

Appendix B

Air Quality and Climate Technical Report

Final

FORT LAUDERDALE-HOLLYWOOD INTERNATIONAL AIRPORT

Air Quality and Climate Technical Report

Prepared for
Broward County Aviation Department

May 2024



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INTRODUCTION

Project Description

The Broward County Aviation Department (BCAD) is planning construction of an Intermodal Center (IMC) and Airport People Mover (APM), redevelopment of an airport parking garage and expansion of a second parking garage, reconfiguration of the Airport arrivals circulation roadways, and other associated landside improvements (the Proposed Project) at Fort Lauderdale-Hollywood International Airport (FLL or Airport). The Proposed Project is shown on **Figure 1** and includes the elements described in **Table 1**.

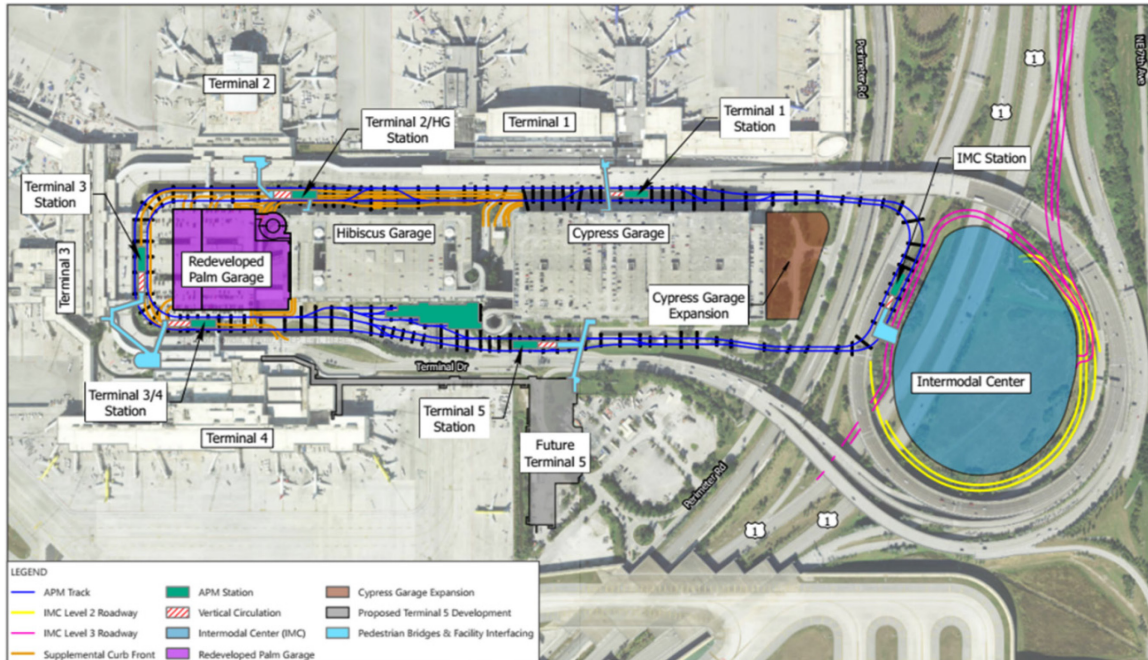


Figure 1
Proposed Project

TABLE 1
PROJECT COMPONENTS AND COMPONENT DESCRIPTIONS

Component	Elements
Intermodal Center (IMC)	• An 8-level, 4.6 million-square-foot facility • Approximately 6,700 parking spaces (Levels 2 – 8) • Ground transportation center (Level 1) • Revenue-generating spaces, such as concessions areas and leasable office space • Multi-modal space to support the FLL APM • Roadway and access improvements • Supporting utility infrastructure improvements • Stormwater improvements
Airport People Mover (APM)	• ~16,000 feet of elevated dual-track guideway • Five elevated on-airport station platforms and a sixth station platform constructed adjacent to the IMC • Pedestrian bridge connectors • Vertical circulation systems • A 52,000 square foot maintenance and storage facility • Supporting utility infrastructure improvements. • Two (2) power distribution substations
Palm Garage Redevelopment with Airport Hotel and Commercial Center	• Development of a seven- to nine-level parking facility providing approximately 3,400 - 3,700 parking stalls in a ~135,000 square foot area. • A large pedestrian circulation area on Level 3 provides users with terminal and transportation connectivity from a central location and eliminates at-grade pedestrian crossings on the terminal roadway system. • ~90,000 square-foot commercial center that may include an airport hotel and other commercial space. • On the eastern side, the public parking garage continues upwards with each floor plate matching the existing Hibiscus Garage to the east. • Supporting infrastructure improvements.
Supplemental Roadways and Curbsides	• Two at-grade supplemental curb areas are proposed to address terminal curbside capacity deficiencies and/or serve as a bypass roadway to circumvent the traffic congestion at the terminals and improve roadway level of service.
Cypress Garage Expansion	• An approximately 90,000 square foot, nine-level expansion facility is proposed to the east of Cypress Garage. • Facility provides approximately 2,150 parking spaces. • Each level planned at same elevation as the corresponding level in the existing Cypress Garage. • Supporting utility infrastructure and drainage improvements

