3 CONSTRUCTION-GENERATED CRITERIA AIR POLLUTANT AND PRECURSOR EMISSIONS

3.1 INTRODUCTION

Construction activities have the potential to generate a substantial amount of air pollution. In some cases, the emissions from construction represent the largest air quality impact associated with a project. Even though the generation of construction-related emissions is temporary in nature, the emissions contribute to the inventory for Sacramento County. Under certain conditions, the increased pollution load can exceed California and National Ambient Air Quality Standards (AAQS) and/or expose nearby receptors to substantial pollutant concentrations. The emissions from construction activities should be assessed, and it should be determined if they could result in a significant air quality impact and, when necessary, appropriate mitigation should be developed to reduce the impact.

The most common construction activities include site preparation, earthmoving, paving of roadway surfaces, the erection of buildings and structures, and the application of architectural coatings. Earthmoving activities may consist of grading, trenching, soil compaction, and cut and fill operations. Site preparation includes activities such as general land clearing and grubbing. Some projects may also entail the demolition of buildings prior to site preparation.

The emissions generated from common construction activities include:

- Exhaust emissions of particulate matter (PM) and oxides of nitrogen (NO_X) from fuel combustion for mobile heavy-duty diesel- and gasoline-powered equipment, portable auxiliary equipment, material delivery trucks, and worker commute trips;
- Fugitive PM dust from soil disturbance and demolition activity;
- Evaporative emissions of reactive organic compounds (ROG) from paving activity and the application of architectural coatings. The application of architectural coatings is typically the largest source of ROG emissions during construction activity. The District addresses construction-related emissions of ROG through the implementation of District Rule 442, which regulates ROG emissions from architectural coatings; and
- Exhaust emissions of greenhouse gases (GHG) such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Construction-related GHG emissions will not be discussed in this chapter. Please see Chapter 6, Greenhouse Gas Emissions for further detail on construction-related GHG emissions.

CAPs and precursors of primary concern from construction activity in California include ozone precursors (ROG and NO_X), particulate matter with an aerodynamic resistance diameter of 10 microns or less (PM_{10}), and fine particulate matter with an aerodynamic resistance diameter of 2.5 microns or less ($PM_{2.5}$). Carbon monoxide, sulfur dioxide, and lead are of less concern because construction activities are not likely to generate substantial quantities of these CAPs.

Demolition of structures and earth disturbances may also result in airborne entrainment of asbestos. Construction-generated emissions of asbestos are also discussed in Chapter 5, Toxic Air Contaminants. Chapter 5 also outlines the District's guidance for addressing construction-generated emissions of diesel particulate matter, which is a designated California toxic air contaminant with potentially significant carcinogenic impacts.

3.2 ANALYSIS EXPECTATIONS

The District recommends that CEQA analyses addressing the potential impacts of construction-related emissions of CAPs and precursors include the following:

- A discussion of type of construction activities that would occur and the emissions sources associated with those activities. This may include the number and types of equipment anticipated to be used during construction;
- The timing, phasing, and duration of when construction would occur;
- A discussion about whether the project scope and size would qualify it to be analyzed using the NO_X Construction Screening Level Table to address construction-related emissions, as discussed in Section 3.3.1, Assessing Mass Emission Levels, below.);
- A quantification of the maximum daily mass emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ that would be emitted by project construction (expressed in pounds per day [lb/day]) and the input parameters and assumptions used to estimate these values. (Quantification of mass emission levels of these pollutants is not necessary for projects that can be analyzed using the District's NO_X Construction Screening Level Table, as described in Section 3.3.1, Assessing Mass Emission Levels, below.);
- The total emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ that would be generated by project construction, expressed in tons (for disclosure purposes), if full quantification of construction emissions is required;
- A discussion of whether the maximum daily construction-generated emissions would exceed the District's mass emission threshold for NO_X;
- A discussion of whether construction-generated PM_{10} emissions would result in concentrations that exceed or contribute to the District's concentration-based threshold of significance for PM_{10} at an off-site receptor;
- A significance determination about construction-generated emissions, without mitigation; and
- A discussion of feasible mitigation necessary to reduce impacts and whether the reduction is sufficient to reduce impacts to a less-than-significant level.

Lead Agencies shall make a concerted effort to obtain detailed project-specific construction information in order to accurately disclose all potential construction-related impacts. However, the District recognizes that the level of detail in which this information is available

may vary at the time the impact analysis is performed. More detailed guidance for analyzing construction emissions is provided below.

3.3 METHODOLOGIES

Construction-generated NO_X emissions shall be evaluated for significance under CEQA on a daily mass emission basis because NO_X is an ozone precursor, which is a pollutant of regional concern. Thus, the evaluation of mass emissions of NO_X pertains, in part, to the following questions regarding air quality from the Environmental Checklist Form (Appendix G) of the State CEQA Guidelines:

III.a. Would the project conflict with or obstruct implementation of the applicable air quality plan?

