AIR QUALITY TECHNICAL ADDENDUM

INTERSTATE 710 CORRIDOR PROJECT

$PM_{2.5}$ AND PM_{10} ANALYSIS

07-LA-710 PM 4.9/24.9

EA: 249900

Submitted to:

State of California
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INTRODUCTION

LSA Associates, Inc. (LSA) prepared this $PM_{2.5}$[1] and PM_{10}[2] Hot-Spot Analysis Air Quality Technical Addendum for the Interstate 710 (I-710) Corridor Project according to the conformity regulations (40 Code of Federal Regulations (CFR) 93.116 and 123 as of January 10, 2012) and the United States Environmental Protection Agency (EPA) guidance for PM[3] hotspot analysis of 2006 and 2010.

This $PM_{2.5}$ and PM_{10} analysis addresses the construction of the I-710 Corridor Project, including the following components identified in the Regional Transportation Plan (RTP) and the Federal Transportation Improvement Program (FTIP): Project ID: LAOB952, Description: I-710 Corridor User-Fee Backed Capacity Enhancement – Widen to 5 Mixed-Flow +2 Dedicated Lanes for Clean Technology Trucks (Each Direction), and Interchange Improvements.

PROJECT LOCATION AND DESCRIPTION

The general I-710 Corridor Project study area includes the portion of the I-710 from Ocean Boulevard in Long Beach to State Route 60 (SR-60), a distance of approximately 18 miles. Specific study areas may be established for individual analyses. For example, the traffic study area for the Project currently extends one mile east and west of the I-710 and includes freeway-to-freeway interchanges at Interstate 405 (I-405), SR-91, Interstate 105 (I-105), and Interstate 5 (I-5). Additionally, the traffic study examines intersections and roadway segments of key north/south and east/west arterials from Wilmington Avenue in the west to Lakewood Boulevard in the east.[4] Given the size of the I-710 Corridor Project and its impact on the region, incremental emission impacts were assessed for the South Coast Air Basin (or SCAB), an Area of Interest (or AOI), which is a subregion of the SCAB that includes cities and communities along the I-710 freeway and the I-710 freeway itself. Figure 1 shows these various areas for this study. Figure 2 shows the existing land uses within the project area.

I-710 (also known as the Long Beach Freeway) is a major north/south interstate freeway connecting the City of Long Beach to central Los Angeles. Within the I-710 Corridor Project study area, the freeway serves as the principal transportation connection for goods movement between the Port of Los Angeles (POLA)/Port of Long Beach (POLB) shipping terminals and the Burlington Northern Santa Fe (BNSF)/Union Pacific (UP) Railroad rail yards in the cities of Commerce and Vernon and destinations along I-710 as well as destinations north and east of I-710.

1 Particulate matter less than 2.5 microns in diameter.
2 Particulate matter less than 10 microns in diameter.
3 Particulate matter
4 Freeway Traffic Operations Analysis Report (Draft); Prepared for Los Angeles County Metropolitan Transportation Authority; Prepared by URS; November 18, 2011.

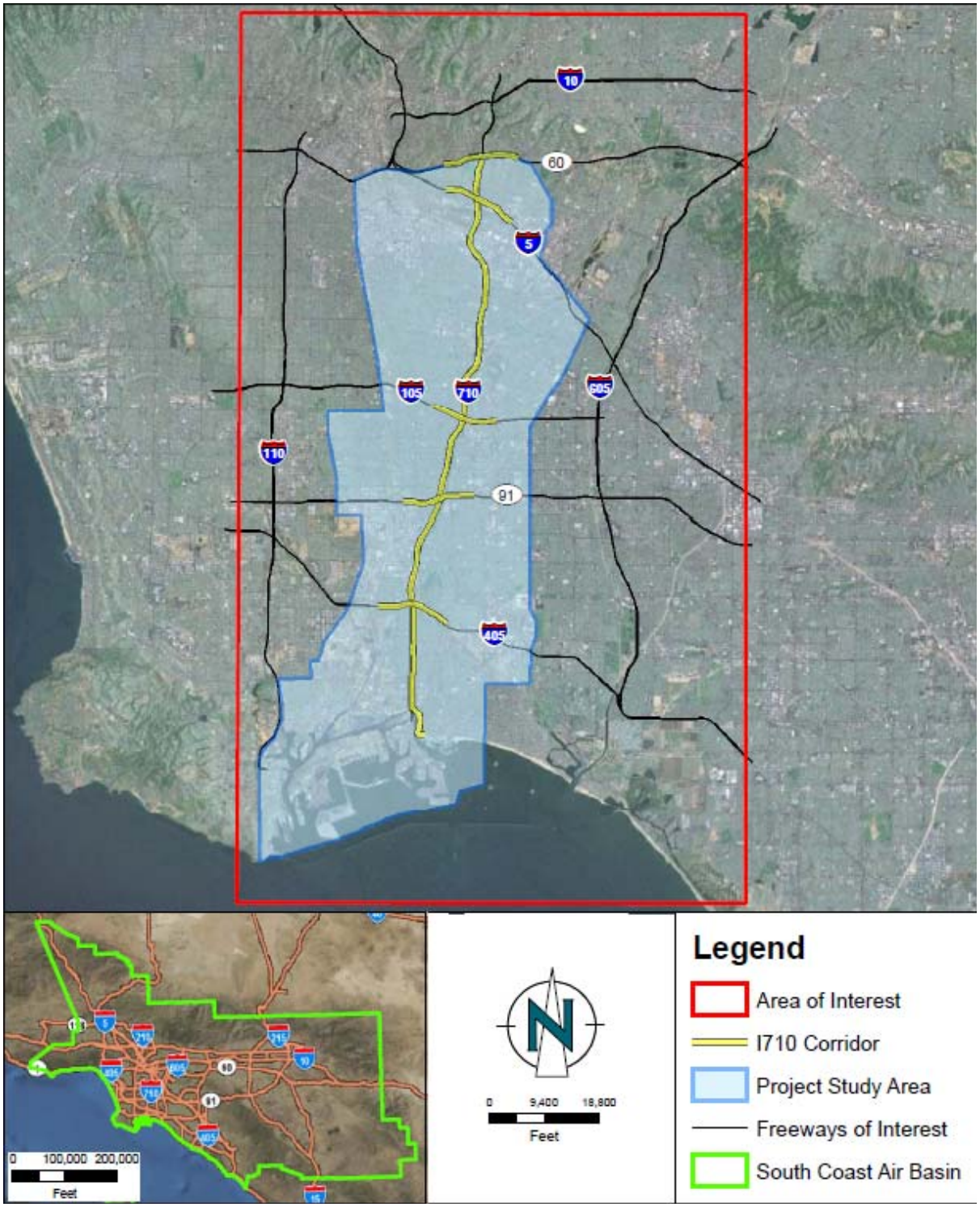
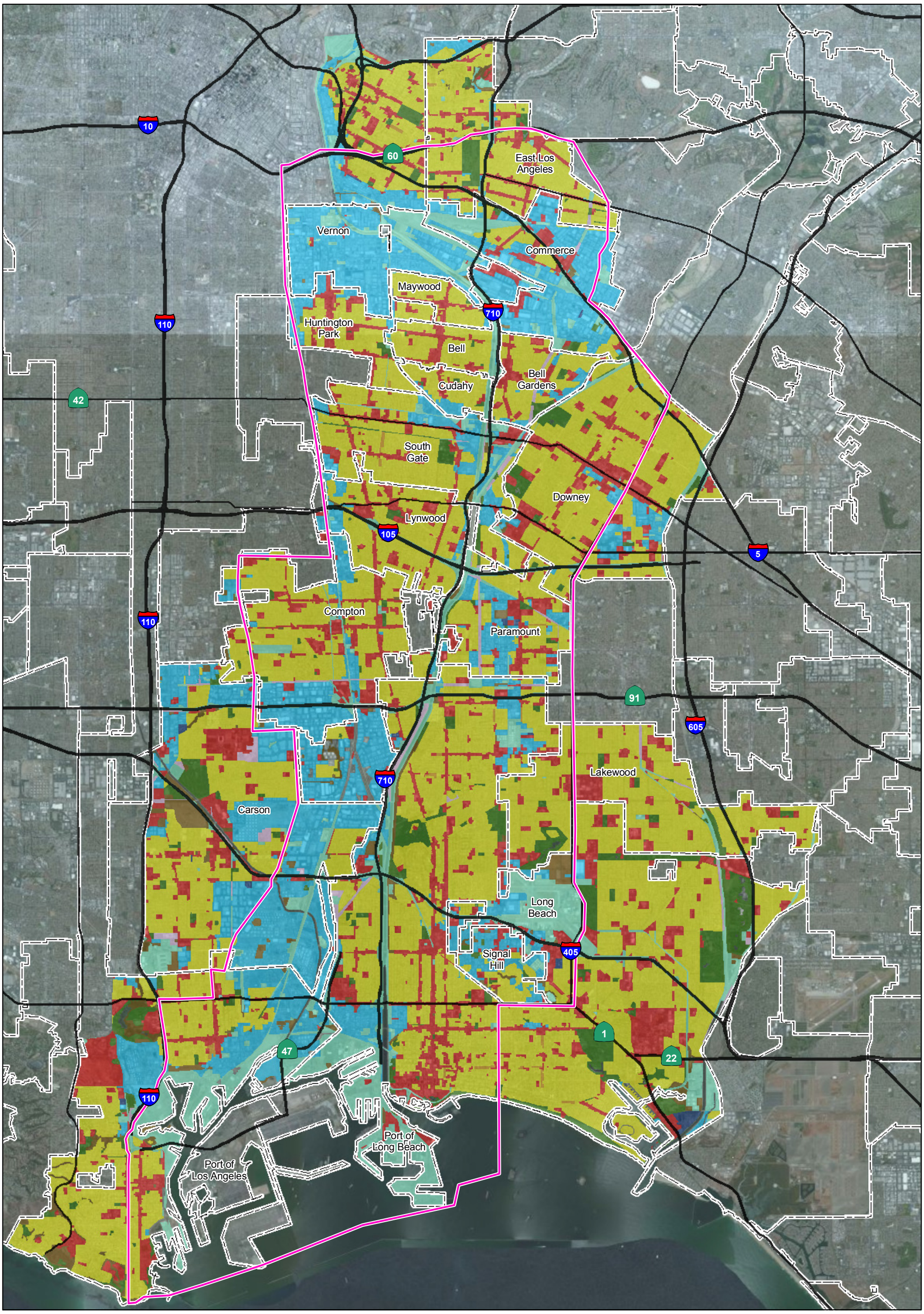


Figure 1: South Coast Air Basin, Area of Interest, General I-710 Corridor Project Study Area, and I-710 Freeway



LEGEND

- I-710 Study Area
- Agriculture
- Commercial and Services
- Industrial
- Mixed Commercial and Industrial
- Mixed Urban
- Open Space and Recreation
- Residential
- Transportation and Utilities
- Vacant

N

0 4750 9500
FEET

SOURCE: BING (2008); TBM (2007); SCAG (2005)

I:\URS0801A\GIS\Air_Quality\StudyArea_LU.mxd (1/6/12)

FIGURE 2

I-710 Corridor Project

Existing Land Use

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The I-710 Major Corridor Study (MCS), undertaken to address the mobility and safety needs of the I-710 Corridor and to explore possible solutions for transportation improvements, was completed in March 2005 and identified a community-based Locally Preferred Strategy (LPS) consisting of 10 general purpose (GP) lanes next to four separated freight movement lanes. The Los Angeles County Metropolitan Transportation Authority (Metro), the California Department of Transportation (Caltrans), the Gateway Cities Council of Governments (GCCOG), the Southern California Association of Governments (SCAG), POLA, POLB, and the Interstate 5 Joint Powers Authority (I-5 JPA) are collectively known as the I-710 Funding Partners. Through a cooperative agreement, these agencies are funding the preparation of preliminary engineering and environmental documentation for the I-710 Corridor Project to evaluate improvements identified in the Major Corridor Study along the I-710 Corridor from Ocean Blvd. in the City of Long Beach to SR-60. The I-710 Funding Partners have continued this engineering and environmental study effort within the same broad, continuous community participation framework that was used for the MCS.

Purpose and Need

The purpose of the I-710 Corridor Project is to achieve the following within the I-710 Corridor (2035 time frame):

- Improve air quality and public health;
- Improve traffic safety;
- Provide modern design for the I-710 mainline;
- Address projected traffic volumes; and
- Address projected growth in population, employment, and activities related to goods movement (based on SCAG population projections and projected container volume increases at the two ports).

The need for the I-710 Corridor Project is as follows:

- I-710 experiences high heavy-duty truck volumes, resulting in high concentrations of diesel particulate emissions within the I-710 Corridor.
- I-710 experiences accident rates, especially truck-related, that are well above the statewide average for freeways of this type.
- At many locations along I-710, the on- and off-ramps do not meet current design standards, and weaving sections within and between interchanges are of insufficient length.
- High volumes of both trucks and cars have led to severe traffic congestion throughout most of the day (6:00 a.m. to 7:00 p.m.) on I-710 as well as on the connecting freeways. This is projected to worsen over the next 25 years.
- Increases in population, employment, and goods movement between now and 2035 will lead to more traffic demand on I-710 and on the streets and roadways within the I-710 Corridor as a whole.

Project Alternatives

This section describes the alternatives based on the Major Corridor Study that were developed by a multidisciplinary technical team to achieve the I-710 Corridor Project purpose and subsequently were reviewed and concurred upon by the various committees involved in the I-710 Corridor Project community participation framework. Alternatives 2, 3, and 4 were considered but withdrawn from further environmental study as stand-alone alternatives, but elements of these alternatives have been included in Build Alternatives 5A, 6A, 6B, and 6C. The alternatives are Alternative 1 (No Build Alternative), Alternative 5A (I-710 Widening up to 10 General Purpose [GP] Lanes), Alternative 6A (10 GP Lanes plus a Four-Lane Freight Corridor), Alternative 6B (10 GP Lanes plus a Zero-Emissions Four-Lane Freight Corridor), and Alternative 6C (10 GP Lanes plus a Four-Lane Freight Corridor Tolled).

Alternative 1: No Build Alternative. The No Build Alternative does not include any improvements within the I-710 Corridor other than those projects that are already planned and committed to be constructed by or before the planning horizon year of 2035. The projects included in this alternative are based on SCAG's 2008 Regional Transportation Improvement Program (RTIP) project list, including freeway, arterial, and transit improvements within the SCAG region. This alternative also assumes that goods movement to and from the ports make maximum utilization of existing and planned railroad capacity within the I-710 Corridor. Alternative 1 is the baseline against which the Build Alternatives proposed for the I-710 Corridor Project will be assessed. The existing I-710 mainline generally consists of eight GP lanes north of I-405 and six GP lanes south of I-405.

Alternative 5A: Freeway Widening up to 10 GP Lanes. Alternative 5A proposes to widen the I-710 mainline to up to ten GP lanes (northbound [NB] I-710 and southbound [SB] I-710). This alternative will:

- Provide an updated design at the I-405 and SR-91 interchanges (no improvements to the I-710/I-5 interchange are proposed under Alternative 5A);
- Reconfigure all local arterial interchanges within the project limits that may include realignment of on- and off-ramps, widening of on- and off-ramps, and reconfiguration of interchange geometry;
- Eliminate local ramp connections over I-710 (9th St. to 6th St. and 7th St. to 10th St.) in the City of Long Beach;
- Eliminate a local interchange at Wardlow Ave. in the City of Long Beach;
- Add a local street connection under I-710 to Thunderbird Villas at Miller Way in the City of South Gate;
- Add a local connection (bridge) over I-710 at Southern Ave. in the City of South Gate;
- Add a local arterial interchange at NB and SB I-710/Slauson Ave. in the City of Maywood; and
- Shift the I-710 centerline at several locations to reduce right-of-way requirements.

Additionally, various structures such as freeway connectors, ramps, and local arterial overcrossings, structures over the Los Angeles River and structures over the two rail yards throughout the project limits will be replaced, widened, or added as part of Alternative 5A.

In addition to improvements to the I-710 mainline and the interchanges, Alternative 5A also includes Transportation Systems/Transportation Demand Management (TSM/TDM), Transit, and Intelligent Transportation Systems (ITS) improvements. TSM improvements include provision of or future provision of ramp metering at all locations and the addition of improved arterial signage for access to I-710. Parking restrictions during peak periods (7:00 a.m.–9:00 a.m. and 4:00 p.m.–7:00 p.m.) will be implemented on four arterial roadways: Atlantic Blvd. between Pacific Coast Hwy. and SR-60; Cherry Ave./Garfield Ave. between Pacific Coast Hwy. and SR-60; Eastern Ave. between Cherry Ave. and Atlantic Blvd.; and Long Beach Blvd. between San Antonio Dr. and Firestone Blvd. Transit improvements that will be provided as part of the I-710 Corridor Project include increased service on all Metro Rapid routes and local bus routes in the study area. ITS improvements include updated fiber-optic communications to interconnect traffic signals along major arterial streets to provide for continuous, real-time adjustment of signal timing to improve traffic flow, as well as other technology improvements.

Alternative 5A also includes improvements to 42 local arterial intersections within the I-710 Corridor Project study area. These improvements generally consist of lane restriping or minimal widening to provide additional intersection turn lanes that will reduce traffic delay and improve intersection operations for those intersections with projected Level of Service (LOS) F.

In addition to the transportation system improvements described above, Alternative 5A also includes

- **Aesthetic Enhancements:** Landscaping and irrigation systems would be provided within the corridor where feasible. Urban design and aesthetic treatment concepts for community enhancement will be integrated into the design of the I-710 Corridor Project. These concepts will highlight unique community identities within a unified overall corridor theme; strengthen physical connections and access/mobility within and between communities; and implement new technologies and best practices to ensure maximum respect for the environment and natural resources. They will continue to evolve and be refined through future phases of project development
- **Drainage/Water Quality Features:** Alternative 5A includes modifications to the Los Angeles River levee; new, extended, replacement, and additional bents and pier walls in the Los Angeles River; additional and extended bents and pier walls in the Compton Channel; modifications to existing pump stations or provision of additional pump stations; and detention basins and bioswales that will provide for treatment of surface water runoff prior to discharge into the storm drain system

Alternative 6A: 10 GP Lanes plus a Four-Lane Freight Corridor. Alternative 6A includes all the components of Alternatives 1 and 5A described above. (The alignment of the GP lanes in Alternative 6A will be slightly different than Alternative 5A in a few locations.) In addition, this alternative includes a separated four-lane freight corridor (FC) from Ocean Blvd. northerly to its terminus near the UP and BNSF rail yards in the City of Commerce. The FC would be built to Caltrans highway design standards and would be restricted to the exclusive use of heavy-duty trucks (5+ axles). In

Alternative 6A, these trucks are assumed to be "conventional" trucks (conventional trucks are defined to be newer [post-2007] diesel/fossil-fueled trucks [new or retrofitted engines required per new regulations and standards]).

The FC would be both at-grade and on elevated structure with two lanes in each direction. There are exclusive, truck only ingress and egress ramps to and/or from the FC at the following locations:

- Harbor Scenic Dr. (NB ingress only)
- Ocean Blvd. (NB ingress only)
- Pico Ave. (NB ingress and SB egress only)
- Anaheim St. (NB ingress and SB egress only)
- SB I-710 GP lanes just south of Pacific Coast Hwy (SB egress only)
- NB I-710 GP lanes north of I-405 at 208th St. (NB ingress only)
- SB I-710 GP lanes north of I-405 at 208th St. (SB egress only)
- Eastbound (EB) SR-91 (NB egress only)
- Westbound (WB) SR-91 (SB ingress only)
- Patata St. (NB egress and SB ingress only)
- SB I-710 GP lanes at Bandini Blvd. (SB ingress only)
- NB I-710 GP lanes at Bandini Blvd. (NB egress only)
- Washington Blvd. (NB egress and SB ingress only) (Design Options 1 and 2)
- Washington Blvd. (NB egress and SB ingress via Indiana Ave.) (Design Option 3)
- Sheila St. (NB egress only) (Design Option 3)

In addition to the FC feature, Alternative 6A includes:

- Partial modification to the I-5 interchange, notably the replacement of the NB I-710 to NB I-5 connector (right-side ramp replacement of left-side ramp) and a realigned SB I-5 to SB I-710 connector and 5 SB GP lanes from SR-60 to Washington Blvd;
- 3 NB GP lanes from I-5 to SR-60;
- Retention of and modification to the I-710 SB on- and off-ramps at Eastern Ave. to slightly realign them; and
- A local connection over I-710 at Patata St. in the cities of South Gate and Bell Gardens.

As with Alternative 5A, Alternative 6A will include additional aesthetic enhancements and drainage/water quality features as follows:

- **Aesthetic Enhancements:** In addition to the aesthetic enhancements described above for Alternative 5A, specific aesthetic treatments will be developed for the FC, including use of screen walls and masonry treatments on the FC structures (including sound walls).

- **Drainage/Water Quality Features:** Alternative 6A includes features to capture and treat the additional surface water runoff from the FC, as well as some modifications to the Los Angeles River levees in order to accommodate electrical transmission line relocations.

Alternative 6B: 10 GP Lanes plus a Zero-Emissions Four-Lane Freight Corridor. Alternative 6B includes all the components of Alternative 6A as described above, but would restrict the use of the FC to zero-emissions trucks rather than conventional trucks. This proposed zero-emissions truck technology is assumed to consist of trucks powered by electric motors in lieu of internal combustion engines and producing zero tailpipe emissions while traveling on the freight corridor. The specific type of electric motor is not defined, but feasible options include linear induction motors, linear synchronous motors or battery technology. The power systems for these electric propulsion trucks could include, but is not limited to, hybrid with dual-mode operation (ZEV Mode), Range Extender EV (Fuel Cell or Turbine with ZEV mode), Full EV (with fast charging or infrastructure power), road-connected power (e.g., overhead catenary electric power distribution system), alternative fuel hybrids, zero-nitrogen-oxide (NO_x) dedicated fuel engines (compressed natural gas [CNG], renewable natural gas [RNG], hydrogen [H_2] internal combustion engine [ICE]), and range extender EV (turbine). For purposes of the I-710 environmental studies, the zero-emissions electric trucks are assumed to receive electric power while traveling along the FC via an overhead catenary electric power distribution system (road-connected power).

Alternative 6B also includes the assumption that all trucks using the FC will have an automated control system that will steer, brake, and accelerate the trucks under computer control while traveling on the FC. This will safely allow for trucks to travel in “platoons” (e.g., groups of 6–8 trucks) and increase the capacity of the FC from a nominal 2,350 passenger car equivalents per lane per hour (pces/ln/hr) (as defined in Alternative 6A) to 3,000 pces/ln/hr in Alternative 6B.

The design of the FC will also allow for possible future conversion, or be initially constructed, as feasible (which may require additional environmental analysis and approval), of a fixed-track guideway family of alternative freight transport technologies (e.g., Maglev). However, this fixed-track family of technologies has been screened out of this analysis for now, as they have been determined to be inferior to electric trucks in terms of cost and ability to readily serve the multitude of freight origins and destinations served by trucks using the I-710 corridor.

Alternative 6C: 10 GP Lanes plus a Four-Lane Freight Corridor with Tolls. Alternative 6C includes all the components of Alternative 6B as described above, but would toll trucks using the FC. Although tolling trucks in the FC could be done under either Alternative 6A or 6B, for analytical purposes, tolling has only been evaluated for Alternative 6B, as this alternative provides for higher FC capacity than Alternative 6A due to the automated guidance feature of Alternative 6B.

Tolls would be collected using electronic transponders, which would require overhead sign bridges and transponder readers like the SR-91 toll lanes currently operating in Orange County, where no cash toll lanes are provided. The toll pricing structure would provide for collection of higher tolls during peak travel periods.

Design Options

For Alternatives 6A, 6B, and 6C, three design options for the portion of I-710 between the I-710/ Slauson Ave. interchange to just south of the I-710/I-5 interchange are under consideration. These configurations will be fully analyzed so that they can be considered in the future selection of a Preferred Alternative for the project. These options are as follows:

Design Option 1. Design Option 1 applies to Alternatives 6A, 6B, and 6C and provides access to Washington Blvd. using three ramp intersections at Washington Blvd.

Design Option 2. Design Option 2 applies to Alternatives 6A, 6B, and 6C and provides access to Washington Blvd. using two ramp intersections at Washington Blvd.

Design Option 3. Design Option 3 applies only to Alternative 6B[1] and removes access to Washington Blvd. at its current location. The ramps at the I-710/Washington Blvd. interchange would be removed to accommodate the proposed FC ramps in and out of the rail yards. The SB off-ramp and NB on-ramp access would be accommodated by Alternative 6B in the vicinity of the existing interchange by the proposed new SB off-ramp and NB on-ramp at Oak St. and Indiana St. These two ramps are proposed as mixed-flow ramps (freight connector ramps that would also allow automobile traffic). However, the SB on-ramp and NB off-ramp traffic that previously used the Washington Blvd. interchange would be required to access the Atlantic Blvd./Bandini Blvd. interchange located south of the existing Washington Blvd. interchange to ultimately reach I-710.

$PM_{2.5}$ AND PM_{10} HOT-SPOT METHODOLOGY

The new Final Rule establishes the transportation conformity criteria and procedures for determining which transportation projects must be analyzed for local air quality impacts in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas. The proposed project is in the South Coast Air Basin (Basin), which has been designated as a Federal nonattainment area for $PM_{2.5}$ and PM_{10}; therefore, a hot-spot analysis is required.

A hot-spot analysis is defined in the Code of Federal Regulations (CFR) (40 CFR 93.101) as an estimation of likely future localized pollutant concentrations and a comparison of those concentrations to the relevant air quality standards. A hot-spot analysis assesses the air quality impacts on a scale smaller than an entire nonattainment or maintenance area, such as for congested roadway intersections and highways or transit terminals. Such an analysis is a means of demonstrating that a transportation project meets Clean Air Act (CAA) conformity requirements to support State and local air quality goals with respect to potential localized air quality impacts. When a hot-spot analysis is required, it is included within the project-level conformity determination that is made by the FHWA or the Federal Transit Administration (FTA).

[1] Design Option 3 only applies to Alternative 6B because it was not included in the travel demand modeling for either Alternative 6A or 6C.

Section 176(c)(1)(B) of the CAA is the statutory criterion that must be met by all projects in nonattainment and maintenance areas that are subject to transportation conformity.
Section 176(c)(1)(B) states that federally supported transportation projects must not "cause or contribute to any new violation of any standard in any area; increase the frequency or severity of any existing violation of any standard in any area; or delay timely attainment of any standard or any required interim emission reductions or other milestones in any area."

Ambient Air Quality Standards

$PM_{2.5}$ nonattainment and maintenance areas are required to attain and maintain two ambient air quality standards (AAQS):

- **24-hour Standard:** 35 micrograms per cubic meter ($\mu g/m^3$).
- **Annual Standard:** 15.0 $\mu g/m^3$

The current 24-hour standard is based on a three-year average of the 98th percentile of 24-hour $PM_{2.5}$ concentrations. The current annual standard is based on a three-year average of annual mean $PM_{2.5}$ concentrations. A $PM_{2.5}$ hot-spot analysis must consider both standards unless it is determined for a given area in which meeting the controlling standard would ensure that CAA requirements are met for both standards. The interagency consultation process should be used to discuss how the qualitative $PM_{2.5}$ hot-spot analysis meets statutory and regulatory requirements for both $PM_{2.5}$ standards, depending on the factors that are evaluated for a given project.

PM_{10} nonattainment and maintenance areas are required to attain the following standard:

- **24-hour Standard:** 150 $\mu g/m^3$

The 24-hour PM_{10} standard is attained when the average number of exceedances in the previous three calendar years is less than or equal to 1.0. An exceedance occurs when a 24-hour concentration of 155 $\mu g/m^3$ or greater is measured at a site. The annual PM_{10} standard of 50 $\mu g/m^3$ is no longer used for determining the Federal attainment status. The interagency consultation process should be used to discuss how the qualitative PM_{10} hot-spot analysis meets statutory and regulatory requirements for the PM_{10} standards, depending on the factors that are evaluated for a given project.

To meet statutory requirements, the 2006 Final Rule requires $PM_{2.5}$ and PM_{10} hot-spot analyses to be performed for Projects of Air Quality Concern (POAQC). The Final Rule states that projects not identified in 40 CFR 93.123(b)(1) as POAQC have met statutory requirements without any further hot-spot analyses (40 CFR 93.116[a]).

$PM_{2.5}$ AND PM_{10} HOT-SPOT ANALYSIS

Projects of Air Quality Concern

The first step in the hot-spot analysis is to determine whether a project meets the standard for a POAQC. The EPA specified in 40 CFR 93.123(b)(1) of the 2006 Final Rule that POAQC are certain highway and transit projects that involve significant levels of diesel vehicle traffic, or any other

project that is identified in the $PM_{2.5}$ and PM_{10} State Implementation Plan (SIP) as a localized air quality concern. The 2006 Final Rule defines the POAQC that require a $PM_{2.5}$ and PM_{10} hot-spot analysis in 40 CFR 93.123(b)(1) as:

i. New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;

ii. Projects affecting intersections that are at level of service (LOS) D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;

iii. New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;

iv. Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; or

v. Projects in or affecting locations, areas, or categories of sites that are identified in the $PM_{2.5}$ and PM_{10} applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

The proposed I-710 Corridor Project would meet Criteria (i) because it would expand an existing freeway with existing and future high truck volumes. In addition, the proposed project would meet Criteria (ii) because it would impact existing and future intersections operating at LOS D or worse and carrying large numbers of diesel vehicles both under existing and as affected by the project. The proposed project would not construct a new or expand an existing bus or rail terminal or transfer point. In addition, the project does not affect locations, areas, or categories of sights that are identified in the PM implementation plan. Therefore, the project does not meet Criteria (iii), (iv), or (v). As the proposed project meets two of the five criteria listed above, it is considered to be a POAQC, and a qualitative project-level $PM_{2.5}$ and PM_{10} hot-spot analysis has been conducted to assess whether the project would cause or contribute to any new localized $PM_{2.5}$ or PM_{10} violations, increase the frequency or severity of any existing violations, or delay timely attainment of the $PM_{2.5}$ and PM_{10} AAQS.

Types of Emissions Considered

In accordance with the EPA/FHWA Guidance, this hot-spot analysis is based on directly emitted and re-entrained $PM_{2.5}$ and PM_{10} emissions. Tailpipe, brake wear, tire wear, and road dust $PM_{2.5}$ and PM_{10} emissions were considered in this hot-spot analysis.

Vehicles cause dust from paved and unpaved roads to be re-entrained, or resuspended, in the atmosphere. According to the 2006 Final Rule, road dust emissions are to be considered for PM_{10} hot-spot analyses. For $PM_{2.5}$, road dust emissions are only to be considered in hot-spot analyses if the EPA or the State air agency has made a finding that such emissions are a significant contributor to the $PM_{2.5}$ air quality problem (40 CFR 93.102(b)(3)). The EPA has published a guidance on the use of AP-42 for re-entrained road dust for SIP development and conformity (August 2007); therefore, re-entrained $PM_{2.5}$ is considered in this analysis.

Secondary particles formed through $PM_{2.5}$ and PM_{10} precursor emissions from a transportation project take several hours to form in the atmosphere, giving emissions time to disperse beyond the immediate project area of concern for localized analyses; therefore, they were not considered in this hot-spot analysis. Secondary emissions of $PM_{2.5}$ and PM_{10} are considered as part of the regional emission analysis prepared for the conforming RTP and FTIP.

According to the project schedule, some of the construction phases are expected to take more than five years to complete. However, construction would not occur at any one location for more than five years. Therefore, construction-related emissions may be considered temporary; and any construction-related $PM_{2.5}$ and PM_{10} emissions due to this project were not included in this hot-spot analysis. This project will comply with the South Coast Air Quality Management District (SCAQMD) Fugitive Dust Rules for fugitive dust during construction of this project. In addition, per Transportation Conformity Rule 93.117, the project will be required to comply with any $PM_{2.5}$ and PM_{10} control measures in the SIP. Excavation, transportation, placement, and handling of excavated soils will result in no visible dust migration. A water truck or tank will be available within the project limits at all times to suppress and control the migration of fugitive dust from earthwork operations.

Analysis Method

According to hot-spot methodology, estimates of future localized $PM_{2.5}$ and PM_{10} pollutant concentrations need to be determined. This analysis makes those estimates by extrapolating present $PM_{2.5}$ and PM_{10} pollutant concentrations from air quality data measured at monitoring stations in the vicinity of the proposed project. The data from these stations are combined with projections from the 2007 Air Quality Management Plan (AQMP) prepared by the SCAQMD and examined for trends in order to predict future conditions in the project vicinity. Additionally, the impacts of the project on the regional $PM_{2.5}$ and PM_{10} emissions and the likelihood of these impacts interacting with the ambient $PM_{2.5}$ and PM_{10} levels to cause hot spots are discussed.

EMFAC2007 version 2.3 (EMFAC) was used to develop emission factors for the various criteria pollutants[1]. The EMFAC model was run for both the baseline year 2008 and build-out year 2035. EMFAC has a variety of user options that allow the user to analyze on-road emissions under different conditions. For the I-710 Corridor Project, the following options were used:

- Operation Parameters
  - Geographic area chosen: South Coast Air Basin.
  - Calendar Year: Baseline year 2008; 2035 analysis year for the No Build Alternative and Alternatives 5A, 6A, and 6B.
  - Season: Annual average season was used, which represents an average of all monthly inventories.

[1] EMFAC2011 was released by CARB on September 19, 2011, after emissions had been calculated. In addition, EMFAC 2007 is the emission factor model used in the most recent AQMP (2007 AQMP). Emission factors in this analysis have been adjusted for currently adopted non-GHG rules, as in EMFAC2011. See Section 4.3.2.4.

  - Temperature: 60º F was chosen and represents an average annual temperate.
  - Relative Humidity: 40%.
- Method
  - The project domain resides with the SCAB; as such, the "Simple-Average" option was used as the calculation; it uses area averaging to calculate average parameters for temperature, speed, relative humidity, and I/M.
- Modes
  - The model was run in the "EMFAC" mode to generate emission factors in grams of pollutant emitted per vehicle activity (grams per vehicle mile travelled and grams/hr).

EMFAC2007 does not account for rules and regulations enacted by the California Air Resources Board after 2007. Two notable regulations not captured in EMFAC are those designed to reduce NO_X and diesel particulate matter (DPM). The Statewide Bus and Truck Rule and Drayage Truck Rule will require fleets to reduce DPM and NO_X emissions. Additionally, the Ports of Los Angeles and Long Beach have enacted the Clean Port Truck Program (CPTP) mandating trucks that operate within the Ports to reduce DPM emissions by meeting set standards during phase in years. Adjustments were made to EMFAC emission factors to account for the Statewide Bus and Truck Rule and CPTP. Based on a comparison made between the CPTP and the Drayage rule, it was determined that the CPTP is more stringent than the Drayage Rule and hence, no adjustments were made for Drayage rule.

Data Considered

The closest air monitoring stations to the project area are the North Long Beach, Long Beach Pacific Coast Highway (PCH), and Los Angeles Main Street stations. All of these stations monitor $PM_{2.5}$ and PM_{10} concentrations. These monitoring stations are located in Los Angeles County within the vicinity of I-405, State Route 110 (SR-110), United States Route 101 (US-101), Interstate 10 (I-10), and I-710. The North Long Beach Station is located approximately 2,500 feet from I-405 and 1 mile from I-710. The Long Beach PCH Station is located approximately two miles from I-710. The Los Angeles Station is located approximately 3,000 feet from SR-110, 3000 feet from US-101, and 1 mile from I-10. The I-405, I-710, SR-110, US-101, and I-10 freeways currently carry between 7,000 and 23,000 daily truck trips, respectively. These monitoring stations are located within the proposed project's study area. Therefore, the air quality concentrations monitored at these stations are representation of the conditions within the project area. The locations of the air monitoring stations relative to the project area are shown in Figure 3.

Trends in Baseline $PM_{2.5}$ Concentrations. The monitored $PM_{2.5}$ concentrations at the North Long Beach, Long Beach PCH, and Los Angeles Stations are shown in Table A. These data show that the Federal 24-hour $PM_{2.5}$ AAQS (35 $\mu g/m^3$) has been exceeded at the North Long Beach Station in five out of the past six years, at the Long Beach PCH Station in four out of the past six years, and at the Los Angeles Station in each of the past six years. In addition, the annual average $PM_{2.5}$ AAQS (15 $\mu g/m^3$) at the North Long Beach and the Long Beach PCH Stations was exceeded in 2005 and 2006 and at the Los Angeles Station from 2005 through 2009; however, the concentrations continue to diminish every year.

