Appendix B

Air Quality and Climate

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APPENDIX B:
Air Quality and Climate

1. Introduction

This appendix summarizes regulatory setting for air quality and climate, existing air quality conditions in the area surrounding BWI Marshall Airport, and the construction emissions analysis completed for the Proposed Action and No Action Alternatives.

2. Regulatory Setting

Federal, state, and local governments all share responsibility for air quality management. The federal Clean Air Act (CAA) is the primary statute that establishes national ambient air quality standards (NAAQS). It also establishes regulatory authorities to design and enforce air quality regulations. The EPA promulgates the NAAQS to safeguard public health and environmental welfare against the detrimental effects of ambient air pollution.

2.1 Air Quality Standards

The NAAQS set threshold levels for ambient (i.e., outdoor) air quality for six common air pollutants, referred to as "criteria" air pollutants: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2) sulfur dioxide (SO_2), coarse and fine particulate matter (PM_{10} and $PM_{2.5}$), and lead (Pb). Each state has the option to impose stronger air quality standards than those promulgated by the EPA, however Maryland has opted to retain the NAAQS. The NAAQS are provided in **Table 1**.

Table 1: National Ambient Air Quality Standards

Pollutant	Primary/ Secondary	Averaging Period	Standards
Carbon Monoxide (CO)	Primary	1-hour	35 ppm
		8-hour	9 ppm
Ozone (O_3)	Primary and Secondary	8-hour[a]	0.070 ppm
Nitrogen Dioxide (NO_2)	Primary	1-hour[b]	0.10 ppm
	Primary and Secondary	Annual	0.053 ppm
Sulfur dioxide (SO_2)	Primary	1-hour[c]	0.075 ppm
	Secondary	3-hour[d]	0.5 ppm
Coarse Particulate matter (PM_{10})	Primary and Secondary	24-hour	150 µg/m^3
Fine Particulate matter ($PM_{2.5}$)	Primary and Secondary	24-hour[d]	35 µg/m^3
	Primary	Annual[e]	12 µg/m^3
	Secondary	Annual[e]	15 µg/m^3
Lead (Pb)	Primary and Secondary	3-month[f]	0.15 µg/m^3

Notes: ppm = parts per million; and µg/m^3 = micrograms per cubic meter.

(a) Standard based on the annual fourth-highest daily maximum 8-hour concentration, averaged over three years.

(b) Standard based on the 98th percentile of 1-hour daily maximum concentrations, averaged over three years.

(c) Standard based on the 99th percentile of 1-hour daily maximum concentrations, averaged over three years.

(d) Standard based on the daily 98th percentile, averaged over three years.

(e) Standard based on annual mean, averaged over three years.

(f) Corresponds to a rolling three-month average over three years of monitoring data.

* *Primary standards* provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. *Secondary standards* provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

Source: USEPA NAAQS Table, https://www.epa.gov/criteria-air-pollutants/naaqs-table, and USEPA Green Book, https://www.epa.gov/green-book, accessed 9/14/23.

2.2 Air Quality Management Agencies

The management of air quality conditions in the state of Maryland is the responsibility of federal, regional, state, and local governmental air quality regulatory agencies. **Table 2** summarizes the federal, regional, state, and local agencies and their roles and responsibilities with regard to air quality management in Anne Arundel County.

Table 2: Agencies Involved with Air Quality Management in Anne Arundel County

Agency	Roles and Responsibilities
U.S. Environmental Protection Agency (EPA)	Sets national clean air policies under the federal CAA; promulgates the NAAQS; reviews and approves SIPs. Also, regulates aircraft emissions. Maryland is under the jurisdiction of EPA's Region 3
Federal Aviation Administration (FAA)	Ensures that airport related developments comply with NEPA as well as the General Conformity Rule of the CAA.
Federal Highway Administration (FHWA)	Responsible for the approval of roadway projects under NEPA and the Transportation Conformity Rule of the CAA. This includes working with MDOT and BMC in establishing the TIP and RTP for the Baltimore area.
Maryland Department of the Environment (MDE)	Implements and enforces air quality programs state-wide including those pertaining to ambient air monitoring, stationary source permitting, smoke management, regional haze, and PSD. Also, involved in the development of the SIPs in non-attainment areas in Maryland.
Maryland Department of Transportation (MDOT)	Works with the FHWA and BMC to coordinate the Baltimore regional components of the TIP and RTP into the STIP.
Ozone Transport Commission (OTC)	Created under the CAA, this regional agency advises the EPA on transport issues and for developing and implementing regional solutions to the ground-level ozone problem in the Northeast and Mid-Atlantic areas. Provides air pollution assessment, technical support and a forum through which states can work together on strategies to reduce air pollution.
Baltimore Metropolitan Council (BMC)	This local agency assists the MDE in the SIP preparation process specific to development of local control strategies for on-road and non-road mobile sources. Also, involved in the development of the Baltimore area TIP/RTP.

Notes: CAA = Clean Air Act, NAAQS = National Ambient Air Quality Standards, NEPA = National Environmental Policy Act, PSD = Prevention of Significant Deterioration, RTP = Regional Transportation Plan, SIP = State Implementation Plan, STIP = Statewide Transportation Improvement Plan, and TIP = Transportation Improvement Plan.
Source: KB Environmental Sciences, Inc. (2017), updated by HNTB, December 2023.

2.3 Attainment/Non-attainment Status

The EPA designates areas of the United States as either meeting or not meeting the NAAQS. An area that is meeting the NAAQS is designated an "attainment" area, while an area that is not meeting the NAAQS is designated as a "non-attainment" area. Areas that were once designated as "non-attainment," but are currently meeting the NAAQS are classified as a "maintenance" area. "Non-attainment" areas are pollutant specific (i.e., an area could have multiple "non-attainment" designations, one for each criteria pollutant not meeting the NAAQS).

BWI Marshall Airport is located in Anne Arundel County, which is currently designated "non-attainment" for the EPA criteria pollutants O_3 (2008[1] and 2015 standards) and SO_2 (2010 standard). This signifies that exceedances of the NAAQS have occurred within recent years.

Table 3 summarizes the NAAQS "attainment" and "non-attainment" designations for the area encompassing BWI Marshall Airport.

Table 3: Current Attainment / Non-attainment Designations

Pollutant	NAAQS	Designation
Carbon Monoxide (CO)	1971 Standard	Attainment
Ozone (O_3)	1979 (1-Hour) Standard	Revoked on June 15, 2005
	1997 (8-Hour) Standard	Revoked on April 6, 2015
	2008 (8-Hour) Standard	Non-attainment (Moderate)
	2015 (8-Hour) Standard	Non-attainment (Moderate)
Nitrogen Dioxide (NO_2)	1971 Standard	Attainment
Sulfur Dioxide (SO_2)	1971 Standard	Attainment
	2010 Standard	Non-attainment
Particulate Matter (PM_{10})	1987 Standard	Attainment
Particulate Matter ($PM_{2.5}$)	1997 Standard	Revoked on October 24, 2016[1]
	2006 Standard	Attainment
	2012 Standard	Attainment
Lead (Pb)	1978 Standard	Attainment
	2008 Standard	Attainment

Note: [1]Anne Arundel County was within a $PM_{2.5}$ maintenance area for the 1997 standard, however the 1997 standard was revoked on October 24, 2016.
Source: EPA, Green Book at https://www.epa.gov/green-book, October 2023.

2.4 State Implementation Plans

The CAA requires individual states to develop, update and maintain SIPs that will demonstrate compliance with the NAAQS. Common features of a SIP include attainment timeframes or milestones, area-wide emissions inventories and budgets and control/mitigation strategies that are to be employed to achieve attainment. SIPs may be revised by the state with EPA approval. The federally enforceable SIP for the State of Maryland is compiled under 40 CFR Part 52 Subpart V, § 52.1070. Section 110(a) of the CAA requires that within three years of the promulgation of a NAAQS, a state must adopt and submit such a plan to the EPA.

Maryland's Air Quality Planning Program (AQPP) is responsible for writing SIPs and regulations to reduce emissions of "criteria" air pollutants in order to achieve the NAAQS. It is also the responsibility of the AQPP to implement federal, regional, local, and state greenhouse gas (GHG) emissions reduction

[1] The EPA made a final determination that Baltimore, MD (including Anne Arundel County) attained the 2008 ozone standard by its applicable attainment date of July 20, 2018. As designated by the determinations published in the Federal Register on August 23, 2019, "These determinations of attainment do not constitute a redesignation to attainment as provided for under CAA section 107(d)(3). Redesignations require states to meet additional statutory criteria, including the EPA approval of a state plan demonstrating maintenance of the air quality standard for 10 years after redesignation, as required under CAA section 175A. As for all NAAQS, the EPA is committed to working with states that choose to submit redesignation requests for the 2008 ozone NAAQS."

programs, which include the implementation of Maryland's GHG Reduction Act of 2009 and 2016, as well as the involvement in the Regional Greenhouse Gas Initiative (RGGI).

In March 2023, MDE submitted an 8-hour O_3 SIP to EPA detailing the implementation, maintenance and enforcement of the 0.70 ppm 2015 8-hour O_3 NAAQS.[2,3] The plan includes commitments by the state to meet EPA requirements for moderate nonattainment areas and includes a contingency plan and analysis of Reasonably Available Control Measures (RACM). The plan details the progress made by the state and the ongoing efforts to reach the federal health standard for ground-level ozone by August 2024.

In January 2020, MDE submitted the 1-hour SO_2 SIP to EPA. Following EPA designation as a nonattainment area for the 2010 SO2 NAAQS in 2016, Section 192(a) of the CAA, 42 U.S.C. § 7514a(a), required SO2 nonattainment areas to attain the 2010 NAAQS no later than five years from the effective date of EPA's designations, which is September 12, 2021. The January 2020 SIP provides demonstration of attainment of the 2010 primary 1-hour NAAQS for SO2 in Anne Arundel and Baltimore Counties and includes provisions for further progress and implementation of RACM.

2.5 General Conformity Requirements

The General Conformity Rule of the federal CAA prohibits federal agencies (including the FAA) from permitting or funding projects that do not conform to an applicable SIP. The General Conformity Rule applies only to areas that are designated "non-attainment" or "maintenance."

As a means of demonstrating conformity with the SIP, project-related emissions of the applicable "non-attainment/maintenance" pollutants are compared to *de minimis* level thresholds. If the emissions exceed the thresholds, a formal Conformity Determination is required to demonstrate that the action conforms to the applicable SIP. Conversely, if project-related emissions are below the *de minimis* levels the project is automatically assumed to conform to the SIP. BWI Marshall Airport currently resides within the "non-attainment" areas for O_3 (2015 standard) and SO_2, and therefore are subject to the applicable *de minimis* levels listed in **Table 4.** As shown, these thresholds apply to SO_2 as well as NO_x and VOCs – the two primary precursors to ozone formation.

In addition to the General Conformity Rule requirements, the NEPA also requires environmental review of federally-funded projects that have the potential to affect the environment. Therefore, for disclosure purposes under NEPA a construction emissions inventory of the Proposed Action projects is presented in *Chapter 4* of this EA.

Table 4: General Conformity *de minimis* Levels

Pollutant	Tons per year
O_3	100 for NO_x and 50 for VOCs
SO_2	100

Source: EPA, *De Minimis* Emission Levels, De Minimis Tables | US EPA, accessed October 2023.

2.6 Climate Regulations

This section includes information on existing climate regulations at BWI Marshall Airport (and the surrounding areas). Because activities at BWI Marshall Airport contribute to climate change, the Airport is subject to any federal, state or local greenhouse gas (GHG) guidance or regulations.

[2] VOC and NO_x are considered ozone precursor pollutants.
[3] Baltimore Moderate Nonattainment Area 0.070 ppm 8-Hour Ozone State Implementation Plan, March 2023.

GHGs include CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Increasing concentrations of GHGs in the atmosphere affect climate change and GHG emissions from anthropogenic sources include the combustion of fossil fuels, including aircraft fuel. GHG emissions are reported in metric tonnes (MT) of carbon dioxide equivalent (CO_2e).[4]

Federal Guidance

Research has shown that the increase in atmospheric GHG emissions is significantly affecting the Earth's climate. These conclusions are based upon a scientific record that includes substantial contributions from the United States Global Change Research Program (USGCRP)—a program mandated by Congress in the Global Change Research Act to "assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change.[5]

Although there are currently no federal standards for ambient concentrations of GHGs, by the summer of 2016, the EPA acknowledged that scientific assessments by that time "highlight the urgency of addressing the rising concentration of carbon dioxide (CO_2) in the atmosphere" and formally announced that GHG emissions from certain classes of aircraft engines contribute to climate change.[6,7] EPA data indicates that of the five major sectors nationwide—residential and commercial, industrial, agriculture, transportation, and electricity—the transportation industry accounts for the largest portion of U.S GHG emission (28.5 percent) in 2021, followed by emissions from electric power generation (25 percent), and emissions from industry (23.5 percent). Of the 28.5 percent attributed to transportation industry, 8.6 percent is attributed to aircraft (or 2.5 percent of all GHG emissions).[8]

Executive Order 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis* was signed on January 20, 2021, rescinded the 2019 CEQ *Draft NEPA Guidance on Consideration of GHG Emissions*. On January 9, 2023, CEQ issued interim *NEPA Guidance on Consideration of GHG Emissions and Climate Change,* with an extended comment period to April 10, 2023. The interim guidance explains how agencies should immediately apply best practices to climate change analyses, including but not limited to: recommendations for quantifying a proposed action's reasonably foreseeable direct and indirect GHG emissions or reductions, guidance on translating climate impacts into social cost, and guidance in considering reasonable alternatives and mitigation measures for short and long term climate effects.

