Appendix H
Air Quality Analysis

This appendix provides technical information on the approach and results used in the analysis of air quality (*Chapter 3, Section 3.7, Air Quality*).

H.1 National Ambient Air Quality Standards

The Clean Air Act (CAA) amendments, issued by the U.S. Environmental Protection Agency (EPA), set agency guidelines for attainment of the National Ambient Air Quality Standards (NAAQS). The CAA requires EPA to set NAAQS (40 CFR Part 50) for six criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 and 2.5 microns in diameter (PM_{10} and $PM_{2.5}$, respectively), and sulfur dioxide (SO_2). NAAQS standards are based on human health criteria to protect public health (primary standards), and on environmental criteria to prevent environmental and property damage and to protect public welfare (secondary standards). **Table H-1** presents the current NAAQS.

Table H-1 National Ambient Air Quality Standards

Pollutant	Primary or Secondary	Averaging Time	Level	Form
Carbon Monoxide	Primary	8 hours	9 ppm	Not to be exceeded more than once per year
		1 hour	35 ppm	
Lead	Primary and Secondary	Rolling 3-month average	0.15 µg/m3	Not to be exceeded
Nitrogen Dioxide	Primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations; averaged over 3 years
	Primary and Secondary	1 year	53 ppb	Annual mean
Ozone	Primary and Secondary	8 hours	0.070 ppm	Annual 4th highest daily maximum 8-hour concentration; averaged over 3 years
Particulate Matter 2.5	Primary	1 year	9.0 µg/m3	Annual mean, averaged over 3 years
	Secondary	1 year	15.0 µg/m3	Annual mean, averaged over 3 years
	Primary and Secondary	24 hours	35 µg/m3	98th percentile; averaged over 3 years
Particulate Matter 10	Primary and Secondary	24 hours	150 µg/m3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide	Primary	1 hour	75 ppb	99th percentile of 1-hour daily maximum concentrations; averaged over 3 years
	Secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Source: EPA 2024a

Note: ppm = parts per million; ppb = parts per billion; $\mu g/m^3$ = micrograms per cubic meter

EPA classifies each county in the United States as being in "attainment" or "nonattainment" for each criteria pollutant. A county is in attainment for a specific pollutant when the pollutant concentration is below the NAAQS. A county is in nonattainment for a specific pollutant when the pollutant concentration exceeds the NAAQS. Some nonattainment pollutants (such as ozone, CO, and PM_{10}) are further classified by the degree to which they exceed the NAAQS. For ozone, these classifications are ranked based on severity, in the order of "Marginal," "Moderate," "Serious," "Severe," and "Extreme." A county can be in attainment for some pollutants and in nonattainment for other pollutants. A third category, "maintenance area," is an area that was formerly in nonattainment but has reduced pollutant concentrations to be in attainment of the NAAQS. EPA bases its attainment status designations on ongoing air monitoring studies and the number of times specific criteria pollutants exceed NAAQS. EPA uses a fourth category, "unclassifiable," for areas with insufficient data to make an attainment determination. EPA treats unclassifiable areas like attainment areas. Maverick County is currently in attainment for all criteria pollutants.

H.2 *De Minimis* Thresholds

EPA uses the term *de minimis* across a variety of contexts to describe matters that are too small or trivial for regulating authority consideration. Under EPA's Transportation Conformity (40 C.F.R. Part 93, Subpart A) and General Conformity (40 C.F.R. Part 93, Subpart B) regulations, federal agencies compare the total estimated annual criteria pollutant emissions from their projects to applicable *de minimis* emissions thresholds provided under 40 CFR Part 93, Subpart B, to determine whether additional analysis and consultation are appropriate. The Transportation Conformity regulations pertain to highway and transit projects under the jurisdiction of the U.S. Department of Transportation (USDOT); therefore, they do not apply to Surface Transportation Board (Board) actions. Based on consultation with EPA on previous environmental reviews, OEA has determined that certain emissions, such as emissions from construction of a new rail line, are subject to the General Conformity regulations because those emissions meet the definition of direct or indirect emissions set forth at 40 C.F.R. § 93.152. However, the Board does not exercise continuing program control over rail operations and would not exercise such control over operation of the proposed line. Therefore, the proposed line is not subject to the General Conformity rule or required to assess *de minimis* thresholds.[1] However, OEA used the *de minimis* emissions thresholds in the air quality analysis to provide context for the estimated operational emissions (**Table H-2**). The Board would exercise control over construction of the proposed line, so emissions during construction are subject to a General Conformity Determination if emissions are estimated to exceed the *de minimis* thresholds.

[1] Under the General Conformity rule, federal agencies must work with state, tribal and local governments in a nonattainment or maintenance area to ensure that federal actions conform to the air quality plans established in the applicable state or tribal implementation plan.

Table H-2 De Minimis Levels

Pollutant	Tons per Year	Area Type
Ozone (volatile organic compounds (VOC) or NO_x)	50	Serious Nonattainment
	25	Severe Nonattainment
	10	Extreme Nonattainment
	100	Other Areas Outside an Ozone Transport Region[1]
Ozone (NO_x)	100	Marginal and Moderate Nonattainment Inside an Ozone Transport Region[1]
	100	Maintenance
Ozone (VOC)	50	Marginal and Moderate Nonattainment Inside an Ozone Transport Region[1]
	50	Maintenance Within an Ozone Transport Region[1]
	100	Maintenance Outside an Ozone Transport Region[1]
Carbon Monoxide (CO), Sulfur Dioxide (SO_2) and Nitrogen Dioxide (NO_2)	100	All Nonattainment and Maintenance
Particulate Matter 10 (PM_{10})	70	Serious Nonattainment
	100	Moderate Nonattainment and Maintenance
Particulate Matter 2.5 ($PM_{2.5}$)[2]	70	Serious Nonattainment
	100	All Nonattainment and Maintenance
Lead (Pb)	25	All Nonattainment and Maintenance

Source: EPA 2024a

[1] The Ozone Transport Region is composed of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the District of Columbia.

[2] Direct emissions, SO_2, NO_x, (unless determined not to be a significant precursor), VOC or ammonia (if determined to be a significant precursor)

H.3 Class I Areas

The CAA establishes a list of federal lands with special air quality protections from major stationary sources (40 CFR Part 52 Subpart 21, 40 CFR Part 81). These areas primarily include national parks, national wilderness areas, and national monuments. The CAA divides the lands into Class I, II, or III where restrictions on emissions are most severe in Class I areas and are progressively more lenient in Class II and III areas. Mandatory Class I areas include all national wilderness areas exceeding 5,000 acres and national parks exceeding 6,000 acres (National Park Service (NPS) 2023). There are no elements of the proposed line that exceed the Board's thresholds for evaluation within the boundaries of any Class I Area. Although rail lines are not a major stationary source, EPA recommends a review of any Class I areas within 100 kilometers (62 miles) of the project elements that exceed the Board's thresholds. However, there are no Class I areas within 100 kilometers of the proposed line.

H.4 Pollutant Descriptions and Effects

In the impact analysis, OEA identified pollutants to consider and summarized their effects on human health and the environment based on regulations and EPA databases. This section describes the various pollutants OEA analyzed and their potential effects on human health or the environment. These

descriptions include criteria pollutants, hazardous air pollutants (HAPs), and greenhouse gases (GHGs). A summary of criteria pollutants and their effects is presented in **Table H-3**.

Table H-3 Criteria Pollutant Summary

Pollutant	Description
Ozone (O_3)	O_3 is a highly reactive compound of oxygen. At very high concentrations O_3 appears blue in color, is a highly unstable gas and is pungent in odor. At ambient concentrations, O_3 is colorless and odorless. O_3 is not emitted directly into the atmosphere by pollutant sources, but instead is produced by an atmospheric reaction of NO_X and volatile organic compounds (VOCs). Generally, this reaction is most favorable during the warmer summer months when sunlight is stronger. Exposure to O_3 may impair lung function and cause respiratory difficulties for sensitive populations (for example, a person with asthma, emphysema, or reduced lung capacity).
Sulfur Dioxide (SO_2)	SO_2 emissions are the main components of the "oxides of sulfur," a group of highly reactive gases from fossil fuel combustion at power plants, other industrial facilities, industrial processes, and burning of high-sulfur-containing fuels by large ships and non-road equipment. High concentrations of SO_2 will lead to formation of other sulfur oxides. By reducing the SO_2 emissions, other forms of sulfur oxides are also expected to decrease. When oxides of sulfur react with other compounds in the atmosphere, small particles that can affect the lungs can be formed. This can lead to respiratory disease and aggravate existing heart disease.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is comprised of small solid particles and liquid droplets. PM_{10} refers to particulate matter with a nominal aerodynamic diameter of 10 micrometers or less, and $PM_{2.5}$ refers to particulate matter with an aerodynamic diameter of 2.5 micrometers or less. Particulates can enter the body through the respiratory system. Particulates over 10 micrometers in size are generally captured in the nose and throat and are readily expelled from the body. Particles smaller than 10 micrometers, and especially particles smaller than 2.5 micrometers, can reach the air ducts (bronchi) and the air sacs (alveoli) in the lungs. Particulates are associated with increased incidence of respiratory diseases, cardiopulmonary disease, and cancer.
Carbon Monoxide (CO)	CO is a colorless and odorless gas that is a product of incomplete combustion. CO is absorbed by the lungs and reacts with hemoglobin to reduce the oxygen carrying capacity of the blood. At low concentrations, CO has been shown to aggravate the symptoms of cardiovascular disease. It can cause headaches, nausea, and at sustained high concentration levels, can lead to coma and death.
Nitrogen Dioxide (NO_2)	When combustion temperatures are extremely high, such as in engines, atmospheric nitrogen gas may combine with oxygen gas to form various oxides of nitrogen. Of these, nitric oxide (NO) and NO_2 are the most significant air pollutants. This group of pollutants is generally referred to as NO_X. Nitric oxide is relatively harmless to humans but quickly converts to NO_2. NO_2 has been found to be a lung irritant and can lead to respiratory illnesses. Nitrogen oxides, along with VOCs, are also precursors to ozone formation.
Lead (Pb)	Pb is a heavy metal that can affect the nervous system, kidneys, immune system, reproductive system, and cardiovascular system when exposed to substantial doses. Pb is emitted through some heavy industrial manufacturing processes, especially those associated with metal processing. The addition of Pb to fuel increases engine performance and reduces valve wear; however, general use of Pb as a fuel additive has been phased out for on-road vehicles in the United States. Since this phase out, Pb concentrations in ambient air are often low. States with no significant lead-emitting sources typically do not measure Pb at their ambient air monitoring stations.