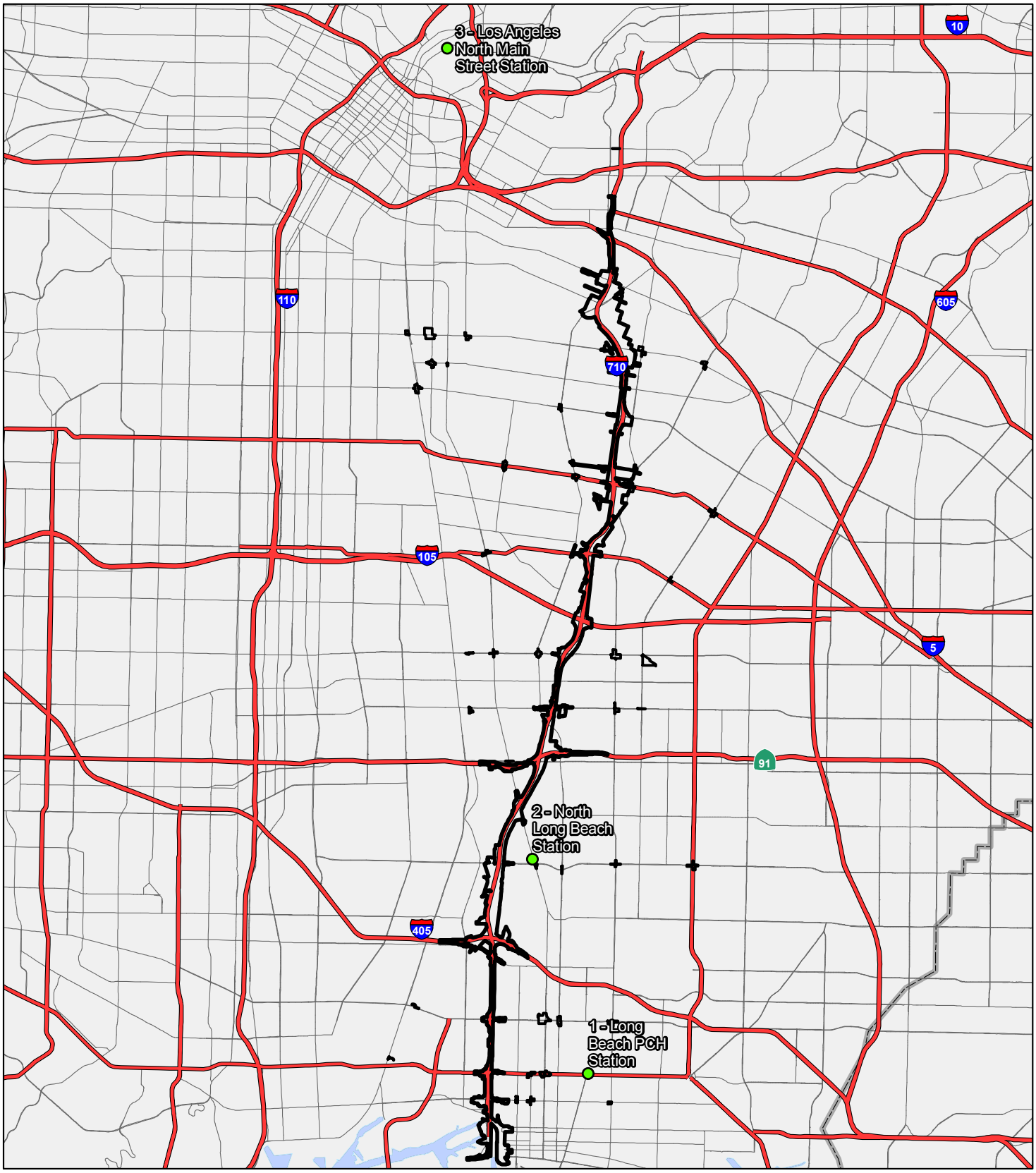

FIGURE 3

LEGEND

Air Quality Monitoring Stations

Project Location

N

0 1.25 2.5
Miles

SOURCE: TBM (2008)

I-710 Corridor Project

Air Quality Monitoring Stations

07-LA-710- PM 4.9/24.9
EA 249900

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Table A: Ambient $PM_{2.5}$ Monitoring Data (µg/m^3)

	2005	2006	2007	2008	2009	2010
North Long Beach Air Quality Monitoring Station						
3-year average 98th percentile	44.6	40.7	39.0	38.2	37.9	33.5
Exceeds Federal 24-hour standard (35 µg/m^3)?	Yes	Yes	Yes	Yes	Yes	No
3-year National annual average	17.3	16.0	14.9	14.3	13.9	12.5
Exceeds Federal annual average standard (15 µg/m^3)?	Yes	Yes	No	No	No	No
Long Beach PCH Air Quality Monitoring Station						
3-year average 98th percentile	44.3	38.3	35.5	35.1	33.8	31.7
Exceeds Federal 24-hour standard (35 µg/m^3)?	Yes	Yes	Yes	Yes	No	No
3-year National annual average	17.3	15.2	14.3	13.9	13.3	12.2
Exceeds Federal annual average standard (15 µg/m^3)?	Yes	Yes	No	No	No	No
Los Angeles – North Main Street Air Quality Monitoring Station						
3-year average 98th percentile	56.3	48.8	47.8	43.5	41.8	35.1
Exceeds Federal 24-hour standard (35 µg/m^3)?	Yes	Yes	Yes	Yes	Yes	Yes
3-year National annual average	19.6	17.6	16.6	16.1	15.7	14.3
Exceeds Federal annual average standard (15 µg/m^3)?	Yes	Yes	Yes	Yes	Yes	No

Source: ARB Web site: http://www.arb.ca.gov/adam/, November 2011.

Projected 24-hour Concentrations. The levels of $PM_{2.5}$ in the project vicinity exceeded the Federal 24-hour standard between 2005 and 2009. The Federal 24-hour standard was not exceeded at either station in 2010. Table V-2-16 in the 2007 AQMP estimates that the 24-hour $PM_{2.5}$ concentration in Long Beach will be 41.9 µg/m^3 in 2015. However, based on the data in Table A, the concentrations measured between 2006 and 2010 are below the level that the AQMP has projected for 2015. Extrapolating from the data in Table A, by 2015, it is estimated that the 24-hour $PM_{2.5}$ level would be 25 µg/m^3, 29 percent below the Federal standard. In 2035, the three-year 98th percentile 24-hour concentration is projected to be 9 µg/m^3, which is approximately 76 percent below the Federal standard.

Projected Annual Concentrations. While the current levels of $PM_{2.5}$ in the project vicinity are generally above the Federal annual standard, indications are that levels in the future will continue to decrease. To estimate the future background $PM_{2.5}$ concentrations, an exponential projection was made of the three-year annual average levels. By 2015, the concentration within the vicinity of the project is projected to be 11 µg/m^3, which is approximately 27 percent below the Federal standard. In 2035, the three-year annual average concentration is projected to be 3.6 µg/m^3, which is approximately 76 percent below the Federal standard.

Trends in Baseline PM_{10} Concentrations. The PM_{10} concentrations monitored at the North Long Beach, the Long Beach PCH, and the Los Angeles Stations are shown in Table B. With the exception

Table B: Ambient PM_{10} Monitoring Data (µg/m^3)

	2005	2006	2007	2008	2009	2010
North Long Beach Air Quality Monitoring Station						
First Highest	66	78	232	62	62	44
Second Highest	61	64	75	45	56	41
Third Highest	57	63	54	45	55	38
Fourth Highest	54	58	53	44	50	36
No. of days above National 24-hour standard (150 µg/m^3)	0	0	1	0	0	0
Long Beach PCH Air Quality Monitoring Station						
First Highest	131	117	123	81	83	76
Second Highest	74	113	87	64	78	53
Third Highest	72	92	67	64	60	50
Fourth Highest	72	90	66	63	58	47
No. of days above National 24-hour standard (150 µg/m^3)	0	0	0	0	0	0
Los Angeles – North Main Street Air Quality Monitoring Station						
First Highest	70	59	78	66	72	42
Second Highest	68	55	77	65	62	41
Third Highest	68	55	63	50	57	41
Fourth Highest	51	48	58	49	63	41
No. of days above National 24-hour standard (150 µg/m^3)	0	0	0	0	0	0

Source: ARB Web site: http://www.arb.ca.gov/adam/, November 2011.

of 2007 at the North Long Beach Station, the Federal 24-hour PM_{10} AAQS (150 µg/m^3) was not exceeded between 2005 and 2010.

The 2007 AQMP (SCAQMD) reports that since the Federal annual PM_{10} standard has been revoked, the Basin is expected to be declared in attainment for the 24-hour Federal PM_{10} standard since 2000. Table V-3-1 in the 2007 AQMP lists the projected 24-hour PM_{10} concentrations at various stations within the Basin. It is estimated that the 24-hour concentration in Long Beach will be 77 µg/m^3 by 2015, 51 percent of the Federal standard. In 2035, the 24-hour average concentration is projected to be 23 µg/m^3, which is approximately 85 percent below the Federal standard.

Transportation and Traffic Conditions

Existing and future (2035) no build average daily traffic (ADT) volumes and average daily truck volumes for I-710 in the project area are shown in Table C. The table indicates that I-710 currently experiences more than 10,000 trucks annual average daily traffic (AADT).

Traffic Changes Due to the Proposed Project

The proposed project is a highway expansion project. Based on the Freeway Traffic Operations Analysis (URS, November 2011), the proposed project would increase the traffic volumes along

Table C: Existing (2008) and No Build (2035) Average Daily Traffic Volumes

I-710 Segment		Existing (2008)		2035 No Build	
From	To	Total	Trucks	Total	Trucks
SR-60	I-5	185,700	17,600	212,700	23,200
I-5	Washington Blvd.	215,300	20,100	233,400	25,300
Washington Blvd.	Atlantic St.	206,900	19,400	235,800	27,800
Atlantic St.	Florence Blvd.	196,600	28,600	224,600	37,800
Florence Blvd.	Firestone Blvd.	196,600	28,600	224,600	37,800
Firestone Blvd.	Imperial Hwy.	205,600	30,400	232,200	39,700
Imperial Hwy.	I-105	206,600	31,500	237,600	43,200
I-105	Rosecrans Ave.	213,100	31,700	242,000	43,400
Rosecrans Ave.	Alondra Blvd.	135,500	26,300	170,400	38,500
Alondra Blvd.	SR-91	213,800	36,700	267,100	59,300
SR-91	Long Beach Blvd.	214,200	37,000	264,100	60,100
Long Beach Blvd.	Del Amo Blvd.	188,100	42,100	238,200	74,100
Del Amo Blvd.	I-405	179,800	42,000	227,600	74,300
I-405	Wardlow Rd.	179,600	41,600	227,500	74,400
Wardlow Rd.	Willow St.	160,700	41,200	202,700	71,600
Willow St.	Pacific Coast Hwy.	150,000	41,400	186,000	71,800
Pacific Coast Hwy.	Anaheim St.	131,800	33,900	170,100	60,100
Anaheim St.	9th St.	52,000	26,000	76,100	46,600
9th St.	Ocean Blvd.	22,200	10,300	32,100	20,100

Source: URS, 2011.
I-5 = Interstate 5
I-105 = Interstate 105
I-405 = Interstate 405
SR-60 = State Route 60
SR-91 = State Route 91

I-710. The future traffic volumes along I-710 for each of the build alternatives are shown in Table D. As shown, the proposed project would increase the traffic volume on and the number of trucks using I-710.

Table E shows the 2035 No Build LOS and delay in the project area for the a.m. and p.m. peak hours. Tables F, G, H, and I show the 2035 LOS and delay in the project area for Build Alternatives 5A, 6A, 6B, and 6C, respectively. As shown, the proposed project would improve the LOS and reduce the delay at some intersections in the project area while worsening the LOS and increasing the delay at other intersections within the project area. Therefore, a vehicle emission analysis was prepared to determine the proposed project's effect on the region attaining the Federal $PM_{2.5}$ and PM_{10} AAQS.

Daily Vehicle Emission Changes Due to the Proposed Project

The $PM_{2.5}$ and PM_{10} emissions for the South Coast Air Basin (SCAB), Area of Interest (AOI) and the I-710 freeway as compared to the 2008 baseline are presented in Tables J through O. These emissions were calculated by Environ (2011) using the I-710 Traffic model data. The results of the modeling are included in Appendix PM-A.

Table D: 2035 Project Alternative Average Daily Traffic Volumes

I-710 Segment		Alternative 5A		Alternative 6A		Alternative 6B		Alternative 6C	
From	To	Total	Trucks	Total	Trucks	Total	Trucks	Total	Trucks
SR-60	I-5	266,900	28,500	273,400	40,300	273,400	40,300	273,400	40,300
I-5	Washington Blvd.	315,800	32,400	328,000	45,000	328,000	45,000	328,000	45,000
Washington Blvd.	Atlantic St.	304,600	33,800	322,400	50,600	322,400	50,600	322,400	50,600
Atlantic St.	Florence Blvd.	316,800	45,900	344,300	65,300	344,300	65,300	344,300	65,300
Florence Blvd.	Firestone Blvd.	302,000	46,300	330,800	64,600	330,800	64,600	330,800	64,600
Firestone Blvd.	Imperial Hwy.	303,800	47,000	332,300	64,800	332,300	64,800	332,300	64,800
Imperial Hwy.	I-105	297,700	49,600	327,700	65,800	327,700	65,800	327,700	65,800
I-105	Rosecrans Ave.	296,300	49,700	328,500	70,000	328,500	70,000	328,500	70,000
Rosecrans Ave.	Alondra Blvd.	209,600	43,500	238,100	65,300	238,100	65,300	238,100	65,300
Alondra Blvd.	SR-91	311,000	65,300	341,300	80,900	341,300	80,900	341,300	80,900
SR-91	Long Beach Blvd.	269,100	63,600	297,400	79,000	297,400	79,000	297,400	79,000
Long Beach Blvd.	Del Amo Blvd.	296,100	80,300	328,800	93,200	328,800	93,200	328,800	93,200
Del Amo Blvd.	I-405	286,000	80,600	317,400	93,400	317,400	93,400	317,400	93,400
I-405	Wardlow Rd.	291,000	80,900	314,100	89,500	314,100	89,500	314,100	89,500
Wardlow Rd.	Willow St.	246,000	76,300	265,900	85,400	265,900	85,400	265,900	85,400
Willow St.	Pacific Coast Hwy.	218,000	76,600	238,000	85,500	238,000	85,500	238,000	85,500
Pacific Coast Hwy.	Anaheim St.	95,800	50,300	90,000	43,900	90,000	43,900	90,000	43,900
Anaheim St.	9th St.	73,800	42,500	71,400	41,500	71,400	41,500	71,400	41,500
9th St.	Ocean Blvd.	35,400	21,300	35,900	24,500	35,900	24,500	35,900	24,500

Source: URS, 2011.
I-5 = Interstate 5
I-105 = Interstate 105
I-405 = Interstate 405
SR-60 = State Route 60
SR-91 = State Route 91

Table E: 2035 Alternative 1 - No Project Intersection Levels of Service

Intersection		AM Peak Hour		PM Peak Hour	
		LOS	Delay (sec)	LOS	Delay (sec)
10	Pico Ave. and 9th St.	D	37.8	C	26.3
19	Pacific Coast Hwy. and Santa Fe Ave.	F	246.8	F	243.4
22	Pacific Coast Hwy. and Atlantic Ave.	C	31.1	D	47.7
34	Del Amo Blvd. and Santa Fe Ave.	E	56.8	E	76.1
41	Alondra Blvd. and Santa Fe Ave.	D	50.8	E	63.8
43	Alondra Blvd. and Atlantic Ave.	E	59.9	D	47.9
45	Alondra Blvd. and Paramount Blvd.	D	35.3	E	76.7
71	Slauson Ave. and Eastern Ave.	D	35.3	F	93.0
112	I-710 NB Ramps and Long Beach Blvd.	D	36.8	C	31.1
148	Wardlow Rd. and Cherry Ave.	D	36.8	F	88.7
155	Wilmington Ave. and 223rd St.	D	50.1	F	170.2
159	38th St. and Santa Fe Ave.	C	25.5	D	53.8

Source: URS, 2011
I-710 = Interstate 710 NB = northbound
LOS = Level of Service sec = seconds

Table F: 2035 Alternative 5A Intersection Levels of Service

Intersection		AM Peak Hour		PM Peak Hour	
		LOS	Delay (sec)	LOS	Delay (sec)
10	Pico Ave. and 9th St.	C	32.0	C	25.8
19	Pacific Coast Hwy. and Santa Fe Ave.	F	146.8	F	143.0
22	Pacific Coast Hwy. and Atlantic Ave.	D	36.1	F	145.9
34	Del Amo Blvd. and Santa Fe Ave.	E	62.5	F	96.6
41	Alondra Blvd. and Santa Fe Ave.	D	54.5	F	90.0
43	Alondra Blvd. and Atlantic Ave.	E	71.1	F	92.9
45	Alondra Blvd. and Paramount Blvd.	E	59.7	F	125.1
71	Slauson Ave. and Eastern Ave.	E	77.1	F	107.8
112	I-710 NB Ramps and Long Beach Blvd.	D	40.4	C	27.6
148	Wardlow Rd. and Cherry Ave.	D	48.2	F	137.4
155	Wilmington Ave. and 223rd St.	D	42.0	F	166.9
159	38th St. and Santa Fe Ave.	D	52.9	D	51.2

Source: URS, 2011
I-710 = Interstate 710 NB = northbound
LOS = Level of Service sec = seconds

Table G: 2035 Alternative 6A Intersection Levels of Service

Intersection		AM Peak Hour		PM Peak Hour	
		LOS	Delay (sec)	LOS	Delay (sec)
10	Pico Ave. and 9th St.	F	123.0	E	41.1
19	Pacific Coast Hwy. and Santa Fe Ave.	F	125.5	F	114.8
22	Pacific Coast Hwy. and Atlantic Ave.	C	33.5	F	132.6
34	Del Amo Blvd. and Santa Fe Ave.	E	72.1	F	138.7
41	Alondra Blvd. and Santa Fe Ave.	D	44.0	F	28.0
43	Alondra Blvd. and Atlantic Ave.	E	64.3	F	90.8
45	Alondra Blvd. and Paramount Blvd.	D	52.5	F	103.8
71	Slauson Ave. and Eastern Ave.	E	63.6	F	87.5
112	I-710 NB Ramps and Long Beach Blvd.	D	53.5	C	31.0
148	Wardlow Rd. and Cherry Ave.	E	71.1	F	167.2
155	Wilmington Ave. and 223rd Street.	D	52.5	F	154.0
159	38th St. and Santa Fe Ave.	E	79.3	F	129.2

Source: URS, 2011
I-710 = Interstate 710 NB = northbound
LOS = Level of Service sec = seconds

Table H: 2035 Alternative 6B Intersection Levels of Service

Intersection		AM Peak Hour		PM Peak Hour	
		LOS	Delay (sec)	LOS	Delay (sec)
10	Pico Ave. and 9th St.	F	139.1	E	61.1
19	Pacific Coast Hwy. and Santa Fe Ave.	F	125.4	F	122.5
22	Pacific Coast Hwy. and Atlantic Ave.	C	33.7	F	137.6
34	Del Amo Blvd. and Santa Fe Ave.	E	72.1	F	137.7
41	Alondra Blvd. and Santa Fe Ave.	D	43.4	F	94.2
43	Alondra Blvd. and Atlantic Ave.	E	64.4	F	94.6
45	Alondra Blvd. and Paramount Blvd.	D	49.5	F	102.5
71	Slauson Ave. and Eastern Ave.	E	61.7	F	85.9
112	I-710 NB Ramps and Long Beach Blvd.	D	49.5	C	28.8
148	Wardlow Rd. and Cherry Ave.	E	64.8	F	169.5
155	Wilmington Ave. and 223rd St.	D	51.4	F	165.3
159	38th St. and Santa Fe Ave.	F	93.8	F	120.8

Source: URS, 2011
I-710 = Interstate 710 NB = northbound
LOS = Level of Service sec = seconds

Table I: 2035 Alternative 6C Intersection Levels of Service

Intersection		AM Peak Hour		PM Peak Hour	
		LOS	Delay (sec)	LOS	Delay (sec)
10	Pico Ave. and 9th St.	E	64.1	E	59.3
19	Pacific Coast Hwy. and Santa Fe Ave.	F	121.8	F	108.3
22	Pacific Coast Hwy. and Atlantic Ave.	C	34.1	F	123.1
34	Del Amo Blvd. and Santa Fe Ave.	E	73.3	F	134.8
41	Alondra Blvd. and Santa Fe Ave.	D	45.5	F	92.8
43	Alondra Blvd. and Atlantic Ave.	E	56.1	F	92.1
45	Alondra Blvd. and Paramount Blvd.	D	48.8	F	97.1
71	Slauson Ave. and Eastern Ave.	E	63.2	F	85.6
112	I-710 NB Ramps and Long Beach Blvd.	F	94.1	D	38.5
148	Wardlow Rd. and Cherry Ave.	E	70.9	F	171.5
155	Wilmington Ave. and 223rd St.	D	51.6	F	165.6
159	38th St. and Santa Fe Ave.	E	71.6	F	103.1

Source: URS, 2011
I-710 = Interstate 710
LOS = Level of Service
NB = northbound
sec = seconds

Table J: Daily $PM_{2.5}$ Emissions within the SCAB Region (pounds per day)

Traffic Condition	Exhaust Emissions	Road Dust	Total	Change from Existing	% Change from Existing	Change from No Build	% Change from No Build
Existing	43,888	23,493	67,381	-	-	-	-
2035 Alt 1	33,001	31,562	64,563	-2,800	-4%	-	-
2035 Alt 5A	33,556	31,552	65,108	-2,300	-3%	500	0.8%
2035 Alt 6A	33,548	31,594	65,141	-2,200	-3%	600	0.9%
2035 Alt 6B	33,294	31,600	64,894	-2,500	-4%	300	0.5%
2035 Alt 6C	33,350	31,587	64,937	-2,400	-4%	400	0.6%

Source: Environ, 2011
Alt = Alternative
SCAB = South Coast Air Basin
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

Table K: Daily $PM_{2.5}$ Emissions within the Area of Interest (pounds per day)

Traffic Condition	Exhaust Emissions	Road Dust	Total	Change from Existing	% Change from Existing	Change from No Build	% Change from No Build
Existing	10,464	5,651	16,115	-	-	-	-
2035 Alt 1	7,124	6,924	14,049	-2,100	-13%	-	-
2035 Alt 5A	7,235	6,943	14,177	-1,900	-12%	200	1.2%
2035 Alt 6A	7,280	5,981	14,252	-1,900	-12%	200	1.2%
2035 Alt 6B	7,029	5,986	14,015	-2,100	-13%	0	0%
2035 Alt 6C	7,081	5,976	14,057	-2,100	-13%	0	0%

Source: Environ, 2011
Alt = Alternative
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

Table L: Daily $PM_{2.5}$ Emissions along I-710 (pounds per day)

Traffic Condition	Exhaust Emissions	Road Dust	Total	Change from Existing	% Change from Existing	Change from No Build	% Change from No Build
Existing	690	252	942	-	-	-	-
2035 Alt 1	387	381	767	-170	-19%	-	-
2035 Alt 5A	465	441	906	-36	-4%	139	18%
2035 Alt 6A	600	572	1172	230	24%	405	53%
2035 Alt 6B	354	584	937	-4	0%	170	22%
2035 Alt 6C	387	548	936	-6	-1%	169	22%

Source: Environ, 2011
Alt = Alternative
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
I-710 = Interstate 710

Table M: Daily PM_{10} Emissions within the SCAB Region (pounds per day)

Traffic Condition	Exhaust Emissions	Road Dust	Total	Change from Existing	% Change from Existing	Change from No Build	% Change from No Build
Existing	58,876	95,713	154,589	-	-	-	-
2035 Alt 1	49,404	128,586	177,990	23,000	15%	-	-
2035 Alt 5A	49,432	128,545	177,978	23,000	15%	0	0%
2035 Alt 6A	49,438	128,714	178,153	24,000	15%	1,000	4%
2035 Alt 6B	49,105	128,742	177,847	23,000	15%	0	0%
2035 Alt 6C	49,178	128,687	177,865	23,000	15%	0	0%

Source: Environ, 2011
Alt = Alternative
SCAB = South Coast Air Basin
PM_{10} = particulate matter less than 10 microns in diameter

Table N: Daily PM_{10} Emissions within the Area of Interest (pounds per day)

Traffic Condition	Exhaust Emissions	Road Dust	Total	Change from Existing	% Change from Existing	Change from No Build	% Change from No Build
Existing	13,968	23,024	36,992	-	-	-	-
2035 Alt 1	10,573	28,210	38,783	1,800	5%	-	-
2035 Alt 5A	10,594	28,280	38,874	1,900	5%	100	0.3%
2035 Alt 6A	10,664	28,443	39,107	2,100	6%	300	0.8%
2035 Alt 6B	10,334	28,461	38,795	1,800	5%	0	0%
2035 Alt 6C	10,402	28,420	38,822	1,800	5%	0	0%

Source: Environ, 2011
Alt = Alternative
PM_{10}= particulate matter less than 2.5 microns in diameter

Table O: Daily PM_{10} Emissions along I-710 (pounds per day)

Traffic Condition	Exhaust Emissions	Road Dust	Total	Change from Existing	% Change from Existing	Change from No Build	% Change from No Build
Existing	868	1025	1893	-	-	-	-
2035 Alt 1	569	1552	2120	230	12	-	-
2035 Alt 5A	678	1798	2476	580	31	350	17%
2035 Alt 6A	857	2330	3188	1300	68	1070	50%
2035 Alt 6B	534	2378	2912	1000	54	770	36%
2035 Alt 6C	578	2234	2812	920	49	690	33%

Source: Environ, 2011
Alt = Alternative
PM_{10} = particulate matter less than 10 microns in diameter
I-710 = Interstate 710

Total $PM_{2.5}$ emissions for the build alternatives compared to the No Build Alternative show increased emissions on the I-710 freeway. This is due to the increased mobility and capacity of the freeway which results in increased exhaust and entrained dust emissions.

The total $PM_{2.5}$ and PM_{10} emissions consist of vehicle exhaust emissions and entrained road dust emissions. In this project, entrained road dust emissions were calculated using the latest EPA AP-42 equation, which was approved in February 2011. This equation assumes that entrained dust emissions are directly proportional to vehicle miles travelled, thereby indicating that roads have an infinite silt reservoir. The SCAQMD used a different approach in their 2007 AQMP, which was based on their analysis that heavily-traveled freeways and arterial roadways have a finite silt reservoir and that additional traffic (vehicle miles traveled [VMT]) in future years will NOT increase entrained particulate matter (PM) on these roads. The EPA methodology used in this project is conservative; it can reasonably be stated that the entrained dust emissions may be overstated and actual PM emissions would closely reflect the exhaust PM emissions.

The exhaust portion of PM_{10} emissions for all 2035 alternatives follow a trend similar to other criteria pollutants in that; it decreases from the 2008 baseline PM_{10} exhaust emissions. Total $PM_{2.5}$ emissions for Alternative 6A as compared to 2008 baseline, on the I-710 freeway, increase for the same reasons as the total PM_{10} emissions. The increase in the entrained $PM_{2.5}$ for this alternative on the I-710 freeway was higher than the decrease seen in the exhaust $PM_{2.5}$ emissions.

As shown in Tables J through O, Alternative 6B would reduce the $PM_{2.5}$ exhaust emissions within the AOI and I-710 regions and the PM_{10} exhaust emissions within the SCAB, AOI, and I-710 regions when compared to the 2035 no build conditions.

By 2035, the 24-hour $PM_{2.5}$ concentrations within the project area are projected to be 76 percent below the Federal standard. The annual $PM_{2.5}$ concentrations are projected to be 77 percent below the Federal standard. The largest increase in $PM_{2.5}$ is under Alternative 6A, where the project would increase the emissions along I-710 by 24 percent over the existing conditions. If re-entrained dust were excluded from the calculations, Alternative 6A would reduce the $PM_{2.5}$ emissions by 90 pounds per day along I-710 when compared to the existing conditions. This is a decrease of approximately 13 percent. When calculated over the larger area of the SCAB region or the AOI, the project would have a minimal effect on long-term $PM_{2.5}$ emissions.

The 24-hour PM_{10} concentration is projected to be 85 percent below the Federal standard by 2035. The largest increase in PM_{10} is under Alternative 6A, where the project would increase the emissions along I-710 by 68 percent over the existing conditions. If re-entrained dust were excluded from the calculations, Alternative 6A would reduce the PM_{10} emissions by 11 pounds per day along I-710 when compared to the existing conditions. This is a decrease of approximately 1.3 percent. When calculated over the larger area of the SCAB region or the AOI, the project would have a minimal effect on long-term PM_{10} emissions.

Design Options. For Alternatives 6A, 6B, and 6C, three design options for the portion of I-710 between the I-710/Slauson Ave. interchange to just south of the I-710/I-5 interchange are under consideration. However, these design options would not substantially affect the regional VMT. Therefore, the results listed in Tables J through O would also apply to the design alternatives.

CONCLUSION

Transportation conformity is required under Section 176(c) of the CAA to ensure that federally supported highway and transit project activities are consistent with the purpose of the SIP. Conformity for the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant AAQS. As required by the 2006 Final Rule, this qualitative $PM_{2.5}$ and PM_{10} hot-spot analysis demonstrates that this project meets the CAA conformity requirements to support State and local air quality goals with respect to potential localized air quality impacts.

It is not expected that changes to $PM_{2.5}$ and PM_{10} emissions levels associated with the proposed project would result in new violations of the Federal air quality standards for the following reasons:

- Based on the local monitoring data, without the proposed project, the 24-hour $PM_{2.5}$ concentrations within the project area would be reduced to 29 percent below the Federal standard by 2015 and to 76 percent below the Federal standard by 2035.
- Based on the local monitoring data, without the proposed project, the annual average $PM_{2.5}$ concentrations within the project area would be reduced to 27 percent below the Federal standard by 2015 and to 76 percent below the Federal standard by 2035.
- With the exception of 2007, the ambient PM_{10} concentrations have not exceeded the 24-hour or annual Federal standard.
- Based on the projected PM_{10} concentrations listed in the 2007 AQMP, without the proposed project, the 24-hour PM_{10} concentrations would be 49 percent below the Federal standard by 2015 and 85 percent below the Federal standard by 2035.
- The project would increase the regional $PM_{2.5}$ emissions by up to 24 percent when compared to the existing conditions. This increase is less than the 76 percent reduction expected in the SIP for regional $PM_{2.5}$ concentrations by 2035. If re-entrained dust is excluded from the calculations, all of the project alternatives would reduce the $PM_{2.5}$ emissions when compared to the existing conditions.
- The project would increase the regional PM_{10} emissions by up to 68 percent when compared to the existing conditions. This increase is less than the 85 percent reduction expected in the SIP for regional PM_{10} concentrations by 2035. If re-entrained dust were excluded from the calculations, all of the project alternatives would reduce the PM_{10} emissions when compared to the existing conditions.

For these reasons, future new or worsened $PM_{2.5}$ and PM_{10} violations of any standards are not anticipated; therefore, the project meets the conformity hot-spot requirements in 40 CFR 93-116 and 93-123 for both $PM_{2.5}$ and PM_{10}.

REFERENCES

United States Environmental Protection Agency (EPA). 2006a. "Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas" (EPA 420-B-06-902, March 2006).

United States Environmental Protection Agency (EPA). 2006b. Final Revisions to the National Ambient Air Quality Standards for Particulate Pollution (Particulate Matter). EPA website: www.epa.gov/oar/particulatepollution/naaqsrev2006.html, accessed on March 19, 2007.

URS, Freeway Traffic Operations Analysis Report, November 18, 2011.

URS, Intersection Traffic Impact Analysis Report, September 1, 2011.

APPENDIX PM-A

$PM_{2.5}$ AND PM_{10} MODELING RESULTS

Table 1A. Comparison of 2035 Alternatives to 2008 within South Coast Air Basin

Pollutant	SCAB (lb/day)						South Coast Air Basin										SCAQMD CEQA Mass Emission Thresholds (lb/day)
	2008	Alt1	Alt5a	Alt6a	Alt6b	Alt6c	Alt.1 - 2008		Alt 5A - 2008		Alt. 6A - 2008		Alt. 6B - 2008		Alt. 6C - 2008		
							lb/day	% Change	lb/day	% Change	lb/day	% Change	lb/day	% Change	lb/day	% Change	
PM10 (Total)	154,589	177,990	177,978	178,153	177,847	177,865	23,000	15%	23,000	15%	24,000	15%	23,000	15%	23,000	15%	150
PM10 (Exhaust)	58,876	49,404	49,432	49,438	49,105	49,178	(9,500)	-16%	(9,400)	-16%	(9,400)	-16%	(9,800)	-17%	(9,700)	-16%	-
PM10 (Entrained)	95,713	128,586	128,545	128,714	128,742	128,687	33,000	34%	33,000	34%	33,000	34%	33,000	35%	33,000	34%	-
PM25 (Total)	67,381	64,563	65,108	65,141	64,894	64,937	(2,800)	-4%	(2,300)	-3%	(2,200)	-3%	(2,500)	-4%	(2,400)	-4%	55
PM25 (Exhaust)	43,888	33,001	33,556	33,548	33,294	33,350	(11,000)	-25%	(10,000)	-24%	(10,000)	-24%	(11,000)	-24%	(11,000)	-24%	-
PM25 (Entrained)	23,493	31,562	31,552	31,594	31,600	31,587	8,100	34%	8,100	34%	8,100	34%	8,100	35%	8,100	34%	-

Table 1B. Comparison of 2035 Alternatives to 2008 within Area of Interest

Pollutant	AOI (lb/day)						Area of Interest									
	2008	Alt1	Alt5a	Alt6a	Alt6b	Alt6c	Alt.1 - 2008		Alt 5A - 2008		Alt. 6A - 2008		Alt. 6B - 2008		Alt. 6C - 2008	
							lb/day	% Change	lb/day	% Change	lb/day	% Change	lb/day	% Change	lb/day	% Change
PM10 (Total)	36,992	38,783	38,874	39,107	38,795	38,822	1,800	5%	1,900	5%	2,100	6%	1,800	5%	1,800	5%
PM10 (Exhaust)	13,968	10,573	10,594	10,664	10,334	10,402	(3,400)	-24%	(3,400)	-24%	(3,300)	-24%	(3,600)	-26%	(3,600)	-26%
PM10 (Entrained)	23,024	28,210	28,280	28,443	28,461	28,420	5,200	23%	5,300	23%	5,400	24%	5,400	24%	5,400	23%
PM25 (Total)	16,115	14,049	14,177	14,262	14,015	14,057	(2,100)	-13%	(1,900)	-12%	(1,900)	-12%	(2,100)	-13%	(2,100)	-13%
PM25 (Exhaust)	10,464	7,124	7,235	7,280	7,029	7,081	(3,300)	-32%	(3,200)	-31%	(3,200)	-30%	(3,400)	-33%	(3,400)	-32%
PM25 (Entrained)	5,651	6,924	6,942	6,981	6,986	6,976	1,300	23%	1,300	23%	1,300	24%	1,300	24%	1,300	23%

Table 1C. Comparison of 2035 Alternatives to 2008 for the I-710 Freeway

Pollutant	I710 (lb/day) *Using Raw Data						I-710									
	2008	Alt1	Alt5a	Alt6a	Alt6b	Alt6c	Alt.1 - 2008		Alt 5A - 2008		Alt. 6A - 2008		Alt. 6B - 2008		Alt. 6C - 2008	
							lb/day	% Change	lb/day	% Change	lb/day	% Change	lb/day	% Change	lb/day	% Change
PM10 (Total)	1,893	2,120	2,476	3,188	2,912	2,812	230	12%	580	31%	1,300	68%	1,000	54%	920	49%
PM10 (Exhaust)	868	569	678	857	534	578	(300)	-34%	(190)	-22%	(11)	-1%	(330)	-39%	(290)	-33%
PM10 (Entrained)	1,025	1,552	1,798	2,330	2,378	2,234	530	51%	770	75%	1,300	127%	1,400	132%	1,200	118%
PM25 (Total)	942	767	906	1,172	937	936	(170)	-19%	(36)	-4%	230	24%	(4.4)	0%	(6.1)	-1%
PM25 (Exhaust)	690	387	465	600	354	387	(300)	-44%	(230)	-33%	(90)	-13%	(340)	-49%	(300)	-44%
PM25 (Entrained)	252	381	441	572	584	548	130	51%	190	75%	320	127%	330	132%	300	118%

Notes:

Parenthesis indicate a negative value.

Alternative 6B and 6C assume that the trucks will have zero exhaust emissions while they are traveling on the freight corridor. It should be noted that the entrained dust (both PM10 and PM2.5) emissions are not zero for the trucks traveling on the freight corrridor for Alt. 6B and Alt. 6C.

Emissions based on the Southern California Association of Governments I-710 Traffic Model data.

Table 2A. Comparison of Future Build Alternatives to No-Build Alternatives within South Coast Air Basin

Pollutant	SCAB (lb/day)					South Coast Air Basin							
	Alt1	Alt5a	Alt6a	Alt6b	Alt6c	Alt. 5A - Alt. 1		Alt. 6A - Alt. 1		Alt. 6B - Alt. 1		Alt. 6C - Alt. 1	
						lb/day	% Change	lb/day	% Change	lb/day	% Change	lb/day	% Change
PM10 (Total)	177,990	177,978	178,153	177,847	177,865	(12)	0%	160	0%	(140)	0%	(120)	0%
PM10 (Exhaust)	49,404	49,432	49,438	49,105	49,178	29	0%	35	0%	(300)	-1%	(230)	0%
PM10 (Entrained)	128,586	128,545	128,714	128,742	128,687	(41)	0%	130	0%	160	0%	100	0%
PM2.5 (Total)	64,563	65,108	65,141	64,894	64,937	540	1%	580	1%	330	1%	370	1%
PM25 (Exhaust)	33,001	33,556	33,548	33,294	33,350	550	2%	550	2%	290	1%	350	1%
PM25 (Entrained)	31,562	31,552	31,594	31,600	31,587	(10)	0%	32	0%	38	0%	25	0%

Table 2B. Comparison of Future Build Alternatives to No-Build Alternatives within Area of Interest

Pollutant	AOI (lb/day)					Area of Interest							
	Alt1	Alt5a	Alt6a	Alt6b	Alt6c	Alt. 5A - Alt. 1		Alt. 6A - Alt. 1		Alt. 6B - Alt. 1		Alt. 6C - Alt. 1	
						lb/day	% Change	lb/day	% Change	lb/day	% Change	lb/day	% Change
PM10 (Total)	38,783	38,874	39,107	38,795	38,822	92	0%	320	1%	12	0%	39	0%
PM10 (Exhaust)	10,573	10,594	10,664	10,334	10,402	21	0%	91	1%	(240)	-2%	(190)	-2%
PM10 (Entrained)	28,210	28,280	28,443	28,461	28,420	71	0%	230	1%	250	1%	140	1%
PM25 (Total)	14,049	14,177	14,262	14,015	14,057	130	1%	210	2%	(34)	0%	7.9	0%
PM25 (Exhaust)	7,124	7,235	7,280	7,029	7,081	110	2%	160	2%	(96)	-1%	(44)	-1%
PM25 (Entrained)	6,924	6,942	6,981	6,986	6,976	17	0%	57	1%	62	1%	52	1%

Table 2C. Comparison of Future Build Alternatives to No-Build Alternatives for the I-710 Freeway Itself

Pollutant	I170 (lb/day)					I-710							
	Alt1	Alt5a	Alt6a	Alt6b	Alt6c	Alt. 5A - Alt. 1		Alt. 6A - Alt. 1		Alt. 6B - Alt. 1		Alt. 6C - Alt. 1	
						lb/day	% Change	lb/day	% Change	lb/day	% Change	lb/day	% Change
PM10 (Total)	2,120	2,476	3,188	2,912	2,812	360	17%	1,100	50%	790	37%	690	33%
PM10 (Exhaust)	569	678	857	534	578	110	19%	290	51%	(35)	-6%	9.3	2%
PM10 (Entrained)	1,552	1,798	2,330	2,378	2,234	250	16%	780	50%	830	53%	680	44%
PM2.5 (Total)	767	906	1,172	937	936	140	18%	400	53%	170	22%	170	22%
PM25 (Exhaust)	387	465	600	354	387	78	20%	210	55%	(33)	-8%	0.77	0%
PM25 (Entrained)	381	441	572	584	548	61	16%	190	50%	200	53%	170	44%

Notes:

Parenthesis indicate a negative value.