State Guidance

On April 4th, 2016, Maryland's Greenhouse Gas Emissions Reduction Act (GGRA) of 2016 was signed into law. The bill (i.e., SB 323/HB 610) renews the 2009 Maryland law that set goals to reduce GHG emissions statewide by 25 percent by 2020 (from 2006 levels). The 2016 extended the GHG reduction goal to reduce GHG emissions by 40 percent by 2030. In a September 2022 progress report, MDE announced a 30% reduction in statewide GHG emissions in 2020. The Maryland Climate Solutions Now Act of 2022 updated the requirements of the GGRA, including a net-zero carbon emissions goal by 2045,

[4] FAA, 1050.1F Desk Reference, Version 2, Chapter 3. Climate, February 2020.
[5] Global Change Research Act of 1990, Pub. L. 101–606, Sec. 103 (November 16, 1990). For additional information on the United States Global Change Research Program, http://www.globalchange.gov. (January 2017)
[6] EPA, Final Rule for Carbon Pollution Emission Guidelines for Existing Stationary Sources Electric Utility Generating Units, 80 Fed. Reg. 64661, 64677 (October 23, 2015).
[7] EPA finalized findings that GHG emissions from certain classes of engines used in aircraft contribute to the air pollution that causes climate change endangering public health and welfare under section 231(a) of the Clean Air Act.
[8] GHG allocation by economic sector. U.S. Environmental Protection Agency (2016). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021, https://www.epa.gov/system/files/documents/2023-04/US-GHG-Inventory-2023-Main-Text.pdf (April 23, 2023).

and requiring MDE to submit an updated plan to the Governor by the end of 2023 to reduce statewide emissions by 60% by 2031.

The GGRA requires MDE to publish an inventory of statewide GHG emissions on a three year cycle. The latest inventory was completed in 2020 and includes 29.8 million MT CO_2e emissions from the transportation sector, accounting for 35% of the total GHG inventory, with approximately 2.4 million MT CO_2e from aircraft emissions.[9]

The 2015 Maryland Commission on Climate Change (MCCC) Act requires the MCCC and participating agencies to maintain action plans with 5-year benchmarks to achieve Maryland's GHG reduction goals. As a member of the MCCC, MDOT works with MDE and other state agencies to develop strategies for the transportation sector to reduce GHG emissions. The 2022 MDOT Progress Report on the Maryland GGRA details various MDOT strategies to reduce GHG emissions, including transportation technologies, VMT reduction, congestion mitigation, and infrastructure design.[10]

Local/MAA

MAA is in the process of developing a Sustainability Plan which will establish performance metrics across four pillars of sustainability – environment, social, human and economic - to achieve GHG emission reduction goals at BWI Marshall Airport and MTN Airport. The Sustainability Plan will help MAA align their investments for a more sustainable future, with a focus on protecting the environment, conserving resources, maintaining economic growth, and benefitting local communities.

3. Airport Air Emissions

Airport-related air emissions associated with BWI Marshall Airport can be classified into six typical source categories. **Table 5** summarizes these airport-related emissions sources, their general characteristics, and pollutants emitted.

Because the Proposed Action will not affect aircraft operations or other airside activities, an existing operational emissions inventory was not prepared. Only construction emissions would be impacted by the projects reviewed in this EA, which are analyzed and presented in Section 4.

[9] MDE, 2020 Greenhouse Gas Inventory, https://mde.maryland.gov/programs/air/ClimateChange/Pages/GreenhouseGasInventory.aspx, accessed 6/23/23.
[10] Maryland Greenhouse Gas Reduction Act, 2022 MDOT Status Report, MDOT_MCCC_State_Agency_Report_MSAR_14367.pdf (maryland.gov), accessed 10/23/23.

Table 5: Typical Airport-Related Sources of Air Pollutant Emissions

Source	Pollutant	Characteristic
Aircraft	CO, VOC, NOx, PM, SO_2, GHGs[1]	Exhaust products of fuel combustion that vary greatly depending on aircraft engine type, power setting, and period of operation. For airport air quality assessments, these emissions are confined to the typical landing and take-off cycle (i.e., landing, take-off, climb-out, and taxi/delay periods).
Ground Access Vehicles	CO, VOC, NOx, PM, SO_2, GHGs	Exhaust products of fuel combustion from passenger, cargo, and employee traffic moving about the airport roadways and parking facilities. Emissions vary depending on vehicle type, fuel type, distance traveled, operating speed, ambient conditions (i.e., temperature), and roadway operating conditions (i.e., "stop-and-go" versus free-flow). Off-site airport-related motor vehicles traveling on public highways and roadways or using off-airport parking facilities are not included.
Ground Support Equipment (GSE) / Auxiliary Power Units (APUs)	CO, VOC, NOx, PM, SO_2, GHGs[1]	Exhaust products of fuel combustion from service trucks, tow tugs, belt loaders, and other portable equipment. Emissions vary by engine and fuel types. Also, includes exhaust emissions from aircraft on-board engines used for supplemental electricity and air conditioning.
Stationary Sources (Non-combustion sources)	VOC, PM	Formed from the evaporation and vapor displacement of fuel from storage tanks and fuel transfer facilities. Emissions vary with fuel usage, type of storage tank, refueling method, fuel type, vapor recovery systems, humidity, and ambient temperature. This category includes application of solvents and coatings. PM emissions can occur during loading and unloading of the piles and through wind erosion of the pile material.
Stationary Sources (Combustion sources)	CO, VOC, NOx, PM, SO_2, GHGs	Exhaust products of fossil fuel combustion from boilers dedicated to indoor heating requirements; emergency power generators; and food preparation.
Construction Activities	CO, VOC, NOx, PM, SO_2, GHGs	Construction activities represent temporary sources of emissions primarily associated with the exhaust from construction equipment; dust generated during construction, demolition, and land clearing activities; and evaporative VOC from asphalt paving operations.

Note: GHGs are represented by CO_2, CH_4, and N_2O.

[1] Contributions of CH4 emissions from commercial aircraft are reported as zero. Years of scientific measurement campaigns conducted at the exhaust exit plane of commercial aircraft gas turbine engines have repeatedly indicated that CH4 emissions are consumed over the full emission flight envelope [Reference: *Aircraft Emissions of Methane and Nitrous Oxide during the Alternative Aviation Fuel Experiment*, Santoni et al., Environ. Sci. Technol., July 2011, Volume 45, pp. 7075-7082]. As a result, the EPA published that: "…methane is no longer considered to be an emission from aircraft gas turbine engines burning Jet A at higher power settings and is, in fact, consumed in net at these higher powers." [Reference: EPA, *Recommended Best Practice for Quantifying Speciated Organic Gas Emissions from Aircraft Equipped with Turbofan, Turbojet, and Turboprop Engines*, May 27, 2009 [EPA-420-R-09-901], http://www.epa.gov/otaq/aviation.htm]. In accordance with the following statements in the 2006 IPCC Guidelines (IPCC 2006), the FAA does not calculate CH_4 emissions for either the domestic or international bunker commercial aircraft jet fuel emissions inventories. "Methane (CH_4) may be emitted by gas turbines during idle and by older technology engines, but recent data suggest that little or no CH_4 is emitted by modern engines." "Current scientific understanding does not allow other gases (e.g., N_2O and CH_4) to be included in calculation of cruise emissions." (IPCC 1999)

Source: FAA, Aviation Emissions and Air Quality Handbook, Version 3, Update 1, Table 3-2. Sources of Air Emissions and Pollutants of Concern at Airports, page 16, accessed December 2023.

3.1 Existing Ambient Air Quality Monitoring

MDE maintains and operates 24 air quality monitoring stations throughout Maryland as part of its permanent, state-wide air monitoring program. These monitoring stations are used to measure concentrations of air pollutants in the ambient (i.e., outdoor) air to determine compliance with the NAAQS. **Table 6** shows the most recent three years (2020 – 2022) of ambient air quality monitoring data for the monitors closest to BWI Marshall Airport. For ease of reference, the applicable NAAQS for each monitored pollutant is included. Although BWI Marshall Airport is within "non-attainment" areas for O_3 and SO_2, based on these ambient air quality data, the NAAQS for all criteria pollutants are being met.

Table 6: Air Monitoring Data in the BWI Marshall Airport Area (2020-2022)

Site Name, Address, and ID (Distance)	Pollutant	Averaging Period	NAAQS	Year		
				2020	2021	2022
Anne Arundel County Public Works Building 7409 Baltimore Annapolis Blvd. Glen Burnie, MD 24-003-1003, (1 mile E)	O_3	8-hour[1]	0.07 ppm	0.07	0.07	0.07
	PM_{10}	24-hour[2]	150 µg/m^3	28	31	26
Essex 600 Dorsey Avenue Baltimore County, MD 024-005-3001 (13 miles NE)	SO_2	3-hour[3]	0.5 ppm	0.01	0.01	0.003
		1-hour[4]	75 ppb	9	7	5
	CO	8-hour[5]	9 ppm	2	1	1
		1-hour[5]	35 ppm	2	2	2
	$PM_{2.5}$	Annual[6]	12 µg/m^3	7	8	7
		24-hour[7]	35 µg/m^3	20	20	14
	NO_2	Annual	53 ppb	8	9	9
		1-hour[8]	100 ppb	39	37	38
Oldtown Fire Station, 1100 Hillen Street Baltimore City, MD 24-510-0040, (8 miles NE)	NO_2	Annual	53 ppb	12	12	n/a
		1-hour[8]	100 ppb	48	49	n/a

Notes: ppm = parts per million, µg/m^3 = micrograms per cubic meter, and NAAQS = National Ambient Air Quality Standards. n/a = not applicable (monitoring station did not record pollutant level in given year). There are no active lead (Pb) monitoring stations in the vicinity of BWI Marshall.

(1) Standard based on the annual fourth-highest daily maximum 8-hour concentration, averaged over three years.
(2) Not to be exceeded more than once per year on average over three years.
(3) The SO_2 3-hour standard is a "secondary" standard not to be exceeded more than once per year.
(4) Standard based on the 99th percentile of 1-hour daily maximum concentrations, averaged over three years.
(5) Not to be exceeded more than once per year.
(6) Standard based on annual mean, averaged over three years.
(7) Standard based on the daily 98th percentile, averaged over three years.
(8) Standard based on the 98th percentile of 1-hour daily maximum concentrations, averaged over three years.

Sources: EPA AirData – Monitor Value Reports, http://www.epa.gov/airdata/, 2020, 2021 and 2022 Annual Reports, accessed 8/10/23.

3.2 Existing and New Permits

Air emissions from BWI Marshall Airport are regulated under their current Title V Air Permit, which is administered by the EPA. This permit is valid through January 31, 2024. Any additional air emission sources that are operated as a result of the proposed projects at BWI Marshall Airport would operate under this permit.

4. Construction Emissions Analysis

This section presents the methodology, background, assumptions and approach for preparing criteria pollutant and pollutant precursor construction emissions inventories. For purposes of the air quality analysis, the study area is considered the entire geographic area that could be impacted by the Proposed Action. Therefore, study area for air quality is the Metro Baltimore Region, as defined by MDE, which includes Anne Arundel and parts of Baltimore Counties.[11]

Construction-related emissions are typically associated with the exhaust from heavy equipment (e.g., backhoes, graders, etc.), delivery trucks (e.g., dump trucks, construction materials delivery), and construction worker vehicles traveling to and from the construction site. There are also emissions (i.e., dust) associated with site preparation, land clearing, and equipment traversing unpaved areas. Construction emissions are temporary in nature and generally confined to the construction site and roads used to enter and exit the construction site. Emissions of CO, NO_x, VOC, SO_x, $PM_{2.5}$, PM_{10}, as well as Greenhouse Gas Emissions (GHG) (i.e., CO_2, CH_4, N_20, and CO_{2e}) were evaluated for the Proposed Action's five-year construction period, 2025-2029.

4.1 Methodology

Emissions inventories were prepared to evaluate pollutant or pollutant precursor emissions associated with construction of the Proposed Action for years 2025 and 2027-2029 and the No Action for 2025.[12]

The Airport Construction Emissions Inventory Tool (ACEIT), developed by the Transportation Research Board (TRB) Airport Cooperative Research Program (ACRP) under Project 02-33, was used to identify the types of construction activities and equipment/vehicle activity data for the air quality analysis. For this analysis, ACEIT was also used to derive the hours of operation for off-road construction equipment and vehicle miles traveled (VMT) for on-road trucks and employee vehicles. Construction activity levels were derived in ACEIT based on MAA conceptual designs, including the known areas (square feet) associated with the site clearing and building areas, as well as preliminary project costs. The construction activity levels developed in the ACEIT model were then used to calculate emissions using emission factors obtained from OFFROAD2017 (non-road equipment) and EPA's Motor Vehicle Emissions Simulator (MOVES, Version 3). The emissions inventories were compared to NAAQS general conformity thresholds.[13]

The Proposed Action Alternative would not increase flights, passenger loads, operational procedures, or vehicular traffic. Without the proposed improvements, operations would continue to grow as there are no constraints to continued growth, i.e., the airfield, general aviation, terminal, landside, and support facilities can accommodate additional operations without improvements. There would be no difference in operational emissions between the No Action and Proposed Action Alternatives and therefore, an operational emissions analysis was not prepared.

The greenhouse gases (GHGs) inventoried were carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). As is customary for GHG emissions inventories, the results are reported in units of metric tons (MT) of carbon dioxide equivalents (CO_2e), by source, on an annual basis. The GHG emission results were converted to CO_2e values using the Global Warming Potential (GWP) values of 1 for CO_2, 28 for

[11] Maryland Department of the Environment, Air Quality Forecast, Air Quality Forecast (maryland.gov), accessed 10/11/23.
[12] The removal of LOS obstructions between the existing and new ATCT and future Taxiway F, as well as the Part 77 obstructions would occur in 2025. Construction of the Proposed Action projects (new ATCT, FAA office space, new hotel, and utility relocations) would occur from 2027 through 2029. There are no construction emissions associated with the supplemental ATCT upgrades as they are all internal to the existing ramp tower.
[13] 40 CFR § 93 – Determining Conformity of Federal Actions to State or Federal Implementation Plans, Section 153, Applicability.

CH_4, and 265 for nitrous oxide (N_2O), based on a 100-year period.[14] GWP values are relative measures of how much heat a GHG traps in the atmosphere when compared to carbon dioxide (e.g., CH_4 is 28 times as potent a GHG than CO_2). For this purpose, estimates of CH_4 and N_2O emissions were multiplied by their respective GWP values (28 for CH_4 and 265 for N_2O) to determine the CO_2e.