H.4.1 Hazardous Air Pollutants

Controlling airborne toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that EPA regulate 188 air toxics, also known as hazardous air pollutants (HAPs). EPA has assessed this expansive list in its latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (*Federal Register*, Vol. 72, No. 37), and identified a group of 93 compounds emitted from mobile sources, listed in its Integrated Risk Information System (EPA 2024c). In addition, EPA identified nine compounds with significant contributions from mobile sources that are among the national- and regional-scale cancer risk drivers from its 2011 National Air Toxics Assessment (EPA 2024d). The nine compounds are called mobile source air toxics (MSATs) and are typically associated with transportation sources including motor vehicles, construction equipment, and locomotives. These are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter (POM). OEA considered these nine compounds in the emissions assessment.

H.4.2 Greenhouse Gases

In nature, carbon dioxide (CO_2) is exchanged continually between the atmosphere, plants, and animals through processes of photosynthesis, respiration, and decomposition, and between the atmosphere and ocean through gas exchange. Oceans and living biomass (i.e., sinks) absorb billions of tons of carbon in the form of CO_2 and emit it to the atmosphere annually through natural and man-made processes (i.e., sources). CO_2, however, constitutes less than one-tenth of 1 percent of the total atmosphere gases. Similar to the glass in a greenhouse, certain gases, primarily CO_2, nitrous oxide (N_2O), and methane (CH_4) absorb heat that the surface of the Earth radiates. Increases in the atmospheric concentrations of these gases can cause the Earth to warm by trapping more heat. The common term for this phenomenon is the "greenhouse effect," and these gases are typically referred to as "greenhouse gases." GHG emissions have effects at the regional and global scale and are thus reviewed at a regional scale. EPA has not established ambient air standards for GHGs as it has for the criteria pollutants under the NAAQS.

H.5 Emissions Inventory Methodology

H.5.1 Rail Line and Associated CMV Facility Operations Emissions

OEA evaluated the environmental consequences for operation of the Southern and Northern Rail Alternatives and measured air quality and GHG emissions. OEA assessed changes in pollutant emissions for the proposed line and the associated CMV Facility. OEA also compared emissions under the Southern and Northern Rail Alternatives to emissions under the No-Action Alternative.

OEA estimated emissions for nitrogen oxides (NO_X); VOC; PM_{10}; $PM_{2.5}$; SO_2; CO; Carbon Dioxide Equivalent (CO2e); Methane (CH_4); Nitrogen Dioxide (N_2O); and HAPs. OEA calculated CO2e by deriving CO_2, CH_4, and N_2O emissions and applying global warming potentials (EPA 2024b). The emissions estimations were based on changes in freight train activity, delays at public at-grade crossings, truck vehicle miles traveled (VMTs), and construction schedules. OEA analyzed operational and construction emissions despite the study area being in attainment for all criteria pollutants.

OEA used the number of locomotives per day, average rated horsepower (HP) of any locomotives observed in the fleet, idle load factor, and idle time to calculate the estimated daily idling activity during rail operations. OEA used the number of locomotives per day, average rated HP of any locomotive observed in the fleet, track length, and average travel speed to calculate the estimated daily moving activity during rail operations. The fuel usage associated with idling and moving activities were combined to get the total daily fuel usage. OEA obtained emission factors for calculating locomotive emissions and emission tier standards using the 2020 National Emissions Inventory for Class I Fleets, as Union Pacific Railroad (UP) and BNSF Railway are both Class I railroads (Eastern Research Group, Inc. (ERG) 2022). OEA used this to create composite fleet-wide emission factors by pollutant for its analysis. Emission factors were converted into a grams per gallon format using the EPA-provided conversion factor from brake horsepower-hours to gallons and HAPs emission rates were estimated by applying speciation profiles to the VOC or PM emission rates (EPA 2009; EPA 2021).

For its grade crossings assessment, OEA used the MOVES4 on-road module to determine idling emission rates for all motor vehicles at at-grade crossings on urban unrestricted access roadways in Maverick County. The lowest speeds possible were assumed to account for the idling speeds. These rates were used alongside the estimated total annual delays under the Southern and Northern Rail Alternatives and under the No-Action Alternative. Total annual delays were calculated at each at-grade crossing by multiplying the average vehicle delay time with the average number of vehicles delayed per day and then converting to the delay hours per year. These values were used to determine the emissions in tons per year for each of the previously mentioned pollutants.

OEA also analyzed truck emissions related to VMT and changes in delay times at the United States/Mexico border between the No-Action Alternative and the associated CMV Facility. OEA used VMTs that were estimated based on projected 2031 annual truck trips as well as travel routes using existing and planned future roadways. Emission rates of each pollutant were determined using default inputs within the on-road module of the MOVES4 model (EPA 2023). Truck speeds were estimated using the existing speed limits on the current travel roadways. OEA analyzed VMT emissions for long- and short-haul trucks on urban and rural unrestricted and restricted access roadways within Maverick County. The emission rates from MOVES4 were multiplied with the projected VMT volumes and then converted to tons per year to get the total emissions for each pollutant.

OEA also calculated impacts from reduced idling of inbound trucks queued at the associated CMV Facility based on on-road emission factors from the MOVES4 model's default inputs. Speeds for long- and short-haul trucks on urban unrestricted roadways were assumed to be less than 2.5 mph to represent the idling condition. OEA calculated emissions per year by multiplying the pollutant emission rates by the projected 2031 analysis year number of annual trucks entering the United States and estimated idling times at the border. OEA then converted these rates from grams per year to tons per year for each pollutant.

H.5.2 Rail Line and Associated CMV Facility Construction Emissions

OEA also assessed emissions from construction of the proposed line and the associated CMV Facility. The construction assessment included a quantification of the air quality emissions of the construction equipment as well as fugitive dust (dust emissions of the criteria pollutant PM) from general construction sitework and earthwork.

Under the Southern and Northern Rail Alternatives, GER would construct 1.3 miles of new rail line. OEA used the estimated number of construction days to calculate equipment use and the associated emissions as explained below. GER estimated that construction would take approximately 382 working days for the proposed rail line and 384 working days for the associated CMV Facility, where working days are assumed to be 8-hour days in a 5-day work week; 382 and 384 working days is equivalent to 534 and 537 total calendar days, respectively. According to GER, construction of the proposed line and the associated CMV Facility would progress simultaneously, and all construction would be completed roughly one and a half years from the start date. OEA analyzed the rolling year that would have the highest emissions, which would be the first to fourth quarter of the first year of construction, assuming an analysis year of 2025. OEA quantified emissions from both nonroad equipment and fugitive dust for its construction analysis as described below. OEA added equipment and fugitive dust emissions to create a total construction emissions inventory.

OEA estimated emissions from nonroad equipment based on a list of equipment provided by GER (see **Table H-15** and **Table H-16**). OEA derived emission factors for the equipment using the nonroad module within the MOVES4 model. OEA ran the MOVES4 model for Maverick County, where the construction would be located, using model default inputs. OEA assumed equipment size and age corresponding to the model's default population data and used GER-provided fuel type information. OEA estimated hours of equipment operation by assuming an 8-hour workday and provided time utilization factors.[2] OEA combined these operating hours with emission factors and load factors to estimate equipment emissions.

OEA quantified fugitive dust emissions associated with construction from general site work and earthwork. Fugitive dust emissions were quantified based on the assumption that dust-generating construction and earthwork occurs throughout the 8-hour workday using factors from the "WRAP Fugitive Dust Handbook" for construction emissions and corresponding earthwork emissions (Countess Environmental 2006). OEA assumed $PM_{2.5}$ emissions to be 10 percent of the PM_{10} emissions consistent with the guidance. The estimated fugitive dust emissions are conservative since dust control measures, which are expected to be implemented, were not included in the analysis.

For its GHG analysis, OEA quantified the tons of GHG emissions per year that it projects would occur under the build alternatives as well as the No-Action Alternative.

H.6 Affected Environment

The affected environment for air quality is determined by the attainment status of the counties in the study area and by identifying proximate Class I Areas. Maverick County, Texas, is in attainment for all NAAQS.

[2] Time utilization factor is the percentage of time that a piece of equipment is actively being used. For example, a truck could be on site for a full 8-hour day, but with a utilization rate of 25 percent, it is only being used two of those eight hours.

Rail Segment Analysis Tables

Table H-4. Locomotive Emissions

No Action Rail Emissions

Trains/Day	19
Locomotives/Train	3
Locomotives/Day	57
Rated HP	4,280

Idle Activity

Idle Load Factor	0.004
Idle Time (hr)	0.12
Idle bhp-hr	100

Moving Activity

Moving Load Factor	0.44
Moving Distance (mi)	4.2
Moving Avg Speed (mph)	15.0
Moving Time (hr) per train	0.3
Moving bhp-hr	30,096

Total Activity

Total bhp-hr	30,195
Gallons	1,452

Proposed Rail Emissions

Trains/Day	19
Locomotives/Train	3
Locomotives/Day	57
Rated HP	4,280

Idle Activity

Idle Load Factor	0.004
Idle Time (hr)	0.0
Idle bhp-hr	0

Moving Activity

Moving Load Factor	0.44
Moving Distance (mi)	1.3
Moving Avg Speed (mph)	15.0
Moving Time (hr) per locomotive	0.1
Moving bhp-hr	9,566

Total Daily Activity

Total bhp-hr	9,566
Gallons	460

Emissions Calcuations	Emission Factor (g/gal)	Emissions (g/day)	Emissions (tons/yr)
Criteria Pollutants			
NOx	120.48	174,900.84	70.37
VOC	4.85	7,047.13	2.84
PM10	3.04	4,416.07	1.78
PM2.5	2.95	4,283.59	1.72
SO2	0.09	136.31	0.05
CO	26.62	38,649.79	15.55
Greenhouse Gases			
CO2	10,150.00	14,734,653.59	5,928.39
CH4	0.80	1,161.35	0.47
N2O	0.26	377.44	0.15
CO2e	-	14,867,192.88	5,981.71
Hazardous Air Pollutants			
Acetaldehyde	0.38	551.79	0.22
Acrolein	0.08	112.75	0.05
Benzene	0.11	158.56	0.06
1,3-Butadiene	0.01	13.11	0.01
Ethyl Benzene	0.02	27.06	0.01
Formaldehyde	1.08	1,571.51	0.63
Napthalene	0.01	19.24	0.01
POM	0.01	19.51	0.01

Emissions Calcuations	Emission Factor (g/gal)	Emissions (g/day)	Emissions (tons/yr)
Criteria Pollutants			
NOx	120.48	55,410.07	22.29
VOC	4.85	2,232.59	0.90
PM10	3.04	1,399.05	0.56
PM2.5	2.95	1,357.08	0.55
SO2	0.09	43.19	0.02
CO	26.62	12,244.58	4.93
Greenhouse Gases			
CO2	10,150.00	4,668,063.48	1,878.16
CH4	0.80	367.93	0.15
N2O	0.26	119.58	0.05
CO2e	-	4,710,053.05	1,895.06
Hazardous Air Pollutants			
Acetaldehyde	0.38	174.81	0.070
Acrolein	0.08	35.72	0.014
Benzene	0.11	50.23	0.020
1,3-Butadiene	0.01	4.15	0.002
Ethyl Benzene	0.02	8.57	0.003
Formaldehyde	1.08	497.87	0.200
Napthalene	0.01	6.09	0.002
POM	0.01	6.18	0.002

Notes:

CO2e values were calculated using the 100-year potential global warming potential (GWP) values from Table A-1 in 40 CFR 98.

