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## **CALTRANS INTERIM GUIDANCE: PROJECT-LEVEL PM<sub>10</sub> HOT-SPOT ANALYSIS**

### ***OVERVIEW – INTERIM PROJECT-LEVEL PM<sub>10</sub> ANALYSIS GUIDANCE***

This guidance is being distributed within Caltrans staff as an “Interim” document. The Federal Highway Administration (FHWA), together with other agencies participating in the California Statewide Conformity Working Group, is in the process of developing additional PM<sub>10</sub> project-level analysis guidance. It will likely take many months, at least, before guidance from FHWA and others becomes available. Caltrans is distributing this guidance to assist project analysts during the interim period.

### ***CONTEXT - PROJECT-LEVEL AIR QUALITY ANALYSIS***

Project-level air quality analysis and reporting serves three main functions:

- Documents "Affected Environment" of a project in terms of air quality, the current status of air quality planning in the region where the project is to be built, and regional Federal Clean Air Act Conformity findings specific to that project.
- Documents project-specific issues and findings required for Conformity under the Federal Clean Air Act.
- Provides information needed to determine impacts, mitigation measures, and significance of impacts for CEQA and NEPA environmental document preparation.

PM<sub>10</sub> hot spot analysis is required by the US EPA Transportation Conformity Rule (40 CFR 93.116 and 40 CFR 93.123) in order to determine project-level Conformity in PM<sub>10</sub> nonattainment or maintenance areas (Federal standards). Hot-spot analysis for Conformity purposes deals primarily with in-use project emissions, not construction emissions. It is also usually necessary to address construction-stage PM<sub>10</sub> emissions from projects for CEQA purposes, since practically all of California is nonattainment for PM<sub>10</sub> under State standards. Construction activities lasting five years or less are considered temporary impacts under the Transportation Conformity Rule and are normally not subject to hot-spot analysis requirements (40 CFR 93.123(c)(5)). This guidance deals only with qualitative PM<sub>10</sub> hot-spot analysis addressing Transportation Conformity requirements, but the procedures may also be helpful for CEQA analysis purposes.

### ***WHAT IS HOT-SPOT ANALYSIS?***

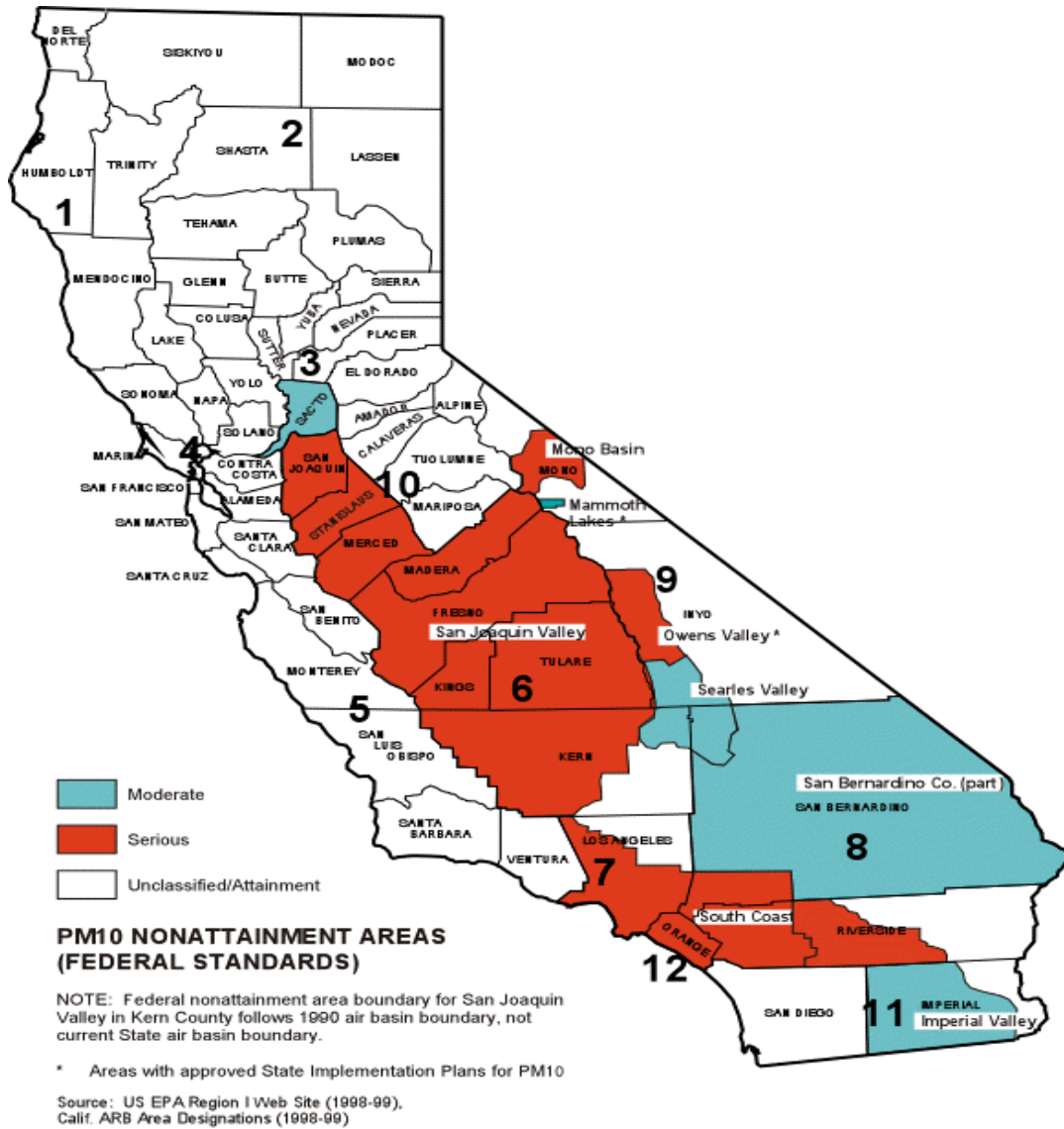
Transportation facilities may generate localized high concentrations of air pollutants. This is most likely to occur where large amounts of traffic operate under heavily congested conditions, or where unusually large numbers of diesel-powered vehicles can be expected to occur especially if they will be idling for a substantial period of time. Hot Spot Analysis concentrates on air quality impacts which may occur as a direct result of transportation facility operation, and in the immediate vicinity of the facility.