Alternative 6B and 6C assume that the trucks will have zero exhaust emissions while they are traveling on the freight corridor. It should be noted that the entrained dust (both PM10 and PM2.5) emissions are not zero for the trucks traveling on the freight corrridor for Alt. 6B and Alt. 6C.

Emissions based on the Southern California Association of Governments I-710 Traffic Model data.

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This Appendix discusses the methodology used to develop the emission inventories for the 2008 baseline and 2035 alternatives for both the criteria pollutants and the MSATs from traffic operations. These emission inventories were used to assess incremental emission impacts and for the I-710 freeway itself, were used as the basis for emission inputs to the air quality and health risk modeling for the Project.

C.1. Emission Inventory Development Methodology

Emission inventories were developed for the exhaust pollutants NO_x, CO, PM_{10}, $PM_{2.5}$, ROG, SO_2, TOG and DPM using the equation shown below.

$$Total\ Exhaust\ Emissions\ for\ a\ Pollutant\ (lb/day) = \frac{1}{453.59} \times \sum_k \sum_j \sum_i EF_{i,S_{j,k}} \times VMT_{i,j,k}$$

…..Equation C.1

Where,

453.59	=	Conversion factor from pounds to grams
i	=	A particular vehicle class. Vehicle classes used in this analysis include automobiles, light-heavy duty trucks (LHDT), medium-heavy duty trucks (MHDT), heavy-heavy duty trucks (HHDT), and port trucks
j	=	A particular time period. A day was split into four time periods in this analysis: AM (6 AM to 9 AM), mid-day (9 AM to 3 PM), PM (3 PM to 7 PM), and night time (7 PM to 6 AM)
k	=	A particular traffic link or section of a roadway in the region, for which emissions are calculated.
$S_{j,k}$	=	Average vehicle speed during the jth time period for the kth link.
$VMT_{i,j,k}$	=	Total vehicle miles travelled by the ith vehicle class during the jth time period in the kth traffic link. This is calculated as a product of length of the kth traffic link and the traffic volume of the ith vehicle class during the jth time period flowing through the kth traffic link
$EF_{i,Si,k}$	=	Pollutant emission factor of the ith vehicle class at speed $S_{j,k}$ expressed in grams per miles

Total exhaust emissions were calculated for three regions (see Figure ES.1 in the main report): the South Coast Air Basin (SCAB), the Area of Interest (AOI), and the I-710 freeway (which may include a freight corridor and related ramps, depending on the alternative). The various input parameters in Equation C.1 above (such as link length, average vehicle speed, and traffic volumes) were obtained from the traffic data as described in Section C.2. The traffic model used in this analysis assigns one-directional traffic flows for traffic links (sections of roadways) that represent freeways, ramps and one-way streets. All other traffic links were assigned bidirectional vehicle flow. For bi-directional traffic links, average speeds and vehicle flows were

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provided in the traffic data for each individual direction. Emissions in each direction were calculated separately and summed up using the methodology shown in the Equation C.1. The emission factors used in Equation C.1 were generated by running the EMFAC2007[1] model for both 2008 (baseline year) and 2035 and further adjusted as described in Section C.

Total PM_{10} and $PM_{2.5}$ emission inventories were developed by summing up the exhaust and entrained road dust PM emissions. Exhaust PM emissions were calculated using Equation C.1 and the entrained PM emissions were calculated based on EPA's AP-42 equation for paved road dust (released January 2011). Section C.4 provides details of the methodology used to calculate the entrained PM emissions.

Emission inventories of the MSATs were calculated from the exhaust TOG emission inventory using speciation profiles for the MSATs of interest. Section C.5 provides a description of this methodology, and Section C.6 presents the unique nature of the 2035 DPM emission factor.

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[1] Note that CARB released EMFAC2011 in September 2011, after the emission analysis was completed and modeling was well underway. Based on an initial review, it is not anticipated that the results of the analysis using the adjusted EMFAC2007 emission factors would be substantially changed using EMFAC2011. For example, EMFAC2011 reflects CARB's October 2008 "Regulation to Control Emission from In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks" and December 2008 "Truck and Bus Regulation." See Section C.3 for more details.

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C.2. Traffic Data

Cambridge Systematics Incorporated (CSI), a member of the I-710 Project Team, ran a modified version of the Southern California Association of Governments (SCAG) Regional Transportation Plan Travel Demand Model (the SCAG model) for the years 2008 and 2035 to estimate the traffic volumes and speeds for the various traffic links in the SCAG network for the I-710 Project. The output of the I-710 Traffic Model provides several parameters including a unique identifier for each link in the SCAG network (Link ID), description of each link (road name, route name, and road type), link lengths, average vehicle speeds and traffic volumes for each link during four different time periods (AM, mid-day, PM and night time). Within each time period traffic flow was sub-divided into five different vehicle classes as shown below.

- Automobiles (further divided into three sub-classes: drive alone, shared ride, and 3-person carpool),
- Light-heavy duty trucks,
- Medium-heavy duty trucks,
- Heavy-heavy duty trucks, and
- Port trucks.

To calculate the emissions using Equation C.1 the vehicle classes from the I-710 Traffic Model had to be matched with the vehicle classes in the EMFAC2007 model (EMFAC2007 provides emission factors). Table 1 documents this matching process.

Table 1: Matching of EMFAC2007 Vehicle Classification to I-710 Traffic Model Classification

SCAG Model Vehicle Class	Corresponding EMFAC2007 Classes	Description	EMFAC2007 Weight Class (lbs)
Automobile (Drive Alone, 2 Person and 3 Person Carpool)	PC, LDT1, LDT2, MDV	Passenger cars, light duty trucks, medium duty trucks and motorcycles	0 - 8,500
Light Duty Trucks	LHDT1, LHDT2	Light-heavy duty trucks	8,501 - 14,000
Medium Duty Trucks	MHDT	Medium-heavy duty trucks	14,001 - 33,000
Heavy Duty Trucks	HHDT	Heavy-heavy duty trucks	33,001 - 60,000
Port Trucks	HHDT	Heavy-heavy duty trucks	33,001 - 60,000

For air quality and health risk modeling of I-710 freeway emissions, the I-710 Traffic Model results were further adjusted and/or calibrated using actual traffic counts at specific locations on the I-710 to provide more accurate traffic volumes (referred to as “post-processed traffic data”

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hereinafter). The post-processed traffic volumes data (Tables C.3 -1.A through C.3 - 6.D) were available for the traffic links on the I-710 freeway and were used for calculating the emissions for the I-710 freeway links (See Tables C.4 - 1 through C.5 - 6) used in the impact modeling. Average vehicle speeds from the I-710 Traffic Model for the respective links were used for emission calculations. The traffic link lengths for the I-710 freeway were obtained from the URS geometric design. For the I-710 freeway, ENVIRON used the emissions of the post-processed traffic data, and I-710 freeway geometrics (link length and elevation) to evaluate ambient air quality impacts and health risks as described in Appendices D and E.

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C.3. Emission Factors

ENVIRON used the EMFAC2007 model to generate the emissions factors for the various criteria pollutants. EMFAC (short for EMission FACtor) is a computer model developed by CARB and can be used for estimating emission rates for on-road mobile sources for calendar years from 1970 to 2040 operating in California. Federal Register release Vol. 73, No. 13 on January 18, 2008 states that starting April 18, 2008, EMFAC2007 is required to be used statewide in all new regional emissions analyses and carbon monoxide (CO) hot-spot analyses for transportation conformity determinations in California. (Note that CARB released EMFAC2011 in September 2011, after the emission analysis was completed and modeling was well underway. Based on an initial review, it is not anticipated that the results of the analysis using the adjusted EMFAC2007 emission factors would be substantially changed using EMFAC2011. For example, EMFAC2011 reflects CARB's October 2008 "Regulation to Control Emission from In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks" and December 2008 "Truck and Bus Regulation." See below for more details.)

Emissions from the on-road vehicles can be categorized as follows:

- **Combustion Emissions (g/mile or g/hr for idling)**: Combustion emissions (i.e., exhaust emissions) from the combustion of fuel, which are the main source of emissions for all pollutants. EMFAC2007 has the capability to provide emission factors for user defined vehicle speeds. EMFAC2007 provides combustion emission factors for the following pollutants: TOG, ROG, CO, NO_X, CO_2, PM_{10}, $PM_{2.5}$ and SO_2.
- **Tire Wear (g/mile) and Brake Wear (g/mile)**: Particulate emissions from tires and brakes occurring as a result of operational wear. EMFAC2007 provides PM_{10} and $PM_{2.5}$ emission factors for tire and brake wear.
- **Evaporative Running Loss Emissions (g/min)**: EMFAC2007 also provides the evaporative hydrocarbon emission factors as a result of hot fuel vapor release during the operation of the vehicles. These hydrocarbon emissions are categorized as reactive organic gases (ROG) and toxic organic gases (TOG) by EMFAC2007.
- **Other Emissions**: These include start-up exhaust emissions, resting losses, and other evaporative emissions including hot soak emissions, partial day diurnal loss, multi day diurnal loss, partial day resting loss, multi day resting loss. EMFAC2007 provides emission factors for the appropriate pollutants from each of these sources as well.

For the I-710 Project, ENVIRON included the emission factors for combustion emissions, tire and break wear, and evaporative running loss emissions. Other emissions mentioned above were not evaluated for this Project because the Project should have no quantifiable effect on these emission modes.

The exhaust NO_X, CO and SO_2 emissions factors used in this Project were the combustion emission factors (g/mi or g/hr (idling)) obtained from the EMFAC2007 model. The idling PM,

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ROG, and TOG emission factors were also directly obtained from the combustion emissions output of EMFAC2007. The non-idling PM, ROG, and TOC emission factors are derived as follows.

Exhaust PM emission factor for non-idling:

$$PM_{exhaust} = PM_c + PM_t + PM_b$$

…..Equation C.2

Where,

$PM_{exhaust}$	=	Non-Idle/running exhaust particulate matter emission factor (g/mi)
PM_c	=	Non-Idle/running combustion emission factor for PM (g/mi)
PM_t	=	Tire wear emission factor for PM (g/mi)
PM_b	=	Break wear emission factor for PM (g/mi)

The non-idling hydrocarbon HC (ROG and TOG) exhaust emission factors:

$$HC_{exhaust} = HC_c + HC_e \times \frac{60}{S}$$

…..Equation C.3

Where,

$HC_{exhaust}$	=	Non-Idle exhaust hydrocarbon emission factor (g/mi)
HC_c	=	Non-Idle combustion emission factor for PM (g/mi)
HC_e	=	Evaporative running loss emission factor for HC (g/min)
S	=	Speed (mi/hr)
60	=	Conversion factor from g/min to g/hr

(Note that ROG emissions are often referred to as VOC emissions. For the purposes of this analysis, they can be considered equivalent.) Emissions of individual MSATs are calculated by applying the compound-specific MSAT speciation profiles for exhaust and evaporative emissions to TOG emission estimates.

Besides emission factors, EMFAC2007 provides fuel usage data in g/mi (running) and g/hr (idling), which were used to develop GHG emission inventories as described in Appendix F. Vehicle weight data provided by EMFAC2007 were used to develop the traffic entrained PM emission inventories (Section C.4).

EMFAC2007 Input Data

The input data used for the EMFAC2007 model runs are presented in the following sections.

- Vehicle information:
  - Vehicle class: EMFAC2007 divides the on-road fleet into 13 different vehicle classes (as shown in the Table below).

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Table 2: Vehicle Classes Modeled In EMFAC2007

Vehicle Class	Fuel Type	Code	Description	Weight Class (lbs)
1	Gas, Diesel, and Electric	PC	Passenger Cars	All
2	Gas, Diesel, and Electric	T1	Light-Duty Trucks	0-3750
3	Gas, Diesel	T2	Light-Duty Trucks	3751-5750
4	Gas, Diesel	T3	Medium-Duty Trucks	5751-8500
5	Gas, Diesel	T4	Light-Heavy-Duty	8501-10000
6	Gas, Diesel	T5	Light-Heavy-Duty	10001-14000
7	Gas, Diesel	T6	Medium-Heavy-Duty	14001-33000
8	Gas, Diesel	T7	Heavy-Heavy-Duty	33001-60000
9	Gas, Diesel	OB	Other Buses	All
10	Diesel	UB	Urban Buses	All
11	Gas	MC	Motorcycles	All
12	Gas, Diesel	SB	School Buses	All
13	Gas, Diesel	MH	Motor Homes	All

- Fuel type: Gasoline, Diesel and Electric, wherever applicable.
- Model year: All available vehicle model years for South Coast fleet were used.
- Inspection and Maintenance (I/M) condition: Vehicular emissions increase with their age as a result of vehicle defects, mal-maintenance, and tampering. For the purpose of this Project, default I&M program was used.
- Speed: Vehicular emissions are a function of the speed traveled, and generally follow a "U" shaped curve. Emissions per mile are highest at lower speeds and decrease with the increase in speed, reaching a minimum at speeds of 35-55 mph, depending on the vehicle type and pollutant. As the speed increases beyond the range above, the emissions per mile again increase with speed. Emission factors were calculated for vehicle speeds starting at idling (0 mph) and ranging up to maximum allowed design speed on the highway (70 mph) in the increments of 5 mph. However, only emissions factors for speeds estimated by the I-710 Traffic Model were used in the emission calculations.

- Operation information:
  - Geographic area: The Project is located in the South Coast Air Basin.

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- Calendar year: The calendar year dictates the available vehicle model years on the road and their age distribution, current control technology, and permissible emission levels for different vehicles/engines. EMFAC2007 emission modeling was performed for the base year as well as the year of operation/completion.
- Season: Annual average season was used which represents an average of all the monthly inventories.
- Temperature (-20 ºF to 120 ºF): For the purpose of this Project, representative ambient temperature(s) of 60 ^{o}F was used for the EMFAC2007 modeling.
- Relative Humidity (0% to 100%): An ambient relative humidity of 40%, which is representative of the South Coast Air Basin, was used for EMFAC2007 modeling.

- Method: As the Project domain is limited to the South Coast Air Basin, "Simple-Average" option was used as the calculation method. "Simple-Average" method uses area averaging to calculate averaged parameters for temperature, speed, relative humidity, and I/M.
- Modes: The model was run in "Emfac" mode, which generates emission factors in grams of pollutant emitted per vehicle activity (in grams/mile and grams/hr). Emfac mode also calculates a matrix of emission factors at specific values of temperature, relative humidity, and vehicle speed for each vehicle class/technology combination. The "Detailed Impact Rates (RTL)" option was selected, which gives the most detailed output.
- Other inputs: Default values for all other inputs were used.

Adjustments to EMFAC2007 Emission Factors

Since the last release of EMFAC2007 the following new regulations/other programs have been adopted/approved that will impact future emissions of heavy-duty trucks that travel on the I-710.

1. The CARB "Regulation to Control Emissions from In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks" (http://www.arb.ca.gov/msprog/onroad/porttruck/porttruck.htm)[2]
   - Phase 1: by Dec 31, 2009, all pre-1994 engine model years (MYs) drayage trucks need to be retired or replaced with 1994 or newer engines AND all 1994 – 2003 engine MY will need to demonstrate an 85% reduction in PM emissions.
   - Phase 2: after Dec 31, 2013, all drayage trucks will be required to further reduce emission to meet 2007 engine emission standards.
2. The Clean Trucks Program that is part of the approved POLA/POLB Clean Air Action Plan (CAAP) (http://www.cleanairactionplan.org/strategies/cleantrucks/default.asp)
   - Oct. 1, 2008: All pre-model 1989 engine MY are banned from entering the Port.

[2] Adopted on October 12, 2008. http://www.arb.ca.gov/regact/2007/drayage07/drayage07.htm

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- Jan 1, 2010: All 1989 – 2003 engine model years are banned from entering the Port.
- Jan 1, 2012: Only trucks meeting the 2007 or better federal emissions standards will be permitted to operate at the Port.

3. The CARB "Truck and Bus Regulation", adopted December 2008 (http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm)
   - Requirements
     - Owners must reduce emissions by upgrading vehicles one of three ways:
       - PM retrofits and replace vehicles (or engines) according to a prescribed schedule.
       - PM retrofits to a minimum number of engines each year and to replace a minimum number of older engines with newer engines meeting the 2010 engine standards.
       - Meet the fleet average based on the fleet owner's prerogative using PM and NOX retrofits.
   - Compliance Dates
     - PM requirements begin Jan 1, 2011.
     - NOx reductions starting Jan 1, 2013.
     - For fleets smaller than 3 vehicles performance requirements are expected by Jan 1, 2014.
     - By Jan 1, 2023 all vehicles must have a 2010 model year engine or equivalent.

The present version of EMFAC2007 model does not account for emission reductions for medium heavy-duty and heavy heavy-duty trucks (including port trucks) for the above adopted regulations/ programs. Therefore, the emission factors for medium heavy-duty and heavy heavy-duty trucks from EMFAC2007 model were adjusted to reflect the reductions for the above regulations/programs as discussed below.

The CARB "Regulation to Control Emissions from In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks" (Drayage Truck rule) requires that all drayage trucks further reduce emission to meet 2007 engine emission standards after December 31, 2013. The Clean Truck Program of POLA/POLB (Clean Truck Program or CTP) requires that only trucks meeting the 2007 or better federal emissions standards will be permitted to operate at the Port starting January 1, 2012. Therefore, the Clean Truck Program has stricter requirements as compared to the ARB Drayage truck rule and any adjustment made to the EMFAC2007 emission factors to account for the Clean Truck Program essentially covers the emission reductions on account of the ARB Drayage Truck rule.

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Adjustment to EMFAC2007 Emission Factor to Account for Truck and Bus Regulation

To adjust emission factors for the non-port medium- and heavy-duty truck emission factors in the calendar year 2035 the following approach was used. The Statewide truck and Bus rule requires public fleets to achieve reductions in fleet emissions for both PM_{10} and NO_x beginning in December of 2009. The fleet emission target rates become progressively more stringent for every compliance year (2013 – 2023). It was assumed that the fleet target emission rates indicated for 2023 would be applicable in 2035 because a lack of any other guidance. The emission factors for medium- and heavy-duty fleets in the calendar year 2035 were adjusted using the following steps:

First, the medium- and heavy-duty fleet mass emissions were generated by running EMFAC2007 in the "burden" mode.

Mass emissions were then converted into an emission factor using the total vehicle miles travelled per day for both medium- and heavy-duty diesel fleets to obtain a default emission factor for the fleet.

As the next step, a "control factor" was developed which was the Statewide Truck and Bus 2023 target fleet emission factor divided by the EMFAC2007 default emission factor. This control factor was applied to EMFAC2007 speed dependent emission factors obtained for the calendar year 2035 to obtain the "adjusted emission factor".

Adjustment to EMFAC2007 Emission Factor to Account for Clean Truck Program

The Clean Truck Programs administered by the Ports of Long Beach and Los Angeles are designed to accelerate the retrofit and/or replacement of older diesel trucks with cleaner trucks that meet current engine emission standards. One effect of the CTPs, which began its phased implementation in 2008, is to change the age distribution of trucks that serve the Ports, now and for future years. Emission factors from EMFAC2007 were adjusted for the Clean Truck Program by adjusting the population distribution of engine model years modeled in EMFAC2007. The fleet age distribution, developed by StarCrest, which accounted for the fleet turnover due to the CTP was used. This fleet age distribution has been used by the Ports for developing various emission inventories. The following steps were used to make this adjustment:

The default emission factors were obtained for each model year that exists within the 2035 fleet, omitting engine model years banned from entering the port due to the CTP.

The emission factor for a given model year was then weighted by the new fleet age distribution to get the weighted emission factor for that model year. For example if the fleet age distribution showed that 5% of the fleet in 2035 would be 2008 model year trucks, the emission factor for 2008 was multiplied by 5%.

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Finally, the weighted emission factors were added to obtain an adjusted emission factor for 2035.

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C.4. Entrained PM Emissions

This section presents the methodology used to estimate the entrained PM emissions for paved roadways in the SCAB, AOI, and the I-710 freeway for the 2008 baseline and 2035 alternatives. The primary source of entrained PM emissions during operation on the roadways is the re-suspension of loose particulate material from the surface of the road as a result of vehicle movement.

Emission inventories for traffic entrained PM emissions were generated using Equation C.4. The primary drivers for the total entrained PM emissions include vehicle miles travelled (see Equation C.4) and the fraction of heavy-duty vehicles on the roadway, which affects the average vehicle weight on the traffic link (see Equation C.5). As in the case of the other criteria pollutants, entrained PM emission inventories for SCAB, AOI, and the I-710 freeway were developed using the I-710 Traffic Model data. Entrained PM emissions for the I-710 freeway were also calculated using the post-processed traffic data, which were then used to estimate the ambient air quality impacts.

$$Total\ Entrained\ PM = \sum_i E_i \times VMT_i$$

…..Equation C.4

Where,

i	=	A particular traffic link as defined in the I-710 Traffic Model
E_i	=	Entrained Particulate Matter (PM) emission factor in lb/VMT for the ith traffic link calculated using Equation C.5
VMT_i	=	Total vehicle miles travelled in the ith traffic link. This is calculated as a sum of the vehicle miles travelled by the individual vehicle classes in the ith traffic link. Vehicle miles travelled by an individual vehicle class in a particular traffic link can be estimated by multiplying the length of that traffic link with the traffic flow of the individual vehicle class through that traffic link.

The entrained PM emission factor required to develop the entrained PM emissions inventory was calculated using EPA's AP-42 equation[3] as shown below (Equation C.5).

$$E_i = k \times sL^{0.91} \times W_i^{1.02} \times \left(1 - \frac{P}{4 \times N}\right)$$

…..Equation C.5

Where,

E	=	Entrained Particulate Matter (PM) emission factor in lb/VMT (VMT refers to Vehicle Miles Travelled)

[3] http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf (dated January 2011)

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k	=	Particle size multiplier. This is equal to 0.0054 lb/VMT for entrained PM_{10} and 0.0022 lb/VMT for entrained $PM_{2.5}$
sL	=	Road surface silt loading factor
W_i	=	Average weight in tons of the vehicles travelling on the ith traffic link calculated using Equation C.6
P	=	Number of wet days of precipitation with at least 0.1 inch of precipitation in the averaging period N.
N	=	Number of days in the averaging period

Input parameters needed to calculate the entrained PM emission factor are discussed below.

Silt Loading: CARB[4] and SCAQMD's 2007 AQMP provide average silt loading factors based on road type. Using this data, silt loading factors were assigned to each traffic link based on the road type specified in the I-710 Traffic Model as shown in Table 3.

Table 3: Silt Loading Values

Road Types in the I-710 Traffic Model	Silt Loading sL (g/m^2)
Freeway, HOV, Expressway/Parkway, Ramps, Truck Lanes	0.022
Principal Arterial, Minor Arterial, Major Collector, Centroid Connector	0.035
Minor Collector	0.32

Average Vehicle Weight: The average vehicle weight on each link was calculated using a weighted average method (Equation C.4) following the procedure stated in EPA's AP-42 methodology for calculation of entrained PM emissions from paved roads.

$$W_i = \frac{\sum_j W_j \times VMT_{i,j}}{VMT_i}$$

…..Equation C.6

Where,

i	=	A particular traffic link as defined in the I-710 Traffic Model
W_i	=	Average Vehicle Weight on the ith traffic link
j	=	A particular vehicle class as defined in the I-710 Traffic Model
W_j	=	Median Vehicle Weight for the jth vehicle class (see Table 4)

[4] http://www.arb.ca.gov/ei/areasrc/PMSJVPavedRoadMethod2003.pdf

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$VMT_{i,j}$ = Vehicle miles travelled by the jth vehicle class in the ith traffic link. This is calculated as a product of the length of jth traffic link and traffic volume of the ith vehicle class passing through the jth traffic link

VMT_i = Total vehicle miles travelled in the ith traffic link. This is calculated as a sum of the vehicle miles travelled by individual vehicle classes in the ith traffic link.

The average weight for any I-710 Traffic Model vehicle class was determined from EMFAC2007. EMFAC2007 provides a weight range (see Table 2) for the various vehicle classes. The average weight for the range for a given vehicle class was used as the weight for that particular vehicle class as shown in Table 4 below.

Table 4: Median Vehicle Weight for I-710 Traffic Model Vehicle Classes

Vehicle Class in the I-710 Traffic Model	Average Weight from the EMFAC2007 model (tons)
Automobiles	2.13
Light-Heavy Duty Trucks	5.63
Medium-Heavy Duty Trucks	11.75
Heavy-Heavy Duty Trucks	23.25
Port Trucks	23.25

Precipitation: Figure 13.2.1-2 in EPA's AP-42 methodology for calculation of entrained PM emissions from paved roads provides annual precipitation data for United States. Using this figure the number of wet days in a year with at least 0.01 inches of precipitation was found to be 40 for the South Coast Air Basin.

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Table C.1.1C. 2008 EMFAC Emission Factors for PM2.5

Speed (mph) [1]	EMFAC2007 Emission Factor per Vehicle Class (g/mi) [2]									
	LDA	LDT1	LDT2	MDV	LHD1	LHD2	LHDT [3]	MHD	HHD [4]	Autos [5]
0	0.00	0.00	0.00	0.00	0.14	0.40	0.20	0.76	1.89	0.00
1	0.06	0.07	0.13	0.13	0.06	0.09	0.07	0.60	2.93	0.09
2	0.06	0.07	0.13	0.13	0.06	0.09	0.07	0.60	2.93	0.09
3	0.06	0.07	0.12	0.12	0.06	0.09	0.07	0.60	2.93	0.08
4	0.06	0.07	0.11	0.11	0.06	0.09	0.07	0.60	2.93	0.08
5	0.05	0.06	0.11	0.10	0.06	0.09	0.07	0.60	2.93	0.07
6	0.05	0.06	0.10	0.09	0.06	0.09	0.07	0.57	2.74	0.07
7	0.05	0.05	0.09	0.09	0.06	0.09	0.06	0.55	2.55	0.06
8	0.04	0.05	0.08	0.08	0.05	0.08	0.06	0.52	2.37	0.06
9	0.04	0.05	0.08	0.08	0.05	0.08	0.06	0.50	2.18	0.05
10	0.04	0.04	0.07	0.07	0.05	0.07	0.05	0.47	1.99	0.05
11	0.03	0.04	0.07	0.07	0.04	0.07	0.05	0.45	1.86	0.05
12	0.03	0.04	0.06	0.06	0.04	0.07	0.05	0.43	1.72	0.04
13	0.03	0.04	0.06	0.06	0.04	0.06	0.05	0.41	1.58	0.04
14	0.03	0.03	0.06	0.05	0.04	0.06	0.04	0.40	1.45	0.04
15	0.03	0.03	0.05	0.05	0.04	0.06	0.04	0.38	1.31	0.04
16	0.03	0.03	0.05	0.05	0.03	0.06	0.04	0.36	1.23	0.03
17	0.03	0.03	0.05	0.05	0.03	0.05	0.04	0.35	1.15	0.03
18	0.02	0.03	0.04	0.04	0.03	0.05	0.04	0.34	1.08	0.03
19	0.02	0.03	0.04	0.04	0.03	0.05	0.03	0.32	1.00	0.03
20	0.02	0.03	0.04	0.04	0.03	0.05	0.03	0.31	0.92	0.03
21	0.02	0.02	0.04	0.04	0.03	0.05	0.03	0.30	0.89	0.03
22	0.02	0.02	0.04	0.04	0.03	0.04	0.03	0.29	0.86	0.03
23	0.02	0.02	0.03	0.03	0.03	0.04	0.03	0.28	0.83	0.03
24	0.02	0.02	0.03	0.03	0.03	0.04	0.03	0.27	0.80	0.02
25	0.02	0.02	0.03	0.03	0.03	0.04	0.03	0.26	0.77	0.02
26	0.02	0.02	0.03	0.03	0.02	0.04	0.03	0.25	0.75	0.02
27	0.02	0.02	0.03	0.03	0.02	0.04	0.03	0.25	0.73	0.02
28	0.02	0.02	0.03	0.03	0.02	0.04	0.03	0.24	0.71	0.02
29	0.02	0.02	0.03	0.03	0.02	0.04	0.03	0.23	0.69	0.02
30	0.02	0.02	0.03	0.03	0.02	0.04	0.03	0.23	0.66	0.02
31	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.22	0.65	0.02
32	0.02	0.02	0.03	0.02	0.02	0.03	0.02	0.22	0.63	0.02
33	0.02	0.02	0.03	0.02	0.02	0.03	0.02	0.21	0.62	0.02
34	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.20	0.60	0.02
35	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.20	0.59	0.02
36	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.20	0.58	0.02
37	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.19	0.57	0.02
38	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.19	0.56	0.02
39	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.18	0.56	0.02
40	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.18	0.55	0.02
41	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.18	0.55	0.02
42	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.17	0.55	0.02
43	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.17	0.55	0.02
44	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.17	0.54	0.02
45	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.16	0.54	0.02
46	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.16	0.55	0.02
47	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.16	0.56	0.02
48	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.16	0.56	0.02
49	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.16	0.57	0.02
50	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.58	0.02
51	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.59	0.02
52	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.60	0.02
53	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.62	0.02
54	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.63	0.02
55	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.64	0.02

Table C.1.1C. 2008 EMFAC Emission Factors for PM2.5

Speed (mph) [1]	EMFAC2007 Emission Factor per Vehicle Class (g/mi) [2]									
	LDA	LDT1	LDT2	MDV	LHD1	LHD2	LHDT [3]	MHD	HHD [4]	Autos [5]
56	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.66	0.02
57	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.68	0.02
58	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.70	0.02
59	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.72	0.02
60	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.74	0.02
61	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.77	0.02
62	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.80	0.02
63	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.83	0.02
64	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.15	0.85	0.02
65	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.15	0.88	0.02
66	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.15	0.92	0.02
67	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.15	0.95	0.02
68	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.15	0.99	0.02
69	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.15	1.02	0.02
70	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.15	1.05	0.02
71	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.15	1.10	0.02
72	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.15	1.14	0.02
73	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.15	1.18	0.02
74	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.15	1.22	0.02
75	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.15	1.26	0.02
76	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.16	1.31	0.02
77	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.16	1.36	0.02
78	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.16	1.41	0.02
79	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.16	1.46	0.02
80	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.16	1.51	0.02

1. Emission factors for speeds greater than 5 mph and that are not multiples of 5 mph are interpolated between the closest increments of 5 mph.
2. EMFAC2007 vehicle class area based on gross vehicular weights. Class abbreviations and corresponding gross vehicle weights are presented in the EMFAC2007 version 6.3.1 users guide.
3. LHDT emission factors are averaged from LHD1 and LHD2 which are weighted by the fraction of vehicle miles traveled within the South Coast Air Basin.
4. HHD emission factors are also applied to port trucks.
5. Auto emission factors are averaged from LDA, LDT1, LDT2 and MDV EMFAC2007 vehicle classes which are weighted by the fraction of vehicle miles traveled within the South Coast Air Basin

Table C.1.1D. 2008 EMFAC Emission Factors for PM10

Speed (mph) [1]	EMFAC2007 Emission Factor per Vehicle Class (g/mi) [2]									
	LDA	LDT1	LDT2	MDV	LHD1	LHD2	LHDT [3]	MHD	HHD [4]	Autos [5]
0	0.00	0.00	0.00	0.00	0.15	0.44	0.22	0.83	2.06	0.00
1	0.08	0.09	0.15	0.15	0.08	0.12	0.09	0.67	3.22	0.11
2	0.08	0.09	0.15	0.15	0.08	0.12	0.09	0.67	3.22	0.11
3	0.08	0.09	0.15	0.14	0.08	0.12	0.09	0.67	3.22	0.10
4	0.07	0.08	0.14	0.13	0.08	0.12	0.09	0.67	3.22	0.10
5	0.07	0.08	0.13	0.12	0.08	0.12	0.09	0.67	3.22	0.09
6	0.07	0.08	0.12	0.12	0.08	0.11	0.09	0.64	3.02	0.09
7	0.06	0.07	0.11	0.11	0.08	0.11	0.08	0.61	2.82	0.08
8	0.06	0.07	0.10	0.10	0.07	0.10	0.08	0.58	2.61	0.08
9	0.06	0.06	0.10	0.10	0.07	0.10	0.08	0.55	2.41	0.07
10	0.05	0.06	0.09	0.09	0.07	0.10	0.07	0.53	2.21	0.07
11	0.05	0.06	0.09	0.08	0.06	0.09	0.07	0.51	2.06	0.06
12	0.05	0.05	0.08	0.08	0.06	0.09	0.07	0.49	1.91	0.06
13	0.05	0.05	0.08	0.08	0.06	0.09	0.07	0.47	1.76	0.06
14	0.05	0.05	0.07	0.07	0.06	0.08	0.06	0.45	1.61	0.06
15	0.04	0.05	0.07	0.07	0.06	0.08	0.06	0.43	1.46	0.05
16	0.04	0.05	0.07	0.06	0.05	0.08	0.06	0.41	1.38	0.05
17	0.04	0.05	0.06	0.06	0.05	0.07	0.06	0.40	1.29	0.05
18	0.04	0.04	0.06	0.06	0.05	0.07	0.06	0.38	1.21	0.05
19	0.04	0.04	0.06	0.06	0.05	0.07	0.05	0.37	1.12	0.05
20	0.04	0.04	0.06	0.06	0.05	0.07	0.05	0.35	1.04	0.04
21	0.04	0.04	0.05	0.05	0.05	0.07	0.05	0.34	1.01	0.04
22	0.04	0.04	0.05	0.05	0.05	0.06	0.05	0.33	0.98	0.04
23	0.03	0.04	0.05	0.05	0.05	0.06	0.05	0.32	0.94	0.04
24	0.03	0.04	0.05	0.05	0.04	0.06	0.05	0.31	0.91	0.04
25	0.03	0.04	0.05	0.05	0.04	0.06	0.05	0.30	0.88	0.04
26	0.03	0.04	0.05	0.05	0.04	0.06	0.05	0.29	0.86	0.04
27	0.03	0.04	0.05	0.05	0.04	0.06	0.05	0.29	0.83	0.04
28	0.03	0.04	0.05	0.04	0.04	0.06	0.04	0.28	0.81	0.04
29	0.03	0.03	0.04	0.04	0.04	0.06	0.04	0.27	0.78	0.04
30	0.03	0.03	0.04	0.04	0.04	0.06	0.04	0.26	0.76	0.04
31	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.26	0.74	0.04
32	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.25	0.73	0.03
33	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.24	0.71	0.03
34	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.24	0.70	0.03
35	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.23	0.68	0.03
36	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.23	0.67	0.03
37	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.22	0.66	0.03
38	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.22	0.65	0.03
39	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.21	0.64	0.03
40	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.21	0.64	0.03
41	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.21	0.64	0.03
42	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.20	0.63	0.03
43	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.20	0.63	0.03
44	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.20	0.63	0.03
45	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.20	0.63	0.03
46	0.03	0.03	0.04	0.04	0.03	0.05	0.04	0.19	0.64	0.03
47	0.03	0.03	0.04	0.04	0.03	0.05	0.04	0.19	0.65	0.03
48	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.19	0.65	0.03
49	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.19	0.66	0.03
50	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	0.67	0.03
51	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	0.68	0.03
52	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	0.69	0.03
53	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	0.71	0.03
54	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	0.72	0.03
55	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	0.74	0.03

Table C.1.1D. 2008 EMFAC Emission Factors for PM10

Speed (mph) [1]	EMFAC2007 Emission Factor per Vehicle Class (g/mi) [2]									
	LDA	LDT1	LDT2	MDV	LHD1	LHD2	LHDT [3]	MHD	HHD [4]	Autos [5]
56	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	0.76	0.03
57	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	0.78	0.03
58	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	0.80	0.03
59	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.17	0.83	0.03
60	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.17	0.85	0.03
61	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.17	0.88	0.03
62	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.17	0.91	0.03
63	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.17	0.94	0.03
64	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.17	0.97	0.03
65	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.17	1.00	0.03
66	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.17	1.04	0.03
67	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	1.07	0.03
68	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	1.11	0.03
69	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	1.15	0.03
70	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	1.19	0.03
71	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	1.23	0.03
72	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	1.28	0.03
73	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	1.32	0.03
74	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.18	1.37	0.03
75	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.18	1.41	0.03
76	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.19	1.47	0.03
77	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.19	1.52	0.03
78	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.19	1.57	0.04
79	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.19	1.62	0.04
80	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.20	1.68	0.04

1. Emission factors for speeds greater than 5 mph and that are not multiples of 5 mph are interpolated between the closest increments of 5 mph.

2. EMFAC2007 vehicle class area based on gross vehicular weights. Class abbreviations and corresponding gross vehicle weights are presented in the EMFAC2007 version 6.3.1 users guide.

3. LHDT emission factors are averaged from LHD1 and LHD2 which are weighted by the fraction of vehicle miles traveled within the South Coast Air Basin.