Social Cost of GHG

On January 9, 2023, CEQ issued interim *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change.* The guidance updates CEQ's 2016 guidance and explains how agencies should use best practices in their climate change analyses, including quantifying a project's reasonably foreseeable direct and indirect gross and net GHG emissions and monetizing the social cost of those emissions. In compliance with this guidance, the social cost of GHG (SC-GHG) emissions was calculated.

Directly following issuance of EO 13990 in 2021, the Interagency Working Group (IWG) on the SC-GHG developed a technical support document on the *Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990*. Estimating the SC-GHG allows the public to understand the social cost of increasing emissions or benefits from reducing emissions which aid in the policy making process. "The SC-GHG is the monetary value of the net harm to society associated with adding a small amount of that GHG to the atmosphere in a given year. In principle, it includes the value of all climate change impacts, including (but not limited to) changes in net agricultural productivity, human health effects, property damage from increased flood risk natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services. The SC-GHG, therefore, should reflect the societal value of reducing emissions of the gas in question by one ton. The marginal estimate of social costs will differ by the type of greenhouse gas (such as carbon dioxide, methane, and nitrous oxide) and by the year in which the emissions change occurs. The SC-GHGs are calculated along a baseline path and provide a measure of the marginal benefit of GHG abatement. Thus, they are the theoretically appropriate values to use when conducting benefit-cost analyses of policies that affect GHG emissions."[15]

The SC-GHG was calculated for the CO_2 equivalents of CO_2, CH_4, and N_2O emissions for the Proposed Action and No Action Alternative using the IWG recommended average discount rates of 2.5 percent, 3 percent, 5 percent and the 95th percentile estimate with the 3 percent discount rate. The discount rate considers how much weight is placed on impacts that occur in the future, with a higher discount rate assuming that the future effects are considered less significant that the present effects, and a lower discount rate assumes that future and present effects are more equally significant.

4.2 Project Schedule, Duration and Areas

Table 7 summarizes the project elements, anticipated construction duration, project area and estimated total cost. Project areas and cost are based on the Terminal C/D Connector Concept Schematic Design, March 2023.

[14] IPCC, 2014: *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, pg. 87.

[15] IWG SC-GHG, *Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990, February 2021, p.9.*

Table 7: Projects, Duration, and Area

Project Element	Description	Construction Duration	Area	Cost
Tree Clearing	Clearing of 13 acres of forest area[1]	1/2025-3/2025	13 acres (566,280 SF)	$260,000
Supplemental Tower Upgrades[2]	Internal upgrades to the existing ramp tower	2026	n/a	n/a
ATCT	12-story tower and base building	1/2027-12/2028	36,016 SF	$61,000,000
Hotel	10-story, 257 room hotel	2/2027-7/2029	220,176 SF[3]	$120,700,000
C-D Connector	4-story C-D Connector base building beneath hotel, including MAA/FAA office space	2/2027-7/2029	306,909 SF[4]	$371,300,000

Notes:
[1] The tree clearing study area is 13 acres, however total tree clearing will be less than 13 acres due to proposed select tree removal or tree felling in the area east of Taxilane W. Therefore, 13 acres clearing is a conservative estimate of removal for emissions calculations. Tree clearing cost is based on a rough assumption of $20,000/acre clearing of 13 total acres.
[2] Supplemental tower upgrades will be completed in 2026, however there are no construction emissions associated with the project as it is all internal to the existing ramp tower building.
[3] Hotel area includes 168,060 SF assumed for the building space program plus an additional 52,116 SF for building allowance (50% of total program allowance) (Table 3.4-1 of Terminal C/D Connector Concept Schematic Design, March 2023).
[4] C-D Connector area includes 147,793 SF terminal space and 107,000 SF MAA office space assumed for the building space program plus an additional 52,116 SF for building allowance (50% of total program allowance) (Table 3.4-1 of Terminal C/D Connector Concept Schematic Design, March 2023).
Source: Terminal C/D Connector Concept Schematic Design, March 2023, and HNTB schedule assumptions.

4.3 ACEIT

ACEIT facilitates the modeling of emissions through user defined input of construction scenarios, project types, and overall project size inputs (i.e., cost and dimensions). Associated with the user input project types, ACEIT provides default input data for construction activities, equipment types, fuel types, size details and emission factors.

Attachment 1, ACEIT Input provides the ACEIT input summary sheets, with separate scenarios developed for each project element (tree clearing, ATCT, hotel and C-D Connector).

Scenarios

ACEIT requires project activity to be grouped by Scenario. A Scenario includes the project year, number of months, season (summer/winter), and average weather temperature inputs (average daily temperature, maximum and minimum daily temperature change). The project year and season and weather inputs are used to determine emission factors. Because ACEIT emission factors are not ultimately used to calculate construction emissions, specific project year is not relevant to the set up and weather data was not collected and default “summer” and temperature inputs were used to set up the scenarios.

Four scenarios were set up to represent the proposed improvements. Projects were assumed to occur in a single calendar year for purposes of deriving activity levels in ACEIT:

- Scenario 1: Tree Removal (3 months)
- Scenario 2: ATCT (12 months)
- Scenario 3: Hotel (12 months)
- Scenario 4: C-D Connector (12 months)

Project Type

Project types, construction activity types, fuel type and equipment were then selected for each scenario. To be conservative, all default construction activity types and diesel equipment were selected for project types, with the exception of removing site restoration and underground services for the "Site Work" project type used to represent tree clearing. The following summaries the project types selected for each scenario. Unless noted otherwise, all default construction activity types were used for each project type.

- Scenario 1: LOS and Part 77 Obstruction Tree Removal, including the following ACEIT project type, and associated construction activities were used in the model:
  - Site Work – 10,000 SF[16] (construction mob & layout, and site clearing – remove trees & shrubs)

- Scenario 2: ATCT, including the following ACEIT project type, and associated construction activities were used in the model:
  - Building – 100,000 SF – 10 stories[17] (concrete foundations, construction mob & layout, exterior wall framing, interior build-out/ finishes, roofing, security & safety systems, structural steel erection & decks)

- Scenario 3: Hotel, including the following ACEIT project type, and associated construction activities were used in the model:
  - Building – 100,000 SF – 10 stories[18] (concrete foundations, construction mob & layout, exterior wall framing, interior build-out/ finishes, roofing, security & safety systems, structural steel erection & decks)

- Scenario 4: C-D Connector, including the following ACEIT project type, and associated construction activities were used in the model:
  - Building – 30,000 SF. – 3 stories[19] (concrete foundations, construction mob & layout, exterior wall framing, interior build-out/ finishes, roofing, security & safety systems, structural steel frame)

Overall Size

The ACEIT model requires a minimal set of overall project size and characteristic data to model each project type. For the project types selected, input of estimated cost is required. Project size details was assumed in the project type selected (i.e., 10,000 SF site work or 100,000 SF building). The construction activity levels derived were then scaled up or down to represent the exact project area. For example, the hotel is assumed to be 220,000 SF. Therefore, the activity levels generated for the 100,000 SF building project type were multiplied by 2.2 to obtain estimated activity levels.

[16] Construction activity levels for "Site Work – 10,000 SF" were multiplied by 56.6 to obtain activity levels for 13 acres (566,280 SF) of tree clearing.
[17] Construction activity levels for "Building – 100,000 SF -10 stories" were multiplied by 0.36 to obtain activity levels for ATCT – 36,016 SF – 12 stories.
[18] Construction activity levels for "Building – 100,000 SF – 10 stories" were multiplied by 2.2 to obtain activity levels for hotel – 220,176 SF – 10 stories.
[19] Construction activity levels for "Building – 30,000 SF – 3 stories" were multiplied by 10.2 to obtain activity levels for C-D Connector – 220,176 SF – 4 stories.

Activity Data

ACEIT calculates activity levels for non-road equipment and on-road vehicles based on the defined scenarios and project size details. ACEIT makes the following assumptions for on-road activity:

- # employees based on the higher of two methods: (1) number of equipment and (2) multiplying the project cost in million by 11.
- Average employee travels 30 miles round-trip from home to construction site each-day.
- Average on-road material delivery truck travels 40 miles round-trip.

The non-road equipment and on-road vehicle activity data generated in ACEIT, and scaled for the exact project size is provided in ***Attachment 2, Construction Emissions Calculations***.

4.4 Construction Emissions

Proposed Action Alternative Emissions

Table 8 summarizes the Proposed Action Alternative emissions from 2025 through 2029 resulting from construction activities, as compared to the NAAQS *de minimis* thresholds of significance. As shown, the construction-related emissions are well below the applicable NAAQS thresholds for all pollutants/precursors and construction years. Construction emission calculations are provided in *Attachment 2*.

Table 8: Proposed Action Alternative Construction Emissions

Year	Pollutants (tons/year)					
	CO	NO_x	VOC	SO_2	$PM_{2.5}$	PM_{10}
2025	5	4	1	<0.1	0.2	0.2
2027	75	7	5	<0.1	0.3	0.1
2028	81	8	5	<0.1	0.3	0.2
2029	41	4	3	<0.1	0.2	0.1
Total	**201**	**24**	**13**	**0.1**	**1**	**0.6**
NAAQS *de minimis* threshold	-	*100*	*50*	*100*	--	-

Notes: Although lead (Pb) is a criteria pollutant, it was not evaluated because the project would have no impacts on lead emissions. Totals may not sum due to rounding.
Source: HNTB analysis 2023.

Table 9 depicts the construction GHG emissions on an annual basis in metric tons for all construction years.

Table 9: Proposed Action Alternative Construction GHG Emissions

Year	CO_2e (MT/year)
2025	1,236
2027	8,557
2028	9,231
2029	4,722
Total	**23,746**

Note: MT = metric ton; CO_2e = carbon dioxide equivalent
Source: HNTB analysis 2023.

No Action Alternative Emissions

Table 10 summarizes the No Action Alternative emissions in 2025 from obstruction tree removal, as compared to the NAAQS *de minimis* thresholds of significance. As shown, the construction-related emissions are well below the applicable NAAQS thresholds for all pollutants/precursors. Construction emission calculations are provided in *Attachment 2*.

Table 10: No Action Alternative Construction Emissions

Year	Pollutants (tons/year)					
	CO	NO_x	VOC	SO_2	$PM_{2.5}$	PM_{10}
2025	5	4	1	<0.1	0.2	0.2
NAAQS *de minimis* threshold	-	*100*	*50*	*100*	--	-

Note: Although lead (Pb) is a criteria pollutant, it was not evaluated because the project would have no impacts on lead emissions.
Source: HNTB analysis 2023.

Table 11 depicts the construction GHG emissions in metric tons for 2025.

Table 11: No Action Alternative Construction GHG Emissions

Year	CO_2e (MT/year)
2025	1,236

Source: HNTB analysis 2023.

4.5 Social Cost of GHG Emissions

Table 12 summarizes the SC-GHG for the Proposed Action Alternative. SC-GHG is the monetary value of the net harm to society associated with adding GHG to the atmosphere in a given year. In summary, the SC-GHG peak in construction year 2028, ranging from $166,332 to $1,661,843. All SC-GHG are a result of construction activities as no operational GHG emissions are considered for the Proposed Action Alternative.

Table 12: SC-GHG for the Proposed Action Alternative

Year	MT CO2e	5% Average	3% Average	2.5% Average	3% 95th Percentile
2025	1,236	$21,056	$69,301	$102,687	$209,005
2027	8,557	$154,166	$505,023	$736,084	$1,506,190
2028	9,231	$166,332	$554,110	$803,386	$1,661,843
2029	4,722	$89,800	$288,142	$415,658	$864,216

Source: Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under EO 13990, Interagency Working Group, February 2021.

Table 13 summarizes the SC-GHG for the No Action Alternative. SC-GHG is the monetary value of the net harm to society associated with adding GHG to the atmosphere in a given year. In summary, the SC-GHG in 2025 range from $21,056 to $209,005 as a result of the construction activities associated with vegetation obstruction removal.

Table 13: SC-GHG for the No Action Alternative

Year	MT CO2e	5% Average	3% Average	2.5% Average	3% 95th Percentile
2025	1,236	$21,056	$69,301	$102,687	$209,005

Source: Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under EO 13990, Interagency Working Group, February 2021.

4.6 Avoidance, Minimization, and Mitigation Measures

There are no mitigation measures required for the project because the project-related emissions would not exceed the CAA General Conformity *de minimis* levels, and therefore there are no significant impacts.

As there are no FAA-established significance thresholds for GHG emissions, no mitigation measures are proposed. Estimated SC-GHG do not take into account actions that may be taken on the federal, state or local level to reduce GHG emissions, such as use of alternative fuel vehicles, recycling and reuse of materials, or use of sustainable building materials. Therefore, these estimates are provided for disclosure and context, and estimated costs may not actually result from the Proposed Action and No Action Alternatives.