III.c. Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

PM_{10} and $PM_{2.5}$ shall be evaluated based on the concentrations generated and receptors exposed to those concentrations. Since PM_{10} and $PM_{2.5}$ are pollutants of localized concern and analyzed on a concentration-based level, their evaluation pertains, in part, to the following questions from the Environmental Checklist Form (Appendix G) of the State CEQA Guidelines:

III.b. Would the project violate an air quality standard or contribute substantially to an existing or projected air quality violation?

III.d. Expose sensitive receptors to substantial pollutant concentrations?

Therefore, the District recommends that PM and NOx be discussed separately in environmental impact analyses. Methodologies for addressing NO_X emissions and PM emissions are discussed separately in greater detail below under Section 3.3.1 and Section 3.3.2, respectively.

3.3.1 ASSESSING MASS EMISSION LEVELS

Because ozone is a secondary pollutant and a pollutant of regional concern, the District assesses emissions of ozone precursors, ROG and NO_X, based on mass emission levels (lb/day).

Various methodologies for determining whether a project's construction-related emissions of NO_X would exceed the District's applicable lb/day threshold are described below.

SCREENING

The District has developed screening levels to help analyze NO_X emissions from construction projects in Sacramento County. The construction screening levels shown in the NO_X Construction Screening Level Table represent the development size of land uses at which

typical construction activities would not exceed the District's threshold of significance for NO_X. Construction of projects below the screening levels presented in the NO_X Construction Screening Level Table would be considered to have a less-than-significant impact on air quality. However, all construction projects, including for projects that would be below the screening levels in the NO_X Construction Screening Level Table are required to implement the District's Basic Construction Emission Control Practices. The Basic Emission Control Practices are discussed in further detail below in Section 3.4.1, Mitigation Measures.

Construction screening levels in the NO_X Construction Screening Level Table have been developed using average default construction parameter inputs in the California Air Resources Board-approved Urban Land Use Emissions Model (URBEMIS). Lead agencies are encouraged to use the NO_X Construction Screening Level Table for screening purposes; however, the screening levels should not be considered absolute thresholds. Screening levels in the NO_X Construction Screening Level Table shall not be used to evaluate construction projects that meet one or more of the following conditions:

1. Include demolition activities;

2. A construction schedule that is unusually compact, fast-paced, or involves more than 2 phases (i.e., grading, paving, building construction, and architectural coatings) occurring simultaneously;

3. Simultaneous construction of multiple land use types;

4. Soil disturbance activity (i.e., grading) that exceeds 15 acres per day;

5. Cut-and-fill operations (involving moving earth with haul trucks and/or flattening or terracing hills); and

6. Import or export of soil materials that would require a considerable amount of haul truck activity.

In cases where the applicability of the screening tables is in question, the lead agency should consult with the District. Analysis of construction projects that include one or more of these conditions should proceed to performing a full, detailed construction emissions analysis, including a quantification of mass emissions of NO_X. Detailed guidance for the quantification and analysis of construction-related emissions using the URBEMIS model, the District's Roadway Construction Emissions Model, and manual estimation is provided below.

While the primary purpose of estimating daily mass emissions of construction emissions is to analyze the project with respect to the District's mass emission threshold for construction-generated NO_X, the District also recommends reporting the emissions of ROG, PM_{10}, $PM_{2.5}$ and CO_2 for the purposes of added disclosure to readers of the environmental impact analysis. Discussion of the District's recommendations for assessing construction-related GHG emissions is provided in Chapter 6 Greenhouse Gas Emissions.

URBAN LAND USE EMISSIONS MODEL (URBEMIS)

When possible, the quantification of emissions associated with the construction of land use development projects should be estimated using the most recent version of URBEMIS and used in accordance with the URBEMIS User's Guide. URBEMIS allows users to model construction criteria air pollutants and precursor emissions from demolition, site grading, asphalt paving, building construction, and architectural coating activities. Herein the District provides additional guidance on the use of URBEMIS to quantify mass emissions associated with construction activities.

In many cases, some project-specific information is not known at the time of analysis. In these situations, users should rely on the default parameters in URBEMIS. The default values in URBEMIS tend to provide a conservative estimate of emissions. Therefore, when possible, users should obtain project-specific information to more accurately estimate construction-related emissions.

In the opening module of the program (Step 1: Open a New or Existing Project) users should select the "Sacramento County AQMD" geographical area. The following section provides guidance for the various URBEMIS modules that are applicable to estimating construction emissions (i.e., Land Use, Construction) and construction phases (i.e., demolition, mass site grading, asphalt paving, building construction, architectural coatings) used to quantify construction emissions.

Land Use Module

The Land Use Module (Step 2: Enter Land Use Data) in URBEMIS allows users to enter the size and type of project proposed for development. Users should be aware of the units (e.g., thousand square feet [ksf], acres, students) of the land uses contained in URBEMIS. Some land uses allow users to change the units (e.g., ksf or the number of students can be used for schools); however, other land uses have fixed units. By default, URBEMIS estimates the total site size (i.e., acres) based on the amount of land uses entered. If specific information regarding the total site size is known, users should also adjust the Acres data field for the respective land use. It should be noted that changing the Acres would affect the trip generation rate, which is discussed further in Chapter 4, Operational Emissions of Criteria Air Pollutants and Precursors.