4. HHD emission factors are also applied to port trucks.

5. Auto emission factors are averaged from LDA, LDT1, LDT2 and MDV EMFAC2007 vehicle classes which are weighted by the fraction of vehicle miles traveled within the South Coast Air Basin

Table C.1.2C. 2035 EMFAC Emission Factors for PM2.5

Speed (mph) [1]	EMFAC2007 Emission Factor per Vehicle Class (g/mi) [2]										
	LDA	LDT1	LDT2	MDV	LHD1	LHD2	LHDT [3]	MHD	HHD	Autos [4]	Port Truck [5]
0	0.00	0.00	0.00	0.00	0.14	0.31	0.18	0.60	0.12	0.00	0.10
1	0.08	0.09	0.18	0.18	0.06	0.06	0.06	0.28	0.11	0.12	0.14
2	0.08	0.09	0.18	0.18	0.06	0.06	0.06	0.28	0.11	0.12	0.14
3	0.07	0.08	0.17	0.18	0.06	0.06	0.06	0.28	0.11	0.11	0.14
4	0.07	0.08	0.16	0.16	0.06	0.06	0.06	0.28	0.11	0.10	0.14
5	0.06	0.07	0.15	0.15	0.06	0.06	0.06	0.28	0.11	0.09	0.14
6	0.06	0.07	0.14	0.14	0.06	0.05	0.06	0.26	0.11	0.09	0.14
7	0.05	0.06	0.13	0.13	0.05	0.05	0.05	0.25	0.11	0.08	0.14
8	0.05	0.06	0.12	0.12	0.05	0.05	0.05	0.24	0.10	0.08	0.14
9	0.05	0.05	0.11	0.11	0.05	0.05	0.05	0.23	0.10	0.07	0.13
10	0.04	0.05	0.10	0.10	0.04	0.04	0.04	0.22	0.10	0.06	0.13
11	0.04	0.05	0.09	0.09	0.04	0.04	0.04	0.21	0.10	0.06	0.13
12	0.04	0.04	0.08	0.09	0.04	0.04	0.04	0.20	0.10	0.06	0.13
13	0.04	0.04	0.08	0.08	0.04	0.04	0.04	0.19	0.10	0.05	0.13
14	0.03	0.04	0.07	0.07	0.04	0.04	0.04	0.18	0.09	0.05	0.12
15	0.03	0.04	0.07	0.07	0.03	0.03	0.03	0.18	0.09	0.05	0.12
16	0.03	0.03	0.06	0.06	0.03	0.03	0.03	0.17	0.09	0.04	0.12
17	0.03	0.03	0.06	0.06	0.03	0.03	0.03	0.16	0.09	0.04	0.12
18	0.03	0.03	0.06	0.06	0.03	0.03	0.03	0.16	0.09	0.04	0.12
19	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.15	0.09	0.04	0.11
20	0.02	0.03	0.05	0.05	0.03	0.03	0.03	0.14	0.09	0.03	0.11
21	0.02	0.03	0.05	0.05	0.03	0.03	0.03	0.14	0.09	0.03	0.11
22	0.02	0.03	0.05	0.05	0.02	0.03	0.02	0.14	0.09	0.03	0.11
23	0.02	0.02	0.04	0.05	0.02	0.03	0.02	0.13	0.08	0.03	0.11
24	0.02	0.02	0.04	0.04	0.02	0.02	0.02	0.13	0.08	0.03	0.11
25	0.02	0.02	0.04	0.04	0.02	0.02	0.02	0.12	0.08	0.03	0.11
26	0.02	0.02	0.04	0.04	0.02	0.02	0.02	0.12	0.08	0.03	0.11
27	0.02	0.02	0.04	0.04	0.02	0.02	0.02	0.12	0.08	0.03	0.11
28	0.02	0.02	0.04	0.04	0.02	0.02	0.02	0.11	0.08	0.03	0.11
29	0.02	0.02	0.04	0.04	0.02	0.02	0.02	0.11	0.08	0.02	0.11
30	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.11	0.09	0.02	0.11
31	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.10	0.09	0.02	0.11
32	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.10	0.09	0.02	0.11
33	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.10	0.09	0.02	0.11
34	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.10	0.09	0.02	0.12
35	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.09	0.09	0.02	0.12
36	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.09	0.09	0.02	0.12
37	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.09	0.09	0.02	0.12
38	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.09	0.09	0.02	0.12
39	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.09	0.09	0.02	0.12
40	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.08	0.09	0.02	0.13
41	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.08	0.10	0.02	0.13
42	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.08	0.10	0.02	0.13
43	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.08	0.10	0.02	0.13
44	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.08	0.10	0.02	0.14
45	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.08	0.10	0.02	0.14
46	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.08	0.10	0.02	0.14
47	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.08	0.11	0.02	0.14
48	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.08	0.11	0.02	0.15
49	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.07	0.11	0.02	0.15
50	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.07	0.11	0.02	0.15
51	0.01	0.02	0.03	0.03	0.01	0.02	0.02	0.07	0.12	0.02	0.16
52	0.01	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.12	0.02	0.16
53	0.01	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.12	0.02	0.17
54	0.01	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.12	0.02	0.17
55	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.13	0.02	0.17
56	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.13	0.02	0.18
57	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.13	0.02	0.18
58	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.14	0.02	0.19
59	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.14	0.02	0.19
60	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.14	0.02	0.20
61	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.15	0.02	0.20
62	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.15	0.02	0.21
63	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.15	0.02	0.21
64	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.16	0.02	0.22

Table C.1.2C. 2035 EMFAC Emission Factors for PM2.5

Speed (mph) [1]	EMFAC2007 Emission Factor per Vehicle Class (g/mi) [2]										
	LDA	LDT1	LDT2	MDV	LHD1	LHD2	LHDT [3]	MHD	HHD	Autos [4]	Port Truck [5]
65	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.16	0.02	0.22
66	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.17	0.02	0.23
67	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.17	0.02	0.24
68	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.07	0.18	0.02	0.24
69	0.02	0.02	0.03	0.03	0.01	0.02	0.02	0.07	0.18	0.02	0.25
70	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.07	0.18	0.02	0.25
71	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.07	0.19	0.02	0.26
72	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.07	0.19	0.02	0.27
73	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.07	0.20	0.02	0.27
74	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.07	0.20	0.02	0.28
75	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.07	0.21	0.02	0.29
76	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.07	0.21	0.02	0.30
77	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.08	0.22	0.02	0.30
78	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.08	0.22	0.02	0.31
79	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.08	0.23	0.02	0.32
80	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.08	0.24	0.02	0.33

1. Emission factors for speeds greater than 5 mph and that are not multiples of 5 mph are interpolated between the closest increments of 5 mph.

2. EMFAC2007 vehicle class area based on gross vehicular weights. Class abbreviations and corresponding gross vehicle weights are presented in the EMFAC2007 version 6.3.1 users guide.

3. LHDT emission factors are averaged from LHD1 and LHD2 which are weighted by the fraction of vehicle miles traveled within the South Coast Air Basin.

4. Auto emission factors are averaged from LDA, LDT1, LDT2 and MDV EMFAC2007 vehicle classes which are weighted by the fraction of vehicle miles traveled within the South Coast Air Basin

5. Port Truck emissions are HHD emission factors adjusted by the projected fleet mix due to the Ports Clean Truck Program enacted in 2008 which bans certain model year engines from operating within the Ports. EMFAC2007 does not account for this rule.

Table C.1.2D. 2035 EMFAC Emission Factors for PM10

Speed (mph) [1]	EMFAC2007 Emission Factor per Vehicle Class (g/mi) [2]										
	LDA	LDT1	LDT2	MDV	LHD1	LHD2	LHDT [3]	MHD	HHD	Autos [4]	Port Truck [5]
0	0.00	0.00	0.00	0.00	0.15	0.34	0.19	0.34	0.12	0.00	0.11
1	0.09	0.11	0.21	0.21	0.08	0.08	0.08	0.17	0.16	0.14	0.20
2	0.09	0.11	0.21	0.21	0.08	0.08	0.08	0.17	0.16	0.14	0.20
3	0.09	0.10	0.20	0.20	0.08	0.08	0.08	0.17	0.16	0.13	0.20
4	0.08	0.10	0.19	0.19	0.08	0.08	0.08	0.17	0.16	0.12	0.20
5	0.08	0.09	0.17	0.17	0.08	0.08	0.08	0.17	0.16	0.12	0.20
6	0.07	0.08	0.16	0.16	0.08	0.08	0.08	0.17	0.15	0.11	0.19
7	0.07	0.08	0.15	0.15	0.07	0.07	0.07	0.16	0.15	0.10	0.19
8	0.07	0.07	0.14	0.14	0.07	0.07	0.07	0.16	0.15	0.10	0.19
9	0.06	0.07	0.13	0.13	0.07	0.07	0.07	0.15	0.15	0.09	0.19
10	0.06	0.07	0.12	0.12	0.06	0.06	0.06	0.14	0.15	0.08	0.18
11	0.06	0.06	0.11	0.11	0.06	0.06	0.06	0.14	0.15	0.08	0.18
12	0.05	0.06	0.11	0.11	0.06	0.06	0.06	0.13	0.14	0.07	0.18
13	0.05	0.06	0.10	0.10	0.06	0.06	0.06	0.13	0.14	0.07	0.18
14	0.05	0.05	0.09	0.09	0.05	0.06	0.05	0.12	0.14	0.07	0.18
15	0.05	0.05	0.09	0.09	0.05	0.05	0.05	0.12	0.14	0.06	0.17
16	0.04	0.05	0.08	0.08	0.05	0.05	0.05	0.12	0.14	0.06	0.17
17	0.04	0.05	0.08	0.08	0.05	0.05	0.05	0.11	0.14	0.06	0.17
18	0.04	0.05	0.08	0.08	0.05	0.05	0.05	0.11	0.14	0.06	0.17
19	0.04	0.04	0.07	0.07	0.05	0.05	0.05	0.10	0.13	0.05	0.17
20	0.04	0.04	0.07	0.07	0.05	0.05	0.05	0.10	0.13	0.05	0.16
21	0.04	0.04	0.07	0.07	0.04	0.05	0.04	0.10	0.13	0.05	0.16
22	0.04	0.04	0.06	0.06	0.04	0.05	0.04	0.10	0.13	0.05	0.16
23	0.04	0.04	0.06	0.06	0.04	0.04	0.04	0.09	0.13	0.05	0.16
24	0.04	0.04	0.06	0.06	0.04	0.04	0.04	0.09	0.13	0.05	0.16
25	0.04	0.04	0.06	0.06	0.04	0.04	0.04	0.09	0.13	0.04	0.16
26	0.03	0.04	0.06	0.06	0.04	0.04	0.04	0.09	0.13	0.04	0.16
27	0.03	0.04	0.05	0.05	0.04	0.04	0.04	0.09	0.13	0.04	0.16
28	0.03	0.04	0.05	0.05	0.04	0.04	0.04	0.08	0.13	0.04	0.16
29	0.03	0.03	0.05	0.05	0.04	0.04	0.04	0.08	0.13	0.04	0.16
30	0.03	0.03	0.05	0.05	0.04	0.04	0.04	0.08	0.13	0.04	0.16
31	0.03	0.03	0.05	0.05	0.04	0.04	0.04	0.08	0.13	0.04	0.16
32	0.03	0.03	0.05	0.05	0.04	0.04	0.04	0.08	0.13	0.04	0.16
33	0.03	0.03	0.05	0.05	0.04	0.04	0.04	0.08	0.13	0.04	0.17
34	0.03	0.03	0.05	0.05	0.04	0.04	0.04	0.07	0.13	0.04	0.17
35	0.03	0.03	0.05	0.05	0.04	0.04	0.04	0.07	0.13	0.04	0.17
36	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.07	0.14	0.04	0.17
37	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.07	0.14	0.04	0.17
38	0.03	0.03	0.04	0.04	0.03	0.04	0.03	0.07	0.14	0.04	0.17
39	0.03	0.03	0.04	0.04	0.03	0.04	0.03	0.07	0.14	0.03	0.18
40	0.03	0.03	0.04	0.04	0.03	0.04	0.03	0.07	0.14	0.03	0.18
41	0.03	0.03	0.04	0.04	0.03	0.04	0.03	0.07	0.14	0.03	0.18
42	0.03	0.03	0.04	0.04	0.03	0.04	0.03	0.07	0.14	0.03	0.18
43	0.03	0.03	0.04	0.04	0.03	0.04	0.03	0.07	0.15	0.03	0.19
44	0.03	0.03	0.04	0.04	0.03	0.04	0.03	0.07	0.15	0.03	0.19
45	0.03	0.03	0.04	0.04	0.03	0.04	0.03	0.06	0.15	0.03	0.19
46	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.15	0.03	0.19
47	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.15	0.03	0.20
48	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.16	0.03	0.20
49	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.16	0.03	0.20
50	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.16	0.03	0.21
51	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.16	0.03	0.21
52	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.17	0.03	0.22
53	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.17	0.03	0.22
54	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.17	0.03	0.23
55	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.18	0.03	0.23
56	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.18	0.03	0.23
57	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.18	0.03	0.24
58	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.19	0.04	0.24
59	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.19	0.04	0.25
60	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.19	0.04	0.25
61	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.06	0.20	0.04	0.26
62	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.20	0.04	0.27

Table C.1.2D. 2035 EMFAC Emission Factors for PM10

Speed (mph) [1]	EMFAC2007 Emission Factor per Vehicle Class (g/mi) [2]										
	LDA	LDT1	LDT2	MDV	LHD1	LHD2	LHDT [3]	MHD	HHD	Autos [4]	Port Truck [5]
63	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.20	0.04	0.27
64	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.21	0.04	0.28
65	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.21	0.04	0.28
66	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.22	0.04	0.29
67	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.22	0.04	0.30
68	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.23	0.04	0.30
69	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.23	0.04	0.31
70	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.23	0.04	0.32
71	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.24	0.04	0.32
72	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.24	0.04	0.33
73	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.25	0.04	0.34
74	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.26	0.04	0.35
75	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.26	0.04	0.35
76	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.27	0.04	0.36
77	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.27	0.04	0.37
78	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.28	0.04	0.38
79	0.03	0.03	0.05	0.05	0.03	0.03	0.03	0.06	0.28	0.04	0.39
80	0.03	0.03	0.05	0.05	0.03	0.04	0.03	0.06	0.29	0.04	0.40

1. Emission factors for speeds greater than 5 mph and that are not multiples of 5 mph are interpolated between the closest increments of 5 mph.

2. EMFAC2007 vehicle class area based on gross vehicular weights. Class abbreviations and corresponding gross vehicle weights are presented in the EMFAC2007 version 6.3.1 users guide.

3. LHDT emission factors are averaged from LHD1 and LHD2 which are weighted by the fraction of vehicle miles traveled within the South Coast Air Basin.

4. Auto emission factors are averaged from LDA, LDT1, LDT2 and MDV EMFAC2007 vehicle classes which are weighted by the fraction of vehicle miles traveled within the South Coast Air Basin

5. Port Truck emissions are HHD emission factors adjusted by the projected fleet mix due to the Ports Clean Truck Program enacted in 2008 which bans certain model year engines from operating within the Ports. EMFAC2007 does not account for this rule.

Table C.2.1A. EMFAC2007 Burden Run for the 2035 Calendar Year for MHD and HHD Vehicle Classes.

Title : SCAB Avg Annual CYr 2035 (HHD and MHD)
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 6/9/2009 16:46
Scen Year: 2035 -- All model years in the range 1995 to 2035 selected
Season : Annual
Area : South Coast
I/M Stat : Enhanced Interim (2005)
Emissions: Tons Per Period

RecType	ScenNum	Calendar Year	Area	Vehicle Class	Model Year	Vehicle Technology	Period	Pop	Vehicle Miles Traveled	Trips
Vh	1	2035	South Coast Air Basin	MHD	AllMYr	GAS	Day	28,396	1.38E+06	1,296,794
Vh	1	2035	South Coast Air Basin	MHD	AllMYr	DSL	Day	108,326	6.37E+06	3,037,450
Vh	1	2035	South Coast Air Basin	MHD	AllMYr	TOT	Day	136,722	7.76E+06	4,334,244
Vh	1	2035	South Coast Air Basin	HHD	AllMYr	GAS	Day	1,443	1.55E+05	65,896
Vh	1	2035	South Coast Air Basin	HHD	AllMYr	DSL	Day	72,317	1.53E+07	365,959
Vh	1	2035	South Coast Air Basin	HHD	AllMYr	TOT	Day	73,760	1.55E+07	431,855

Table C.2.1B. NOX and PM10 Emission Factors for HHD and MHD in 2035

Pollutant	Vehicle Class	Mass Emissions (ton/day) [1]	Mass Emission (g/day)	Vehicle Miles Traveled (mi/day)	Emission Factor (g/mi) [2]
NOX	HHD	58.09	52,698,086	1.5E+07	3.44
	MHD	10.62	9,634,252	6.4E+06	1.51
PM10	HHD	1.96	1,778,073	1.5E+07	0.12
	MHD	0.8	725,744	6.4E+06	0.11

1. Reflects the summation of running and idle mass emissions

2. Emission factor is based on the burden performed for the 2035 calendar year and is a default emission factor based on vehicular activity and mass emissions within the South Coast Air Basin

Table C.2.1C. CARBs Statewide Public Fleet and Bus Rule Target Emission Factors per Compliance Year [1,2]

Compliance Deadline (as of Jan 1)	Fleet NOX Targets (g/mi)		Fleet PM10 Targets (g/mi)	
	MHD	HHD	MHD	HHD
2013	8.5	14.4	0.38	0.71
2014	5.8	9.8	0.29	0.53
2015	5.8	9.8	0.17	0.32
2016	4.6	7.8	0.06	0.11
2017	4	6	0.06	0.11
2018	4	6	0.06	0.11
2019	4	6	0.06	0.11
2020	3.2	4.4	0.06	0.11
2021	3.2	4.4	0.06	0.11
2022	1.6	3	0.06	0.11
2023	0.8	1.6	0.06	0.11
2035	0.8	1.6	0.06	0.11

Table C.2.1D. Control Factors Used to Adjust EMFAC2007 2035 Emission Factors.

Vehicle Class	2035 Control Factors					
	NOx			PM10		
	EMFAC Default (g/mi)	Target (g/mi)	NOX Control Factor	EMFAC Default (g/mi)	Target (g/mi)	PM10 Control Factor
HHD	3.44	1.6	0.47	0.11	0.11	0.97
MHD	1.51	0.8	0.53	0.12	0.06	0.52

Table C.2.2A. 2035 Fleet Age Distribution

Model Year	Fraction of Model Year in 2035 [1]
2035	0.00462
2034	0.00479
2033	0.00570
2032	0.00615
2031	0.00886
2030	0.01622
2029	0.02584
2028	0.03591
2027	0.04590
2026	0.05637
2025	0.06577
2024	0.07173
2023	0.07324
2022	0.06870
2021	0.06440
2020	0.06046
2019	0.05756
2018	0.05263
2017	0.04815
2016	0.04411
2015	0.04101
2014	0.03734
2013	0.03202
2012	0.02801
2011	0.02262
2010	0.01909
2009	0.00000
2008	0.00000
2007	0.00000
2006	0.00000
2005	0.00000
2004	0.00000
2003	0.00000
2002	0.00000
2001	0.00000
2000	0.00000
1999	0.00000
1998	0.00000
1997	0.00000
1996	0.00000
1995	0.00000

1. Distribution is based on a survey conducted by Starcrest in 2007 in which engine model years were recorded. Based on accrural rates the 2035 heavy-heavy duty fleet age distribution was projected.

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
1995	0	1.85	49.53	110.27	6.30E-02	1.85	1.70	12.41	14.13	0	0	0	0	0	0	0	0
1995	1	6.53	43.05	70.19	3.70E-02	6.59	6.03	29.47	33.55	0	0	0	0	0	0	0	0
1995	2	6.53	43.05	70.19	3.70E-02	6.59	6.03	29.47	33.55	0	0	0	0	0	0	0	0
1995	3	6.53	43.05	70.19	3.70E-02	6.59	6.03	29.47	33.55	0	0	0	0	0	0	0	0
1995	4	6.53	43.05	70.19	3.70E-02	6.59	6.03	29.47	33.55	0	0	0	0	0	0	0	0
1995	5	6.53	43.05	70.19	3.70E-02	6.59	6.03	29.47	33.55	0	0	0	0	0	0	0	0
1995	10	4.19	32.28	45.79	3.00E-02	4.25	3.87	16.18	18.42	0	0	0	0	0	0	0	0
1995	15	2.50	23.60	31.68	2.50E-02	2.56	2.32	7.54	8.58	0	0	0	0	0	0	0	0
1995	20	1.55	17.44	27.70	2.10E-02	1.62	1.45	3.88	4.42	0	0	0	0	0	0	0	0
1995	25	1.21	14.36	27.45	2.00E-02	1.27	1.13	3.00	3.42	0	0	0	0	0	0	0	0
1995	30	0.95	11.75	27.32	1.80E-02	1.01	0.89	2.32	2.64	0	0	0	0	0	0	0	0
1995	35	0.76	9.61	27.33	1.70E-02	0.83	0.72	1.84	2.09	0	0	0	0	0	0	0	0
1995	40	0.67	7.95	27.46	1.70E-02	0.73	0.63	1.56	1.77	0	0	0	0	0	0	0	0
1995	45	0.65	6.76	27.73	1.60E-02	0.71	0.62	1.47	1.68	0	0	0	0	0	0	0	0
1995	50	0.71	6.04	28.12	1.60E-02	0.78	0.68	1.59	1.81	0	0	0	0	0	0	0	0
1995	55	0.86	5.80	28.64	1.60E-02	0.93	0.81	1.91	2.17	0	0	0	0	0	0	0	0
1995	60	1.09	6.03	29.30	1.60E-02	1.15	1.02	2.42	2.76	0	0	0	0	0	0	0	0
1995	65	1.40	6.73	30.08	1.60E-02	1.47	1.31	3.14	3.57	0	0	0	0	0	0	0	0
1995	70	1.79	7.90	30.99	1.70E-02	1.86	1.67	4.05	4.61	0	0	0	0	0	0	0	0
1995	75	2.27	9.55	32.03	1.80E-02	2.33	2.11	5.17	5.88	0	0	0	0	0	0	0	0
1995	80	2.83	11.67	33.19	1.90E-02	2.89	2.62	6.48	7.38	0	0	0	0	0	0	0	0
1996	0	1.85	49.53	110.27	6.30E-02	1.85	1.70	12.41	14.13	0	0	0	0	0	0	0	0
1996	1	6.52	42.94	70.14	3.70E-02	6.58	6.02	29.40	33.47	0	0	0	0	0	0	0	0
1996	2	6.52	42.94	70.14	3.70E-02	6.58	6.02	29.40	33.47	0	0	0	0	0	0	0	0
1996	3	6.52	42.94	70.14	3.70E-02	6.58	6.02	29.40	33.47	0	0	0	0	0	0	0	0
1996	4	6.52	42.94	70.14	3.70E-02	6.58	6.02	29.40	33.47	0	0	0	0	0	0	0	0
1996	5	6.52	42.94	70.14	3.70E-02	6.58	6.02	29.40	33.47	0	0	0	0	0	0	0	0
1996	10	4.18	32.20	45.76	3.00E-02	4.24	3.86	16.14	18.37	0	0	0	0	0	0	0	0
1996	15	2.49	23.54	31.66	2.50E-02	2.56	2.31	7.52	8.56	0	0	0	0	0	0	0	0
1996	20	1.55	17.40	27.68	2.10E-02	1.61	1.45	3.87	4.41	0	0	0	0	0	0	0	0
1996	25	1.21	14.32	27.42	2.00E-02	1.27	1.13	2.99	3.41	0	0	0	0	0	0	0	0
1996	30	0.94	11.72	27.30	1.80E-02	1.01	0.89	2.31	2.63	0	0	0	0	0	0	0	0
1996	35	0.76	9.59	27.31	1.70E-02	0.83	0.72	1.83	2.09	0	0	0	0	0	0	0	0
1996	40	0.66	7.93	27.44	1.70E-02	0.73	0.63	1.55	1.77	0	0	0	0	0	0	0	0
1996	45	0.65	6.74	27.71	1.60E-02	0.71	0.62	1.47	1.67	0	0	0	0	0	0	0	0
1996	50	0.71	6.03	28.10	1.60E-02	0.78	0.68	1.59	1.81	0	0	0	0	0	0	0	0
1996	55	0.86	5.78	28.62	1.60E-02	0.92	0.81	1.90	2.17	0	0	0	0	0	0	0	0
1996	60	1.09	6.01	29.27	1.60E-02	1.15	1.02	2.42	2.75	0	0	0	0	0	0	0	0
1996	65	1.40	6.71	30.05	1.60E-02	1.46	1.31	3.13	3.56	0	0	0	0	0	0	0	0
1996	70	1.79	7.88	30.96	1.70E-02	1.85	1.67	4.04	4.60	0	0	0	0	0	0	0	0
1996	75	2.26	9.52	32.00	1.80E-02	2.33	2.10	5.16	5.87	0	0	0	0	0	0	0	0
1996	80	2.82	11.64	33.17	1.90E-02	2.88	2.62	6.47	7.36	0	0	0	0	0	0	0	0
1997	0	1.85	49.53	110.27	6.30E-02	1.85	1.70	12.41	14.13	0	0	0	0	0	0	0	0
1997	1	6.50	42.84	70.09	3.70E-02	6.57	6.00	29.32	33.38	0	0	0	0	0	0	0	0
1997	2	6.50	42.84	70.09	3.70E-02	6.57	6.00	29.32	33.38	0	0	0	0	0	0	0	0

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
1997	3	6.50	42.84	70.09	3.70E-02	6.57	6.00	29.32	33.38	0	0	0	0	0	0	0	0
1997	4	6.50	42.84	70.09	3.70E-02	6.57	6.00	29.32	33.38	0	0	0	0	0	0	0	0
1997	5	6.50	42.84	70.09	3.70E-02	6.57	6.00	29.32	33.38	0	0	0	0	0	0	0	0
1997	10	4.17	32.12	45.72	3.00E-02	4.23	3.86	16.10	18.33	0	0	0	0	0	0	0	0
1997	15	2.49	23.48	31.64	2.50E-02	2.55	2.31	7.50	8.54	0	0	0	0	0	0	0	0
1997	20	1.55	17.36	27.66	2.10E-02	1.61	1.44	3.86	4.40	0	0	0	0	0	0	0	0
1997	25	1.20	14.29	27.40	2.00E-02	1.27	1.13	2.99	3.40	0	0	0	0	0	0	0	0
1997	30	0.94	11.69	27.28	1.80E-02	1.01	0.89	2.31	2.63	0	0	0	0	0	0	0	0
1997	35	0.76	9.57	27.29	1.70E-02	0.83	0.72	1.83	2.08	0	0	0	0	0	0	0	0
1997	40	0.66	7.91	27.42	1.70E-02	0.73	0.63	1.55	1.76	0	0	0	0	0	0	0	0
1997	45	0.65	6.73	27.69	1.60E-02	0.71	0.62	1.47	1.67	0	0	0	0	0	0	0	0
1997	50	0.71	6.01	28.08	1.60E-02	0.78	0.68	1.58	1.80	0	0	0	0	0	0	0	0
1997	55	0.86	5.77	28.60	1.60E-02	0.92	0.81	1.90	2.16	0	0	0	0	0	0	0	0
1997	60	1.09	6.00	29.25	1.60E-02	1.15	1.02	2.41	2.74	0	0	0	0	0	0	0	0
1997	65	1.40	6.69	30.03	1.60E-02	1.46	1.30	3.12	3.56	0	0	0	0	0	0	0	0
1997	70	1.79	7.86	30.94	1.70E-02	1.85	1.66	4.03	4.59	0	0	0	0	0	0	0	0
1997	75	2.26	9.50	31.98	1.80E-02	2.32	2.10	5.14	5.85	0	0	0	0	0	0	0	0
1997	80	2.81	11.61	33.14	1.90E-02	2.88	2.61	6.45	7.34	0	0	0	0	0	0	0	0
1998	0	1.28	44.51	119.08	6.30E-02	1.28	1.18	9.31	10.60	0	0	0	0	0	0	0	0
1998	1	6.18	42.53	71.93	3.70E-02	6.24	5.70	29.10	33.13	0	0	0	0	0	0	0	0
1998	2	6.18	42.53	71.93	3.70E-02	6.24	5.70	29.10	33.13	0	0	0	0	0	0	0	0
1998	3	6.18	42.53	71.93	3.70E-02	6.24	5.70	29.10	33.13	0	0	0	0	0	0	0	0
1998	4	6.18	42.53	71.93	3.70E-02	6.24	5.70	29.10	33.13	0	0	0	0	0	0	0	0
1998	5	6.18	42.53	71.93	3.70E-02	6.24	5.70	29.10	33.13	0	0	0	0	0	0	0	0
1998	10	3.96	31.89	46.92	3.00E-02	4.03	3.67	15.98	18.19	0	0	0	0	0	0	0	0
1998	15	2.36	23.32	32.47	2.50E-02	2.43	2.19	7.45	8.48	0	0	0	0	0	0	0	0
1998	20	1.47	17.23	28.38	2.10E-02	1.53	1.37	3.83	4.36	0	0	0	0	0	0	0	0
1998	25	1.14	14.19	28.12	2.00E-02	1.21	1.07	2.96	3.37	0	0	0	0	0	0	0	0
1998	30	0.89	11.61	28.00	1.80E-02	0.96	0.84	2.29	2.61	0	0	0	0	0	0	0	0
1998	35	0.72	9.50	28.01	1.70E-02	0.79	0.69	1.82	2.07	0	0	0	0	0	0	0	0
1998	40	0.63	7.86	28.14	1.70E-02	0.69	0.60	1.54	1.75	0	0	0	0	0	0	0	0
1998	45	0.61	6.68	28.41	1.60E-02	0.68	0.59	1.46	1.66	0	0	0	0	0	0	0	0
1998	50	0.68	5.97	28.82	1.60E-02	0.74	0.64	1.57	1.79	0	0	0	0	0	0	0	0
1998	55	0.81	5.73	29.35	1.60E-02	0.88	0.77	1.88	2.14	0	0	0	0	0	0	0	0
1998	60	1.03	5.95	30.02	1.60E-02	1.10	0.97	2.39	2.72	0	0	0	0	0	0	0	0
1998	65	1.33	6.65	30.82	1.60E-02	1.39	1.24	3.10	3.53	0	0	0	0	0	0	0	0
1998	70	1.70	7.81	31.75	1.70E-02	1.76	1.58	4.00	4.56	0	0	0	0	0	0	0	0
1998	75	2.15	9.43	32.82	1.80E-02	2.21	2.00	5.10	5.81	0	0	0	0	0	0	0	0
1998	80	2.67	11.53	34.02	1.90E-02	2.74	2.48	6.40	7.29	0	0	0	0	0	0	0	0
1999	0	1.28	44.51	119.08	6.30E-02	1.28	1.18	9.31	10.60	0	0	0	0	0	0	0	0
1999	1	6.17	42.43	71.87	3.70E-02	6.23	5.69	29.03	33.05	0	0	0	0	0	0	0	0
1999	2	6.17	42.43	71.87	3.70E-02	6.23	5.69	29.03	33.05	0	0	0	0	0	0	0	0
1999	3	6.17	42.43	71.87	3.70E-02	6.23	5.69	29.03	33.05	0	0	0	0	0	0	0	0
1999	4	6.17	42.43	71.87	3.70E-02	6.23	5.69	29.03	33.05	0	0	0	0	0	0	0	0
1999	5	6.17	42.43	71.87	3.70E-02	6.23	5.69	29.03	33.05	0	0	0	0	0	0	0	0

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
1999	10	3.95	31.82	46.88	3.00E-02	4.02	3.66	15.94	18.15	0	0	0	0	0	0	0	0
1999	15	2.36	23.26	32.44	2.50E-02	2.42	2.19	7.43	8.46	0	0	0	0	0	0	0	0
1999	20	1.47	17.19	28.36	2.10E-02	1.53	1.37	3.82	4.35	0	0	0	0	0	0	0	0
1999	25	1.14	14.15	28.10	2.00E-02	1.21	1.07	2.96	3.36	0	0	0	0	0	0	0	0
1999	30	0.89	11.58	27.98	1.80E-02	0.96	0.84	2.28	2.60	0	0	0	0	0	0	0	0
1999	35	0.72	9.48	27.98	1.70E-02	0.79	0.69	1.81	2.06	0	0	0	0	0	0	0	0
1999	40	0.63	7.84	28.12	1.70E-02	0.69	0.60	1.53	1.75	0	0	0	0	0	0	0	0
1999	45	0.61	6.66	28.39	1.60E-02	0.68	0.59	1.45	1.65	0	0	0	0	0	0	0	0
1999	50	0.67	5.96	28.79	1.60E-02	0.74	0.64	1.57	1.78	0	0	0	0	0	0	0	0
1999	55	0.81	5.71	29.33	1.60E-02	0.88	0.77	1.88	2.14	0	0	0	0	0	0	0	0
1999	60	1.03	5.94	30.00	1.60E-02	1.09	0.97	2.39	2.72	0	0	0	0	0	0	0	0
1999	65	1.32	6.63	30.80	1.60E-02	1.39	1.24	3.09	3.52	0	0	0	0	0	0	0	0
1999	70	1.69	7.79	31.73	1.70E-02	1.76	1.58	3.99	4.55	0	0	0	0	0	0	0	0
1999	75	2.14	9.41	32.79	1.80E-02	2.21	1.99	5.09	5.80	0	0	0	0	0	0	0	0
1999	80	2.67	11.50	33.99	1.90E-02	2.73	2.48	6.39	7.27	0	0	0	0	0	0	0	0
2000	0	1.28	44.51	119.08	6.30E-02	1.28	1.18	9.31	10.60	0	0	0	0	0	0	0	0
2000	1	6.15	42.32	71.81	3.70E-02	6.22	5.68	28.96	32.97	0	0	0	0	0	0	0	0
2000	2	6.15	42.32	71.81	3.70E-02	6.22	5.68	28.96	32.97	0	0	0	0	0	0	0	0
2000	3	6.15	42.32	71.81	3.70E-02	6.22	5.68	28.96	32.97	0	0	0	0	0	0	0	0
2000	4	6.15	42.32	71.81	3.70E-02	6.22	5.68	28.96	32.97	0	0	0	0	0	0	0	0
2000	5	6.15	42.32	71.81	3.70E-02	6.22	5.68	28.96	32.97	0	0	0	0	0	0	0	0
2000	10	3.95	31.74	46.84	3.00E-02	4.01	3.65	15.90	18.10	0	0	0	0	0	0	0	0
2000	15	2.35	23.20	32.41	2.50E-02	2.42	2.19	7.41	8.43	0	0	0	0	0	0	0	0
2000	20	1.46	17.15	28.33	2.10E-02	1.53	1.37	3.81	4.34	0	0	0	0	0	0	0	0
2000	25	1.14	14.12	28.08	2.00E-02	1.20	1.07	2.95	3.36	0	0	0	0	0	0	0	0
2000	30	0.89	11.55	27.95	1.80E-02	0.96	0.84	2.28	2.59	0	0	0	0	0	0	0	0
2000	35	0.72	9.45	27.96	1.70E-02	0.78	0.68	1.81	2.06	0	0	0	0	0	0	0	0
2000	40	0.63	7.82	28.10	1.70E-02	0.69	0.60	1.53	1.74	0	0	0	0	0	0	0	0
2000	45	0.61	6.65	28.37	1.60E-02	0.68	0.58	1.45	1.65	0	0	0	0	0	0	0	0
2000	50	0.67	5.94	28.77	1.60E-02	0.74	0.64	1.56	1.78	0	0	0	0	0	0	0	0
2000	55	0.81	5.70	29.30	1.60E-02	0.88	0.77	1.87	2.13	0	0	0	0	0	0	0	0
2000	60	1.03	5.92	29.97	1.60E-02	1.09	0.97	2.38	2.71	0	0	0	0	0	0	0	0
2000	65	1.32	6.61	30.77	1.60E-02	1.38	1.24	3.08	3.51	0	0	0	0	0	0	0	0
2000	70	1.69	7.77	31.70	1.70E-02	1.75	1.58	3.98	4.53	0	0	0	0	0	0	0	0
2000	75	2.14	9.39	32.76	1.80E-02	2.20	1.99	5.08	5.78	0	0	0	0	0	0	0	0
2000	80	2.66	11.47	33.96	1.90E-02	2.73	2.47	6.37	7.25	0	0	0	0	0	0	0	0
2001	0	1.28	44.51	119.08	6.30E-02	1.28	1.18	9.31	10.60	0	0	0	0	0	0	0	0
2001	1	6.14	42.22	71.75	3.70E-02	6.20	5.67	28.89	32.89	0	0	0	0	0	0	0	0
2001	2	6.14	42.22	71.75	3.70E-02	6.20	5.67	28.89	32.89	0	0	0	0	0	0	0	0
2001	3	6.14	42.22	71.75	3.70E-02	6.20	5.67	28.89	32.89	0	0	0	0	0	0	0	0
2001	4	6.14	42.22	71.75	3.70E-02	6.20	5.67	28.89	32.89	0	0	0	0	0	0	0	0
2001	5	6.14	42.22	71.75	3.70E-02	6.20	5.67	28.89	32.89	0	0	0	0	0	0	0	0
2001	10	3.94	31.66	46.81	3.00E-02	4.00	3.64	15.86	18.06	0	0	0	0	0	0	0	0
2001	15	2.35	23.15	32.39	2.50E-02	2.41	2.18	7.39	8.41	0	0	0	0	0	0	0	0
2001	20	1.46	17.11	28.31	2.10E-02	1.52	1.36	3.80	4.33	0	0	0	0	0	0	0	0

