

E.2.6 Select Dispersion Models

CAL3QHC and CAL3QHCR are the two EPA-approved mobile source dispersion models used to predict CO and PM (i.e., PM₁₀ and PM_{2.5}) concentrations, respectively, at sensitive receptor locations adjacent to highway and roadway intersections¹⁰⁷. Information on EPA's recommended models is detailed in EPA's *Guideline on Air Quality Models* mentioned above.

The CAL3QHC model is an effective tool for predicting hourly CO emissions due to motor vehicles operating under free-flow conditions and from idling vehicles under stop-and-go conditions (or queuing conditions) near signalized intersections. The model's inputs include roadway geometries, traffic data, receptor locations, meteorological conditions, and vehicular emission rates (estimated using either EPA's MOVES or California's EMFAC). Additionally, it incorporates intersection-specific parameters and detailed signal information (e.g., signal timing and intersection lane assignments) to predict 1-hour and 8-hour CO concentrations at near-by sensitive receptors.

The CAL3QHCR is the refined, yet independent version of CAL3QHC that has the capability to predict 1-hour, 8-hour, 24-hour, and annual concentrations, with the use of a full year of hourly meteorological and traffic data; thus CAL3QHCR is better suited for PM hot-spot analyses. Notably, when using the CAL3QHCR for PM hot-spot analysis for highway and roadway intersection projects, its queuing algorithm should not be used.¹⁰⁸ CAL3QHCR should be used for CO when a CAL3QHC analysis with conservative assumptions indicates a potential to exceed the NAAQS.

Additionally, EPA has also approved AERMOD as a recommended air quality model for completing PM hot-spot analyses for different types of transportation projects (e.g., parking facilities). Refer to EPA's *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas* mentioned above, for complete information on selecting an appropriate air quality model.

The CAL3QHC and CAL3QHCR model inputs and their respective parameters are provided in **Table E-5 (CAL3QHC and CAL3QHCR Model Input Data)** and further discussed in this section.

Table E-5. CAL3QHC and CAL3QHCR Model Input Data

Model Inputs	Parameters	Units
Roadway Geometry	<ul style="list-style-type: none"> Free flow link coordinates (x, y, z) Queue link coordinates (x, y, z) Mixing zone width Link Height 	<ul style="list-style-type: none"> Meters or feet
Traffic Data ¹	<ul style="list-style-type: none"> Traffic Volume 	<ul style="list-style-type: none"> Vehicle per hour

¹⁰⁷ EPA's Technology Transfer Network (TTN) Support Center for Regulatory Atmospheric Modeling website at: http://www.epa.gov/scram001/dispersion_prefrec.htm for latest model guidance, updates and revisions.

¹⁰⁸ EPA, *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM_{2.5} and PM₁₀ Non-attainment and Maintenance Areas*, November 2013 [EPA-420-B-13-053], <http://www.epa.gov/otaq/stateresources/transconf/policy/420b13053-sec.pdf>.