Chapter 6
CO, PM_{10}, and Other Pollutant Air Quality Impacts and Mitigation For Project Operation

6.1 Introduction

This Chapter addresses the recommended techniques for quantifying emissions of carbon monoxide (CO), inhalable particulate matter (PM_{10}) and other pollutants from project operations, and for determining how those emissions impact ambient air quality. If the result is to cause or contribute to a violation of an ambient air quality standard, then project emissions will be deemed significant under CEQA and an EIR will have to be prepared unless mitigation is applied to eliminate the projected violation. This chapter also provides mitigation measures that may be used for the latter purpose.

6.2 AAQS Significance Criteria for CO, PM_{10}, and Other Pollutants

The El Dorado County APCD evaluates ROG and NOx emissions from project operations for significance under CEQA on a daily mass emission basis, as explained in Chapter 5 of this Guide. CO, PM_{10}, and other pollutants are evaluated for significance by comparison against the applicable national and state ambient air quality standards (AAQS). Though all criteria pollutants are of concern, and a project is considered significant if it is projected to cause a violation of any national or state AAQS, CO is of special importance because of the localized health impacts it can pose at concentrated levels. Similarly, PM_{10} can be associated with adverse health effects. Depending on the type of project and its proposed location, the project may also have to be evaluated for other criteria pollutants such as nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead, sulfates, hydrogen sulfide (H_2S), vinyl chloride, and visibility impacts.

The relevant AAQS are displayed in Appendix B. As noted in Chapter 2, both the Mountain Counties Air Basin and Lake Tahoe Air Basin portions of El Dorado County are classified as attainment (or are unclassified) for all national and state AAQS for CO, PM_{10}, NO_2, SO_2, sulfates, lead, and H_2S, except that both the Mountain Counties Air Basin and the Lake Tahoe Air Basin portions of the county are classified as nonattainment for the state 24-hour PM_{10} standard. (In the future, this Guide will be revised to incorporate the new national standard for $PM_{2.5}$, after EPA has implemented the standard.)

If a project is located in an area where high pollutant concentrations already exist, a project may be significant even if it generates only small amounts of pollutants. Emissions of CO, PM_{10}, and other pollutants from project operation, which are subject to the AAQS significance criteria as described above, are considered significant if:

1. The project's contribution by itself would cause a violation of the AAQS; or
2. the project's contribution plus the background level would result in a violation of the AAQS, and either
   a. a sensitive receptor is located within a quarter-mile of the project, or

b. the project's contribution exceeds five percent of the AAQS.

6.3 Estimating Emissions Concentrations

6.3.1 Project Screening. The District has identified the following screening techniques to identify projects that can be conservatively assumed not to be associated with significant emissions of CO, PM_{10} or other pollutants. Application of air pollution modeling techniques need not be applied to emissions that can be addressed through screening. Please note that this section applies only for purposes of evaluating “project alone” emissions; cumulative impacts, toxic emissions, impacts on sensitive receptors, etc., must be separately evaluated as set forth in other chapters of this Guide.

- CO and NO_2 Emissions From Development Projects – The District considers development projects of the type and size that fall below the significance cut-points in Table 5.2 in Chapter 5 for ROG and NOx also to be insignificant for CO emissions. CO emissions from projects listed in Table 5.2 would be adequately controlled by state and federal vehicle and engine emission control programs, and CO violations are now associated only with very large concentrations of vehicles. NO_2 emissions are accounted for as NOx in Table 5.2.

- PM_{10}, and SO_2 Emissions from Development Projects – PM_{10} and SO_2 emissions from development projects, if they are of the type and size below the cut-points in Table 5.2 for ROG and NOx, may likewise be considered not significant. However, this policy applies only to projects that do not generate trips by heavy-duty Diesel vehicles in greater proportion than such trips occur generally on public roadways. For example, if a development project involves warehousing or heavy-duty Diesel vehicle fleet operations, PM_{10} and SO_2 emissions should be evaluated in more detail using the techniques described below in Section 6.3.2.

- Industrial Sources – The District allows industrial sources that have CO, NOx, and PM_{10} emissions below the significance levels in Table 6.1, below, to be considered not significant. If any industrial source covered by Table 6.1 does not combust sulfur-containing fuel (i.e., more than 50 ppm sulfur), it may be considered insignificant for SO_2 without further analysis. It is not expected that Table 6.1 will allow a Negative Declaration for projects with components that typically have higher NOx and/or SO_2 emissions, such as power generation or petroleum refining.

- Lead, Sulfates and H_2S -- These pollutants may be assumed to be not significant except for industrial sources that have specific processes resulting in direct emissions of lead, sulfates, or H_2S, such as a foundry, acid plant, or pulp mill.

- Small Sources – Sources that have emissions associated with project operations that are less than 10 pounds per day of a pollutant, including indirect, area, and stationary source emissions of that pollutant, may be presumed to have impacts that are not significant for that pollutant.

- Visibility – It may be assumed that visibility impacts from development projects in the Mountain Counties Air Basin portion of the county are not significant; such impacts will be controlled to the maximum extent feasible through state and national regulatory programs governing vehicle emissions, and through mitigation required for ozone precursors and particulate matter under this Guide. In the Lake Tahoe Air Basin portion of the county, development project proponents (or the Lead Agency) should consult with TRPA to determine if visibility is potentially significant under the more stringent TRPA standard. For industrial projects, visibility impacts may be assumed to be insignificant for the same reasons as apply to development projects, unless the project involves an electrical power generating facility over 50 MW capacity, or consists of or includes operations such as surface mining or quarrying, which are inherently more likely to interfere with visibility.

