

# **APPENDIX P**

## ***Air Quality Analysis***



EMISSIONS INVENTORY REPORT  
FOR RUNWAY EXTENSION AT  
FLOYD BENNETT MEMORIAL AIRPORT

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# **APPENDIX A**

## **ACEIT MODEL PRINTOUTS**



## **SECTION 1**

### **BACKGROUND**

Warren County is requesting Federal Aviation Administration (FAA) approval for the extension of Runway 1-19 at Floyd Bennett Memorial Airport (Airport). The airport is primarily within the town of Queensbury, New York in Warren County, approximately three miles northeast of Glens Falls. The County owns the Airport and the Department of Public Works is responsible for its operation. The proposed action (i.e. project) includes the 1,000-foot extension to Runway 1-19, which also involves the construction of a parallel taxiway extension, the removal of 23 acres of trees that have been identified as Runway End Siting Surface (RESS) obstructions, and the possibility of mitigating up to 18 acres of wetlands through the construction of an engineered wetland. The purpose of the proposed project is to provide adequate runway length to accommodate the family of critical design airplanes/aircraft currently operating at the airport and those anticipated to operate at the airport in the next five years.

The extension of the runway would not alter aircraft operations and will not increase emissions from stationary sources, however there would be an increase in emissions during construction due to the use of various construction equipment and travel by contractors. In accordance with FAA requirements, an air quality analysis requires consideration under both the Clean Air Act (CAA) and the National Environmental Policy Act (NEPA).

#### **CAA - CONFORMITY ANALYSIS:**

Under Section 176(c)(1) (Conformity regulations) of CAA, actions subject to federal funding or approval require a demonstration of conformity to the State Implementation Plan (SIP) for a proposed action when the project is located in areas designated as non-attainment or maintenance by the United States Environmental Protection Agency (USEPA). Compliance with the SIP requires the sponsoring Federal agency to prepare an analytical demonstration of the potential for significant air quality impacts from Federal actions. The USEPA promulgated the initial conformity regulations to assist Federal agencies in complying with the SIP by specifying rules for two categories of Federal actions: transportation actions and general actions.



Table 1 – *Clean Air Act De Minimis Thresholds* provides the applicable thresholds for pollutants based on their non-attainment status. If the increase in emissions from a proposed action does not equal or exceed these thresholds, the action is assumed to comply with the Rule and no further analysis is required under CAA Section 176(c)(1). If the threshold levels are exceeded, a General Conformity Determination would be required.

<b>TABLE 1 CLEAN AIR ACT DE MINIMIS THRESHOLDS</b>		
<b>POLLUTANT</b>	<b>NONATTAINMENT AREA THRESHOLD (tons per year)</b>	<b>MAINTENANCE AREA THRESHOLD (tons per year)</b>
<b>Carbon Monoxide (CO)</b>	100	100
<b>Particulate Matter (PM<sub>10</sub>)</b>		100
Moderate Nonattainment Area	100	
Serious Nonattainment Area	70	
<b>Particulate Matter (PM<sub>2.5</sub>)</b>		
Direct Emissions	100	100
SO <sub>2</sub>	100	100
NO <sub>x</sub>	100	100
VOC or Ammonia	100	100
<b>Sulfur Dioxide (SO<sub>2</sub>)</b>	100	
<b>Nitrogen Dioxide (NO<sub>2</sub>)</b>	100	
<b>Lead (Pb)</b>	25	25
<b>Ozone (O<sub>3</sub>)</b>	<i>VOC/NO<sub>x</sub></i>	<i>VOC/NO<sub>x</sub></i>
Serious Nonattainment Area	50/50	
Severe Nonattainment Area	25/25	
Extreme Nonattainment Area	10/10	
<u>Inside an ozone transport region:</u>	50/100	50/100
<u>Outside an ozone transport region:</u>	100/100	100/100

**Note:** The ozone transport region is a single transport region for ozone [within the meaning of CAA Section 176A(a)], comprised of the States of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Consolidated Metropolitan Statistical Area that includes the District of Columbia, given at CAA Sec. 184.

**Source:** 40 CFR 93.153(b)(1) & (2)

As previously mentioned, the General Conformity Rule applies to a federal action that is located in an area designated nonattainment or maintenance by the USEPA. Since the proposed project is located in an attainment area, General Conformity Applicability does not apply to this project.

**NEPA:**

Under NEPA, federal agencies are required to assess the impacts federal actions may have on air quality and the human environment. National Ambient Air Quality Standards (NAAQS) have been promulgated for six criteria air pollutants by the USEPA for public health and environmental welfare against poor air quality. The six criteria air pollutants include: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter (PM) for both PM<sub>10</sub> and PM<sub>2.5</sub>, and sulfur dioxide (SO<sub>2</sub>). As part of the NEPA process, the proposed action's impact on air quality is assessed by evaluating the impact of the proposed action on the NAAQS. The methodology for evaluating the need to conduct an air quality analysis is provided in the FAA document, *Aviation Emissions and Air Quality Handbook Version 3* dated July 2014 (*Air Quality Handbook*).

Since there would be a temporary increase in emissions during construction for this project, the FAA *Air Quality Handbook* requires completion of an emissions inventory. Based on information provided, the project will not affect the emissions associated with aircraft, ground support vehicles (GSE) and ground access vehicles at the airport. Therefore, this document only summarizes the expected construction emissions associated with the runway extension project at the Airport.

## SECTION 2

### CONSTRUCTION EMISSION CALCULATIONS

In accordance with the FAA *Air Quality Handbook*, a construction emission inventory was conducted to determine the expected emissions associated with heavy equipment, deliveries, and worker mobilization. The software contained in the ACRP Report 102: *Guidance for Estimating Airport Construction Emissions* was used for the calculations. ACRP Report 102 provides guidance and an interactive modeling tool, called Airport Construction Emissions Inventory Tool (ACEIT), to assist airports and other stakeholders in developing airport construction emissions inventories.<sup>1</sup> It should be noted that representatives from USEPA participated on the ACRP panel for the ACEIT modeling tool.

The ACEIT software tool uses default emission factors from USEPA approved emission publications and models for non-road equipment and on-road vehicles. The two main emission factor models used to develop the Guidebook and ACEIT are the EPA's non-road equipment emissions model (NONROAD 2008a, July 2009) and the Motor Vehicle Emissions Simulator (MOVES) (EPA 2009 and 2012). As the name implies, NONROAD provides predictions of emissions inventories from which emission factors can be derived for equipment typically used for non-road (off-road) purposes. In contrast, MOVES is used to develop emission inventories and emission factors for on-road vehicles. Both exhaust and particulate matter fugitive emission factors were developed using these models for non-road construction equipment and on-road vehicles that were incorporated into ACEIT.

The NONROAD emission factors are in grams per horsepower-hour (g/HP-hr), while MOVES emission factors are in grams per mile (g/mi). ACEIT assumes the horsepower to be the average for each type of equipment. In order to be conservative, it was assumed for this project that all equipment would be operating on diesel, with the exception of on-road passenger vehicles for construction employees which are assumed to operate on gasoline.

<sup>1</sup> ACRP Report 102: Guidance for Estimating Airport Construction Emissions

Construction is expected to last approximately six months, starting in the spring of 2018. The ACEIT modeling tool provides typical activities and construction equipment used for airport development projects. The ACEIT modeling tool provides typical activities and construction equipment used for airport development projects. The ACEIT model has a scenario for a runway extension, however it does not have a scenario for the installation of an engineered wetland. Therefore, equipment and hours of operation were chosen to match the project description. The calculations were based on the following scenario selections and overall project sizes:

<b>Project Selection</b>	<b>Cost</b>	<b>Size</b>
Runway Extension	\$6.7 million	<ul style="list-style-type: none"> <li>• Runway dimensions of 1,000 feet long, 150 feet wide</li> <li>• Taxiway dimensions of 1,400 feet long, 35 feet wide</li> <li>• 66.7 acres of grading/removal of terrain obstructions</li> <li>• 23 acres of tree obstruction removal</li> </ul>
Engineered Wetland	\$1.7 million	18 acres of wetland construction

As previously mentioned, all of the construction equipment is expected to operate on diesel. The ACEIT default round trip distances of on road vehicles were used for this project. Passenger vehicles, used by workers to access the site, were assumed to travel 30 miles round trip during construction. Trucks used for material delivery to the site were assumed to travel 40 miles round trip.

Based on the results of the ACEIT modeling software, the emissions of criteria pollutants and greenhouse gases during construction of the runway extension and associated projects are listed in Table 2. Modeling results are included in Appendix A.

<b>TABLE 2 TEMPORARY CONSTRUCTION EMISSIONS</b>				
<b>Criteria Pollutants</b>	<b>NonRoad Emissions (tons)</b>	<b>OnRoad Emissions (tons)</b>	<b>Fugitive Emissions (tons)</b>	<b>Total Emissions (tons)</b>
Carbon Monoxide	5.8940	1.8338	0.3630	8.0907
Oxides of Nitrogen	12.1001	0.1672	0.0227	12.2899
Sulfur Dioxide	0.0344	0.0040	0.0042	0.0425
PM10	0.7250	0.0050	0.3917	1.1217
PM2.5	0.6670	0.0047	--	0.6717
VOCs	2.1720	0.1111	5.5759	7.8590
<b>Greenhouse Gases</b>	<b>(metric tons)</b>	<b>(metric tons)</b>	<b>(metric tons)</b>	<b>(metric tons)</b>
Carbon Dioxide	6,006.662	324.6209	--	6,331.283
Methane	--	0.0363	--	0.0363
Nitrous Oxide	--	0.0082	--	0.0082
Carbon Dioxide Equivalents	6,007	328		6,335

## **SECTION 3**

### **CONCLUSIONS**

The runway extension project at the Airport will temporarily increase emissions for a six month period based on the anticipated construction schedule. However, the completed project will not increase emissions over its useful life.

#### **CONFORMITY**

The airport is located in an area designated as attainment with the NAAQS by USEPA. Therefore, General Conformity Applicability does not apply to this project.

#### **NEPA**

As illustrated in Table 2, the estimated construction emissions of any criteria pollutant are less than any de minimus threshold, if general conformity were applicable. Therefore, given the location of the project, short construction timeframe, and expected emissions, it is unlikely that the pollutant concentration levels would exceed a NAAQS standard.

Greenhouse gas emissions associated with the project were also calculated for carbon dioxide, methane, and nitrous oxide. The resulting carbon dioxide equivalent emissions are approximately 6,335 metric tons. There are currently no federal requirements for reporting greenhouse gases from aviation sources and no significance thresholds.

Given the information detailed above, as well as the fact that the proposed action would not have an effect on enplanements or aircraft operations at the airport, the proposed project would not significantly impact air quality and therefore a NAAQS review was not prepared for this air quality analysis.