This report provides an analysis of the annual construction-related air quality and greenhouse gas (GHG) emissions associated with the proposed project, beginning in 2026 and ending in 2032. The Motor Vehicle Emission Simulator (MOVES) model developed by the Environmental Protection Agency (EPA) was used to develop air quality and GHG emissions both on- and off-

road emission factors specific to Broward County, Florida.¹ The project-specific emissions were prepared by Environmental Science Associates (ESA) using construction fleet activity data for the on-road and non-road equipment developed by Ricondo & Associates (Ricondo) and verified by BCAD. A detailed discussion of the model inputs used to develop air quality and GHG emissions calculations is included in the following sections.

The Proposed Project does not include development actions that would result in a change in aircraft operations at the Airport. The Proposed Project would also not induce passenger levels or vehicular travel. Background growth trends in traffic volumes and passenger levels at FLL would continue to increase as forecasted in the most recent Airport Master Plan Update. As such, aircraft operational emissions are not analyzed as part of this air quality technical analysis.

¹ Motor Vehicle Emission Simulator (MOVES) Version 4, Office of Transportation and Air Quality. US Environmental Protection Agency. August 2023. <https://www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves>

REGULATORY OVERVIEW

Criteria Air Pollutants

Air quality regulations in the United States are based on concerns that high concentrations of air pollutants can harm human health, especially for children, the elderly, and people with compromised health conditions; as well as adversely affect public welfare by damage to crops, vegetation, buildings, and other property. Information on applicable air quality standards and current attainment/nonattainment designations are detailed throughout this section. For the Proposed Project, located in Broward County, Florida, this includes information on attainment/nonattainment designations, and applicable regulatory criteria and/or thresholds that will be applied to the results of the air quality assessment.

The EPA has established National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃) and its precursors such as oxides of nitrogen (NO_x) and volatile organic compounds (VOCs), particulate matter (PM₁₀ and PM_{2.5}), and sulfur dioxide (SO₂). In complying with the National Environmental Policy Act (NEPA), the FAA must determine if “the action would cause pollutant concentrations to exceed one or more of the NAAQS, as established by the EPA under the Clean Air Act, for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations.”² FAA will evaluate if the emissions caused by the Proposed Action Alternative would result in a significant impact under the FAA’s NEPA threshold.

The current attainment status for Broward County is presented in **Table 2**.

The FAA Air Quality Handbook provides guidance on the level of assessment necessary for various airport projects.³ Given that the Proposed Project would not induce or change passenger levels and associated aircraft operations at FLL, any emissions increase is anticipated to be driven by construction. Therefore, a detailed construction-based emission inventory was performed.

² FAA, July 2015. *1050.1 Desk Reference, Chapter 1, Air Quality*.

³ Aviation Emissions and Air Quality Handbook Version 3. Federal Aviation Administration. January 2015. https://www.faa.gov/sites/faa.gov/files/regulations_policies/policy_guidance/envir_policy/airquality_handbook/Air_Quality_Handbook_Appendices.pdf

TABLE 2
BROWARD COUNTY NAAQS ATTAINMENT STATUS

Criteria Air Pollutant	NAAQS Attainment Status
Ozone (1-Hour)	Attainment*
Ozone (8-Hour)	Unclassified/Attainment
CO (1-Hour and 8-Hour)	Unclassified/Attainment
NO ₂ (1-Hour)	Unclassified/Attainment
NO ₂ (Annual)	Unclassified/Attainment
SO ₂ (1-Hour and 3-Hour)	Unclassified/Attainment
PM ₁₀ (24-Hour)	Unclassified/Attainment
PM _{2.5} (24-Hour and Annual)	Unclassified/Attainment
Lead	Unclassified/Attainment

SOURCE: EPA, 2024.