### ***WHERE IS PM<sub>10</sub> HOT-SPOT ANALYSIS REQUIRED FOR CONFORMITY PURPOSES?***

Projects are only subject to hot spot analysis requirements for PM<sub>10</sub> if they are located in a PM<sub>10</sub> nonattainment or maintenance area.

PM<sub>10</sub> hot spot analysis is required, for Conformity purposes, in the California regions listed in the following map and table. Many "Moderate" areas have not experienced a monitored PM<sub>10</sub> violation for a number of

years. As of January 2000, there are no Maintenance (Attainment with an approved Maintenance Plan)



areas in California for the Federal PM10 standard.

PM <sub>10</sub> Nonattainment Area Designation	Location
Serious	Coachella Valley
Serious	Mono Basin Planning Area
Serious	Owens Valley Planning Area (SIP approved)
Serious	San Joaquin Valley
Serious	South Coast Air Basin
Moderate	Imperial Valley
Moderate	Mammoth Lakes Planning Area (SIP approved)
Moderate	Sacramento County

Moderate	San Bernardino Co. outside South Coast Air Basin and Searles Valley Planning Area
Moderate	Searles Valley Planning Area

Projects in attainment areas (Federal PM<sub>10</sub> standard) may need to perform hot spot analysis for CEQA or NEPA purposes independent of Conformity analysis requirements. Typically, this would be done if a fair argument could be made that the project has the potential for causing a hot spot, or at least elevated levels of pollutants subject to localized impact analysis. All of California except for Lake County is nonattainment for the State PM<sub>10</sub> standard.

### **WHAT KIND OF PROJECTS MUST HAVE HOT SPOT ANALYSIS?**

In PM<sub>10</sub> nonattainment and maintenance areas, hot-spot analysis must be done for all projects unless they are exempt from *all* conformity analysis requirements. The exempt projects types are listed in "Table 2" (40 CFR 93.126) of the Transportation Conformity Rule. A copy of the list is attached. The hot spot analysis or documentation that the project is exempt must be included in the project-level air quality report, and should be summarized in the project's environmental document or Categorical Exemption/Exclusion determination.

QUANTITATIVE PM<sub>10</sub> hot-spot analysis is **not** required for Conformity purposes at the time this guidance is being prepared. Specific guidance from EPA, published in the Federal Register, is required before the Conformity Rule's PM<sub>10</sub> quantitative analysis requirements apply (40 CFR 93.123(b)(4)). Even after the guidance is issued, quantitative analysis will ordinarily be required only for: intersections identified in air quality attainment plan modeling as exceeding standards; intersections with characteristics substantially similar to those modeled in the SIP with exceedances; and facilities which support unusual concentrations of diesel-powered vehicles such as truck and bus terminals, and railroad yards. As of January 2000, EPA had no immediate plans to issue PM<sub>10</sub> hot spot analysis guidance; therefore, quantitative PM<sub>10</sub> hot spot analyses will NOT be required under Conformity in the near future.

QUALITATIVE PM<sub>10</sub> hot-spot analysis is required for all projects in PM<sub>10</sub> nonattainment or maintenance areas unless they are exempt as described above.

### **WHAT ANALYSIS PROTOCOL SHOULD BE USED?**

*Quantitative Analysis:* There is no EPA-accepted or required protocol for PM<sub>10</sub> quantitative hot-spot analysis. If a facility will accommodate a large concentration of diesel vehicles, then quantitative analysis for CEQA or NEPA purposes may be required (but not for Conformity). Consult with Headquarters Environmental if assistance is required to determine which modeling protocol(s) to use or adapt in those special cases.