Table 6.1 De Minimis Emission Levels for Industrial Sources

Total Heat Input Capacity For All Stationary Combustion Equipment (MM BTUs/hr)	NO_2 (as NOx) (lbs/hr)	CO (lbs/hr)	PM_{10} (lbs/hr)
Noncombustion Sources	0.068	3.7	0.41
Combustion Sources			
<2	0.20	11.0	1.2
>2 <5	0.31	17.1	1.9
>5 <10	0.47	25.9	2.8
>10 <20	0.86	47.3	5.2
>20 <30	1.26	69.3	7.6
>30 <40	1.31	72.1	7.9
>40	Screening table cannot be used		
Source: South Coast Air Quality Management District Rule 1303, Appendix A.			

The District may require modeling for projects that might otherwise be deemed not significant under this section, where there are indications that the screening assumptions may not be applicable, such as for combined development and industrial projects, or projects in areas where there may be special meteorological considerations.

6.3.2 Techniques for Estimating Emissions. The following techniques should be used for pollutants not deemed insignificant under the screening assumptions in Section 6.3.1 above, or if the project proponent or Lead Agency otherwise desires to calculate impacts. For a preliminary estimate of emissions for the project, complete Table 6.2 below to determine the concentration and significance determination for CO. If a more detailed analysis is needed, the CALINE computer model should be used.

Table 6.2 may be used to calculate PM_{10} concentrations as well. For modeling PM_{10}, the District recommends the use of SCREEN3 to develop an emissions value for smaller or simpler projects;

alternatively, a more sophisticated model, ISCST3, may be used. Modeling techniques are also available for determining ambient impacts of SO_2, NO_2, lead, sulfate, and vinyl chloride emissions, and for determining visibility impacts. The District should be consulted before such modeling is conducted for a project.

Table 6.2 Pollutant Concentration and Significance Determination

1. Background Concentration	
2. Project-Related Pollutant Concentration	
3. Anticipated Total Concentration	
4. Ambient Air Quality Standard	
5. Significance Determination: Significant if >0	

6.3.3. Table 6.2, line 1: Background Concentration. Before evaluating the significance of a project's impacts, the Lead Agency must first determine the background concentration in the vicinity of the project site. Figures 6.1 through 6.7 are maps that show the levels and spatial distribution of background CO, PM_{10}, SO_2, and NO_2 values in the Sacramento region, including the western portion of El Dorado County. A background map for each applicable air quality standard is included, since there is more than one standard for each pollutant. Described below are the steps for completing the Background Concentration row for CO, PM_{10}, SO_2, and NO_2 in Table 6.2.

Step 1: On the appropriate map, find the isopleth that totally encloses the project. The number appearing on that isopleth represents the highest background value on that isopleth. The area that lies between two isopleth lines will contain a range of background concentrations. For example, on the one-hour CO concentration map, the area within the 6 parts per million (ppm) isopleth contains a range of values from 6 to 8 ppm. On the eight-hour concentration map, the 3 ppm isopleth contains a range of values from 3 to 5 ppm.

Note: A persistence factor of 70 percent can be used to derive eight-hour CO concentration values. A persistence factor is the ratio between the 8-hour and 1-hour concentrations. A factor of 70% was developed as an average after several studies were conducted at urban, rural, and suburban sites.

Step 2: Interpolate the base-year background values between two isopleth lines using the following guidelines:

A. For projects located between two isopleth lines:
   1. Projects located in rural areas or in urban areas with a low density of emission sources are assigned the lower isopleth line's value.
   2. Projects located in or near high volume traffic intersections or areas with a high density of emission sources are assigned the higher isopleth value.
B. Sources located within the highest concentration isopleth are assigned the value that appears nearest to the project location.
C. Sources located outside the lowest concentration isopleth are assigned the value that appears nearest to the project location.

Note: The portion of El Dorado County to the east of the areas shown on the maps should be assigned the lowest base-year background concentration value shown on the map at any location.

Step 3: Determine the analysis year background concentration (for phased projects, each phase should be separately examined). For the CO analysis, an adjustment must be made to account for reduced levels of CO projected in future years due to more stringent vehicle emission control standards. Use Table 6.3, below, to make the adjustment. Find the CO concentration value obtained from the background map in the left column. Then find the appropriate analysis year (the year in which the project will be constructed) in the top row of the table. The number in the CO concentration row that falls under the analysis year column is the anticipated CO background concentration for the project during the year of construction. Enter this estimated background rollback value that corresponds to the one- and eight-hour background level on line 1 of Table 6.2

Table 6.3 Carbon Monoxide Background Rollback Values

Background Level (CO in ppm)	Analysis Year Factors							
	2000	2001	2002	2003	2004	2005	2007	2010
	0.82	0.78	0.73	0.67	0.63	0.58	0.51	0.35
3	2.46	2.34	2.19	2.01	1.89	1.74	1.53	1.32
4	3.28	3.12	2.92	2.68	2.52	2.32	2.04	1.76
5	4.10	3.90	3.65	3.35	3.15	2.90	2.55	2.20
6	4.92	4.68	4.38	4.02	3.78	3.48	3.06	2.64
7	5.74	5.46	5.11	4.69	4.41	4.06	3.57	3.08
8	6.56	6.24	5.84	5.36	5.04	4.64	4.08	3.52
9	7.38	7.02	6.57	6.03	5.67	5.22	4.59	3.96
10	8.20	7.80	7.30	6.70	6.30	5.80	5.10	4.40
11	9.02	8.58	8.03	7.37	6.93	6.38	5.61	4.84

For a PM_{10}, NO_2, or SO_2 analysis, the background concentration as found on the appropriate background map can be entered on line 1 of Table 6.2. This is because the background concentrations for these pollutants are expected to remain at or near current levels over time.