Table H-5. Locomotive Emission Factors

Factors by Tier (g/gal) (from "2020 National Emissions Inventory - Locomotive Methodology"- ERG 2020)

Tier	%	NOx	VOC	PM10	PM2.5	SO2	CO	CO2	CH4	N2O
Uncontrolled	2%	270.40	10.51	6.656	6.456	0.0939	26.624	10150	0.8	0.26
0	5%	178.88	10.51	6.656	6.456	0.0939	26.624	10150	0.8	0.26
0+	14%	149.76	6.57	4.160	4.035	0.0939	26.624	10150	0.8	0.26
1	1%	139.36	10.29	6.656	6.456	0.0939	26.624	10150	0.8	0.26
1+	26%	139.36	6.35	4.160	4.035	0.0939	26.624	10150	0.8	0.26
2	5%	102.96	5.69	3.744	3.632	0.0939	26.624	10150	0.8	0.26
2+	23%	102.96	2.85	1.664	1.614	0.0939	26.624	10150	0.8	0.26
3	14%	102.96	2.85	1.664	1.614	0.0939	26.624	10150	0.8	0.26
4	7%	20.80	0.88	0.312	0.303	0.0939	26.624	10150	0.8	0.26
4C	4%	102.96	2.85	1.664	1.614	0.0939	26.624	10150	0.8	0.26
Composite	**100%**	**120.48**	**4.85**	**3.042**	**2.951**	**0.0939**	**26.624**	**10150**	**0.8**	**0.26**

HAPS	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Ethyl Benzene	Formaldehyde	Napthalene	POM
Composite (g/gal)	**0.38**	**0.08**	**0.11**	**0.01**	**0.02**	**1.08**	**0.01**	**0.01**

Source Criteria Pollutants/GHGs: "2020 National Emissions Inventory - Locomotive Methodology"- ERG 2020, Table 5
Source HAPS: 2017 EPA National Emissions Inventory, "2017Rail_HAP_AugmentationProfileAssignmentFactors_20200128.xlsx".
Notes:

Tier mix from Table 4 in the previously cited ERG document.
HAPs speciation for locomotives from 2017 NEI applied to VOC and PM2.5 emission rates, as appropriate.

Grade Crossing Analysis Tables

Table H-6. Grade Crossing Analysis - No Action Criteria Pollutant Emissions by Crossing

			Average Vehicle Delay		Daily Vehicles Delayed		Total Annual Delay		No Action Emissions (tons/year)									
FRA Crossing ID	**County**	**State**	**NA min**	**WA min**	**NA VPD**	**WA VPD**	**NA Hrs**	**WA Hrs**	**NOX**	**VOC**	**PM10**	**PM2.5**	**SO2**	**CO**	**CO2**	**CH4**	**N2O**	**CO2e**
764104S	MAVERICK	TEXAS	0.4133	0.0000	270	0	679.7	0.0	7.2E-04	9.8E-05	1.2E-05	1.1E-05	6.3E-06	6.1E-03	1.32	1.2E-04	4.1E-05	1.33
764106F	MAVERICK	TEXAS	0.4250	0.0000	452	0	1,167.8	0.0	1.2E-03	1.7E-04	2.0E-05	1.8E-05	1.1E-05	1.0E-02	2.26	2.0E-04	7.1E-05	2.29
912039X	MAVERICK	TEXAS	0.4000	0.0000	312	0	758.0	0.0	8.1E-04	1.1E-04	1.3E-05	1.2E-05	7.0E-06	6.8E-03	1.47	1.3E-04	4.6E-05	1.48
764107M	MAVERICK	TEXAS	0.4083	0.0000	290	0	719.6	0.0	7.7E-04	1.0E-04	1.3E-05	1.1E-05	6.7E-06	6.5E-03	1.39	1.2E-04	4.4E-05	1.41
764108U	MAVERICK	TEXAS	0.4250	0.0000	700	0	1,808.5	0.0	1.9E-03	2.6E-04	3.2E-05	2.9E-05	1.7E-05	1.6E-02	3.50	3.1E-04	1.1E-04	3.54
764113R	MAVERICK	TEXAS	0.4117	0.0000	251	0	628.8	0.0	6.7E-04	9.0E-05	1.1E-05	9.9E-06	5.8E-06	5.6E-03	1.22	1.1E-04	3.8E-05	1.23

Notes:

Vehicles Delayed and Average Delay provided from the transportation study

CO2e values were calculated using the 100-year potential global warming potential (GWP) values from Table A-1 in 40 CFR 98.

Table H-7. Grade Crossing Analysis - Proposed Action Criteria Pollutant Emissions by Crossing

			Average Vehicle Delay		Daily Vehicles Delayed		Total Annual Delay		With Action Emissions (tons/year)									
FRA Crossing ID	**County**	**State**	**NA min**	**WA min**	**NA VPD**	**WA VPD**	**NA Hrs**	**WA Hrs**	**NOX**	**VOC**	**PM10**	**PM2.5**	**SO2**	**CO**	**CO2**	**CH4**	**N2O**	**CO2e**
764104S	MAVERICK	TEXAS	0.4133	0.0000	270	0	679.7	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
764106F	MAVERICK	TEXAS	0.4250	0.0000	452	0	1,167.8	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
912039X	MAVERICK	TEXAS	0.4000	0.0000	312	0	758.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
764107M	MAVERICK	TEXAS	0.4083	0.0000	290	0	719.6	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
764108U	MAVERICK	TEXAS	0.4250	0.0000	700	0	1,808.5	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
764113R	MAVERICK	TEXAS	0.4117	0.0000	251	0	628.8	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes:

Vehicles Delayed and Average Delay provided from the transportation study

CO2e values were calculated using the 100-year potential global warming potential (GWP) values from Table A-1 in 40 CFR 98.

Table H-8. Grade Crossing Analysis - Action-Related Criteria Pollutant Emissions by Crossing

			Average Vehicle Delay		Daily Vehicles Delayed		Total Annual Delay		Acquisition-Related Emissions (tons/year)						
FRA Crossing ID	**County**	**State**	**NA min**	**WA min**	**NA VPD**	**WA VPD**	**NA Hrs**	**WA Hrs**	**NOX**	**VOC**	**PM10**	**PM2.5**	**SO2**	**CO**	**CO2e**
764104S	MAVERICK	TEXAS	0.4133	0.0000	270	0	679.7	0.0	-7.2E-04	-9.8E-05	-1.2E-05	-1.1E-05	-6.3E-06	-6.1E-03	-1.33
764106F	MAVERICK	TEXAS	0.4250	0.0000	452	0	1,167.8	0.0	-1.2E-03	-1.7E-04	-2.0E-05	-1.8E-05	-1.1E-05	-1.0E-02	-2.29
912039X	MAVERICK	TEXAS	0.4000	0.0000	312	0	758.0	0.0	-8.1E-04	-1.1E-04	-1.3E-05	-1.2E-05	-7.0E-06	-6.8E-03	-1.48
764107M	MAVERICK	TEXAS	0.4083	0.0000	290	0	719.6	0.0	-7.7E-04	-1.0E-04	-1.3E-05	-1.1E-05	-6.7E-06	-6.5E-03	-1.41
764108U	MAVERICK	TEXAS	0.4250	0.0000	700	0	1,808.5	0.0	-1.9E-03	-2.6E-04	-3.2E-05	-2.9E-05	-1.7E-05	-1.6E-02	-3.54
764113R	MAVERICK	TEXAS	0.4117	0.0000	251	0	628.8	0.0	-6.7E-04	-9.0E-05	-1.1E-05	-9.9E-06	-5.8E-06	-5.6E-03	-1.23

Notes:

Vehicles Delayed and Average Delay provided from the transportation study

CO2e values were calculated using the 100-year potential global warming potential (GWP) values from Table A-1 in 40 CFR 98.

Table H-9. Grade Crossing Analysis - No Action HAPs Emissions by Crossing

			Average Vehicle Delay		Daily Vehicles Delayed		Total Annual Delay		No Action Emissions (tons/year)							
FRA Crossing ID	County	State	NA min	WA min	NA VPD	WA VPD	NA Hrs	WA Hrs	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Ethyl Benzene	Formaldehyde	Napthalene	POM
764104S	MAVERICK	TEXAS	0.4133	0.0000	270	0	679.7	0.0	2.2E-06	2.1E-07	3.1E-06	4.9E-08	1.3E-06	3.5E-06	1.5E-07	4.0E-09
764106F	MAVERICK	TEXAS	0.4250	0.0000	452	0	1,167.8	0.0	3.7E-06	3.7E-07	5.3E-06	8.3E-08	2.2E-06	6.0E-06	2.6E-07	6.9E-09
912039X	MAVERICK	TEXAS	0.4000	0.0000	312	0	758.0	0.0	2.4E-06	2.4E-07	3.5E-06	5.4E-08	1.4E-06	3.9E-06	1.7E-07	4.5E-09
764107M	MAVERICK	TEXAS	0.4083	0.0000	290	0	719.6	0.0	2.3E-06	2.3E-07	3.3E-06	5.1E-08	1.3E-06	3.7E-06	1.6E-07	4.2E-09
764108U	MAVERICK	TEXAS	0.4250	0.0000	700	0	1,808.5	0.0	5.7E-06	5.7E-07	8.2E-06	1.3E-07	3.4E-06	9.3E-06	4.0E-07	1.1E-08
764113R	MAVERICK	TEXAS	0.4117	0.0000	251	0	628.8	0.0	2.0E-06	2.0E-07	2.9E-06	4.5E-08	1.2E-06	3.2E-06	1.4E-07	3.7E-09

Notes:

Vehicles Delayed and Average Delay provided from the transportation study

Table H-10. Grade Crossing Analysis - Proposed Action HAPs Emissions by Crossing

			Average Vehicle Delay		Daily Vehicles Delayed		Total Annual Delay		With Action Emissions (tons/year)							
FRA Crossing ID	County	State	NA min	WA min	NA VPD	WA VPD	NA Hrs	WA Hrs	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Ethyl Benzene	Formaldehyde	Napthalene	POM
764104S	MAVERICK	TEXAS	0.4133	0.0000	270	0	679.7	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
764106F	MAVERICK	TEXAS	0.4250	0.0000	452	0	1,167.8	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
912039X	MAVERICK	TEXAS	0.4000	0.0000	312	0	758.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
764107M	MAVERICK	TEXAS	0.4083	0.0000	290	0	719.6	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
764108U	MAVERICK	TEXAS	0.4250	0.0000	700	0	1,808.5	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
764113R	MAVERICK	TEXAS	0.4117	0.0000	251	0	628.8	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes:

Vehicles Delayed and Average Delay provided from the transportation study

Table H-11. Grade Crossing Analysis - Action-Related HAPs Emissions by Crossing

			Average Vehicle Delay		Daily Vehicles Delayed		Total Annual Delay		Acquisition-Related Emissions (tons/year)							
FRA Crossing ID	County	State	NA min	WA min	NA VPD	WA VPD	NA Hrs	WA Hrs	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Ethyl Benzene	Formaldehyde	Napthalene	POM
764104S	MAVERICK	TEXAS	0.4133	0.0000	270	0	679.7	0.0	-2.2E-06	-2.1E-07	-3.1E-06	-4.9E-08	-1.3E-06	-3.5E-06	-1.5E-07	-4.0E-09
764106F	MAVERICK	TEXAS	0.4250	0.0000	452	0	1,167.8	0.0	-3.7E-06	-3.7E-07	-5.3E-06	-8.3E-08	-2.2E-06	-6.0E-06	-2.6E-07	-6.9E-09
912039X	MAVERICK	TEXAS	0.4000	0.0000	312	0	758.0	0.0	-2.4E-06	-2.4E-07	-3.5E-06	-5.4E-08	-1.4E-06	-3.9E-06	-1.7E-07	-4.5E-09
764107M	MAVERICK	TEXAS	0.4083	0.0000	290	0	719.6	0.0	-2.3E-06	-2.3E-07	-3.3E-06	-5.1E-08	-1.3E-06	-3.7E-06	-1.6E-07	-4.2E-09
764108U	MAVERICK	TEXAS	0.4250	0.0000	700	0	1,808.5	0.0	-5.7E-06	-5.7E-07	-8.2E-06	-1.3E-07	-3.4E-06	-9.3E-06	-4.0E-07	-1.1E-08
764113R	MAVERICK	TEXAS	0.4117	0.0000	251	0	628.8	0.0	-2.0E-06	-2.0E-07	-2.9E-06	-4.5E-08	-1.2E-06	-3.2E-06	-1.4E-07	-3.7E-09

Notes:

Vehicles Delayed and Average Delay provided from the transportation study

Table H-12. Grade Crossing Analysis – Onroad Vehicle Emission Factors

Roadway Idling Emission Factors (g/hr)

Year	NOX	VOC	PM10	PM2.5	SO2	CO	CO2	CH4	N2O	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Ethyl Benzene	Formaldehyde	Napthalene	POM
2031	0.96	0.13	0.02	0.01	0.01	8.13	1756.4	0.16	0.06	2.9E-03	2.9E-04	4.1E-03	6.5E-05	1.7E-03	4.6E-03	2.0E-04	5.3E-06

Source: MOVES 4

Notes:

MOVES Emission Rates assumed default inputs. County is in attainment and these results are for informational purposes only.

County-Level Default Scale with Default Inputs Except Average Speed Distribution set to SpeedBin 1

Represents an average of emission factors for all 24 hours and 12 months for weekday

Maverick County, TX

All Vehicle and Fuel types included

Urban Unrestricited Access Roadways included

TIGERweb (census.gov) for rural and urban classifications

Truck Analysis Tables

Table H-13. Diesel Truck VMT Emissions

2031 No Action					2031 Proposed Action				
Pollutant	**Emission Rate (g/mi)**	**Total VMT**	**g/year**	**tons/year**	**Pollutant**	**Emission Rate (g/mi)**	**Total VMT**	**g/year**	**tons/year**
NOX	1.45	13,567,650	19,608,234	21.61	NOX	1.82	3,642,014	6,619,491	7.30
VOC	0.03	13,567,650	453,684	0.50	VOC	0.04	3,642,014	143,779	0.16
PM10	0.01	13,567,650	195,466	0.22	PM10	0.04	3,642,014	144,810	0.16
PM2.5	0.01	13,567,650	84,672	0.09	PM2.5	0.01	3,642,014	37,212	0.04
SO2	0.00	13,567,650	64,892	0.07	SO2	0.00	3,642,014	17,372	0.02
CO	1.09	13,567,650	14,799,550	16.31	CO	1.42	3,642,014	5,153,604	5.68
CO2	1430	13,567,650	19,397,155,172	21,382	CO2	1426	3,642,014	5,192,900,625	5,724
CH4	0.01	13,567,650	148,675	0.16	CH4	0.01	3,642,014	47,163	0.05
N2O	0.21	13,567,650	2,862,059	3.15	N2O	0.21	3,642,014	767,036	0.85
Acetaldehyde	1.37E-03	13,567,650	18,602	2.05E-02	Acetaldehyde	1.62E-03	3,642,014	5,901	6.50E-03
Acrolein	1.49E-04	13,567,650	2,026	2.23E-03	Acrolein	1.79E-04	3,642,014	651	7.18E-04
Benzene	7.18E-05	13,567,650	974	1.07E-03	Benzene	9.06E-05	3,642,014	330	3.64E-04
1,3-Butadiene	2.32E-05	13,567,650	315	3.48E-04	1,3-Butadiene	2.90E-05	3,642,014	106	1.16E-04
Ethyl Benzene	3.04E-04	13,567,650	4,127	4.55E-03	Ethyl Benzene	3.54E-04	3,642,014	1,290	1.42E-03
Formaldehyde	1.46E-03	13,567,650	19,743	2.18E-02	Formaldehyde	1.77E-03	3,642,014	6,459	7.12E-03
Napthalene	4.93E-05	13,567,650	670	7.38E-04	Napthalene	6.16E-05	3,642,014	224	2.47E-04
POM	1.27E-06	13,567,650	17	1.90E-05	POM	1.57E-06	3,642,014	6	6.30E-06
CO2e				22,222	CO2e				5,950

Notes:

CO2e values were calculated using the 100-year potential global warming potential (GWP) values from Table A-1 in 40 CFR 98.

MOVES Emission Rates assumed default inputs. County is in attainment and these results are for informational purposes only.

County-Level Default Scale with Default Inputs Except Average Speed Distribution

Average Speed Distribution has Speed Bin 15 set to 1 for No Action

Average Speed Distribution has Speed Bins 9, 10, and 15 set to 0.4276, 0.2886, and 0.2838 respectively for Proposed Action

These estimations are based on VMT and roadway details incl speed limits

Represents an average of emission factors for 8-9 AM on January weekdays

Maverick County, TX

Long and short-haul trucks with all fuel types included, although only diesel results are presented

Urban and Rural Unrestricited and Restricted Access Roadways included

TIGERweb (census.gov) for rural and urban classifications

Table H-14. Diesel Truck Idling Emissions at Border

Pollutant	Emission Rate (g/hr)	Trucks/year*	2031 No Action			2031 Proposed Action		
			Idle Time (hr)	Emissions (g/year)	Emissions (tons/year)	Idle Time (hr)	Emissions (g/year)	Emissions (tons/year)
NOX	22.07	289,067	0.70	4,442,132	4.90	0.18	1,169,822	1.29
VOC	0.52	289,067	0.70	103,982	0.11	0.18	27,383	0.03
PM10	0.59	289,067	0.70	119,142	0.13	0.18	31,376	0.03
PM2.5	0.11	289,067	0.70	21,180	0.02	0.18	5,578	0.01
SO2	0.02	289,067	0.70	3,742	0.00	0.18	985	0.00
CO	12.25	289,067	0.70	2,465,621	2.72	0.18	649,314	0.72
CO2	5,558	289,067	0.70	1,118,408,400	1,233	0.18	294,529,385	325
CH4	0.18	289,067	0.70	36,626	0.04	0.18	9,645	0.01
N2O	0.82	289,067	0.70	164,508	0.18	0.18	43,323	0.05
Acetaldehyde	2.13E-02	289,067	0.70	4,282	4.72E-03	0.18	1,128	1.24E-03
Acrolein	2.32E-03	289,067	0.70	468	5.16E-04	0.18	123	1.36E-04
Benzene	1.14E-03	289,067	0.70	230	2.54E-04	0.18	61	6.68E-05
1,3-Butadiene	3.59E-04	289,067	0.70	72	7.97E-05	0.18	19	2.10E-05
Ethyl Benzene	4.69E-03	289,067	0.70	944	1.04E-03	0.18	249	2.74E-04
Formaldehyde	2.30E-02	289,067	0.70	4,635	5.11E-03	0.18	1,221	1.35E-03
Napthalene	7.83E-04	289,067	0.70	158	1.74E-04	0.18	42	4.58E-05
POM	1.82E-05	289,067	0.70	4	4.04E-06	0.18	1	1.06E-06
CO2e					1,282			338

Source: MOVES4

Notes:

CO2e values were calculated using the 100-year potential global warming potential (GWP) values from Table A-1 in 40 CFR 98.

MOVES Emission Rates assumed default inputs. County is in attainment and these results are for informational purposes only.