Attachment 1:

ACEIT Input

Airport Constrcution Emission Inventory Tool (ACEIT)
Version 1.0

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Setup
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Study Name
BWI ATCT EA - ATCT

Study Description
tower and base building

State/County
Maryland
Anne Arundel County

Scenarios

Scenario ID	Year	Number of	Season	Average Da	Max Daily ˙	Min Daily Temp Change (degF)
1	2027	12	Summer	50 < T <= 8	10 <= Char	10 <= Change in T < 20
2						

==========
Project
--

Scenario ID
1

Selected Project

1	Building - 1	SetSelected	

Selected Construction Activities

1	Building - 1	Concrete F	SetSelected
1	Building - 1	Constructi	SetSelected
1	Building - 1	Exterior W	SetSelected
1	Building - 1	Interior Bu	SetSelected
1	Building - 1	Roofing	SetSelected
1	Building - 1	Security &	SetSelected
1	Building - 1	Structural	SetSelected

Selected Fuel Types
1 Diesel

Selected Equipment

1	Building - 1	Concrete F	Backhoe	SetSelected
1	Building - 1	Concrete F	Concrete P	SetSelected
1	Building - 1	Concrete F	Concrete R	SetSelected
1	Building - 1	Concrete F	Excavator	SetSelected
1	Building - 1	Concrete F	Fork Truck	SetSelected
1	Building - 1	Concrete F	Tool Truck	SetSelected
1	Building - 1	Concrete F	Tractor Tra	SetSelected
1	Building - 1	Constructi	Survey Cre	SetSelected
1	Building - 1	Constructi	Tractor Tra	SetSelected
1	Building - 1	Exterior W	Fork Truck	SetSelected
1	Building - 1	Exterior W	Generator	SetSelected
1	Building - 1	Exterior W	Grout Mixe	SetSelected
1	Building - 1	Exterior W	Grout Whe	SetSelected
1	Building - 1	Exterior W	Man Lift	SetSelected
1	Building - 1	Exterior W	Tool Truck	SetSelected
1	Building - 1	Exterior W	Tractor Tra	SetSelected
1	Building - 1	Exterior W	Truck Towe	SetSelected
1	Building - 1	Interior Bu	Fork Truck	SetSelected
1	Building - 1	Interior Bu	Man Lift	SetSelected
1	Building - 1	Interior Bu	Tool Truck	SetSelected
1	Building - 1	Interior Bu	Tractor Tra	SetSelected
1	Building - 1	Roofing	High Lift	SetSelected
1	Building - 1	Roofing	Man Lift	SetSelected
1	Building - 1	Roofing	Material D	SetSelected
1	Building - 1	Roofing	Tractor Tra	SetSelected
1	Building - 1	Roofing	Truck Towe	SetSelected
1	Building - 1	Security &	High Lift	SetSelected
1	Building - 1	Security &	Tool Truck	SetSelected
1	Building - 1	Structural	90 Ton Cra	SetSelected
1	Building - 1	Structural	Concrete P	SetSelected
1	Building - 1	Structural	Concrete T	SetSelected
1	Building - 1	Structural	Fork Truck	SetSelected
1	Building - 1	Structural	Tool Truck	SetSelected
1	Building - 1	Structural	Tractor Tra	SetSelected
1	Building - 1	Structural	Trowel Ma	SetSelected
1	Building - 1	Structural	Truck Towe	SetSelected

Final Selections

1	Building - 1	Concrete F	Backhoe	Diesel	
1	Building - 1	Concrete F	Concrete P	Diesel	
1	Building - 1	Concrete F	Concrete R	Diesel	
1	Building - 1	Concrete F	Excavator	Diesel	
1	Building - 1	Concrete F	Fork Truck	Diesel	
1	Building - 1	Concrete F	Tool Truck	Diesel	
1	Building - 1	Concrete F	Tractor Tra	Diesel	
1	Building - 1	Constructio	Survey Cre	Diesel	
1	Building - 1	Constructio	Tractor Tra	Diesel	
1	Building - 1	Exterior W	Fork Truck	Diesel	
1	Building - 1	Exterior W	Generator	Diesel	
1	Building - 1	Exterior W	Grout Mixe	Diesel	
1	Building - 1	Exterior W	Grout Whe	Diesel	
1	Building - 1	Exterior W	Man Lift	Diesel	
1	Building - 1	Exterior W	Tool Truck	Diesel	
1	Building - 1	Exterior W	Tractor Tra	Diesel	
1	Building - 1	Exterior W	Truck Towe	Diesel	
1	Building - 1	Interior Bu	Fork Truck	Diesel	
1	Building - 1	Interior Bu	Man Lift	Diesel	
1	Building - 1	Interior Bu	Tool Truck	Diesel	
1	Building - 1	Interior Bu	Tractor Tra	Diesel	
1	Building - 1	Roofing	High Lift	Diesel	
1	Building - 1	Roofing	Man Lift	Diesel	
1	Building - 1	Roofing	Material D	Diesel	
1	Building - 1	Roofing	Tractor Tra	Diesel	
1	Building - 1	Roofing	Truck Towe	Diesel	
1	Building - 1	Security &	High Lift	Diesel	
1	Building - 1	Security &	Tool Truck	Diesel	
1	Building - 1	Structural !	90 Ton Cra	Diesel	
1	Building - 1	Structural !	Concrete P	Diesel	
1	Building - 1	Structural !	Concrete T	Diesel	
1	Building - 1	Structural !	Fork Truck	Diesel	
1	Building - 1	Structural !	Tool Truck	Diesel	
1	Building - 1	Structural !	Tractor Tra	Diesel	
1	Building - 1	Structural !	Trowel Ma	Diesel	
1	Building - 1	Structural !	Truck Towe	Diesel	

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Overall Size

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Scenario ID	Project	Project Size	User Input	Unit
1	Building - 1	What is the	169	$ Million(s)

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Size Detail

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ScenarioID	Project	Constructio	Default Act	Unit	User Activity Size

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Activity: Non-Road

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Scenario ID	Project	Constructio	Equipment	Fuel Type	Activity Siz	Activity Ra	Default Act	Activity Un	User Activity Data
1	Building - 1	Concrete F	Backhoe	Diesel	100000.00	0.0048	Hou	480	hours
1	Building - 1	Concrete F	Concrete P	Diesel	100000.00	0.0018	Hou	180	hours
1	Building - 1	Concrete F	Concrete R	Diesel	100000.00	0.0036	Hou	360	hours
1	Building - 1	Concrete F	Excavator	Diesel	100000.00	0.0016	Hou	160	hours
1	Building - 1	Concrete F	Fork Truck	Diesel	100000.00	0.0048	Hou	480	hours
1	Building - 1	Concrete F	Tool Truck	Diesel	100000.00	0.0012	Hou	120	hours
1	Building - 1	Concrete F	Tractor Tra	Diesel	100000.00	0.0024	Hou	240	hours
1	Building - 1	Constructio	Survey Cre	Diesel	100000.00	0.0001	Hou	10	hours
1	Building - 1	Constructio	Tractor Tra	Diesel	100000.00	0.00004	Ho	4	hours
1	Building - 1	Exterior W	Fork Truck	Diesel	100000.00	0.0084	Hou	840	hours
1	Building - 1	Exterior W	Generator	Diesel	100000.00	0.0008	Hou	80	hours
1	Building - 1	Exterior W	Grout Mixe	Diesel	100000.00	0.0042	Hou	420	hours
1	Building - 1	Exterior W	Grout Whe	Diesel	100000.00	0.0016	Hou	160	hours
1	Building - 1	Exterior W	Man Lift	Diesel	100000.00	0.0168	Hou	1680	hours
1	Building - 1	Exterior W	Tool Truck	Diesel	100000.00	0.0042	Hou	420	hours
1	Building - 1	Exterior W	Tractor Tra	Diesel	100000.00	0.0084	Hou	840	hours
1	Building - 1	Exterior W	Truck Towe	Diesel	100000.00	0.0008	Hou	80	hours
1	Building - 1	Interior Bu	Fork Truck	Diesel	100000.00	0.016	Hour	1600	hours
1	Building - 1	Interior Bu	Man Lift	Diesel	100000.00	0.032	Hour	3200	hours
1	Building - 1	Interior Bu	Tool Truck	Diesel	100000.00	0.016	Hour	1600	hours
1	Building - 1	Interior Bu	Tractor Tra	Diesel	100000.00	0.016	Hour	1600	hours
1	Building - 1	Roofing	High Lift	Diesel	100000.00	0.0016	Hou	160	hours
1	Building - 1	Roofing	Man Lift	Diesel	100000.00	0.0004	Hou	40	hours
1	Building - 1	Roofing	Material D	Diesel	100000.00	0.0006	Hou	60	hours
1	Building - 1	Roofing	Tractor Tra	Diesel	100000.00	0.0004	Hou	40	hours
1	Building - 1	Roofing	Truck Towe	Diesel	100000.00	0.0012	Hou	120	hours
1	Building - 1	Security &	High Lift	Diesel	100000.00	0.008	Hour	800	hours
1	Building - 1	Security &	Tool Truck	Diesel	100000.00	0.008	Hour	800	hours
1	Building - 1	Structural !	90 Ton Cra	Diesel	100000.00	0.0024	Hou	240	hours
1	Building - 1	Structural !	Concrete P	Diesel	100000.00	0.0006	Hou	60	hours
1	Building - 1	Structural !	Concrete T	Diesel	100000.00	0.0006	Hou	60	hours
1	Building - 1	Structural !	Fork Truck	Diesel	100000.00	0.0064	Hou	640	hours
1	Building - 1	Structural !	Tool Truck	Diesel	100000.00	0.0016	Hou	160	hours
1	Building - 1	Structural !	Tractor Tra	Diesel	100000.00	0.0036	Hou	360	hours
1	Building - 1	Structural !	Trowel Ma	Diesel	100000.00	0.0004	Hou	40	hours
1	Building - 1	Structural !	Truck Towe	Diesel	100000.00	0.0072	Hou	720	hours

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Activity: On-Road

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Scenario ID	Project	Equipment	On-road Ac	Fuel	Roadway T	Round Trip	Number of	Number of	Project Ler	Project Wi	Project Are	Building He	Open Spac	Number of	Activity Siz	Activity Ra	Default VM	User VMT
1	Building - 1	Cement M	Material D	Diesel	Urban Unr	40	--	--	--	--	100000	--	--	--	--	--	23125	
1	Building - 1	Dump Truc	Material D	Diesel	Urban Unr	40	--	--	--	--	100000	--	--	--	--	--	12333	
1	Building - 1	Passenger	Employee (	Gasoline	Urban Unr	30	1859	258	--	--	--	--	--	--	--	--	14388660	
1	Building - 1	Tractor Tra	Material D	Diesel	Urban Unr	40	--	--	--	--	100000	--	--	--	--	0.0024	2400	

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END

Airport Constrcution Emission Inventory Tool (ACEIT)
Version 1.0

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Setup
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Study Name
BWI ATCT EA - C-D Connector

Study Description
includes MAA offices and building allowances

State/County
Maryland
Anne Arundel County

Scenarios

Scenario ID	Year	Number of	Season	Average Da	Max Daily	Min Daily Temp Change (degF)
1	2027	12	Summer	50 < T <= 8	10 <= Chan	10 <= Change in T < 20
2						

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Project
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Scenario ID
1

Selected Project

1	Airfield Lig	SetSelected

Selected Construction Activities

1	Building - 3	Concrete F
1	Building - 3	Constructic
1	Building - 3	Exterior W
1	Building - 3	Interior Bu
1	Building - 3	Roofing
1	Building - 3	Security &
1	Building - 3	Structural S

Selected Fuel Types

1	Diesel

Selected Equipment

1	Building - 3	Concrete F	Backhoe	SetSelected
1	Building - 3	Concrete F	Concrete R	SetSelected
1	Building - 3	Concrete F	Fork Truck	SetSelected
1	Building - 3	Concrete F	Tool Truck	SetSelected
1	Building - 3	Concrete F	Tractor Tra	SetSelected
1	Building - 3	Constructic	Survey Cre	SetSelected
1	Building - 3	Constructic	Tractor Tra	SetSelected
1	Building - 3	Exterior W	Fork Truck	SetSelected
1	Building - 3	Exterior W	Generator	SetSelected
1	Building - 3	Exterior W	Man Lift	SetSelected
1	Building - 3	Exterior W	Tool Truck	SetSelected
1	Building - 3	Exterior W	Tractor Tra	SetSelected
1	Building - 3	Interior Bu	Fork Truck	SetSelected
1	Building - 3	Interior Bu	Man Lift	SetSelected
1	Building - 3	Interior Bu	Tool Truck	SetSelected
1	Building - 3	Interior Bu	Tractor Tra	SetSelected
1	Building - 3	Roofing	High Lift	SetSelected
1	Building - 3	Roofing	Man Lift (F	SetSelected
1	Building - 3	Roofing	Material D	SetSelected
1	Building - 3	Roofing	Tractor Tra	SetSelected
1	Building - 3	Security &	High Lift	SetSelected
1	Building - 3	Security &	Tool Truck	SetSelected
1	Building - 3	Structural S	90 Ton Cra	SetSelected
1	Building - 3	Structural S	Concrete P	SetSelected
1	Building - 3	Structural S	Concrete T	SetSelected
1	Building - 3	Structural S	Fork Truck	SetSelected
1	Building - 3	Structural S	Tool Truck	SetSelected
1	Building - 3	Structural S	Tractor Tra	SetSelected
1	Building - 3	Structural S	Trowel Ma	SetSelected

Final Selections

1	Building - 3	Concrete F	Backhoe	Diesel
1	Building - 3	Concrete F	Concrete R	Diesel
1	Building - 3	Concrete F	Fork Truck	Diesel
1	Building - 3	Concrete F	Tool Truck	Diesel
1	Building - 3	Concrete F	Tractor Tra	Diesel
1	Building - 3	Constructic	Survey Cre	Diesel
1	Building - 3	Constructic	Tractor Tra	Diesel
1	Building - 3	Exterior W	Fork Truck	Diesel
1	Building - 3	Exterior W	Generator	Diesel
1	Building - 3	Exterior W	Man Lift	Diesel
1	Building - 3	Exterior W	Tool Truck	Diesel
1	Building - 3	Exterior W	Tractor Tra	Diesel
1	Building - 3	Interior Bu	Fork Truck	Diesel
1	Building - 3	Interior Bu	Man Lift	Diesel
1	Building - 3	Interior Bu	Tool Truck	Diesel
1	Building - 3	Interior Bu	Tractor Tra	Diesel
1	Building - 3	Roofing	High Lift	Diesel
1	Building - 3	Roofing	Man Lift (F	Diesel
1	Building - 3	Roofing	Material D	Diesel
1	Building - 3	Roofing	Tractor Tra	Diesel
1	Building - 3	Security &	High Lift	Diesel
1	Building - 3	Security &	Tool Truck	Diesel
1	Building - 3	Structural !	90 Ton Cra	Diesel
1	Building - 3	Structural !	Concrete P	Diesel
1	Building - 3	Structural !	Concrete T	Diesel
1	Building - 3	Structural !	Fork Truck	Diesel
1	Building - 3	Structural !	Tool Truck	Diesel
1	Building - 3	Structural !	Tractor Tra	Diesel
1	Building - 3	Structural !	Trowel Ma	Diesel

