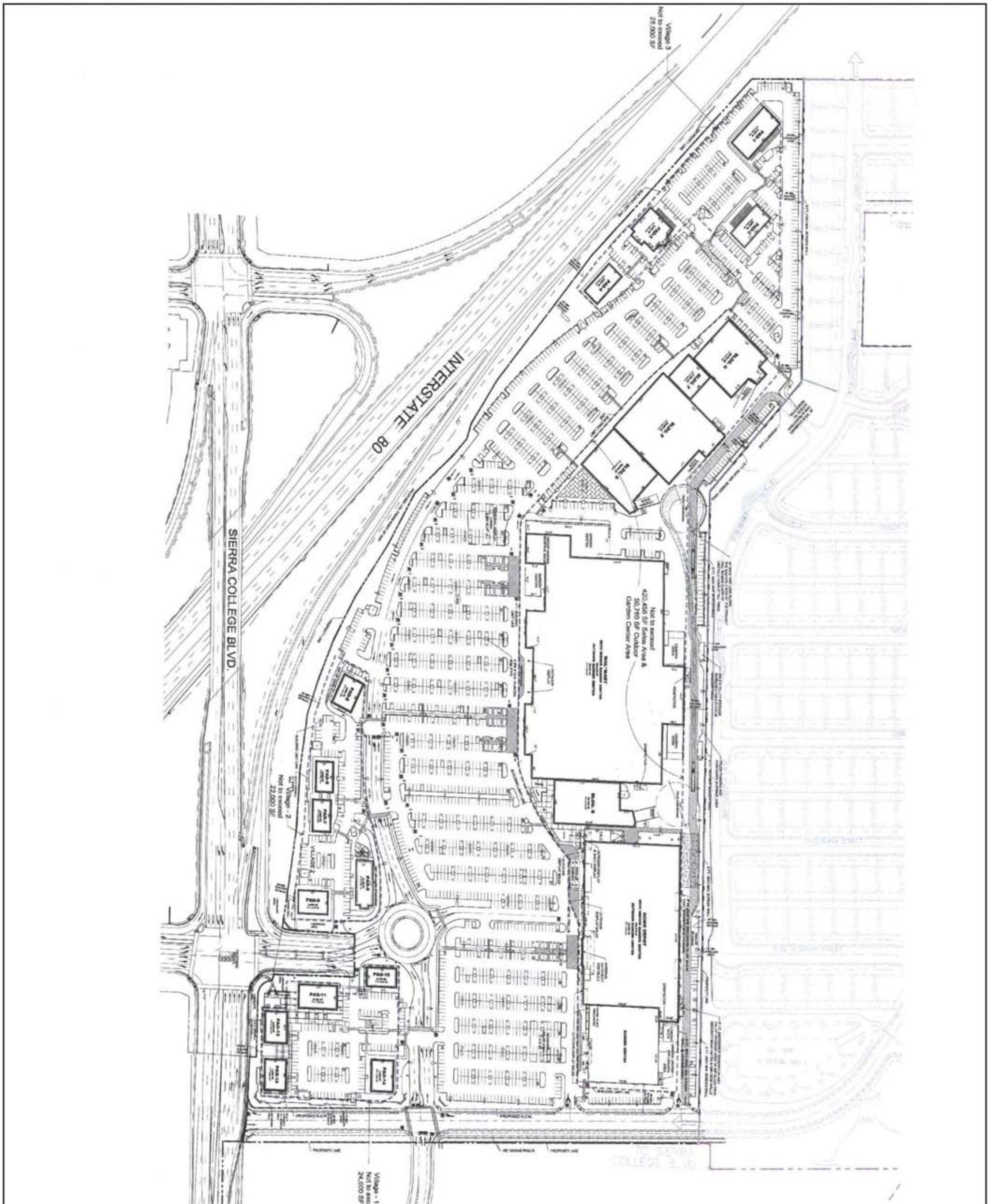
ROCKLIN CROSSINGS PROJECT



Source: Perkowitz+Ruth Architects.