County-Level Default Scale with Default Inputs Except Average Speed Distribution set to SpeedBin 1

Represents an average of emission factors for 8-9 AM on January weekdays

Maverick County, TX

Long and short-haul trucks with all fuel types included, although only diesel results are presented

Urban Unrestricited Access Roadways included

TIGERweb (census.gov) for rural and urban classifications

*Number of annual northbound trucks

Construction Analysis Tables

Table H-15. Construction Analysis- Equipment Emissions Criteria Pollutants

		Time Utilization	Year 1 - Q1	Year 1 - Q2	Year 1 - Q3	Year 1 - Q4	Year 2 - Q1	Year 2 - Q2	Load	Quantity	State and SCC	Criteria Pollutant Emission Factors (g/hr)									Construction Emissions (Rolling Construction Y1Q1 - Y1Q4 (tons/year))											
Construction Phase	Equipment	Factor	Working hrs	Working hrs	Working hrs	Working hrs	Working hrs	Working hrs	Factor	# of pcs	Code	NOX	VOC	PM10	PM2.5	SO2	CO	CO2	CH4	N2O	NOX	VOC	PM10	PM2.5	SO2	CO	CO2e	CO2	CH4	N2O
Rail Line Earthworks	Dumpers/Tenders	65%	1143	1143	286	0	0.00	0.00	0.21	4	TX-2270002023	24.34	4.13	2.75	2.66	0.02	19	4,743	0.22	0.04	0.04	0.01	0.00	0.00	0.00	0.03	7	7	0.00	0.00
Rail Line Earthworks	Rubber Tire Loaders	65%	1143	1143	286	0	0.00	0.00	0.59	2	TX-2270002020	117.12	5.65	6.06	5.88	0.21	34	77,271	0.44	0.09	0.25	0.01	0.01	0.01	0.00	0.07	168	168	0.00	0.00
Rail Line Earthworks	Graders	45%	571	1143	1143	0	0.00	0.00	0.59	1	TX-2270002078	30.11	1.92	2.05	1.99	0.17	9	64,850	0.13	0.03	0.03	0.00	0.00	0.00	0.00	0.01	54	54	0.00	0.00
Rail Line Earthworks	Rollers	30%	0	143	571	0	0.00	0.00	0.59	1	TX-2270002009	52.12	2.43	2.29	2.22	0.08	14	30,461	0.24	0.05	0.01	0.00	0.00	0.00	0.00	0.00	4	4	0.00	0.00
Rail Line Earthworks	Rubber Tire Loaders	70%	904	904	904	0	0.00	0.00	0.59	1	TX-2270002020	117.12	5.65	6.06	5.88	0.21	34	77,271	0.44	0.09	0.14	0.01	0.01	0.01	0.00	0.04	95	95	0.00	0.00
Rail Line Earthworks	Dumpers/Tenders	70%	904	904	904	0	0.00	0.00	0.21	4	TX-2270002023	24.34	4.13	2.75	2.66	0.02	19	4,743	0.22	0.04	0.04	0.01	0.00	0.00	0.00	0.03	8	8	0.00	0.00
Rail Line Earthworks	Graders	50%	571	571	571	0	0.00	0.00	0.59	1	TX-2270002078	30.11	1.92	2.05	1.99	0.17	9	64,850	0.13	0.03	0.02	0.00	0.00	0.00	0.00	0.01	36	36	0.00	0.00
Rail Line Earthworks	Rollers	40%	0	286	286	0	0.00	0.00	0.59	1	TX-2270002009	52.12	2.43	2.29	2.22	0.08	14	30,461	0.24	0.05	0.01	0.00	0.00	0.00	0.00	0.00	5	5	0.00	0.00
Rail Line Earthworks	Off-highway Trucks	30%	0	286	286	0	0.00	0.00	0.59	1	TX-2270002079	652.06	13.34	9.50	9.22	0.66	38	247,943	1.10	0.22	0.07	0.00	0.00	0.00	0.00	0.00	28	28	0.00	0.00
Rail Line Railroad	Cranes	30%	0	0	286	286	0.00	0.00	0.43	2	TX-2270002017	60.59	3.56	2.99	2.90	0.15	16	52,952	0.27	0.05	0.01	0.00	0.00	0.00	0.00	0.00	9	9	0.00	0.00
Rail Line Railroad	Railway Maintenance	30%	0	0	286	286	0.00	0.00	0.21	4	TX-2285002088	77.96	11.40	8.23	7.99	0.06	47	18,976	0.58	0.11	0.01	0.00	0.00	0.00	0.00	0.01	3	3	0.00	0.00
Rail Line Railroad	Rubber Tire Loaders	40%	0	0	286	143	0.00	0.00	0.59	1	TX-2270002020	117.12	5.65	6.06	5.88	0.21	34	77,271	0.44	0.09	0.01	0.00	0.00	0.00	0.00	0.00	9	9	0.00	0.00
Rail Line Railroad	Railway Maintenance	25%	0	0	36	36	0.00	0.00	0.21	1	TX-2285002088	77.96	11.40	8.23	7.99	0.06	47	18,976	0.58	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
Rail Line Railroad	Railway Maintenance	25%	0	0	36	36	0.00	0.00	0.21	1	TX-2285002088	77.96	11.40	8.23	7.99	0.06	47	18,976	0.58	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
Rail Line Bridge and Complementary Works	Off-highway Trucks	30%	143	143	143	143	142.86	142.86	0.59	3	TX-2270002079	652.06	13.34	9.50	9.22	0.66	38	247,943	1.10	0.22	0.22	0.00	0.00	0.00	0.00	0.01	83	83	0.00	0.00
Rail Line Bridge and Complementary Works	Graders	20%	0	0	0	0	142.86	142.86	0.59	1	TX-2270002078	30.11	1.92	2.05	1.99	0.17	9	64,850	0.13	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
Rail Line Bridge and Complementary Works	Rollers	30%	0	0	0	0	285.71	142.86	0.59	1	TX-2270002009	52.12	2.43	2.29	2.22	0.08	14	30,461	0.24	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
Rail Line Bridge and Complementary Works	Cranes	50%	0	0	143	286	285.71	142.86	0.43	2	TX-2270002017	60.59	3.56	2.99	2.90	0.15	16	52,952	0.27	0.05	0.01	0.00	0.00	0.00	0.00	0.00	11	11	0.00	0.00
Rail Line Bridge and Complementary Works	Air Compressors	40%	107	107	107	107	107.14	107.14	0.43	2	TX-2270006066	59.19	2.36	2.23	2.16	0.06	14	20,445	0.24	0.05	0.01	0.00	0.00	0.00	0.00	0.00	3	3	0.00	0.00
Rail Line Bridge and Complementary Works	Bore/Drill Rigs	30%	143	143	143	143	142.86	142.86	0.43	1	TX-2270002014	163.48	10.96	8.30	8.05	0.12	47	40,762	0.56	0.11	0.01	0.00	0.00	0.00	0.00	0.00	3	3	0.00	0.00
CMV Facility Earthworks	Rubber Tire Loaders	40%	750	750	0	0	0.00	0.00	0.59	2	TX-2270002020	117.12	5.65	6.06	5.88	0.21	34	77,271	0.44	0.09	0.09	0.00	0.00	0.00	0.00	0.03	60	60	0.00	0.00
CMV Facility Earthworks	Excavators	50%	857	857	0	0	0.00	0.00	0.59	2	TX-2270002077	40.11	1.86	1.77	1.71	0.15	9	54,730	0.15	0.03	0.04	0.00	0.00	0.00	0.00	0.01	61	61	0.00	0.00
CMV Facility Earthworks	Crawler Tractor/Dozers	65%	893	714	0	0	0.00	0.00	0.59	2	TX-2270002081	99.52	4.10	4.26	4.13	0.22	24	82,752	0.33	0.06	0.14	0.01	0.01	0.01	0.00	0.03	112	112	0.00	0.00
CMV Facility Earthworks	Rubber Tire Loaders	45%	0	1714	1143	0	0.00	0.00	0.59	2	TX-2270002020	117.12	5.65	6.06	5.88	0.21	34	77,271	0.44	0.09	0.20	0.01	0.01	0.01	0.00	0.06	129	129	0.00	0.00
CMV Facility Earthworks	Off-highway Trucks	65%	1286	1286	714	0	0.00	0.00	0.59	4	TX-2270002079	652.06	13.34	9.50	9.22	0.66	38	247,943	1.10	0.22	3.62	0.07	0.05	0.05	0.00	0.21	1,378	1,378	0.01	0.00
CMV Facility Earthworks	Dumpers/Tenders	65%	1143	1143	286	0	0.00	0.00	0.21	4	TX-2270002023	24.34	4.13	2.75	2.66	0.02	19	4,743	0.22	0.04	0.04	0.01	0.00	0.00	0.00	0.03	7	7	0.00	0.00
CMV Facility Earthworks	Graders	45%	0	0	0	1714	1,714.29	0.00	0.59	4	TX-2270002078	30.11	1.92	2.05	1.99	0.17	9	64,850	0.13	0.03	0.06	0.00	0.00	0.00	0.00	0.02	130	130	0.00	0.00
CMV Facility Earthworks	Rollers	40%	0	0	0	900	0.00	0.00	0.59	2	TX-2270002009	52.12	2.43	2.29	2.22	0.08	14	30,461	0.24	0.05	0.02	0.00	0.00	0.00	0.00	0.01	14	14	0.00	0.00
CMV Facility Earthworks	Tampers/Rammers	40%	0	0	1429	1429	0.00	0.00	0.43	4	TX-2270002007	7.58	1.49	0.47	0.45	0.00	5	1,062	0.13	0.03	0.02	0.00	0.00	0.00	0.00	0.01	2	2	0.00	0.00
CMV Facility Earthworks	Tractors/Loaders/Backhoes	45%	0	0	1500	1500	1,500.00	0.00	0.21	4	TX-2270002021	44.45	6.32	5.33	5.17	0.04	35	13,054	0.38	0.08	0.06	0.01	0.01	0.01	0.00	0.04	16	16	0.00	0.00
CMV Facility Earthworks	Rollers	30%	0	0	0	893	0.00	0.00	0.59	2	TX-2270002009	52.12	2.43	2.29	2.22	0.08	14	30,461	0.24	0.05	0.02	0.00	0.00	0.00	0.00	0.00	11	11	0.00	0.00
CMV Facility Earthworks	Rollers	30%	0	0	0	893	0.00	0.00	0.59	2	TX-2270002009	52.12	2.43	2.29	2.22	0.08	14	30,461	0.24	0.05	0.02	0.00	0.00	0.00	0.00	0.00	11	11	0.00	0.00
CMV Facility Earthworks	Dumpers/Tenders	70%	0	0	0	904	903.57	0.00	0.21	4	TX-2270002023	24.34	4.13	2.75	2.66	0.02	19	4,743	0.22	0.04	0.01	0.00	0.00	0.00	0.00	0.01	3	3	0.00	0.00
CMV Facility Pavement	Off-highway Trucks	40%	0	0	0	0	600.00	600.00	0.59	2	TX-2270002079	652.06	13.34	9.50	9.22	0.66	38	247,943	1.10	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
CMV Facility Pavement	Other Construction Equipment	40%	0	0	0	0	485.71	600.00	0.59	2	TX-2270002024	233.68	14.58	16.77	16.26	0.31	108	104,188	0.98	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
CMV Facility Pavement	Crushing/Proc. Equipment	50%	0	0	0	0	1,178.57	821.43	0.43	2	TX-2270002018	74.48	3.33	2.51	2.44	0.10	16	35,813	0.31	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
CMV Facility Pavement	Crushing/Proc. Equipment	50%	0	0	0	0	1,178.57	821.43	0.43	2	TX-2270002018	74.48	3.33	2.51	2.44	0.10	16	35,813	0.31	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
CMV Facility Pavement	Pavers	60%	0	0	0	0	0.00	857.14	0.59	2	TX-2270002006	53.06	2.13	2.20	2.13	0.11	12	40,395	0.22	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
CMV Facility Pavement	Tractors/Loaders/Backhoes	45%	0	0	0	0	0.00	571.43	0.21	4	TX-2270002021	44.45	6.32	5.33	5.17	0.04	35	13,054	0.38	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
CMV Facility Pavement	Rollers	30%	0	0	0	0	0.00	857.14	0.59	2	TX-2270002009	52.12	2.43	2.29	2.22	0.08	14	30,461	0.24	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
CMV Facility Pavement	Rollers	30%	0	0	0	0	0.00	857.14	0.59	2	TX-2270002009	52.12	2.43	2.29	2.22	0.08	14	30,461	0.24	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
CMV Facility Pavement	Dumpers/Tenders	70%	0	0	0	0	571.43	285.71	0.21	4	TX-2270002023	24.34	4.13	2.75	2.66	0.02	19	4,743	0.22	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
CMV Facility Buildings	Other Construction Equipment	70%	0	0	0	214	214.29	0.00	0.59	2	TX-2270002024	233.68	14.58	16.77	16.26	0.31	108	104,188	0.98	0.19	0.05	0.00	0.00	0.00	0.00	0.02	20	20	0.00	0.00
CMV Facility Buildings	Signal Boards/Light Plants	0%	0	0	143	857	857.14	857.14	0.43	6	TX-2270002012	34.62	3.02	1.46	1.41	0.02	12	6,059	0.27	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
CMV Facility Buildings	Excavators	80%	0	0	286	1429	1,428.57	1,428.57	0.59	6	TX-2270002077	40.11	1.86	1.77	1.71	0.15	9	54,730	0.15	0.03	0.21	0.01	0.01	0.01	0.00	0.05	293	293	0.00	0.00
CMV Facility Buildings	Cranes	40%	0	0	0	214	214.29	214.29	0.43	2	TX-2270002017	60.59	3.56	2.99	2.90	0.15	16	52,952	0.27	0.05	0.00	0.00	0.00	0.00	0.00	0.00	4	4	0.00	0.00
CMV Facility Bridge	Other Construction Equipment	70%	686	686	0	0	0.00	0.00	0.59	2	TX-2270002024	233.68	14.58	16.77	16.26	0.31	108	104,188	0.98	0.19	0.29	0.02	0.02	0.02	0.00	0.14	130	130	0.00	0.00
CMV Facility Bridge	Off-highway Trucks	50%	714	714	714	714	714.29	0.00	0.59	4	TX-2270002079	652.06	13.34	9.50	9.22	0.66	38	247,943	1.10	0.22	2.42	0.05	0.04	0.03	0.00	0.14	922	921	0.00	0.00
CMV Facility Bridge	Signal Boards/Light Plants	0%	0	714	714	714	928.57	642.86	0.43	6	TX-2270002012	34.62	3.02	1.46	1.41	0.02	12	6,059	0.27	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
CMV Facility Bridge	Surfacing Equipment	20%	0	714	714	714	928.57	642.86	0.59	6	TX-2260002011	9.15	31.11	0.76	0.70	0.02	1,162	4,964	3.43	0.67	0.02	0.05	0.00	0.00	0.00	1.94	9	8	0.01	0.00
CMV Facility Bridge	Bore/Drill Rigs	40%	0	571	500	500	0.00	0.00	0.43	2	TX-2270002014	163.48	10.96	8.30	8.05	0.12	47	40,762	0.56	0.11	0.10	0.01	0.00	0.00	0.00	0.03	24	24	0.00	0.00
CMV Facility Bridge	Cranes	40%	0	679	679	679	678.57	0.00	0.43	2	TX-2270002017	60.59	3.56	2.99	2.90	0.15	16	52,952	0.27	0.05	0.05	0.00	0.00	0.00	0.00	0.01	41	41	0.00	0.00
CMV Facility Bridge	Cranes	30%	0	0	714	714	714.29	535.71	0.43	2	TX-2270002017	60.59	3.56	2.99	2.90	0.15	16	52,952	0.27	0.05	0.02	0.00	0.00	0.00	0.00	0.01	22	22	0.00	0.00
CMV Facility Bridge	Cranes	30%	0	0	0	893	892.86	892.86	0.43	2	TX-2270002017	60.59	3.56	2.99	2.90	0.15	16	52,952	0.27	0.05	0.02	0.00	0.00	0.00	0.00	0.00	13	13	0.00	0.00
CMV Facility Bridge	Cranes	40%	0	893	893	893	0.00	0.00	0.43	2	TX-2270002017	60.59	3.56	2.99	2.90	0.15	16	52,952	0.27	0.05	0.06	0.00	0.00	0.00	0.00	0.02	54	54	0.00	0.00
CMV Facility Bridge	Pumps	0%	0	464	464	464	392.86	0.00	0.43	2	TX-2270006065	60.07	4.91	3.52	3.41	0.04	21	12,906	0.31	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
CMV Facility Bridge	Other Construction Equipment	0%	0	0	0	429	428.57	357.14	0.59	2	TX-2270002024	233.68	14.58	16.77	16.26	0.31	108	104,188	0.98	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
CMV Facility Fence	Tractors/Loaders/Backhoes	30%	129	129	0	0	0.00	0.00	0.21	1	TX-2270002021	44.45	6.32	5.33	5.17	0.04	35	13,054	0.38	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00
CMV Facility Complimentary Works	Tractors/Loaders/Backhoes	60%	0	0	0	0	464.29	50.00	0.21	1	TX-2270002021	44.45	6.32	5.33	5.17	0.04	35	13,054	0.38	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00