Construction Module

The Construction Module (Step 3: Enter Construction Data) allows users to adjust the timing and length of the construction schedule, add or remove construction phases (e.g., demolition, mass site grading, asphalt paving, building construction, architectural coatings), and input project-specific information for each construction phase. Users should modify the default URBEMIS construction phases and schedule (using the Click to Add, Delete, or Modify Phases button) to represent the timing (i.e., commencement dates), length, and types of construction activities required for the proposed project. When entering the timing and length of construction phases, users should be aware that URBEMIS does not treat weekend days (i.e., Saturday and Sunday) as construction workdays. Therefore, the length of construction phases should be selected to include the proper number of workdays (i.e., weekdays) required to complete the phase. When project-specific scheduling is provided in units of months, it is recommended that users assume 22 workdays per month. Lastly, projects that have not

determined a commencement date for construction should always use the project's earliest possible start date as the commencement date instead of the default start date in URBEMIS. When a project-specific construction schedule is not available, using the earliest construction year is considered to be conservative because exhaust emission rates for construction equipment will decline gradually over time. This ensures that the construction impacts are not understated.

Guidance regarding each of the construction phases is provided below. It shall be noted that trenching activities typically include cut/fill and earthmoving, for which URBEMIS does not include emission calculations (in the Trenching phase of the software). Therefore, the District recommends users refer to the guidance for Mass Site Grading to model trenching activities.

Demolition

The Demolition phase consists of a Demolition Dust/On Road tab and a Demolition Equipment tab for adding project inputs that are used to estimate demolition-related emissions. Input parameters used by URBEMIS to quantify demolition-related emissions includes the commencement date of the phase and phase duration, total building volume or building dimensions to be demolished (i.e., cubic feet; or width, length, and height, respectively), maximum daily building volume or building dimensions to be demolished (i.e., cubic feet; or width, length, and height, respectively), haul truck capacity (i.e., cubic yards [yd^3]), round trip distance to disposal site (i.e., miles), and equipment types and quantities. Thus, users must obtain project-specific information for the timing and length of demolition activities, total volume to be demolished, and maximum daily volume to be demolished. URBEMIS can provide default assumptions for the haul truck capacity, round trip distance to disposal site, and demolition equipment. It should be noted that URBEMIS uses the land uses (and resulting acres) entered in Step 2: Enter Land Use Data to estimate the default equipment mix in the Demolition Equipment tab. In other words, URBEMIS assumes the size of the land use to be demolished is equal to the land use that would be developed. *Thus, if the size and/or type of the land use to be demolished are different from the land use to be developed, the District recommends analysts use a separate URBEMIS run to quantify demolition emissions.* Users should input the size and type of land use(s) to be demolished in the Land Uses Module for the separate demolition URBEMIS run and only include a Demolition phase in the Construction Module.

The Demolition Dust/On Road tab within the Demolition phase is used to estimate demolition dust and haul truck emissions generated during the demolition phase. When entering the maximum daily volume to be demolished, users should be aware that URBEMIS assumes demolished materials (i.e., bulk material) amount to 25% of the total volume of the building. A detailed example (Example Project B) for the quantification of demolition activities is provided below under Example Construction Projects.

Site Grading

URBEMIS provides users with the option of a Fine or Mass Site Grading phase. Due to the fact that both grading phases perform the same emission calculations and contain the same default assumptions, the District recommends only using the Mass Site Grading phase to avoid confusion. The Mass Site Grading phase consists of separate tabs for Daily Acreage, Fugitive Dust, Soil Hauling, and Mass Site Grading Equipment. Values input on these tabs

are used to quantify emissions from site grading activities. Each of these tabs is discussed separately below.

Daily Acreage

For the Daily Acreage tab, quantification of site grading emissions requires values for the Total Acres To Be Graded and Maximum Daily Acreage Disturbed. This tab is important, in part, because URBEMIS selects default values for the type and number of NO_X-emitting construction equipment used during the Site Grading phase based on the maximum daily acres. URBEMIS assumes the value for the maximum daily acres disturbed is equal to 25% of the total acres to be graded. Users can override both assumptions if project-specific information is available by turning off the Reset acreage checkbox land use changes check box and entering project-specific information in the data field for Total Acres To Be Graded and Maximum Daily Acreage Disturbed. For projects without project-specific information, the District recommends that the user input the greater of 10 acres or 25% of the total acres for the Maximum Daily Acreage Disturbed.

Fugitive Dust

The Fugitive Dust tab allows users to use default assumptions or project-specific information to quantify on-site fugitive particulate matter PM (i.e., PM_{10} and $PM_{2.5}$) dust emissions from cut/fill and grading activities. Though the parameters on this tab do not directly influence the mass emission level of NO_X or other exhaust pollutants generated by the site grading activity, the District provides this guidance about the Fugitive Dust tab to assist users in reporting the emissions of PM_{10}, and $PM_{2.5}$ for the purposes of added disclosure.