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250 125 0 250 Feet

Exhibit 3
Site Plan

Table 1: Project Summary

Proposed New Development	Approximate Gross Leasable Space (sq-ft)
Building A (Home Depot)	141,000
Building B	20, 300
Building C (Wal-Mart)	222, 000
Building D	Total = 87,400
Building E	
Building F	
Building G	
Pad 1	Total = 24,200
Pad 2	
Pad 3	
Pad 4	
Pad 5	Total = 22,000
Pad 6	
Pad 7	
Pad 8	
Pad 9	
Pad 10	Total = 24,600
Pad 11	
Pad 12	
Pad 13	
Pad 14	
Grand Total = 543, 500 sq-ft	

2.3 - Thresholds of Significance for Impacts from Project Operations

2.3.1 - Health Risk-Based Thresholds

Any project with the potential to expose sensitive receptors or the general public to substantial levels of TAC would be deemed to have a potentially significant impact. Discussions with the PCAPCD (PCAPCD 2007) indicate that the District applies a cancer risk significance threshold of 10 in one million for an individual project's contribution of excess lifetime cancer risk. Such a risk is assumed to apply for a continuous exposure to TACs over a 70-year lifetime.

SECTION 3: HEALTH RISK ASSESSMENT

A health risk assessment requires the completion and interaction of four general steps: (1) quantify project-generated TAC emissions; (2) identify ground-level receptor locations that may be affected by the emissions (including any special sensitive receptor locations such as residences, schools, hospitals, convalescent homes, and daycare centers); (3) perform air dispersion modeling analyses to estimate ambient pollutant concentrations at each receptor location using project TAC emissions and representative meteorological data to define the transport of those emissions in the atmosphere; and (4) characterize and compare the calculated pollutant concentrations with the applicable health risk significance threshold.

3.1 - Emission Inventory Development

The first requirement to carryout the assessment involves the process of identifying and quantifying the sources of TAC air emissions from the project, also termed an emission inventory. Each piece of equipment that emits is identified as to location and physical characteristics (release height, release temperature, etc.) as well as the chemical nature of the emissions. The sources of TAC emissions from this project are associated with the DPM emitted from the delivery truck traffic that will service the facility. DPM emissions arise from delivery truck exhaust emissions as well as from the idling of the trucks as they unload/load their contents. In addition, project facilities involving the receipt of perishable foods will also be serviced by trucks equipped with diesel-powered transportation refrigeration units (TRUs) which also emit DPM.

DPM is a mixture of thousands of particles and gases that is produced when an engine burns diesel fuel. Many compounds found in diesel exhaust are carcinogenic. The State of California, after a 10-year research program, determined in 1998 (CARB, 1998) that DPM from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to DPM poses a chronic health risk. In addition to increasing the risk of lung cancer, exposure to diesel exhaust can have other health effects as well. Diesel exhaust can irritate the eyes, nose, throat and lungs, and it can cause coughs, headaches, light-headedness and nausea. Diesel exhaust is a major source of fine particulate pollution as well and numerous studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visit, asthma attacks and premature deaths among those suffering from respiratory problems.

The emissions from theses sources are described and quantified below.

3.1.1 - Emission Source Estimates – DPM

DPM emissions from the various sources were calculated using information derived from the project description, forecasted delivery truck information, and mobile source emission factors from the CARB EMFAC2007 emissions factor model.[1],[2].

Table 2 provides an inventory of the diesel trucks accessing the project during operations as derived from projects of a similar nature and land use (MBA 2007a and b) for the project buildout year of 2009. Delivery truck traffic was assumed to access the project site facilities from two main access points:

- From the southeast corner of the project adjacent to Home Depot ; and
- From the main entrance to the project from Sierra College Boulevard.

Table 2: Forecasted Number of Delivery Trucks – 2009 Buildout

Proposed New Development	Delivery Trucks per day	Truck Class
Home Depot	4	4+ axle
Building B	1	2 axle
Wal-Mart	6 12	4+ axle 2 axle
Building D	1	2 axle
Building E	1	2 axle
Building F	1	2 axle
Building G	1	2 axle
Pad 1	1	4+ axle
Pad 2	1	4+ axle
Pad 3	1	4+ axle
Pad 4	1	2 axle
Pad 5	1	4+ axle
Pad 6	1	2 axle
Pad 7	1	2 axle
Pad 8	1	2 axle
Pad 9	1	2 axle
Pad 10	1	2 axle
Pad 11	1	2 axle
Pad 12	1	2 axle
Pad 13	1	2 axle
Pad 14	1	2 axle
Total Delivery Trucks (trucks/day): 41		
Notes: (1) All delivery trucks assumed to be diesel trucks Source: MBA 2007a and b		

[1] On November 1, 2006, the CARB released the EMFAC2007 update to its earlier EMFAC2002 model. Among the changes from the previous EMFAC2002 version, the emission factors for all pollutants increased significantly for heavy heavy-duty vehicles in EMFAC2007 compared to the earlier version. At this time, EMFAC2007 has not been approved by the USEPA for state implementation planning. However, to provide conservative health risk assessment results for this project, use was made of the EMFAC2007 emission factors.