*Qualitative Analysis:* There is no specific FHWA/FTA- or EPA-accepted protocol for PM<sub>10</sub> qualitative analysis. The most recent draft guidance from FHWA HQ is attached, but note that the draft is still an early product and will likely undergo substantial revision before it is finalized. However, explicit consideration of how a project may affect localized PM<sub>10</sub> concentrations is required. Major projects (EIR/EIS or complicated ND/FONSI being prepared) located in an area that has monitored Federal PM<sub>10</sub> violations or which has PM<sub>10</sub> concentrations very close to the Federal PM<sub>10</sub> standard should be individually taken through Interagency Consultation for Conformity purposes."

UCD has performed studies for Caltrans indicating that, absent unusual circumstances, a transportation facility in California is unlikely to cause or experience a localized PM<sub>10</sub> problem unless the immediate vicinity is already at or above standards. Until a formal protocol is developed and accepted statewide, use the following general procedure:

1. Confirm and document whether the project is located in a PM<sub>10</sub> nonattainment or maintenance area (Federal standards).

2. Locate nearby existing PM<sub>10</sub> monitoring site(s) operated by an air pollution control district/air quality management district, or other air quality agency. Evaluate and document whether the monitor location is clearly subject to unusual sources of PM<sub>10</sub> that may not be present at the project site; use of a monitor meeting "neighborhood-scale" criteria is desirable. Obtain (from the air district if possible, in order to get up-to-date information, or from Air Resources Board publications) records of PM<sub>10</sub> monitoring at the site(s). [Note, ARB has this information available via the Internet; see Web addresses at end of this guidance document.] Document whether NAAQS violations have occurred within the last 3 years, and evaluate how close to exceedance the monitor has been if no NAAQS violations have occurred. If no violations have been recorded in the project vicinity by air district monitors, and the monitored concentrations are not close to the NAAQS (meaning within about 80 to 90 percent of the NAAQS concentration threshold), Caltrans/UCD studies strongly suggest that no PM<sub>10</sub> hot spot can occur as a result of a typical project. See sample discussion below.
3. Evaluate and document whether unusual circumstances exist that may result in a localized PM<sub>10</sub> exceedance while the project is IN OPERATION (not during construction). Unusual circumstances might include, for instance, heavy wintertime sanding operations for snow control, unpaved shoulders in loose material on a road with more than about 500 ADT, or other facility-related issues that could cause high silt loading on the road surface. Also, if the project is likely to have a high concentration of diesel vehicles (typically things like truck/bus terminals, rail yards, possibly weigh stations and rest areas) unusual circumstances may be present and should be investigated.
4. Summarize the evaluation results and make a written commitment to including all PM<sub>10</sub> mitigation measures for transportation projects that are required in the PM<sub>10</sub> SIP or applicable regulations. These mitigation measures will vary by air district and air basin, but could include wetting of exposed soil and covering of trucks and other dust sources. Itemize the measures required and the project features that address them if possible. For examples of measures that can be used to address PM<sub>10</sub> emissions from highway operations, look at the Paved/Unpaved Road PM<sub>10</sub> regulations of the San Joaquin Valley Unified Air Pollution Control District and South Coast Air Quality Management District. [Internet addresses for the location of these rules are listed below; an appendix includes sample language from the South Coast Air Quality Management District.]
5. If the PM<sub>10</sub> nonattainment area's SIP includes control measures that impact transportation projects, then the FHWA/FTA project must comply with any PM<sub>10</sub> control measures in the applicable SIP. This criterion is satisfied if the project-level conformity determination contains a written commitment to include those control measures in the final plans, specifications, and estimates for the project. These SIP controls may be for the purpose of limiting PM<sub>10</sub> emissions from construction activities and/or normal use and operation associated with the project. Consult with the air district about applicable SIP requirements. If the PM<sub>10</sub> SIP for the area has not yet been approved by EPA, but the air district has enacted rules pertaining to PM<sub>10</sub> based on the SIP submittal, compliance with those rules should be documented for NEPA purposes.
6. Document dates, contacts, and results of Interagency Consultation under the Conformity procedures applying to the project area. Until a protocol is developed which can be accepted statewide or as a regional standard (like the CO Protocol), it will be necessary to carry out and document formal Interagency Consultation for each project that might be considered a contributor to violations of the Federal PM<sub>10</sub> standards. The assumptions, procedures, and findings of the analysis must be approved through this process.

### ***THRESHOLDS OF SIGNIFICANCE (CEQA)***

Caltrans has not formally adopted thresholds of significance related to PM<sub>10</sub>. The default thresholds are therefore the adopted air quality standards under the California Clean Air Act. Since practically all of California is in nonattainment for PM<sub>10</sub>, localized information should be developed. The State PM<sub>10</sub> standard is extremely stringent, so many monitors in urban areas will show nonattainment. The project generalist should discuss with legal staff whether this may require an EIR in order to deal with potential additional emissions in a nonattainment area.