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STUDY

Study Name

Floyd Bennett EA

Study Description

Runway extension

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EMISSIONS INVENTORY - SUMMARY

Total Emissions by Year

Units for Non-Greenhouse Gases Emission: Short Ton

Units for Greenhouse Gases (CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O) Emission: Metric Ton

Year	CO	NOx	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	VOC	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
2018	8.346013282	12.34958	0.043005	1.1256	0.675298	7.88354	6379.017	0.039819	0.008483

Total Emissions by Source Categories

Units for Non-Greenhouse Gases Emission: Short Ton

Units for Greenhouse Gases Emission: Metric Ton

Year	Emission Source	CO	NOx	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	VOC	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
2018	NonRoad	5.93167	12.15087	0.034521	0.728568	0.670282	2.184025	6032.73	--	--
2018	OnRoad	2.051393	0.176061	0.004314	0.005332	0.005016	0.123665	346.2873	0.039819	0.008483
2018	Fugitive	0.36295	0.02265	0.00417	0.3917	--	5.57585	--	--	--
2018	TOTAL	8.346013	12.34958	0.043005	1.1256	0.675298	7.88354	6379.017	0.039819	0.008483

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EMISSIONS INVENTORY - DETAILS:

Non-Road Sources

Units for Non-Greenhouse Gases Emission: Short Ton

Units for Greenhouse Gases (CO2, CH4, and N2O) Emission: Metric Ton

Scenario ID	Year	Project	Construction Activity	Equipment	Fuel	HP Average	Load Factor	Hours of Activity	CO	NOx	SO2	PM10	PM2.5	VOC	CO2
1	2018	Detention Basin	Clearing and Grubbing	Chain Saw	Diesel	11	0.7	216	0.538159	0.002426	0.000257	0.017872	0.016442	0.117193	1.140949
1	2018	Detention Basin	Clearing and Grubbing	Chipper/Stump Grinder	Diesel	100	0.43	216	0.019756	0.035476	3.64E-05	0.003502	0.003222	0.004105	5.472234
1	2018	Detention Basin	Clearing and Grubbing	Pickup Truck	Diesel	600	0.59	288	0.029937	0.092692	0.000302	0.00385	0.003542	0.016151	54.68671
1	2018	Detention Basin	Drainage	Dozer	Diesel	175	0.59	57.28	0.003209	0.00753	1.86E-05	0.000724	0.000666	0.001094	3.171995
1	2018	Detention Basin	Drainage	Dump Truck	Diesel	600	0.59	57.28	0.005954	0.018435	6.00E-05	0.000766	0.000705	0.003258	10.87658
1	2018	Detention Basin	Drainage	Loader	Diesel	175	0.59	57.28	0.004139	0.009648	1.93E-05	0.000974	0.000896	0.001199	3.171731
1	2018	Detention Basin	Drainage	Other General Equipment	Diesel	175	0.43	57.28	0.002328	0.00854	1.43E-05	0.00058	0.000534	0.00095	2.286473
1	2018	Detention Basin	Drainage	Pickup Truck	Diesel	600	0.59	57.28	0.005954	0.018435	6.00E-05	0.000766	0.000705	0.003258	10.87658
1	2018	Detention Basin	Drainage	Roller	Diesel	100	0.59	57.28	0.006436	0.006515	1.23E-05	0.000838	0.000771	0.000758	2.012732
1	2018	Detention Basin	Dust Control	Water Truck	Diesel	600	0.59	1440	0.149683	0.463459	0.001508	0.019252	0.017712	0.080525	273.4336
1	2018	Detention Basin	Excavation (Cut to Fill)	Dozer	Diesel	175	0.59	1448.966	0.081186	0.190476	0.00047	0.018308	0.016843	0.026791	80.23939
1	2018	Detention Basin	Excavation (Cut to Fill)	Dump Truck (12 cy)	Diesel	600	0.59	3863.909	0.40164	1.243587	0.004047	0.05166	0.047527	0.215974	733.6961
1	2018	Detention Basin	Excavation (Cut to Fill)	Excavator	Diesel	175	0.59	1159.173	0.050134	0.123956	0.000365	0.010499	0.009659	0.020237	64.19481
1	2018	Detention Basin	Excavation (Cut to Fill)	Pickup Truck	Diesel	600	0.59	1159.173	0.120492	0.373076	0.001214	0.015498	0.014258	0.064832	220.1089
1	2018	Detention Basin	Excavation (Cut to Fill)	Roller	Diesel	100	0.59	1159.173	0.130243	0.131835	0.000248	0.016961	0.015604	0.014701	40.73157
1	2018	Detention Basin	Excavation (Cut to Fill)	Scraper	Diesel	600	0.59	1448.966	0.398731	0.972436	0.001694	0.060756	0.055896	0.091098	275.1086
1	2018	Detention Basin	Excavation (Topsoil Stripping)	Dozer	Diesel	175	0.59	136.373	0.007641	0.017927	4.43E-05	0.001723	0.001585	0.002555	7.551928
1	2018	Detention Basin	Fencing	Concrete Truck	Diesel	600	0.59	9.833	0.001022	0.003165	1.03E-05	0.000131	0.000121	0.000607	1.867134
1	2018	Detention Basin	Fencing	Dump Truck	Diesel	600	0.59	39.333	0.004089	0.012659	4.12E-05	0.000526	0.000484	0.002255	7.468724
1	2018	Detention Basin	Fencing	Other General Equipment	Diesel	175	0.43	39.333	0.001599	0.005864	9.82E-06	0.000398	0.000367	0.000666	1.570074
1	2018	Detention Basin	Fencing	Pickup Truck	Diesel	600	0.59	39.333	0.004089	0.012659	4.12E-05	0.000526	0.000484	0.002255	7.468724
1	2018	Detention Basin	Fencing	Skid Steer Loader	Diesel	75	0.21	39.333	0.003348	0.003399	2.93E-06	0.0005	0.00046	0.00074	0.429337
1	2018	Detention Basin	Fencing	Tractors/Loader/Backhoe	Diesel	100	0.21	39.333	0.004149	0.003301	3.79E-06	0.000591	0.000544	0.000782	0.573061
1	2018	Detention Basin	Hydroseeding	Hydroseeder	Diesel	600	0.59	78.323	0.008141	0.025208	8.20E-05	0.001047	0.000963	0.004434	14.87232
1	2018	Detention Basin	Hydroseeding	Off-Road Truck	Diesel	600	0.59	78.323	0.008141	0.025208	8.20E-05	0.001047	0.000963	0.004434	14.87232
1	2018	Detention Basin	Soil Erosion/Sediment Control	Other General Equipment	Diesel	175	0.43	72	0.002926	0.010734	1.80E-05	0.000729	0.000671	0.001182	2.874058
1	2018	Detention Basin	Soil Erosion/Sediment Control	Pickup Truck	Diesel	600	0.59	144	0.014968	0.046346	0.000151	0.001925	0.001771	0.008104	27.34336
1	2018	Detention Basin	Soil Erosion/Sediment Control	Pumps	Diesel	11	0.43	72	0.001676	0.001767	1.49E-06	0.000168	0.000155	0.000251	0.200373
1	2018	Detention Basin	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	100	0.21	72	0.007595	0.006042	6.93E-06	0.001082	0.000995	0.001335	1.049001
1	2018	Detention Basin	Topsoil Placement	Dozer	Diesel	175	0.59	197.587	0.011071	0.025974	6.41E-05	0.002497	0.002297	0.003685	10.94178
1	2018	Detention Basin	Topsoil Placement	Dump Truck	Diesel	600	0.59	197.587	0.020538	0.063593	0.000207	0.002642	0.00243	0.011099	37.51869
1	2018	Detention Basin	Topsoil Placement	Pickup Truck	Diesel	600	0.59	197.587	0.020538	0.063593	0.000207	0.002642	0.00243	0.011099	37.51869
1	2018	Landscaping	Mulching	Dump Truck	Diesel	600	0.59	72	0.007484	0.023173	7.54E-05	0.000963	0.000886	0.004081	13.67168
1	2018	Landscaping	Mulching	Other General Equipment	Diesel	175	0.43	72	0.002926	0.010734	1.80E-05	0.000729	0.000671	0.001182	2.874058
1	2018	Landscaping	Mulching	Pickup Truck	Diesel	600	0.59	72	0.007484	0.023173	7.54E-05	0.000963	0.000886	0.004081	13.67168
1	2018	Landscaping	Mulching	Tractors/Loader/Backhoe	Diesel	100	0.21	72	0.007595	0.006042	6.93E-06	0.001082	0.000995	0.001335	1.049001
1	2018	Landscaping	Sodding	Flatbed Truck	Diesel	600	0.59	368.576	0.038312	0.118625	0.000386	0.004928	0.004534	0.020654	69.98684
1	2018	Landscaping	Sodding	Other General Equipment	Diesel	175	0.43	368.576	0.01498	0.054951	9.20E-05	0.003734	0.003435	0.005874	14.71262
1	2018	Landscaping	Sodding	Pickup Truck	Diesel	600	0.59	368.576	0.038312	0.118625	0.000386	0.004928	0.004534	0.020654	69.98684
1	2018	Landscaping	Sodding	Skid Steer Loader	Diesel	75	0.21	368.576	0.031371	0.031847	2.75E-05	0.004682	0.004307	0.006315	4.02317
1	2018	Landscaping	Tree Planting	Flatbed Truck	Diesel	600	0.59	4860	0.50518	1.564175	0.00509	0.064977	0.059779	0.271636	922.8383
1	2018	Landscaping	Tree Planting	Other General Equipment	Diesel	175	0.43	4860	0.197526	0.724576	0.001213	0.049232	0.045294	0.076933	193.9989
1	2018	Landscaping	Tree Planting	Pickup Truck	Diesel	600	0.59	4860	0.50518	1.564175	0.00509	0.064977	0.059779	0.271636	922.8383
1	2018	Landscaping	Tree Planting	Tractors/Loader/Backhoe	Diesel	100	0.21	4860	0.51269	0.407854	0.000468	0.073034	0.067191	0.082361	70.80759
1	2018	Runway Extension	Asphalt Placement	Asphalt Paver	Diesel	175	0.59	27.625	0.001827	0.00424	9.18E-06	0.000425	0.000391	0.000579	1.529715
1	2018	Runway Extension	Asphalt Placement	Dump Truck	Diesel	600	0.59	99.494	0.010342	0.032022	0.000104	0.00133	0.001224	0.005617	18.89236
1	2018	Runway Extension	Asphalt Placement	Other General Equipment	Diesel	175	0.43	55.25	0.002246	0.008237	1.38E-05	0.00056	0.000515	0.000917	2.20544
1	2018	Runway Extension	Asphalt Placement	Pickup Truck	Diesel	600	0.59	27.625	0.002872	0.008891	2.89E-05	0.000369	0.00034	0.001601	5.245557
1	2018	Runway Extension	Asphalt Placement	Roller	Diesel	100	0.59	27.625	0.003104	0.003142	5.91E-06	0.000404	0.000372	0.000383	0.9707
1	2018	Runway Extension	Asphalt Placement	Skid Steer Loader	Diesel	75	0.21	27.625	0.002351	0.002387	2.06E-06	0.000351	0.000323	0.000541	0.301539
1	2018	Runway Extension	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	25	0.59	35.36	0.001377	0.002563	2.30E-06	0.000203	0.000187	0.000273	0.310184
1	2018	Runway Extension	Clearing and Grubbing	Chain Saw	Diesel	11	0.7	276	0.687648	0.003099	0.000328	0.022837	0.02101	0.148711	1.457879
1	2018	Runway Extension	Clearing and Grubbing	Chipper/Stump Grinder	Diesel	100	0.43	276	0.025244	0.04533	4.65E-05	0.004475	0.004117	0.005228	6.992298
1	2018	Runway Extension	Clearing and Grubbing	Pickup Truck	Diesel	600	0.59	368	0.038252	0.11844	0.000385	0.00492	0.004526	0.020621	69.87747
1	2018	Runway Extension	Drainage - 24 inch SICPP	Dozer	Diesel	175	0.59	48	0.002689	0.00631	1.56E-05	0.000606	0.000558	0.000923	2.658096
1	2018	Runway Extension	Drainage - 24 inch SICPP	Dump Truck	Diesel	600	0.59	48	0.004989	0.015449	5.03E-05	0.000642	0.00059	0.00274	9.114452
1	2018	Runway Extension	Drainage - 24 inch SICPP	Excavator	Diesel	175	0.59	48	0.002076	0.005133	1.51E-05	0.000435	0.0004	0.000865	2.658232
1	2018	Runway Extension	Drainage - 24 inch SICPP	Loader	Diesel	175	0.59	48	0.003468	0.008085	1.62E-05	0.000816	0.000751	0.001012	2.657875

EMISSIONS INVENTORY - DETAILS:

Non-Road Sources

Units for Non-Greenhouse Gases Emission: Short Ton

Units for Greenhouse Gases (CO2, CH4, and N2O) Emission: Metric Ton

Scenario ID	Year	Project	Construction Activity	Equipment	Fuel	HP Average	Load Factor	Hours of Activity	CO	NOx	SO2	PM10	PM2.5	VOC	CO2
1	2018	Runway Extension	Drainage - 24 inch SICPP	Other General Equipment	Diesel	175	0.43	48	0.001951	0.007156	1.20E-05	0.000486	0.000447	0.000803	1.916039
1	2018	Runway Extension	Drainage - 24 inch SICPP	Pickup Truck	Diesel	600	0.59	48	0.004989	0.015449	5.03E-05	0.000642	0.00059	0.00274	9.114452
1	2018	Runway Extension	Drainage - 24 inch SICPP	Roller	Diesel	100	0.59	48	0.005393	0.005459	1.03E-05	0.000702	0.000646	0.000641	1.686647
1	2018	Runway Extension	Drainage - 6 inch Perforated Underdrain	Dump Truck	Diesel	600	0.59	44.444	0.00462	0.014304	4.65E-05	0.000594	0.000547	0.002541	8.439223
1	2018	Runway Extension	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	175	0.59	44.444	0.003211	0.007486	1.50E-05	0.000756	0.000695	0.00094	2.460971
1	2018	Runway Extension	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	175	0.43	44.444	0.001806	0.006626	1.11E-05	0.00045	0.000414	0.000746	1.774092
1	2018	Runway Extension	Drainage - 6 inch Perforated Underdrain	Pickup Truck	Diesel	600	0.59	44.444	0.00462	0.014304	4.65E-05	0.000594	0.000547	0.002541	8.439223
1	2018	Runway Extension	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	100	0.21	44.444	0.004688	0.00373	4.28E-06	0.000668	0.000614	0.000868	0.647525
1	2018	Runway Extension	Dust Control	Water Truck	Diesel	600	0.59	1440	0.149683	0.463459	0.001508	0.019252	0.017712	0.080525	273.4336
1	2018	Runway Extension	Excavation (Borrow)	Dozer	Diesel	175	0.59	0	0	0	0	0	0	3.68E-05	0
1	2018	Runway Extension	Excavation (Borrow)	Dump Truck (12 cy)	Diesel	600	0.59	0	0	0	0	0	0	5.75E-05	0
1	2018	Runway Extension	Excavation (Borrow)	Pickup Truck	Diesel	600	0.59	0	0	0	0	0	0	5.75E-05	0
1	2018	Runway Extension	Excavation (Borrow)	Roller	Diesel	100	0.59	0	0	0	0	0	0	3.35E-05	0
1	2018	Runway Extension	Excavation (Cut to Fill)	Dozer	Diesel	175	0.59	550	0.030817	0.072301	0.000179	0.006949	0.006393	0.010192	30.45735
1	2018	Runway Extension	Excavation (Cut to Fill)	Dump Truck (12 cy)	Diesel	600	0.59	1466.667	0.152455	0.472042	0.001536	0.019609	0.01804	0.082015	278.4972
1	2018	Runway Extension	Excavation (Cut to Fill)	Excavator	Diesel	175	0.59	440	0.01903	0.047051	0.000139	0.003985	0.003667	0.007699	24.36713
1	2018	Runway Extension	Excavation (Cut to Fill)	Pickup Truck	Diesel	600	0.59	440	0.045736	0.141613	0.000461	0.005883	0.005412	0.024645	83.54914
1	2018	Runway Extension	Excavation (Cut to Fill)	Roller	Diesel	100	0.59	440	0.049438	0.050042	9.42E-05	0.006438	0.005923	0.005601	15.46093
1	2018	Runway Extension	Excavation (Cut to Fill)	Scraper	Diesel	600	0.59	550	0.151351	0.369118	0.000643	0.023062	0.021217	0.03467	104.426
1	2018	Runway Extension	Excavation (Topsoil Stripping)	Dozer	Diesel	175	0.59	196.078	0.010986	0.025776	6.36E-05	0.002477	0.002279	0.003657	10.85821
1	2018	Runway Extension	Fencing	Concrete Truck	Diesel	600	0.59	11.111	0.001155	0.003576	1.16E-05	0.000149	0.000137	0.000678	2.109806
1	2018	Runway Extension	Fencing	Dump Truck	Diesel	600	0.59	44.444	0.00462	0.014304	4.65E-05	0.000594	0.000547	0.002541	8.439223
1	2018	Runway Extension	Fencing	Other General Equipment	Diesel	175	0.43	44.444	0.001806	0.006626	1.11E-05	0.00045	0.000414	0.000746	1.774092
1	2018	Runway Extension	Fencing	Pickup Truck	Diesel	600	0.59	44.444	0.00462	0.014304	4.65E-05	0.000594	0.000547	0.002541	8.439223
1	2018	Runway Extension	Fencing	Skid Steer Loader	Diesel	75	0.21	44.444	0.003783	0.00384	3.32E-06	0.000565	0.000519	0.000826	0.485126
1	2018	Runway Extension	Fencing	Tractors/Loader/Backhoe	Diesel	100	0.21	44.444	0.004688	0.00373	4.28E-06	0.000668	0.000614	0.000868	0.647525
1	2018	Runway Extension	Grading	Dozer	Diesel	175	0.59	324.281	0.01817	0.042629	0.000105	0.004097	0.00377	0.006024	17.95771
1	2018	Runway Extension	Grading	Grader	Diesel	300	0.59	324.281	0.019676	0.063597	0.000174	0.003328	0.003062	0.009709	30.78628
1	2018	Runway Extension	Grading	Roller	Diesel	100	0.59	324.281	0.036436	0.036881	6.94E-05	0.004745	0.004365	0.004137	11.39474
1	2018	Runway Extension	Hydroseeding	Hydroseeder	Diesel	600	0.59	261.361	0.027168	0.084118	0.000274	0.003494	0.003215	0.014662	49.62838
1	2018	Runway Extension	Hydroseeding	Off-Road Truck	Diesel	600	0.59	261.361	0.027168	0.084118	0.000274	0.003494	0.003215	0.014662	49.62838
1	2018	Runway Extension	Lighting	Dump Truck	Diesel	600	0.59	50	0.005197	0.016092	5.24E-05	0.000668	0.000615	0.002852	9.494221
1	2018	Runway Extension	Lighting	Loader	Diesel	175	0.59	50	0.003613	0.008422	1.69E-05	0.00085	0.000782	0.001052	2.76862
1	2018	Runway Extension	Lighting	Other General Equipment	Diesel	175	0.43	50	0.002032	0.007454	1.25E-05	0.000507	0.000466	0.000834	1.995874
1	2018	Runway Extension	Lighting	Pickup Truck	Diesel	600	0.59	50	0.005197	0.016092	5.24E-05	0.000668	0.000615	0.002852	9.494221
1	2018	Runway Extension	Lighting	Skid Steer Loader	Diesel	75	0.21	50	0.004256	0.00432	3.73E-06	0.000635	0.000584	0.00092	0.545772
1	2018	Runway Extension	Lighting	Tractors/Loader/Backhoe	Diesel	100	0.21	50	0.005275	0.004196	4.81E-06	0.000751	0.000691	0.000962	0.728473
1	2018	Runway Extension	Markings	Flatbed Truck	Diesel	600	0.59	80	0.008316	0.025748	8.38E-05	0.00107	0.000984	0.004528	15.19075
1	2018	Runway Extension	Markings	Other General Equipment	Diesel	175	0.43	80	0.003251	0.011927	2.00E-05	0.00081	0.000746	0.001309	3.193398
1	2018	Runway Extension	Markings	Pickup Truck	Diesel	600	0.59	80	0.008316	0.025748	8.38E-05	0.00107	0.000984	0.004528	15.19075
1	2018	Runway Extension	Soil Erosion/Control	Other General Equipment	Diesel	175	0.43	268	0.010892	0.039956	6.69E-05	0.002715	0.002498	0.004283	10.69788
1	2018	Runway Extension	Soil Erosion/Control	Pickup Truck	Diesel	600	0.59	536	0.055715	0.17251	0.000561	0.007166	0.006593	0.030009	101.778
1	2018	Runway Extension	Soil Erosion/Control	Pumps	Diesel	11	0.43	268	0.006239	0.006579	5.54E-06	0.000625	0.000575	0.000928	0.745833
1	2018	Runway Extension	Soil Erosion/Control	Tractors/Loader/Backhoe	Diesel	100	0.21	268	0.028272	0.022491	2.58E-05	0.004027	0.003705	0.004652	3.904616
1	2018	Runway Extension	Subbase Placement	Dozer	Diesel	175	0.59	54.737	0.003067	0.007196	1.78E-05	0.000692	0.000636	0.001047	3.031171
1	2018	Runway Extension	Subbase Placement	Dump Truck (12 cy)	Diesel	600	0.59	577.778	0.060058	0.185956	0.000605	0.007725	0.007107	0.032344	109.711
1	2018	Runway Extension	Subbase Placement	Pickup Truck	Diesel	600	0.59	54.737	0.00569	0.017617	5.73E-05	0.000732	0.000673	0.003116	10.3937
1	2018	Runway Extension	Subbase Placement	Roller	Diesel	100	0.59	80	0.008989	0.009099	1.71E-05	0.001171	0.001077	0.001046	2.811078
1	2018	Runway Extension	Topsoil Placement	Dozer	Diesel	175	0.59	720.625	0.040377	0.094731	0.000234	0.009105	0.008377	0.013343	39.90605
1	2018	Runway Extension	Topsoil Placement	Dump Truck	Diesel	600	0.59	720.625	0.074906	0.231931	0.000755	0.009635	0.008864	0.040326	136.8355
1	2018	Runway Extension	Topsoil Placement	Pickup Truck	Diesel	600	0.59	720.625	0.074906	0.231931	0.000755	0.009635	0.008864	0.040326	136.8355

On-Road Sources

Units for Non-Greenhouse Gases Emission: Short Ton

Units for Greenhouse Gases (CO2, CH4, and N2O) Emission: Metric Ton

Scenario ID	Year	Project	Equipment	Equipment Category	On-road Activity	Fuel	Roadway Type	Round Trip Distance (miles)	Distance for fugitive PM	Number of Vehicles	Number of Employees Or SM*11 (Whichever is larger)	Number of Project Days	Project Length	Project Width	Project Area	Building Height (Building Demolition Only)	Open Space Height (Building Demolition Only)	Number of Trees	Activity Rate	VMT	CO	NOx	SO2	PM10	PM2.5	VOC	CO2	CH4	N2O
1	2018	Detention Basin	Cement Truck for Fencing	Single Unit Short-haul Truck	Material Delivery	Diesel	Urban Unrestricted Access	40	5	4	--	129	--	--	--	--	--	--	--	34688	0.028268	0.032889	0.000376	0.000656	0.000636	0.00079	49.81609	0.002896	0.002472
1	2018	Detention Basin	Passenger Car	Passenger Car	Employee Commute	Gasoline	Urban Unrestricted Access	30	--	32	32	129	--	--	--	--	--	--	--	123840	0.452201	0.018493	0.000729	0.000725	0.000668	0.02608	45.02111	0.007251	0.000583
1	2018	Landscaping	Flatbed Truck	Combination Short-haul Truck	Material Delivery	Diesel	Urban Unrestricted Access	40	5	3	--	129	--	--	--	--	--	6	75	24300	0.023508	0.038468	0.000476	0.001009	0.000979	0.006288	63.09175	0.003159	
1	2018	Landscaping	Passenger Car	Passenger Car	Employee Commute	Gasoline	Urban Unrestricted Access	30	--	19.8	19.8	129	--	--	--	--	--	--	--	76626	0.279799	0.011443	0.000451	0.000449	0.000413	0.016137	27.85681	0.004487	0.000361
1	2018	Runway Extension	Asphalt 18 Wheeler	Combination Short-haul Truck	Material Delivery	Diesel	Urban Unrestricted Access	40	5	1	--	129	1000	150	--	--	--	--	--	2176	0.004844	0.003447	4.29E-05	9.04E-05	8.77E-05	0.002073	5.680792	0.000283	0.000158
1	2018	Runway Extension	Dump Truck - Asphalt	Single Unit Short-haul Truck	Material Delivery	Diesel	Urban Unrestricted Access	40	5	1	--	129	1000	150	--	--	--	--	--	3083	0.004571	0.002924	3.36E-05	5.83E-05	5.66E-05	0.000176	4.448967	0.000257	0.00022
1	2018	Runway Extension	Dump Truck Subbase Material	Single Unit Short-haul Truck	Material Delivery	Diesel	Urban Unrestricted Access	40	5	2	--	129	1000	150	--	--	--	--	--	18500	0.01465	0.01754	0.0002	0.00035	0.000339	0.0004	26.56377	0.001544	0.001318
1	2018	Runway Extension	Passenger Car	Passenger Car	Employee Commute	Gasoline	Urban Unrestricted Access	30	--	88	88	129	--	--	--	--	--	--	--	340560	1.243552	0.050857	0.002005	0.001994	0.001836	0.071721	123.808	0.019941	0.001603