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Overall Size

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Scenario ID	Project	Project Size	User Input	Unit
1	Building - 3	What is the	36.4	$ Million(s)

==========

Size Detail

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ScenarioID	Project	Constructic	Default Act	Unit	User Activity Size

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Activity: Non-Road

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Scenario ID	Project	Constructic	Equipment	Fuel Type	Activity Siz	Activity Ra	Default Act	Activity Un	User Activity Data
1	Building - 3	Concrete F	Backhoe	Diesel	30000.00	0.01067	Hc	320.1	hours
1	Building - 3	Concrete F	Concrete R	Diesel	30000.00	0.002	Hour	60	hours
1	Building - 3	Concrete F	Fork Truck	Diesel	30000.00	0.01067	Hc	320.1	hours
1	Building - 3	Concrete F	Tool Truck	Diesel	30000.00	0.00267	Hc	80.1	hours
1	Building - 3	Concrete F	Tractor Tra	Diesel	30000.00	0.00053	Hc	15.9	hours
1	Building - 3	Constructic	Survey Cre	Diesel	30000.00	0.00033	Hc	9.9	hours
1	Building - 3	Constructic	Tractor Tra	Diesel	30000.00	0.00013	Hc	3.9	hours
1	Building - 3	Exterior W	Fork Truck	Diesel	30000.00	0.02	Hours	600	hours
1	Building - 3	Exterior W	Generator	Diesel	30000.00	0.01	Hours	300	hours
1	Building - 3	Exterior W	Man Lift	Diesel	30000.00	0.02	Hours	600	hours
1	Building - 3	Exterior W	Tool Truck	Diesel	30000.00	0.005	Hour	150	hours
1	Building - 3	Exterior W	Tractor Tra	Diesel	30000.00	0.005	Hour	150	hours
1	Building - 3	Interior Bu	Fork Truck	Diesel	30000.00	0.08	Hours	2400	hours
1	Building - 3	Interior Bu	Man Lift	Diesel	30000.00	0.08	Hours	2400	hours
1	Building - 3	Interior Bu	Tool Truck	Diesel	30000.00	0.01	Hours	300	hours
1	Building - 3	Interior Bu	Tractor Tra	Diesel	30000.00	0.02	Hours	600	hours
1	Building - 3	Roofing	High Lift	Diesel	30000.00	0.004	Hour	120	hours
1	Building - 3	Roofing	Man Lift (F	Diesel	30000.00	0.0008	Hou	24	hours
1	Building - 3	Roofing	Material D	Diesel	30000.00	0.002	Hour	60	hours
1	Building - 3	Roofing	Tractor Tra	Diesel	30000.00	0.002	Hour	60	hours
1	Building - 3	Security &	High Lift	Diesel	30000.00	0.02667	Hc	800.1	hours
1	Building - 3	Security &	Tool Truck	Diesel	30000.00	0.00667	Hc	200.1	hours
1	Building - 3	Structural !	90 Ton Cra	Diesel	30000.00	0.01067	Hc	320.1	hours
1	Building - 3	Structural !	Concrete P	Diesel	30000.00	0.0004	Hou	12	hours
1	Building - 3	Structural !	Concrete T	Diesel	30000.00	0.0008	Hou	24	hours
1	Building - 3	Structural !	Fork Truck	Diesel	30000.00	0.00267	Hc	80.1	hours
1	Building - 3	Structural !	Tool Truck	Diesel	30000.00	0.0004	Hou	12	hours
1	Building - 3	Structural !	Tractor Tra	Diesel	30000.00	0.00133	Hc	39.9	hours
1	Building - 3	Structural !	Trowel Ma	Diesel	30000.00	0.0004	Hou	12	hours

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Activity: On-Road

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Scenario ID	Project	Equipment	On-road Ac	Fuel	Roadway T	Round Trip	Number of	Number of	Project Le	Project Wi	Project Are	Building He	Open Spac	Number of	Activity Siz	Activity Ra	Default VM	User VMT
1	Building - 3	Cement Mi	Material Di	Diesel	Urban Unr	40	--	--	--	--	30000	--	--	--	--	--	6938	
1	Building - 3	Dump Truc	Material Di	Diesel	Urban Unr	40	--	--	--	--	30000	--	--	--	--	--	3700	
1	Building - 3	Passenger	Employee (	Gasoline	Urban Unr	30	400.4	258	--	--	--	--	--	--	--	--	3099096	
1	Building - 3	Tractor Tra	Material Di	Diesel	Urban Unr	40	--	--	--	--	30000	--	--	--	--	0.00053	159	

==========

END

Airport Constrcution Emission Inventory Tool (ACEIT)
Version 1.0

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Setup
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Study Name
BWI ATCT EA - Hotel

Study Description
Hotel - 10 stories

State/County
Maryland
Anne Arundel County

Scenarios

Scenario ID	Year	Number of	Season	Average Da	Max Daily ˙	Min Daily Temp Change (degF)
1	2027	12	Summer	50 < T <= 8	10 <= Char	10 <= Change in T < 20
2						

==========
Project
--

Scenario ID
1

Selected Project

1	Building - 1	SetSelected	

Selected Construction Activities

1	Building - 1	Concrete F	SetSelected
1	Building - 1	Constructi	SetSelected
1	Building - 1	Exterior W	SetSelected
1	Building - 1	Interior Bu	SetSelected
1	Building - 1	Roofing	SetSelected
1	Building - 1	Security &	SetSelected
1	Building - 1	Structural	SetSelected

Selected Fuel Types
1 Diesel

Selected Equipment

1	Building - 1	Concrete F	Backhoe	SetSelected
1	Building - 1	Concrete F	Concrete P	SetSelected
1	Building - 1	Concrete F	Concrete R	SetSelected
1	Building - 1	Concrete F	Excavator	SetSelected
1	Building - 1	Concrete F	Fork Truck	SetSelected
1	Building - 1	Concrete F	Tool Truck	SetSelected
1	Building - 1	Concrete F	Tractor Tra	SetSelected
1	Building - 1	Constructi	Survey Cre	SetSelected
1	Building - 1	Constructi	Tractor Tra	SetSelected
1	Building - 1	Exterior W	Fork Truck	SetSelected
1	Building - 1	Exterior W	Generator	SetSelected
1	Building - 1	Exterior W	Grout Mixe	SetSelected
1	Building - 1	Exterior W	Grout Whe	SetSelected
1	Building - 1	Exterior W	Man Lift	SetSelected
1	Building - 1	Exterior W	Tool Truck	SetSelected
1	Building - 1	Exterior W	Tractor Tra	SetSelected
1	Building - 1	Exterior W	Truck Towe	SetSelected
1	Building - 1	Interior Bu	Fork Truck	SetSelected
1	Building - 1	Interior Bu	Man Lift	SetSelected
1	Building - 1	Interior Bu	Tool Truck	SetSelected
1	Building - 1	Interior Bu	Tractor Tra	SetSelected
1	Building - 1	Roofing	High Lift	SetSelected
1	Building - 1	Roofing	Man Lift	SetSelected
1	Building - 1	Roofing	Material D	SetSelected
1	Building - 1	Roofing	Tractor Tra	SetSelected
1	Building - 1	Roofing	Truck Towe	SetSelected
1	Building - 1	Security &	High Lift	SetSelected
1	Building - 1	Security &	Tool Truck	SetSelected
1	Building - 1	Structural	90 Ton Cra	SetSelected
1	Building - 1	Structural	Concrete P	SetSelected
1	Building - 1	Structural	Concrete T	SetSelected
1	Building - 1	Structural	Fork Truck	SetSelected
1	Building - 1	Structural	Tool Truck	SetSelected
1	Building - 1	Structural	Tractor Tra	SetSelected
1	Building - 1	Structural	Trowel Ma	SetSelected
1	Building - 1	Structural	Truck Towe	SetSelected

Final Selections

1	Building - 1	Concrete F	Backhoe	Diesel	
1	Building - 1	Concrete F	Concrete P	Diesel	
1	Building - 1	Concrete F	Concrete R	Diesel	
1	Building - 1	Concrete F	Excavator	Diesel	
1	Building - 1	Concrete F	Fork Truck	Diesel	
1	Building - 1	Concrete F	Tool Truck	Diesel	
1	Building - 1	Concrete F	Tractor Tra	Diesel	
1	Building - 1	Constructio	Survey Cre	Diesel	
1	Building - 1	Constructio	Tractor Tra	Diesel	
1	Building - 1	Exterior W	Fork Truck	Diesel	
1	Building - 1	Exterior W	Generator	Diesel	
1	Building - 1	Exterior W	Grout Mixe	Diesel	
1	Building - 1	Exterior W	Grout Whe	Diesel	
1	Building - 1	Exterior W	Man Lift	Diesel	
1	Building - 1	Exterior W	Tool Truck	Diesel	
1	Building - 1	Exterior W	Tractor Tra	Diesel	
1	Building - 1	Exterior W	Truck Towe	Diesel	
1	Building - 1	Interior Bu	Fork Truck	Diesel	
1	Building - 1	Interior Bu	Man Lift	Diesel	
1	Building - 1	Interior Bu	Tool Truck	Diesel	
1	Building - 1	Interior Bu	Tractor Tra	Diesel	
1	Building - 1	Roofing	High Lift	Diesel	
1	Building - 1	Roofing	Man Lift	Diesel	
1	Building - 1	Roofing	Material D	Diesel	
1	Building - 1	Roofing	Tractor Tra	Diesel	
1	Building - 1	Roofing	Truck Towe	Diesel	
1	Building - 1	Security &	High Lift	Diesel	
1	Building - 1	Security &	Tool Truck	Diesel	
1	Building - 1	Structural !	90 Ton Cra	Diesel	
1	Building - 1	Structural !	Concrete P	Diesel	
1	Building - 1	Structural !	Concrete T	Diesel	
1	Building - 1	Structural !	Fork Truck	Diesel	
1	Building - 1	Structural !	Tool Truck	Diesel	
1	Building - 1	Structural !	Tractor Tra	Diesel	
1	Building - 1	Structural !	Trowel Ma	Diesel	
1	Building - 1	Structural !	Truck Towe	Diesel	

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Overall Size

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Scenario ID	Project	Project Size	User Input	Unit
1	Building - 1	What is the	54.9	$ Million(s)

==========

Size Detail

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ScenarioID	Project	Constructio	Default Act	Unit	User Activity Size

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Activity: Non-Road

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Scenario ID	Project	Constructio	Equipment	Fuel Type	Activity Size	Activity Ra	Default Act	Activity Un	User Activity Data
1	Building - 1	Concrete F	Backhoe	Diesel	100000.00	0.0048	Hou	480	hours
1	Building - 1	Concrete F	Concrete P	Diesel	100000.00	0.0018	Hou	180	hours
1	Building - 1	Concrete F	Concrete R	Diesel	100000.00	0.0036	Hou	360	hours
1	Building - 1	Concrete F	Excavator	Diesel	100000.00	0.0016	Hou	160	hours
1	Building - 1	Concrete F	Fork Truck	Diesel	100000.00	0.0048	Hou	480	hours
1	Building - 1	Concrete F	Tool Truck	Diesel	100000.00	0.0012	Hou	120	hours
1	Building - 1	Concrete F	Tractor Tra	Diesel	100000.00	0.0024	Hou	240	hours
1	Building - 1	Constructio	Survey Cre	Diesel	100000.00	0.0001	Hou	10	hours
1	Building - 1	Constructio	Tractor Tra	Diesel	100000.00	0.00004	Ho	4	hours
1	Building - 1	Exterior W	Fork Truck	Diesel	100000.00	0.0084	Hou	840	hours
1	Building - 1	Exterior W	Generator	Diesel	100000.00	0.0008	Hou	80	hours
1	Building - 1	Exterior W	Grout Mixe	Diesel	100000.00	0.0042	Hou	420	hours
1	Building - 1	Exterior W	Grout Whe	Diesel	100000.00	0.0016	Hou	160	hours
1	Building - 1	Exterior W	Man Lift	Diesel	100000.00	0.0168	Hou	1680	hours
1	Building - 1	Exterior W	Tool Truck	Diesel	100000.00	0.0042	Hou	420	hours
1	Building - 1	Exterior W	Tractor Tra	Diesel	100000.00	0.0084	Hou	840	hours
1	Building - 1	Exterior W	Truck Towe	Diesel	100000.00	0.0008	Hou	80	hours
1	Building - 1	Interior Bu	Fork Truck	Diesel	100000.00	0.016	Hour	1600	hours
1	Building - 1	Interior Bu	Man Lift	Diesel	100000.00	0.032	Hour	3200	hours
1	Building - 1	Interior Bu	Tool Truck	Diesel	100000.00	0.016	Hour	1600	hours
1	Building - 1	Interior Bu	Tractor Tra	Diesel	100000.00	0.016	Hour	1600	hours
1	Building - 1	Roofing	High Lift	Diesel	100000.00	0.0016	Hou	160	hours
1	Building - 1	Roofing	Man Lift	Diesel	100000.00	0.0004	Hou	40	hours
1	Building - 1	Roofing	Material D	Diesel	100000.00	0.0006	Hou	60	hours
1	Building - 1	Roofing	Tractor Tra	Diesel	100000.00	0.0004	Hou	40	hours
1	Building - 1	Roofing	Truck Towe	Diesel	100000.00	0.0012	Hou	120	hours
1	Building - 1	Security &	High Lift	Diesel	100000.00	0.008	Hour	800	hours
1	Building - 1	Security &	Tool Truck	Diesel	100000.00	0.008	Hour	800	hours
1	Building - 1	Structural !	90 Ton Cra	Diesel	100000.00	0.0024	Hou	240	hours
1	Building - 1	Structural !	Concrete P	Diesel	100000.00	0.0006	Hou	60	hours
1	Building - 1	Structural !	Concrete T	Diesel	100000.00	0.0006	Hou	60	hours
1	Building - 1	Structural !	Fork Truck	Diesel	100000.00	0.0064	Hou	640	hours
1	Building - 1	Structural !	Tool Truck	Diesel	100000.00	0.0016	Hou	160	hours
1	Building - 1	Structural !	Tractor Tra	Diesel	100000.00	0.0036	Hou	360	hours
1	Building - 1	Structural !	Trowel Ma	Diesel	100000.00	0.0004	Hou	40	hours
1	Building - 1	Structural !	Truck Towe	Diesel	100000.00	0.0072	Hou	720	hours