All projects which add capacity (arguably, this includes any project that adds lanes in any form, but certainly includes projects that add through lanes or a new facility), under current EPA-approved analysis methods (AP-42) for re-entrained dust and similar materials, will increase PM<sub>10</sub>. It is not possible at this time to unequivocally demonstrate that the normal mitigation measures (paved shoulders, curbs, sweeping, etc.) can reduce this impact to insignificance. So unless the nearby monitor used for the qualitative analysis clearly shows *State* attainment (<65 µg/m<sup>3</sup> annual geometric mean) a capacity enhancement project may have a problem.

Regional transportation plan air quality analyses usually show that the transportation system will not increase PM<sub>10</sub> overall, considering all sources (direct, indirect, and secondary formation). Consult with the MPO which maintains the regional transportation plan and Conformity determination, and the air district, to verify this and its applicability to the project. It may be enough to demonstrate that a project which is clearly covered by the MPO plan and program will not have a significant regional or cumulative impact. Unusual circumstances (high concentration of diesel vehicles, high silt loading or regular wintertime sanding, etc.) can also suggest a need for a higher-level document and evaluation of possible mitigation measures for localized impacts.

### ***SAMPLE QUALITATIVE PM<sub>10</sub> HOT SPOT PROJECT ANALYSIS FINDING***

This sample language is a modified version of documentation recently prepared for a Los Angeles-area project for Conformity purposes. FHWA has not yet reviewed and approved the language as of January 2000.

#### Finding

There is no reason to believe that this project will contribute to a PM<sub>10</sub> hot spot that will cause or contribute to violations of the PM<sub>10</sub> National Ambient Air Quality Standards (NAAQS).

#### Discussion

At the regional scale, this project is included in the Approved RTP and TIP. Regional PM<sub>10</sub> SIP budget compliance was accounted for during the RTP and TIP conformity determinations, [or the regional conformity determination demonstrated that the Emission Reduction Test(s) were passed]. No violations of the PM<sub>10</sub> NAAQS have been recorded at monitoring site(s) near the project, and the monitored concentrations are well below the standards. The PM<sub>10</sub> "Air Quality Summaries" for years 1993-1997 published by the Air Resources Board and the \_\_\_\_\_ AQMD for the (specify location) PM<sub>10</sub> monitor (the monitor closest to the project site) showed no monitored violations occurred at or near the project location, and documented PM<sub>10</sub> concentrations well below the standard. For example, ARB's 1997 data show a maximum 24-hour concentration of \_\_\_ µg/m<sup>3</sup>, approximately 60 percent of the federal standard.

#### Summary of Related Studies

Recent work by U.C. Davis and others suggests that project-level PM<sub>10</sub> impacts are insignificant beginning a short distance downwind of the project. These studies document that unless background conditions already contribute to pollutant concentrations that exceed or are close to the NAAQS threshold, project impacts will be negligible. Provided here is a brief summary of three recent studies documenting the insignificant contribution of project-level PM<sub>10</sub> emissions.

"Final Report: Traffic Generated PM<sub>10</sub> Hot Spots" (Ashbaugh et al., 1996): The study evaluated PM<sub>10</sub> associated with a Sacramento area intersection (Florin Road and Stockton Boulevard). The authors conducted a field study involving PM<sub>10</sub> sampling during August 1995. The study concluded: "All the [PM<sub>10</sub>] species measured at the intersection dispersed almost completely back to background levels within 100 meters of the intersection. Furthermore, the measured and predicted 24-hour concentration increases due to the intersection were about 15 µg/m<sup>3</sup>, well below the current PM<sub>10</sub> standard of 150 µg/m<sup>3</sup>. For this reason, and given the uncertainties associated with surface silt loadings,

particularly for projects that have not yet been built, it appears that regional emission budgets would be a better approach to controlling possible exceedances of the [national ambient air quality] standard.”

“Final Report: Wintertime Traffic Generated PM<sub>10</sub> Hot Spots” (Ashbaugh et al., 1998): The study evaluated PM<sub>10</sub> associated with a heavily-traveled, congested Sacramento area intersection (Sunrise Boulevard and Greenback Lane). The authors conducted a field study involving PM<sub>10</sub> sampling during February and March 1997. The study concluded: “The primary objective of this study was to investigate whether a large intersection was likely to be a PM<sub>10</sub> “hot spot” during periods of low wind speed and poor dispersion... The concentrations at the SW Far site were higher than at the intersection in nearly all cases, which suggests that the intersection was not acting as a “hot spot” of PM<sub>10</sub> ... The highest measured concentrations did not approach the PM<sub>10</sub> standard, and were sustained for only a few hours. Thus, the 24-hour average was even lower than the peak concentrations... The Sunrise Boulevard/Greenback Lane intersection is not a “hot spot” of PM<sub>10</sub> emissions under the meteorological and traffic conditions measured. This finding confirms the earlier work at Stockton Boulevard/Florin Road, a much smaller intersection. The highest concentrations measured during this study occurred during stagnant conditions, as expected, but they did not approach the ambient air quality standard and were centered on the intersection.”