[2] An emission factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. These factors are usually expressed as the weight of pollutant divided by a unit of activity, volume, distance, or duration of the activity emitting the pollutant (e. g., grams of pollutant emitted per vehicle-mile traveled or grams of pollutant emitted per brake-horsepower).

With regard to the truck inventory provided in Table 2, it was assumed that delivery trucks servicing facilities handling perishables such as produce and frozen foods for retail or restaurants would be equipped with a TRU. These buildings include: Wal-Mart, and Pads 1, 2, 3, and 5.

Table 3 provides the DPM emission factors for the mobile source diesel particulate matter emissions sources as derived from the CARB EMFAC2007 emission factors for PM10 specifically for Placer County. The emission factor for the TRU emissions was derived from the CARB Air Toxic Control Measure for TRUs (CARB 2003).

As indicated above, onsite emissions were calculated for delivery vehicle travel and idling. Likely onsite travel links were defined from the project entrances to the respective project buildings and emissions were calculated along each link. Delivery vehicles were assumed to idle for a maximum of 5 minutes per vehicle per day in keeping with the CARB ATCM, which regulates truck idling time (CARB 2005a).

Table 4 summarizes the total DPM emissions from the project for the buildout year of 2009[3].

Table 3: Emission Factors for Operational DPM Emissions

Emission Source	2009
Exhaust Emission	
4+ axle truck (g/mi)	1.852
2 axle truck (g/mi)	0.082
TRU (g/hp-hr)	0.760
Idle Emissions	
4+ axle truck (g/hr)	2.393
2 axle truck (g/hr)	0.758
TRU (g/hp-hr)	0.760

Notes:
(1) All motor vehicle emission factors were derived from the EMFAC2007 model for Placer County as PM10 exhaust
(2) Exhaust emissions for the 4+ axle (HHD DSL) and 2 axle (LHD1 DSL) trucks assumed a travel speed of 10 mph; air temperature of 54 degrees Fahrenheit and a relative humidity of 50% were assumed as representative of average winter weather conditions
(3) The idling emission factors for the 4+ axle and 2 axle trucks assumed a speed of 0 mph
(4) The TRU emission factors were derived from the CARB ATCM for TRUs ISOR Appendix D; TRU size = 35 hp (typical size); CARB 2003c
(5) Emission factor units: g/mi (grams per mile); g/hr (grams per idle-hour); g/hp-hr (grams per brake horsepower per-hour)

[3] The exhaust and idle emission factors represent a fleet average covering the period from 1965 to 2009.

Table 4: Annual Total DPM Emissions

Emission Source	Annual DPM Emissions (tons/year)
Exhaust from Truck Travel	0.0034
Idling Emissions	0.0018
TRU Emissions	0.0093
Source: See Appendix A for the emission calculations	

3.1.2 - Emission Source Characterization

Each of the emission source types described above also requires geometrical and emission release specifications for use in the air dispersion model. Table 5 provides a summary of the assumptions used to configure the various emission sources. By way of explanation, the following definitions are used in defining the emission source geometrical configurations referred to in Table 5:

- Point source: a single identifiable local source of emissions; it is approximated in the ISC air dispersion model as a mathematical point in the modeling region with a location and emission characteristics such as height of release, temperature, etc. (Example: a stack or vent);
- Volume source: an area source with a third dimension (Example: construction area using off-road equipment with a height of release); and
- Line source: a series of volume sources along a path (Example: vehicular traffic along a street).

