Analyzing Construction Emissions

3.1. Assessing Construction Impacts for Criteria Pollutants

Use of heavy equipment and earth moving operations during project construction can generate fugitive dust and engine combustion emissions that may have substantial temporary impacts on local air quality. Fugitive dust of concern is particulate matter that is less than ten microns in size (PM_{10}) and is not emitted from definable point sources such as industrial smokestacks. Sources include open fields, roadways, storage piles, earthwork, etc. Fugitive dust emissions results from land clearing, demolition, ground excavation, cut and fill operations and equipment traffic over temporary roads at the construction site.

Diesel exhaust is another emission that can have a significant effect on health. In July 1999, CARB listed the particulate fraction of diesel exhaust as a toxic air contaminant, identifying both chronic and carcinogenic public health risks. Heavy-duty construction equipment is usually diesel powered combustion emissions, such as nitrogen oxides (NO_x), reactive organic gases (ROG), and diesel particulate matter (diesel PM), and are most significant when using large, diesel-fueled scrapers, loaders, bulldozers, haul trucks, compressors, generators and other heavy equipment. Emissions from both fugitive dust and combustion sources can vary substantially from day-to-day depending on the level of activity, the specific type of operation, moisture content of soil, use of dust suppressants and the prevailing weather conditions.

3.2. Methods for Calculating Construction Emissions

When calculating emissions for construction operations (NO_x, ROG, DPM, GHG and fugitive PM), specific information about each activity and phase of the construction project is needed. Several methods are described below, each of which requires increasingly detailed information to produce more accurate results.

For proposed land use development projects, the District recommends using the currently accepted modeling analysis tools to quantify construction-related criteria air pollutants and precursors. All assumptions, estimates, and calculation methods must be provided if the District is required to review the project. Calculation of combustion and fugitive dust emissions from construction activities should include peak daily construction phase emissions of ROG, NOx, diesel PM, and fugitive PM. Annual and total GHG emissions should also be included in the analysis. Both the duration of the construction activities and schedule of phases are required in the evaluation.

For all projects which exceed, or have potential to exceed the applicable Project Level Threshold for criteria pollutants, the District encourages the following information to be included within the modeling output located in the appendix of the DEIR or other applicable section.

- Summary table showing all construction emissions
- Modeling analysis output files which includes the following: a) detailed summer emissions report (both unmitigated and mitigated emissions) and b) detailed winter emissions report (both unmitigated and mitigated emissions)
- Detailed description of assumptions used for the calculations
- Construction fleet;
- Construction phase duration (user must specify the start and end dates for each phase);
- Daily disturbed acreage;
- Fugitive dust emission rate;
- Asphalt paving (if applicable);
- Construction workers' trips;
- Equipment fleet mix for various phases of construction:
- Construction vendors' trips; and,
- Architectural coating emissions.

NOTE: It may be necessary to calculate the project-related construction impacts without knowing the exact fleet of construction equipment involved in the project.

Depending on the type of modeling analysis utilized, the model may or may not automatically calculate off-site hauling trips and associated emissions. If not included as a default value, any soil or demolition materials which will need to be hauled off-site or any materials that will be imported, cubic yards of material and the number of truck trips will need to be entered into the model. In addition, the trip length associated with hauling will need to be entered into the model along with a detailed explanation of the trip length. Specific truck emission factors for the hauling fleet should be included in the simulation. If the specific fleet is unknown at the time of modeling, a defensible worst case set of hauling fleet emission factors shall be used. This hauling component is an important step and is often overlooked resulting in an under-estimation of emissions.

If more detailed information regarding the construction phase of the project is known, the construction phases and default values can be modified in this step to more accurately reflect the anticipated emissions from the project.

The construction calculator within CalEEMod allows for project specific equipment data to be used to calculate emissions. The use of the construction calculator is recommended when the actual fleet mix and construction schedule is known. The following variables can be defined for each piece of construction equipment:

- Equipment type;
- Quantity of equipment used;
- Horsepower rating;
- Load factor;
- Usage (hours/day);
- Engine model year;
- Engine deterioration (years and hours since last rebuild); and,
- Exhaust after-treatment devices such as VDEC (verified diesel emission control devices).

  - ✓ For further information on CalEEMod visit: http://www.caleemod.com
  - ✓ Sacramento Metro Air Quality Management District: "" Construction Mitigation Calculator. Cancel the user password prompt window to access the calculator.