Fugitive Sources

Units for Non-Greenhouse Gases Emission: Short Ton

Scenario ID	Year	Project	Fugitive Source Type	Number of Months	CO	NOx	SO2	PM10	VOC
1	2018	Detention Basin	Material Movement (Paved Roads)	6	0	0	0	0	0
1	2018	Detention Basin	Material Movement (Unpaved Roads)	6	0	0	0	0.04895	0
1	2018	Detention Basin	Soil Handling	6	0	0	0	0.2217	0
1	2018	Detention Basin	Unstabilized Land and Wind Erosion	6	0	0	0	0.000000158	0
1	2018	Landscaping	Material Movement (Paved Roads)	6	0	0	0	0	0
1	2018	Landscaping	Material Movement (Unpaved Roads)	6	0	0	0	0	0
1	2018	Runway Extension	Asphalt Drying	6	0	0	0	0	5.5646
1	2018	Runway Extension	Asphalt Storage and Batching	6	0.36295	0.02265	0.0041695	0.02485	0.01125
1	2018	Runway Extension	Material Movement (Paved Roads)	6	0	0	0	0.01195	0
1	2018	Runway Extension	Material Movement (Unpaved Roads)	6	0	0	0	0.0418	0
1	2018	Runway Extension	Soil Handling	6	0	0	0	0.04245	0
1	2018	Runway Extension	Unstabilized Land and Wind Erosion	6	0	0	0	3.026E-08	0

INPUT DATA AND SPECIFICATIONS

State/County  
 New York  
 Warren County

Scenarios

Scenario ID	Year	Number of Months	Season	Average Daily Temp (degF)	Max Daily Temp Change (degF)	Min Daily Temp Change (degF)
1	2018	6	Summer	50 < T <= 80	0 <= Change in T < 10	10 <= Change in T < 20

Project Final Selections

Scenario ID	Project	Construction Activity	Equipment	Fuel Type
1	Detention Basin	Clearing and Grubbing	Chain Saw	Diesel
1	Detention Basin	Clearing and Grubbing	Chipper/Stump Grinder	Diesel
1	Detention Basin	Clearing and Grubbing	Pickup Truck	Diesel
1	Detention Basin	Drainage	Dozer	Diesel
1	Detention Basin	Drainage	Dump Truck	Diesel
1	Detention Basin	Drainage	Loader	Diesel
1	Detention Basin	Drainage	Other General Equipment	Diesel
1	Detention Basin	Drainage	Pickup Truck	Diesel
1	Detention Basin	Drainage	Roller	Diesel
1	Detention Basin	Dust Control	Water Truck	Diesel
1	Detention Basin	Excavation (Cut to Fill)	Dozer	Diesel
1	Detention Basin	Excavation (Cut to Fill)	Dump Truck (12 cy)	Diesel
1	Detention Basin	Excavation (Cut to Fill)	Excavator	Diesel
1	Detention Basin	Excavation (Cut to Fill)	Pickup Truck	Diesel
1	Detention Basin	Excavation (Cut to Fill)	Roller	Diesel
1	Detention Basin	Excavation (Cut to Fill)	Scraper	Diesel
1	Detention Basin	Excavation (Topsoil Stripping)	Dozer	Diesel
1	Detention Basin	Fencing	Concrete Truck	Diesel
1	Detention Basin	Fencing	Dump Truck	Diesel
1	Detention Basin	Fencing	Other General Equipment	Diesel
1	Detention Basin	Fencing	Pickup Truck	Diesel
1	Detention Basin	Fencing	Skid Steer Loader	Diesel
1	Detention Basin	Fencing	Tractors/Loader/Backhoe	Diesel
1	Detention Basin	Hydroseeding	Hydroseeder	Diesel
1	Detention Basin	Hydroseeding	Off-Road Truck	Diesel
1	Detention Basin	Soil Erosion/Sediment Control	Other General Equipment	Diesel
1	Detention Basin	Soil Erosion/Sediment Control	Pickup Truck	Diesel
1	Detention Basin	Soil Erosion/Sediment Control	Pumps	Diesel
1	Detention Basin	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel
1	Detention Basin	Topsoil Placement	Dozer	Diesel
1	Detention Basin	Topsoil Placement	Dump Truck	Diesel

\*\*\* GASOLINE DATA USED. DIESEL DATA NOT AV.

1	Detention Basin	Topsoil Placement	Pickup Truck	Diesel
1	Landscaping	Mulching	Dump Truck	Diesel
1	Landscaping	Mulching	Other General Equipment	Diesel
1	Landscaping	Mulching	Pickup Truck	Diesel
1	Landscaping	Mulching	Tractors/Loader/Backhoe	Diesel
1	Landscaping	Sodding	Flatbed Truck	Diesel
1	Landscaping	Sodding	Other General Equipment	Diesel
1	Landscaping	Sodding	Pickup Truck	Diesel
1	Landscaping	Sodding	Skid Steer Loader	Diesel
1	Landscaping	Tree Planting	Flatbed Truck	Diesel
1	Landscaping	Tree Planting	Other General Equipment	Diesel
1	Landscaping	Tree Planting	Pickup Truck	Diesel
1	Landscaping	Tree Planting	Tractors/Loader/Backhoe	Diesel
1	Runway Extension	Asphalt Placement	Asphalt Paver	Diesel
1	Runway Extension	Asphalt Placement	Dump Truck	Diesel
1	Runway Extension	Asphalt Placement	Other General Equipment	Diesel
1	Runway Extension	Asphalt Placement	Pickup Truck	Diesel
1	Runway Extension	Asphalt Placement	Roller	Diesel
1	Runway Extension	Asphalt Placement	Skid Steer Loader	Diesel
1	Runway Extension	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel
1	Runway Extension	Clearing and Grubbing	Chain Saw	Diesel
1	Runway Extension	Clearing and Grubbing	Chipper/Stump Grinder	Diesel
1	Runway Extension	Clearing and Grubbing	Pickup Truck	Diesel
1	Runway Extension	Drainage - 24 inch SICPP	Dozer	Diesel
1	Runway Extension	Drainage - 24 inch SICPP	Dump Truck	Diesel
1	Runway Extension	Drainage - 24 inch SICPP	Excavator	Diesel
1	Runway Extension	Drainage - 24 inch SICPP	Loader	Diesel
1	Runway Extension	Drainage - 24 inch SICPP	Other General Equipment	Diesel
1	Runway Extension	Drainage - 24 inch SICPP	Pickup Truck	Diesel
1	Runway Extension	Drainage - 24 inch SICPP	Roller	Diesel
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Dump Truck	Diesel
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Loader	Diesel
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Pickup Truck	Diesel
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel
1	Runway Extension	Dust Control	Water Truck	Diesel
1	Runway Extension	Excavation (Borrow)	Dozer	Diesel
1	Runway Extension	Excavation (Borrow)	Dump Truck (12 cy)	Diesel
1	Runway Extension	Excavation (Borrow)	Pickup Truck	Diesel
1	Runway Extension	Excavation (Borrow)	Roller	Diesel
1	Runway Extension	Excavation (Cut to Fill)	Dozer	Diesel
1	Runway Extension	Excavation (Cut to Fill)	Dump Truck (12 cy)	Diesel
1	Runway Extension	Excavation (Cut to Fill)	Excavator	Diesel
1	Runway Extension	Excavation (Cut to Fill)	Pickup Truck	Diesel
1	Runway Extension	Excavation (Cut to Fill)	Roller	Diesel
1	Runway Extension	Excavation (Cut to Fill)	Scraper	Diesel
1	Runway Extension	Excavation (Topsoil Stripping)	Dozer	Diesel

\*\*\* GASOLINE DATA USED. DIESEL DATA NOT AV.

1	Runway Extension	Fencing	Concrete Truck	Diesel
1	Runway Extension	Fencing	Dump Truck	Diesel
1	Runway Extension	Fencing	Other General Equipment	Diesel
1	Runway Extension	Fencing	Pickup Truck	Diesel
1	Runway Extension	Fencing	Skid Steer Loader	Diesel
1	Runway Extension	Fencing	Tractors/Loader/Backhoe	Diesel
1	Runway Extension	Grading	Dozer	Diesel
1	Runway Extension	Grading	Grader	Diesel
1	Runway Extension	Grading	Roller	Diesel
1	Runway Extension	Hydroseeding	Hydroseeder	Diesel
1	Runway Extension	Hydroseeding	Off-Road Truck	Diesel
1	Runway Extension	Lighting	Dump Truck	Diesel
1	Runway Extension	Lighting	Loader	Diesel
1	Runway Extension	Lighting	Other General Equipment	Diesel
1	Runway Extension	Lighting	Pickup Truck	Diesel
1	Runway Extension	Lighting	Skid Steer Loader	Diesel
1	Runway Extension	Lighting	Tractors/Loader/Backhoe	Diesel
1	Runway Extension	Markings	Flatbed Truck	Diesel
1	Runway Extension	Markings	Other General Equipment	Diesel
1	Runway Extension	Markings	Pickup Truck	Diesel
1	Runway Extension	Soil Erosion/Control	Other General Equipment	Diesel
1	Runway Extension	Soil Erosion/Control	Pickup Truck	Diesel
1	Runway Extension	Soil Erosion/Control	Pumps	Diesel
1	Runway Extension	Soil Erosion/Control	Tractors/Loader/Backhoe	Diesel
1	Runway Extension	Subbase Placement	Dozer	Diesel
1	Runway Extension	Subbase Placement	Dump Truck (12 cy)	Diesel
1	Runway Extension	Subbase Placement	Pickup Truck	Diesel
1	Runway Extension	Subbase Placement	Roller	Diesel
1	Runway Extension	Topsoil Placement	Dozer	Diesel

Overall Size

Scenario ID	Project	Project Size Questions	User Input	Unit
1	Detention Basin	What is the estimated cost of the project?	1.8	\$ Million(s)
1	Detention Basin	What is the maximum depth of the detention basin (D) in feet?	5	Feet
1	Detention Basin	What is the maximum length of the detention basin (L) in feet?	885	Feet
1	Detention Basin	What is the maximum width of the detention basin (W) in feet?	885	Feet
1	Landscaping	What is the estimated cost of the project?	1.8	\$ Million(s)
1	Landscaping	What is the maximum length of the project area (L) in feet?	885	Feet
1	Landscaping	What is the maximum width of the project area (W) in feet?	885	Feet
1	Landscaping	What is the number of trees planted?	6075	---
1	Landscaping	What is the number of trees pruned?	0	---
1	Runway Extension	What is the estimated cost of the project?	8	\$ Million(s)
1	Runway Extension	What is the maximum length of the runway extension (L) in feet?	1000	Feet
1	Runway Extension	What is the maximum width of the runway extension (W) in feet?	150	Feet

Size Detail (Estimated based on engineering experience)

ScenarioID	Project	Construction Activity	Default Activity Size	Unit	User Activity Size
1	Detention Basin	Clearing and Grubbing	18.4	Acres	18
1	Detention Basin	Drainage	1790	Linear Feet	
1	Detention Basin	Dust Control	180	Days	
1	Detention Basin	Excavation (Cut to Fill)	144896.6	Cubic Yards	
1	Detention Basin	Excavation (Topsoil Stripping)	86938	Square Yards	
1	Detention Basin	Fencing	885	Linear Feet	
1	Detention Basin	Hydroseeding	801025	Square Feet	783225
1	Detention Basin	Soil Erosion/Sediment Control	18.4	Acres	18
1	Detention Basin	Topsoil Placement	14819	Cubic Yards	
1	Landscaping	Mulching	18	Acres	
1	Landscaping	Sodding	783225	Square Feet	
1	Landscaping	Tree Planting	6075	Trees	
1	Runway Extension	Asphalt Placement	16650	Square Yards	22100
1	Runway Extension	Clearing and Grubbing	3.7	Acres	23
1	Runway Extension	Drainage - 24 inch SICPP	1010	Linear Feet	1500
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	2020	Linear Feet	5000
1	Runway Extension	Dust Control	180	Days	
1	Runway Extension	Excavation (Borrow)	6937.5	Cubic Yards	0
1	Runway Extension	Excavation (Cut to Fill)	6937.5	Cubic Yards	55000
1	Runway Extension	Excavation (Topsoil Stripping)	16650	Square Yards	125000
1	Runway Extension	Fencing	1000	Linear Feet	
1	Runway Extension	Grading	17937.6	Square Yards	324281.3
1	Runway Extension	Hydroseeding	161600	Square Feet	2613610
1	Runway Extension	Lighting	2300	Linear Feet	7500
1	Runway Extension	Markings	150000	Square Feet	35000
1	Runway Extension	Soil Erosion/Control	3.7	Acres	67
1	Runway Extension	Subbase Placement	16650	Square Yards	26000
1	Runway Extension	Subbase Placement	5550	Cubic Yards	13000
1	Runway Extension	Topsoil Placement	2989.6	Cubic Yards	54046.9