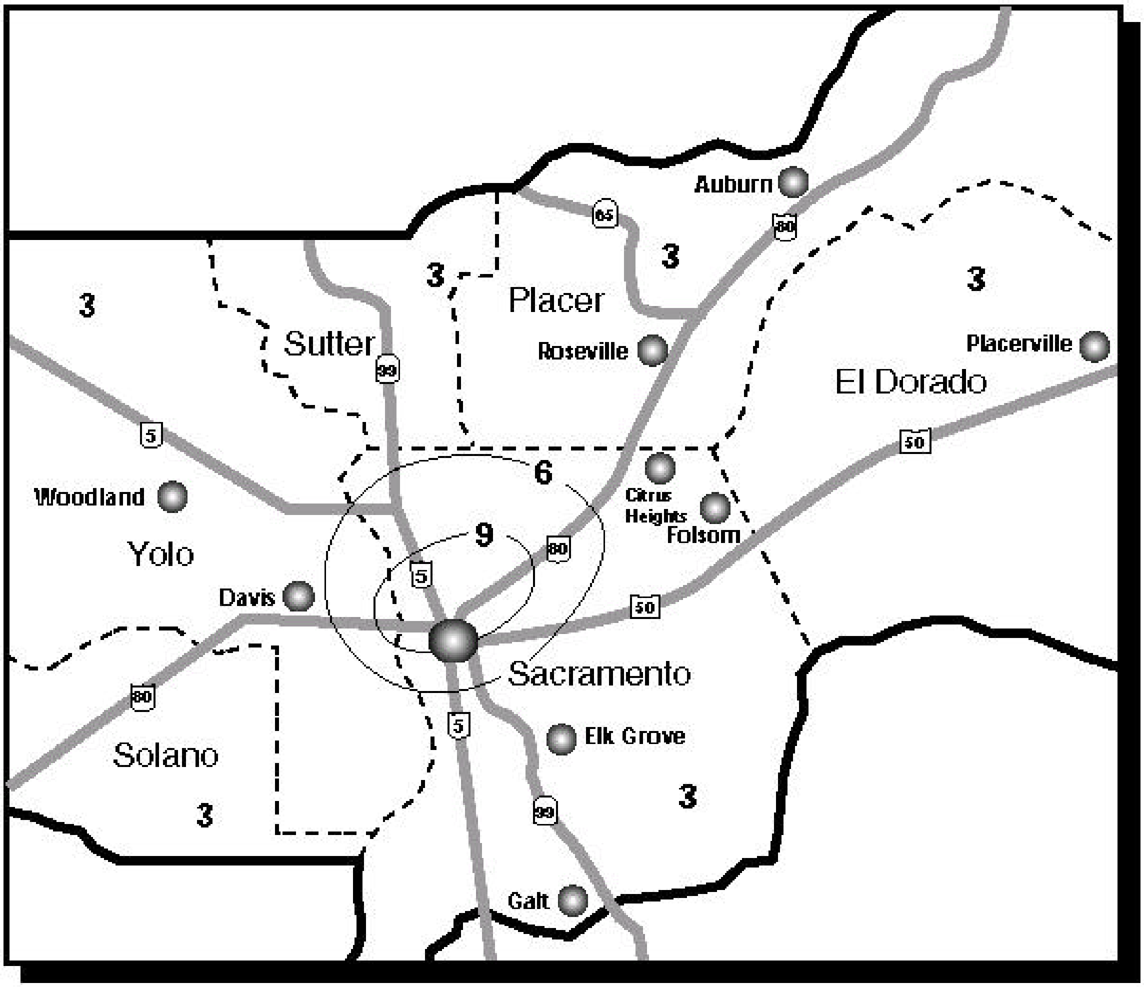

Figure 6.1 Regional Background Map for Carbon Monoxide 1-Hour Standard (Concentration in Parts per Million)