Notes:

Emission Factors were derived for the equipment using the Nonroad module within the MOVES

Nonroad run for 2025 Analysis

Maverick County, TX

Assumes Default Inputs and Population Data

Accounts for all months of year

Load Factors sourced from "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling" EPA, 2010, EPA-420-R-10-016

N2O not provided in Nonroad, Estimated using ratio between N2O/CH4 emission factors based on EPAs "Emission Factors for GHG Inventories" for diesel fuel

CO2e values were calculated using the 100-year potential global warming potential (GWP) values from Table A-1 in 40 CFR 98.

Table H-16. Construction Analysis- Equipment Emissions HAPS

												HAPs Emission Factors (g/hr)								Construction Emissions (Rolling Construction Y1Q1 - Y1Q4 (tons/year))							
Construction Phase	Equipment	Time Utilization Factor	Year 1 - Q1 Working hrs	Year 1 - Q2 Working hrs	Year 1 - Q3 Working hrs	Year 1 - Q4 Working hrs	Year 2 - Q1 Working hrs	Year 2 - Q2 Working hrs	Load Factor	Quantity # of pcs	State and SCC Code	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Ethyl Benzene	Formaldehyde	Naphthalene	POM	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Ethyl Benzene	Formaldehyde	Naphthalene	POM
Rail Line Earthworks	Dumpers/Tenders	65%	1143	1143	286	0	0.00	0.00	0.21	4	TX-2270002023	3.77E-01	8.96E-02	1.61E-01	7.66E-03	2.40E-02	1.06E+00	8.11E-03	6.17E-04	5.83E-04	1.39E-04	2.49E-04	1.19E-05	3.72E-05	1.64E-03	1.26E-05	9.55E-07
Rail Line Earthworks	Rubber Tire Loaders	65%	1143	1143	286	0	0.00	0.00	0.59	2	TX-2270002020	5.37E-01	9.83E-02	2.54E-01	9.60E-03	2.86E-02	1.47E+00	1.17E-02	8.06E-04	1.17E-03	2.14E-04	5.52E-04	2.09E-05	6.22E-05	3.19E-03	2.54E-05	1.75E-06
Rail Line Earthworks	Graders	45%	571	1143	1143	0	0.00	0.00	0.59	1	TX-2270002078	1.66E-01	2.79E-02	7.49E-02	2.59E-03	1.22E-02	4.21E-01	3.46E-03	2.35E-04	1.39E-04	2.33E-05	6.26E-05	2.16E-06	1.02E-05	3.52E-04	2.89E-06	1.96E-07
Rail Line Earthworks	Rollers	30%	0	143	571	0	0.00	0.00	0.59	1	TX-2270002009	2.42E-01	4.32E-02	1.21E-01	4.26E-03	1.16E-02	6.70E-01	5.53E-03	3.62E-04	3.37E-05	6.02E-06	1.69E-05	5.94E-07	1.61E-06	9.34E-05	7.71E-07	5.05E-08
Rail Line Earthworks	Rubber Tire Loaders	70%	904	904	904	0	0.00	0.00	0.59	1	TX-2270002020	5.37E-01	9.83E-02	2.54E-01	9.60E-03	2.86E-02	1.47E+00	1.17E-02	8.06E-04	6.62E-04	1.21E-04	3.13E-04	1.18E-05	3.53E-05	1.81E-03	1.44E-05	9.95E-07
Rail Line Earthworks	Dumpers/Tenders	70%	904	904	904	0	0.00	0.00	0.21	4	TX-2270002023	3.77E-01	8.96E-02	1.61E-01	7.66E-03	2.40E-02	1.06E+00	8.11E-03	6.17E-04	6.62E-04	1.57E-04	2.83E-04	1.35E-05	4.22E-05	1.86E-03	1.42E-05	1.08E-06
Rail Line Earthworks	Graders	50%	571	571	571	0	0.00	0.00	0.59	1	TX-2270002078	1.66E-01	2.79E-02	7.49E-02	2.59E-03	1.22E-02	4.21E-01	3.46E-03	2.35E-04	9.27E-05	1.55E-05	4.17E-05	1.44E-06	6.80E-06	2.34E-04	1.93E-06	1.31E-07
Rail Line Earthworks	Rollers	40%	0	286	286	0	0.00	0.00	0.59	1	TX-2270002009	2.42E-01	4.32E-02	1.21E-01	4.26E-03	1.16E-02	6.70E-01	5.53E-03	3.62E-04	3.60E-05	6.42E-06	1.80E-05	6.34E-07	1.72E-06	9.96E-05	8.22E-07	5.39E-08
Rail Line Earthworks	Off-highway Trucks	30%	0	286	286	0	0.00	0.00	0.59	1	TX-2270002079	1.33E+00	2.35E-01	6.68E-01	2.30E-02	6.56E-02	3.64E+00	2.91E-02	1.93E-03	1.48E-04	2.62E-05	7.45E-05	2.56E-06	7.32E-06	4.05E-04	3.24E-06	2.16E-07
Rail Line Railroad	Cranes	30%	0	0	286	286	0.00	0.00	0.43	2	TX-2270002017	3.36E-01	6.11E-02	1.58E-01	5.93E-03	1.85E-02	9.11E-01	7.27E-03	4.88E-04	5.46E-05	9.92E-06	2.57E-05	9.64E-07	3.01E-06	1.48E-04	1.18E-06	7.93E-08
Rail Line Railroad	Railway Maintenance	30%	0	0	286	286	0.00	0.00	0.21	4	TX-2285002088	1.02E+00	2.41E-01	4.24E-01	2.11E-02	6.44E-02	2.87E+00	2.17E-02	1.65E-03	1.63E-04	3.82E-05	6.74E-05	3.35E-06	1.02E-05	4.56E-04	3.44E-06	2.62E-07
Rail Line Railroad	Rubber Tire Loaders	40%	0	0	286	143	0.00	0.00	0.59	1	TX-2270002020	5.37E-01	9.83E-02	2.54E-01	9.60E-03	2.86E-02	1.47E+00	1.17E-02	8.06E-04	5.98E-05	1.10E-05	2.83E-05	1.07E-06	3.19E-06	1.64E-04	1.30E-06	8.99E-08
Rail Line Railroad	Railway Maintenance	25%	0	0	36	36	0.00	0.00	0.21	1	TX-2285002088	1.02E+00	2.41E-01	4.24E-01	2.11E-02	6.44E-02	2.87E+00	2.17E-02	1.65E-03	4.23E-06	9.94E-07	1.75E-06	8.73E-08	2.66E-07	1.19E-05	8.96E-08	6.82E-09
Rail Line Railroad	Railway Maintenance	25%	0	0	36	36	0.00	0.00	0.21	1	TX-2285002088	1.02E+00	2.41E-01	4.24E-01	2.11E-02	6.44E-02	2.87E+00	2.17E-02	1.65E-03	4.23E-06	9.94E-07	1.75E-06	8.73E-08	2.66E-07	1.19E-05	8.96E-08	6.82E-09
Rail Line Bridge and Complementary Works	Off-highway Trucks	30%	143	143	143	143	142.86	142.86	0.59	3	TX-2270002079	1.33E+00	2.35E-01	6.68E-01	2.30E-02	6.56E-02	3.64E+00	2.91E-02	1.93E-03	4.44E-04	7.85E-05	2.24E-04	7.69E-06	2.19E-05	1.22E-03	9.72E-06	6.47E-07
Rail Line Bridge and Complementary Works	Graders	20%	0	0	0	0	142.86	142.86	0.59	1	TX-2270002078	1.66E-01	2.79E-02	7.49E-02	2.59E-03	1.22E-02	4.21E-01	3.46E-03	2.35E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rail Line Bridge and Complementary Works	Rollers	30%	0	0	0	0	285.71	142.86	0.59	1	TX-2270002009	2.42E-01	4.32E-02	1.21E-01	4.26E-03	1.16E-02	6.70E-01	5.53E-03	3.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rail Line Bridge and Complementary Works	Cranes	50%	0	0	143	286	285.71	142.86	0.43	2	TX-2270002017	3.36E-01	6.11E-02	1.58E-01	5.93E-03	1.85E-02	9.11E-01	7.27E-03	4.88E-04	6.82E-05	1.24E-05	3.22E-05	1.20E-06	3.76E-06	1.85E-04	1.48E-06	9.92E-08
Rail Line Bridge and Complementary Works	Air Compressors	40%	107	107	107	107	107.14	107.14	0.43	2	TX-2270006066	2.36E-01	4.28E-02	1.17E-01	4.26E-03	1.08E-02	6.59E-01	5.48E-03	3.54E-04	3.83E-05	6.96E-06	1.89E-05	6.92E-07	1.75E-06	1.07E-04	8.90E-07	5.75E-08
Rail Line Bridge and Complementary Works	Bore/Drill Rigs	30%	143	143	143	143	142.86	142.86	0.43	1	TX-2270002014	9.75E-01	2.32E-01	3.99E-01	2.01E-02	6.38E-02	2.72E+00	2.07E-02	1.59E-03	7.92E-05	1.89E-05	3.24E-05	1.63E-06	5.18E-06	2.21E-04	1.68E-06	1.29E-07
CMV Facility Earthworks	Rubber Tire Loaders	40%	750	750	0	0	0.00	0.00	0.59	2	TX-2270002020	5.37E-01	9.83E-02	2.54E-01	9.60E-03	2.86E-02	1.47E+00	1.17E-02	8.06E-04	4.19E-04	7.67E-05	1.98E-04	7.49E-06	2.23E-05	1.15E-03	9.10E-06	6.29E-07
CMV Facility Earthworks	Excavators	50%	857	857	0	0	0.00	0.00	0.59	2	TX-2270002077	1.70E-01	2.91E-02	7.96E-02	2.76E-03	1.09E-02	4.44E-01	3.67E-03	2.43E-04	1.89E-04	3.24E-05	8.88E-05	3.08E-06	1.21E-05	4.95E-04	4.09E-06	2.71E-07
CMV Facility Earthworks	Crawler Tractor/Dozers	65%	893	714	0	0	0.00	0.00	0.59	2	TX-2270002081	3.87E-01	6.79E-02	1.85E-01	6.61E-03	2.18E-02	1.04E+00	8.39E-03	5.70E-04	5.26E-04	9.22E-05	2.52E-04	8.99E-06	2.96E-05	1.41E-03	1.14E-05	7.75E-07
CMV Facility Earthworks	Rubber Tire Loaders	45%	0	1714	1143	0	0.00	0.00	0.59	2	TX-2270002020	5.37E-01	9.83E-02	2.54E-01	9.60E-03	2.86E-02	1.47E+00	1.17E-02	8.06E-04	8.98E-04	1.64E-04	4.25E-04	1.61E-05	4.79E-05	2.45E-03	1.95E-05	1.35E-06
CMV Facility Earthworks	Off-highway Trucks	65%	1286	1286	714	0	0.00	0.00	0.59	4	TX-2270002079	1.33E+00	2.35E-01	6.68E-01	2.30E-02	6.56E-02	3.64E+00	2.91E-02	1.93E-03	7.37E-03	1.30E-03	3.71E-03	1.28E-04	3.65E-04	2.02E-02	1.61E-04	1.08E-05
CMV Facility Earthworks	Dumpers/Tenders	65%	1143	1143	286	0	0.00	0.00	0.21	4	TX-2270002023	3.77E-01	8.96E-02	1.61E-01	7.66E-03	2.40E-02	1.06E+00	8.11E-03	6.17E-04	5.83E-04	1.39E-04	2.49E-04	1.19E-05	3.72E-05	1.64E-03	1.26E-05	9.55E-07