Activity: Non-Road (Estimated based on engineering experience)

Scenario ID	Project	Construction Activity	Equipment	Fuel Type	Activity Size	Activity Rate	Default Activity	Activity Unit	User Activity Data
1	Detention Basin	Clearing and Grubbing	Chain Saw	Diesel	18.40 Acre	12 Hours per 1.00 Acre	220.8	hours	216
1	Detention Basin	Clearing and Grubbing	Chipper/Stump Grinder	Diesel	18.40 Acre	12 Hours per 1.00 Acre	220.8	hours	216
1	Detention Basin	Clearing and Grubbing	Pickup Truck	Diesel	18.40 Acre	16 Hours per 1.00 Acre	294.4	hours	288
1	Detention Basin	Drainage	Dozer	Diesel	1790.00 LF	8 Hours per 250.00 LF	57.28	hours	
1	Detention Basin	Drainage	Dump Truck	Diesel	1790.00 LF	8 Hours per 250.00 LF	57.28	hours	
1	Detention Basin	Drainage	Loader	Diesel	1790.00 LF	8 Hours per 250.00 LF	57.28	hours	
1	Detention Basin	Drainage	Other General Equipment	Diesel	1790.00 LF	8 Hours per 250.00 LF	57.28	hours	
1	Detention Basin	Drainage	Pickup Truck	Diesel	1790.00 LF	8 Hours per 250.00 LF	57.28	hours	
1	Detention Basin	Drainage	Roller	Diesel	1790.00 LF	8 Hours per 250.00 LF	57.28	hours	
1	Detention Basin	Dust Control	Water Truck	Diesel	180.00 Day	8 Hours per 1.00 Day	1440	hours	
1	Detention Basin	Excavation (Cut to Fill)	Dozer	Diesel	144896.60 CY	8 Hours per 800.00 CY	1448.97	hours	
1	Detention Basin	Excavation (Cut to Fill)	Dump Truck (12 cy)	Diesel	144896.60 CY	8 Hours per 300.00 CY	3863.91	hours	
1	Detention Basin	Excavation (Cut to Fill)	Excavator	Diesel	144896.60 CY	8 Hours per 1000.00 CY	1159.17	hours	
1	Detention Basin	Excavation (Cut to Fill)	Pickup Truck	Diesel	144896.60 CY	8 Hours per 1000.00 CY	1159.17	hours	
1	Detention Basin	Excavation (Cut to Fill)	Roller	Diesel	144896.60 CY	8 Hours per 1000.00 CY	1159.17	hours	
1	Detention Basin	Excavation (Cut to Fill)	Scraper	Diesel	144896.60 CY	8 Hours per 800.00 CY	1448.97	hours	
1	Detention Basin	Excavation (Topsoil Stripping)	Dozer	Diesel	86938.00 SY	8 Hours per 5100.00 SY	136.37	hours	
1	Detention Basin	Fencing	Concrete Truck	Diesel	885.00 LF	2 Hours per 180.00 LF	9.83	hours	
1	Detention Basin	Fencing	Dump Truck	Diesel	885.00 LF	8 Hours per 180.00 LF	39.33	hours	
1	Detention Basin	Fencing	Other General Equipment	Diesel	885.00 LF	8 Hours per 180.00 LF	39.33	hours	
1	Detention Basin	Fencing	Pickup Truck	Diesel	885.00 LF	8 Hours per 180.00 LF	39.33	hours	
1	Detention Basin	Fencing	Skid Steer Loader	Diesel	885.00 LF	8 Hours per 180.00 LF	39.33	hours	
1	Detention Basin	Fencing	Tractors/Loader/Backhoe	Diesel	885.00 LF	8 Hours per 180.00 LF	39.33	hours	
1	Detention Basin	Hydroseeding	Hydroseeder	Diesel	801025.00 SF	8 Hours per 80000.00 SF	80.1	hours	78.323
1	Detention Basin	Hydroseeding	Off-Road Truck	Diesel	801025.00 SF	8 Hours per 80000.00 SF	80.1	hours	78.323
1	Detention Basin	Soil Erosion/Sediment Control	Other General Equipment	Diesel	18.40 Acre	4 Hours per 1.00 Acre	73.6	hours	72
1	Detention Basin	Soil Erosion/Sediment Control	Pickup Truck	Diesel	18.40 Acre	8 Hours per 1.00 Acre	147.2	hours	144
1	Detention Basin	Soil Erosion/Sediment Control	Pumps	Diesel	18.40 Acre	4 Hours per 1.00 Acre	73.6	hours	72
1	Detention Basin	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	18.40 Acre	4 Hours per 1.00 Acre	73.6	hours	72
1	Detention Basin	Topsoil Placement	Dozer	Diesel	14819.00 CY	8 Hours per 600.00 CY	197.59	hours	
1	Detention Basin	Topsoil Placement	Dump Truck	Diesel	14819.00 CY	8 Hours per 600.00 CY	197.59	hours	
1	Detention Basin	Topsoil Placement	Pickup Truck	Diesel	14819.00 CY	8 Hours per 600.00 CY	197.59	hours	
1	Landscaping	Mulching	Dump Truck	Diesel	18.00 Acres	8 Hours per 2.00 Acres	72	hours	
1	Landscaping	Mulching	Other General Equipment	Diesel	18.00 Acres	8 Hours per 2.00 Acres	72	hours	
1	Landscaping	Mulching	Pickup Truck	Diesel	18.00 Acres	8 Hours per 2.00 Acres	72	hours	
1	Landscaping	Mulching	Tractors/Loader/Backhoe	Diesel	18.00 Acres	8 Hours per 2.00 Acres	72	hours	
1	Landscaping	Sodding	Flatbed Truck	Diesel	783225.00 SF	8 Hours per 17000.00 SF	368.58	hours	
1	Landscaping	Sodding	Other General Equipment	Diesel	783225.00 SF	8 Hours per 17000.00 SF	368.58	hours	
1	Landscaping	Sodding	Pickup Truck	Diesel	783225.00 SF	8 Hours per 17000.00 SF	368.58	hours	
1	Landscaping	Sodding	Skid Steer Loader	Diesel	783225.00 SF	8 Hours per 17000.00 SF	368.58	hours	
1	Landscaping	Tree Planting	Flatbed Truck	Diesel	6075.00 Trees	8 Hours per 10.00 Trees	4860	hours	
1	Landscaping	Tree Planting	Other General Equipment	Diesel	6075.00 Trees	8 Hours per 10.00 Trees	4860	hours	
1	Landscaping	Tree Planting	Pickup Truck	Diesel	6075.00 Trees	8 Hours per 10.00 Trees	4860	hours	
1	Landscaping	Tree Planting	Tractors/Loader/Backhoe	Diesel	6075.00 Trees	8 Hours per 10.00 Trees	4860	hours	
1	Runway Extension	Asphalt Placement	Asphalt Paver	Diesel	16650.00 SY	8 Hours per 6400.00 SY	20.81	hours	27.625
1	Runway Extension	Asphalt Placement	Dump Truck	Diesel	16650.00 SY	8 Hours per 1777.00 SY	74.96	hours	99.494
1	Runway Extension	Asphalt Placement	Other General Equipment	Diesel	16650.00 SY	16 Hours per 6400.00 SY	41.63	hours	55.25
1	Runway Extension	Asphalt Placement	Pickup Truck	Diesel	16650.00 SY	8 Hours per 6400.00 SY	20.81	hours	27.625
1	Runway Extension	Asphalt Placement	Roller	Diesel	16650.00 SY	8 Hours per 6400.00 SY	20.81	hours	27.625
1	Runway Extension	Asphalt Placement	Skid Steer Loader	Diesel	16650.00 SY	8 Hours per 6400.00 SY	20.81	hours	27.625
1	Runway Extension	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	16650.00 SY	8 Hours per 5000.00 SY	26.64	hours	35.36
1	Runway Extension	Clearing and Grubbing	Chain Saw	Diesel	3.70 Acre	12 Hours per 1.00 Acre	44.4	hours	276
1	Runway Extension	Clearing and Grubbing	Chipper/Stump Grinder	Diesel	3.70 Acre	12 Hours per 1.00 Acre	44.4	hours	276