3.3. Diesel Idling Restrictions for Construction Phases

The District recognizes the public health risk reductions that can be realized by idling limitations for on-road and off-road equipment. The following idling restricting measures are recommended for construction activity, including the use of both on-road (i.e., dump trucks) and off-road (i.e., backhoes) equipment:

Idling Restrictions for Construction Activity

- Off-road diesel equipment shall comply with the five minute idling restriction identified in Section 2449(d) (3) of the CARB's In-Use off-Road Diesel regulation: www.arb.ca.gov/regact/2007/ordiesl07/frooal.pdf. (pdf)
- The following local jurisdictions have specific code requirements for idling restrictions:
    - City of Auburn, City Code Section 71.78:
    - City of Lincoln, City Ordinance Code 789B;
    - Placer County, Code Section 10.14.040 requires an equipment operator of an off-road piece of equipment to not cause or allow an off-road piece of equipment to idle at any location for more than five consecutive minutes.
- Staging and queuing areas within 1,000 feet of sensitive receptors is not recommended;
- Diesel idling within 1,000 feet of sensitive receptors is not recommended;
- Use of alternative fueled equipment is recommended whenever possible;
- Signs that specify the no idling requirements must be posted and enforced at the construction site.

3.4. Developmental Burning During Construction

During construction, no open burning of removed vegetation shall be allowed unless permitted by the District. The District recommends that all removed vegetative material shall be either chipped on site or taken to an appropriate recycling site, or if a site is not available, a licensed disposal site.

3.5. Permits for Construction

Portable equipment and engines 50 horsepower (hp) or greater, used during construction activities will require either California statewide portable equipment registration (issued by the CARB) or an Air District permit. The following list is provided as a guide to equipment and operations that may have permitting requirements, but should not be viewed as exclusive:

- Power screens, conveyors, diesel engines, and/or crushers;
- Portable generators and equipment with engines that are 50 hp or greater;
- Construction related internal combustion engines;
- Unconfined abrasive blasting operations;
- Concrete batch plants;
- Rock and pavement crushing;
- Tub grinders; and,
- Trommel screens.

3.6. Greenhouse Gas Emissions

The District has not yet established significance thresholds for greenhouse gas (GHG) emissions from construction activities. Nonetheless, GHGs from construction projects should still be quantified and analyzed within the environmental document.

✓ See CHAPTER 5: for additional information on GHGs.

3.7. Steps in Determining Significance for Construction Emissions

The threshold criteria recommended by the District to determine the significance and appropriate mitigation level for project-related construction emissions from a project are presented in Table 2-1: District Recommended Project-Level Thresholds of Significance.

The following steps should be considered when determining the significance of construction related criteria pollutants and precursors:

Step 1: Emissions Quantification

The District recommends using the most current version of CalEEMod to quantify construction emissions for proposed land use development projects.

Step 2: Comparison of Unmitigated Emissions with Thresholds of Significance

Following quantification of project-related construction emissions, the maximum daily emissions of each criteria pollutant and precursor should be compared with the applicable thresholds of significance. For instance, with respect to PM_{10} and $PM_{2.5}$, compare the total amount of emissions from both exhaust and fugitive sources with the applicable threshold of significance. If construction-related emissions have been quantified using multiple models or model runs, calculate the criteria air pollutants and precursor levels from each where said activities would overlap. In cases where the exact timing of construction activities is not known, calculate any phases that could potentially overlap to be conservative.

If the maximum daily emissions of construction-related criteria air pollutants or precursors would not exceed any of the applicable thresholds, the project would result in a less-than-significant impact to air quality (for construction impacts). If the maximum daily emissions of construction-related criteria air pollutants or precursors would exceed thresholds, the proposed project would

result in a significant impact to air quality and would require mitigation measures for emission reductions.

Step 3: Evaluate Mitigation and Emission Reductions

For all proposed projects, the District recommends the implementation of all applicable mitigation measures and District Rules and Regulations associated with construction activity. Reduction measures should be included from the following sources: 1.) Measures included within the Project Description; 2.) Recommended measures within the CEQA-compliant environmental document; and 3.) Reduction measures as required by federal, state and local rules and regulations. Please note that implementation of mitigation measures will result in all measures being included as conditions of approval during the entitlement phase of project approval, which may also include a mitigation monitoring plan (MMP).

NOTE: It is up to each lead agency whether or not District rules or other local, state, and federal rules are considered within the baseline of a project, or used as mitigation for an identified impact.

Step 4: Comparison of Mitigated Emissions with Thresholds of Significance

Following quantification of project-related construction emissions in accordance with the above District recommended methods, compare the maximum daily amount of mitigated (with Mitigation Measures implemented) criteria air pollutants and precursors with the applicable thresholds. If the implementation of additional mitigation measures would reduce the total amount of construction-related criteria air pollutants and precursors to levels below thresholds, the impact to air quality would be reduced to a less-than-significant level. If mitigated levels of any criteria air pollutant or precursor still exceed thresholds, the impact to air quality would remain significant and unavoidable.