CMV Facility Earthworks	Graders	45%	0	0	0	1714	1,714.29	0.00	0.59	4	TX-2270002078	1.66E-01	2.79E-02	7.49E-02	2.59E-03	1.22E-02	4.21E-01	3.46E-03	2.35E-04	3.34E-04	5.60E-05	1.50E-04	5.19E-06	2.45E-05	8.44E-04	6.94E-06	4.71E-07
CMV Facility Earthworks	Rollers	40%	0	0	0	900	0.00	0.00	0.59	2	TX-2270002009	2.42E-01	4.32E-02	1.21E-01	4.26E-03	1.16E-02	6.70E-01	5.53E-03	3.62E-04	1.13E-04	2.02E-05	5.67E-05	2.00E-06	5.41E-06	3.14E-04	2.59E-06	1.70E-07
CMV Facility Earthworks	Tampers/Rammers	40%	0	0	1429	1429	0.00	0.00	0.43	4	TX-2270002007	1.54E-01	2.78E-02	8.02E-02	2.76E-03	6.53E-03	4.33E-01	3.44E-03	2.21E-04	3.34E-04	6.03E-05	1.74E-04	5.99E-06	1.41E-05	9.39E-04	7.46E-06	4.78E-07
CMV Facility Earthworks	Tractors/Loaders/Backhoes	45%	0	0	1500	1500	1,500.00	0.00	0.21	4	TX-2270002021	5.91E-01	1.25E-01	2.62E-01	1.17E-02	3.20E-02	1.66E+00	1.26E-02	9.19E-04	7.38E-04	1.57E-04	3.27E-04	1.47E-05	4.00E-05	2.07E-03	1.57E-05	1.15E-06
CMV Facility Earthworks	Rollers	30%	0	0	0	893	0.00	0.00	0.59	2	TX-2270002009	2.42E-01	4.32E-02	1.21E-01	4.26E-03	1.16E-02	6.70E-01	5.53E-03	3.62E-04	8.43E-05	1.51E-05	4.22E-05	1.49E-06	4.03E-06	2.33E-04	1.93E-06	1.26E-07
CMV Facility Earthworks	Rollers	30%	0	0	0	893	0.00	0.00	0.59	2	TX-2270002009	2.42E-01	4.32E-02	1.21E-01	4.26E-03	1.16E-02	6.70E-01	5.53E-03	3.62E-04	8.43E-05	1.51E-05	4.22E-05	1.49E-06	4.03E-06	2.33E-04	1.93E-06	1.26E-07
CMV Facility Earthworks	Dumpers/Tenders	70%	0	0	0	904	903.57	0.00	0.21	4	TX-2270002023	3.77E-01	8.96E-02	1.61E-01	7.66E-03	2.40E-02	1.06E+00	8.11E-03	6.17E-04	2.21E-04	5.25E-05	9.43E-05	4.49E-06	1.41E-05	6.19E-04	4.75E-06	3.61E-07
CMV Facility Pavement	Off-highway Trucks	40%	0	0	0	0	600.00	600.00	0.59	2	TX-2270002079	1.33E+00	2.35E-01	6.68E-01	2.30E-02	6.56E-02	3.64E+00	2.91E-02	1.93E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CMV Facility Pavement	Other Construction Equipment	40%	0	0	0	0	485.71	600.00	0.59	2	TX-2270002024	1.36E+00	2.81E-01	6.19E-01	2.59E-02	7.75E-02	3.78E+00	2.95E-02	2.19E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CMV Facility Pavement	Crushing/Proc. Equipment	50%	0	0	0	0	1,178.57	821.43	0.43	2	TX-2270002018	3.21E-01	5.97E-02	1.54E-01	5.80E-03	1.65E-02	8.88E-01	7.34E-03	4.71E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CMV Facility Pavement	Crushing/Proc. Equipment	50%	0	0	0	0	1,178.57	821.43	0.43	2	TX-2270002018	3.21E-01	5.97E-02	1.54E-01	5.80E-03	1.65E-02	8.88E-01	7.34E-03	4.71E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CMV Facility Pavement	Pavers	60%	0	0	0	0	0.00	857.14	0.59	2	TX-2270002006	2.05E-01	3.61E-02	1.00E-01	3.51E-03	1.09E-02	5.59E-01	4.76E-03	3.05E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CMV Facility Pavement	Tractors/Loaders/Backhoes	45%	0	0	0	0	0.00	571.43	0.21	4	TX-2270002021	5.91E-01	1.25E-01	2.62E-01	1.17E-02	3.20E-02	1.66E+00	1.26E-02	9.19E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CMV Facility Pavement	Rollers	30%	0	0	0	0	0.00	857.14	0.59	2	TX-2270002009	2.42E-01	4.32E-02	1.21E-01	4.26E-03	1.16E-02	6.70E-01	5.53E-03	3.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CMV Facility Pavement	Rollers	30%	0	0	0	0	0.00	857.14	0.59	2	TX-2270002009	2.42E-01	4.32E-02	1.21E-01	4.26E-03	1.16E-02	6.70E-01	5.53E-03	3.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CMV Facility Pavement	Dumpers/Tenders	70%	0	0	0	0	571.43	285.71	0.21	4	TX-2270002023	3.77E-01	8.96E-02	1.61E-01	7.66E-03	2.40E-02	1.06E+00	8.11E-03	6.17E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CMV Facility Buildings	Other Construction Equipment	70%	0	0	0	214	214.29	0.00	0.59	2	TX-2270002024	1.36E+00	2.81E-01	6.19E-01	2.59E-02	7.75E-02	3.78E+00	2.95E-02	2.19E-03	2.66E-04	5.48E-05	1.21E-04	5.06E-06	1.51E-05	7.37E-04	5.76E-06	4.26E-07
CMV Facility Buildings	Signal Boards/Light Plants	0%	0	0	143	857	857.14	857.14	0.43	6	TX-2270002012	3.11E-01	5.67E-02	1.60E-01	5.60E-03	1.34E-02	8.75E-01	7.00E-03	4.54E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CMV Facility Buildings	Excavators	80%	0	0	286	1429	1,428.57	1,428.57	0.59	6	TX-2270002077	1.70E-01	2.91E-02	7.96E-02	2.76E-03	1.09E-02	4.44E-01	3.67E-03	2.43E-04	9.09E-04	1.56E-04	4.26E-04	1.48E-05	5.82E-05	2.38E-03	1.96E-05	1.30E-06
CMV Facility Buildings	Cranes	40%	0	0	0	214	214.29	214.29	0.43	2	TX-2270002017	3.36E-01	6.11E-02	1.58E-01	5.93E-03	1.85E-02	9.11E-01	7.27E-03	4.88E-04	2.73E-05	4.96E-06	1.29E-05	4.82E-07	1.51E-06	7.41E-05	5.91E-07	3.97E-08
CMV Facility Bridge	Other Construction Equipment	70%	686	686	0	0	0.00	0.00	0.59	2	TX-2270002024	1.36E+00	2.81E-01	6.19E-01	2.59E-02	7.75E-02	3.78E+00	2.95E-02	2.19E-03	1.70E-03	3.51E-04	7.72E-04	3.24E-05	9.67E-05	4.72E-03	3.68E-05	2.73E-06
CMV Facility Bridge	Off-highway Trucks	50%	714	714	714	714	714.29	0.00	0.59	4	TX-2270002079	1.33E+00	2.35E-01	6.68E-01	2.30E-02	6.56E-02	3.64E+00	2.91E-02	1.93E-03	4.93E-03	8.72E-04	2.48E-03	8.54E-05	2.44E-04	1.35E-02	1.08E-04	7.19E-06
CMV Facility Bridge	Signal Boards/Light Plants	0%	0	714	714	714	928.57	642.86	0.43	6	TX-2270002012	3.11E-01	5.67E-02	1.60E-01	5.60E-03	1.34E-02	8.75E-01	7.00E-03	4.54E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CMV Facility Bridge	Surfacing Equipment	20%	0	714	714	714	928.57	642.86	0.59	6	TX-2260002011	1.82E-01	9.11E-03	1.27E+00	2.52E-01	5.20E-01	3.57E-01	2.10E-02	5.49E-04	3.04E-04	1.52E-05	2.13E-03	4.21E-04	8.70E-04	5.97E-04	3.52E-05	9.18E-07
CMV Facility Bridge	Bore/Drill Rigs	40%	0	571	500	500	0.00	0.00	0.43	2	TX-2270002014	9.75E-01	2.32E-01	3.99E-01	2.01E-02	6.38E-02	2.72E+00	2.07E-02	1.59E-03	5.81E-04	1.38E-04	2.38E-04	1.20E-05	3.80E-05	1.62E-03	1.24E-05	9.49E-07
CMV Facility Bridge	Cranes	40%	0	679	679	679	678.57	0.00	0.43	2	TX-2270002017	3.36E-01	6.11E-02	1.58E-01	5.93E-03	1.85E-02	9.11E-01	7.27E-03	4.88E-04	2.59E-04	4.71E-05	1.22E-04	4.58E-06	1.43E-05	7.04E-04	5.61E-06	3.77E-07
CMV Facility Bridge	Cranes	30%	0	0	714	714	714.29	535.71	0.43	2	TX-2270002017	3.36E-01	6.11E-02	1.58E-01	5.93E-03	1.85E-02	9.11E-01	7.27E-03	4.88E-04	1.36E-04	2.48E-05	6.43E-05	2.41E-06	7.53E-06	3.70E-04	2.96E-06	1.98E-07
CMV Facility Bridge	Cranes	30%	0	0	0	893	892.86	892.86	0.43	2	TX-2270002017	3.36E-01	6.11E-02	1.58E-01	5.93E-03	1.85E-02	9.11E-01	7.27E-03	4.88E-04	8.52E-05	1.55E-05	4.02E-05	1.51E-06	4.71E-06	2.31E-04	1.85E-06	1.24E-07
CMV Facility Bridge	Cranes	40%	0	893	893	893	0.00	0.00	0.43	2	TX-2270002017	3.36E-01	6.11E-02	1.58E-01	5.93E-03	1.85E-02	9.11E-01	7.27E-03	4.88E-04	3.41E-04	6.20E-05	1.61E-04	6.02E-06	1.88E-05	9.26E-04	7.39E-06	4.96E-07
CMV Facility Bridge	Pumps	0%	0	464	464	464	392.86	0.00	0.43	2	TX-2270006065	4.56E-01	9.81E-02	2.00E-01	9.08E-03	2.53E-02	1.28E+00	9.82E-03	7.06E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CMV Facility Bridge	Other Construction Equipment	0%	0	0	0	429	428.57	357.14	0.59	2	TX-2270002024	1.36E+00	2.81E-01	6.19E-01	2.59E-02	7.75E-02	3.78E+00	2.95E-02	2.19E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CMV Facility Fence	Tractors/Loaders/Backhoes	30%	129	129	0	0	0.00	0.00	0.21	1	TX-2270002021	5.91E-01	1.25E-01	2.62E-01	1.17E-02	3.20E-02	1.66E+00	1.26E-02	9.19E-04	1.05E-05	2.24E-06	4.67E-06	2.09E-07	5.72E-07	2.96E-05	2.25E-07	1.64E-08
CMV Facility Complimentary Works	Tractors/Loaders/Backhoes	60%	0	0	0	0	464.29	50.00	0.21	1	TX-2270002021	5.91E-01	1.25E-01	2.62E-01	1.17E-02	3.20E-02	1.66E+00	1.26E-02	9.19E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Notes:

Emission Factors were derived for the equipment using the Nonroad module within the MOVES

Nonroad run for 2025 Analysis

Maverick County, TX

Assumes Default Inputs and Population Data

Accounts for all months of year

Load Factors sourced from "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling" EPA, 2010, EPA-420-R-10-016

N2O not provided in Nonroad, Estimated using ratio between N2O/CH4 emission factors based on EPAs "Emission Factors for GHG Inventories" for diesel fuel

Table H-17. Construction Analysis- Fugitive Dust Emissions

Rolling Year 1

						Days of Construction	Work Hours	Emission Factors (lbs/hr)		Construction Emissions (Rolling Construction Y1Q1 - Y1Q4 (tons/year))	
Site	**County**	**State**	**Attainment**	**NA Pollutant**	**Dust Source**	**days**	**hrs**	**PM10**	**PM2.5**	**PM10**	**PM2.5**
Rail Line	Maverick	TX	Attainment	N/A	General Construction	261	2086	0.13	0.013	0.14	0.01
Rail Line	Maverick	TX	Attainment	N/A	Earthwork	143	1143	49	4.9	28.00	2.80
CMV Facility	Maverick	TX	Attainment	N/A	General Construction	261	2086	0.13	0.013	0.14	0.01
CMV Facility	Maverick	TX	Attainment	N/A	Earthwork	261	2086	49	4.9	51.10	5.11

Notes:

Analysis done for the first rolling year as it has the highest construction emissions

Fugitive Dust Emissions rates taken from WRAP Fugitive Dust Handbook.

Western Governors' Association (WGA). "WRAP Fugitive Dust Handbook" September 7, 2006.

PM2.5 emissions were assumed to be 10 percent of the PM10 emissions as described by the guidance.

Table H-18. Construction Analysis- Emissions Yearly Summary

Construction Phase	Construction Emissions (Rolling Construction Y1Q1 - Y1Q4 (tons/year))																	
	NOX	VOC	PM10	PM2.5	SO2	CO	CO2e	CO2	CH4	N2O	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Ethyl Benzene	Formaldehyde	Napthalene	POM
Rail Line																		
Construction Equipment	0.90	0.05	0.04	0.04	0.00	0.24	527	527	0.00	0.00	4.44E-03	8.86E-04	2.04E-03	8.22E-05	2.54E-04	1.22E-02	9.61E-05	6.81E-06
Fugitive Dust	-	-	28.14	2.81	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rail Line Subtotal	0.90	0.05	28.18	2.85	0.00	0.24	527	527	0.00	0.00	4.44E-03	8.86E-04	2.04E-03	8.22E-05	2.54E-04	1.22E-02	9.61E-05	6.81E-06
CMV Facility																		
Construction Equipment	7.58	0.27	0.18	0.17	0.01	2.82	3,468	3,466	0.02	0.00	2.14E-02	3.93E-03	1.24E-02	7.96E-04	1.99E-03	5.85E-02	4.96E-04	3.24E-05
Fugitive Dust	-	-	51.24	5.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CMV Facility Subtotal	7.58	0.27	51.41	5.30	0.01	2.82	3,468	3,466	0.02	0.00	2.14E-02	3.93E-03	1.24E-02	7.96E-04	1.99E-03	5.85E-02	4.96E-04	3.24E-05
Overall Total	8.48	0.32	79.59	8.15	0.01	3.06	3,995	3,993	0.03	0.01	2.59E-02	4.81E-03	1.44E-02	8.78E-04	2.24E-03	7.07E-02	5.92E-04	3.92E-05

Notes:

Year 1 Quarters 1-4 was selected as the analysis year as it had the highest emissions of any rolling construction year.

Totals may not add exactly due to rounding.