Table 5: Summary of Emission Source Configurations

Emission Source Type	Geometric Configuration	Relevant Assumptions
Onsite Diesel Truck Traffic	Line Sources	• See Table 2 for an inventory of truck operations • Stack release height: 6 feet • Vehicle Speed: 10 mph • Length of the line source (distances from the facility entrances behind Home Depot or from the main entrance from Sierra College Boulevard to the various project buildings) • Vehicle types: heavy duty and light heavy duty diesel delivery trucks • Traffic volume: MBA 2007a and b • Emission factor: CARB EMFAC2007

Table 5: Summary of Emission Source Configurations (Cont.)

Emission Source Type	Geometric Configuration	Relevant Assumptions
Onsite Diesel Truck Idling	Point Sources located at each facility	• Stack release height: 12 feet • Stack release characteristics > Stack diameter: 0.3 feet > Stack velocity: 170 feet/sec > Stack temperature: 200° F • Idle time: 5 minutes per truck per day as per CARB 2005a • Vehicle type: heavy duty and light heavy duty diesel delivery trucks • Emission factor: CARB EMFAC2007
Onsite Diesel Truck TRU	Point Sources at each facility loading dock; emissions also include operation while traveling onsite	• Stack release height: 12 feet • TRU Size: 35 horsepower (typical size) • Stack release characteristics > Stack diameter: 0.1 feet > Stack velocity: 161 feet/sec > Temperature: 442° F • Cooling time (idling): 30 min per truck per day • Load factor: 28% • Emission factor: ARB ATCM for TRUs CARB, 2000, 2003)
Retail/Commercial Facility Operations	All facilities	• 24/7 365 days/yr • See Table 1 for the listing of facilities

Exhibit 4 provides the location of the various project facilities and emission source locations in the buildout year of 2009.

3.2 - Receptor Network

The assessment requires that a network of receptors be specified such that the impacts can be computed at the various locations surrounding the project. For purposes of this assessment, receptors were located at the existing sensitive receptors and at receptor locations within the proposed Rocklin 60 residential development project located immediately to the east of Rocklin Crossing. Modeling receptors were placed at each residence that will comprise the Rocklin 60 project. Exhibit 5 shows the various receptor locations.

3.3 - Dispersion Modeling

The next step in the assessment process utilizes the emissions inventory along with a mathematical air dispersion model and representative meteorological data to calculate impacts at the various receptor locations. The dispersion model used in this assessment is described below.