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Activity: On-Road

--

Scenario ID	Project	Equipment	On-road Ac	Fuel	Roadway T	Round Trip	Number of	Number of	Project Ler	Project Wi	Project Are	Building He	Open Spac	Number of	Activity Siz	Activity Ra	Default VM	User VMT
1	Building - 1	Cement M	Material D	Diesel	Urban Unr	40	--	--	--	--	100000	--	--	--	--	--		23125
1	Building - 1	Dump Truc	Material D	Diesel	Urban Unr	40	--	--	--	--	100000	--	--	--	--	--		12333
1	Building - 1	Passenger	Employee (	Gasoline	Urban Unr	30	603.9	258	--	--	--	--	--	--	--	--		4674186
1	Building - 1	Tractor Tra	Material D	Diesel	Urban Unr	40	--	--	--	--	100000	--	--	--	--		0.0024	2400

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END

Airport Constrcution Emission Inventory Tool (ACEIT)
Version 1.0

==========
Setup
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Study Name
BWI ATCT EA - Enabling Project

Study Description
Existing and Future ATCT LOS obstruction removal and Part 77 obstruction removal

State/County
Maryland
Anne Arundel County

Scenarios

Scenario ID	Year	Number of	Season	Average Da	Max Daily	Min Daily Temp Change (degF)
1	2025	3	Winter	30 < T <= 5	10 <= Chan	10 <= Change in T < 20
2						

==========
Project
--

Scenario ID
1

Selected Project

1	Terminal A	SetSelected

Selected Construction Activities

1	Site Work - Constructio	SetSelected
1	Site Work - Site Clearir	SetSelected

Selected Fuel Types

1	Diesel

Selected Equipment

1	Site Work - Constructio	Survey Cre	SetSelected
1	Site Work - Site Clearir	Bulldozer	SetSelected
1	Site Work - Site Clearir	Chain Saws	SetSelected
1	Site Work - Site Clearir	Flat Bed or	SetSelected
1	Site Work - Site Clearir	Front Load	SetSelected
1	Site Work - Site Clearir	Grub the si	SetSelected
1	Site Work - Site Clearir	Log Chippe	SetSelected
1	Site Work - Site Clearir	Mulcher	SetSelected
1	Site Work - Site Clearir	Ten Wheel	SetSelected
1	Site Work - Site Clearir	Tractor	SetSelected

Final Selections

1	Site Work - Constructio	Survey Cre	Diesel
1	Site Work - Site Clearir	Bulldozer	Diesel
1	Site Work - Site Clearir	Chain Saws	Diesel
1	Site Work - Site Clearir	Flat Bed or	Diesel
1	Site Work - Site Clearir	Front Load	Diesel
1	Site Work - Site Clearir	Grub the si	Diesel
1	Site Work - Site Clearir	Log Chippe	Diesel
1	Site Work - Site Clearir	Mulcher	Diesel
1	Site Work - Site Clearir	Ten Wheel	Diesel
1	Site Work - Site Clearir	Tractor	Diesel

==========
Overall Size
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Scenario ID	Project	Project Size	User Input	Unit
1	Site Work -	What is the	0.005	$ Million(s)

==========
Size Detail
--

ScenarioID	Project	Constructio	Default Act	Unit	User Activity Size

==========

Activity: Non-Road

--

Scenario ID	Project	Construction	Equipment	Fuel Type	Activity Size	Activity Ra	Default Act	Activity Un	User Activity Data
1	Site Work -	Construction	Survey Cre	Diesel	10000.00 S	0.001	Hour	10	hours
1	Site Work -	Site Clearir	Bulldozer	Diesel	10000.00 S	0.004	Hour	40	hours
1	Site Work -	Site Clearir	Chain Saws	Diesel	10000.00 S	0.004	Hour	40	hours
1	Site Work -	Site Clearir	Flat Bed or	Diesel	10000.00 S	0.008	Hour	80	hours
1	Site Work -	Site Clearir	Front Load	Diesel	10000.00 S	0.004	Hour	40	hours
1	Site Work -	Site Clearir	Grub the si	Diesel	10000.00 S	0.004	Hour	40	hours
1	Site Work -	Site Clearir	Log Chippe	Diesel	10000.00 S	0.004	Hour	40	hours
1	Site Work -	Site Clearir	Mulcher	Diesel	10000.00 S	0.004	Hour	40	hours
1	Site Work -	Site Clearir	Ten Wheel	Diesel	10000.00 S	0.004	Hour	40	hours
1	Site Work -	Site Clearir	Tractor	Diesel	10000.00 S	0.008	Hour	80	hours

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Activity: On-Road

--

Scenario ID	Project	Equipment	On-road Ac	Fuel	Roadway T	Round Trip	Number of	Number of	Project Ler	Project Wi	Project Are	Building He	Open Spac	Number of	Activity Siz	Activity Ra	Default VM	User VMT
1	Site Work -	Dump Truc	Material Di	Diesel	Urban Unr	40	--	--	--	--	10000	--	--	--	--	--	1233	
1	Site Work -	Passenger	Employee (	Gasoline	Urban Unr	30	0.055	65	--	--	--	--	--	--	--	--	107	
1	Site Work -	Tractor Tra	Material Di	Diesel	Urban Unr	40	--	--	--	--	--	--	--	--	--	--	0	

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END

Attachment 2:

Construction Emissions Calculations

Tree Removal Non-Road Emissions Calculations

				x 56.6			OFFROAD2017 EF (g/HP-hr)												Emission Calc (tons)										
ACEIT Equipment	**OFFROAD2017**	**HP**	**LF**	**Activity Data (hrs)**	**Total Hours**	**Year**	**Low HP**	**High HP**	**TOG**	**ROG**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**	**TOG**	**ROG**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**
Survey Crew Trucks	Off-Highway Trucks	376	0.38	10	566	2025	300	600	0.211	0.177	1.086	1.174	0.005	0.038	0.035	528.587	0.021	0.004	0.02	0.02	0.10	0.10	0.00	0.00	0.00	47.12	0.00	0.00
Bulldozer	Rubber Tired Dozers	367	0.4	40	2264	2025	300	600	0.441	0.371	3.506	2.902	0.005	0.154	0.142	532.172	0.022	0.004	0.16	0.14	1.28	1.06	0.00	0.06	0.05	194.97	0.01	0.00
Chain Saws	Other General Industrial Equipment	35	0.34	40	2264	2025	25	50	0.585	0.491	3.713	4.675	0.005	0.136	0.125	588.026	0.024	0.005	0.02	0.01	0.11	0.14	0.00	0.00	0.00	17.46	0.00	0.00
Flat Bed or Dump Trucks	Off-Highway Trucks	376	0.38	80	4528	2025	300	600	0.211	0.177	1.086	1.174	0.005	0.038	0.035	528.587	0.021	0.004	0.15	0.13	0.77	0.84	0.00	0.03	0.02	376.96	0.01	0.00
Front Loader	Tractors/Loaders/Backhoes	84	0.37	40	2264	2025	75	100	0.233	0.196	2.01	3.482	0.005	0.077	0.071	529.863	0.021	0.004	0.02	0.02	0.16	0.27	0.00	0.01	0.01	41.10	0.00	0.00
Grub the site down 2'-0	Graders	148	0.41	40	2264	2025	100	175	0.404	0.34	2.859	3.419	0.005	0.159	0.146	531.194	0.022	0.004	0.06	0.05	0.43	0.52	0.00	0.02	0.02	80.44	0.00	0.00
Log Chipper	Off-Highway Trucks	376	0.38	40	2264	2025	300	600	0.211	0.177	1.086	1.174	0.005	0.038	0.035	528.587	0.021	0.004	0.08	0.06	0.39	0.42	0.00	0.01	0.01	188.48	0.01	0.00
Mulcher	Other General Industrial Equipment	35	0.34	40	2264	2025	25	50	0.585	0.491	3.713	4.675	0.005	0.136	0.125	588.026	0.024	0.005	0.02	0.01	0.11	0.14	0.00	0.00	0.00	17.46	0.00	0.00
Ten Wheelers	Off-Highway Trucks	376	0.38	40	2264	2025	300	600	0.211	0.177	1.086	1.174	0.005	0.038	0.035	528.587	0.021	0.004	0.08	0.06	0.39	0.42	0.00	0.01	0.01	188.48	0.01	0.00
Tractor	Tractors/Loaders/Backhoes	84	0.37	80	4528	2025	75	100	0.233	0.196	2.01	3.482	0.005	0.077	0.071	529.863	0.021	0.004	0.04	0.03	0.31	0.54	0.00	0.01	0.01	82.20	0.00	0.00
																			0.63	**0.53**	**4.05**	**4.45**	**0.01**	**0.16**	**0.15**	**1234.67**	**0.05**	**0.01**

Tree Removal On-Road Emissions Calculations

					x 56.6			MOVES3 Emission Factors, g/mile (calendar year)									Emission Calc (tons)								
Equipment	MOVES3 Vehicle	On-road Activity	Fuel Type	VMT	Total VMT (S	Year	Total HC	Exhaust CO	Exhaust NOx	Exhaust PM2.5	Brakewea r PM2.5	Tirewear PM2.5	CO2	CH4	N2O	Total HC	Exhaust CO	Exhaust NOx	Exhaust PM2.5	Brakewea r PM2.5	Tirewear PM2.5	CO2	CH4	N2O
Dump Truck Subbase Mat	Heavy-duty vehicle	Material Delivery	Diesel	1233	69787.8	2025	0.165	1.586	2.616	0.038	0.009	0.003	1567.692	0.0095	0.0431	0.013	0.122	0.201	0.003	0.001	0.000	120.599	0.001	0.003
Passenger Car	Light-duty trucks, g	Employee Commute	Gasoline	107	6056.2	2025	0.207	3.501	0.145	0.005	0.003	0.001	386.3913	0.0079	0.0012	0.001	0.023	0.001	0.000	0.000	0.000	2.579	0.000	0.000
																0.014	0.145	0.202	0.003	0.001	0.000	123.179	0.001	0.003

Notes:

CH4 and N2O emission factors based on 2020 calendar year, EPA Inventory of US GHG Emissions and Sinks, 2022.

CO2 based on typical emissions/gallon fuel (Gasoline: 8,887 grams/gallon, Diesel: 10,190 grams/gallon), EPA Office of Transportation and Air Quality, EPA-420-F-23-014, June 2023.