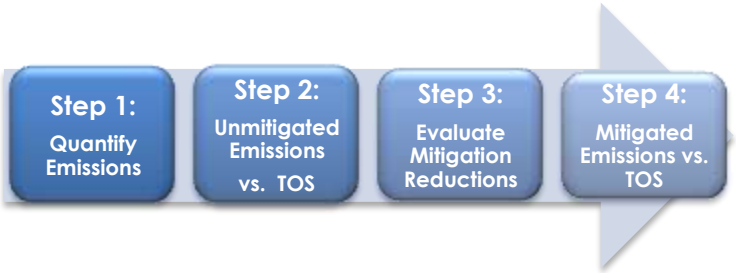

Figure 3-1: Steps in Determining Significance

3.8. Guidance for Assessing Construction Impacts

Construction-related activities are those which are associated with the construction of a project or plan components. Construction activities are typically short-term or temporary in duration. However, project generated emissions could represent a significant impact with respect to air quality and/or global climate change. Construction related activities will result in the generation of criteria air pollutants including carbon monoxide (CO), particulate matter (PM_{10}, and $PM_{2.5}$), reactive organic gases (ROG), nitrogen oxides (NO_X), and GHGs from exhaust, and fugitive dust. Sources of exhaust emissions could include on-road haul trucks, delivery trucks, worker commute

motor vehicles, and off-road heavy-duty equipment. Sources of fugitive emissions (e.g., PM dust) could include construction related activities such as soil disturbance, grading, and material hauling.

Recommended mitigation measures for these types of impacts are provided in the appendix of this document. Not all of these measures may be applicable for every proposed project. In addition to the mitigation measures, please review the District's Rules and Regulations also provided in the appendix.

- ✓ APPENDIX A for District Construction Mitigation Measures
- ✓ Appendix B: for District Construction Rules & Regulations

3.9. Additional Diesel Emission Control Strategies for Construction Equipment

If the estimated ozone precursor emissions from the actual fleet for a given construction phase are expected to exceed the District threshold of significance after the standard mitigation measures are factored into the estimation, additional diesel emission control strategies may be recommended to further reduce these impacts[17]. The control strategies should include the following but is not limited to:

- Further reducing emissions by expanding the use of Tier 3 and Tier 4 off-road and 2010 on-road compliant engines;
- Repowering equipment with the cleanest engines available; and
- Installing California Verified Diesel Emission Control Strategies.

  - ✓ These strategies are listed at: http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm.

3.10. District Rules (Construction)

In addition to the District's recommended construction mitigation measures, there are District rules which are required for all projects whether or not construction-related emissions exceed the applicable thresholds.

District "Rules & Regulations" for construction provided in Appendix B applies to discretionary projects where a Grading Plan or Improvement Plans are required. Such rules could be listed as "mitigation" in an environmental document, depending on the lead agencies' view of the need for mitigation for construction impacts. Regardless of the lead agencies' position on that matter, the District Rules & Regulations may also be required as conditions of approval during the entitlement process. If the lead agency uses District rules as mitigation within environmental documents, the lead agency would also be responsible for ensuring compliance with those laws as conditions of approval for the project and may develop an enforcement plan to ensure adherence to the project's mitigation monitoring plan.

- ✓ See Appendix B: for additional information on District construction rules.

3.11. Dust Control Plan

District Rule 228, Fugitive Dust, establishes standards to be met by activities generating fugitive dust. Rule 228 applies to all of Placer County and addresses fugitive dust generated by construction and grading activities, and by other land use practices including recreational uses.

Fugitive dust is particulate matter discharged into the atmosphere due to a man-made activity or condition. Examples of dust sources that are subject to the rule are excavating and trenching, drilling, boring, earthmoving and grading operations, pavement or masonry cutting operations, brush clearing, travel on unpaved roads within construction sites, and wind-blown dust from uncovered graded areas and storage piles.

Rule 228 establishes standards to be met by activities generating fugitive dust. Among the standards to be met is a prohibition on visible dust crossing the property boundary, generation of high levels of visible dust (dust sufficient to obscure vision by 40%), and controls on the track-out of dirt and mud on to public roads. The regulation also establishes minimum dust mitigation and control requirements.

Rule 228's minimum dust control practices must be used for all construction and grading activities. See the Fugitive Dust Control Requirements Fact Sheet.

When an area to be disturbed is greater than one acre, and if required by a Condition of Approval of a discretionary permit, a dust control plan (DCP) must be submitted to and approved by the District prior to any construction activities. The District has developed an application for this purpose. The dust control plan instructions contain a DCP Application form. Completion of this application and subsequent approval by the District will satisfy requirements to have a dust control plan. Failure to implement the plan is subject to enforcement through the Conditions of Approval, and by the District through Rule 228.

- ✓ For more detail, including an application form, please visit the District website: http://www.placer.ca.gov/Departments/Air/Dust%20Control%20Requirements.aspx