“Draft Final Report: Multiple Air Toxics Exposure Study in the South Coast Air Basin, MATES-II” (SCAQMD, 1999): The study evaluated air toxics concentrations, including toxic particulate matter emitted by diesel-powered motor vehicles, and assessed the relative concentrations at regional scale and microscale sites. The study focused on air toxics, finding that particulate matter was responsible for the vast majority of mobile source-related air toxics health risks. In general, the study further confirms the U.C. Davis PM<sub>10</sub> studies’ findings regarding microscale PM. The MATES-II study monitored air toxics at three microscale sites specifically chosen “because of influence and proximity to major mobile sources (e.g., congested freeways).” The South Coast Air Quality Management district concluded, in part: “No significantly higher levels of key mobile source toxics compounds, benzene and 1,3 butadiene, were found at any of the microscale sites, including those sited near freeways specifically for mobile source influences.” In addition, the study concluded: “Because risk levels ascribed to nearby sources inventoried for the study are generally much lower than region-wide risk levels, region-wide risks tend to overwhelm any potential local “hot spots.”

#### References for Study Summary Descriptions

- Asbaugh et al., 1996. Final Report: Traffic Generated PM<sub>10</sub> Hot Spots. Prepared for the California Department of Transportation, under Caltrans Contract No. 53V606 A2. Prepared by L. Ashbaugh, R. Flocchini, D. Chang, V. Garza, O. Carvacho, T. James, R. Matsumura. Air Quality Group, Crocker Nuclear Laboratory, University of California, Davis. August.
- Ashbaugh et al., 1998. Final Report: Wintertime Traffic Generated PM<sub>10</sub> Hot Spots. Prepared for the California Department of Transportation. Contract No. 43X878. Prepared by L. Ashbaugh, R. Flocchini, R. Matsumura, T. James, O. Carvacho, C. Tsubamoto, M. Brown. Air Quality Group, Crocker Nuclear Laboratory, University of California, Davis. September 3.
- SCAQMD, 1999. Draft Final Report: Multiple Air Toxics Exposure Study in the South Coast Air Basin, (MATES-II). Prepared by the South Coast Air Quality Management District. November. 1999

## **ADDITIONAL RESOURCES**

Caltrans External Web Site: <http://www.dot.ca.gov/hq/Environmental/air/Disclm.htm>  
*CO hot-spot analysis guidance and models*

Caltrans Internal Web Site: <http://trenv.dot.ca.gov/air/main.htm>  
*Air quality and Conformity information for Caltrans planning and environmental staff*

California Air Resources Board:

General site on transportation and air quality planning: <http://www.arb.ca.gov/planning/planning.htm>

Web site for air quality monitoring data: <http://www.arb.ca.gov/aqd/aqd.htm>

Air Pollution Control District Rules searchable database: <http://www.arb.ca.gov/html/drdb.htm>

Air Pollution Control District addresses/phones: <http://www.arb.ca.gov/capcoa/roster.htm>

San Joaquin Valley Unified Air Pollution Control District:

Paved and Unpaved Road Requirements: <http://207.126.64.79/rules/1ruleslist.htm#reg9>  
(Download "Rule8060.pdf")

South Coast Air Quality Management District:

Paved and Unpaved Road Requirements: <http://www.aqmd.gov/rules/html/r1186.html>  
(see Appendix for language from these requirements)

US EPA

Transportation Conformity Regulations (1997 Amendments, Federal Register package)  
<http://www.epa.gov/fedrgstr/EPA-AIR/1997/August/Day-15/a20968.pdf>

Transportation Conformity Web Page: <http://www.epa.gov/oms/transp/traqconf.htm>

US DOT

FHWA Air Quality Web Page: <http://www.fhwa.dot.gov/environment/aq.htm>

## **Appendix A: Projects Exempt from All Conformity Analyses**

40 CFR 93.126 states: “Notwithstanding the other requirements of this subpart, highway and transit projects of the types listed in Table 2 of this section are exempt from the requirement to determine conformity. Such projects may proceed toward implementation even in the absence of a conforming transportation plan and TIP. A particular action of the type listed in Table 2 of this section is not exempt if the MPO in consultation with other agencies (see Sec. 93.105(c)(1)(iii)), the EPA, and the FHWA (in the case of a highway project) or the FTA (in the case of a transit project) concur that it has potentially adverse emissions impacts for any reason. States and MPOs must ensure that exempt projects do not interfere with TCM implementation.” Table 2 is reproduced here.