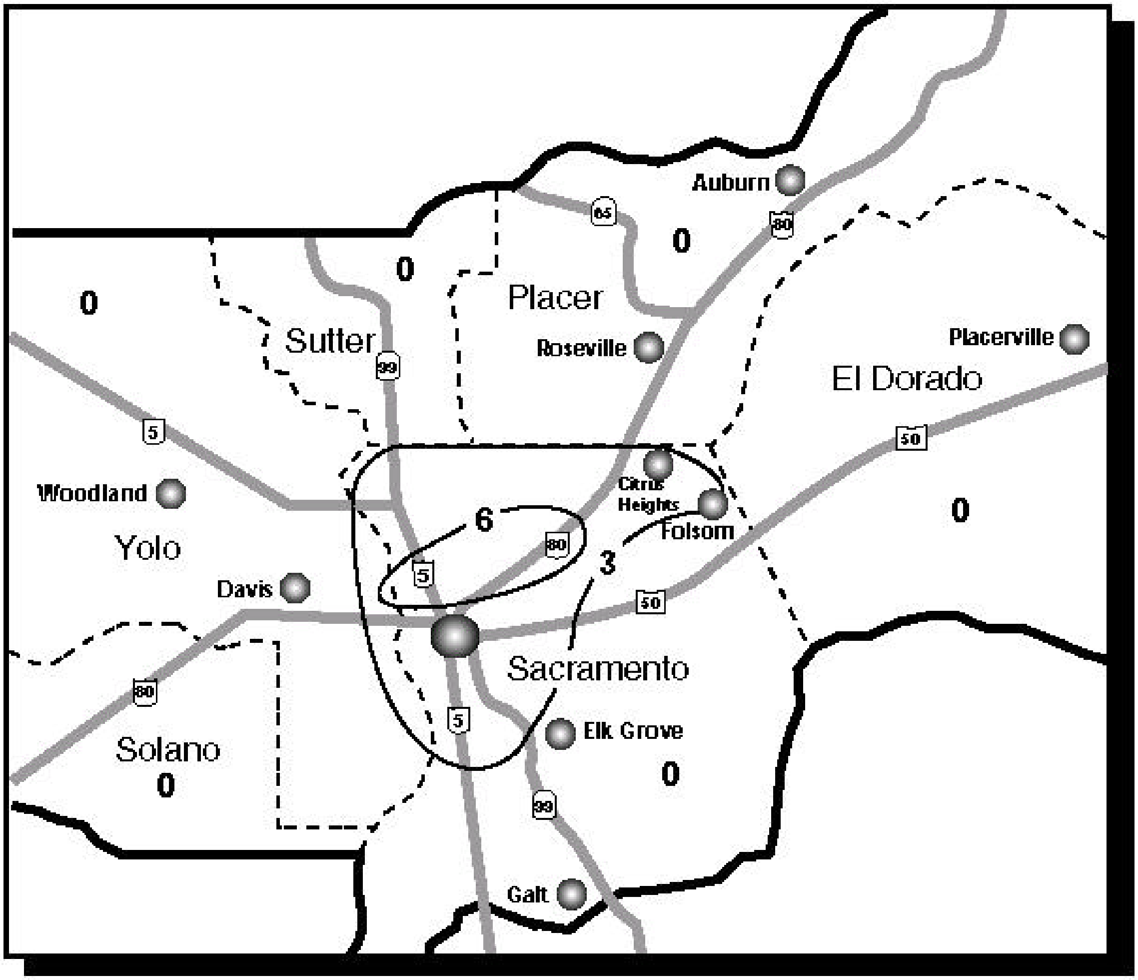

Figure 6.2 Regional Background Map for Carbon Monoxide 8-Hour Standard (Concentration in Parts per Million)

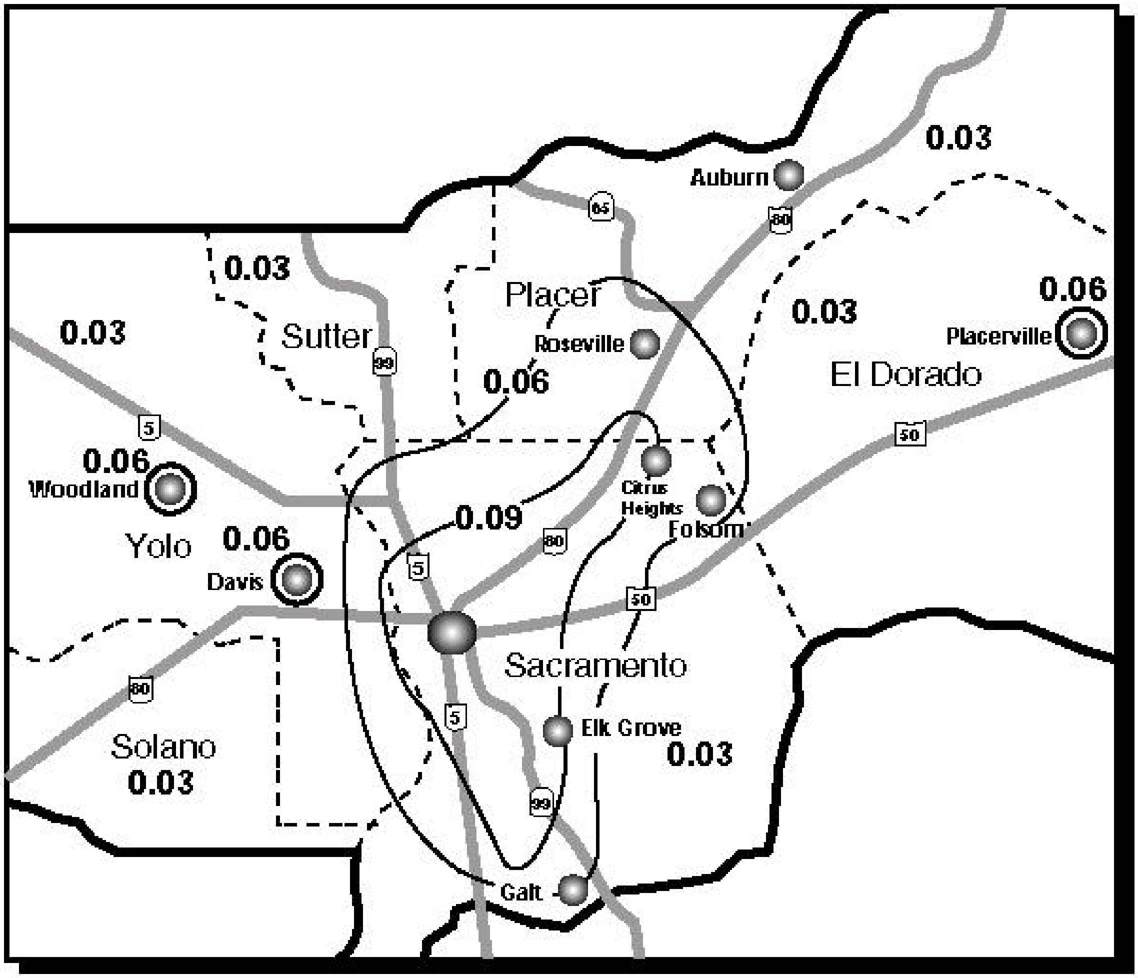

Figure 6.3 Regional Background Map for Nitrogen Dioxide 1-Hour Standard (Concentration in Parts per Million)