URBEMIS contains four different methodologies that can be used to quantify fugitive PM dust emissions based on the amount of project-specific information available. A description of the four methodologies contained in the Fugitive Dust tab is provided below. Quantification of fugitive PM dust emissions is not limited to the methodologies below; however, lead agencies should consult with the District prior to using other methodologies to quantify fugitive PM dust emissions.

> **Method 1 (Default Emission Rate):** The first fugitive PM dust quantification method requires the least amount of project-specific information. The Default Emission Rate data field in the Fugitive Dust tab should be used when typical site grading activities are anticipated or when cut/fill activities are anticipated to occur, but project-specific information is not available. The District recommends using the URBEMIS average fugitive PM dust emission factor (i.e., 10 pounds per acre-day) for projects that would involve typical grading activities without cut/fill activities. Projects that would involve cut/fill activities, but do not have project-specific information should use the URBEMIS worst-case fugitive PM dust emission factor (i.e., 38 pounds per acre-day). URBEMIS uses the Maximum Daily Acreage Disturbed data field from the Daily Acreage tab to quantify fugitive PM dust emissions for the Default Emission Rate quantification method. It should be noted that using the worst-case emission factor tends to provide the most conservative estimate of PM emissions. Therefore, the District recommends users obtain project-specific information for the use of Method 2, 3, or 4, as described below.
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> **Method 2 (Low Level of Detail):** The Low Level of Detail quantification method should be used when cut/fill activities are anticipated and the amount of on-site and

off-site cut/fill (i.e., yd^3 per day) is known. URBEMIS considers "on-site" cut/fill activities to involve movement of soil materials within the boundaries of the project site using scrapers and graders, while "off-site" cut/fill activities involve soil movement outside of the boundaries of the project site via haul trucks. Users should input the on-site and off-site daily volume (i.e., yd^3 per day) of cut/fill that would occur into the appropriate Low Level of Detail data fields. Projects that would involve off-site cut/fill activities should also enter the total volume of soil material (i.e., yd^3) to be imported or exported in the appropriate Soil Hauling tab data fields, as discussed in further detail below.

Method 3 (Medium Level of Detail): The Medium Level of Detail method for quantifying fugitive PM dust emissions should be used when cut/fill activities are anticipated and the number of daily hours of activities for on-site scrapers and off-site haul trucks is known. Similar to Method 2, URBEMIS considers "on-site" cut/fill activities to involve movement of soil materials within the boundaries of the project site using scrapers, while "off-site" cut/fill activities involve soil movement outside of the boundaries of the project site via haul trucks. Users should input the total number of scraper-hours and/or haul truck-hours into the appropriate Medium Level of Detail data fields. For example, if 3 scrapers would operate for 8 hours per day each and 2 haul trucks would operated for 3 hours a day each; users should enter a value of 24 for the Onsite Scraper data field (i.e., 3 scrapers × 8 hours) and a value of 6 for the Offsite Haulage data field (i.e., 2 haul trucks × 3 hours). Projects that would involve off-site cut/fill activities should also enter the total volume of soil material (i.e., yd^3) to be imported or exported in the appropriate Soil Hauling tab data fields, which is discussed in further detail below.

Method 4 (High Level of Detail): The High Level of Detail quantification method should be used when cut/fill activities are anticipated and detailed information is known about where and how soil materials would be moved on the project site. Information required to use the High Level of Detail quantification method includes the daily volume of cut/fill activities (i.e., yd^3 per day), the density of the soil being moved (i.e., tons per yd^3), and the round-trip distance a haul truck or scraper would travel on site to move soil materials (i.e., miles). The District has provided a Ton-Mile Calculation Worksheet that can be used to calculate the on- and off-site ton-miles per day for input into the appropriate High Level of Detail data fields. Projects that would involve off-site cut/fill activities should also enter the total volume of soil material (i.e., yd^3) to be imported or exported in the appropriate Soil Hauling tab data fields, which is discussed in further detail below.

Soil Hauling

URBEMIS uses information input to the Soil Hauling tab within the Mass Site Grading phase to estimate the level of truck activity associated with soil hauling activities, which effects emissions of NO_X and other exhaust pollutants. The Soil Hauling tab also allows users to quantify entrained PM road dust and haul truck exhaust emissions associated with soil hauling. Information required to use the Soil Hauling tab includes the total volume of soil to be imported and/or exported (i.e., yd^3), round trips per day, round trip distance (i.e., miles), and haul truck capacity (i.e., yd^3 per truck). URBEMIS provides default assumptions for all

of the Soil Hauling data fields except for the Total Amount of Soil to Import (cubic yards) and Total Amount of Soil to Export (cubic yards).

Mass Site Grading Equipment

The Mass Site Grading Equipment tab within the Mass Site Grading phase allows users to quantify exhaust emissions from off-road construction equipment used for mass site grading. Information required for the Mass Site Grading Equipment tab includes the type of equipment and number, along with horsepower, load factor, and hours of operation per day. URBEMIS provides default assumptions for all of these based on the Maximum Daily Acreage Disturbed data field in the Daily Acreage tab. If project-specific grading equipment is known, users should click on the All Checks Off button and input the number for each type of equipment to be used for the project. Users should note that although the All Checks Off button allows users to override the URBEMIS default equipment assumptions in the Amount Model Uses column, users must also delete the previous URBEMIS default equipment selections (i.e., the quantity of each equipment type) prior to entering the project-specific equipment information.