1	Runway Extension	Clearing and Grubbing	Pickup Truck	Diesel	3.70 Acre	16 Hours per 1.00 Acre	59.2	hours	368
1	Runway Extension	Drainage - 24 inch SICPP	Dozer	Diesel	1010.00 LF	8 Hours per 250.00 LF	32.32	hours	48
1	Runway Extension	Drainage - 24 inch SICPP	Dump Truck	Diesel	1010.00 LF	8 Hours per 250.00 LF	32.32	hours	48
1	Runway Extension	Drainage - 24 inch SICPP	Excavator	Diesel	1010.00 LF	8 Hours per 250.00 LF	32.32	hours	48
1	Runway Extension	Drainage - 24 inch SICPP	Loader	Diesel	1010.00 LF	8 Hours per 250.00 LF	32.32	hours	48
1	Runway Extension	Drainage - 24 inch SICPP	Other General Equipment	Diesel	1010.00 LF	8 Hours per 250.00 LF	32.32	hours	48
1	Runway Extension	Drainage - 24 inch SICPP	Pickup Truck	Diesel	1010.00 LF	8 Hours per 250.00 LF	32.32	hours	48
1	Runway Extension	Drainage - 24 inch SICPP	Roller	Diesel	1010.00 LF	8 Hours per 250.00 LF	32.32	hours	48
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Dump Truck	Diesel	2020.00 LF	8 Hours per 900.00 LF	17.96	hours	44.444
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	2020.00 LF	8 Hours per 900.00 LF	17.96	hours	44.444
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	2020.00 LF	8 Hours per 900.00 LF	17.96	hours	44.444
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Pickup Truck	Diesel	2020.00 LF	8 Hours per 900.00 LF	17.96	hours	44.444
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	2020.00 LF	8 Hours per 900.00 LF	17.96	hours	44.444
1	Runway Extension	Dust Control	Water Truck	Diesel	180.00 Day	8 Hours per 1.00 Day	1440	hours	
1	Runway Extension	Excavation (Borrow)	Dozer	Diesel	6937.50 CY	8 Hours per 600.00 CY	92.5	hours	0
1	Runway Extension	Excavation (Borrow)	Dump Truck (12 cy)	Diesel	6937.50 CY	8 Hours per 600.00 CY	92.5	hours	0
1	Runway Extension	Excavation (Borrow)	Pickup Truck	Diesel	6937.50 CY	8 Hours per 600.00 CY	92.5	hours	0
1	Runway Extension	Excavation (Borrow)	Roller	Diesel	6937.50 CY	8 Hours per 1300.00 CY	42.69	hours	0
1	Runway Extension	Excavation (Cut to Fill)	Dozer	Diesel	6937.50 CY	8 Hours per 800.00 CY	69.38	hours	550
1	Runway Extension	Excavation (Cut to Fill)	Dump Truck (12 cy)	Diesel	6937.50 CY	8 Hours per 300.00 CY	185	hours	1466.667
1	Runway Extension	Excavation (Cut to Fill)	Excavator	Diesel	6937.50 CY	8 Hours per 1000.00 CY	55.5	hours	440
1	Runway Extension	Excavation (Cut to Fill)	Pickup Truck	Diesel	6937.50 CY	8 Hours per 1000.00 CY	55.5	hours	440
1	Runway Extension	Excavation (Cut to Fill)	Roller	Diesel	6937.50 CY	8 Hours per 1000.00 CY	55.5	hours	440
1	Runway Extension	Excavation (Cut to Fill)	Scraper	Diesel	6937.50 CY	8 Hours per 800.00 CY	69.38	hours	550
1	Runway Extension	Excavation (Topsoil Stripping)	Dozer	Diesel	16650.00 SY	8 Hours per 5100.00 SY	26.12	hours	196.078
1	Runway Extension	Fencing	Concrete Truck	Diesel	1000.00 LF	2 Hours per 180.00 LF	11.11	hours	
1	Runway Extension	Fencing	Dump Truck	Diesel	1000.00 LF	8 Hours per 180.00 LF	44.44	hours	
1	Runway Extension	Fencing	Other General Equipment	Diesel	1000.00 LF	8 Hours per 180.00 LF	44.44	hours	
1	Runway Extension	Fencing	Pickup Truck	Diesel	1000.00 LF	8 Hours per 180.00 LF	44.44	hours	
1	Runway Extension	Fencing	Skid Steer Loader	Diesel	1000.00 LF	8 Hours per 180.00 LF	44.44	hours	
1	Runway Extension	Fencing	Tractors/Loader/Backhoe	Diesel	1000.00 LF	8 Hours per 180.00 LF	44.44	hours	
1	Runway Extension	Grading	Dozer	Diesel	17937.60 SY	8 Hours per 8000.00 SY	17.94	hours	324.281
1	Runway Extension	Grading	Grader	Diesel	17937.60 SY	8 Hours per 8000.00 SY	17.94	hours	324.281
1	Runway Extension	Grading	Roller	Diesel	17937.60 SY	8 Hours per 8000.00 SY	17.94	hours	324.281
1	Runway Extension	Hydroseeding	Hydroseeder	Diesel	161600.00 SF	8 Hours per 80000.00 SF	16.16	hours	261.361
1	Runway Extension	Hydroseeding	Off-Road Truck	Diesel	161600.00 SF	8 Hours per 80000.00 SF	16.16	hours	261.361
1	Runway Extension	Lighting	Dump Truck	Diesel	2300.00 LF	8 Hours per 1200.00 LF	15.33	hours	50
1	Runway Extension	Lighting	Loader	Diesel	2300.00 LF	8 Hours per 1200.00 LF	15.33	hours	50
1	Runway Extension	Lighting	Other General Equipment	Diesel	2300.00 LF	8 Hours per 1200.00 LF	15.33	hours	50
1	Runway Extension	Lighting	Pickup Truck	Diesel	2300.00 LF	8 Hours per 1200.00 LF	15.33	hours	50
1	Runway Extension	Lighting	Skid Steer Loader	Diesel	2300.00 LF	8 Hours per 1200.00 LF	15.33	hours	50
1	Runway Extension	Lighting	Tractors/Loader/Backhoe	Diesel	2300.00 LF	8 Hours per 1200.00 LF	15.33	hours	50
1	Runway Extension	Markings	Flatbed Truck	Diesel	150000.00 SF	8 Hours per 3500.00 SF	342.86	hours	80
1	Runway Extension	Markings	Other General Equipment	Diesel	150000.00 SF	8 Hours per 3500.00 SF	342.86	hours	80
1	Runway Extension	Markings	Pickup Truck	Diesel	150000.00 SF	8 Hours per 3500.00 SF	342.86	hours	80
1	Runway Extension	Soil Erosion/Control	Other General Equipment	Diesel	3.70 Acre	4 Hours per 1.00 Acre	14.8	hours	268
1	Runway Extension	Soil Erosion/Control	Pickup Truck	Diesel	3.70 Acre	8 Hours per 1.00 Acre	29.6	hours	536
1	Runway Extension	Soil Erosion/Control	Pumps	Diesel	3.70 Acre	4 Hours per 1.00 Acre	14.8	hours	268
1	Runway Extension	Soil Erosion/Control	Tractors/Loader/Backhoe	Diesel	3.70 Acre	4 Hours per 1.00 Acre	14.8	hours	268
1	Runway Extension	Subbase Placement	Dozer	Diesel	16650.00 SY	8 Hours per 3800.00 SY	35.05	hours	54.737
1	Runway Extension	Subbase Placement	Dump Truck (12 cy)	Diesel	5550.00 CY	8 Hours per 180.00 CY	246.67	hours	577.778
1	Runway Extension	Subbase Placement	Pickup Truck	Diesel	16650.00 SY	8 Hours per 3800.00 SY	35.05	hours	54.737
1	Runway Extension	Subbase Placement	Roller	Diesel	5550.00 CY	8 Hours per 1300.00 CY	34.15	hours	80
1	Runway Extension	Topsoil Placement	Dozer	Diesel	2989.60 CY	8 Hours per 600.00 CY	39.86	hours	720.625
1	Runway Extension	Topsoil Placement	Dump Truck	Diesel	2989.60 CY	8 Hours per 600.00 CY	39.86	hours	720.625
1	Runway Extension	Topsoil Placement	Pickup Truck	Diesel	2989.60 CY	8 Hours per 600.00 CY	39.86	hours	720.625

Activity: On-Road (Estimated based on engineering experience)

Scenario ID	Project	Equipment	On-road Activity	Fuel	Roadway Type	Round Trip Distance (miles)	Number of Employees Or \$M*11 (Whichever larger)	Number of Project Days	Project Length	Project Width	Project Area	Building Height (Building Demolition Only)	Open Space Height (Building Demolition Only)	Number of Trees	Activity Size	Activity Rate	Default VMT	User VMT
1	Detention Basin	Cement Truck for Fencing	Material Delivery	Diesel	Urban Unrestricted Access	40	--	129	--	--	--	--	--	--	--	--	34688	
1	Detention Basin	Passenger Car	Employee Commute	Gasoline	Urban Unrestricted Access	30	32	129	--	--	--	--	--	--	--	--	123840	
1	Landscaping	Flatbed Truck	Material Delivery	Diesel	Urban Unrestricted Access	40	--	129	--	--	--	--	--	6	75	--	--	24300
1	Landscaping	Passenger Car	Employee Commute	Gasoline	Urban Unrestricted Access	30	19.8	129	--	--	--	--	--	--	--	--	76626	
1	Runway Extension	Asphalt 18 Wheeler	Material Delivery	Diesel	Urban Unrestricted Access	40	--	129	1000	150	--	--	--	--	--	--	2176	
1	Runway Extension	Dump Truck - Asphalt	Material Delivery	Diesel	Urban Unrestricted Access	40	--	129	1000	150	--	--	--	--	--	--	3083	
1	Runway Extension	Dump Truck Subbase Material	Material Delivery	Diesel	Urban Unrestricted Access	40	--	129	1000	150	--	--	--	--	--	--	18500	
1	Runway Extension	Passenger Car	Employee Commute	Gasoline	Urban Unrestricted Access	30	88	129	--	--	--	--	--	--	--	--	340560	

Emission Factor: Non-Road (from NONROAD)

Scenario ID	Project	Construction Activity	Equipment	Fuel Type	Avg Rated HP	Load Factor	CO (g/hp-hr)	NOx (g/hp-hr)	CO2 (g/hp-hr)	SO2 (g/hp-hr)	PM10 (g/hp-hr)	PM2.5 (g/hp-hr)	VOC Exhaust (g/hp-hr)	VOC Evaporative (g/equipment-day)
1	Detention Basin	Clearing and Grubbing	Chain Saw	Diesel	11	0.7	293.535	1.322993	685.9963	0.140192	9.748187	8.968332	61.88836	26.21942804
1	Detention Basin	Clearing and Grubbing	Chipper/Stump Grinder	Diesel	100	0.43	1.929615	3.464992	589.1724	0.003558	0.342033	0.31467	0.39496	0.429365499
1	Detention Basin	Clearing and Grubbing	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Detention Basin	Drainage	Dozer	Diesel	175	0.59	0.492297	1.155007	536.339	0.002852	0.111014	0.102133	0.162233	0.258487387
1	Detention Basin	Drainage	Dump Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Detention Basin	Drainage	Loader	Diesel	175	0.59	0.634868	1.479918	536.2944	0.002963	0.149449	0.137493	0.176953	0.317105203
1	Detention Basin	Drainage	Other General Equipment	Diesel	175	0.43	0.489977	1.797358	530.4648	0.00301	0.122123	0.112354	0.190729	0.304444821
1	Detention Basin	Drainage	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Detention Basin	Drainage	Roller	Diesel	100	0.59	1.727618	1.74874	595.5674	0.003291	0.224984	0.206986	0.194558	0.235891718
1	Detention Basin	Dust Control	Water Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Detention Basin	Excavation (Cut to Fill)	Dozer	Diesel	175	0.59	0.492297	1.155007	536.339	0.002852	0.111014	0.102133	0.162233	0.258487387
1	Detention Basin	Excavation (Cut to Fill)	Dump Truck (12 cy)	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Detention Basin	Excavation (Cut to Fill)	Excavator	Diesel	175	0.59	0.380005	0.939556	536.3664	0.002766	0.079583	0.073216	0.153176	0.197817282
1	Detention Basin	Excavation (Cut to Fill)	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Detention Basin	Excavation (Cut to Fill)	Roller	Diesel	100	0.59	1.727618	1.74874	595.5674	0.003291	0.224984	0.206986	0.194558	0.235891718
1	Detention Basin	Excavation (Cut to Fill)	Scraper	Diesel	600	0.59	0.7052	1.71986	536.3432	0.002997	0.107454	0.098858	0.160859	1.027726521
1	Detention Basin	Excavation (Topsoil Stripping)	Dozer	Diesel	175	0.59	0.492297	1.155007	536.339	0.002852	0.111014	0.102133	0.162233	0.258487387
1	Detention Basin	Fencing	Concrete Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Detention Basin	Fencing	Dump Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Detention Basin	Fencing	Other General Equipment	Diesel	175	0.43	0.489977	1.797358	530.4648	0.00301	0.122123	0.112354	0.190729	0.304444821
1	Detention Basin	Fencing	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Detention Basin	Fencing	Skid Steer Loader	Diesel	75	0.21	4.902494	4.976788	693.044	0.004298	0.731667	0.673133	0.975305	0.517508037
1	Detention Basin	Fencing	Tractors/Loader/Backhoe	Diesel	100	0.21	4.557146	3.625292	693.784	0.004159	0.649179	0.597244	0.731048	0.817864082
1	Detention Basin	Hydroseeding	Hydroseeder	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Detention Basin	Hydroseeding	Off-Road Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Detention Basin	Soil Erosion/Sediment Control	Other General Equipment	Diesel	175	0.43	0.489977	1.797358	530.4648	0.00301	0.122123	0.112354	0.190729	0.304444821
1	Detention Basin	Soil Erosion/Sediment Control	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Detention Basin	Soil Erosion/Sediment Control	Pumps	Diesel	11	0.43	4.464977	4.708033	588.3635	0.003966	0.447631	0.411821	0.661952	0.01866583
1	Detention Basin	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	100	0.21	4.557146	3.625292	693.784	0.004159	0.649179	0.597244	0.731048	0.817864082
1	Detention Basin	Topsoil Placement	Dozer	Diesel	175	0.59	0.492297	1.155007	536.339	0.002852	0.111014	0.102133	0.162233	0.258487387
1	Detention Basin	Topsoil Placement	Dump Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Detention Basin	Topsoil Placement	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Landscaping	Mulching	Dump Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Landscaping	Mulching	Other General Equipment	Diesel	175	0.43	0.489977	1.797358	530.4648	0.00301	0.122123	0.112354	0.190729	0.304444821
1	Landscaping	Mulching	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Landscaping	Mulching	Tractors/Loader/Backhoe	Diesel	100	0.21	4.557146	3.625292	693.784	0.004159	0.649179	0.597244	0.731048	0.817864082
1	Landscaping	Sodding	Flatbed Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Landscaping	Sodding	Other General Equipment	Diesel	175	0.43	0.489977	1.797358	530.4648	0.00301	0.122123	0.112354	0.190729	0.304444821
1	Landscaping	Sodding	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Landscaping	Sodding	Skid Steer Loader	Diesel	75	0.21	4.902494	4.976788	693.044	0.004298	0.731667	0.673133	0.975305	0.517508037
1	Landscaping	Tree Planting	Flatbed Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Landscaping	Tree Planting	Other General Equipment	Diesel	175	0.43	0.489977	1.797358	530.4648	0.00301	0.122123	0.112354	0.190729	0.304444821
1	Landscaping	Tree Planting	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Landscaping	Tree Planting	Tractors/Loader/Backhoe	Diesel	100	0.21	4.557146	3.625292	693.784	0.004159	0.649179	0.597244	0.731048	0.817864082
1	Runway Extension	Asphalt Placement	Asphalt Paver	Diesel	175	0.59	0.581022	1.348614	536.3128	0.002921	0.135016	0.124215	0.170888	0.292902346
1	Runway Extension	Asphalt Placement	Dump Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Asphalt Placement	Other General Equipment	Diesel	175	0.43	0.489977	1.797358	530.4648	0.00301	0.122123	0.112354	0.190729	0.304444821
1	Runway Extension	Asphalt Placement	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Asphalt Placement	Roller	Diesel	100	0.59	1.727618	1.74874	595.5674	0.003291	0.224984	0.206986	0.194558	0.235891718
1	Runway Extension	Asphalt Placement	Skid Steer Loader	Diesel	75	0.21	4.902494	4.976788	693.044	0.004298	0.731667	0.673133	0.975305	0.517508037
1	Runway Extension	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	25	0.59	2.395309	4.457987	594.7241	0.004009	0.352929	0.324695	0.472896	0.007018715
1	Runway Extension	Clearing and Grubbing	Chain Saw	Diesel	11	0.7	293.535	1.322993	685.9963	0.140192	9.748187	8.968332	61.88836	26.21942804
1	Runway Extension	Clearing and Grubbing	Chipper/Stump Grinder	Diesel	100	0.43	1.929615	3.464992	589.1724	0.003558	0.342033	0.31467	0.39496	0.429365499
1	Runway Extension	Clearing and Grubbing	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Drainage - 24 inch SICPP	Dozer	Diesel	175	0.59	0.492297	1.155007	536.339	0.002852	0.111014	0.102133	0.162233	0.258487387
1	Runway Extension	Drainage - 24 inch SICPP	Dump Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Drainage - 24 inch SICPP	Excavator	Diesel	175	0.59	0.380005	0.939556	536.3664	0.002766	0.079583	0.073216	0.153176	0.197817282