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2001	25	1.14	14.08	28.05	2.00E-02	1.20	1.07	2.94	3.35	0	0	0	0	0	0	0	0
2001	30	0.89	11.52	27.93	1.80E-02	0.95	0.84	2.27	2.59	0	0	0	0	0	0	0	0
2001	35	0.72	9.43	27.93	1.70E-02	0.78	0.68	1.80	2.05	0	0	0	0	0	0	0	0
2001	40	0.63	7.80	28.07	1.70E-02	0.69	0.60	1.53	1.74	0	0	0	0	0	0	0	0
2001	45	0.61	6.63	28.34	1.60E-02	0.67	0.58	1.44	1.64	0	0	0	0	0	0	0	0
2001	50	0.67	5.93	28.75	1.60E-02	0.74	0.64	1.56	1.78	0	0	0	0	0	0	0	0
2001	55	0.81	5.69	29.28	1.60E-02	0.87	0.77	1.87	2.13	0	0	0	0	0	0	0	0
2001	60	1.03	5.91	29.95	1.60E-02	1.09	0.96	2.38	2.70	0	0	0	0	0	0	0	0
2001	65	1.32	6.60	30.74	1.60E-02	1.38	1.23	3.08	3.50	0	0	0	0	0	0	0	0
2001	70	1.69	7.75	31.67	1.70E-02	1.75	1.57	3.97	4.52	0	0	0	0	0	0	0	0
2001	75	2.13	9.36	32.74	1.80E-02	2.20	1.98	5.07	5.77	0	0	0	0	0	0	0	0
2001	80	2.66	11.44	33.93	1.90E-02	2.72	2.47	6.35	7.23	0	0	0	0	0	0	0	0
2002	0	1.28	44.51	119.08	6.30E-02	1.28	1.18	9.31	10.60	0	0	0	0	0	0	0	0
2002	1	6.13	42.12	71.69	3.70E-02	6.19	5.66	28.82	32.81	0	0	0	0	0	0	0	0
2002	2	6.13	42.12	71.69	3.70E-02	6.19	5.66	28.82	32.81	0	0	0	0	0	0	0	0
2002	3	6.13	42.12	71.69	3.70E-02	6.19	5.66	28.82	32.81	0	0	0	0	0	0	0	0
2002	4	6.13	42.12	71.69	3.70E-02	6.19	5.66	28.82	32.81	0	0	0	0	0	0	0	0
2002	5	6.13	42.12	71.69	3.70E-02	6.19	5.66	28.82	32.81	0	0	0	0	0	0	0	0
2002	10	3.93	31.58	46.77	3.00E-02	3.99	3.64	15.82	18.01	0	0	0	0	0	0	0	0
2002	15	2.34	23.09	32.36	2.50E-02	2.41	2.18	7.37	8.39	0	0	0	0	0	0	0	0
2002	20	1.46	17.06	28.29	2.10E-02	1.52	1.36	3.79	4.32	0	0	0	0	0	0	0	0
2002	25	1.13	14.05	28.03	2.00E-02	1.20	1.06	2.93	3.34	0	0	0	0	0	0	0	0
2002	30	0.89	11.50	27.90	1.80E-02	0.95	0.84	2.27	2.58	0	0	0	0	0	0	0	0
2002	35	0.72	9.41	27.91	1.70E-02	0.78	0.68	1.80	2.05	0	0	0	0	0	0	0	0
2002	40	0.63	7.78	28.05	1.70E-02	0.69	0.60	1.52	1.73	0	0	0	0	0	0	0	0
2002	45	0.61	6.61	28.32	1.60E-02	0.67	0.58	1.44	1.64	0	0	0	0	0	0	0	0
2002	50	0.67	5.91	28.72	1.60E-02	0.73	0.64	1.56	1.77	0	0	0	0	0	0	0	0
2002	55	0.81	5.67	29.25	1.60E-02	0.87	0.76	1.86	2.12	0	0	0	0	0	0	0	0
2002	60	1.02	5.90	29.92	1.60E-02	1.09	0.96	2.37	2.70	0	0	0	0	0	0	0	0
2002	65	1.32	6.58	30.72	1.60E-02	1.38	1.23	3.07	3.49	0	0	0	0	0	0	0	0
2002	70	1.68	7.73	31.65	1.70E-02	1.75	1.57	3.96	4.51	0	0	0	0	0	0	0	0
2002	75	2.13	9.34	32.71	1.80E-02	2.19	1.98	5.05	5.75	0	0	0	0	0	0	0	0
2002	80	2.65	11.41	33.90	1.90E-02	2.72	2.46	6.34	7.22	0	0	0	0	0	0	0	0
2003	0	0.99	41.43	123.52	6.30E-02	0.99	0.91	7.65	8.71	0	0	0	0	0	0	0	0
2003	1	1.14	23.38	44.71	3.70E-02	1.21	1.07	11.89	13.54	0	0	0	0	0	0	0	0
2003	2	1.14	23.38	44.71	3.70E-02	1.21	1.07	11.89	13.54	0	0	0	0	0	0	0	0
2003	3	1.14	23.38	44.71	3.70E-02	1.21	1.07	11.89	13.54	0	0	0	0	0	0	0	0
2003	4	1.14	23.38	44.71	3.70E-02	1.21	1.07	11.89	13.54	0	0	0	0	0	0	0	0
2003	5	1.14	23.38	44.71	3.70E-02	1.21	1.07	11.89	13.54	0	0	0	0	0	0	0	0
2003	10	1.05	14.01	33.53	3.00E-02	1.11	0.98	6.48	7.38	0	0	0	0	0	0	0	0
2003	15	0.95	8.03	25.54	2.50E-02	1.02	0.90	3.10	3.53	0	0	0	0	0	0	0	0
2003	20	0.87	5.58	20.84	2.10E-02	0.94	0.82	1.83	2.08	0	0	0	0	0	0	0	0
2003	25	0.85	5.30	18.73	2.00E-02	0.91	0.80	1.59	1.81	0	0	0	0	0	0	0	0
2003	30	0.86	5.12	16.96	1.80E-02	0.92	0.81	1.39	1.58	0	0	0	0	0	0	0	0
2003	35	0.91	5.04	15.52	1.70E-02	0.97	0.86	1.21	1.38	0	0	0	0	0	0	0	0

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2003	40	0.99	5.06	14.42	1.70E-02	1.05	0.93	1.07	1.21	0	0	0	0	0	0	0	0
2003	45	1.10	5.17	13.66	1.60E-02	1.17	1.04	0.95	1.08	0	0	0	0	0	0	0	0
2003	50	1.26	5.38	13.23	1.60E-02	1.32	1.18	0.85	0.97	0	0	0	0	0	0	0	0
2003	55	1.44	5.69	13.14	1.60E-02	1.51	1.35	0.79	0.90	0	0	0	0	0	0	0	0
2003	60	1.66	6.09	13.39	1.60E-02	1.73	1.55	0.76	0.86	0	0	0	0	0	0	0	0
2003	65	1.92	6.59	13.97	1.60E-02	1.98	1.79	0.75	0.85	0	0	0	0	0	0	0	0
2003	70	2.21	7.19	14.89	1.70E-02	2.27	2.05	0.77	0.88	0	0	0	0	0	0	0	0
2003	75	2.53	7.88	16.15	1.80E-02	2.60	2.35	0.82	0.94	0	0	0	0	0	0	0	0
2003	80	2.89	8.67	17.75	1.90E-02	2.96	2.68	0.90	1.03	0	0	0	0	0	0	0	0
2004	0	0.99	41.43	123.52	6.30E-02	0.99	0.91	7.65	8.71	0	0	0	0	0	0	0	0
2004	1	1.14	23.30	44.64	3.70E-02	1.20	1.07	11.85	13.49	0	0	0	0	0	0	0	0
2004	2	1.14	23.30	44.64	3.70E-02	1.20	1.07	11.85	13.49	0	0	0	0	0	0	0	0
2004	3	1.14	23.30	44.64	3.70E-02	1.20	1.07	11.85	13.49	0	0	0	0	0	0	0	0
2004	4	1.14	23.30	44.64	3.70E-02	1.20	1.07	11.85	13.49	0	0	0	0	0	0	0	0
2004	5	1.14	23.30	44.64	3.70E-02	1.20	1.07	11.85	13.49	0	0	0	0	0	0	0	0
2004	10	1.04	13.97	33.47	3.00E-02	1.11	0.98	6.46	7.35	0	0	0	0	0	0	0	0
2004	15	0.95	8.01	25.49	2.50E-02	1.01	0.89	3.09	3.52	0	0	0	0	0	0	0	0
2004	20	0.87	5.56	20.81	2.10E-02	0.93	0.82	1.82	2.07	0	0	0	0	0	0	0	0
2004	25	0.85	5.28	18.70	2.00E-02	0.91	0.80	1.59	1.81	0	0	0	0	0	0	0	0
2004	30	0.86	5.11	16.93	1.80E-02	0.92	0.81	1.38	1.58	0	0	0	0	0	0	0	0
2004	35	0.90	5.03	15.50	1.70E-02	0.97	0.85	1.21	1.38	0	0	0	0	0	0	0	0
2004	40	0.99	5.04	14.40	1.70E-02	1.05	0.93	1.06	1.21	0	0	0	0	0	0	0	0
2004	45	1.10	5.16	13.64	1.60E-02	1.17	1.03	0.94	1.07	0	0	0	0	0	0	0	0
2004	50	1.25	5.36	13.21	1.60E-02	1.32	1.17	0.85	0.97	0	0	0	0	0	0	0	0
2004	55	1.44	5.67	13.12	1.60E-02	1.50	1.34	0.79	0.90	0	0	0	0	0	0	0	0
2004	60	1.66	6.07	13.37	1.60E-02	1.72	1.55	0.75	0.86	0	0	0	0	0	0	0	0
2004	65	1.91	6.57	13.95	1.60E-02	1.98	1.78	0.75	0.85	0	0	0	0	0	0	0	0
2004	70	2.20	7.16	14.87	1.70E-02	2.27	2.05	0.77	0.88	0	0	0	0	0	0	0	0
2004	75	2.53	7.85	16.13	1.80E-02	2.59	2.34	0.82	0.93	0	0	0	0	0	0	0	0
2004	80	2.88	8.64	17.72	1.90E-02	2.95	2.67	0.90	1.02	0	0	0	0	0	0	0	0
2005	0	0.99	41.43	123.52	6.30E-02	0.99	0.91	7.65	8.71	0	0	0	0	0	0	0	0
2005	1	1.14	23.20	44.55	3.70E-02	1.20	1.07	11.80	13.43	0	0	0	0	0	0	0	0
2005	2	1.14	23.20	44.55	3.70E-02	1.20	1.07	11.80	13.43	0	0	0	0	0	0	0	0
2005	3	1.14	23.20	44.55	3.70E-02	1.20	1.07	11.80	13.43	0	0	0	0	0	0	0	0
2005	4	1.14	23.20	44.55	3.70E-02	1.20	1.07	11.80	13.43	0	0	0	0	0	0	0	0
2005	5	1.14	23.20	44.55	3.70E-02	1.20	1.07	11.80	13.43	0	0	0	0	0	0	0	0
2005	10	1.04	13.91	33.41	3.00E-02	1.10	0.98	6.43	7.32	0	0	0	0	0	0	0	0
2005	15	0.95	7.97	25.44	2.50E-02	1.01	0.89	3.08	3.51	0	0	0	0	0	0	0	0
2005	20	0.87	5.53	20.76	2.10E-02	0.93	0.82	1.81	2.06	0	0	0	0	0	0	0	0
2005	25	0.84	5.26	18.66	2.00E-02	0.91	0.80	1.58	1.80	0	0	0	0	0	0	0	0
2005	30	0.86	5.09	16.90	1.80E-02	0.92	0.81	1.38	1.57	0	0	0	0	0	0	0	0
2005	35	0.90	5.01	15.46	1.70E-02	0.97	0.85	1.20	1.37	0	0	0	0	0	0	0	0
2005	40	0.98	5.02	14.37	1.70E-02	1.05	0.92	1.06	1.20	0	0	0	0	0	0	0	0
2005	45	1.10	5.13	13.61	1.60E-02	1.16	1.03	0.94	1.07	0	0	0	0	0	0	0	0
2005	50	1.25	5.34	13.18	1.60E-02	1.31	1.17	0.85	0.97	0	0	0	0	0	0	0	0

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2005	55	1.43	5.65	13.10	1.60E-02	1.50	1.34	0.79	0.89	0	0	0	0	0	0	0	0
2005	60	1.65	6.05	13.34	1.60E-02	1.72	1.54	0.75	0.86	0	0	0	0	0	0	0	0
2005	65	1.91	6.54	13.92	1.60E-02	1.97	1.77	0.74	0.85	0	0	0	0	0	0	0	0
2005	70	2.19	7.13	14.84	1.70E-02	2.26	2.04	0.77	0.87	0	0	0	0	0	0	0	0
2005	75	2.52	7.82	16.09	1.80E-02	2.58	2.34	0.82	0.93	0	0	0	0	0	0	0	0
2005	80	2.87	8.60	17.68	1.90E-02	2.94	2.67	0.89	1.02	0	0	0	0	0	0	0	0
2006	0	0.99	41.43	123.52	6.30E-02	0.99	0.91	7.65	8.71	0	0	0	0	0	0	0	0
2006	1	1.13	23.08	44.45	3.70E-02	1.20	1.06	11.74	13.36	0	0	0	0	0	0	0	0
2006	2	1.13	23.08	44.45	3.70E-02	1.20	1.06	11.74	13.36	0	0	0	0	0	0	0	0
2006	3	1.13	23.08	44.45	3.70E-02	1.20	1.06	11.74	13.36	0	0	0	0	0	0	0	0
2006	4	1.13	23.08	44.45	3.70E-02	1.20	1.06	11.74	13.36	0	0	0	0	0	0	0	0
2006	5	1.13	23.08	44.45	3.70E-02	1.20	1.06	11.74	13.36	0	0	0	0	0	0	0	0
2006	10	1.04	13.84	33.33	3.00E-02	1.10	0.97	6.40	7.29	0	0	0	0	0	0	0	0
2006	15	0.94	7.93	25.38	2.50E-02	1.01	0.89	3.06	3.49	0	0	0	0	0	0	0	0
2006	20	0.86	5.50	20.72	2.10E-02	0.93	0.82	1.80	2.05	0	0	0	0	0	0	0	0
2006	25	0.84	5.23	18.62	2.00E-02	0.90	0.79	1.57	1.79	0	0	0	0	0	0	0	0
2006	30	0.85	5.06	16.86	1.80E-02	0.92	0.80	1.37	1.56	0	0	0	0	0	0	0	0
2006	35	0.90	4.98	15.43	1.70E-02	0.96	0.85	1.20	1.36	0	0	0	0	0	0	0	0
2006	40	0.98	5.00	14.34	1.70E-02	1.04	0.92	1.05	1.20	0	0	0	0	0	0	0	0
2006	45	1.09	5.11	13.58	1.60E-02	1.16	1.03	0.93	1.06	0	0	0	0	0	0	0	0
2006	50	1.24	5.31	13.15	1.60E-02	1.31	1.16	0.84	0.96	0	0	0	0	0	0	0	0
2006	55	1.43	5.62	13.06	1.60E-02	1.49	1.33	0.78	0.89	0	0	0	0	0	0	0	0
2006	60	1.64	6.02	13.31	1.60E-02	1.71	1.53	0.75	0.85	0	0	0	0	0	0	0	0
2006	65	1.90	6.51	13.89	1.60E-02	1.96	1.77	0.74	0.84	0	0	0	0	0	0	0	0
2006	70	2.18	7.10	14.81	1.70E-02	2.25	2.03	0.76	0.87	0	0	0	0	0	0	0	0
2006	75	2.51	7.78	16.06	1.80E-02	2.57	2.33	0.81	0.92	0	0	0	0	0	0	0	0
2006	80	2.86	8.56	17.64	1.90E-02	2.93	2.65	0.89	1.01	0	0	0	0	0	0	0	0
2007	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	0	0	0	0	0	0	0	0
2007	1	0.20	16.29	30.12	3.70E-02	0.26	0.20	8.32	9.47	0	0	0	0	0	0	0	0
2007	2	0.20	16.29	30.12	3.70E-02	0.26	0.20	8.32	9.47	0	0	0	0	0	0	0	0
2007	3	0.20	16.29	30.12	3.70E-02	0.26	0.20	8.32	9.47	0	0	0	0	0	0	0	0
2007	4	0.20	16.29	30.12	3.70E-02	0.26	0.20	8.32	9.47	0	0	0	0	0	0	0	0
2007	5	0.20	16.29	30.12	3.70E-02	0.26	0.20	8.32	9.47	0	0	0	0	0	0	0	0
2007	10	0.18	9.77	22.58	3.00E-02	0.25	0.19	4.53	5.16	0	0	0	0	0	0	0	0
2007	15	0.17	5.60	17.20	2.50E-02	0.23	0.17	2.17	2.47	0	0	0	0	0	0	0	0
2007	20	0.15	3.89	14.04	2.10E-02	0.22	0.16	1.28	1.45	0	0	0	0	0	0	0	0
2007	25	0.15	3.69	12.61	2.00E-02	0.21	0.16	1.11	1.27	0	0	0	0	0	0	0	0
2007	30	0.15	3.57	11.42	1.80E-02	0.21	0.16	0.97	1.11	0	0	0	0	0	0	0	0
2007	35	0.16	3.52	10.45	1.70E-02	0.22	0.17	0.85	0.97	0	0	0	0	0	0	0	0
2007	40	0.17	3.53	9.71	1.70E-02	0.24	0.18	0.75	0.85	0	0	0	0	0	0	0	0
2007	45	0.19	3.61	9.20	1.60E-02	0.26	0.20	0.66	0.75	0	0	0	0	0	0	0	0
2007	50	0.22	3.75	8.91	1.60E-02	0.28	0.22	0.60	0.68	0	0	0	0	0	0	0	0
2007	55	0.25	3.97	8.85	1.60E-02	0.32	0.25	0.55	0.63	0	0	0	0	0	0	0	0
2007	60	0.29	4.25	9.02	1.60E-02	0.35	0.29	0.53	0.60	0	0	0	0	0	0	0	0
2007	65	0.33	4.59	9.41	1.60E-02	0.40	0.33	0.53	0.60	0	0	0	0	0	0	0	0

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2007	70	0.38	5.01	10.03	1.70E-02	0.45	0.38	0.54	0.62	0	0	0	0	0	0	0	0
2007	75	0.44	5.49	10.88	1.80E-02	0.51	0.43	0.58	0.66	0	0	0	0	0	0	0	0
2007	80	0.50	6.04	11.95	1.90E-02	0.57	0.48	0.63	0.72	0	0	0	0	0	0	0	0
2008	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	0	0	0	0	0	0	0	0
2008	1	0.20	16.18	29.99	3.70E-02	0.26	0.20	8.26	9.40	0	0	0	0	0	0	0	0
2008	2	0.20	16.18	29.99	3.70E-02	0.26	0.20	8.26	9.40	0	0	0	0	0	0	0	0
2008	3	0.20	16.18	29.99	3.70E-02	0.26	0.20	8.26	9.40	0	0	0	0	0	0	0	0
2008	4	0.20	16.18	29.99	3.70E-02	0.26	0.20	8.26	9.40	0	0	0	0	0	0	0	0
2008	5	0.20	16.18	29.99	3.70E-02	0.26	0.20	8.26	9.40	0	0	0	0	0	0	0	0
2008	10	0.18	9.70	22.49	3.00E-02	0.25	0.19	4.50	5.13	0	0	0	0	0	0	0	0
2008	15	0.17	5.56	17.13	2.50E-02	0.23	0.17	2.16	2.45	0	0	0	0	0	0	0	0
2008	20	0.15	3.86	13.98	2.10E-02	0.22	0.16	1.27	1.44	0	0	0	0	0	0	0	0
2008	25	0.15	3.67	12.56	2.00E-02	0.21	0.16	1.11	1.26	0	0	0	0	0	0	0	0
2008	30	0.15	3.55	11.37	1.80E-02	0.21	0.16	0.97	1.10	0	0	0	0	0	0	0	0
2008	35	0.16	3.49	10.41	1.70E-02	0.22	0.17	0.84	0.96	0	0	0	0	0	0	0	0
2008	40	0.17	3.50	9.67	1.70E-02	0.24	0.18	0.74	0.84	0	0	0	0	0	0	0	0
2008	45	0.19	3.58	9.16	1.60E-02	0.26	0.20	0.66	0.75	0	0	0	0	0	0	0	0
2008	50	0.22	3.73	8.87	1.60E-02	0.28	0.22	0.59	0.68	0	0	0	0	0	0	0	0
2008	55	0.25	3.94	8.81	1.60E-02	0.31	0.25	0.55	0.63	0	0	0	0	0	0	0	0
2008	60	0.29	4.22	8.98	1.60E-02	0.35	0.29	0.53	0.60	0	0	0	0	0	0	0	0
2008	65	0.33	4.56	9.37	1.60E-02	0.40	0.33	0.52	0.59	0	0	0	0	0	0	0	0
2008	70	0.38	4.98	9.99	1.70E-02	0.45	0.37	0.54	0.61	0	0	0	0	0	0	0	0
2008	75	0.44	5.46	10.83	1.80E-02	0.50	0.42	0.57	0.65	0	0	0	0	0	0	0	0
2008	80	0.50	6.00	11.90	1.90E-02	0.56	0.48	0.63	0.71	0	0	0	0	0	0	0	0
2009	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	0	0	0	0	0	0	0	0
2009	1	0.20	16.06	29.84	3.70E-02	0.26	0.20	8.20	9.33	0	0	0	0	0	0	0	0
2009	2	0.20	16.06	29.84	3.70E-02	0.26	0.20	8.20	9.33	0	0	0	0	0	0	0	0
2009	3	0.20	16.06	29.84	3.70E-02	0.26	0.20	8.20	9.33	0	0	0	0	0	0	0	0
2009	4	0.20	16.06	29.84	3.70E-02	0.26	0.20	8.20	9.33	0	0	0	0	0	0	0	0
2009	5	0.20	16.06	29.84	3.70E-02	0.26	0.20	8.20	9.33	0	0	0	0	0	0	0	0
2009	10	0.18	9.62	22.38	3.00E-02	0.24	0.19	4.47	5.09	0	0	0	0	0	0	0	0
2009	15	0.16	5.52	17.04	2.50E-02	0.23	0.17	2.14	2.44	0	0	0	0	0	0	0	0
2009	20	0.15	3.83	13.91	2.10E-02	0.21	0.16	1.26	1.43	0	0	0	0	0	0	0	0
2009	25	0.15	3.64	12.50	2.00E-02	0.21	0.16	1.10	1.25	0	0	0	0	0	0	0	0
2009	30	0.15	3.52	11.32	1.80E-02	0.21	0.16	0.96	1.09	0	0	0	0	0	0	0	0
2009	35	0.16	3.46	10.36	1.70E-02	0.22	0.16	0.84	0.95	0	0	0	0	0	0	0	0
2009	40	0.17	3.48	9.62	1.70E-02	0.23	0.18	0.73	0.84	0	0	0	0	0	0	0	0
2009	45	0.19	3.55	9.12	1.60E-02	0.25	0.20	0.65	0.74	0	0	0	0	0	0	0	0
2009	50	0.22	3.70	8.83	1.60E-02	0.28	0.22	0.59	0.67	0	0	0	0	0	0	0	0
2009	55	0.25	3.91	8.77	1.60E-02	0.31	0.25	0.55	0.62	0	0	0	0	0	0	0	0
2009	60	0.29	4.18	8.94	1.60E-02	0.35	0.28	0.52	0.59	0	0	0	0	0	0	0	0
2009	65	0.33	4.53	9.33	1.60E-02	0.39	0.32	0.52	0.59	0	0	0	0	0	0	0	0
2009	70	0.38	4.94	9.94	1.70E-02	0.44	0.37	0.53	0.61	0	0	0	0	0	0	0	0
2009	75	0.44	5.41	10.78	1.80E-02	0.50	0.42	0.57	0.65	0	0	0	0	0	0	0	0
2009	80	0.50	5.95	11.84	1.90E-02	0.56	0.48	0.62	0.71	0	0	0	0	0	0	0	0

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2010	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	2.10E-03	7.91E-01	2.36E+00	1.20E-03	2.10E-03	1.93E-03	1.46E-01	1.66E-01
2010	1	0.19	9.40	15.38	3.70E-02	0.26	0.20	4.73	5.38	3.68E-03	1.79E-01	2.94E-01	7.06E-04	4.90E-03	3.78E-03	9.02E-02	1.03E-01
2010	2	0.19	9.40	15.38	3.70E-02	0.26	0.20	4.73	5.38	3.68E-03	1.79E-01	2.94E-01	7.06E-04	4.90E-03	3.78E-03	9.02E-02	1.03E-01
2010	3	0.19	9.40	15.38	3.70E-02	0.26	0.20	4.73	5.38	3.68E-03	1.79E-01	2.94E-01	7.06E-04	4.90E-03	3.78E-03	9.02E-02	1.03E-01
2010	4	0.19	9.40	15.38	3.70E-02	0.26	0.20	4.73	5.38	3.68E-03	1.79E-01	2.94E-01	7.06E-04	4.90E-03	3.78E-03	9.02E-02	1.03E-01
2010	5	0.19	9.40	15.38	3.70E-02	0.26	0.20	4.73	5.38	3.68E-03	1.79E-01	2.94E-01	7.06E-04	4.90E-03	3.78E-03	9.02E-02	1.03E-01
2010	10	0.18	5.64	11.53	3.00E-02	0.24	0.18	2.58	2.93	3.36E-03	1.08E-01	2.20E-01	5.73E-04	4.58E-03	3.49E-03	4.92E-02	5.60E-02
2010	15	0.16	3.23	8.78	2.50E-02	0.22	0.17	1.23	1.40	3.05E-03	6.17E-02	1.68E-01	4.77E-04	4.28E-03	3.23E-03	2.35E-02	2.68E-02
2010	20	0.15	2.24	7.17	2.10E-02	0.21	0.16	0.73	0.83	2.81E-03	4.28E-02	1.37E-01	4.01E-04	4.03E-03	2.98E-03	1.38E-02	1.58E-02
2010	25	0.14	2.13	6.44	2.00E-02	0.21	0.15	0.63	0.72	2.73E-03	4.07E-02	1.23E-01	3.82E-04	3.95E-03	2.92E-03	1.21E-02	1.38E-02
2010	30	0.15	2.06	5.83	1.80E-02	0.21	0.15	0.55	0.63	2.77E-03	3.93E-02	1.11E-01	3.44E-04	3.99E-03	2.94E-03	1.05E-02	1.20E-02
2010	35	0.15	2.03	5.34	1.70E-02	0.22	0.16	0.48	0.55	2.92E-03	3.87E-02	1.02E-01	3.24E-04	4.14E-03	3.09E-03	9.20E-03	1.05E-02
2010	40	0.17	2.04	4.96	1.70E-02	0.23	0.17	0.42	0.48	3.19E-03	3.88E-02	9.47E-02	3.24E-04	4.41E-03	3.32E-03	8.07E-03	9.20E-03
2010	45	0.19	2.08	4.70	1.60E-02	0.25	0.19	0.38	0.43	3.55E-03	3.97E-02	8.96E-02	3.05E-04	4.77E-03	3.66E-03	7.18E-03	8.17E-03
2010	50	0.21	2.17	4.55	1.60E-02	0.28	0.22	0.34	0.39	4.05E-03	4.13E-02	8.69E-02	3.05E-04	5.27E-03	4.12E-03	6.49E-03	7.39E-03
2010	55	0.24	2.29	4.52	1.60E-02	0.31	0.24	0.32	0.36	4.64E-03	4.37E-02	8.63E-02	3.05E-04	5.86E-03	4.66E-03	6.01E-03	6.83E-03
2010	60	0.28	2.45	4.61	1.60E-02	0.34	0.28	0.30	0.34	5.34E-03	4.68E-02	8.79E-02	3.05E-04	6.57E-03	5.32E-03	5.74E-03	6.53E-03
2010	65	0.32	2.65	4.81	1.60E-02	0.39	0.32	0.30	0.34	6.16E-03	5.06E-02	9.17E-02	3.05E-04	7.39E-03	6.07E-03	5.69E-03	6.49E-03
2010	70	0.37	2.89	5.12	1.70E-02	0.44	0.36	0.31	0.35	7.10E-03	5.52E-02	9.78E-02	3.24E-04	8.32E-03	6.93E-03	5.86E-03	6.66E-03
2010	75	0.43	3.17	5.56	1.80E-02	0.49	0.41	0.33	0.37	8.15E-03	6.05E-02	1.06E-01	3.44E-04	9.37E-03	7.90E-03	6.24E-03	7.10E-03
2010	80	0.49	3.49	6.10	1.90E-02	0.55	0.47	0.36	0.41	9.29E-03	6.66E-02	1.16E-01	3.63E-04	1.05E-02	8.95E-03	6.83E-03	7.77E-03
2011	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	2.49E-03	9.37E-01	2.79E+00	1.43E-03	2.49E-03	2.28E-03	1.73E-01	1.97E-01
2011	1	0.19	9.32	15.22	3.70E-02	0.26	0.20	4.68	5.33	4.32E-03	2.11E-01	3.44E-01	8.37E-04	5.77E-03	4.46E-03	1.06E-01	1.21E-01
2011	2	0.19	9.32	15.22	3.70E-02	0.26	0.20	4.68	5.33	4.32E-03	2.11E-01	3.44E-01	8.37E-04	5.77E-03	4.46E-03	1.06E-01	1.21E-01
2011	3	0.19	9.32	15.22	3.70E-02	0.26	0.20	4.68	5.33	4.32E-03	2.11E-01	3.44E-01	8.37E-04	5.77E-03	4.46E-03	1.06E-01	1.21E-01
2011	4	0.19	9.32	15.22	3.70E-02	0.26	0.20	4.68	5.33	4.32E-03	2.11E-01	3.44E-01	8.37E-04	5.77E-03	4.46E-03	1.06E-01	1.21E-01
2011	5	0.19	9.32	15.22	3.70E-02	0.26	0.20	4.68	5.33	4.32E-03	2.11E-01	3.44E-01	8.37E-04	5.77E-03	4.46E-03	1.06E-01	1.21E-01
2011	10	0.18	5.59	11.41	3.00E-02	0.24	0.18	2.55	2.91	3.96E-03	1.26E-01	2.58E-01	6.79E-04	5.41E-03	4.12E-03	5.78E-02	6.58E-02
2011	15	0.16	3.20	8.69	2.50E-02	0.22	0.17	1.22	1.39	3.60E-03	7.24E-02	1.97E-01	5.66E-04	5.04E-03	3.78E-03	2.76E-02	3.15E-02
2011	20	0.15	2.22	7.09	2.10E-02	0.21	0.16	0.72	0.82	3.30E-03	5.03E-02	1.60E-01	4.75E-04	4.75E-03	3.51E-03	1.63E-02	1.85E-02
2011	25	0.14	2.11	6.38	2.00E-02	0.21	0.15	0.63	0.71	3.21E-03	4.78E-02	1.44E-01	4.52E-04	4.66E-03	3.42E-03	1.42E-02	1.62E-02
2011	30	0.14	2.04	5.77	1.80E-02	0.21	0.15	0.55	0.62	3.26E-03	4.62E-02	1.31E-01	4.07E-04	4.71E-03	3.46E-03	1.24E-02	1.41E-02
2011	35	0.15	2.01	5.28	1.70E-02	0.22	0.16	0.48	0.54	3.42E-03	4.55E-02	1.20E-01	3.85E-04	4.86E-03	3.62E-03	1.08E-02	1.23E-02
2011	40	0.17	2.02	4.91	1.70E-02	0.23	0.17	0.42	0.48	3.73E-03	4.56E-02	1.11E-01	3.85E-04	5.18E-03	3.91E-03	9.50E-03	1.08E-02
2011	45	0.18	2.06	4.65	1.60E-02	0.25	0.19	0.37	0.42	4.16E-03	4.66E-02	1.05E-01	3.62E-04	5.61E-03	4.32E-03	8.44E-03	9.59E-03
2011	50	0.21	2.15	4.50	1.60E-02	0.27	0.21	0.34	0.38	4.73E-03	4.85E-02	1.02E-01	3.62E-04	6.18E-03	4.84E-03	7.62E-03	8.66E-03
2011	55	0.24	2.27	4.47	1.60E-02	0.30	0.24	0.31	0.36	5.43E-03	5.13E-02	1.01E-01	3.62E-04	6.88E-03	5.47E-03	7.06E-03	8.03E-03
2011	60	0.28	2.43	4.56	1.60E-02	0.34	0.28	0.30	0.34	6.27E-03	5.49E-02	1.03E-01	3.62E-04	7.71E-03	6.24E-03	6.74E-03	7.67E-03
2011	65	0.32	2.63	4.76	1.60E-02	0.38	0.32	0.30	0.34	7.24E-03	5.94E-02	1.08E-01	3.62E-04	8.69E-03	7.13E-03	6.70E-03	7.60E-03
2011	70	0.37	2.87	5.07	1.70E-02	0.43	0.36	0.30	0.35	8.32E-03	6.48E-02	1.15E-01	3.85E-04	9.77E-03	8.14E-03	6.88E-03	7.83E-03
2011	75	0.42	3.14	5.50	1.80E-02	0.49	0.41	0.32	0.37	9.57E-03	7.11E-02	1.24E-01	4.07E-04	1.10E-02	9.27E-03	7.33E-03	8.35E-03
2011	80	0.48	3.46	6.04	1.90E-02	0.55	0.47	0.36	0.40	1.09E-02	7.82E-02	1.37E-01	4.30E-04	1.24E-02	1.05E-02	8.03E-03	9.14E-03
2012	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	3.08E-03	1.16E+00	3.46E+00	1.76E-03	3.08E-03	2.83E-03	2.14E-01	2.44E-01
2012	1	0.19	9.23	15.05	3.70E-02	0.25	0.20	4.64	5.28	5.29E-03	2.58E-01	4.22E-01	1.04E-03	7.09E-03	5.46E-03	1.30E-01	1.48E-01
2012	2	0.19	9.23	15.05	3.70E-02	0.25	0.20	4.64	5.28	5.29E-03	2.58E-01	4.22E-01	1.04E-03	7.09E-03	5.46E-03	1.30E-01	1.48E-01

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2012	3	0.19	9.23	15.05	3.70E-02	0.25	0.20	4.64	5.28	5.29E-03	2.58E-01	4.22E-01	1.04E-03	7.09E-03	5.46E-03	1.30E-01	1.48E-01
2012	4	0.19	9.23	15.05	3.70E-02	0.25	0.20	4.64	5.28	5.29E-03	2.58E-01	4.22E-01	1.04E-03	7.09E-03	5.46E-03	1.30E-01	1.48E-01
2012	5	0.19	9.23	15.05	3.70E-02	0.25	0.20	4.64	5.28	5.29E-03	2.58E-01	4.22E-01	1.04E-03	7.09E-03	5.46E-03	1.30E-01	1.48E-01
2012	10	0.17	5.53	11.28	3.00E-02	0.24	0.18	2.53	2.88	4.85E-03	1.55E-01	3.16E-01	8.40E-04	6.64E-03	5.04E-03	7.08E-02	8.06E-02
2012	15	0.16	3.17	8.59	2.50E-02	0.22	0.17	1.21	1.38	4.40E-03	8.88E-02	2.41E-01	7.00E-04	6.19E-03	4.65E-03	3.39E-02	3.86E-02
2012	20	0.14	2.20	7.01	2.10E-02	0.21	0.15	0.71	0.81	4.03E-03	6.16E-02	1.96E-01	5.88E-04	5.83E-03	4.29E-03	1.99E-02	2.27E-02
2012	25	0.14	2.09	6.30	2.00E-02	0.20	0.15	0.62	0.71	3.92E-03	5.86E-02	1.77E-01	5.60E-04	5.71E-03	4.20E-03	1.74E-02	1.98E-02
2012	30	0.14	2.02	5.71	1.80E-02	0.21	0.15	0.54	0.62	3.98E-03	5.66E-02	1.60E-01	5.04E-04	5.77E-03	4.26E-03	1.52E-02	1.73E-02
2012	35	0.15	1.99	5.22	1.70E-02	0.21	0.16	0.47	0.54	4.20E-03	5.57E-02	1.46E-01	4.76E-04	5.99E-03	4.45E-03	1.32E-02	1.51E-02
2012	40	0.16	2.00	4.85	1.70E-02	0.23	0.17	0.42	0.47	4.57E-03	5.59E-02	1.36E-01	4.76E-04	6.36E-03	4.79E-03	1.16E-02	1.32E-02
2012	45	0.18	2.04	4.60	1.60E-02	0.25	0.19	0.37	0.42	5.10E-03	5.72E-02	1.29E-01	4.48E-04	6.89E-03	5.29E-03	1.03E-02	1.18E-02
2012	50	0.21	2.12	4.45	1.60E-02	0.27	0.21	0.33	0.38	5.80E-03	5.95E-02	1.25E-01	4.48E-04	7.59E-03	5.94E-03	9.33E-03	1.06E-02
2012	55	0.24	2.25	4.42	1.60E-02	0.30	0.24	0.31	0.35	6.67E-03	6.29E-02	1.24E-01	4.48E-04	8.46E-03	6.72E-03	8.66E-03	9.83E-03
2012	60	0.27	2.40	4.51	1.60E-02	0.34	0.27	0.30	0.34	7.68E-03	6.73E-02	1.26E-01	4.48E-04	9.47E-03	7.65E-03	8.26E-03	9.41E-03
2012	65	0.32	2.60	4.70	1.60E-02	0.38	0.31	0.29	0.33	8.85E-03	7.29E-02	1.32E-01	4.48E-04	1.06E-02	8.74E-03	8.21E-03	9.33E-03
2012	70	0.36	2.84	5.01	1.70E-02	0.43	0.36	0.30	0.34	1.02E-02	7.94E-02	1.40E-01	4.76E-04	1.20E-02	9.97E-03	8.43E-03	9.61E-03
2012	75	0.42	3.11	5.44	1.80E-02	0.48	0.41	0.32	0.37	1.17E-02	8.71E-02	1.52E-01	5.04E-04	1.35E-02	1.14E-02	8.99E-03	1.02E-02
2012	80	0.48	3.42	5.97	1.90E-02	0.54	0.46	0.35	0.40	1.34E-02	9.58E-02	1.67E-01	5.32E-04	1.52E-02	1.29E-02	9.83E-03	1.12E-02
2013	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	3.52E-03	1.33E+00	3.96E+00	2.02E-03	3.52E-03	3.23E-03	2.45E-01	2.79E-01
2013	1	0.15	7.43	12.84	3.70E-02	0.22	0.16	3.74	4.26	4.93E-03	2.38E-01	4.11E-01	1.18E-03	6.98E-03	5.22E-03	1.20E-01	1.36E-01
2013	2	0.15	7.43	12.84	3.70E-02	0.22	0.16	3.74	4.26	4.93E-03	2.38E-01	4.11E-01	1.18E-03	6.98E-03	5.22E-03	1.20E-01	1.36E-01
2013	3	0.15	7.43	12.84	3.70E-02	0.22	0.16	3.74	4.26	4.93E-03	2.38E-01	4.11E-01	1.18E-03	6.98E-03	5.22E-03	1.20E-01	1.36E-01
2013	4	0.15	7.43	12.84	3.70E-02	0.22	0.16	3.74	4.26	4.93E-03	2.38E-01	4.11E-01	1.18E-03	6.98E-03	5.22E-03	1.20E-01	1.36E-01
2013	5	0.15	7.43	12.84	3.70E-02	0.22	0.16	3.74	4.26	4.93E-03	2.38E-01	4.11E-01	1.18E-03	6.98E-03	5.22E-03	1.20E-01	1.36E-01
2013	10	0.14	4.45	9.62	3.00E-02	0.21	0.15	2.04	2.32	4.52E-03	1.43E-01	3.08E-01	9.61E-04	6.56E-03	4.84E-03	6.53E-02	7.43E-02
2013	15	0.13	2.55	7.33	2.50E-02	0.19	0.14	0.98	1.11	4.10E-03	8.18E-02	2.35E-01	8.01E-04	6.15E-03	4.45E-03	3.13E-02	3.56E-02
2013	20	0.12	1.77	5.98	2.10E-02	0.18	0.13	0.57	0.65	3.78E-03	5.67E-02	1.92E-01	6.72E-04	5.83E-03	4.13E-03	1.84E-02	2.09E-02
2013	25	0.11	1.69	5.38	2.00E-02	0.18	0.13	0.50	0.57	3.65E-03	5.40E-02	1.72E-01	6.40E-04	5.70E-03	4.03E-03	1.60E-02	1.83E-02
2013	30	0.12	1.63	4.87	1.80E-02	0.18	0.13	0.44	0.50	3.71E-03	5.22E-02	1.56E-01	5.76E-04	5.76E-03	4.10E-03	1.40E-02	1.59E-02
2013	35	0.12	1.60	4.46	1.70E-02	0.19	0.13	0.38	0.43	3.91E-03	5.13E-02	1.43E-01	5.44E-04	5.96E-03	4.26E-03	1.22E-02	1.39E-02
2013	40	0.13	1.61	4.14	1.70E-02	0.20	0.14	0.34	0.38	4.26E-03	5.15E-02	1.33E-01	5.44E-04	6.31E-03	4.58E-03	1.07E-02	1.22E-02
2013	45	0.15	1.64	3.92	1.60E-02	0.21	0.16	0.30	0.34	4.77E-03	5.26E-02	1.26E-01	5.12E-04	6.82E-03	5.06E-03	9.51E-03	1.09E-02
2013	50	0.17	1.71	3.80	1.60E-02	0.23	0.18	0.27	0.31	5.41E-03	5.48E-02	1.22E-01	5.12E-04	7.46E-03	5.67E-03	8.61E-03	9.80E-03
2013	55	0.19	1.81	3.77	1.60E-02	0.26	0.20	0.25	0.28	6.21E-03	5.79E-02	1.21E-01	5.12E-04	8.26E-03	6.40E-03	7.97E-03	9.06E-03
2013	60	0.22	1.94	3.84	1.60E-02	0.29	0.23	0.24	0.27	7.17E-03	6.20E-02	1.23E-01	5.12E-04	9.22E-03	7.27E-03	7.62E-03	8.68E-03
2013	65	0.26	2.10	4.01	1.60E-02	0.32	0.26	0.24	0.27	8.26E-03	6.71E-02	1.28E-01	5.12E-04	1.03E-02	8.29E-03	7.56E-03	8.61E-03
2013	70	0.30	2.29	4.28	1.70E-02	0.36	0.30	0.24	0.28	9.51E-03	7.32E-02	1.37E-01	5.44E-04	1.16E-02	9.45E-03	7.78E-03	8.84E-03
2013	75	0.34	2.51	4.64	1.80E-02	0.41	0.34	0.26	0.29	1.09E-02	8.02E-02	1.48E-01	5.76E-04	1.30E-02	1.07E-02	8.26E-03	9.41E-03
2013	80	0.39	2.76	5.09	1.90E-02	0.45	0.38	0.28	0.32	1.25E-02	8.83E-02	1.63E-01	6.08E-04	1.45E-02	1.22E-02	9.06E-03	1.03E-02
2014	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	4.11E-03	1.55E+00	4.61E+00	2.35E-03	4.11E-03	3.77E-03	2.86E-01	3.25E-01
2014	1	0.15	7.35	12.66	3.70E-02	0.22	0.16	3.70	4.21	5.68E-03	2.74E-01	4.73E-01	1.38E-03	8.07E-03	6.01E-03	1.38E-01	1.57E-01
2014	2	0.15	7.35	12.66	3.70E-02	0.22	0.16	3.70	4.21	5.68E-03	2.74E-01	4.73E-01	1.38E-03	8.07E-03	6.01E-03	1.38E-01	1.57E-01
2014	3	0.15	7.35	12.66	3.70E-02	0.22	0.16	3.70	4.21	5.68E-03	2.74E-01	4.73E-01	1.38E-03	8.07E-03	6.01E-03	1.38E-01	1.57E-01
2014	4	0.15	7.35	12.66	3.70E-02	0.22	0.16	3.70	4.21	5.68E-03	2.74E-01	4.73E-01	1.38E-03	8.07E-03	6.01E-03	1.38E-01	1.57E-01
2014	5	0.15	7.35	12.66	3.70E-02	0.22	0.16	3.70	4.21	5.68E-03	2.74E-01	4.73E-01	1.38E-03	8.07E-03	6.01E-03	1.38E-01	1.57E-01