Paving

The Paving phase includes an Off Gas Emissions and Paving Equipment tab from which inputs are used to quantify emissions associated with asphalt off-gas and off-road equipment exhaust emissions, respectively. Information required to quantify emissions from the Asphalt Paving phase includes the commencement date, duration of asphalt paving activities (i.e., days), total acres to be paved, and number and types of off-road construction equipment. URBEMIS assumes the Total Acreage to be Paved with Asphalt data field within the Off Gas Emissions tab is 25% of the total Acres of land uses selected in the Land Use Module. For the Paving Equipment tab, URBEMIS uses the Total Acreage to be Paved with Asphalt data field to estimate the off-road equipment mix (Paving Equipment) required for asphalt paving activities. Users should also account for the size of project features (e.g., parking structure, roadways, and large hardtop fields) that would require asphalt paving in excess of default assumptions (i.e., standard site access and parking spaces) within the Total Acreage to be Paved with Asphalt data field. To add additional acres to be paved to the Total Acreage to be Paved with Asphalt data field or enter project-specific acres to be paved, users should turn off the Reset acreage with land use changes button within the Off Gas Emissions tab and add the extra acres to the URBEMIS default acres to be paved or enter the project-specific acres to be paved, respectively.

Architectural Coatings

The Architectural Coatings phase is used by URBEMIS to quantify emissions associated with the application of architectural coatings. Information required to quantify emissions for this phase includes the duration of architectural coating activities. URBEMIS includes default values for the VOC content per liter of coating. Relatively small levels of exhaust (including NO_X) and PM dust emissions generated during this phase are associated with worker commute trips.

Roadway Construction Emissions Model (for Linear Construction Projects)

As described above, the construction module in URBEMIS is recommended to quantify emissions from construction of land use development projects. However, for linear

construction projects such as construction of a new roadway, road widening, roadway overpass, levees, or pipelines the District recommends the use of the most recent version of the Roadway Construction Emissions Model. The Roadway Construction Emissions Model is a spreadsheet-based model that is able to use basic project information (e.g., total construction months, project type, total project area) to estimate a construction schedule and quantify NO_X and other exhaust emissions from heavy-duty construction equipment, haul trucks, and worker commute trips associated with linear construction projects, as well as fugitive PM dust. Users should refer to the User Instructions worksheet in the Roadway Construction Emissions Model.

Special Project Types

Some projects types may not fit into the land uses contained in URBEMIS or be modeled as a linear construction project in the Roadway Construction Emissions Model. Moreover, the modeling guidance provided above for the use of URBEMIS and contained in the Roadway Construction Emissions Model may not be applicable for the quantification of construction activities associated with these special project types. Quantification of construction emissions for these types of projects should be addressed on a project-by-project basis. However, the District has provided general guidance and highlighted distinctive features that should be accounted for when quantifying construction emissions for these types of projects.

A list of some unique project types and how they could be modeled using URBEMIS is provided below:

- Multi-story mixed use development: All the proposed land uses should be entered into the Land Use Module (Step 2: Enter Land Use Data), but adjustments should be made to the Acres field for each land use type in the Land Use Module to avoid overestimating the total acres to be graded and asphalt paved. For example, if a multi-story mixed used development would include 80 ksf of Strip Mall, 30 ksf of General Office Building, and 50 ksf of Racquet Club, URBEMIS would assume the project site totals 7.35 acres. In reality, the site may be 5 acres, in which case users should adjust the URBEMIS default Acres assumptions (contained in the Land Uses Module) such that the total acreage for the proposed land uses is 5 acres.

- Parking garage: Construction of a parking garage could be modeled in URBEMIS using a land use such as Warehouse as a surrogate. Industrial land uses in URBEMIS are assumed to require more Vendor Trips than residential or commercial uses, which could account for additional material delivery trucks (e.g., concrete) for parking garages.

- Wastewater treatment plant: Construction of a wastewater treatment plant could be modeled in URBEMIS using a blank land use type. Users modeling wastewater treatment plants should pay attention to the Total Acres to be Paved with Asphalt in the Asphalt Paving phase. Typically, wastewater treatment plants would not require the same amount of asphalt paving assumed for land use development projects. In addition, wastewater treatment plants would not typically require the amount of architectural coatings as typical land use development project.

- Exclusive earthmoving and grading for restoration projects: Projects that would involve a large amount of earthmoving and grading over a long period of time may be able to use

the Mass Site Grading phase in URBEMIS to quantify construction emissions. For these types of projects, fugitive PM dust emissions would be the main air pollutant of concern. When possible, users should obtain the most project-specific information (i.e., amount of soil volume, density of soil to be moved, distance soil would be moved) for these projects in order to use the High Level of Detail quantification method in the Fugitive Dust tab.