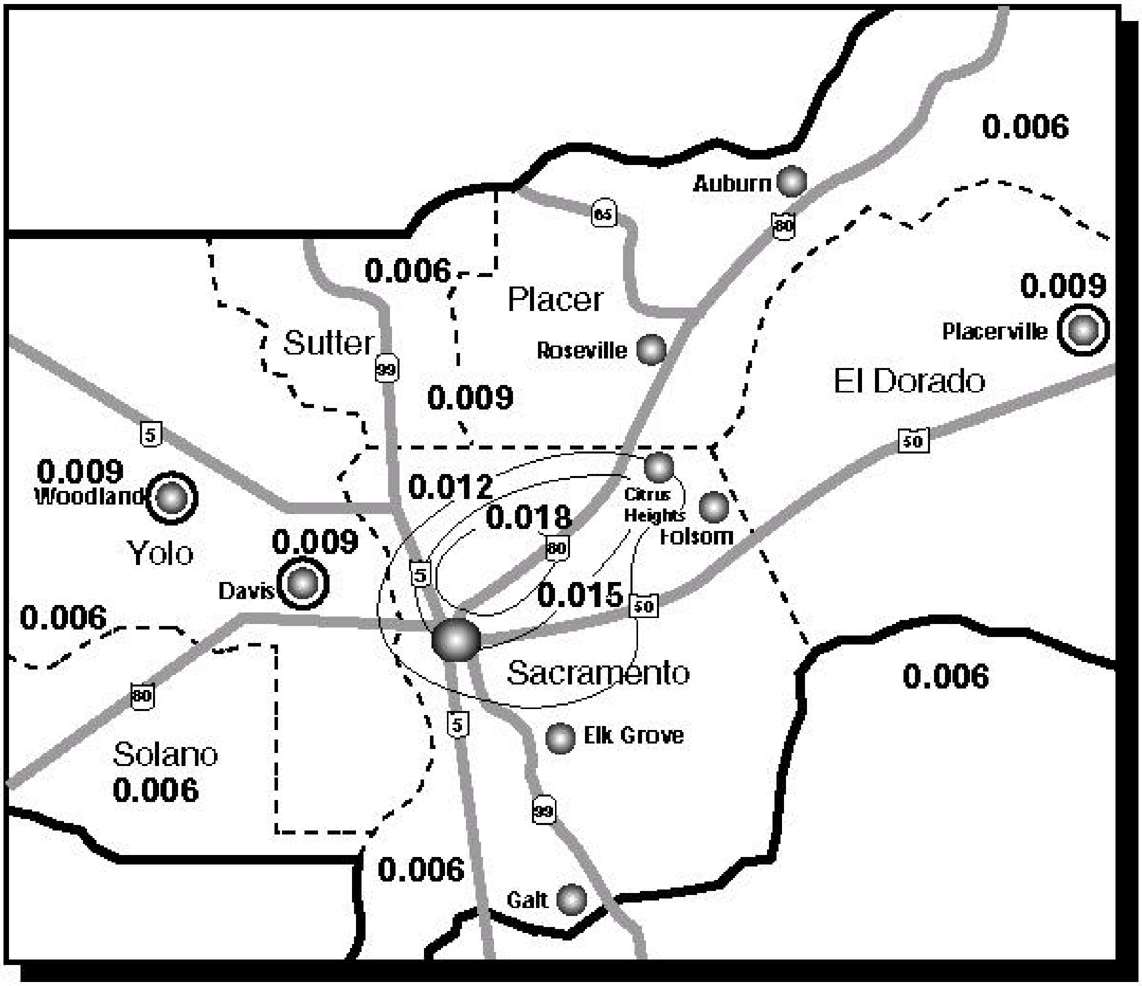

Figure 6.4 Regional Background Map for Nitrogen Dioxide Annual Standard (Concentration in Parts per Million)