Emission Factor: Non-Road (from NONROAD)

Scenario ID	Project	Construction Activity	Equipment	Fuel Type	Avg Rated HP	Load Factor	CO (g/hp-hr)	NOx (g/hp-hr)	CO2 (g/hp-hr)	SO2 (g/hp-hr)	PM10 (g/hp-hr)	PM2.5 (g/hp-hr)	VOC Exhaust (g/hp-hr)	VOC Evaporative (g/equipment-day)
1	Runway Extension	Drainage - 24 inch SICPP	Loader	Diesel	175	0.59	0.634868	1.479918	536.2944	0.002963	0.149449	0.137493	0.176953	0.317105203
1	Runway Extension	Drainage - 24 inch SICPP	Other General Equipment	Diesel	175	0.43	0.489977	1.797358	530.4648	0.00301	0.122123	0.112354	0.190729	0.304444821
1	Runway Extension	Drainage - 24 inch SICPP	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Drainage - 24 inch SICPP	Roller	Diesel	100	0.59	1.727618	1.74874	595.5674	0.003291	0.224984	0.206986	0.194558	0.235891718
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Dump Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	175	0.59	0.634868	1.479918	536.2944	0.002963	0.149449	0.137493	0.176953	0.317105203
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	175	0.43	0.489977	1.797358	530.4648	0.00301	0.122123	0.112354	0.190729	0.304444821
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	100	0.21	4.557146	3.625292	693.784	0.004159	0.649179	0.597244	0.731048	0.817864082
1	Runway Extension	Dust Control	Water Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Excavation (Borrow)	Dozer	Diesel	175	0.59	0.492297	1.155007	536.339	0.002852	0.111014	0.102133	0.162233	0.258487387
1	Runway Extension	Excavation (Borrow)	Dump Truck (12 cy)	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Excavation (Borrow)	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Excavation (Borrow)	Roller	Diesel	100	0.59	1.727618	1.74874	595.5674	0.003291	0.224984	0.206986	0.194558	0.235891718
1	Runway Extension	Excavation (Cut to Fill)	Dozer	Diesel	175	0.59	0.492297	1.155007	536.339	0.002852	0.111014	0.102133	0.162233	0.258487387
1	Runway Extension	Excavation (Cut to Fill)	Dump Truck (12 cy)	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Excavation (Cut to Fill)	Excavator	Diesel	175	0.59	0.380005	0.939556	536.3664	0.002766	0.079583	0.073216	0.153176	0.197817282
1	Runway Extension	Excavation (Cut to Fill)	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Excavation (Cut to Fill)	Roller	Diesel	100	0.59	1.727618	1.74874	595.5674	0.003291	0.224984	0.206986	0.194558	0.235891718
1	Runway Extension	Excavation (Cut to Fill)	Scraper	Diesel	600	0.59	0.7052	1.71986	536.3432	0.002997	0.107454	0.098858	0.160859	1.027726521
1	Runway Extension	Excavation (Topsoil Stripping)	Dozer	Diesel	175	0.59	0.492297	1.155007	536.339	0.002852	0.111014	0.102133	0.162233	0.258487387
1	Runway Extension	Fencing	Concrete Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Fencing	Dump Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Fencing	Other General Equipment	Diesel	175	0.43	0.489977	1.797358	530.4648	0.00301	0.122123	0.112354	0.190729	0.304444821
1	Runway Extension	Fencing	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Fencing	Skid Steer Loader	Diesel	75	0.21	4.902494	4.976788	693.044	0.004298	0.731667	0.673133	0.975305	0.517508037
1	Runway Extension	Fencing	Tractors/Loader/Backhoe	Diesel	100	0.21	4.557146	3.625292	693.784	0.004159	0.649179	0.597244	0.731048	0.817864082
1	Runway Extension	Grading	Dozer	Diesel	175	0.59	0.492297	1.155007	536.339	0.002852	0.111014	0.102133	0.162233	0.258487387
1	Runway Extension	Grading	Grader	Diesel	300	0.59	0.310981	1.005164	536.3675	0.002755	0.052605	0.048397	0.15282	0.278751144
1	Runway Extension	Grading	Roller	Diesel	100	0.59	1.727618	1.74874	595.5674	0.003291	0.224984	0.206986	0.194558	0.235891718
1	Runway Extension	Hydroseeding	Hydroseeder	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Hydroseeding	Off-Road Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Lighting	Dump Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Lighting	Loader	Diesel	175	0.59	0.634868	1.479918	536.2944	0.002963	0.149449	0.137493	0.176953	0.317105203
1	Runway Extension	Lighting	Other General Equipment	Diesel	175	0.43	0.489977	1.797358	530.4648	0.00301	0.122123	0.112354	0.190729	0.304444821
1	Runway Extension	Lighting	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Lighting	Skid Steer Loader	Diesel	75	0.21	4.902494	4.976788	693.044	0.004298	0.731667	0.673133	0.975305	0.517508037
1	Runway Extension	Lighting	Tractors/Loader/Backhoe	Diesel	100	0.21	4.557146	3.625292	693.784	0.004159	0.649179	0.597244	0.731048	0.817864082
1	Runway Extension	Markings	Flatbed Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Markings	Other General Equipment	Diesel	175	0.43	0.489977	1.797358	530.4648	0.00301	0.122123	0.112354	0.190729	0.304444821
1	Runway Extension	Markings	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Soil Erosion/Control	Other General Equipment	Diesel	175	0.43	0.489977	1.797358	530.4648	0.00301	0.122123	0.112354	0.190729	0.304444821
1	Runway Extension	Soil Erosion/Control	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Soil Erosion/Control	Pumps	Diesel	11	0.43	4.464977	4.708033	588.3635	0.003966	0.447631	0.411821	0.661952	0.01866583
1	Runway Extension	Soil Erosion/Control	Tractors/Loader/Backhoe	Diesel	100	0.21	4.557146	3.625292	693.784	0.004159	0.649179	0.597244	0.731048	0.817864082
1	Runway Extension	Subbase Placement	Dozer	Diesel	175	0.59	0.492297	1.155007	536.339	0.002852	0.111014	0.102133	0.162233	0.258487387
1	Runway Extension	Subbase Placement	Dump Truck (12 cy)	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Subbase Placement	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Subbase Placement	Roller	Diesel	100	0.59	1.727618	1.74874	595.5674	0.003291	0.224984	0.206986	0.194558	0.235891718
1	Runway Extension	Topsoil Placement	Dozer	Diesel	175	0.59	0.492297	1.155007	536.339	0.002852	0.111014	0.102133	0.162233	0.258487387
1	Runway Extension	Topsoil Placement	Dump Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326
1	Runway Extension	Topsoil Placement	Pickup Truck	Diesel	600	0.59	0.266379	0.824782	536.3967	0.002684	0.034262	0.031521	0.143202	0.404636326

Emission Factors: On-Road (from MOVES)

Scenario ID	Project Type	Equipment	Fuel Type	Roadway Type	CO(g/mi)	NOx(g/mi)	CO2(g/mi)	SO2(g/mi)	PM10(g/mi)	PM2.5(g/mi)	CH4(g/mi)	N2O(g/mi)	VOC(g/mi)	RV CO(g/veh-day)	RV NOx(g/veh-day)	RV CO2(g/veh-day)	RV SO2(g/veh-day)	RV PM10(g/veh-day)	RV PM2.5(g/veh-day)	RV VOC(g/veh-day)	RP VOC(g/veh-day)
1	Detention Basin	Cement Truck for Fencing	Diesel	Urban Unrestricted Access	0.405184	0.85998178	1432.287493	0.009801437	0.017157375	0.016643264	0.083484002	0.071260126	0.003463901	22.45996841	0.009382885	257.5548602	0.001762504	0.000127064	0.000123285	1.15638543	0
1	Detention Basin	Passenger Car	Gasoline	Urban Unrestricted Access	2.442901	0.089655639	355.4345116	0.00522241	0.004248024	0.003911643	0.05855389	0.00470557	0.001667516	26.08972704	1.374484603	243.2406937	0.003573942	0.031909696	0.029382805	5.681446424	0
1	Landscaping	Flatbed Truck	Diesel	Urban Unrestricted Access	0.458112	1.435824828	2591.119732	0.017731586	0.037673963	0.036545019	0.129998178	0.07277586	0.003463899	26.3408413	0.018519697	329.5741875	0.002255346	0.000162595	0.000157759	14.52126087	0
1	Landscaping	Passenger Car	Gasoline	Urban Unrestricted Access	2.442901	0.089655639	355.4345116	0.00522241	0.004248024	0.003911643	0.05855389	0.00470557	0.001667516	26.08972704	1.374484603	243.2406937	0.003573942	0.031909696	0.029382805	5.681446424	0
1	Runway Extension	Asphalt 18 Wheeler	Diesel	Urban Unrestricted Access	0.458112	1.435824828	2591.119732	0.017731586	0.037673963	0.036545019	0.129998178	0.07277586	0.003463899	26.3408413	0.018519697	329.5741875	0.002255346	0.000162595	0.000157759	14.52126087	0
1	Runway Extension	Dump Truck - Asphalt	Diesel	Urban Unrestricted Access	0.405184	0.85998178	1432.287493	0.009801437	0.017157375	0.016643264	0.083484002	0.071260126	0.003463901	22.45996841	0.009382885	257.5548602	0.001762504	0.000127064	0.000123285	1.15638543	0
1	Runway Extension	Dump Truck Subbase Material	Diesel	Urban Unrestricted Access	0.405184	0.85998178	1432.287493	0.009801437	0.017157375	0.016643264	0.083484002	0.071260126	0.003463901	22.45996841	0.009382885	257.5548602	0.001762504	0.000127064	0.000123285	1.15638543	0
1	Runway Extension	Passenger Car	Gasoline	Urban Unrestricted Access	2.442901	0.089655639	355.4345116	0.00522241	0.004248024	0.003911643	0.05855389	0.00470557	0.001667516	26.08972704	1.374484603	243.2406937	0.003573942	0.031909696	0.029382805	5.681446424	0