Projects With Incomplete Information

For projects where complete project-specific information is not available to accurately quantify construction emissions using URBEMIS or the Roadway Construction Emissions Model, users should quantify construction emissions using conservative assumptions. In addition, as discussed under Section 3.2, Analysis Expectations, users should disclose all assumptions used to quantify construction emissions. Below is a list of conservative assumptions the District recommends when modeling projects with limited details about project construction:

- Assume an overlap of construction phases in the construction phasing (e.g., an overlap in grading and asphalt paving, an overlap in asphalt paving and building construction, an overlap in building construction and architectural coatings) to account for all potential worst-case maximum daily emissions;
- Assume the minimum amount of days necessary for grading, asphalt paving, and architectural coating activities;
- Assume the maximum daily acreage disturbed during grading activities is equal to 15 acres or 25% of the total project, whichever value is greater; and
- For construction projects that will last more than 4 years, assume 25% of the total land uses would be constructed in 1 single year.

Manual Estimation

Construction emissions may also be estimated using U.S. Environmental Protection Agency air pollutant (AP-42) emission factors for heavy construction operations if a project includes some unique aspects or construction activities (e.g., excessive stockpiling) that make this method of calculation the logical choice. Before using AP-42 emission factors or emission factors from any other source, it is recommended that the lead agency consult with the District.

Determining Level of Significance

Following quantification of the project's construction emissions, users should determine the maximum daily emissions of NO_X that would occur during any particular time of the construction schedule. If construction emissions of NO_X are quantified using multiple models or methodologies, users should determine which part of the construction schedule would generate the maximum daily NO_X emission level. For example, if building construction activities quantified in URBEMIS would occur simultaneously with the Grubbing/Land Clearing phase in the Roadway Construction Emissions Model, users should add the NO_X emissions from both activity phases to calculate the maximum daily emissions that would

occur. If the exact schedule of the linear construction project is not known, users should add the NO_X emissions that would be generated during the worst-case phases of each model to avoid underestimating potential impacts to air quality. If the project's maximum daily NO_X emissions would exceed the District's threshold of significance for construction-generated NO_X, the project would have a significant impact to air quality and all feasible mitigation shall be implemented to reduce NO_X emissions.

EXAMPLE CONSTRUCTION ANALYSES

The District has included Example Construction Analyses to illustrate the use of the NO_X Construction Screening Level Table for analyzing NO_X emissions, provide examples of the guidance described above for URBEMIS and the Roadway Construction Emissions Model, and discuss some unique construction scenarios. Lead agencies may refer to these examples for further clarification of how to analyze construction emissions of NO_X. However, guidance regarding the quantification of daily mass emission levels of other CAPs and precursors is also provided.

3.3.2 ASSESSING EMISSION CONCENTRATIONS

During typical construction projects the majority of particulate matter emissions (i.e., PM_{10} and $PM_{2.5}$) are generated in the form of fugitive dust during ground disturbance activities, most of which is generated during the grading phase. PM emissions are also generated in the form of equipment exhaust and reentrained road dust from vehicle travel on paved and unpaved surfaces.

The District recommends that PM_{10} emissions be addressed as a localized pollutant. Thus, the District considers PM_{10} emissions to be a significant impact at the project level if they would exceed the District's concentration-based threshold of significance at an off-site receptor location. Because $PM_{2.5}$ is a subset of PM_{10}, the District assumes that construction projects that do not generate concentrations of PM_{10} that exceed the District's concentration-based threshold of significance would also be considered less-than-significant for $PM_{2.5}$ impacts.

The District does not expect construction activity to generate high concentrations of other CAPs (e.g., NO_2, SO_X, CO) and, therefore, does not recommend evaluation of their concentrations. The District does not expect that, at the local level, CAPs other than PM would expose nearby sensitive receptors to substantial pollutant concentrations that would violate an air quality standard or contribute substantially to an existing or projected air quality violation.

SCREENING

The District recommends that lead agencies model the PM_{10} emission concentrations generated by construction activity for all projects except those that meet the following conditions:

- The project would implement all Basic Construction Emission Control Practices, and

- The maximum daily disturbed area (i.e., grading, excavation, cut and fill) would not exceed 15 acres. (If the maximum daily disturbed area is not known at the time of the analysis, users shall assume that up to 25% of the total project area would be disturbed in a single day. Other reasonable assumptions may also be used in consultation with the District.)

Projects that meet the above two conditions are considered by the District to not have the potential to exceed or contribute to the District's concentration-based threshold of significance for PM_{10} (and, therefore, $PM_{2.5}$) at an off-site location. Thus, the PM_{10} emission concentrations generated by construction projects that meet the above criteria shall be considered a less-than-significant impact to air quality.