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2014	10	0.14	4.41	9.50	3.00E-02	0.20	0.15	2.02	2.30	5.19E-03	1.64E-01	3.55E-01	1.12E-03	7.58E-03	5.56E-03	7.53E-02	8.57E-02
2014	15	0.13	2.53	7.23	2.50E-02	0.19	0.14	0.97	1.10	4.74E-03	9.43E-02	2.70E-01	9.34E-04	7.13E-03	5.15E-03	3.60E-02	4.10E-02
2014	20	0.12	1.75	5.90	2.10E-02	0.18	0.13	0.57	0.65	4.33E-03	6.54E-02	2.20E-01	7.84E-04	6.72E-03	4.78E-03	2.12E-02	2.41E-02
2014	25	0.11	1.67	5.31	2.00E-02	0.18	0.13	0.50	0.56	4.22E-03	6.22E-02	1.98E-01	7.47E-04	6.61E-03	4.67E-03	1.85E-02	2.11E-02
2014	30	0.11	1.61	4.80	1.80E-02	0.18	0.13	0.43	0.49	4.26E-03	6.02E-02	1.79E-01	6.72E-04	6.65E-03	4.70E-03	1.61E-02	1.84E-02
2014	35	0.12	1.59	4.40	1.70E-02	0.19	0.13	0.38	0.43	4.52E-03	5.92E-02	1.64E-01	6.35E-04	6.91E-03	4.93E-03	1.41E-02	1.60E-02
2014	40	0.13	1.59	4.08	1.70E-02	0.20	0.14	0.33	0.38	4.89E-03	5.94E-02	1.52E-01	6.35E-04	7.28E-03	5.30E-03	1.24E-02	1.41E-02
2014	45	0.15	1.63	3.87	1.60E-02	0.21	0.16	0.29	0.34	5.49E-03	6.07E-02	1.44E-01	5.97E-04	7.88E-03	5.83E-03	1.10E-02	1.25E-02
2014	50	0.17	1.69	3.75	1.60E-02	0.23	0.18	0.27	0.30	6.24E-03	6.32E-02	1.40E-01	5.97E-04	8.63E-03	6.53E-03	9.93E-03	1.13E-02
2014	55	0.19	1.79	3.72	1.60E-02	0.26	0.20	0.25	0.28	7.17E-03	6.68E-02	1.39E-01	5.97E-04	9.56E-03	7.36E-03	9.19E-03	1.05E-02
2014	60	0.22	1.92	3.79	1.60E-02	0.29	0.22	0.24	0.27	8.25E-03	7.15E-02	1.42E-01	5.97E-04	1.06E-02	8.36E-03	8.78E-03	1.00E-02
2014	65	0.26	2.07	3.96	1.60E-02	0.32	0.26	0.23	0.27	9.52E-03	7.74E-02	1.48E-01	5.97E-04	1.19E-02	9.56E-03	8.70E-03	9.93E-03
2014	70	0.29	2.26	4.22	1.70E-02	0.36	0.29	0.24	0.27	1.10E-02	8.44E-02	1.58E-01	6.35E-04	1.34E-02	1.09E-02	8.96E-03	1.02E-02
2014	75	0.34	2.48	4.58	1.80E-02	0.40	0.33	0.26	0.29	1.26E-02	9.25E-02	1.71E-01	6.72E-04	1.50E-02	1.24E-02	9.56E-03	1.09E-02
2014	80	0.39	2.73	5.03	1.90E-02	0.45	0.38	0.28	0.32	1.44E-02	1.02E-01	1.88E-01	7.09E-04	1.68E-02	1.40E-02	1.05E-02	1.19E-02
2015	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	4.51E-03	1.70E+00	5.07E+00	2.58E-03	4.51E-03	4.14E-03	3.14E-01	3.57E-01
2015	1	0.15	7.26	12.48	3.70E-02	0.21	0.16	3.65	4.16	6.15E-03	2.98E-01	5.12E-01	1.52E-03	8.78E-03	6.52E-03	1.50E-01	1.71E-01
2015	2	0.15	7.26	12.48	3.70E-02	0.21	0.16	3.65	4.16	6.15E-03	2.98E-01	5.12E-01	1.52E-03	8.78E-03	6.52E-03	1.50E-01	1.71E-01
2015	3	0.15	7.26	12.48	3.70E-02	0.21	0.16	3.65	4.16	6.15E-03	2.98E-01	5.12E-01	1.52E-03	8.78E-03	6.52E-03	1.50E-01	1.71E-01
2015	4	0.15	7.26	12.48	3.70E-02	0.21	0.16	3.65	4.16	6.15E-03	2.98E-01	5.12E-01	1.52E-03	8.78E-03	6.52E-03	1.50E-01	1.71E-01
2015	5	0.15	7.26	12.48	3.70E-02	0.21	0.16	3.65	4.16	6.15E-03	2.98E-01	5.12E-01	1.52E-03	8.78E-03	6.52E-03	1.50E-01	1.71E-01
2015	10	0.14	4.35	9.36	3.00E-02	0.20	0.15	1.99	2.27	5.62E-03	1.78E-01	3.84E-01	1.23E-03	8.24E-03	6.03E-03	8.17E-02	9.30E-02
2015	15	0.13	2.50	7.13	2.50E-02	0.19	0.14	0.95	1.09	5.13E-03	1.02E-01	2.92E-01	1.03E-03	7.75E-03	5.58E-03	3.91E-02	4.45E-02
2015	20	0.11	1.73	5.82	2.10E-02	0.18	0.13	0.56	0.64	4.68E-03	7.10E-02	2.39E-01	8.61E-04	7.30E-03	5.17E-03	2.30E-02	2.62E-02
2015	25	0.11	1.65	5.23	2.00E-02	0.18	0.12	0.49	0.56	4.55E-03	6.75E-02	2.14E-01	8.20E-04	7.18E-03	5.04E-03	2.01E-02	2.28E-02
2015	30	0.11	1.59	4.73	1.80E-02	0.18	0.13	0.43	0.49	4.63E-03	6.53E-02	1.94E-01	7.38E-04	7.26E-03	5.13E-03	1.75E-02	1.99E-02
2015	35	0.12	1.57	4.33	1.70E-02	0.18	0.13	0.37	0.42	4.88E-03	6.42E-02	1.78E-01	6.97E-04	7.51E-03	5.33E-03	1.53E-02	1.74E-02
2015	40	0.13	1.57	4.03	1.70E-02	0.19	0.14	0.33	0.37	5.33E-03	6.45E-02	1.65E-01	6.97E-04	7.96E-03	5.74E-03	1.34E-02	1.53E-02
2015	45	0.15	1.61	3.81	1.60E-02	0.21	0.15	0.29	0.33	5.95E-03	6.59E-02	1.56E-01	6.56E-04	8.57E-03	6.32E-03	1.19E-02	1.36E-02
2015	50	0.17	1.67	3.69	1.60E-02	0.23	0.17	0.26	0.30	6.77E-03	6.86E-02	1.51E-01	6.56E-04	9.39E-03	7.10E-03	1.08E-02	1.23E-02
2015	55	0.19	1.77	3.67	1.60E-02	0.25	0.20	0.24	0.28	7.75E-03	7.25E-02	1.50E-01	6.56E-04	1.04E-02	8.00E-03	9.97E-03	1.14E-02
2015	60	0.22	1.89	3.74	1.60E-02	0.28	0.22	0.23	0.27	8.94E-03	7.76E-02	1.53E-01	6.56E-04	1.16E-02	9.10E-03	9.56E-03	1.09E-02
2015	65	0.25	2.05	3.90	1.60E-02	0.32	0.25	0.23	0.26	1.03E-02	8.40E-02	1.60E-01	6.56E-04	1.30E-02	1.03E-02	9.47E-03	1.07E-02
2015	70	0.29	2.23	4.16	1.70E-02	0.35	0.29	0.24	0.27	1.19E-02	9.15E-02	1.70E-01	6.97E-04	1.45E-02	1.18E-02	9.72E-03	1.11E-02
2015	75	0.33	2.45	4.51	1.80E-02	0.40	0.33	0.25	0.29	1.36E-02	1.00E-01	1.85E-01	7.38E-04	1.62E-02	1.34E-02	1.04E-02	1.18E-02
2015	80	0.38	2.69	4.95	1.90E-02	0.44	0.37	0.28	0.32	1.56E-02	1.10E-01	2.03E-01	7.79E-04	1.82E-02	1.52E-02	1.14E-02	1.29E-02
2016	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	4.85E-03	1.83E+00	5.45E+00	2.78E-03	4.85E-03	4.45E-03	3.38E-01	3.84E-01
2016	1	0.15	7.17	12.28	3.70E-02	0.21	0.16	3.61	4.11	6.53E-03	3.16E-01	5.42E-01	1.63E-03	9.35E-03	6.93E-03	1.59E-01	1.81E-01
2016	2	0.15	7.17	12.28	3.70E-02	0.21	0.16	3.61	4.11	6.53E-03	3.16E-01	5.42E-01	1.63E-03	9.35E-03	6.93E-03	1.59E-01	1.81E-01
2016	3	0.15	7.17	12.28	3.70E-02	0.21	0.16	3.61	4.11	6.53E-03	3.16E-01	5.42E-01	1.63E-03	9.35E-03	6.93E-03	1.59E-01	1.81E-01
2016	4	0.15	7.17	12.28	3.70E-02	0.21	0.16	3.61	4.11	6.53E-03	3.16E-01	5.42E-01	1.63E-03	9.35E-03	6.93E-03	1.59E-01	1.81E-01
2016	5	0.15	7.17	12.28	3.70E-02	0.21	0.16	3.61	4.11	6.53E-03	3.16E-01	5.42E-01	1.63E-03	9.35E-03	6.93E-03	1.59E-01	1.81E-01
2016	10	0.14	4.30	9.21	3.00E-02	0.20	0.15	1.97	2.24	5.95E-03	1.89E-01	4.06E-01	1.32E-03	8.78E-03	6.40E-03	8.67E-02	9.87E-02
2016	15	0.12	2.46	7.01	2.50E-02	0.19	0.13	0.94	1.07	5.43E-03	1.09E-01	3.09E-01	1.10E-03	8.25E-03	5.91E-03	4.15E-02	4.72E-02
2016	20	0.11	1.71	5.72	2.10E-02	0.18	0.13	0.55	0.63	4.98E-03	7.54E-02	2.52E-01	9.26E-04	7.81E-03	5.51E-03	2.44E-02	2.78E-02

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2016	25	0.11	1.63	5.15	2.00E-02	0.17	0.12	0.48	0.55	4.85E-03	7.17E-02	2.27E-01	8.82E-04	7.67E-03	5.38E-03	2.13E-02	2.43E-02
2016	30	0.11	1.57	4.66	1.80E-02	0.18	0.12	0.42	0.48	4.90E-03	6.93E-02	2.05E-01	7.94E-04	7.72E-03	5.43E-03	1.86E-02	2.11E-02
2016	35	0.12	1.55	4.26	1.70E-02	0.18	0.13	0.37	0.42	5.16E-03	6.82E-02	1.88E-01	7.50E-04	7.98E-03	5.69E-03	1.62E-02	1.85E-02
2016	40	0.13	1.55	3.96	1.70E-02	0.19	0.14	0.32	0.37	5.65E-03	6.84E-02	1.75E-01	7.50E-04	8.47E-03	6.13E-03	1.42E-02	1.62E-02
2016	45	0.14	1.59	3.75	1.60E-02	0.21	0.15	0.29	0.33	6.31E-03	7.00E-02	1.65E-01	7.06E-04	9.13E-03	6.70E-03	1.27E-02	1.44E-02
2016	50	0.16	1.65	3.63	1.60E-02	0.23	0.17	0.26	0.30	7.15E-03	7.28E-02	1.60E-01	7.06E-04	9.97E-03	7.50E-03	1.14E-02	1.30E-02
2016	55	0.19	1.74	3.61	1.60E-02	0.25	0.19	0.24	0.27	8.20E-03	7.69E-02	1.59E-01	7.06E-04	1.10E-02	8.47E-03	1.06E-02	1.20E-02
2016	60	0.22	1.87	3.68	1.60E-02	0.28	0.22	0.23	0.26	9.48E-03	8.24E-02	1.62E-01	7.06E-04	1.23E-02	9.66E-03	1.01E-02	1.15E-02
2016	65	0.25	2.02	3.84	1.60E-02	0.31	0.25	0.23	0.26	1.09E-02	8.91E-02	1.69E-01	7.06E-04	1.38E-02	1.10E-02	1.01E-02	1.14E-02
2016	70	0.29	2.20	4.09	1.70E-02	0.35	0.28	0.23	0.27	1.26E-02	9.72E-02	1.80E-01	7.50E-04	1.54E-02	1.25E-02	1.03E-02	1.18E-02
2016	75	0.33	2.42	4.44	1.80E-02	0.39	0.32	0.25	0.28	1.44E-02	1.07E-01	1.96E-01	7.94E-04	1.72E-02	1.42E-02	1.10E-02	1.25E-02
2016	80	0.37	2.66	4.88	1.90E-02	0.44	0.37	0.27	0.31	1.65E-02	1.17E-01	2.15E-01	8.38E-04	1.93E-02	1.61E-02	1.20E-02	1.37E-02
2017	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	5.30E-03	1.99E+00	5.95E+00	3.03E-03	5.30E-03	4.86E-03	3.68E-01	4.19E-01
2017	1	0.15	7.06	12.07	3.70E-02	0.21	0.16	3.56	4.05	6.98E-03	3.40E-01	5.81E-01	1.78E-03	1.01E-02	7.46E-03	1.71E-01	1.95E-01
2017	2	0.15	7.06	12.07	3.70E-02	0.21	0.16	3.56	4.05	6.98E-03	3.40E-01	5.81E-01	1.78E-03	1.01E-02	7.46E-03	1.71E-01	1.95E-01
2017	3	0.15	7.06	12.07	3.70E-02	0.21	0.16	3.56	4.05	6.98E-03	3.40E-01	5.81E-01	1.78E-03	1.01E-02	7.46E-03	1.71E-01	1.95E-01
2017	4	0.15	7.06	12.07	3.70E-02	0.21	0.16	3.56	4.05	6.98E-03	3.40E-01	5.81E-01	1.78E-03	1.01E-02	7.46E-03	1.71E-01	1.95E-01
2017	5	0.15	7.06	12.07	3.70E-02	0.21	0.16	3.56	4.05	6.98E-03	3.40E-01	5.81E-01	1.78E-03	1.01E-02	7.46E-03	1.71E-01	1.95E-01
2017	10	0.13	4.23	9.05	3.00E-02	0.20	0.14	1.94	2.21	6.40E-03	2.04E-01	4.36E-01	1.44E-03	9.49E-03	6.89E-03	9.33E-02	1.06E-01
2017	15	0.12	2.43	6.89	2.50E-02	0.19	0.13	0.93	1.06	5.83E-03	1.17E-01	3.32E-01	1.20E-03	8.91E-03	6.36E-03	4.47E-02	5.08E-02
2017	20	0.11	1.68	5.63	2.10E-02	0.18	0.12	0.55	0.62	5.34E-03	8.11E-02	2.71E-01	1.01E-03	8.43E-03	5.92E-03	2.63E-02	2.99E-02
2017	25	0.11	1.60	5.06	2.00E-02	0.17	0.12	0.48	0.54	5.20E-03	7.71E-02	2.43E-01	9.63E-04	8.28E-03	5.78E-03	2.29E-02	2.61E-02
2017	30	0.11	1.55	4.58	1.80E-02	0.17	0.12	0.42	0.47	5.25E-03	7.45E-02	2.20E-01	8.67E-04	8.33E-03	5.87E-03	2.00E-02	2.28E-02
2017	35	0.12	1.52	4.19	1.70E-02	0.18	0.13	0.36	0.41	5.54E-03	7.34E-02	2.02E-01	8.19E-04	8.62E-03	6.12E-03	1.75E-02	1.99E-02
2017	40	0.13	1.53	3.89	1.70E-02	0.19	0.14	0.32	0.36	6.07E-03	7.36E-02	1.87E-01	8.19E-04	9.15E-03	6.60E-03	1.53E-02	1.75E-02
2017	45	0.14	1.56	3.69	1.60E-02	0.20	0.15	0.28	0.32	6.74E-03	7.53E-02	1.77E-01	7.70E-04	9.82E-03	7.22E-03	1.36E-02	1.55E-02
2017	50	0.16	1.63	3.57	1.60E-02	0.22	0.17	0.26	0.29	7.70E-03	7.83E-02	1.72E-01	7.70E-04	1.08E-02	8.09E-03	1.23E-02	1.40E-02
2017	55	0.18	1.72	3.55	1.60E-02	0.25	0.19	0.24	0.27	8.81E-03	8.28E-02	1.71E-01	7.70E-04	1.19E-02	9.15E-03	1.14E-02	1.30E-02
2017	60	0.21	1.84	3.61	1.60E-02	0.28	0.22	0.23	0.26	1.02E-02	8.86E-02	1.74E-01	7.70E-04	1.32E-02	1.04E-02	1.09E-02	1.24E-02
2017	65	0.24	1.99	3.77	1.60E-02	0.31	0.25	0.22	0.26	1.17E-02	9.59E-02	1.82E-01	7.70E-04	1.48E-02	1.18E-02	1.08E-02	1.23E-02
2017	70	0.28	2.17	4.02	1.70E-02	0.35	0.28	0.23	0.26	1.35E-02	1.05E-01	1.94E-01	8.19E-04	1.66E-02	1.34E-02	1.11E-02	1.27E-02
2017	75	0.32	2.38	4.36	1.80E-02	0.39	0.32	0.25	0.28	1.55E-02	1.15E-01	2.10E-01	8.67E-04	1.86E-02	1.53E-02	1.18E-02	1.35E-02
2017	80	0.37	2.62	4.79	1.90E-02	0.43	0.36	0.27	0.31	1.77E-02	1.26E-01	2.31E-01	9.15E-04	2.08E-02	1.73E-02	1.30E-02	1.47E-02
2018	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	5.79E-03	2.18E+00	6.50E+00	3.32E-03	5.79E-03	5.32E-03	4.03E-01	4.58E-01
2018	1	0.14	6.95	11.84	3.70E-02	0.21	0.15	3.50	3.99	7.53E-03	3.66E-01	6.23E-01	1.95E-03	1.09E-02	8.00E-03	1.84E-01	2.10E-01
2018	2	0.14	6.95	11.84	3.70E-02	0.21	0.15	3.50	3.99	7.53E-03	3.66E-01	6.23E-01	1.95E-03	1.09E-02	8.00E-03	1.84E-01	2.10E-01
2018	3	0.14	6.95	11.84	3.70E-02	0.21	0.15	3.50	3.99	7.53E-03	3.66E-01	6.23E-01	1.95E-03	1.09E-02	8.00E-03	1.84E-01	2.10E-01
2018	4	0.14	6.95	11.84	3.70E-02	0.21	0.15	3.50	3.99	7.53E-03	3.66E-01	6.23E-01	1.95E-03	1.09E-02	8.00E-03	1.84E-01	2.10E-01
2018	5	0.14	6.95	11.84	3.70E-02	0.21	0.15	3.50	3.99	7.53E-03	3.66E-01	6.23E-01	1.95E-03	1.09E-02	8.00E-03	1.84E-01	2.10E-01
2018	10	0.13	4.17	8.88	3.00E-02	0.20	0.14	1.91	2.17	6.89E-03	2.19E-01	4.67E-01	1.58E-03	1.03E-02	7.42E-03	1.00E-01	1.14E-01
2018	15	0.12	2.39	6.76	2.50E-02	0.18	0.13	0.91	1.04	6.26E-03	1.26E-01	3.56E-01	1.32E-03	9.63E-03	6.84E-03	4.80E-02	5.47E-02
2018	20	0.11	1.66	5.52	2.10E-02	0.17	0.12	0.54	0.61	5.74E-03	8.73E-02	2.90E-01	1.11E-03	9.10E-03	6.37E-03	2.83E-02	3.22E-02
2018	25	0.11	1.58	4.96	2.00E-02	0.17	0.12	0.47	0.53	5.58E-03	8.30E-02	2.61E-01	1.05E-03	8.95E-03	6.26E-03	2.47E-02	2.81E-02
2018	30	0.11	1.52	4.49	1.80E-02	0.17	0.12	0.41	0.47	5.68E-03	8.02E-02	2.36E-01	9.47E-04	9.05E-03	6.32E-03	2.15E-02	2.45E-02
2018	35	0.11	1.50	4.11	1.70E-02	0.18	0.13	0.36	0.41	5.95E-03	7.89E-02	2.16E-01	8.95E-04	9.31E-03	6.58E-03	1.88E-02	2.14E-02

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2018	40	0.12	1.51	3.82	1.70E-02	0.19	0.14	0.31	0.36	6.47E-03	7.92E-02	2.01E-01	8.95E-04	9.84E-03	7.10E-03	1.65E-02	1.88E-02
2018	45	0.14	1.54	3.62	1.60E-02	0.20	0.15	0.28	0.32	7.26E-03	8.10E-02	1.90E-01	8.42E-04	1.06E-02	7.79E-03	1.46E-02	1.67E-02
2018	50	0.16	1.60	3.50	1.60E-02	0.22	0.17	0.25	0.29	8.26E-03	8.43E-02	1.84E-01	8.42E-04	1.16E-02	8.68E-03	1.33E-02	1.51E-02
2018	55	0.18	1.69	3.48	1.60E-02	0.24	0.19	0.23	0.27	9.47E-03	8.90E-02	1.83E-01	8.42E-04	1.28E-02	9.84E-03	1.23E-02	1.39E-02
2018	60	0.21	1.81	3.55	1.60E-02	0.27	0.21	0.22	0.25	1.09E-02	9.54E-02	1.87E-01	8.42E-04	1.43E-02	1.12E-02	1.17E-02	1.34E-02
2018	65	0.24	1.96	3.70	1.60E-02	0.30	0.24	0.22	0.25	1.26E-02	1.03E-01	1.95E-01	8.42E-04	1.60E-02	1.27E-02	1.16E-02	1.32E-02
2018	70	0.28	2.14	3.94	1.70E-02	0.34	0.28	0.23	0.26	1.45E-02	1.13E-01	2.08E-01	8.95E-04	1.79E-02	1.45E-02	1.19E-02	1.36E-02
2018	75	0.32	2.34	4.28	1.80E-02	0.38	0.31	0.24	0.28	1.66E-02	1.23E-01	2.25E-01	9.47E-04	2.00E-02	1.64E-02	1.27E-02	1.45E-02
2018	80	0.36	2.58	4.70	1.90E-02	0.43	0.35	0.27	0.30	1.90E-02	1.36E-01	2.47E-01	1.00E-03	2.24E-02	1.86E-02	1.39E-02	1.59E-02
2019	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	6.33E-03	2.38E+00	7.11E+00	3.63E-03	6.33E-03	5.81E-03	4.40E-01	5.01E-01
2019	1	0.14	6.84	11.59	3.70E-02	0.20	0.15	3.44	3.92	8.06E-03	3.93E-01	6.67E-01	2.13E-03	1.17E-02	8.63E-03	1.98E-01	2.25E-01
2019	2	0.14	6.84	11.59	3.70E-02	0.20	0.15	3.44	3.92	8.06E-03	3.93E-01	6.67E-01	2.13E-03	1.17E-02	8.63E-03	1.98E-01	2.25E-01
2019	3	0.14	6.84	11.59	3.70E-02	0.20	0.15	3.44	3.92	8.06E-03	3.93E-01	6.67E-01	2.13E-03	1.17E-02	8.63E-03	1.98E-01	2.25E-01
2019	4	0.14	6.84	11.59	3.70E-02	0.20	0.15	3.44	3.92	8.06E-03	3.93E-01	6.67E-01	2.13E-03	1.17E-02	8.63E-03	1.98E-01	2.25E-01
2019	5	0.14	6.84	11.59	3.70E-02	0.20	0.15	3.44	3.92	8.06E-03	3.93E-01	6.67E-01	2.13E-03	1.17E-02	8.63E-03	1.98E-01	2.25E-01
2019	10	0.13	4.10	8.69	3.00E-02	0.19	0.14	1.88	2.14	7.37E-03	2.36E-01	5.00E-01	1.73E-03	1.11E-02	8.00E-03	1.08E-01	1.23E-01
2019	15	0.12	2.35	6.62	2.50E-02	0.18	0.13	0.90	1.02	6.73E-03	1.35E-01	3.81E-01	1.44E-03	1.04E-02	7.37E-03	5.17E-02	5.88E-02
2019	20	0.11	1.63	5.40	2.10E-02	0.17	0.12	0.53	0.60	6.16E-03	9.38E-02	3.11E-01	1.21E-03	9.84E-03	6.85E-03	3.04E-02	3.46E-02
2019	25	0.10	1.55	4.86	2.00E-02	0.17	0.12	0.46	0.53	5.99E-03	8.92E-02	2.80E-01	1.15E-03	9.67E-03	6.73E-03	2.65E-02	3.02E-02
2019	30	0.11	1.50	4.40	1.80E-02	0.17	0.12	0.40	0.46	6.04E-03	8.62E-02	2.53E-01	1.04E-03	9.73E-03	6.79E-03	2.31E-02	2.63E-02
2019	35	0.11	1.48	4.02	1.70E-02	0.18	0.12	0.35	0.40	6.39E-03	8.49E-02	2.32E-01	9.79E-04	1.01E-02	7.08E-03	2.02E-02	2.30E-02
2019	40	0.12	1.48	3.74	1.70E-02	0.19	0.13	0.31	0.35	6.96E-03	8.52E-02	2.15E-01	9.79E-04	1.06E-02	7.60E-03	1.77E-02	2.02E-02
2019	45	0.14	1.51	3.54	1.60E-02	0.20	0.15	0.27	0.31	7.77E-03	8.71E-02	2.04E-01	9.21E-04	1.15E-02	8.35E-03	1.58E-02	1.80E-02
2019	50	0.15	1.57	3.43	1.60E-02	0.22	0.16	0.25	0.28	8.86E-03	9.06E-02	1.97E-01	9.21E-04	1.25E-02	9.32E-03	1.42E-02	1.62E-02
2019	55	0.18	1.66	3.41	1.60E-02	0.24	0.18	0.23	0.26	1.02E-02	9.57E-02	1.96E-01	9.21E-04	1.39E-02	1.05E-02	1.32E-02	1.50E-02
2019	60	0.20	1.78	3.47	1.60E-02	0.27	0.21	0.22	0.25	1.17E-02	1.03E-01	2.00E-01	9.21E-04	1.54E-02	1.20E-02	1.26E-02	1.43E-02
2019	65	0.24	1.93	3.62	1.60E-02	0.30	0.24	0.22	0.25	1.35E-02	1.11E-01	2.09E-01	9.21E-04	1.72E-02	1.36E-02	1.25E-02	1.42E-02
2019	70	0.27	2.10	3.86	1.70E-02	0.33	0.27	0.22	0.25	1.55E-02	1.21E-01	2.22E-01	9.79E-04	1.92E-02	1.55E-02	1.28E-02	1.46E-02
2019	75	0.31	2.30	4.19	1.80E-02	0.37	0.31	0.24	0.27	1.78E-02	1.33E-01	2.41E-01	1.04E-03	2.15E-02	1.76E-02	1.37E-02	1.56E-02
2019	80	0.35	2.54	4.60	1.90E-02	0.42	0.35	0.26	0.30	2.04E-02	1.46E-01	2.65E-01	1.09E-03	2.41E-02	2.00E-02	1.50E-02	1.71E-02
2020	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	6.65E-03	2.50E+00	7.47E+00	3.81E-03	6.65E-03	6.11E-03	4.63E-01	5.27E-01
2020	1	0.14	6.71	11.32	3.70E-02	0.20	0.15	3.38	3.84	8.28E-03	4.06E-01	6.85E-01	2.24E-03	1.22E-02	8.89E-03	2.04E-01	2.32E-01
2020	2	0.14	6.71	11.32	3.70E-02	0.20	0.15	3.38	3.84	8.28E-03	4.06E-01	6.85E-01	2.24E-03	1.22E-02	8.89E-03	2.04E-01	2.32E-01
2020	3	0.14	6.71	11.32	3.70E-02	0.20	0.15	3.38	3.84	8.28E-03	4.06E-01	6.85E-01	2.24E-03	1.22E-02	8.89E-03	2.04E-01	2.32E-01
2020	4	0.14	6.71	11.32	3.70E-02	0.20	0.15	3.38	3.84	8.28E-03	4.06E-01	6.85E-01	2.24E-03	1.22E-02	8.89E-03	2.04E-01	2.32E-01
2020	5	0.14	6.71	11.32	3.70E-02	0.20	0.15	3.38	3.84	8.28E-03	4.06E-01	6.85E-01	2.24E-03	1.22E-02	8.89E-03	2.04E-01	2.32E-01
2020	10	0.13	4.02	8.49	3.00E-02	0.19	0.14	1.84	2.10	7.56E-03	2.43E-01	5.13E-01	1.81E-03	1.14E-02	8.22E-03	1.11E-01	1.27E-01
2020	15	0.11	2.31	6.47	2.50E-02	0.18	0.13	0.88	1.00	6.89E-03	1.39E-01	3.91E-01	1.51E-03	1.08E-02	7.62E-03	5.33E-02	6.06E-02
2020	20	0.11	1.60	5.28	2.10E-02	0.17	0.12	0.52	0.59	6.35E-03	9.67E-02	3.19E-01	1.27E-03	1.02E-02	7.07E-03	3.13E-02	3.57E-02
2020	25	0.10	1.52	4.74	2.00E-02	0.17	0.12	0.45	0.52	6.17E-03	9.20E-02	2.87E-01	1.21E-03	1.00E-02	6.95E-03	2.73E-02	3.11E-02
2020	30	0.10	1.47	4.29	1.80E-02	0.17	0.12	0.39	0.45	6.23E-03	8.89E-02	2.60E-01	1.09E-03	1.01E-02	7.01E-03	2.38E-02	2.71E-02
2020	35	0.11	1.45	3.93	1.70E-02	0.17	0.12	0.34	0.39	6.59E-03	8.75E-02	2.38E-01	1.03E-03	1.05E-02	7.32E-03	2.08E-02	2.37E-02
2020	40	0.12	1.45	3.65	1.70E-02	0.18	0.13	0.30	0.34	7.13E-03	8.78E-02	2.21E-01	1.03E-03	1.10E-02	7.86E-03	1.83E-02	2.08E-02
2020	45	0.13	1.48	3.46	1.60E-02	0.20	0.14	0.27	0.31	7.98E-03	8.97E-02	2.09E-01	9.67E-04	1.19E-02	8.65E-03	1.63E-02	1.85E-02
2020	50	0.15	1.54	3.35	1.60E-02	0.21	0.16	0.24	0.28	9.07E-03	9.34E-02	2.03E-01	9.67E-04	1.29E-02	9.61E-03	1.47E-02	1.67E-02