### **TABLE 2--EXEMPT PROJECTS**

#### **Safety**

Railroad/highway crossing.  
Hazard elimination program.  
Safer non-Federal-aid system roads.  
Shoulder improvements.  
Increasing sight distance.  
Safety improvement program.  
Traffic control devices and operating assistance other than signalization projects.  
Railroad/highway crossing warning devices.  
Guardrails, median barriers, crash cushions.  
Pavement resurfacing and/or rehabilitation.  
Pavement marking demonstration.  
Emergency relief (23 U.S.C. 125).  
Fencing.  
Skid treatments.  
Safety roadside rest areas.  
Adding medians.  
Truck climbing lanes outside the urbanized area.  
Lighting improvements.  
Widening narrow pavements or reconstructing bridges (no additional travel lanes).  
Emergency truck pullovers.

#### **Mass Transit**

Operating assistance to transit agencies.  
Purchase of support vehicles.  
Rehabilitation of transit vehicles.\*  
Purchase of office, shop, and operating equipment for existing facilities.  
Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts, etc.).

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\* In PM<sub>10</sub> nonattainment or maintenance areas, such projects are exempt only if they are in compliance with control measures in the applicable implementation plan.

Construction or renovation of power, signal, and communications systems.

Construction of small passenger shelters and information kiosks.

Reconstruction or renovation of transit buildings and structures (e.g., rail or bus buildings, storage and maintenance facilities, stations, terminals, and ancillary structures).

Rehabilitation or reconstruction of track structures, track, and trackbed in existing rights-of-way.

Purchase of new buses and rail cars to replace existing vehicles or for minor expansions of the fleet. \*

Construction of new bus or rail storage/maintenance facilities categorically excluded in 23 CFR part 771.

### **Air Quality**

Continuation of ride-sharing and van-pooling promotion activities at current levels.

Bicycle and pedestrian facilities.

### **Other**

Specific activities which do not involve or lead directly to construction, such as: Planning and technical studies.

Grants for training and research programs.

Planning activities conducted pursuant to titles 23 and 49 U.S.C. Federal-aid systems revisions.

Engineering to assess social, economic, and environmental effects of the proposed action or alternatives to that action.

Noise attenuation.

Emergency or hardship advance land acquisitions (23 CFR 712.204(d)).

Acquisition of scenic easements.

Plantings, landscaping, etc.

Sign removal.

Directional and informational signs.

Transportation enhancement activities (except rehabilitation and operation of historic transportation buildings, structures, or facilities).

Repair of damage caused by natural disasters, civil unrest, or terrorist acts, except projects involving substantial functional, locational or capacity changes.

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\* In PM<sub>10</sub> nonattainment or maintenance areas, such projects are exempt only if they are in compliance with control measures in the applicable implementation plan.

**Appendix B: Example Paved and Unpaved Road Requirements from the South Coast Air Quality Management District**

The Text provided below is from the South Coast Air Quality Management District's "Rule 1186. Pm<sub>10</sub> Emissions From Paved And Unpaved Roads, And Livestock Operations," Section D. The rule is available from the air district's Internet site: <http://www.aqmd.gov/rules/html/r1186.html>.

**Paved Roads**

(1) Any owner or operator of a paved public road on which there is visible roadway accumulations shall begin removal of such material through street cleaning within 72 hours following any notification of the accumulation and shall completely remove such material as soon as feasible. If removal cannot be completed within 10 days of notification, the owner/operator shall notify the Executive Officer and provide information on the location of the accumulation(s) and estimated removal completion date.

(2) Any government or government agency which contracts to acquire street sweeping equipment or street sweeping services for routine street sweeping on public roads that it owns and / or maintains, where the contract date or purchase or lease date is January 1, 2000 or later, shall acquire or use only certified street sweeping equipment.

(3) Any government or government agency subject to the requirements of paragraph (d)(2) and/or its contractors shall operate and maintain the certified street sweeping equipment in accordance with the manufacturer's specifications.

**Unpaved Roads**

(4) Any owner or operator of an unpaved public road shall annually treat unpaved roads that have greater than the average ADT of all unpaved roads in its jurisdiction (as determined by the owner/operator) beginning January 1, 1998 and each of the 8 calendar years thereafter by either:

(A) Paving at least 1 mile of such roads using typical roadway materials; or

(B) Applying chemical stabilization to 2 miles of such roads in sufficient quantities to maintain a stabilized surface; or

(C) Taking one or more of the following actions on 3 miles of such roads:

(i) Installing signage at 1/4 mile intervals that prohibits vehicular speeds in excess of 15 miles per hour (mph) as authorized by California Vehicle Code section 22365 and/or

(ii) Installing speed control devices (e.g., speed bumps) every 500 feet and/or

(iii) Maintaining the roadway in such a manner that inhibits vehicular speeds in excess of 15 mph to 3 miles of unpaved roads in its jurisdiction.

(Note: Treatment in excess of the annual requirement can be credited toward future year requirements.)