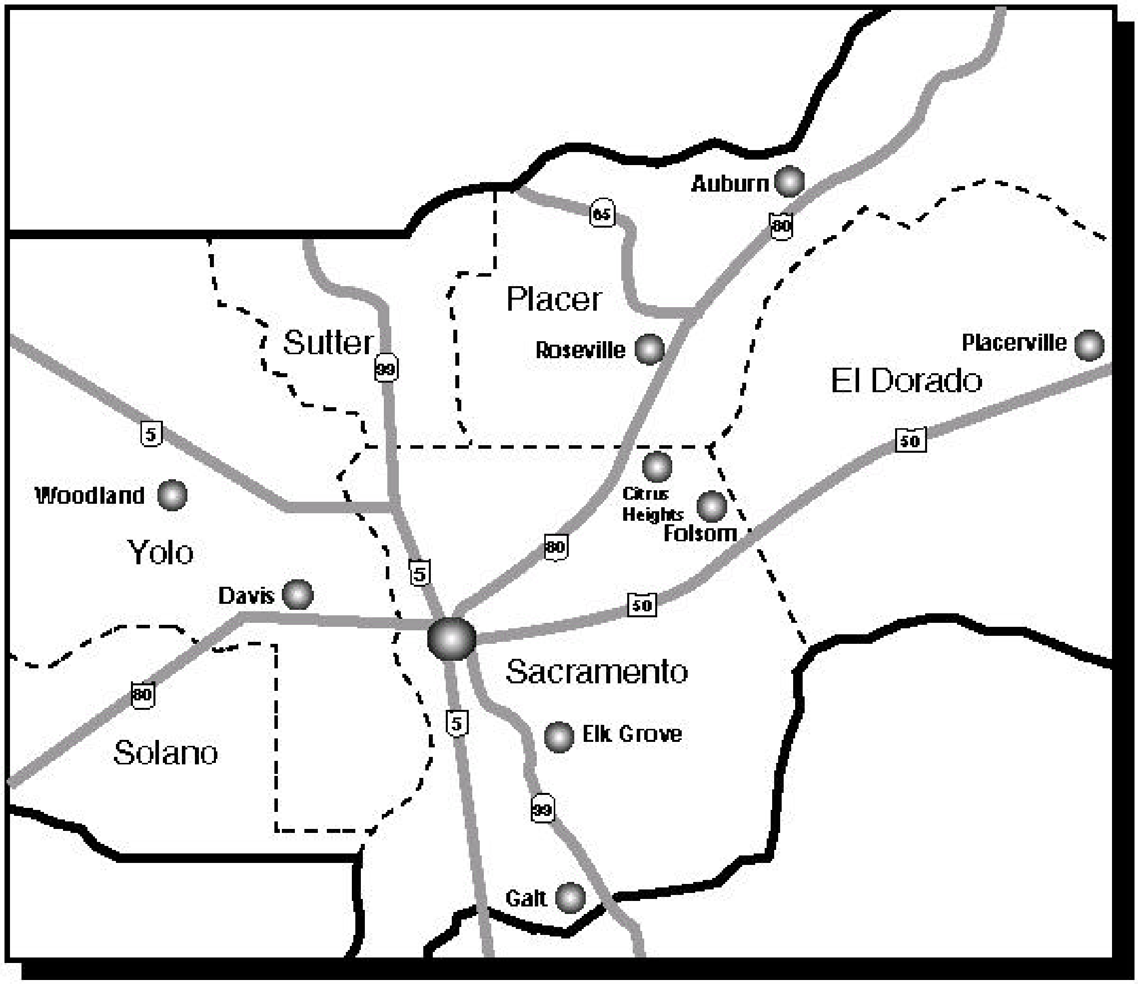

Figure 6.5 Regional Background Map for Sulfur Dioxide 1-Hour Standard (Concentration in Parts per Million)

[Values still being developed]

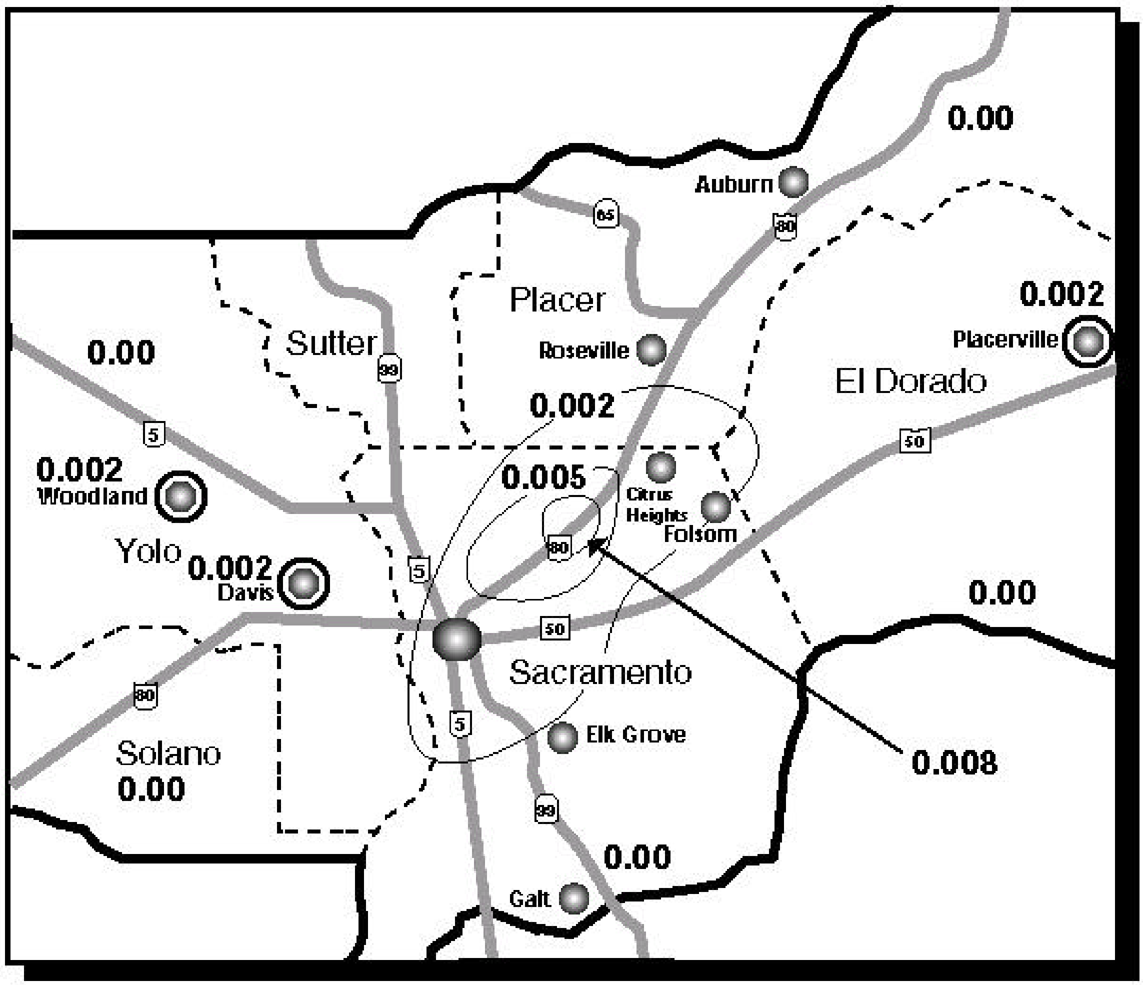

Figure 6.6 Regional Background Map for Sulfur Dioxide 24-Hour Standard (Concentration in Parts per Million)