Fugitive Emissions (Emission Factors from Various Sources including AP-42)

Scenario ID	Project	Fugitive Type	Variable	Default Values	Units	User Value
1	Detention Basin	Unstabilized Land and Wind Erosion	$A = \text{Area affected} = L \times W / 43560.0$	18	acres	
1	Detention Basin	Unstabilized Land and Wind Erosion	$\text{TPConv} = \text{TSP/PM10 conversion}$	0.5	fraction	
1	Detention Basin	Unstabilized Land and Wind Erosion	$\text{CE} = \text{Control efficiency}$	0.63	fraction	
1	Detention Basin	Unstabilized Land and Wind Erosion	$t = \text{year (e.g. 0.65 year)}$	0.5	years	
1	Detention Basin	Unstabilized Land and Wind Erosion	$\text{PM10} = 0.38 \times A \times \text{TPConv} \times (1-\text{CE}) \times t / 2000$	0	lbs	
1	Detention Basin	Soil Handling	$u = \text{Wind speed}$	5	mph	
1	Detention Basin	Soil Handling	$m = \text{Moisture content}$	0.25	fraction	
1	Detention Basin	Soil Handling	$T = \text{Mass of aggregate storage pile} = L \times W \times 0.5 \times 110 / 2000$	21538.7	tons	
1	Detention Basin	Soil Handling	$\text{PM10} = T \times 0.35 \times 0.0032 \times [(u/5)^{1.3}] / [(m/2)^{1.4}]$	443.4	lbs	
1	Detention Basin	Material Movement (Unpaved Roads)	$s = \text{Surface material silt content}$	0.043	fraction	
1	Detention Basin	Material Movement (Unpaved Roads)	$\text{Wt.} = \text{Mean vehicle weight}$	32	tons	
1	Detention Basin	Material Movement (Unpaved Roads)	$\text{VMT} = \text{Vehicle miles traveled}$	3576.3	miles	
1	Detention Basin	Material Movement (Unpaved Roads)	$\text{PM10} = 1.5 \times [(s/12)^{0.9}] \times [(Wt./3)^{0.45}] \times \text{VMT}$	97.9	lbs	
1	Detention Basin	Material Movement (Paved Roads)	$sL = \text{Road surface silt loading}$	0.1	g/m3	
1	Detention Basin	Material Movement (Paved Roads)	$\text{Wt.} = \text{Mean vehicle weight}$	32	tons	
1	Detention Basin	Material Movement (Paved Roads)	$\text{VMT} = \text{Vehicle miles traveled}$	0	miles	
1	Detention Basin	Material Movement (Paved Roads)	$\text{PM10} = 0.0022 \times (sL^{0.91}) \times (Wt^{1.02}) \times \text{VMT}$	0	lbs	
1	Landscaping	Material Movement (Unpaved Roads)	$s = \text{Surface material silt content}$	0.043	fraction	
1	Landscaping	Material Movement (Unpaved Roads)	$\text{Wt.} = \text{Mean vehicle weight}$	32	tons	
1	Landscaping	Material Movement (Unpaved Roads)	$\text{VMT} = \text{Vehicle miles traveled}$	0	miles	
1	Landscaping	Material Movement (Unpaved Roads)	$\text{PM10} = 1.5 \times [(s/12)^{0.9}] \times [(Wt./3)^{0.45}] \times \text{VMT}$	0	lbs	
1	Landscaping	Material Movement (Paved Roads)	$sL = \text{Road surface silt loading}$	0.1	g/m3	
1	Landscaping	Material Movement (Paved Roads)	$\text{Wt.} = \text{Mean vehicle weight}$	32	tons	
1	Landscaping	Material Movement (Paved Roads)	$\text{VMT} = \text{Vehicle miles traveled}$	0	miles	
1	Landscaping	Material Movement (Paved Roads)	$\text{PM10} = 0.0022 \times (sL^{0.91}) \times (Wt^{1.02}) \times \text{VMT}$	0	lbs	
1	Runway Extension	Asphalt Drying	$A = \text{Area of land affected} = L \times W \times 0.0929$	13935	m2	
1	Runway Extension	Asphalt Drying	$\text{AR} = \text{Application rate of liquefied asphalt over area}$	1.811	l/m2	
1	Runway Extension	Asphalt Drying	$\text{VD} = \text{Volume fraction of diluent in liquefied asphalt}$	0.35	fraction	
1	Runway Extension	Asphalt Drying	$\text{EF} = \text{Mass fraction of diluent which evaporates and becomes VOC}$	0.7	fraction	
1	Runway Extension	Asphalt Drying	$D = \text{Density of solvent utilized}$	1.8	lbs/l	
1	Runway Extension	Asphalt Drying	$\text{VOC} = A \times \text{AR} \times \text{VD} \times \text{EF} \times D$	11129.2	lbs	
1	Runway Extension	Asphalt Storage and Batching	$T = \text{Mass of asphalt loaded} = L \times W \times 0.1667 \times 145 / 2000$	1812.9	tons	
1	Runway Extension	Asphalt Storage and Batching	$\text{PM10} = (0.027 + 0.00042) \times T$	49.7	lbs	
1	Runway Extension	Asphalt Storage and Batching	$\text{CO} = (0.4 + 0.0004) \times T$	725.9	lbs	
1	Runway Extension	Asphalt Storage and Batching	$\text{NOx} = (0.025) \times T$	45.3	lbs	
1	Runway Extension	Asphalt Storage and Batching	$\text{SOx} = (0.0046) \times T$	8.339	lbs	
1	Runway Extension	Asphalt Storage and Batching	$\text{VOC} = (0.0082 + 0.0042) \times T$	22.5	lbs	
1	Runway Extension	Material Movement (Unpaved Roads)	$s = \text{Surface material silt content}$	0.043	fraction	
1	Runway Extension	Material Movement (Unpaved Roads)	$\text{Wt.} = \text{Mean vehicle weight}$	32	tons	
1	Runway Extension	Material Movement (Unpaved Roads)	$\text{VMT} = \text{Vehicle miles traveled}$	3053.3	miles	
1	Runway Extension	Material Movement (Unpaved Roads)	$\text{PM10} = 1.5 \times [(s/12)^{0.9}] \times [(Wt./3)^{0.45}] \times \text{VMT}$	83.6	lbs	
1	Runway Extension	Material Movement (Paved Roads)	$sL = \text{Road surface silt loading}$	0.1	g/m3	
1	Runway Extension	Material Movement (Paved Roads)	$\text{Wt.} = \text{Mean vehicle weight}$	32	tons	
1	Runway Extension	Material Movement (Paved Roads)	$\text{VMT} = \text{Vehicle miles traveled}$	2580	miles	
1	Runway Extension	Material Movement (Paved Roads)	$\text{PM10} = 0.0022 \times (sL^{0.91}) \times (Wt^{1.02}) \times \text{VMT}$	23.9	lbs	
1	Runway Extension	Unstabilized Land and Wind Erosion	$A = \text{Area affected} = L \times W / 43560.0$	3.444	acres	
1	Runway Extension	Unstabilized Land and Wind Erosion	$\text{TPConv} = \text{TSP/PM10 conversion}$	0.5	fraction	
1	Runway Extension	Unstabilized Land and Wind Erosion	$\text{CE} = \text{Control efficiency}$	0.63	fraction	
1	Runway Extension	Unstabilized Land and Wind Erosion	$t = \text{year (e.g. 0.65 year)}$	0.5	years	
1	Runway Extension	Unstabilized Land and Wind Erosion	$\text{PM10} = 0.38 \times A \times \text{TPConv} \times (1-\text{CE}) \times t / 2000$	0	lbs	
1	Runway Extension	Soil Handling	$u = \text{Wind speed}$	5	mph	
1	Runway Extension	Soil Handling	$m = \text{Moisture content}$	0.25	fraction	
1	Runway Extension	Soil Handling	$T = \text{Mass of aggregate storage pile} = L \times W \times 0.5 \times 110 / 2000$	4125	tons	
1	Runway Extension	Soil Handling	$\text{PM10} = T \times 0.35 \times 0.0032 \times [(u/5)^{1.3}] / [(m/2)^{1.4}]$	84.9	lbs	

## ASSUMPTIONS

Emission factors were developed from the following models:

On-Road Vehicles: MOVES 2010b, revised January 2013

Non-Road Equipment: NONROAD2008a, July 2009

In addition to the overall project size dimensions (e.g., Length and width) provided by the user, an additional 10 ft length and 10 ft width is added to account for disturbance areas.

The number of employees is based on the higher of two methods: (1) number of equipment, and (2) multiply the project cost in million by 11.

The average employee travels 30 miles round-trip from home to construction site each day.

The average on-road material delivery round-trip distance per truck is 40 miles per day.

For calculating fugitive, re-entrained PM emissions from on-road and non-road material delivery and handling equipment, a nominal VMT of 5 miles is used for each vehicle per day.

In deriving emission factors from NONROAD, the horsepower for each equipment represents the most popular in each equipment category.

The total length of each modeled scenario is used to define the number of days associated with vehicle/equipment evaporative emissions.

The choice of location and season are assumed to adequately represent differences in fuel characteristics affecting emissions.

Only two seasons (Summer and Winter) are used to represent all seasons.

14 U.S. Counties are used to represent all other counties in the U.S. (all other counties are mapped to the 14).

The default methods assume that all construction equipment use diesel as well as heavy-duty on-road vehicles, while passenger vehicles (including motorcycles) use gasoline.

Fugitive emissions are only modeled for:

- Asphalt drying
- Asphalt storage and batching
- Concrete mixing/batching
- Soil handling
- Unstabilized land and wind erosion
- Material movement (unpaved roads)
- Material movement (paved roads)

On-Road vehicle speeds are not explicitly modeled. The associated emission factors for each modeled vehicle from MOVES represent averages over the driving cycles, the roadway type, and daily temperature variations.

The default equipment hours-of-use data are developed based on the overall size of the project provided by the user and activity rates based on expert engineering judgment.

Under the Construction Activity Type list (Activity Tab), when a choice between asphalt and concrete materials occurs, asphalt is always selected as default. To choose concrete, de-select the asphalt item and select the corresponding concrete item.

Two trips per day were assumed for each on-road material handling trucks.

Only CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O are used to represent greenhouse gas emissions. Other potential greenhouse gases including air conditioning refrigerants were not included.

The following equipment are always modeled using diesel emission factors since gasoline-based emission factors are not available:

- Asphalt Deliveries/Ten Wheelers
- Bulldozer



Concrete Ready Mix Trucks  
Concrete Ready Trucks Mix for Cores  
Concrete Truck  
Crack Filler (Trailer Mounted)  
Delivery of Tanks (3)  
Distributing Tanker  
Dozer  
Dump Truck  
Dump Truck (12 cy)  
Excavator  
Excavator for U/G Services/Tanks  
Flat Bed or Dump Trucks  
Flatbed Truck  
Grader  
Grout Wheel Truck  
Hoist Equipment with 40 Ton Rig  
Hydraulic Hammer  
Hydroseeder  
Line Painting Truck and Sprayer  
Material Deliveries  
Off-Road Truck  
Pickup Truck  
Scraper  
Seed Truck Spreader  
Small Dozer  
Survey Crew Trucks  
Ten Wheelers  
Ten Wheelers- Material Delivery  
Tool Truck  
Tractor Trailer- Equipment Delivery  
Tractor Trailer- Material Delivery  
Tractor Trailer- Steel Deliveries  
Tractor Trailer- Stone Delivery  
Tractor Trailer- Topsoil & Seed  
Tractor Trailer- Truck Delivery  
Tractor Trailer with Boom Hoist- Curbs Del & Place  
Tractor Trailer with Boom Hoist- Delivery  
Tractor Trailers- Rebar Deliveries  
Tractor Trailers Temp Fac.  
Truck for Topsoil & Seed Del&Spread  
Water Truck  
Excavator with Bucket  
Excavator with Hoe Ram