Utilized average light-duty vehicle fuel efficiency in 2020 of 23 mpg

Utilized average Heavy duty trucks (semi-truck) fuel efficiency of 6.5 mpg

ATCT Non-Road Emission Calculations

				x 0.36			OFFROAD2017 EF (g/HP-hr)											Emission Calc (tons)									
ACEIT Equipment	**OFFROAD2017 Equipment**	**HP**	**LF**	**Activity Data (hrs)**	**Total Hours**	**Year**	**Low HP**	**High HP**	**TOG**	**ROG**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**	**TOG**	**ROG**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**
Backhoe	Tractors/Loaders/Backhoes	84	0.37	480	172.8	2027	75	100	0.211	0.177	1.807	3.487	0.005	0.054	0.05	529.618	0.021	0.004	0.001	0.001	0.011	0.021	0.000	0.000	0.000	3.135	0.000	0.000
Concrete Pump	Pumps	11	0.74	180	64.8	2027	0	25	0.683	0.565	4.288	2.986	0.008	0.173	0.16	568.297	0.023	0.005	0.000	0.000	0.002	0.002	0.000	0.000	0.000	0.330	0.000	0.000
Concrete Ready Mix Trucks	Off-Highway Trucks	376	0.38	360	129.6	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.004	0.004	0.020	0.024	0.000	0.001	0.001	10.798	0.000	0.000
Excavator	Excavators	36	0.38	160	57.6	2027	25	50	0.45	0.378	3.367	4.216	0.005	0.089	0.082	587.394	0.024	0.005	0.000	0.000	0.003	0.004	0.000	0.000	0.000	0.510	0.000	0.000
Fork Truck	Forklifts	82	0.2	480	172.8	2027	75	100	0.272	0.228	2.152	3.568	0.005	0.092	0.085	527.07	0.021	0.004	0.001	0.001	0.007	0.011	0.000	0.000	0.000	1.646	0.000	0.000
Tool Truck	Off-Highway Trucks	376	0.38	120	43.2	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.001	0.001	0.007	0.008	0.000	0.000	0.000	3.599	0.000	0.000
Tractor Trailer- Material Delivery	Off-Highway Trucks	376	0.38	240	86.4	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.003	0.002	0.013	0.016	0.000	0.000	0.000	7.199	0.000	0.000
Survey Crew Trucks	Off-Highway Trucks	376	0.38	10	3.6	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.300	0.000	0.000
Tractor Trailers Temp Fac.	Off-Highway Trucks	376	0.38	4	1.44	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.000	0.000
Fork Truck	Forklifts	82	0.2	840	302.4	2027	75	100	0.272	0.228	2.152	3.568	0.005	0.092	0.085	527.07	0.021	0.004	0.001	0.001	0.012	0.020	0.000	0.001	0.000	2.881	0.000	0.000
Generator	Generator Sets	14	0.74	80	28.8	2027	0	25	0.65	0.537	4.305	2.852	0.008	0.172	0.158	568.306	0.023	0.005	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.187	0.000	0.000
Grout Mixer	Other General Industrial Equipment	35	0.34	420	151.2	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.001	0.001	0.007	0.009	0.000	0.000	0.000	1.166	0.000	0.000
Grout Wheel Truck	Off-Highway Trucks	376	0.38	160	57.6	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.002	0.002	0.009	0.011	0.000	0.000	0.000	4.799	0.000	0.000
Man Lift	Other General Industrial Equipment	35	0.34	1680	604.8	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.004	0.003	0.028	0.036	0.000	0.001	0.001	4.664	0.000	0.000
Tool Truck	Off-Highway Trucks	376	0.38	420	151.2	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.005	0.004	0.023	0.028	0.000	0.001	0.001	12.598	0.001	0.000
Tractor Trailer- Material Delivery	Off-Highway Trucks	376	0.38	840	302.4	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.010	0.008	0.046	0.056	0.000	0.002	0.001	25.195	0.001	0.000
Truck Tower (Mantiwoc type)	Off-Highway Trucks	376	0.38	80	28.8	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.001	0.001	0.004	0.005	0.000	0.000	0.000	2.400	0.000	0.000
Fork Truck	Forklifts	82	0.2	1600	576	2027	75	100	0.272	0.228	2.152	3.568	0.005	0.092	0.085	527.07	0.021	0.004	0.003	0.002	0.022	0.037	0.000	0.001	0.001	5.488	0.000	0.000
Man Lift	Other General Industrial Equipment	35	0.34	3200	1152	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.008	0.007	0.053	0.069	0.000	0.001	0.001	8.884	0.000	0.000
Tool Truck	Off-Highway Trucks	376	0.38	1600	576	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.019	0.016	0.088	0.107	0.000	0.003	0.003	47.991	0.002	0.000
Tractor Trailer- Material Delivery	Off-Highway Trucks	376	0.38	1600	576	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.019	0.016	0.088	0.107	0.000	0.003	0.003	47.991	0.002	0.000
High Lift	Other General Industrial Equipment	35	0.34	160	57.6	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.000	0.000	0.003	0.003	0.000	0.000	0.000	0.444	0.000	0.000
Man Lift	Other General Industrial Equipment	35	0.34	40	14.4	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.111	0.000	0.000
Material Deliveries	Off-Highway Trucks	376	0.38	60	21.6	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.001	0.001	0.003	0.004	0.000	0.000	0.000	1.800	0.000	0.000
Tractor Trailer- Material Delivery	Off-Highway Trucks	376	0.38	40	14.4	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.000	0.000	0.002	0.003	0.000	0.000	0.000	1.200	0.000	0.000
Truck Tower (Mantiwoc type)	Off-Highway Trucks	376	0.38	120	43.2	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.001	0.001	0.007	0.008	0.000	0.000	0.000	3.599	0.000	0.000
High Lift	Other General Industrial Equipment	35	0.34	800	288	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.002	0.002	0.013	0.017	0.000	0.000	0.000	2.221	0.000	0.000
Tool Truck	Off-Highway Trucks	376	0.38	800	288	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.010	0.008	0.044	0.053	0.000	0.002	0.001	23.996	0.001	0.000
90 Ton Crane	Cranes	367	0.29	240	86.4	2027	300	600	0.232	0.195	1.748	1.629	0.005	0.072	0.066	527.455	0.021	0.004	0.002	0.002	0.018	0.017	0.000	0.001	0.001	5.346	0.000	0.000
Concrete Pump	Pumps	11	0.74	60	21.6	2027	0	25	0.683	0.565	4.288	2.986	0.008	0.173	0.16	568.297	0.023	0.005	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.110	0.000	0.000
Concrete Truck	Off-Highway Trucks	376	0.38	60	21.6	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.001	0.001	0.003	0.004	0.000	0.000	0.000	1.800	0.000	0.000
Fork Truck	Forklifts	82	0.2	640	230.4	2027	75	100	0.272	0.228	2.152	3.568	0.005	0.092	0.085	527.07	0.021	0.004	0.001	0.001	0.009	0.015	0.000	0.000	0.000	2.195	0.000	0.000
Tool Truck	Off-Highway Trucks	376	0.38	160	57.6	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.002	0.002	0.009	0.011	0.000	0.000	0.000	4.799	0.000	0.000
Tractor Trailer- Steel Deliveries	Off-Highway Trucks	376	0.38	360	129.6	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.004	0.004	0.020	0.024	0.000	0.001	0.001	10.798	0.000	0.000
Trowel Machine	Other General Industrial Equipment	35	0.34	40	14.4	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.111	0.000	0.000
Truck Tower (Mantiwoc type)	Off-Highway Trucks	376	0.38	720	259.2	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.009	0.007	0.039	0.048	0.000	0.001	0.001	21.596	0.001	0.000
																			0.119	**0.100**	**0.616**	**0.783**	**0.003**	**0.021**	**0.020**	**272.011**	**0.011**	**0.002**

ATCT On-Road Emission Calculations

					x 0.36		MOVES3 Emission Factors, g/mile (calendar year)									Emission Calc (tons)								
								Exhaust	Exhaust	Exhaust	Brakewear	Tirewear					Exhaust	Exhaust	Exhaust	Brakewear	Tirewear			
Equipment	**MOVES3 Vehicle**	**On-road Activity**	**Fuel Type**	**VMT**	**Total VMT (Scaled)**	**Year**	**Total HC**	**CO**	**NOx**	**PM2.5**	**PM2.5**	**PM2.5**	**CO2**	**CH4**	**N2O**	**Total HC**	**CO**	**NOx**	**PM2.5**	**PM2.5**	**PM2.5**	**CO2**	**CH4**	**N2O**
Cement Mixer	Heavy-duty vehicles, diesel	Material Delivery	Diesel	23125	8325	2027	0.165	1.586	2.616	0.038	0.009	0.003	1567.692	0.0095	0.0431	0.002	0.015	0.024	0.000	0.000	0.000	14.386	0.000	0.000
Dump Truck Subbase Material	Heavy-duty vehicles, diesel	Material Delivery	Diesel	12333	4439.88	2027	0.165	1.586	2.616	0.038	0.009	0.003	1567.692	0.0095	0.0431	0.001	0.008	0.013	0.000	0.000	0.000	7.672	0.000	0.000
Passenger Car	Light-duty trucks, gasoline	Employee Commute	Gasoline	14388660	5179917.6	2027	0.207	3.501	0.145	0.005	0.003	0.001	386.3913	0.0079	0.0012	1.182	19.990	0.828	0.029	0.017	0.006	2206.248	0.045	0.007
Tractor Trailer	Heavy-duty vehicles, diesel	Material Delivery	Diesel	2400	864	2027	0.165	1.586	2.616	0.038	0.009	0.003	1567.692	0.0095	0.0431	0.000	0.002	0.002	0.000	0.000	0.000	1.493	0.000	0.000
																1.184	**20.014**	**0.867**	**0.029**	**0.017**	**0.006**	**2229.800**	**0.045**	**0.007**

Notes:
CH4 and N2O emission factors based on 2020 calendar year, EPA Inventory of US GHG Emissions and Sinks, 2022.
CO2 based on typical emissions/gallon fuel (Gasoline: 8,887 grams/gallon, Diesel: 10,190 grams/gallon), EPA Office of Transportation and Air Quality, EPA-420-F-23-014, June 2023.
Utilized average light-duty vehicle fuel efficiency in 2020 of 23 mpg
Utilized average Heavy duty trucks (semi-truck) fuel efficiency of 6.5 mpg

Hotel Non-Road Emissions Calculations

				x 2.2			OFFROAD2017 EF (g/HP-hr)												Emission Calc (tons)									
ACEIT Equipment	**OFFROAD2017 Equipment**	**HP**	**LF**	**Activity Data (hrs)**	**Total Hours**	**Year**	**Low HP**	**High HP**	**TOG**	**ROG**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**	**TOG**	**ROG**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**
Backhoe	Tractors/Loaders/Backhoes	84	0.37	480	1056	2027	75	100	0.211	0.177	1.807	3.487	0.005	0.054	0.05	529.618	0.021	0.004	0.008	0.006	0.065	0.126	0.000	0.002	0.002	19.161	0.001	0.000
Concrete Pump	Pumps	11	0.74	180	396	2027	0	25	0.683	0.565	4.288	2.986	0.008	0.173	0.16	568.297	0.023	0.005	0.002	0.002	0.015	0.011	0.000	0.001	0.001	2.019	0.000	0.000
Concrete Ready Mix Trucks	Off-Highway Trucks	376	0.38	360	792	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.026	0.022	0.120	0.147	0.001	0.004	0.004	65.988	0.003	0.000
Excavator	Excavators	36	0.38	160	352	2027	25	50	0.45	0.378	3.367	4.216	0.005	0.089	0.082	587.394	0.024	0.005	0.002	0.002	0.018	0.022	0.000	0.000	0.000	3.118	0.000	0.000
Fork Truck	Forklifts	82	0.2	480	1056	2027	75	100	0.272	0.228	2.152	3.568	0.005	0.092	0.085	527.07	0.021	0.004	0.005	0.004	0.041	0.068	0.000	0.002	0.002	10.062	0.000	0.000
Tool Truck	Off-Highway Trucks	376	0.38	120	264	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.009	0.007	0.040	0.049	0.000	0.001	0.001	21.996	0.001	0.000
Tractor Trailer- Material Delivery	Off-Highway Trucks	376	0.38	240	528	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.017	0.015	0.080	0.098	0.000	0.003	0.003	43.992	0.002	0.000
Survey Crew Trucks	Off-Highway Trucks	376	0.38	10	22	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.001	0.001	0.003	0.004	0.000	0.000	0.000	1.833	0.000	0.000
Tractor Trailers Temp Fac.	Off-Highway Trucks	376	0.38	4	8.8	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.000	0.000	0.001	0.002	0.000	0.000	0.000	0.733	0.000	0.000
Fork Truck	Forklifts	82	0.2	840	1848	2027	75	100	0.272	0.228	2.152	3.568	0.005	0.092	0.085	527.07	0.021	0.004	0.009	0.008	0.072	0.119	0.000	0.003	0.003	17.608	0.001	0.000
Generator	Generator Sets	14	0.74	80	176	2027	0	25	0.65	0.537	4.305	2.852	0.008	0.172	0.158	568.306	0.023	0.005	0.001	0.001	0.009	0.006	0.000	0.000	0.000	1.142	0.000	0.000
Grout Mixer	Other General Industrial Equipment	35	0.34	420	924	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.006	0.005	0.043	0.056	0.000	0.001	0.001	7.126	0.000	0.000
Grout Wheel Truck	Off-Highway Trucks	376	0.38	160	352	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.012	0.010	0.053	0.065	0.000	0.002	0.002	29.328	0.001	0.000
Man Lift	Other General Industrial Equipment	35	0.34	1680	3696	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.025	0.021	0.171	0.223	0.000	0.005	0.004	28.504	0.001	0.000
Tool Truck	Off-Highway Trucks	376	0.38	420	924	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.031	0.026	0.140	0.172	0.001	0.005	0.005	76.986	0.003	0.001
Tractor Trailer- Material Delivery	Off-Highway Trucks	376	0.38	840	1848	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.061	0.051	0.281	0.343	0.001	0.010	0.009	153.972	0.006	0.001
Truck Tower (Mantiwoc type)	Off-Highway Trucks	376	0.38	80	176	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.006	0.005	0.027	0.033	0.000	0.001	0.001	14.664	0.001	0.000
Fork Truck	Forklifts	82	0.2	1600	3520	2027	75	100	0.272	0.228	2.152	3.568	0.005	0.092	0.085	527.07	0.021	0.004	0.017	0.015	0.137	0.227	0.000	0.006	0.005	33.540	0.001	0.000
Man Lift	Other General Industrial Equipment	35	0.34	3200	7040	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.048	0.040	0.326	0.425	0.000	0.009	0.008	54.293	0.002	0.000
Tool Truck	Off-Highway Trucks	376	0.38	1600	3520	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.116	0.098	0.535	0.654	0.003	0.019	0.017	293.280	0.012	0.002
Tractor Trailer- Material Delivery	Off-Highway Trucks	376	0.38	1600	3520	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.116	0.098	0.535	0.654	0.003	0.019	0.017	293.280	0.012	0.002
High Lift	Other General Industrial Equipment	35	0.34	160	352	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.002	0.002	0.016	0.021	0.000	0.000	0.000	2.715	0.000	0.000
Man Lift	Other General Industrial Equipment	35	0.34	40	88	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.001	0.001	0.004	0.005	0.000	0.000	0.000	0.679	0.000	0.000
Material Deliveries	Off-Highway Trucks	376	0.38	60	132	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.004	0.004	0.020	0.025	0.000	0.001	0.001	10.998	0.000	0.000
Tractor Trailer- Material Delivery	Off-Highway Trucks	376	0.38	40	88	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.003	0.002	0.013	0.016	0.000	0.000	0.000	7.332	0.000	0.000
Truck Tower (Mantiwoc type)	Off-Highway Trucks	376	0.38	120	264	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.009	0.007	0.040	0.049	0.000	0.001	0.001	21.996	0.001	0.000
High Lift	Other General Industrial Equipment	35	0.34	800	1760	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.012	0.010	0.081	0.106	0.000	0.002	0.002	13.573	0.001	0.000
Tool Truck	Off-Highway Trucks	376	0.38	800	1760	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.058	0.049	0.267	0.327	0.001	0.009	0.009	146.640	0.006	0.001
90 Ton Crane	Cranes	367	0.29	240	528	2027	300	600	0.232	0.195	1.748	1.629	0.005	0.072	0.066	527.455	0.021	0.004	0.014	0.012	0.108	0.101	0.000	0.004	0.004	32.673	0.001	0.000
Concrete Pump	Pumps	11	0.74	60	132	2027	0	25	0.683	0.565	4.288	2.986	0.008	0.173	0.16	568.297	0.023	0.005	0.001	0.001	0.005	0.004	0.000	0.000	0.000	0.673	0.000	0.000
Concrete Truck	Off-Highway Trucks	376	0.38	60	132	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.004	0.004	0.020	0.025	0.000	0.001	0.001	10.998	0.000	0.000
Fork Truck	Forklifts	82	0.2	640	1408	2027	75	100	0.272	0.228	2.152	3.568	0.005	0.092	0.085	527.07	0.021	0.004	0.007	0.006	0.055	0.091	0.000	0.002	0.002	13.416	0.001	0.000
Tool Truck	Off-Highway Trucks	376	0.38	160	352	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.012	0.010	0.053	0.065	0.000	0.002	0.002	29.328	0.001	0.000
Tractor Trailer- Steel Deliveries	Off-Highway Trucks	376	0.38	360	792	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.026	0.022	0.120	0.147	0.001	0.004	0.004	65.988	0.003	0.000
Trowel Machine	Other General Industrial Equipment	35	0.34	40	88	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.001	0.001	0.004	0.005	0.000	0.000	0.000	0.679	0.000	0.000
Truck Tower (Mantiwoc type)	Off-Highway Trucks	376	0.38	720	1584	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.052	0.044	0.241	0.294	0.001	0.008	0.008	131.976	0.005	0.001
																			0.727	**0.609**	**3.763**	**4.783**	**0.016**	**0.131**	**0.119**	**1662.288**	**0.066**	**0.013**