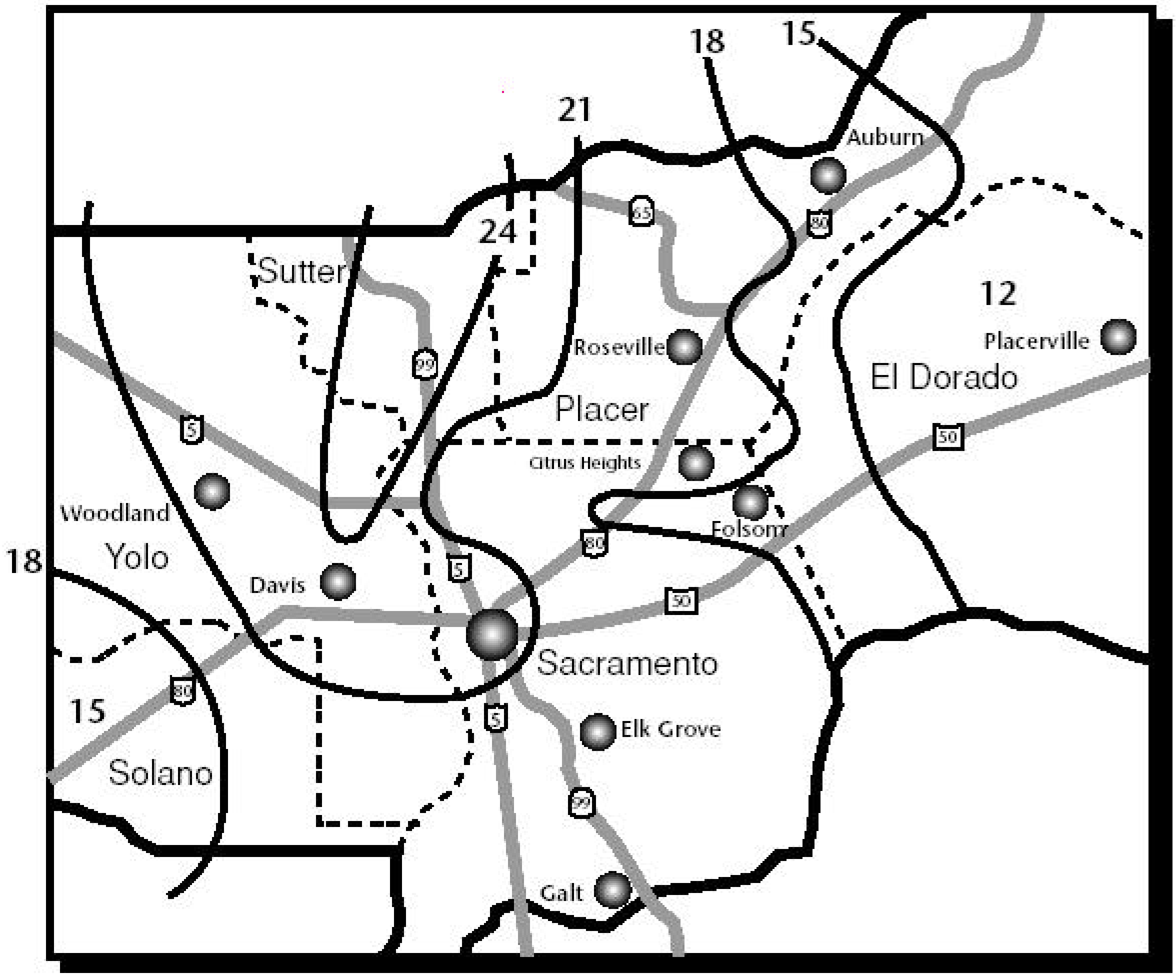

Figure 6.7 Regional Background Map for PM_{10} 24-Hour Standard (Concentration in Parts per Million)

6.3.4. Table 6.2, line 2: Project-Related Emissions Concentration. The first step to determine a project's contribution to CO concentration levels requires an estimate of peak-period trip generation. Appendix D includes information and procedures for estimating daily trip generation.

Step 1: Multiply total daily trips by 0.1 to estimate peak-period trip generation.

Step 2: Table 6.4 shows CO emission concentrations associated with project-related peak-period traffic levels. Locate the level of peak period traffic estimated for the project in column one to determine the project-related pollutant concentration contribution (intermediate values may be interpolated). Enter the result on line 2 of Table 6.2. (Use 70 percent of the one-hour value for the CO eight-hour concentration.)

For land development projects primarily associated with indirect emissions from gasoline-powered vehicles, PM_{10} may be assumed to be insignificant and zero may be entered on line 2 of Table 6.2; the same measures that limit vehicular ROG and NOx emissions to *de minimis* levels for such projects will assure that PM_{10} emissions are *de minimis* as well. For development projects that will induce Diesel-powered vehicle activity greater than occurs in the general mix of vehicular activity (such as a warehouse development, or stores that receive frequent truck deliveries) project-specific estimates of PM_{10} emissions must be developed and ambient effects must be demonstrated through modeling, in a manner acceptable to the District, unless truck activity or fuel use is below the *de minimis* thresholds used for analysis of toxic air contaminants in Chapter 7 (10 trucks/day). Similarly, for industrial projects that directly emit PM_{10} (or SO_2 or NO_2 as precursors to PM_{10} aerosols), unless full emission offsets are provided, emissions analysis and modeling must be used.