***Appendix C: Draft Guidance from FHWA (as of January 2000 this is preliminary and still undergoing review and comment)***

**FEDERAL HIGHWAY ADMINISTRATION DRAFT (Fall 1999) GUIDANCE FOR PM10  
QUALITATIVE ANALYSIS**

**Draft FHWA Guidelines for Performing a Qualitative Analysis for Projects in Particulate Matter (PM10) Nonattainment Areas**

The Conformity Rule described in the Clean Air Act Amendments of 1990 addresses the need to evaluate individual projects in nonattainment areas for their contribution to carbon monoxide (CO) and particulate matter (PM) emissions. The process used in this evaluation is referred to as project level or “hot spot” analysis since the analysis only estimates the emissions attributable to the particular project at the project’s location, not at other locations within the nonattainment area. Often, air quality analyses for pollutants are performed using “quantitative” methods employing computer models. Although the EPA does require quantitative analysis techniques for CO emissions, it does not currently require this detailed analysis for PM10 but has instead pursued the use of “qualitative” procedures to estimate a project’s local impact. The conformity process includes a requirement that qualitative analysis methods<sup>1</sup> be used to demonstrate a project’s impact on the surrounding air quality but provides little information on the technique that should be used. The information presented below was developed to address the need for qualitative methods for estimating PM10 emission impacts and provides guidelines on performing a qualitative analysis for determining the influence a project will have on an area’s PM10 air quality.

**Background for Project Level Conformity Determination**

The construction of a new highway facility or improvement to an existing facility requires that the project’s influence on the local air quality be estimated. According to the conformity rule, any project constructed in a PM10 nonattainment or maintenance area must demonstrate that no new local PM10 violations will be created and the severity or number will not be increased as a result of the project.<sup>2</sup> This analysis can be performed using quantitative or qualitative analysis<sup>3</sup>, however, for PM10, the EPA only *requires* qualitative analysis<sup>4</sup>. The project’s sponsor is permitted to use quantitative analysis methods incorporating the use of the PART5 and CAL3QHC computer models, however, since this is not required, this guidance will only address the qualitative procedures outlined.

It was EPA’s intent, when permitting the use of qualitative methods, that areas have maximum flexibility to decide what evidence is necessary to document that hot spots will not be created or worsened. As a result, the EPA required that an interagency consultation process be used to decide the methods and assumptions which can be used in the analysis.<sup>5</sup> The EPA has suggested that in this process, areas would consider local factors such as PM10 background concentrations, traffic volumes and speeds, diesel vehicle traffic, re-

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<sup>1</sup> See 40 CFR 93.123 (a)(2)(ii)

<sup>2</sup> See 40 CFR 93.116

<sup>3</sup> Qualitative analysis is an effort to accurately describe the current conditions and the likely future conditions or impacts resulting from a particular project. It does not rely on “calculations” or the use of computer models although it could include tables, charts, or graphs illustrating the possible impacts from the project (i.e. a table or graph illustrating the decrease in emission quantities resulting from reduced congestion of a similar project).

Quantitative analysis is a more rigorous analysis method using calculations and computer models to determine the changes in emissions before and after a project is built. Computations are shown to define impacts and for use in trying to design specific strategies to reduce emissions or to determine the quantity (typically expressed in tons/year) of emissions for the reason of regulation, emission credit trading, etc....

<sup>4</sup> See 40 CFR 93.123 (b)(4)

<sup>5</sup> See 40 CFR 93.105 (c)(1)(i)

entrained road dust, local meteorology, and the location, frequency, and severity of any existing localized PM10 violations.

#### Projects Requiring Qualitative Analysis

A qualitative analysis can be performed for any project although it is only **required** for projects located in nonattainment and maintenance areas. Other projects such as those located in areas attaining the NAAQS for PM10, those in area where PM is not likely to be a problem (rural areas), and those areas having background concentrations (low or high)<sup>6</sup> that could influence impacts are also projects that can use qualitative methods.

#### Qualitative Analysis Techniques

There are several approaches to qualitative analysis that can be used to meet the requirements of the conformity rule, the most common of which are described below. These approaches vary from a simple summary statement to more elaborate “estimations” of the anticipated emission concentrations. The method selected should be decided through consultation with all parties involved in the preparation of the document presenting the analysis. Three such analysis methods are described below. The technique selected should be based on the data available and the resources that the agency performing the analysis can expend on the study.

- 1) interagency consultation - a summary statement discussing the project’s contribution to PM10 emission concentrations at the project site; the summary would elaborate on the factors discussed below.
- 2) project precedence - a description of similar projects which are located in a similar area and the results including a discussion of the success by the other projects in reducing air pollution; this discussion would elaborate on the factors discussed below.
- 3) graphical and tabular illustration - use of tables, charts, or graphs illustrating anticipated effects; this illustrative description would elaborate on the factors discussed below.

#### Information Included in a Qualitative Analysis

The selection of any of the above methods should result from the interagency consultation process. A meeting of the agencies that participate in the conformity finding including federal, state, and local agencies should be held to discuss which method is appropriate for any given project. It is likely that one approach may be used for one project while a second approached used for another project. The only requirement is that the selected method be sufficiently detailed to demonstrate conformity with the SIP.