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2020	55	0.17	1.63	3.33	1.60E-02	0.24	0.18	0.23	0.26	1.05E-02	9.87E-02	2.01E-01	9.67E-04	1.43E-02	1.09E-02	1.36E-02	1.55E-02
2020	60	0.20	1.75	3.39	1.60E-02	0.26	0.20	0.22	0.25	1.20E-02	1.06E-01	2.05E-01	9.67E-04	1.59E-02	1.23E-02	1.30E-02	1.48E-02
2020	65	0.23	1.89	3.54	1.60E-02	0.29	0.23	0.21	0.24	1.39E-02	1.14E-01	2.14E-01	9.67E-04	1.78E-02	1.40E-02	1.29E-02	1.47E-02
2020	70	0.27	2.06	3.77	1.70E-02	0.33	0.26	0.22	0.25	1.60E-02	1.25E-01	2.28E-01	1.03E-03	1.99E-02	1.60E-02	1.32E-02	1.51E-02
2020	75	0.30	2.26	4.09	1.80E-02	0.37	0.30	0.23	0.27	1.84E-02	1.37E-01	2.47E-01	1.09E-03	2.23E-02	1.81E-02	1.41E-02	1.61E-02
2020	80	0.35	2.49	4.50	1.90E-02	0.41	0.34	0.26	0.29	2.10E-02	1.50E-01	2.72E-01	1.15E-03	2.49E-02	2.06E-02	1.55E-02	1.76E-02
2021	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	7.08E-03	2.67E+00	7.95E+00	4.06E-03	7.08E-03	6.50E-03	4.93E-01	5.61E-01
2021	1	0.13	6.57	11.03	3.70E-02	0.20	0.14	3.31	3.77	8.63E-03	4.23E-01	7.11E-01	2.38E-03	1.28E-02	9.27E-03	2.13E-01	2.42E-01
2021	2	0.13	6.57	11.03	3.70E-02	0.20	0.14	3.31	3.77	8.63E-03	4.23E-01	7.11E-01	2.38E-03	1.28E-02	9.27E-03	2.13E-01	2.42E-01
2021	3	0.13	6.57	11.03	3.70E-02	0.20	0.14	3.31	3.77	8.63E-03	4.23E-01	7.11E-01	2.38E-03	1.28E-02	9.27E-03	2.13E-01	2.42E-01
2021	4	0.13	6.57	11.03	3.70E-02	0.20	0.14	3.31	3.77	8.63E-03	4.23E-01	7.11E-01	2.38E-03	1.28E-02	9.27E-03	2.13E-01	2.42E-01
2021	5	0.13	6.57	11.03	3.70E-02	0.20	0.14	3.31	3.77	8.63E-03	4.23E-01	7.11E-01	2.38E-03	1.28E-02	9.27E-03	2.13E-01	2.42E-01
2021	10	0.12	3.94	8.27	3.00E-02	0.19	0.13	1.80	2.05	7.86E-03	2.54E-01	5.33E-01	1.93E-03	1.20E-02	8.63E-03	1.16E-01	1.32E-01
2021	15	0.11	2.26	6.30	2.50E-02	0.18	0.12	0.86	0.98	7.15E-03	1.45E-01	4.06E-01	1.61E-03	1.13E-02	7.99E-03	5.56E-02	6.32E-02
2021	20	0.10	1.57	5.14	2.10E-02	0.17	0.12	0.51	0.58	6.57E-03	1.01E-01	3.31E-01	1.35E-03	1.07E-02	7.41E-03	3.27E-02	3.72E-02
2021	25	0.10	1.49	4.62	2.00E-02	0.16	0.11	0.44	0.50	6.38E-03	9.59E-02	2.98E-01	1.29E-03	1.05E-02	7.21E-03	2.85E-02	3.25E-02
2021	30	0.10	1.44	4.18	1.80E-02	0.17	0.11	0.39	0.44	6.50E-03	9.27E-02	2.69E-01	1.16E-03	1.06E-02	7.34E-03	2.49E-02	2.83E-02
2021	35	0.11	1.42	3.83	1.70E-02	0.17	0.12	0.34	0.38	6.83E-03	9.13E-02	2.47E-01	1.09E-03	1.09E-02	7.66E-03	2.17E-02	2.47E-02
2021	40	0.12	1.42	3.56	1.70E-02	0.18	0.13	0.30	0.34	7.47E-03	9.16E-02	2.29E-01	1.09E-03	1.16E-02	8.18E-03	1.91E-02	2.17E-02
2021	45	0.13	1.45	3.37	1.60E-02	0.19	0.14	0.26	0.30	8.31E-03	9.36E-02	2.17E-01	1.03E-03	1.24E-02	9.02E-03	1.69E-02	1.93E-02
2021	50	0.15	1.51	3.27	1.60E-02	0.21	0.16	0.24	0.27	9.47E-03	9.74E-02	2.10E-01	1.03E-03	1.36E-02	1.00E-02	1.53E-02	1.75E-02
2021	55	0.17	1.60	3.24	1.60E-02	0.23	0.18	0.22	0.25	1.09E-02	1.03E-01	2.09E-01	1.03E-03	1.50E-02	1.13E-02	1.42E-02	1.62E-02
2021	60	0.19	1.71	3.30	1.60E-02	0.26	0.20	0.21	0.24	1.25E-02	1.10E-01	2.13E-01	1.03E-03	1.66E-02	1.29E-02	1.35E-02	1.55E-02
2021	65	0.22	1.85	3.45	1.60E-02	0.29	0.23	0.21	0.24	1.44E-02	1.19E-01	2.22E-01	1.03E-03	1.85E-02	1.46E-02	1.35E-02	1.53E-02
2021	70	0.26	2.02	3.68	1.70E-02	0.32	0.26	0.22	0.24	1.66E-02	1.30E-01	2.37E-01	1.09E-03	2.07E-02	1.67E-02	1.38E-02	1.57E-02
2021	75	0.30	2.21	3.99	1.80E-02	0.36	0.29	0.23	0.26	1.91E-02	1.43E-01	2.57E-01	1.16E-03	2.32E-02	1.89E-02	1.47E-02	1.67E-02
2021	80	0.34	2.44	4.38	1.90E-02	0.40	0.33	0.25	0.29	2.18E-02	1.57E-01	2.82E-01	1.22E-03	2.59E-02	2.14E-02	1.61E-02	1.84E-02
2022	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	7.56E-03	2.85E+00	8.49E+00	4.33E-03	7.56E-03	6.94E-03	5.26E-01	5.98E-01
2022	1	0.13	6.42	10.72	3.70E-02	0.19	0.14	3.23	3.68	8.93E-03	4.41E-01	7.36E-01	2.54E-03	1.33E-02	9.69E-03	2.22E-01	2.53E-01
2022	2	0.13	6.42	10.72	3.70E-02	0.19	0.14	3.23	3.68	8.93E-03	4.41E-01	7.36E-01	2.54E-03	1.33E-02	9.69E-03	2.22E-01	2.53E-01
2022	3	0.13	6.42	10.72	3.70E-02	0.19	0.14	3.23	3.68	8.93E-03	4.41E-01	7.36E-01	2.54E-03	1.33E-02	9.69E-03	2.22E-01	2.53E-01
2022	4	0.13	6.42	10.72	3.70E-02	0.19	0.14	3.23	3.68	8.93E-03	4.41E-01	7.36E-01	2.54E-03	1.33E-02	9.69E-03	2.22E-01	2.53E-01
2022	5	0.13	6.42	10.72	3.70E-02	0.19	0.14	3.23	3.68	8.93E-03	4.41E-01	7.36E-01	2.54E-03	1.33E-02	9.69E-03	2.22E-01	2.53E-01
2022	10	0.12	3.85	8.04	3.00E-02	0.18	0.13	1.76	2.01	8.18E-03	2.64E-01	5.52E-01	2.06E-03	1.26E-02	9.00E-03	1.21E-01	1.38E-01
2022	15	0.11	2.21	6.12	2.50E-02	0.17	0.12	0.84	0.96	7.42E-03	1.51E-01	4.20E-01	1.72E-03	1.18E-02	8.31E-03	5.79E-02	6.60E-02
2022	20	0.10	1.53	4.99	2.10E-02	0.16	0.11	0.50	0.56	6.80E-03	1.05E-01	3.43E-01	1.44E-03	1.12E-02	7.69E-03	3.41E-02	3.87E-02
2022	25	0.10	1.46	4.49	2.00E-02	0.16	0.11	0.43	0.49	6.66E-03	1.00E-01	3.08E-01	1.37E-03	1.11E-02	7.56E-03	2.97E-02	3.39E-02
2022	30	0.10	1.41	4.06	1.80E-02	0.16	0.11	0.38	0.43	6.73E-03	9.66E-02	2.79E-01	1.24E-03	1.11E-02	7.63E-03	2.59E-02	2.95E-02
2022	35	0.10	1.38	3.72	1.70E-02	0.17	0.12	0.33	0.38	7.08E-03	9.51E-02	2.56E-01	1.17E-03	1.15E-02	7.97E-03	2.26E-02	2.58E-02
2022	40	0.11	1.39	3.46	1.70E-02	0.18	0.13	0.29	0.33	7.76E-03	9.54E-02	2.37E-01	1.17E-03	1.22E-02	8.59E-03	1.99E-02	2.26E-02
2022	45	0.13	1.42	3.27	1.60E-02	0.19	0.14	0.26	0.29	8.66E-03	9.76E-02	2.25E-01	1.10E-03	1.31E-02	9.41E-03	1.77E-02	2.01E-02
2022	50	0.14	1.48	3.17	1.60E-02	0.21	0.15	0.23	0.26	9.82E-03	1.01E-01	2.18E-01	1.10E-03	1.42E-02	1.04E-02	1.59E-02	1.81E-02
2022	55	0.16	1.56	3.15	1.60E-02	0.23	0.17	0.22	0.25	1.13E-02	1.07E-01	2.16E-01	1.10E-03	1.57E-02	1.18E-02	1.48E-02	1.68E-02
2022	60	0.19	1.67	3.21	1.60E-02	0.25	0.20	0.21	0.23	1.30E-02	1.15E-01	2.20E-01	1.10E-03	1.74E-02	1.34E-02	1.42E-02	1.61E-02
2022	65	0.22	1.81	3.35	1.60E-02	0.28	0.22	0.20	0.23	1.50E-02	1.24E-01	2.30E-01	1.10E-03	1.94E-02	1.53E-02	1.40E-02	1.59E-02

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2022	70	0.25	1.97	3.57	1.70E-02	0.32	0.25	0.21	0.24	1.72E-02	1.36E-01	2.45E-01	1.17E-03	2.16E-02	1.73E-02	1.44E-02	1.64E-02
2022	75	0.29	2.16	3.87	1.80E-02	0.35	0.29	0.22	0.25	1.98E-02	1.49E-01	2.66E-01	1.24E-03	2.42E-02	1.96E-02	1.53E-02	1.75E-02
2022	80	0.33	2.38	4.25	1.90E-02	0.39	0.32	0.25	0.28	2.26E-02	1.63E-01	2.92E-01	1.31E-03	2.70E-02	2.23E-02	1.68E-02	1.91E-02
2023	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	8.06E-03	3.03E+00	9.05E+00	4.61E-03	8.06E-03	7.40E-03	5.60E-01	6.38E-01
2023	1	0.13	6.25	10.37	3.70E-02	0.19	0.14	3.15	3.58	9.23E-03	4.58E-01	7.59E-01	2.71E-03	1.39E-02	1.00E-02	2.30E-01	2.62E-01
2023	2	0.13	6.25	10.37	3.70E-02	0.19	0.14	3.15	3.58	9.23E-03	4.58E-01	7.59E-01	2.71E-03	1.39E-02	1.00E-02	2.30E-01	2.62E-01
2023	3	0.13	6.25	10.37	3.70E-02	0.19	0.14	3.15	3.58	9.23E-03	4.58E-01	7.59E-01	2.71E-03	1.39E-02	1.00E-02	2.30E-01	2.62E-01
2023	4	0.13	6.25	10.37	3.70E-02	0.19	0.14	3.15	3.58	9.23E-03	4.58E-01	7.59E-01	2.71E-03	1.39E-02	1.00E-02	2.30E-01	2.62E-01
2023	5	0.13	6.25	10.37	3.70E-02	0.19	0.14	3.15	3.58	9.23E-03	4.58E-01	7.59E-01	2.71E-03	1.39E-02	1.00E-02	2.30E-01	2.62E-01
2023	10	0.12	3.75	7.77	3.00E-02	0.18	0.13	1.72	1.95	8.50E-03	2.74E-01	5.69E-01	2.20E-03	1.32E-02	9.30E-03	1.26E-01	1.43E-01
2023	15	0.11	2.15	5.92	2.50E-02	0.17	0.12	0.82	0.94	7.69E-03	1.57E-01	4.34E-01	1.83E-03	1.24E-02	8.64E-03	6.01E-02	6.85E-02
2023	20	0.10	1.49	4.83	2.10E-02	0.16	0.11	0.48	0.55	7.03E-03	1.09E-01	3.54E-01	1.54E-03	1.17E-02	8.06E-03	3.54E-02	4.03E-02
2023	25	0.09	1.42	4.34	2.00E-02	0.16	0.11	0.42	0.48	6.88E-03	1.04E-01	3.18E-01	1.46E-03	1.16E-02	7.84E-03	3.08E-02	3.52E-02
2023	30	0.10	1.37	3.93	1.80E-02	0.16	0.11	0.37	0.42	6.96E-03	1.00E-01	2.88E-01	1.32E-03	1.16E-02	7.91E-03	2.69E-02	3.06E-02
2023	35	0.10	1.35	3.60	1.70E-02	0.16	0.11	0.32	0.37	7.32E-03	9.87E-02	2.64E-01	1.25E-03	1.20E-02	8.28E-03	2.35E-02	2.67E-02
2023	40	0.11	1.35	3.34	1.70E-02	0.17	0.12	0.28	0.32	7.98E-03	9.91E-02	2.45E-01	1.25E-03	1.27E-02	8.86E-03	2.07E-02	2.35E-02
2023	45	0.12	1.38	3.17	1.60E-02	0.19	0.13	0.25	0.29	8.94E-03	1.01E-01	2.32E-01	1.17E-03	1.36E-02	9.74E-03	1.83E-02	2.09E-02
2023	50	0.14	1.44	3.07	1.60E-02	0.20	0.15	0.23	0.26	1.02E-02	1.05E-01	2.25E-01	1.17E-03	1.49E-02	1.09E-02	1.66E-02	1.88E-02
2023	55	0.16	1.52	3.05	1.60E-02	0.22	0.17	0.21	0.24	1.16E-02	1.11E-01	2.23E-01	1.17E-03	1.63E-02	1.22E-02	1.53E-02	1.74E-02
2023	60	0.18	1.63	3.10	1.60E-02	0.25	0.19	0.20	0.23	1.35E-02	1.19E-01	2.27E-01	1.17E-03	1.82E-02	1.39E-02	1.46E-02	1.67E-02
2023	65	0.21	1.76	3.24	1.60E-02	0.28	0.22	0.20	0.23	1.55E-02	1.29E-01	2.37E-01	1.17E-03	2.02E-02	1.58E-02	1.46E-02	1.66E-02
2023	70	0.24	1.92	3.45	1.70E-02	0.31	0.25	0.20	0.23	1.79E-02	1.41E-01	2.53E-01	1.25E-03	2.26E-02	1.79E-02	1.49E-02	1.71E-02
2023	75	0.28	2.11	3.75	1.80E-02	0.34	0.28	0.22	0.25	2.05E-02	1.54E-01	2.74E-01	1.32E-03	2.52E-02	2.04E-02	1.60E-02	1.82E-02
2023	80	0.32	2.32	4.12	1.90E-02	0.38	0.32	0.24	0.27	2.34E-02	1.70E-01	3.01E-01	1.39E-03	2.81E-02	2.31E-02	1.74E-02	1.98E-02
2024	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	7.89E-03	2.97E+00	8.86E+00	4.52E-03	7.89E-03	7.24E-03	5.49E-01	6.25E-01
2024	1	0.12	6.07	9.99	3.70E-02	0.19	0.13	3.06	3.48	8.75E-03	4.35E-01	7.16E-01	2.65E-03	1.33E-02	9.54E-03	2.19E-01	2.49E-01
2024	2	0.12	6.07	9.99	3.70E-02	0.19	0.13	3.06	3.48	8.75E-03	4.35E-01	7.16E-01	2.65E-03	1.33E-02	9.54E-03	2.19E-01	2.49E-01
2024	3	0.12	6.07	9.99	3.70E-02	0.19	0.13	3.06	3.48	8.75E-03	4.35E-01	7.16E-01	2.65E-03	1.33E-02	9.54E-03	2.19E-01	2.49E-01
2024	4	0.12	6.07	9.99	3.70E-02	0.19	0.13	3.06	3.48	8.75E-03	4.35E-01	7.16E-01	2.65E-03	1.33E-02	9.54E-03	2.19E-01	2.49E-01
2024	5	0.12	6.07	9.99	3.70E-02	0.19	0.13	3.06	3.48	8.75E-03	4.35E-01	7.16E-01	2.65E-03	1.33E-02	9.54E-03	2.19E-01	2.49E-01
2024	10	0.11	3.64	7.49	3.00E-02	0.18	0.12	1.67	1.90	8.03E-03	2.61E-01	5.37E-01	2.15E-03	1.26E-02	8.89E-03	1.19E-01	1.36E-01
2024	15	0.10	2.09	5.70	2.50E-02	0.17	0.11	0.80	0.91	7.32E-03	1.50E-01	4.09E-01	1.79E-03	1.19E-02	8.18E-03	5.72E-02	6.51E-02
2024	20	0.09	1.45	4.65	2.10E-02	0.16	0.11	0.47	0.53	6.67E-03	1.04E-01	3.34E-01	1.51E-03	1.13E-02	7.67E-03	3.36E-02	3.83E-02
2024	25	0.09	1.38	4.18	2.00E-02	0.16	0.10	0.41	0.47	6.53E-03	9.87E-02	3.00E-01	1.43E-03	1.11E-02	7.46E-03	2.93E-02	3.34E-02
2024	30	0.09	1.33	3.79	1.80E-02	0.16	0.11	0.36	0.41	6.60E-03	9.54E-02	2.72E-01	1.29E-03	1.12E-02	7.53E-03	2.56E-02	2.91E-02
2024	35	0.10	1.31	3.47	1.70E-02	0.16	0.11	0.31	0.36	6.96E-03	9.39E-02	2.49E-01	1.22E-03	1.15E-02	7.89E-03	2.24E-02	2.55E-02
2024	40	0.11	1.31	3.22	1.70E-02	0.17	0.12	0.27	0.31	7.53E-03	9.42E-02	2.31E-01	1.22E-03	1.21E-02	8.46E-03	1.97E-02	2.24E-02
2024	45	0.12	1.34	3.05	1.60E-02	0.18	0.13	0.24	0.28	8.46E-03	9.63E-02	2.19E-01	1.15E-03	1.31E-02	9.25E-03	1.74E-02	1.99E-02
2024	50	0.13	1.40	2.96	1.60E-02	0.20	0.14	0.22	0.25	9.61E-03	1.00E-01	2.12E-01	1.15E-03	1.42E-02	1.03E-02	1.58E-02	1.79E-02
2024	55	0.15	1.48	2.94	1.60E-02	0.22	0.16	0.20	0.23	1.10E-02	1.06E-01	2.11E-01	1.15E-03	1.56E-02	1.16E-02	1.46E-02	1.66E-02
2024	60	0.18	1.58	2.99	1.60E-02	0.24	0.18	0.19	0.22	1.27E-02	1.13E-01	2.14E-01	1.15E-03	1.73E-02	1.32E-02	1.39E-02	1.59E-02
2024	65	0.21	1.71	3.12	1.60E-02	0.27	0.21	0.19	0.22	1.47E-02	1.23E-01	2.24E-01	1.15E-03	1.93E-02	1.50E-02	1.38E-02	1.57E-02
2024	70	0.24	1.87	3.33	1.70E-02	0.30	0.24	0.20	0.23	1.69E-02	1.34E-01	2.39E-01	1.22E-03	2.15E-02	1.71E-02	1.42E-02	1.62E-02
2024	75	0.27	2.05	3.61	1.80E-02	0.33	0.27	0.21	0.24	1.94E-02	1.47E-01	2.59E-01	1.29E-03	2.40E-02	1.94E-02	1.51E-02	1.72E-02
2024	80	0.31	2.25	3.96	1.90E-02	0.37	0.31	0.23	0.26	2.22E-02	1.61E-01	2.84E-01	1.36E-03	2.68E-02	2.19E-02	1.66E-02	1.89E-02

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2025	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	7.23E-03	2.72E+00	8.12E+00	4.14E-03	7.23E-03	6.64E-03	5.03E-01	5.73E-01
2025	1	0.12	5.87	9.57	3.70E-02	0.18	0.13	2.96	3.36	7.69E-03	3.86E-01	6.29E-01	2.43E-03	1.19E-02	8.48E-03	1.94E-01	2.21E-01
2025	2	0.12	5.87	9.57	3.70E-02	0.18	0.13	2.96	3.36	7.69E-03	3.86E-01	6.29E-01	2.43E-03	1.19E-02	8.48E-03	1.94E-01	2.21E-01
2025	3	0.12	5.87	9.57	3.70E-02	0.18	0.13	2.96	3.36	7.69E-03	3.86E-01	6.29E-01	2.43E-03	1.19E-02	8.48E-03	1.94E-01	2.21E-01
2025	4	0.12	5.87	9.57	3.70E-02	0.18	0.13	2.96	3.36	7.69E-03	3.86E-01	6.29E-01	2.43E-03	1.19E-02	8.48E-03	1.94E-01	2.21E-01
2025	5	0.12	5.87	9.57	3.70E-02	0.18	0.13	2.96	3.36	7.69E-03	3.86E-01	6.29E-01	2.43E-03	1.19E-02	8.48E-03	1.94E-01	2.21E-01
2025	10	0.11	3.52	7.17	3.00E-02	0.17	0.12	1.61	1.83	7.04E-03	2.31E-01	4.72E-01	1.97E-03	1.12E-02	7.89E-03	1.06E-01	1.21E-01
2025	15	0.10	2.02	5.46	2.50E-02	0.16	0.11	0.77	0.88	6.45E-03	1.33E-01	3.59E-01	1.64E-03	1.07E-02	7.30E-03	5.07E-02	5.77E-02
2025	20	0.09	1.40	4.46	2.10E-02	0.15	0.10	0.45	0.52	5.85E-03	9.20E-02	2.93E-01	1.38E-03	1.01E-02	6.77E-03	2.98E-02	3.39E-02
2025	25	0.09	1.33	4.01	2.00E-02	0.15	0.10	0.40	0.45	5.72E-03	8.75E-02	2.64E-01	1.32E-03	9.93E-03	6.64E-03	2.60E-02	2.97E-02
2025	30	0.09	1.29	3.63	1.80E-02	0.15	0.10	0.35	0.39	5.79E-03	8.46E-02	2.39E-01	1.18E-03	1.00E-02	6.71E-03	2.27E-02	2.58E-02
2025	35	0.09	1.27	3.32	1.70E-02	0.16	0.11	0.30	0.34	6.12E-03	8.32E-02	2.18E-01	1.12E-03	1.03E-02	7.04E-03	1.98E-02	2.26E-02
2025	40	0.10	1.27	3.09	1.70E-02	0.17	0.11	0.27	0.30	6.64E-03	8.35E-02	2.03E-01	1.12E-03	1.09E-02	7.50E-03	1.74E-02	1.98E-02
2025	45	0.11	1.30	2.92	1.60E-02	0.18	0.13	0.24	0.27	7.43E-03	8.54E-02	1.92E-01	1.05E-03	1.16E-02	8.22E-03	1.55E-02	1.76E-02
2025	50	0.13	1.35	2.83	1.60E-02	0.19	0.14	0.21	0.24	8.48E-03	8.88E-02	1.86E-01	1.05E-03	1.27E-02	9.14E-03	1.39E-02	1.59E-02
2025	55	0.15	1.43	2.81	1.60E-02	0.21	0.16	0.20	0.22	9.73E-03	9.38E-02	1.85E-01	1.05E-03	1.39E-02	1.03E-02	1.30E-02	1.47E-02
2025	60	0.17	1.53	2.87	1.60E-02	0.23	0.18	0.19	0.21	1.12E-02	1.00E-01	1.88E-01	1.05E-03	1.54E-02	1.17E-02	1.24E-02	1.41E-02
2025	65	0.20	1.65	2.99	1.60E-02	0.26	0.20	0.19	0.21	1.30E-02	1.09E-01	1.97E-01	1.05E-03	1.72E-02	1.33E-02	1.22E-02	1.39E-02
2025	70	0.23	1.80	3.19	1.70E-02	0.29	0.23	0.19	0.22	1.49E-02	1.19E-01	2.10E-01	1.12E-03	1.91E-02	1.51E-02	1.26E-02	1.43E-02
2025	75	0.26	1.98	3.46	1.80E-02	0.32	0.26	0.20	0.23	1.71E-02	1.30E-01	2.27E-01	1.18E-03	2.13E-02	1.71E-02	1.34E-02	1.53E-02
2025	80	0.30	2.18	3.80	1.90E-02	0.36	0.29	0.22	0.26	1.95E-02	1.43E-01	2.50E-01	1.25E-03	2.37E-02	1.93E-02	1.47E-02	1.68E-02
2026	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	6.20E-03	2.34E+00	6.96E+00	3.55E-03	6.20E-03	5.69E-03	4.31E-01	4.91E-01
2026	1	0.11	5.65	9.11	3.70E-02	0.18	0.12	2.84	3.24	6.31E-03	3.18E-01	5.13E-01	2.09E-03	9.92E-03	6.99E-03	1.60E-01	1.83E-01
2026	2	0.11	5.65	9.11	3.70E-02	0.18	0.12	2.84	3.24	6.31E-03	3.18E-01	5.13E-01	2.09E-03	9.92E-03	6.99E-03	1.60E-01	1.83E-01
2026	3	0.11	5.65	9.11	3.70E-02	0.18	0.12	2.84	3.24	6.31E-03	3.18E-01	5.13E-01	2.09E-03	9.92E-03	6.99E-03	1.60E-01	1.83E-01
2026	4	0.11	5.65	9.11	3.70E-02	0.18	0.12	2.84	3.24	6.31E-03	3.18E-01	5.13E-01	2.09E-03	9.92E-03	6.99E-03	1.60E-01	1.83E-01
2026	5	0.11	5.65	9.11	3.70E-02	0.18	0.12	2.84	3.24	6.31E-03	3.18E-01	5.13E-01	2.09E-03	9.92E-03	6.99E-03	1.60E-01	1.83E-01
2026	10	0.10	3.38	6.83	3.00E-02	0.17	0.12	1.55	1.77	5.81E-03	1.91E-01	3.85E-01	1.69E-03	9.41E-03	6.48E-03	8.74E-02	9.95E-02
2026	15	0.09	1.94	5.20	2.50E-02	0.16	0.11	0.74	0.85	5.24E-03	1.09E-01	2.93E-01	1.41E-03	8.85E-03	6.03E-03	4.18E-02	4.76E-02
2026	20	0.09	1.35	4.24	2.10E-02	0.15	0.10	0.44	0.50	4.85E-03	7.59E-02	2.39E-01	1.18E-03	8.46E-03	5.64E-03	2.46E-02	2.80E-02
2026	25	0.08	1.28	3.81	2.00E-02	0.15	0.10	0.38	0.43	4.68E-03	7.22E-02	2.15E-01	1.13E-03	8.29E-03	5.52E-03	2.15E-02	2.45E-02
2026	30	0.08	1.24	3.45	1.80E-02	0.15	0.10	0.33	0.38	4.74E-03	6.97E-02	1.95E-01	1.01E-03	8.34E-03	5.58E-03	1.87E-02	2.13E-02
2026	35	0.09	1.22	3.16	1.70E-02	0.15	0.10	0.29	0.33	5.02E-03	6.87E-02	1.78E-01	9.58E-04	8.62E-03	5.81E-03	1.63E-02	1.86E-02
2026	40	0.10	1.22	2.94	1.70E-02	0.16	0.11	0.26	0.29	5.47E-03	6.89E-02	1.66E-01	9.58E-04	9.08E-03	6.20E-03	1.44E-02	1.63E-02
2026	45	0.11	1.25	2.78	1.60E-02	0.17	0.12	0.23	0.26	6.09E-03	7.04E-02	1.57E-01	9.02E-04	9.70E-03	6.82E-03	1.27E-02	1.45E-02
2026	50	0.12	1.30	2.69	1.60E-02	0.19	0.13	0.20	0.23	6.93E-03	7.33E-02	1.52E-01	9.02E-04	1.05E-02	7.55E-03	1.15E-02	1.31E-02
2026	55	0.14	1.37	2.68	1.60E-02	0.21	0.15	0.19	0.22	7.95E-03	7.75E-02	1.51E-01	9.02E-04	1.16E-02	8.51E-03	1.07E-02	1.22E-02
2026	60	0.16	1.47	2.73	1.60E-02	0.23	0.17	0.18	0.21	9.19E-03	8.29E-02	1.54E-01	9.02E-04	1.28E-02	9.64E-03	1.02E-02	1.16E-02
2026	65	0.19	1.59	2.85	1.60E-02	0.25	0.19	0.18	0.20	1.06E-02	8.97E-02	1.60E-01	9.02E-04	1.42E-02	1.09E-02	1.01E-02	1.15E-02
2026	70	0.22	1.74	3.03	1.70E-02	0.28	0.22	0.19	0.21	1.22E-02	9.79E-02	1.71E-01	9.58E-04	1.58E-02	1.24E-02	1.04E-02	1.18E-02
2026	75	0.25	1.90	3.29	1.80E-02	0.31	0.25	0.20	0.22	1.40E-02	1.07E-01	1.85E-01	1.01E-03	1.76E-02	1.40E-02	1.11E-02	1.26E-02
2026	80	0.28	2.09	3.61	1.90E-02	0.35	0.28	0.22	0.25	1.60E-02	1.18E-01	2.04E-01	1.07E-03	1.96E-02	1.59E-02	1.21E-02	1.38E-02
2027	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	5.05E-03	1.90E+00	5.67E+00	2.89E-03	5.05E-03	4.64E-03	3.51E-01	4.00E-01
2027	1	0.11	5.40	8.60	3.70E-02	0.17	0.12	2.72	3.10	4.86E-03	2.48E-01	3.95E-01	1.70E-03	7.80E-03	5.46E-03	1.25E-01	1.42E-01
2027	2	0.11	5.40	8.60	3.70E-02	0.17	0.12	2.72	3.10	4.86E-03	2.48E-01	3.95E-01	1.70E-03	7.80E-03	5.46E-03	1.25E-01	1.42E-01

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2027	3	0.11	5.40	8.60	3.70E-02	0.17	0.12	2.72	3.10	4.86E-03	2.48E-01	3.95E-01	1.70E-03	7.80E-03	5.46E-03	1.25E-01	1.42E-01
2027	4	0.11	5.40	8.60	3.70E-02	0.17	0.12	2.72	3.10	4.86E-03	2.48E-01	3.95E-01	1.70E-03	7.80E-03	5.46E-03	1.25E-01	1.42E-01
2027	5	0.11	5.40	8.60	3.70E-02	0.17	0.12	2.72	3.10	4.86E-03	2.48E-01	3.95E-01	1.70E-03	7.80E-03	5.46E-03	1.25E-01	1.42E-01
2027	10	0.10	3.24	6.45	3.00E-02	0.16	0.11	1.49	1.69	4.45E-03	1.49E-01	2.96E-01	1.38E-03	7.39E-03	5.09E-03	6.82E-02	7.76E-02
2027	15	0.09	1.86	4.91	2.50E-02	0.15	0.10	0.71	0.81	4.08E-03	8.52E-02	2.25E-01	1.15E-03	7.02E-03	4.73E-03	3.26E-02	3.71E-02
2027	20	0.08	1.29	4.01	2.10E-02	0.15	0.10	0.42	0.48	3.72E-03	5.92E-02	1.84E-01	9.64E-04	6.65E-03	4.41E-03	1.92E-02	2.18E-02
2027	25	0.08	1.23	3.60	2.00E-02	0.14	0.09	0.37	0.42	3.63E-03	5.62E-02	1.65E-01	9.18E-04	6.56E-03	4.31E-03	1.68E-02	1.90E-02
2027	30	0.08	1.18	3.26	1.80E-02	0.14	0.10	0.32	0.36	3.67E-03	5.43E-02	1.50E-01	8.26E-04	6.61E-03	4.36E-03	1.46E-02	1.66E-02
2027	35	0.08	1.17	2.99	1.70E-02	0.15	0.10	0.28	0.32	3.86E-03	5.35E-02	1.37E-01	7.80E-04	6.79E-03	4.54E-03	1.28E-02	1.45E-02
2027	40	0.09	1.17	2.77	1.70E-02	0.16	0.11	0.24	0.28	4.22E-03	5.37E-02	1.27E-01	7.80E-04	7.16E-03	4.86E-03	1.12E-02	1.28E-02
2027	45	0.10	1.20	2.63	1.60E-02	0.17	0.12	0.22	0.25	4.73E-03	5.49E-02	1.21E-01	7.34E-04	7.66E-03	5.32E-03	9.96E-03	1.13E-02
2027	50	0.12	1.24	2.55	1.60E-02	0.18	0.13	0.20	0.22	5.37E-03	5.71E-02	1.17E-01	7.34E-04	8.31E-03	5.87E-03	9.00E-03	1.02E-02
2027	55	0.13	1.32	2.53	1.60E-02	0.20	0.14	0.18	0.21	6.15E-03	6.04E-02	1.16E-01	7.34E-04	9.09E-03	6.61E-03	8.31E-03	9.45E-03
2027	60	0.16	1.41	2.58	1.60E-02	0.22	0.16	0.17	0.20	7.11E-03	6.46E-02	1.18E-01	7.34E-04	1.01E-02	7.48E-03	7.94E-03	9.04E-03
2027	65	0.18	1.52	2.69	1.60E-02	0.24	0.19	0.17	0.20	8.17E-03	6.99E-02	1.23E-01	7.34E-04	1.11E-02	8.49E-03	7.89E-03	9.00E-03
2027	70	0.21	1.66	2.87	1.70E-02	0.27	0.21	0.18	0.20	9.41E-03	7.62E-02	1.31E-01	7.80E-04	1.23E-02	9.64E-03	8.12E-03	9.23E-03
2027	75	0.24	1.82	3.11	1.80E-02	0.30	0.24	0.19	0.21	1.08E-02	8.36E-02	1.43E-01	8.26E-04	1.38E-02	1.09E-02	8.63E-03	9.82E-03
2027	80	0.27	2.00	3.41	1.90E-02	0.33	0.27	0.21	0.24	1.23E-02	9.20E-02	1.57E-01	8.72E-04	1.53E-02	1.23E-02	9.45E-03	1.08E-02
2028	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	3.95E-03	1.49E+00	4.44E+00	2.26E-03	3.95E-03	3.63E-03	2.75E-01	3.13E-01
2028	1	0.10	5.14	8.05	3.70E-02	0.16	0.11	2.59	2.95	3.59E-03	1.85E-01	2.89E-01	1.33E-03	5.89E-03	4.06E-03	9.30E-02	1.06E-01
2028	2	0.10	5.14	8.05	3.70E-02	0.16	0.11	2.59	2.95	3.59E-03	1.85E-01	2.89E-01	1.33E-03	5.89E-03	4.06E-03	9.30E-02	1.06E-01
2028	3	0.10	5.14	8.05	3.70E-02	0.16	0.11	2.59	2.95	3.59E-03	1.85E-01	2.89E-01	1.33E-03	5.89E-03	4.06E-03	9.30E-02	1.06E-01
2028	4	0.10	5.14	8.05	3.70E-02	0.16	0.11	2.59	2.95	3.59E-03	1.85E-01	2.89E-01	1.33E-03	5.89E-03	4.06E-03	9.30E-02	1.06E-01
2028	5	0.10	5.14	8.05	3.70E-02	0.16	0.11	2.59	2.95	3.59E-03	1.85E-01	2.89E-01	1.33E-03	5.89E-03	4.06E-03	9.30E-02	1.06E-01
2028	10	0.09	3.08	6.04	3.00E-02	0.16	0.11	1.41	1.61	3.30E-03	1.11E-01	2.17E-01	1.08E-03	5.60E-03	3.77E-03	5.07E-02	5.77E-02
2028	15	0.08	1.77	4.60	2.50E-02	0.15	0.10	0.68	0.77	2.98E-03	6.34E-02	1.65E-01	8.98E-04	5.28E-03	3.52E-03	2.43E-02	2.77E-02
2028	20	0.08	1.23	3.75	2.10E-02	0.14	0.09	0.40	0.45	2.73E-03	4.40E-02	1.35E-01	7.54E-04	5.03E-03	3.27E-03	1.43E-02	1.63E-02
2028	25	0.07	1.17	3.37	2.00E-02	0.14	0.09	0.35	0.40	2.66E-03	4.19E-02	1.21E-01	7.18E-04	4.96E-03	3.20E-03	1.25E-02	1.42E-02
2028	30	0.08	1.13	3.05	1.80E-02	0.14	0.09	0.30	0.34	2.69E-03	4.05E-02	1.10E-01	6.46E-04	4.99E-03	3.23E-03	1.09E-02	1.24E-02
2028	35	0.08	1.11	2.80	1.70E-02	0.14	0.09	0.26	0.30	2.87E-03	3.98E-02	1.00E-01	6.10E-04	5.17E-03	3.38E-03	9.48E-03	1.08E-02
2028	40	0.09	1.11	2.60	1.70E-02	0.15	0.10	0.23	0.26	3.12E-03	4.00E-02	9.33E-02	6.10E-04	5.42E-03	3.63E-03	8.33E-03	9.48E-03
2028	45	0.10	1.14	2.46	1.60E-02	0.16	0.11	0.21	0.24	3.48E-03	4.08E-02	8.83E-02	5.75E-04	5.78E-03	3.95E-03	7.40E-03	8.44E-03
2028	50	0.11	1.18	2.38	1.60E-02	0.17	0.12	0.19	0.21	3.95E-03	4.25E-02	8.55E-02	5.75E-04	6.25E-03	4.38E-03	6.68E-03	7.61E-03
2028	55	0.13	1.25	2.37	1.60E-02	0.19	0.14	0.17	0.20	4.52E-03	4.49E-02	8.50E-02	5.75E-04	6.82E-03	4.92E-03	6.18E-03	7.04E-03
2028	60	0.15	1.34	2.41	1.60E-02	0.21	0.16	0.17	0.19	5.24E-03	4.81E-02	8.66E-02	5.75E-04	7.54E-03	5.57E-03	5.93E-03	6.75E-03
2028	65	0.17	1.45	2.52	1.60E-02	0.23	0.18	0.16	0.19	6.03E-03	5.20E-02	9.04E-02	5.75E-04	8.33E-03	6.32E-03	5.85E-03	6.68E-03
2028	70	0.19	1.58	2.68	1.70E-02	0.26	0.20	0.17	0.19	6.97E-03	5.67E-02	9.63E-02	6.10E-04	9.26E-03	7.15E-03	6.03E-03	6.89E-03
2028	75	0.22	1.73	2.91	1.80E-02	0.29	0.23	0.18	0.20	7.97E-03	6.22E-02	1.04E-01	6.46E-04	1.03E-02	8.08E-03	6.43E-03	7.33E-03
2028	80	0.25	1.91	3.20	1.90E-02	0.32	0.25	0.20	0.22	9.12E-03	6.84E-02	1.15E-01	6.82E-04	1.14E-02	9.12E-03	7.04E-03	8.01E-03
2029	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	2.84E-03	1.07E+00	3.19E+00	1.63E-03	2.84E-03	2.61E-03	1.98E-01	2.25E-01
2029	1	0.09	4.85	7.45	3.70E-02	0.16	0.11	2.45	2.79	2.43E-03	1.25E-01	1.93E-01	9.56E-04	4.08E-03	2.76E-03	6.33E-02	7.20E-02
2029	2	0.09	4.85	7.45	3.70E-02	0.16	0.11	2.45	2.79	2.43E-03	1.25E-01	1.93E-01	9.56E-04	4.08E-03	2.76E-03	6.33E-02	7.20E-02
2029	3	0.09	4.85	7.45	3.70E-02	0.16	0.11	2.45	2.79	2.43E-03	1.25E-01	1.93E-01	9.56E-04	4.08E-03	2.76E-03	6.33E-02	7.20E-02
2029	4	0.09	4.85	7.45	3.70E-02	0.16	0.11	2.45	2.79	2.43E-03	1.25E-01	1.93E-01	9.56E-04	4.08E-03	2.76E-03	6.33E-02	7.20E-02
2029	5	0.09	4.85	7.45	3.70E-02	0.16	0.11	2.45	2.79	2.43E-03	1.25E-01	1.93E-01	9.56E-04	4.08E-03	2.76E-03	6.33E-02	7.20E-02