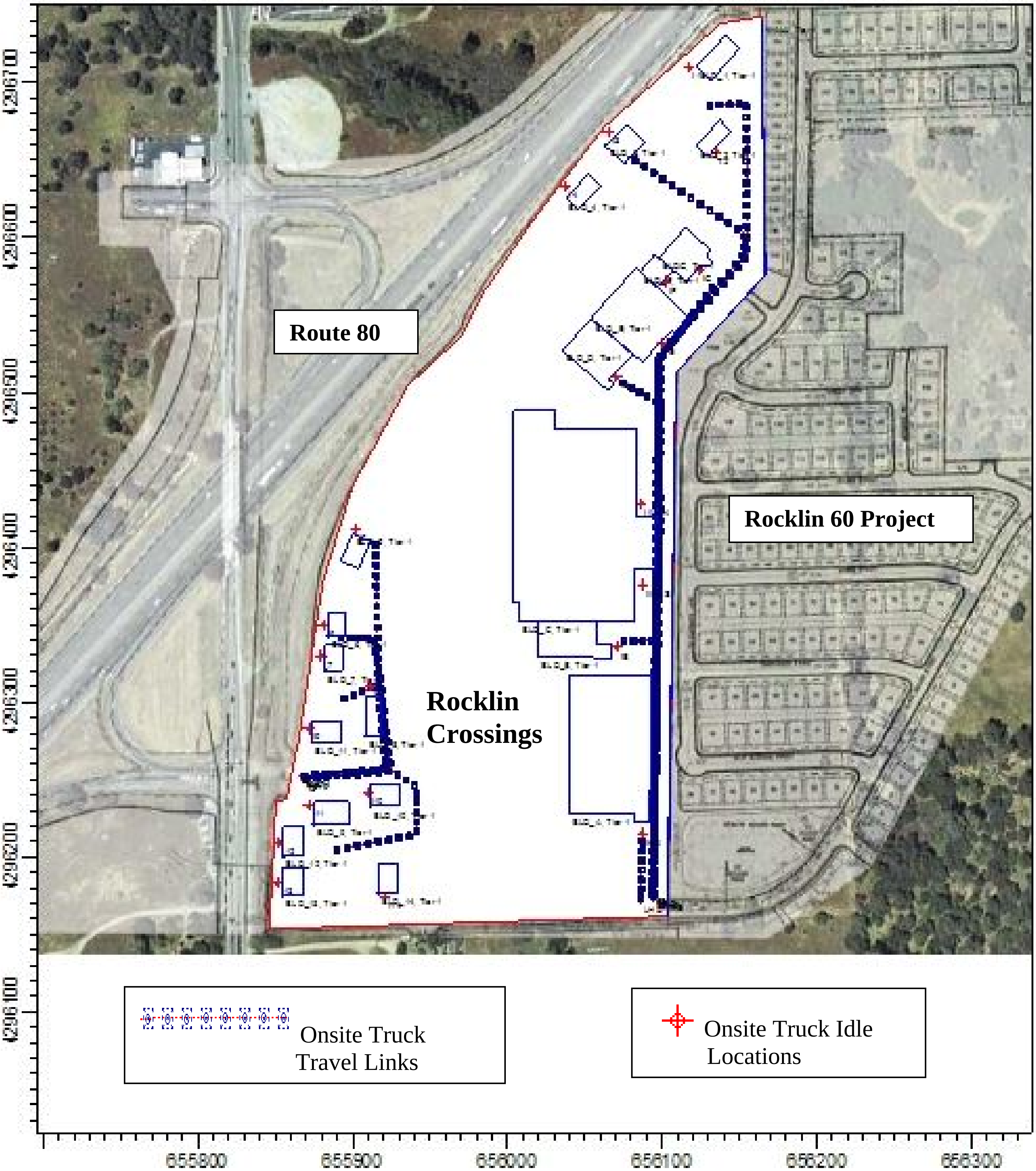

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Exhibit 4
Emission Source Locations - 2009

July 2007

ROCKLIN CROSSINGS

3.3.1 - Model Selection

In accordance with guidance from the Cal OEHHA, the health risk assessment of DPM emissions from this project applied the USEPA ISC Model. The ISC model is an accepted methodology by the CARB, which has used this model in several health risk assessments involving DPM. ISC predicts pollutant concentrations from point, area, volume, line, and flare sources with variable emissions in terrain from flat to complex with the inclusion of building downwash effects from buildings on pollutant dispersion. It captures the essential atmospheric physical processes and provides reasonable estimates over a wide range of meteorological conditions and modeling scenarios.

3.3.2 - General Model Assumptions

The basic options used in the dispersion modeling are summarized in Table 6.

Table 6: General Modeling Assumptions – ISC Model

Feature	Option Selected
Terrain processing	Elevated terrain employed (Receptor heights, building heights and emission source heights derived from the project grading plans)
Emission source configuration	See Table 5 above
Regulatory Dispersion Options	Default
Land Use	Rural
Coordinate System	UTM
Building downwash	Included in Calculations
Receptor height	0 meters above ground
Averaging Time	Annual

As indicated in Table 6, account was taken of the effects of building downwash on the dispersion of emissions from the various sources located on the project's property. Building downwash occurs when the aerodynamic turbulence, induced by nearby buildings, cause pollutants emitted from an elevated source to be mixed rapidly toward the ground (downwash). This results in potentially higher ground-level concentrations than if the buildings were not present. The ISC dispersion model contains algorithms to account for building downwash effects. The required information includes the location of the emission source, location of adjacent buildings, and the building geometry in terms of length, width, and height. For purposes of this analysis, the emission source and building locations were taken from the project site plan. The building geometries were derived from the project plan assuming a building height of 32 feet for the large "Major" buildings and a height of 20 feet for the small retail pads. In addition, the grading plans for the Rocklin Crossing and proposed Rocklin 60 projects were examined to obtain the correct base heights for buildings, emission sources, and receptors.