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<sup>6</sup> Areas having **low** background concentrations and a project that has **low** emissions is not likely to create a problem. In contrast, a project located in an area that has **high** background concentrations before the project requires an analyst to consider the minor impact that a new **low** emission project would contribute relative to the preexisting high background levels.

All analyses conducted should contain similar information regardless of the method selected including the project description, the factors that will influence the air quality (influence factors), and any programs that can be implemented to reduce emissions (mitigation practices) from the project. The extent to which any of these factors can be commented on depends on many constraints such as the availability of data, time to perform the analysis, and the degree of detail that desired among others.

#### Project Description

The qualitative analysis should begin with a brief description of the project including where it is located (rural, urban, suburban) and the project's scope (adding an interchange, widening a highway, changing signal timing, etc...).

#### Influence Factors

The "influence factors" are those elements that influence the quality of the air near the project and can generally be categorized into the areas listed below. These are not the only factors that can influence the air quality near a project, however, these are probably the most critical elements. Elaboration of these influence factors is discussed in the following paragraphs.

- 1) statement of existing air quality
- 2) traffic associated with trucks and cars
- 3) meteorology and climate for area
- 4) location of monitoring stations
- 5) miscellaneous information

Existing air quality should be included to establish the probability of air quality problems from the project. Developers and reviewers of the analysis study should be aware of the existing conditions so that they can understand the relative impact that the project is likely to have. It may be appropriate to cite published information regarding the trends (PM<sub>10</sub> concentrations dropping over the years especially as vehicle travel has increased).

Traffic information should describe current volumes and expected volumes since many projects involve adding capacity to reduce congestion while other projects add new access points. Traffic discussions should also describe any speed changes that may result from the project since vehicle speed is one method of evaluating the emission contribution. The speed and volume estimating method should be included (HPMS, etc...) Additionally, the "fleet" or "vehicle profile" describing the types and percentages of vehicles (mostly new cars, large diesel truck traffic, etc...) likely to use the project will provide important information when considering the contribution.

Meteorology is perhaps the single greatest influence on air pollution problems. Areas having atmospheric "inversions" are much more likely to have air quality problems than are areas that consistently experience strong winds. Temperature, amount of precipitation and other weather conditions are also causes that should be discussed. When performing a qualitative analysis for PM<sub>10</sub>, however, it should be noted that wind can also be the cause of air pollution. Areas experiencing "fugitive" or "wind blown" dust from agricultural areas or from natural geography can have particulate matter problems unrelated to the project. If fugitive dust is a problem in the area, it should be noted so that the influence of fugitive dust, and not necessarily vehicle "entrained" dust could be the cause. Unfortunately, fugitive dust and re-entrained dust can be interrelated problems.

Discussing the location of monitoring stations could also be useful since determining a project's proximity to a monitor could establish its influence. In addition to the project, there may be other sources of PM generated near the monitor such as a power plant, airport, or bus terminal that generate emissions not directly related to the project.

Other information that may also be provided include reports of respiratory illness in the area, unusual geological or atmospheric conditions, other sources and other conditions that could influence the area's air quality. Miscellaneous influencing factors could be whether the area has paved or unpaved shoulders, the number of unpaved roads, and whether roads are salted or sanded during winter storm events. Sources that also contribute to the PM problem should be outlined including agricultural fields, industrial factories, and power generation plants. Also any emission control programs such as I&M and RFG and transportation control measures that will influence the emission concentrations for the area should be discussed.

#### Mitigation Practices

In addition to describing the project's potential for creating an emission problem, the qualitative analysis process can provide a list of operational practices that could be implemented to mitigate or offset any PM problem that may be found to occur at a later time. A table including a menu of options is included below, however, many others may be possible. The options list is divided into solutions based on the suspected cause of the pollution although there may be other causes and solutions that are available.

#### Options to Reduce Particulate Matter Pollution

Suspected Source of PM10 Problem	Options to Reduce PM Pollution	
	Mitigation Measure	Comments
Fugitive Dust	Truck Cover Laws	
	Street cleaning program	includes vacuuming and flushing
Snow and Ice Control	Reduce the quantity of sand	use harder material that is not prone to grinding into finer particles
Diesel Emissions	Require PM Diesel "Traps" on diesel exhaust systems	
	Provide a "retrofit" program for older, high emitting vehicles	could be used on bus fleets to install newer engines or technologies know to have lower emissions

#### Presentation of the Analysis

The qualitative analysis can be short and specific or it can be long and explicit. The only guide to the quantity of supporting information that should be included is to try to present the least amount of information required which fully addresses the environmental impact. After providing several analyses, it

will become apparent the level of analysis which will be required by the specific reviewing agencies in an area.

Also included with this guidance is a set of examples in the appendix. Some of these may be helpful in designing individual programs. Other general information is included describing several scenarios that hopefully can be used in most areas.