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2029	10	0.09	2.91	5.59	3.00E-02	0.15	0.10	1.34	1.52	2.22E-03	7.52E-02	1.44E-01	7.75E-04	3.88E-03	2.58E-03	3.45E-02	3.93E-02
2029	15	0.08	1.67	4.26	2.50E-02	0.14	0.09	0.64	0.73	2.02E-03	4.31E-02	1.10E-01	6.46E-04	3.67E-03	2.40E-03	1.65E-02	1.88E-02
2029	20	0.07	1.16	3.47	2.10E-02	0.14	0.09	0.38	0.43	1.83E-03	2.99E-02	8.98E-02	5.43E-04	3.49E-03	2.25E-03	9.72E-03	1.11E-02
2029	25	0.07	1.10	3.12	2.00E-02	0.13	0.09	0.33	0.37	1.78E-03	2.84E-02	8.07E-02	5.17E-04	3.44E-03	2.20E-03	8.48E-03	9.64E-03
2029	30	0.07	1.06	2.83	1.80E-02	0.13	0.09	0.29	0.33	1.81E-03	2.75E-02	7.30E-02	4.65E-04	3.46E-03	2.22E-03	7.39E-03	8.40E-03
2029	35	0.07	1.05	2.59	1.70E-02	0.14	0.09	0.25	0.28	1.91E-03	2.71E-02	6.68E-02	4.39E-04	3.57E-03	2.30E-03	6.46E-03	7.34E-03
2029	40	0.08	1.05	2.40	1.70E-02	0.15	0.10	0.22	0.25	2.09E-03	2.72E-02	6.21E-02	4.39E-04	3.75E-03	2.45E-03	5.66E-03	6.46E-03
2029	45	0.09	1.07	2.28	1.60E-02	0.15	0.10	0.20	0.22	2.33E-03	2.78E-02	5.88E-02	4.13E-04	3.98E-03	2.69E-03	5.04E-03	5.74E-03
2029	50	0.10	1.12	2.21	1.60E-02	0.17	0.12	0.18	0.20	2.66E-03	2.89E-02	5.70E-02	4.13E-04	4.32E-03	2.97E-03	4.55E-03	5.17E-03
2029	55	0.12	1.18	2.19	1.60E-02	0.18	0.13	0.16	0.19	3.05E-03	3.05E-02	5.66E-02	4.13E-04	4.70E-03	3.33E-03	4.21E-03	4.81E-03
2029	60	0.14	1.27	2.23	1.60E-02	0.20	0.15	0.16	0.18	3.51E-03	3.27E-02	5.77E-02	4.13E-04	5.17E-03	3.77E-03	4.03E-03	4.57E-03
2029	65	0.16	1.37	2.33	1.60E-02	0.22	0.17	0.15	0.18	4.06E-03	3.54E-02	6.02E-02	4.13E-04	5.71E-03	4.26E-03	3.98E-03	4.55E-03
2029	70	0.18	1.49	2.48	1.70E-02	0.25	0.19	0.16	0.18	4.68E-03	3.86E-02	6.42E-02	4.39E-04	6.33E-03	4.83E-03	4.11E-03	4.68E-03
2029	75	0.21	1.64	2.69	1.80E-02	0.27	0.21	0.17	0.19	5.35E-03	4.23E-02	6.96E-02	4.65E-04	7.00E-03	5.48E-03	4.37E-03	4.99E-03
2029	80	0.24	1.80	2.96	1.90E-02	0.30	0.24	0.19	0.21	6.12E-03	4.65E-02	7.65E-02	4.91E-04	7.78E-03	6.18E-03	4.78E-03	5.45E-03
2030	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	1.78E-03	6.72E-01	2.00E+00	1.02E-03	1.78E-03	1.64E-03	1.24E-01	1.41E-01
2030	1	0.09	4.55	6.81	3.70E-02	0.15	0.10	2.29	2.61	1.39E-03	7.37E-02	1.10E-01	6.00E-04	2.43E-03	1.62E-03	3.72E-02	4.24E-02
2030	2	0.09	4.55	6.81	3.70E-02	0.15	0.10	2.29	2.61	1.39E-03	7.37E-02	1.10E-01	6.00E-04	2.43E-03	1.62E-03	3.72E-02	4.24E-02
2030	3	0.09	4.55	6.81	3.70E-02	0.15	0.10	2.29	2.61	1.39E-03	7.37E-02	1.10E-01	6.00E-04	2.43E-03	1.62E-03	3.72E-02	4.24E-02
2030	4	0.09	4.55	6.81	3.70E-02	0.15	0.10	2.29	2.61	1.39E-03	7.37E-02	1.10E-01	6.00E-04	2.43E-03	1.62E-03	3.72E-02	4.24E-02
2030	5	0.09	4.55	6.81	3.70E-02	0.15	0.10	2.29	2.61	1.39E-03	7.37E-02	1.10E-01	6.00E-04	2.43E-03	1.62E-03	3.72E-02	4.24E-02
2030	10	0.08	2.73	5.11	3.00E-02	0.14	0.09	1.25	1.42	1.28E-03	4.42E-02	8.28E-02	4.86E-04	2.32E-03	1.52E-03	2.03E-02	2.31E-02
2030	15	0.07	1.56	3.89	2.50E-02	0.14	0.09	0.60	0.68	1.17E-03	2.53E-02	6.31E-02	4.05E-04	2.21E-03	1.41E-03	9.71E-03	1.10E-02
2030	20	0.07	1.08	3.18	2.10E-02	0.13	0.08	0.35	0.40	1.07E-03	1.76E-02	5.15E-02	3.41E-04	2.11E-03	1.33E-03	5.71E-03	6.50E-03
2030	25	0.06	1.03	2.85	2.00E-02	0.13	0.08	0.31	0.35	1.04E-03	1.67E-02	4.63E-02	3.24E-04	2.08E-03	1.30E-03	4.98E-03	5.68E-03
2030	30	0.07	1.00	2.58	1.80E-02	0.13	0.08	0.27	0.31	1.05E-03	1.62E-02	4.19E-02	2.92E-04	2.09E-03	1.31E-03	4.35E-03	4.95E-03
2030	35	0.07	0.98	2.36	1.70E-02	0.13	0.08	0.23	0.27	1.10E-03	1.59E-02	3.83E-02	2.76E-04	2.14E-03	1.36E-03	3.79E-03	4.31E-03
2030	40	0.08	0.98	2.20	1.70E-02	0.14	0.09	0.21	0.23	1.22E-03	1.60E-02	3.56E-02	2.76E-04	2.25E-03	1.46E-03	3.32E-03	3.79E-03
2030	45	0.08	1.01	2.08	1.60E-02	0.15	0.10	0.18	0.21	1.35E-03	1.63E-02	3.37E-02	2.59E-04	2.38E-03	1.59E-03	2.95E-03	3.37E-03
2030	50	0.10	1.05	2.02	1.60E-02	0.16	0.11	0.17	0.19	1.54E-03	1.70E-02	3.27E-02	2.59E-04	2.58E-03	1.75E-03	2.68E-03	3.05E-03
2030	55	0.11	1.11	2.00	1.60E-02	0.17	0.12	0.15	0.17	1.77E-03	1.79E-02	3.25E-02	2.59E-04	2.81E-03	1.96E-03	2.48E-03	2.82E-03
2030	60	0.13	1.19	2.04	1.60E-02	0.19	0.14	0.15	0.17	2.03E-03	1.92E-02	3.31E-02	2.59E-04	3.06E-03	2.21E-03	2.37E-03	2.69E-03
2030	65	0.15	1.28	2.13	1.60E-02	0.21	0.15	0.15	0.17	2.35E-03	2.08E-02	3.45E-02	2.59E-04	3.39E-03	2.50E-03	2.35E-03	2.68E-03
2030	70	0.17	1.40	2.27	1.70E-02	0.23	0.17	0.15	0.17	2.71E-03	2.27E-02	3.68E-02	2.76E-04	3.75E-03	2.82E-03	2.42E-03	2.76E-03
2030	75	0.19	1.53	2.46	1.80E-02	0.26	0.20	0.16	0.18	3.10E-03	2.49E-02	3.99E-02	2.92E-04	4.13E-03	3.19E-03	2.58E-03	2.93E-03
2030	80	0.22	1.69	2.70	1.90E-02	0.28	0.22	0.17	0.20	3.53E-03	2.73E-02	4.38E-02	3.08E-04	4.57E-03	3.60E-03	2.82E-03	3.21E-03
2031	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	9.75E-04	3.67E-01	1.09E+00	5.58E-04	9.75E-04	8.95E-04	6.78E-02	7.72E-02
2031	1	0.08	4.22	6.13	3.70E-02	0.14	0.09	2.13	2.43	7.00E-04	3.74E-02	5.43E-02	3.28E-04	1.27E-03	8.24E-04	1.89E-02	2.15E-02
2031	2	0.08	4.22	6.13	3.70E-02	0.14	0.09	2.13	2.43	7.00E-04	3.74E-02	5.43E-02	3.28E-04	1.27E-03	8.24E-04	1.89E-02	2.15E-02
2031	3	0.08	4.22	6.13	3.70E-02	0.14	0.09	2.13	2.43	7.00E-04	3.74E-02	5.43E-02	3.28E-04	1.27E-03	8.24E-04	1.89E-02	2.15E-02
2031	4	0.08	4.22	6.13	3.70E-02	0.14	0.09	2.13	2.43	7.00E-04	3.74E-02	5.43E-02	3.28E-04	1.27E-03	8.24E-04	1.89E-02	2.15E-02
2031	5	0.08	4.22	6.13	3.70E-02	0.14	0.09	2.13	2.43	7.00E-04	3.74E-02	5.43E-02	3.28E-04	1.27E-03	8.24E-04	1.89E-02	2.15E-02
2031	10	0.07	2.53	4.60	3.00E-02	0.14	0.09	1.16	1.32	6.38E-04	2.24E-02	4.07E-02	2.66E-04	1.21E-03	7.71E-04	1.03E-02	1.17E-02
2031	15	0.07	1.45	3.50	2.50E-02	0.13	0.08	0.56	0.63	5.76E-04	1.28E-02	3.10E-02	2.22E-04	1.14E-03	7.18E-04	4.93E-03	5.61E-03
2031	20	0.06	1.01	2.86	2.10E-02	0.12	0.08	0.33	0.37	5.32E-04	8.91E-03	2.53E-02	1.86E-04	1.10E-03	6.73E-04	2.90E-03	3.30E-03

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2031	25	0.06	0.96	2.57	2.00E-02	0.12	0.08	0.29	0.33	5.14E-04	8.48E-03	2.27E-02	1.77E-04	1.08E-03	6.65E-04	2.53E-03	2.88E-03
2031	30	0.06	0.93	2.32	1.80E-02	0.12	0.08	0.25	0.28	5.23E-04	8.20E-03	2.06E-02	1.60E-04	1.09E-03	6.65E-04	2.21E-03	2.51E-03
2031	35	0.06	0.91	2.13	1.70E-02	0.13	0.08	0.22	0.25	5.49E-04	8.06E-03	1.88E-02	1.51E-04	1.12E-03	6.91E-04	1.92E-03	2.19E-03
2031	40	0.07	0.91	1.98	1.70E-02	0.13	0.08	0.19	0.22	6.03E-04	8.09E-03	1.75E-02	1.51E-04	1.17E-03	7.44E-04	1.69E-03	1.92E-03
2031	45	0.08	0.93	1.87	1.60E-02	0.14	0.09	0.17	0.19	6.73E-04	8.28E-03	1.66E-02	1.42E-04	1.24E-03	8.06E-04	1.50E-03	1.71E-03
2031	50	0.09	0.97	1.81	1.60E-02	0.15	0.10	0.15	0.17	7.62E-04	8.61E-03	1.61E-02	1.42E-04	1.33E-03	8.86E-04	1.36E-03	1.54E-03
2031	55	0.10	1.03	1.80	1.60E-02	0.16	0.11	0.14	0.16	8.77E-04	9.10E-03	1.60E-02	1.42E-04	1.44E-03	9.93E-04	1.26E-03	1.43E-03
2031	60	0.11	1.10	1.84	1.60E-02	0.18	0.13	0.14	0.15	1.01E-03	9.75E-03	1.63E-02	1.42E-04	1.58E-03	1.12E-03	1.21E-03	1.36E-03
2031	65	0.13	1.19	1.92	1.60E-02	0.20	0.14	0.13	0.15	1.17E-03	1.05E-02	1.70E-02	1.42E-04	1.74E-03	1.26E-03	1.19E-03	1.36E-03
2031	70	0.15	1.30	2.04	1.70E-02	0.22	0.16	0.14	0.16	1.35E-03	1.15E-02	1.81E-02	1.51E-04	1.91E-03	1.43E-03	1.22E-03	1.39E-03
2031	75	0.17	1.42	2.21	1.80E-02	0.24	0.18	0.15	0.17	1.54E-03	1.26E-02	1.96E-02	1.60E-04	2.11E-03	1.60E-03	1.30E-03	1.49E-03
2031	80	0.20	1.57	2.43	1.90E-02	0.26	0.20	0.16	0.18	1.76E-03	1.39E-02	2.16E-02	1.68E-04	2.33E-03	1.81E-03	1.43E-03	1.63E-03
2032	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	6.76E-04	2.55E-01	7.60E-01	3.87E-04	6.76E-04	6.21E-04	4.71E-02	5.36E-02
2032	1	0.07	3.88	5.41	3.70E-02	0.14	0.09	1.96	2.23	4.37E-04	2.38E-02	3.33E-02	2.28E-04	8.30E-04	5.29E-04	1.20E-02	1.37E-02
2032	2	0.07	3.88	5.41	3.70E-02	0.14	0.09	1.96	2.23	4.37E-04	2.38E-02	3.33E-02	2.28E-04	8.30E-04	5.29E-04	1.20E-02	1.37E-02
2032	3	0.07	3.88	5.41	3.70E-02	0.14	0.09	1.96	2.23	4.37E-04	2.38E-02	3.33E-02	2.28E-04	8.30E-04	5.29E-04	1.20E-02	1.37E-02
2032	4	0.07	3.88	5.41	3.70E-02	0.14	0.09	1.96	2.23	4.37E-04	2.38E-02	3.33E-02	2.28E-04	8.30E-04	5.29E-04	1.20E-02	1.37E-02
2032	5	0.07	3.88	5.41	3.70E-02	0.14	0.09	1.96	2.23	4.37E-04	2.38E-02	3.33E-02	2.28E-04	8.30E-04	5.29E-04	1.20E-02	1.37E-02
2032	10	0.07	2.32	4.06	3.00E-02	0.13	0.08	1.07	1.22	4.00E-04	1.43E-02	2.49E-02	1.84E-04	7.93E-04	4.92E-04	6.56E-03	7.47E-03
2032	15	0.06	1.33	3.09	2.50E-02	0.12	0.08	0.51	0.58	3.63E-04	8.19E-03	1.90E-02	1.54E-04	7.56E-04	4.61E-04	3.14E-03	3.57E-03
2032	20	0.05	0.92	2.52	2.10E-02	0.12	0.07	0.30	0.34	3.32E-04	5.68E-03	1.55E-02	1.29E-04	7.26E-04	4.37E-04	1.84E-03	2.10E-03
2032	25	0.05	0.88	2.27	2.00E-02	0.12	0.07	0.26	0.30	3.20E-04	5.40E-03	1.39E-02	1.23E-04	7.13E-04	4.24E-04	1.61E-03	1.83E-03
2032	30	0.05	0.85	2.05	1.80E-02	0.12	0.07	0.23	0.26	3.26E-04	5.22E-03	1.26E-02	1.11E-04	7.19E-04	4.30E-04	1.41E-03	1.60E-03
2032	35	0.06	0.84	1.88	1.70E-02	0.12	0.07	0.20	0.23	3.44E-04	5.14E-03	1.15E-02	1.05E-04	7.38E-04	4.43E-04	1.23E-03	1.40E-03
2032	40	0.06	0.84	1.75	1.70E-02	0.13	0.08	0.18	0.20	3.75E-04	5.16E-03	1.07E-02	1.05E-04	7.69E-04	4.73E-04	1.08E-03	1.23E-03
2032	45	0.07	0.86	1.65	1.60E-02	0.13	0.08	0.16	0.18	4.18E-04	5.28E-03	1.02E-02	9.84E-05	8.12E-04	5.17E-04	9.59E-04	1.09E-03
2032	50	0.08	0.89	1.60	1.60E-02	0.14	0.09	0.14	0.16	4.73E-04	5.48E-03	9.84E-03	9.84E-05	8.67E-04	5.66E-04	8.67E-04	9.84E-04
2032	55	0.09	0.94	1.59	1.60E-02	0.15	0.10	0.13	0.15	5.47E-04	5.80E-03	9.78E-03	9.84E-05	9.41E-04	6.33E-04	7.99E-04	9.10E-04
2032	60	0.10	1.01	1.62	1.60E-02	0.17	0.12	0.13	0.14	6.33E-04	6.21E-03	9.96E-03	9.84E-05	1.03E-03	7.07E-04	7.69E-04	8.73E-04
2032	65	0.12	1.09	1.69	1.60E-02	0.18	0.13	0.12	0.14	7.26E-04	6.72E-03	1.04E-02	9.84E-05	1.12E-03	7.99E-04	7.56E-04	8.67E-04
2032	70	0.14	1.19	1.80	1.70E-02	0.20	0.15	0.13	0.15	8.36E-04	7.32E-03	1.11E-02	1.05E-04	1.23E-03	8.98E-04	7.81E-04	8.92E-04
2032	75	0.16	1.31	1.95	1.80E-02	0.22	0.17	0.14	0.15	9.59E-04	8.03E-03	1.20E-02	1.11E-04	1.35E-03	1.01E-03	8.30E-04	9.47E-04
2032	80	0.18	1.44	2.15	1.90E-02	0.24	0.19	0.15	0.17	1.09E-03	8.84E-03	1.32E-02	1.17E-04	1.49E-03	1.14E-03	9.10E-04	1.04E-03
2033	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	6.27E-04	2.36E-01	7.05E-01	3.59E-04	6.27E-04	5.76E-04	4.36E-02	4.97E-02
2033	1	0.06	3.52	4.67	3.70E-02	0.13	0.08	1.78	2.03	3.54E-04	2.01E-02	2.66E-02	2.11E-04	7.19E-04	4.45E-04	1.01E-02	1.16E-02
2033	2	0.06	3.52	4.67	3.70E-02	0.13	0.08	1.78	2.03	3.54E-04	2.01E-02	2.66E-02	2.11E-04	7.19E-04	4.45E-04	1.01E-02	1.16E-02
2033	3	0.06	3.52	4.67	3.70E-02	0.13	0.08	1.78	2.03	3.54E-04	2.01E-02	2.66E-02	2.11E-04	7.19E-04	4.45E-04	1.01E-02	1.16E-02
2033	4	0.06	3.52	4.67	3.70E-02	0.13	0.08	1.78	2.03	3.54E-04	2.01E-02	2.66E-02	2.11E-04	7.19E-04	4.45E-04	1.01E-02	1.16E-02
2033	5	0.06	3.52	4.67	3.70E-02	0.13	0.08	1.78	2.03	3.54E-04	2.01E-02	2.66E-02	2.11E-04	7.19E-04	4.45E-04	1.01E-02	1.16E-02
2033	10	0.06	2.11	3.50	3.00E-02	0.12	0.07	0.97	1.10	3.25E-04	1.20E-02	2.00E-02	1.71E-04	6.90E-04	4.16E-04	5.53E-03	6.30E-03
2033	15	0.05	1.21	2.67	2.50E-02	0.12	0.07	0.46	0.53	2.97E-04	6.90E-03	1.52E-02	1.43E-04	6.62E-04	3.94E-04	2.65E-03	3.01E-03
2033	20	0.05	0.84	2.18	2.10E-02	0.11	0.07	0.27	0.31	2.68E-04	4.79E-03	1.24E-02	1.20E-04	6.33E-04	3.71E-04	1.56E-03	1.77E-03
2033	25	0.05	0.80	1.96	2.00E-02	0.11	0.06	0.24	0.27	2.62E-04	4.55E-03	1.12E-02	1.14E-04	6.27E-04	3.59E-04	1.36E-03	1.55E-03
2033	30	0.05	0.77	1.77	1.80E-02	0.11	0.06	0.21	0.24	2.68E-04	4.40E-03	1.01E-02	1.03E-04	6.33E-04	3.65E-04	1.19E-03	1.35E-03
2033	35	0.05	0.76	1.62	1.70E-02	0.11	0.07	0.18	0.21	2.79E-04	4.33E-03	9.24E-03	9.70E-05	6.45E-04	3.76E-04	1.03E-03	1.18E-03

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2033	40	0.05	0.76	1.51	1.70E-02	0.12	0.07	0.16	0.18	3.08E-04	4.35E-03	8.58E-03	9.70E-05	6.73E-04	3.99E-04	9.07E-04	1.03E-03
2033	45	0.06	0.78	1.43	1.60E-02	0.12	0.08	0.14	0.16	3.42E-04	4.44E-03	8.13E-03	9.13E-05	7.07E-04	4.33E-04	8.04E-04	9.18E-04
2033	50	0.07	0.81	1.38	1.60E-02	0.13	0.08	0.13	0.15	3.88E-04	4.62E-03	7.88E-03	9.13E-05	7.53E-04	4.79E-04	7.30E-04	8.33E-04
2033	55	0.08	0.86	1.37	1.60E-02	0.14	0.09	0.12	0.14	4.45E-04	4.88E-03	7.82E-03	9.13E-05	8.10E-04	5.30E-04	6.73E-04	7.70E-04
2033	60	0.09	0.92	1.40	1.60E-02	0.15	0.10	0.11	0.13	5.13E-04	5.23E-03	7.97E-03	9.13E-05	8.78E-04	5.93E-04	6.45E-04	7.36E-04
2033	65	0.10	0.99	1.46	1.60E-02	0.17	0.12	0.11	0.13	5.93E-04	5.66E-03	8.32E-03	9.13E-05	9.58E-04	6.67E-04	6.39E-04	7.30E-04
2033	70	0.12	1.08	1.55	1.70E-02	0.18	0.13	0.12	0.13	6.84E-04	6.17E-03	8.86E-03	9.70E-05	1.05E-03	7.47E-04	6.56E-04	7.47E-04
2033	75	0.14	1.19	1.69	1.80E-02	0.20	0.15	0.12	0.14	7.87E-04	6.76E-03	9.62E-03	1.03E-04	1.15E-03	8.44E-04	7.02E-04	7.99E-04
2033	80	0.16	1.31	1.85	1.90E-02	0.22	0.17	0.14	0.15	8.96E-04	7.44E-03	1.06E-02	1.08E-04	1.26E-03	9.47E-04	7.70E-04	8.73E-04
2034	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	5.27E-04	1.98E-01	5.91E-01	3.02E-04	5.27E-04	4.83E-04	3.66E-02	4.17E-02
2034	1	0.05	3.16	3.91	3.70E-02	0.12	0.07	1.60	1.82	2.58E-04	1.51E-02	1.87E-02	1.77E-04	5.65E-04	3.35E-04	7.65E-03	8.71E-03
2034	2	0.05	3.16	3.91	3.70E-02	0.12	0.07	1.60	1.82	2.58E-04	1.51E-02	1.87E-02	1.77E-04	5.65E-04	3.35E-04	7.65E-03	8.71E-03
2034	3	0.05	3.16	3.91	3.70E-02	0.12	0.07	1.60	1.82	2.58E-04	1.51E-02	1.87E-02	1.77E-04	5.65E-04	3.35E-04	7.65E-03	8.71E-03
2034	4	0.05	3.16	3.91	3.70E-02	0.12	0.07	1.60	1.82	2.58E-04	1.51E-02	1.87E-02	1.77E-04	5.65E-04	3.35E-04	7.65E-03	8.71E-03
2034	5	0.05	3.16	3.91	3.70E-02	0.12	0.07	1.60	1.82	2.58E-04	1.51E-02	1.87E-02	1.77E-04	5.65E-04	3.35E-04	7.65E-03	8.71E-03
2034	10	0.05	1.89	2.93	3.00E-02	0.11	0.07	0.87	0.99	2.35E-04	9.07E-03	1.40E-02	1.44E-04	5.41E-04	3.16E-04	4.17E-03	4.75E-03
2034	15	0.05	1.09	2.24	2.50E-02	0.11	0.06	0.42	0.48	2.15E-04	5.20E-03	1.07E-02	1.20E-04	5.22E-04	2.97E-04	2.00E-03	2.27E-03
2034	20	0.04	0.75	1.82	2.10E-02	0.11	0.06	0.25	0.28	1.96E-04	3.60E-03	8.73E-03	1.01E-04	5.03E-04	2.82E-04	1.17E-03	1.34E-03
2034	25	0.04	0.72	1.64	2.00E-02	0.10	0.06	0.21	0.24	1.91E-04	3.43E-03	7.85E-03	9.57E-05	4.98E-04	2.78E-04	1.02E-03	1.17E-03
2034	30	0.04	0.69	1.48	1.80E-02	0.10	0.06	0.19	0.21	1.91E-04	3.31E-03	7.10E-03	8.62E-05	4.98E-04	2.78E-04	8.95E-04	1.01E-03
2034	35	0.04	0.68	1.36	1.70E-02	0.11	0.06	0.16	0.19	2.06E-04	3.26E-03	6.50E-03	8.14E-05	5.12E-04	2.87E-04	7.80E-04	8.90E-04
2034	40	0.05	0.68	1.26	1.70E-02	0.11	0.06	0.14	0.16	2.20E-04	3.27E-03	6.04E-03	8.14E-05	5.27E-04	3.06E-04	6.85E-04	7.80E-04
2034	45	0.05	0.70	1.20	1.60E-02	0.12	0.07	0.13	0.15	2.49E-04	3.35E-03	5.72E-03	7.66E-05	5.55E-04	3.30E-04	6.08E-04	6.94E-04
2034	50	0.06	0.73	1.16	1.60E-02	0.12	0.08	0.12	0.13	2.82E-04	3.48E-03	5.54E-03	7.66E-05	5.89E-04	3.59E-04	5.51E-04	6.27E-04
2034	55	0.07	0.77	1.15	1.60E-02	0.13	0.08	0.11	0.12	3.26E-04	3.68E-03	5.51E-03	7.66E-05	6.32E-04	3.97E-04	5.07E-04	5.79E-04
2034	60	0.08	0.82	1.17	1.60E-02	0.14	0.09	0.10	0.12	3.73E-04	3.94E-03	5.61E-03	7.66E-05	6.80E-04	4.45E-04	4.88E-04	5.55E-04
2034	65	0.09	0.89	1.22	1.60E-02	0.15	0.10	0.10	0.12	4.31E-04	4.27E-03	5.85E-03	7.66E-05	7.37E-04	4.98E-04	4.83E-04	5.51E-04
2034	70	0.10	0.97	1.30	1.70E-02	0.17	0.12	0.10	0.12	4.98E-04	4.65E-03	6.24E-03	8.14E-05	8.04E-04	5.55E-04	4.98E-04	5.65E-04
2034	75	0.12	1.07	1.41	1.80E-02	0.18	0.13	0.11	0.13	5.70E-04	5.10E-03	6.77E-03	8.62E-05	8.76E-04	6.22E-04	5.27E-04	6.03E-04
2034	80	0.14	1.17	1.55	1.90E-02	0.20	0.15	0.12	0.14	6.51E-04	5.61E-03	7.43E-03	9.10E-05	9.57E-04	6.99E-04	5.79E-04	6.61E-04
2035	0	0.11	41.43	123.52	6.30E-02	0.11	0.10	7.65	8.71	5.09E-04	1.92E-01	5.71E-01	2.91E-04	5.09E-04	4.67E-04	3.54E-02	4.03E-02
2035	1	0.05	2.80	3.17	3.70E-02	0.11	0.06	1.42	1.62	2.08E-04	1.30E-02	1.47E-02	1.71E-04	5.04E-04	2.91E-04	6.56E-03	7.48E-03
2035	2	0.05	2.80	3.17	3.70E-02	0.11	0.06	1.42	1.62	2.08E-04	1.30E-02	1.47E-02	1.71E-04	5.04E-04	2.91E-04	6.56E-03	7.48E-03
2035	3	0.05	2.80	3.17	3.70E-02	0.11	0.06	1.42	1.62	2.08E-04	1.30E-02	1.47E-02	1.71E-04	5.04E-04	2.91E-04	6.56E-03	7.48E-03
2035	4	0.05	2.80	3.17	3.70E-02	0.11	0.06	1.42	1.62	2.08E-04	1.30E-02	1.47E-02	1.71E-04	5.04E-04	2.91E-04	6.56E-03	7.48E-03
2035	5	0.05	2.80	3.17	3.70E-02	0.11	0.06	1.42	1.62	2.08E-04	1.30E-02	1.47E-02	1.71E-04	5.04E-04	2.91E-04	6.56E-03	7.48E-03
2035	10	0.04	1.68	2.38	3.00E-02	0.11	0.06	0.77	0.88	1.94E-04	7.77E-03	1.10E-02	1.39E-04	4.90E-04	2.73E-04	3.58E-03	4.07E-03
2035	15	0.04	0.96	1.81	2.50E-02	0.10	0.06	0.37	0.42	1.76E-04	4.46E-03	8.38E-03	1.16E-04	4.72E-04	2.59E-04	1.72E-03	1.95E-03
2035	20	0.04	0.67	1.48	2.10E-02	0.10	0.05	0.22	0.25	1.62E-04	3.09E-03	6.83E-03	9.71E-05	4.58E-04	2.45E-04	1.01E-03	1.15E-03
2035	25	0.03	0.64	1.33	2.00E-02	0.10	0.05	0.19	0.22	1.57E-04	2.94E-03	6.14E-03	9.25E-05	4.53E-04	2.40E-04	8.78E-04	1.00E-03
2035	30	0.03	0.62	1.20	1.80E-02	0.10	0.05	0.17	0.19	1.57E-04	2.84E-03	5.56E-03	8.32E-05	4.53E-04	2.40E-04	7.67E-04	8.74E-04
2035	35	0.04	0.61	1.10	1.70E-02	0.10	0.05	0.15	0.17	1.66E-04	2.80E-03	5.09E-03	7.86E-05	4.62E-04	2.50E-04	6.70E-04	7.63E-04
2035	40	0.04	0.61	1.02	1.70E-02	0.10	0.06	0.13	0.15	1.80E-04	2.81E-03	4.73E-03	7.86E-05	4.76E-04	2.64E-04	5.87E-04	6.70E-04
2035	45	0.04	0.62	0.97	1.60E-02	0.11	0.06	0.11	0.13	2.03E-04	2.87E-03	4.48E-03	7.40E-05	4.99E-04	2.82E-04	5.22E-04	5.96E-04
2035	50	0.05	0.65	0.94	1.60E-02	0.11	0.07	0.10	0.12	2.31E-04	2.99E-03	4.34E-03	7.40E-05	5.27E-04	3.10E-04	4.72E-04	5.36E-04

Table C.2.2B. Summary of Weighted Emission Factors for Heavy-Duty Truck (Diesel Based Engines)

Engine Model Year	Speed (mph)	Default EMFAC Emission Factor (g/mi)								Weighted Emission Factors per Model Year and Speed (g/mi)							
		DPM	CO	NOX	SOX	PM10	PM25	ROG (Running Exhaust)	TOG	DPM	CO	NOX	SOX	PM10	PM25	ROG	TOG
2035	55	0.06	0.68	0.93	1.60E-02	0.12	0.07	0.10	0.11	2.64E-04	3.15E-03	4.31E-03	7.40E-05	5.59E-04	3.42E-04	4.39E-04	4.99E-04
2035	60	0.07	0.73	0.95	1.60E-02	0.13	0.08	0.09	0.10	3.05E-04	3.38E-03	4.39E-03	7.40E-05	6.01E-04	3.79E-04	4.16E-04	4.76E-04
2035	65	0.08	0.79	0.99	1.60E-02	0.14	0.09	0.09	0.10	3.51E-04	3.66E-03	4.58E-03	7.40E-05	6.47E-04	4.21E-04	4.16E-04	4.72E-04
2035	70	0.09	0.86	1.06	1.70E-02	0.15	0.10	0.09	0.11	4.07E-04	3.98E-03	4.89E-03	7.86E-05	7.03E-04	4.72E-04	4.25E-04	4.85E-04
2035	75	0.10	0.95	1.15	1.80E-02	0.17	0.11	0.10	0.11	4.67E-04	4.37E-03	5.30E-03	8.32E-05	7.63E-04	5.22E-04	4.53E-04	5.18E-04
2035	80	0.12	1.04	1.26	1.90E-02	0.18	0.13	0.11	0.12	5.32E-04	4.81E-03	5.82E-03	8.78E-05	8.28E-04	5.87E-04	4.99E-04	5.64E-04

Table C.2.2C. Adjusted EMFAC Emission Factors for Port Trucks in 2035

Speed (mph)	Emission Factors (g/mile)							
	DPM	CO	NOx	SOX	PM10	PM25	ROG	TOG
0	0.11	41.31	123.17	0.06	0.11	0.10	7.63	8.69
1	0.13	6.48	10.75	0.04	0.20	0.14	3.26	3.72
2	0.13	6.48	10.75	0.04	0.20	0.14	3.26	3.72
3	0.13	6.48	10.75	0.04	0.20	0.14	3.26	3.72
4	0.13	6.48	10.75	0.04	0.20	0.14	3.26	3.72
5	0.13	6.48	10.75	0.04	0.20	0.14	3.26	3.72
6	0.13	5.96	10.21	0.04	0.19	0.14	2.97	3.38
7	0.13	5.44	9.68	0.03	0.19	0.14	2.67	3.04
8	0.12	4.92	9.14	0.03	0.19	0.14	2.37	2.70
9	0.12	4.40	8.60	0.03	0.19	0.13	2.08	2.36
10	0.12	3.89	8.06	0.03	0.18	0.13	1.78	2.03
11	0.12	3.55	7.68	0.03	0.18	0.13	1.59	1.81
12	0.12	3.22	7.29	0.03	0.18	0.13	1.41	1.60
13	0.11	2.89	6.91	0.03	0.18	0.13	1.22	1.39
14	0.11	2.56	6.52	0.03	0.18	0.12	1.04	1.18
15	0.11	2.23	6.14	0.02	0.17	0.12	0.85	0.97
16	0.11	2.09	5.91	0.02	0.17	0.12	0.78	0.89
17	0.11	1.95	5.69	0.02	0.17	0.12	0.71	0.81
18	0.10	1.82	5.46	0.02	0.17	0.12	0.64	0.73
19	0.10	1.68	5.24	0.02	0.17	0.11	0.57	0.65
20	0.10	1.55	5.01	0.02	0.16	0.11	0.50	0.57
21	0.10	1.53	4.91	0.02	0.16	0.11	0.49	0.56
22	0.10	1.52	4.81	0.02	0.16	0.11	0.48	0.54
23	0.10	1.50	4.71	0.02	0.16	0.11	0.46	0.53
24	0.10	1.48	4.61	0.02	0.16	0.11	0.45	0.51
25	0.10	1.47	4.50	0.02	0.16	0.11	0.44	0.50
26	0.10	1.46	4.42	0.02	0.16	0.11	0.43	0.48
27	0.10	1.45	4.33	0.02	0.16	0.11	0.41	0.47
28	0.10	1.44	4.25	0.02	0.16	0.11	0.40	0.46
29	0.10	1.43	4.16	0.02	0.16	0.11	0.39	0.45
30	0.10	1.42	4.08	0.02	0.16	0.11	0.38	0.43
31	0.10	1.42	4.01	0.02	0.16	0.11	0.37	0.42
32	0.10	1.41	3.94	0.02	0.16	0.11	0.36	0.41
33	0.10	1.41	3.87	0.02	0.17	0.11	0.35	0.40
34	0.10	1.40	3.80	0.02	0.17	0.12	0.34	0.39
35	0.10	1.40	3.73	0.02	0.17	0.12	0.33	0.38
36	0.11	1.40	3.68	0.02	0.17	0.12	0.32	0.37
37	0.11	1.40	3.63	0.02	0.17	0.12	0.32	0.36
38	0.11	1.40	3.57	0.02	0.17	0.12	0.31	0.35
39	0.11	1.40	3.52	0.02	0.18	0.12	0.30	0.34
40	0.11	1.40	3.47	0.02	0.18	0.13	0.29	0.33
41	0.12	1.41	3.43	0.02	0.18	0.13	0.29	0.33
42	0.12	1.42	3.39	0.02	0.18	0.13	0.28	0.32
43	0.12	1.42	3.36	0.02	0.19	0.13	0.27	0.31
44	0.12	1.43	3.32	0.02	0.19	0.14	0.27	0.30
45	0.13	1.43	3.28	0.02	0.19	0.14	0.26	0.30
46	0.13	1.45	3.26	0.02	0.19	0.14	0.25	0.29
47	0.13	1.46	3.24	0.02	0.20	0.14	0.25	0.28
48	0.14	1.47	3.22	0.02	0.20	0.15	0.24	0.28

Table C.2.2C. Adjusted EMFAC Emission Factors for Port Trucks in 2035

Speed (mph)	Emission Factors (g/mile)							
	DPM	CO	NOx	SOX	PM10	PM25	ROG	TOG
49	0.14	1.48	3.20	0.02	0.20	0.15	0.24	0.27
50	0.14	1.49	3.18	0.02	0.21	0.15	0.23	0.27
51	0.15	1.51	3.18	0.02	0.21	0.16	0.23	0.26
52	0.15	1.53	3.17	0.02	0.22	0.16	0.23	0.26
53	0.16	1.54	3.17	0.02	0.22	0.17	0.22	0.26
54	0.16	1.56	3.16	0.02	0.23	0.17	0.22	0.25
55	0.17	1.58	3.16	0.02	0.23	0.17	0.22	0.25
56	0.17	1.60	3.17	0.02	0.23	0.18	0.22	0.25
57	0.18	1.62	3.18	0.02	0.24	0.18	0.21	0.24
58	0.18	1.64	3.20	0.02	0.24	0.19	0.21	0.24
59	0.19	1.67	3.21	0.02	0.25	0.19	0.21	0.24
60	0.19	1.69	3.22	0.02	0.25	0.20	0.21	0.24
61	0.20	1.72	3.25	0.02	0.26	0.20	0.21	0.24
62	0.20	1.74	3.28	0.02	0.27	0.21	0.21	0.24
63	0.21	1.77	3.30	0.02	0.27	0.21	0.21	0.24
64	0.21	1.80	3.33	0.02	0.28	0.22	0.21	0.23
65	0.22	1.83	3.36	0.02	0.28	0.22	0.21	0.23
66	0.23	1.86	3.40	0.02	0.29	0.23	0.21	0.24
67	0.23	1.89	3.45	0.02	0.30	0.24	0.21	0.24
68	0.24	1.93	3.49	0.02	0.30	0.24	0.21	0.24
69	0.25	1.96	3.54	0.02	0.31	0.25	0.21	0.24
70	0.25	1.99	3.58	0.02	0.32	0.25	0.21	0.24
71	0.26	2.03	3.64	0.02	0.32	0.26	0.21	0.24
72	0.27	2.07	3.70	0.02	0.33	0.27	0.22	0.25
73	0.28	2.11	3.76	0.02	0.34	0.27	0.22	0.25
74	0.28	2.15	3.82	0.02	0.35	0.28	0.22	0.25
75	0.29	2.18	3.88	0.02	0.35	0.29	0.23	0.26
76	0.30	2.23	3.96	0.02	0.36	0.30	0.23	0.26
77	0.31	2.27	4.04	0.02	0.37	0.30	0.23	0.27
78	0.32	2.32	4.11	0.02	0.38	0.31	0.24	0.27
79	0.32	2.36	4.19	0.02	0.39	0.32	0.24	0.28
80	0.33	2.40	4.27	0.02	0.40	0.33	0.25	0.28