For directly emitted SO_2 or NO_2, project-related concentrations need only be estimated if the project is one that contains components that are known to produce SO_2 or NO_2, such as sources that burn sulfur-based fuels or that have components such as power plants or oil refineries, or projects that generate more heavy-duty vehicle trips than occur generally. The District staff should be consulted for projects of this type. For all other cases, zero may be entered for Project-Related Emissions Concentration.

Table 6.4 Project-Related CO Concentration Levels

Additional Peak-Hour Trips[1]	Parts Per Million CO[2]
100	0.4
200	0.7
300	1.1
500	1.7
1000	3.1
2000	5.6
3000	7.7

[1] Approximately ten percent of total daily trips.
[2] Assumes average speed of fifteen miles per hour. Calculations based on CALINE4 computer modeling.

6.3.5 Table 6.2, line 3: Anticipated Concentration. Sum the Background Concentration and the Project-Related Concentration Contribution for the pollutant being evaluated and enter the result as the Anticipated Total Concentration in Table 6.2.

6.3.6 Table 6.2, line 4: AAQS. Insert the appropriate standard for the pollutant evaluated from Appendix B for the AAQS Threshold in Table 6.2.

6.3.7 Table 6.2, line 4: Significance Determination. Subtract the AAQS from the Anticipated Total Concentration and enter the result for Significance Determination. If the value calculated for the Significance Determination is greater than zero, then a project's impacts are considered significant for that pollutant if either of the two following conditions is met:

1. The project is located within one quarter mile of a sensitive receptor; or
2. The Project Related Pollutant Concentration exceeds 5% of the applicable air quality standard.

If the analysis indicates that a project's impacts are significant, a more refined modeling analysis may be required. The District can assist the Lead Agency in identifying dispersion models for site-specific analysis. The use of CALINE4 is recommended to estimate the potential for CO hot spots or possible significant NO_2 concentrations. The CALINE4 software and user's manual can be accessed and downloaded from the CALTRANS website at www.dot.ca.gov. For PM_{10}, SCREEN3 or ISCST3 is recommended.

6.4 Determining the Significance of Transportation Projects

Transportation projects are different from other projects in that their long-term operational significance can usually be determined by whether they are included in the applicable Transportation Improvement Plan (TIP). Since TIPs in nonattainment and maintenance areas must be in conformity with the local air quality plan, a project that is not included in the TIP, by definition, is considered to have a significant air quality impact. See Chapter 9 for a discussion of Transportation Conformity. Exceptions are made for most safety improvement, landscaping, and transit projects. For a comprehensive list of exceptions, consult the UC Davis Institute of Transportation Studies (ITS) Transportation Project-Level CO Protocol (1997). Like the CALINE4 dispersion model, the CO Protocol can also be downloaded from the CALTRANS website at www.dot.ca.gov.

If a transportation project is included in the applicable TIP, the project's operational impacts will usually not be considered significant unless the project has changed. If significant changes have been made to the project's scope, a more detailed analysis may need to be performed to determine whether emissions from the new project will be higher than those projected in the plan. There are a number of tools available for making this determination. These include the previously mentioned UC Davis Project Level CO Protocol, and emission factor dispersion models such as CT-EMFAC and CALINE4.

6.5 Mitigating Significant Impacts

6.5.1 Carbon Monoxide. Significant CO impacts can be mitigated to some extent by increasing traffic speeds through methods such as traffic light synchronization, improved intersection channelization, inclusion of left turn lanes, demand management strategies, or through site design measures which can considerably reduce the impacts of proximate CO through improved dispersion. Expansion of a roadway by adding additional through-lanes to increase speeds may not be a preferable mitigation measure, however, because the resulting increase in traffic volume may negate any reductions in CO gained from the speed increase.

6.5.2 PM_{10}. PM_{10} impacts from industrial operations can be reduced by installation of additional or more efficient control equipment, or by the use of cleaner fuels. PM_{10} emissions from transportation activities are typically from Diesel-fueled vehicles or equipment, and can be mitigated through replacement or retrofit with newer, cleaner vehicles or equipment, or by the use of cleaner fuels or fuel additives.

6.5.3 Nitrogen Dioxide. Nitrogen dioxide impacts can be mitigated by reducing the use of motor vehicles, controlling sources of industrial combustion, and taking steps to minimize energy use wherever possible.

6.5.4 Sulfur Dioxide. Mitigation measures for sulfur oxides include overall reduction of the use of high sulfur fuels. Using low sulfur reformulated diesel fuel for heavy-duty vehicles, or using natural gas vehicles as an alternative can do this. Conservation of energy is another mitigation measure that can help reduce concentrations of SO_2.

6.5.5 Other Measures. Many measures that are incorporated into projects to mitigate impacts of ROG or NOx can mitigate CO, PM_{10}, SO_2, or NO_2 as well. Below is a list of mitigation measures listed in other sections that can also reduce operation-related emissions of CO, PM_{10} and other pollutants:

- Reduce Employee Trips
- Maintain stationary and mobile equipment in proper running order
- Implement a vehicle reduction measure listed in Appendix E
- Phasing of the project with roadway improvements
- Installation of energy-efficient appliances or equipment