Dispersion Modeling

Lead agencies shall perform dispersion modeling to estimate PM_{10} concentrations (from fugitive dust and exhaust emissions) at off-site sensitive receptors resulting from construction projects that do not meet the above screening criteria. Detailed guidance about how dispersion modeling shall be performed is provided in the PM_{10} Dispersion Modeling Guidance. Note that this modeling guidance is not guidance for conducting a Health Risk Assessment. It is important that lead agencies not assume construction-generated PM_{10} concentrations would exceed the District's threshold in order to avoid performing the dispersion modeling. State CEQA Guidelines, Section 15126.2(a), states that "direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects." In short, the purpose of CEQA is to mitigate impacts to the environment that are identified to be significant. The District recommends that dispersion modeling be performed so that the level of mitigation needed to reduce impacts to a less-than-significant level can be determined.

Determining Level of Significance

The PM_{10} concentrations generated by construction projects that meet both of the above screening criteria are considered to have a less-than-significant impact with respect to the District's concentration-based threshold of significance for PM_{10} (and, therefore, $PM_{2.5}$). Projects that do not meet the screening criteria and therefore are required to perform dispersion modeling would be considered to have a significant impact to air quality if they would generate concentrations of PM_{10} that exceed the District's thresholds of significance at off-site sensitive receptors and mitigation shall be implemented to reduce the impact to the extent feasible.

3.4 MITIGATION

CEQA requires the implementation of all feasible mitigation measures to reduce impacts that are determined to be significant to a less-than-significant level.

Due to the nonattainment status of the basin with respect to ozone, PM_{10}, and $PM_{2.5}$, the District recommends that projects implement a set of Basic Construction Emission Control Practices as best management practices regardless of the significance determination.

The following section describes the Basic Construction Emission Control Practices and how to quantify the emission reductions associated with their implementation using URBEMIS.

3.4.1 Basic Construction Emission Control Practices

As mentioned above, all projects that would involve construction activities, regardless of the significance determination, are required to implement the District's Basic Construction Emission Control Practices.

Quantification of Basic Construction Emission Control Practices

The District recommends that the mass emission reductions associated with the Basic Construction Emission Control Practices be quantified using URBEMIS. For quantification of the fugitive PM dust-related Basic Construction Emission Control Practices, users should turn on the Mitigation box for the Mass Site Grading phase in the Construction Module. The Mass Site Grading Mitigation phase contains a Mass Grading Soil Disturbance Mitigation tab, an Unpaved Roads Mitigation tab, and an Off-Road Equipment Mitigation tab to quantify emission reductions associated with fugitive PM dust mitigation measures. Users should turn on the Water exposed surfaces mitigation measure in the Soil Stabilizing Measures and select the 2x daily watering option, which results in a default 55% reduction of fugitive PM dust emissions from soil disturbance activities. For the Unpaved Roads Mitigation tab, users should turn on the Reduce speed on unpaved road to less than 15 mph mitigation measure in the Unpaved Roads Measures, which results in a default 44% reduction of fugitive PM dust emissions from entrained PM road dust from unpaved roads. The District considers the total percent reduction (53% reduction of total fugitive PM_{10} dust) associated with these mitigation measures to be a surrogate for implementation of the Basic Construction Emission Control Practices listed above. Although the Basic Construction Emission Control Practices include measures that would reduce equipment exhaust emissions of PM, the District does not prescribe any quantifiable reduction associated with implementation of these measures.

For linear construction projects, the Roadway Construction Emissions Model assumes a 50% reduction in fugitive PM dust emissions if the use of water trucks is selected. The District requires implementation of the Basic Construction Emission Control Practices for all projects, including linear construction projects. Therefore, all linear construction projects are required to water exposed surfaces two times daily, which can be quantified by assuming the use of water trucks in the Roadway Construction Emissions Model.

3.4.2 Enhanced Construction Emission Control Practices

Enhanced measures for reducing construction exhaust emissions of NO_X and PM and construction-generated fugitive PM dust emissions and are discussed separately below.

Enhanced Exhaust Control Practices

For projects that would generate maximum daily NO_X emissions that exceed the District's threshold of significance, even with implementation of the Basic Construction Emission Control Practices, the District recommends implementation of the Enhanced Exhaust Control

Practices for off-road construction equipment. The District considers implementation of the Enhanced Exhaust Control Practices to achieve a 20% reduction for NO_X and a 45% reduction for PM_{10} from off-road construction equipment exhaust when compared to the state fleet average

Quantification of Enhanced Exhaust Control Practices

The District recommends that users quantify the mass emission reductions associated with the Enhanced Exhaust Control Practices using URBEMIS. Users should turn on the Mitigation component for all construction phases that involve off-road construction equipment. The District recommends turning on the Diesel Particulate Filter (DPF) mitigation measure contained in the Off Road Equipment Mitigation tab for all construction phases to use as a surrogate for the exhaust Enhanced Construction Emission Control Practices. Users should replace the default URBEMIS reduction percentages with 20% for NO_X and 45% for PM_{10}.

In order to quantify the mass emission reductions associated with implementation of the Enhanced Exhaust Control Practices in the Roadway Construction Emissions Model, users should use the Emission Estimates tab. Users should reduce the total maximum daily equipment exhaust emissions of NO_X on the Emissions Estimates tab by 20%.