Meteorological Data

Hourly meteorological data are also required to operate the ISC model to determine the direction and rate of dispersion of emissions released into the atmosphere. The closest source of meteorological data is from Roseville, approximately 5 miles southwest of the project site. Meteorological data for the year 1999 are available from this location. An additional source of meteorological data is available from McClellan Air Force Base located 14 miles southwest of the project site. In a comparison of the relative air quality impacts of using meteorological data from these two locations on cancer risks at the Roseville Railyard (CARB, 2004), the meteorological data from Roseville resulted in higher cancer risks than the data from McClellan. This is due to the fact that the average winds at McClellan are somewhat higher than those at Roseville. Since the formulation of the ISC model expresses air concentrations as inversely proportional to wind speed, the lower wind speeds at Roseville compared to McClellan result in higher air concentration predictions using the Roseville data. Therefore, the meteorological data from Roseville was used in this assessment to provide conservative project impacts. Exhibit 6 provides a wind rose from Roseville. As this exhibit indicates, the predominant winds at this location are from the southeast direction.

3.4 - Health Risk Assessment Results – Toxic Air Contaminants

3.4.1 - Health Risk Assessment Methodology

The health risk assessment of toxic air contaminants requires the application of a risk characterization model to the results from the air dispersion model to estimate potential health risks at each sensitive receptor location. A health risk assessment is a guide that helps to determine if current or future exposure to a chemical or substance could affect the health of a population. The State of California Office of Environmental Health Hazard Assessment (OEHHA) develops methods for conducting health risk assessments. As defined under the Air Toxics "Hot Spots" Information and Assessment Act of 1987 ["AB 2588" (Chapter 1252, Statutes of 1987), California Health and Safety Code Section 44306], "A health risk assessment means a detailed comprehensive analysis prepared pursuant to Section 44361 to evaluate and predict the dispersion of hazardous substances in the environment and the potential for exposure of human populations and to assess and quantify both the individual and population-wide health risks associated with those levels of exposure."

There are four main steps in a health risk assessment: hazard identification, exposure assessment, dose-response assessment, and risk characterization (OEHHA 2001). In hazard identification, the health problems from exposure to a certain chemical are described. The health problems are determined by scientists who test the level at which health effects are seen when a human or animal is exposed to a substance. In exposure assessment, the length of time exposed, the concentration of that exposure, and type of exposure (i.e., inhalation or ingestion) to a chemical are determined. In the dose-response assessment step, the information obtained during hazard identification is applied to determine a dose-response relationship for cancer and non-cancer effects. Scientists help to determine the dose-response and suggest thresholds or standards for the pollutants. In the risk characterization step, the previous three steps are combined to estimate the risk of health effects in individuals and an exposed population.

Cancer Risk Characterization

The HRA process requires four general steps to estimate health impact results: (1) quantify Project-generated emissions; (2) identify ground-level receptor locations that may be affected by the emissions (including both a regular grid of receptors and any special sensitive receptor locations such as schools, hospitals, convalescent homes, and daycare centers); (3) perform dispersion modeling analyses to estimate ambient TAC concentrations at each receptor location; and (4) use a risk characterization model to estimate the potential health risk at each receptor location.

In step 1 above, project-related toxic air contaminant emissions are quantified from the various DPM. The calculation methods and inventory of emissions from these sources were discussed earlier in Section 3.1.

In Step 2, the receptor locations for the health risk assessment were defined earlier in Section 3.2.

In Step 3, the ISC air dispersion model used to quantify the impacts from the DPM for the 2009 buildout year using the available meteorological data from Roseville.

Step 4 involves using the data output from the ISC air dispersion as input to a health risk assessment model that calculates cancer risks from project's DPM emissions as described below.

Diesel Particulate Emission Health Risk Assessment Methodology

The cancer risk from DPM is calculated by multiplying the annual average DPM concentration calculated using the ISC model and a Inhalation Unit Risk (IUR) as in Equation 1 below (COEHHA, 2003).

$$\text{Cancer Risk} = C_{air} \times \text{IUR} \qquad \text{(EQ-1)}$$

Where:

Cancer Risk = Total individual lifetime excess cancer risk defined as the cancer risk a hypothetical individual faces if exposed to carcinogenic emissions from a particular facility continuously, 24 hours/day, 365 days a year, for a 70-year lifetime; this risk is defined as an excess risk because it is above and beyond the background cancer risk to the population; cancer risk is expressed in terms of risk per million exposed individuals.