Hotel On-Road Emissions Calculations

					x 2.2			MOVES3 Emission Factors, g/mile (calendar year)									Emission Calc (tons)								
Equipment	MOVES3 Vehicle	On-road Activity	Fuel Type	VMT	Total VMT	Year	Total HC	Exhaust CO	Exhaust NOx	Exhaust PM2.5	Brakewear PM2.5	Tirewear PM2.5	CO2	CH4	N2O	Total HC	Exhaust CO	Exhaust NOx	Exhaust PM2.5	Brakewear PM2.5	Tirewear PM2.5	CO2	CH4	N2O
Cement Mixer	Heavy-duty vehicles, diesel	Material Delivery	Diesel	23125	50875	2027	0.165	1.586	2.616	0.038	0.009	0.003	1567.692	0.0095	0.0431	0.009	0.089	0.147	0.002	0.001	0.000	87.916	0.001	0.002
Dump Truck Subbase Mate	Heavy-duty vehicles, diesel	Material Delivery	Diesel	12333	27132.6	2027	0.165	1.586	2.616	0.038	0.009	0.003	1567.692	0.0095	0.0431	0.005	0.047	0.078	0.001	0.000	0.000	46.887	0.000	0.001
Passenger Car	Light-duty trucks, gasoline	Employee Commute	Gasoline	4674186	10283209	2027	0.207	3.501	0.145	0.005	0.003	0.001	386.3913	0.0079	0.0012	2.346	39.685	1.644	0.057	0.034	0.011	4379.859	0.090	0.014
Tractor Trailer	Heavy-duty vehicles, diesel	Material Delivery	Diesel	2400	5280	2027	0.165	1.586	2.616	0.038	0.009	0.003	1567.692	0.0095	0.0431	0.001	0.009	0.015	0.000	0.000	0.000	9.124	0.000	0.000
																2.362	39.830	1.884	0.060	0.035	0.012	4523.787	0.090	0.018

Notes:

CH4 and N2O emission factors based on 2020 calendar year, EPA Inventory of US GHG Emissions and Sinks, 2022.

CO2 based on typical emissions/gallon fuel (Gasoline: 8,887 grams/gallon, Diesel: 10,190 grams/gallon), EPA Office of Transportation and Air Quality, EPA-420-F-23-014, June 2023.

Utilized average light-duty vehicle fuel efficiency in 2020 of 23 mpg

Utilized average Heavy duty trucks (semi-truck) fuel efficiency of 6.5 mpg

C-D Connector Non-Road Emissions Calculations

				x 10.2			OFFROAD2017 EF (g/HP-hr)												Emission Calc (tons)										
ACEIT Equipment	**OFFROAD2017 Equipment**	**HP**	**LF**	**Activity Data (Total Hour**		**Year**	**Low HP**	**High HP**	**TOG**	**ROG**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**	**TOG**	**ROG**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**	
Backhoe	Tractors/Loaders/Backhoes	84	0.37	320.1	3265.02	2027	75	100	0.211	0.177	1.807	3.487	0.005	0.054	0.05	529.618	0.021	0.004	0.02	0.02	0.20	0.39	0.00	0.01	0.01	59.24	0.00	0.00	
Concrete Ready Mix Trucks	Off-Highway Trucks	376	0.38	60	612	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.02	0.02	0.09	0.11	0.00	0.00	0.00	50.99	0.00	0.00	
Fork Truck	Forklifts	82	0.2	320.1	3265.02	2027	75	100	0.272	0.228	2.152	3.568	0.005	0.092	0.085	527.07	0.021	0.004	0.02	0.01	0.13	0.21	0.00	0.01	0.01	31.11	0.00	0.00	
Tool Truck	Off-Highway Trucks	376	0.38	80.1	817.02	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.03	0.02	0.12	0.15	0.00	0.00	0.00	68.07	0.00	0.00	
Tractor Trailer- Material Delivery	Off-Highway Trucks	376	0.38	15.9	162.18	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.01	0.00	0.02	0.03	0.00	0.00	0.00	13.51	0.00	0.00	
Survey Crew Trucks	Off-Highway Trucks	376	0.38	9.9	100.98	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.00	0.00	0.02	0.02	0.00	0.00	0.00	8.41	0.00	0.00	
Tractor Trailers Temp Fac.	Off-Highway Trucks	376	0.38	3.9	39.78	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.00	0.00	0.01	0.01	0.00	0.00	0.00	3.31	0.00	0.00	
Fork Truck	Forklifts	82	0.2	600	6120	2027	75	100	0.272	0.228	2.152	3.568	0.005	0.092	0.085	527.07	0.021	0.004	0.03	0.03	0.24	0.39	0.00	0.01	0.01	58.31	0.00	0.00	
Generator	Generator Sets	14	0.74	300	3060	2027	0	25	0.65	0.537	4.305	2.852	0.008	0.172	0.158	568.306	0.023	0.005	0.02	0.02	0.15	0.10	0.00	0.01	0.01	19.86	0.00	0.00	
Man Lift	Other General Industrial Equipment	35	0.34	600	6120	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.04	0.04	0.28	0.37	0.00	0.01	0.01	47.20	0.00	0.00	
Tool Truck	Off-Highway Trucks	376	0.38	150	1530	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.05	0.04	0.23	0.28	0.00	0.01	0.01	127.48	0.01	0.00	
Tractor Trailer- Material Delivery	Off-Highway Trucks	376	0.38	150	1530	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.05	0.04	0.23	0.28	0.00	0.01	0.01	127.48	0.01	0.00	
Fork Truck	Forklifts	82	0.2	2400	24480	2027	75	100	0.272	0.228	2.152	3.568	0.005	0.092	0.085	527.07	0.021	0.004	0.12	0.10	0.95	1.58	0.00	0.04	0.04	233.25	0.01	0.00	
Man Lift	Other General Industrial Equipment	35	0.34	2400	24480	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.17	0.14	1.13	1.48	0.00	0.03	0.03	188.79	0.01	0.00	
Tool Truck	Off-Highway Trucks	376	0.38	300	3060	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.10	0.08	0.47	0.57	0.00	0.02	0.01	254.95	0.01	0.00	
Tractor Trailer- Material Delivery	Off-Highway Trucks	376	0.38	600	6120	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.20	0.17	0.93	1.14	0.00	0.03	0.03	509.91	0.02	0.00	
High Lift	Other General Industrial Equipment	35	0.34	120	1224	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.01	0.01	0.06	0.07	0.00	0.00	0.00	9.44	0.00	0.00	
Man Lift (Fascia Construction)	Other General Industrial Equipment	35	0.34	24	244.8	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.00	0.00	0.01	0.01	0.00	0.00	0.00	1.89	0.00	0.00	
Material Deliveries	Off-Highway Trucks	376	0.38	60	612	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.02	0.02	0.09	0.11	0.00	0.00	0.00	50.99	0.00	0.00	
Tractor Trailer- Material Delivery	Off-Highway Trucks	376	0.38	60	612	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.02	0.02	0.09	0.11	0.00	0.00	0.00	50.99	0.00	0.00	
High Lift	Other General Industrial Equipment	35	0.34	800.1	8161.02	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.06	0.05	0.38	0.49	0.00	0.01	0.01	62.94	0.00	0.00	
Tool Truck	Off-Highway Trucks	376	0.38	200.1	2041.02	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.07	0.06	0.31	0.38	0.00	0.01	0.01	170.05	0.01	0.00	
90 Ton Crane	Cranes	367	0.29	320.1	3265.02	2027	300	600	0.232	0.195	1.748	1.629	0.005	0.072	0.066	527.455	0.021	0.004	0.09	0.07	0.67	0.62	0.00	0.03	0.03	202.04	0.01	0.00	
Concrete Pump	Pumps	11	0.74	12	122.4	2027	0	25	0.683	0.565	4.288	2.986	0.008	0.173	0.16	568.297	0.023	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00	0.00	
Concrete Truck	Off-Highway Trucks	376	0.38	24	244.8	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.01	0.01	0.04	0.05	0.00	0.00	0.00	20.40	0.00	0.00	
Fork Truck	Forklifts	82	0.2	80.1	817.02	2027	75	100	0.272	0.228	2.152	3.568	0.005	0.092	0.085	527.07	0.021	0.004	0.00	0.00	0.03	0.05	0.00	0.00	0.00	7.78	0.00	0.00	
Tool Truck	Off-Highway Trucks	376	0.38	12	122.4	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.00	0.00	0.02	0.02	0.00	0.00	0.00	10.20	0.00	0.00	
Tractor Trailer- Steel Deliveries	Off-Highway Trucks	376	0.38	39.9	406.98	2027	300	600	0.21	0.176	0.965	1.179	0.005	0.034	0.031	529.01	0.021	0.004	0.01	0.01	0.06	0.08	0.00	0.00	0.00	33.91	0.00	0.00	
Trowel Machine	Other General Industrial Equipment	35	0.34	12	122.4	2027	25	50	0.519	0.436	3.525	4.597	0.005	0.099	0.091	587.927	0.024	0.005	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.94	0.00	0.00	
																			1.18	**0.99**	**6.98**	**9.13**	**0.02**	**0.25**	**0.23**	**2424.09**	**0.10**	**0.02**	

C-D Connector On-Road Emissions Calculations

				x 10.2			MOVES3 Emission Factors, g/mile (calendar year)									Emission Calc (tons)								
Equipment	MOVES3 Vehicle	On-road Activity	Fuel Type	VMT	Total VMT (Scaled)	Year	Total HC	Exhaust CO	Exhaust NOx	Exhaust PM2.5	Brakewear PM2.5	Tirewear PM2.5	CO2	CH4	N2O	Total HC	Exhaust CO	Exhaust NOx	Exhaust PM2.5	Brakewear PM2.5	Tirewear PM2.5	CO2	CH4	N2O
Cement Mixer		Material Deliver	Diesel	6938	70767.6	2027	0.165	1.586	2.616	0.038	0.009	0.003	1567.692	0.0095	0.0431	0.013	0.124	0.204	0.003	0.001	0.000	122.292	0.001	0.003
Dump Truck Subbase Material		Material Deliver	Diesel	3700	37740	2027	0.165	1.586	2.616	0.038	0.009	0.003	1567.692	0.0095	0.0431	0.007	0.066	0.109	0.002	0.000	0.000	65.218	0.000	0.002
Passenger Car		Employee Comm	Gasoline	3099096	31610779.2	2027	0.207	3.501	0.145	0.005	0.003	0.001	386.3913	0.0079	0.0012	7.213	121.992	5.053	0.174	0.105	0.035	13463.770	0.275	0.042
Tractor Trailer		Material Deliver	Diesel	159	1621.8	2027	0.165	1.586	2.616	0.038	0.009	0.003	1567.692	0.0095	0.0431	0.000	0.003	0.005	0.000	0.000	0.000	2.803	0.000	0.000
																7.233	**122.185**	**5.370**	**0.179**	**0.106**	**0.035**	**13654.083**	**0.276**	**0.047**

Notes:

CH4 and N2O emission factors based on 2020 calendar year, EPA Inventory of US GHG Emissions and Sinks, 2022.

CO2 based on typical emissions/gallon fuel (Gasoline: 8,887 grams/gallon, Diesel: 10,190 grams/gallon), EPA Office of Transportation and Air Quality, EPA-420-F-23-014, June 2023.

Utilized average light-duty vehicle fuel efficiency in 2020 of 23 mpg

Utilized average Heavy duty trucks (semi-truck) fuel efficiency of 6.5 mpg

Total Construction Emissions

Dates	Project	CO	NO_x	VOC	SO_2	$PM_{2.5}$	PM_{10}	CO2	CH4	N2O	CO2e	CO2e (MT)
2025	Tree Clearing	4.6	4.3	0.5	0.01	0.2	0.2	1,358	0.05	0.01	1,363	1,236
2026	Supplemental Tower			n/a						n/a		
1/2027-12/2028	*ATCT*	*20.8*	*1.5*	*1.3*	*0.00*	*0.1*	*0.0*	*2,502*	*0.06*	*0.01*	*2,506*	*2273.47*
2/2027-7/2029	*Hotel*	*44.6*	*5.6*	*3.0*	*0.02*	*0.2*	*0.1*	*6,186*	*0.16*	*0.03*	*6,199*	*5623.64*
2/2027-7/2029	*C-D Connector*	*131.3*	*12.3*	*8.2*	*0.02*	*0.5*	*0.2*	*16,078*	*0.37*	*0.07*	*16,107*	*14612.10*
2027	ATCT/Hotel/C-D Connector	74.9	7.3	4.7	0.02	0.3	0.1	9414.5	0.2	0.0	9431.9	8,557
2028	ATCT/Hotel/C-D Connector	80.8	7.9	5.1	0.02	0.3	0.2	10156.6	0.2	0.0	10175.5	9,231
2029	*Hotel/C-D Connector*	41.1	4.2	2.6	0.01	0.2	0.1	5195.0	0.1	0.0	5204.8	4,722
	TOTAL	**201.3**	**23.7**	**13.0**	**0.05**	**1.0**	**0.6**	**26,124**	**0.64**	**0.12**	**26,175**	**23,746**