Off-Site Mitigation Fee Program

If modeled construction-generated emissions of NO_X are not reduced to a level below the District's threshold of significance by the application of the Basic Construction Emission Control Practices and the Enhanced Exhaust Control Practices, then the project applicant must pay a mitigation fee into the District's off-site mitigation program. The District's off-site mitigation program uses these fees to purchase emission offsets mainly through the District's Heavy Duty Incentive Program. By paying the appropriate off-site mitigation fee, construction-generated emissions of NO_X are reduced to a less-than-significant level as further discussed below.

Mitigation Fee Program Details

The District's mitigation fee calculator shall be used to determine the total amount of the offset fee and the calculations shall be included in the environmental document. The calculation of the mitigation fee shall be estimated by multiplying the current cost rate and the prospective level of NO_X emissions estimated in the environmental document. The cost rate is based on the cost effectiveness standard established by ARB for the Carl Moyer Incentive Program. The District recommends identifying the total cost of mitigation in the environmental document based on the cost rate at the time of the CEQA analysis. This approach provides certainty that the cost of mitigation is feasible and disclosed to all interested parties.

Other approaches to determine the offset fee are acceptable. One approach is to recognize that the cost rate of NO_X may fluctuate over time and that the emissions from the project identified in the environmental document would be mitigated at the cost rate that exists at the time of construction. Another approach involves projects where emissions are uncertain at the time of writing the environmental document. In rare cases with unique construction equipment that cannot be reasonably estimated at the time of writing the environmental

document, and with permission from the District, the fee calculation may be performed after adoption of the CEQA document when additional construction details are available.

The determination of the final mitigation fee shall be conducted in coordination with the District before any demolition or ground disturbance occurs for any phase of project construction.

In some cases the mitigation monitoring reporting program (MMRP) developed for a project may require emission calculations and mitigation fees to be adjusted if there are changes to construction activities (e.g., equipment lists, increased equipment usage or schedules). If this is the case, the project proponent should work with the lead agency and the District to ensure emission calculations and fees are adjusted appropriately. Nonetheless, the District recommends that the environmental analysis include an estimate of the fee amount.

All mitigation fees should be paid prior to the jurisdiction issuing a grading permit or approval of improvement plans, allowing the District to purchase emissions offsets for the project. Thus, the off-site mitigation fee program would always reduce construction-generated mass emissions of NO_X to a less-than-significant level.

Enhanced Fugitive PM Dust Control Practices

The District requires projects that would result in a PM_{10} concentration at an off-site receptor that would exceed or contribute to the District's concentration-based threshold for PM_{10} to implement all measures of the Enhanced Fugitive PM Dust Control Practices that are feasible and applicable to the project.

Quantification of Enhanced Fugitive PM Dust Control Practices

The District recommends that users quantify the mass emission reductions associated the Enhanced Fugitive PM Dust Control Practices using URBEMIS. Users should turn on the Equipment loading/unloading mitigation measure in the Mass Grading Soil Disturbance Mitigation Measure tab for the Mass Site Grading Mitigation phase to use as a surrogate for the Enhanced Fugitive PM Dust Control Practices.

The District considers 75% to be the maximum quantifiable reduction percentage of fugitive PM dust emissions reasonably assumed to be controlled. Therefore, implementation of the Enhanced Fugitive PM Dust Control Practices would reduce total fugitive PM dust emissions by an additional 22% from the Basic Construction Emission Control Practices. In order to have URBEMIS show this total mass reduction, users should override the default value in the Equipment loading/unloading row of the Mass Grading Soil Disturbance Mitigation tab of the mitigation measure checkbox of each construction phase. The default value should be replaced with 63% in order to have URBEMIS show emission levels after the combined 75% reduction. This process essentially uses the Equipment loading/unloading row as a surrogate. A more detailed explanation of this process is explained in the District's explanation of Recommended Percent Reductions to Use in URBEMIS for Basic and Enhanced Construction Control Practices.

In order to quantify the mass emission reductions associated with implementation of the Enhanced Fugitive PM Dust Control Practices in the Roadway Construction Emissions

Model, users should use the Emission Estimates tab. Because the Roadway Construction Emissions Model already assumes a 50% reduction of fugitive PM dust emissions, users should take 50% off of the remaining maximum daily fugitive dust emissions in the Emission Estimates tab (i.e., cell I10 for PM_{10}). The resulting fugitive PM dust emissions can be added to the maximum daily exhaust PM emissions to calculate the mitigated maximum daily mass emissions of PM_{10} and $PM_{2.5}$.

In order to quantify emission concentration reductions associated with implementation of Enhanced Fugitive PM Dust Control Practices in AERMOD for a project that undergoes dispersion modeling (because it would grade more than 15 acres in one day), users shall reduce the unmitigated emission rates for the volume sources representing fugitive PM_{10} dust emissions by 75%. This is explained in greater detail in the PM_{10} Dispersion Modeling Guidance. If a project's construction activity would result in PM_{10} concentrations that exceed the District's concentration-based threshold at an off-site receptor, even with implementation of the District's Basic Construction Emission Control Practices and Enhanced Fugitive PM Dust Control Practices, then the resultant impact would be considered significant and unavoidable.