C_{air} = Annual average DPM concentration calculated from the ISC model in $\mu g/m^3$

IUR = Inhalation Unit Risk for diesel particulate matter in $(\mu g/m^3)^{-1}$

Value for the IUR was derived from the information supplied by the PCAPCD (PCAPCD 2007) and the OEHHA Toxicity Criteria Database (OEHHA 2007) and has a value of 300. Thus, the lifetime individual cancer risk is calculated using Equation 2 as:

$$\text{Cancer Risk} = C_{air} \times 300 \qquad \text{(EQ-2)}$$

3.4.2 - Toxic Air Contaminant Health Risk Assessment Results Cancer Impacts

The total individual excess cancer risk as determined by this health risk assessment is summarized in Table 7 for the buildout year 2009.

Table 7: Summary of Cancer Risks at Sensitive Receptors

Project Year	Location[1]	Cancer Risk (risk per million)	PCAPCD Significance Threshold (risk per million)
2009	Maximum Exposed Existing Sensitive Receptor	1.4	10
2009	Maximum Exposed Sensitive Receptor within the Rocklin 60 Project	5.1	10

Notes:
(1) The location of the highest cancer risk at an existing sensitive receptor occurs at a residence in a residential area located immediately south of the project's southern boundary.
(2) The location of the highest cancer risk in the proposed Rocklin 60 project occurs at a residence approximately 40 meters east of the project's southeastern boundary.
See Appendix B. for the health risk assessment modeling results

As shown in Table 7, the lifetime excess cancer risks associated with the operation of the project are not expected to exceed the PCAPCD cancer risk significance level of 10 in a million at any nearby existing sensitive receptor or sensitive receptor within the proposed Rocklin 60 development project. Exhibit 7 provides a map showing cancer risk at each receptor location from the project operations for the final buildout year in 2009.

3.5 - Risk Assessment Uncertainty

There are substantial uncertainties involved in assessing the health risk of air pollutants. There are uncertainties in dispersion modeling, toxicological factors, and exposure assessment. Dispersion models and their attendant assumptions for model application have been developed to provide conservative results (in terms of over-predicting impacts). Although many chemical reactions take place in the atmosphere that can transform certain pollutants, model algorithms assume chemical reactions do not take place. Toxicological risk factors are derived primarily from laboratory animal experiments; therefore, there is uncertainty in converting the risk to humans.

The OEHHA (2003) recommends using the 70-year exposure duration for determining residential cancer risks. Although it is unlikely that people will reside at a single residence for 70 years, it is common that people will spend their entire lives in a major urban area. While residing in urban areas, it is very possible to be exposed to the emissions of other facilities. In order to help ensure that people do not accumulate an excess unacceptable cancer risk from cumulative exposure to stationary facilities at multiple residences, OEHHA recommends the 70-year exposure duration for risk management decisions. However, it is important to note that a person who has resided in his current residence for less than 70 years will have a cancer risk less than what is calculated for a 70-year risk. Nonetheless, this assessment attempts to be conservative and provide a worst-case scenario for exposure.

Further, the factors used to calculate emissions reference a particular fleet year, i.e., 2009. The cancer risk projected for 2009 is assumed to apply over the next 70-years. However, emission projections using the CARB EMFAC mobile source emission model indicate that mobile source diesel emission factors will decline substantially over the next 30 years particularly for the heavy-heavy duty truck vehicles with the result that the cancer risks predicted for the year 2009 will also decline in future years. This also applies to future emissions from TRUs which are targeted for significant emission reductions in the future. The DPM emission factor used in this assessment for the TRUs was 0.76 gram per brake-horsepower per hour which is representative of the fleet of TRUs currently in operation. In its Diesel Risk Reduction Plan, CARB adopted a control measure that will reduce in DPM emissions to a level of 0.2 gram per brake-horsepower per hour, which is a reduction of nearly 75 percent (CARB, 2005b). This regulation will affect every TRU in operation in California by December 2008. Thus, using the cancer risk predictions for 2009 as representative of the cancer risk from the fully-operational project over the next 70-years provides a conservative cancer risk estimate.

Finally, it should be noted that Wal-Mart's truck fleets are equipped with an automatic diesel engine shut-off that will automatically switch off their engine after 3 minutes. The health risk assessment above assumed a 5-minute idling time for the diesel trucks and, thus, overstating the health risks associated with the emissions from the Wal-Mart diesel trucks.

SECTION 4: REFERENCES

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Appendix A:DPM Emissions

Appendix B: Health Risk Assessment Model Output