NOTE:

* The EPA Green Book identifies the county with a status of maintenance for the revoked 1979 1-hour ozone standard. The county is considered maintenance because a maintenance plan was in-place when the standard was revoked. The two 10-year maintenance cycles are now complete, and the region is attaining the standards.

Thresholds of Significance

Exhibit 4-1 of FAA Order 1050.1F provides the FAA’s significance threshold for air quality, which states,⁴ “The action would cause pollutant concentrations to exceed one or more of the NAAQS, as established by the EPA under the CAA, for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations.”

While it is noted that the Proposed Project is not currently located within an EPA-designated nonattainment or maintenance area for any of the NAAQS, and thus General Conformity Rule (Section 176(c)(1) of the CAA) de minimis thresholds are not applicable. However, there have been concerns raised regarding the potential for Broward County to enter a non-compliance with that NAAQS in the future. Although specifics on this timeframe are not available, there is an interest in providing assurance regarding the potential air quality impacts of the Proposed Project.

De minimis thresholds, as outlined in the General Conformity Rule (Section 176(c)(1) of the Clean Air Act), serve as thresholds below which emissions from a particular project are not expected to cause concentrations to exceed a NAAQS standard or the frequency of such violations. The least restrictive de minimis thresholds are for regions that have previously exceeded a NAAQS standard, but have entered back into compliance, so called “maintenance areas.” With the Proposed Project not in a nonattainment or maintenance area, the maintenance de minimis thresholds can serve as an emissions-based level of significance. The de minimis thresholds for most general conformity pollutants (NO_x, SO₂, CO, PM₁₀, and PM_{2.5}) is 100 tons per year, with two exceptions for lead (Pb) the threshold is 25 tons per year and the VOC de

⁴ Order 1050.1F – Environmental Impacts: Policies and Procedures. Federal Aviation Administration. July 2015. https://www.faa.gov/documentLibrary/media/Order/FAA_Order_1050_1F.pdf

minimis threshold for maintenance areas in an ozone transport region (only in the northeast United States at the moment) is 50 tons per year.

Greenhouse Gases

FAA Order 1050.1F determines the need for and establishes the extent of the GHG assessment required for airport-related actions and projects. The GHG assessment includes emissions inventories for on-road and non-road construction, prepared for the 2026 through 2032 construction years. The analysis of GHG emissions generally follows the same methodology and modeling tools as the air quality criteria air pollutant emissions analysis as discussed in the *Air Quality Analysis* section of this report.

GHGs include carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). Increasing concentrations of GHGs in the atmosphere affect global climate. For the Proposed Project, anthropogenic (i.e., human-made) sources of GHG emissions are primarily associated with the combustion of fossil fuels (e.g., diesel and natural gas) for non-road construction equipment, on-road employee and truck trips, and material delivery.

Emissions of GHGs are accounted for by converting emissions of specific pollutants to CO₂ equivalent (CO₂e) emissions by applying the proper global warming potential (GWP) value for each specific pollutant. GWP represents the amount of heat captured by a mass of a specific GHG compared to a similar mass of CO₂. These GWP ratios are provided by the Intergovernmental Panel on Climate Change (IPCC) in its Fifth Assessment Report (AR5).⁵ By applying the GWP ratios, project related CO₂e emissions can be tabulated in metric tons per year. Typically, the GWP ratio corresponding to the warming potential of CO₂ over a 100-year period is used as a baseline.

Thresholds of Significance

The FAA has not established a threshold of significance for climate and GHG emissions, nor has the FAA identified specific factors to consider in making a significance determination for GHG emissions. The CEQ has noted that “it is not currently useful for the NEPA analysis to attempt to link specific climatological changes, or the environmental impacts thereof, to the particular project or emissions, as such direct linkage is difficult to isolate and to understand.” However, in January of 2023, the CEQ published guidance to provide context to the GHG emissions through the use of social cost of carbon (SCC) calculations.⁶ The GHG emissions detailed in this technical appendix are utilized to calculate the SCC, which are presented in Section 3.4, *Climate*, of the EA.

⁵ 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, p.87.

⁶ National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change, Council on Environmental Quality. January 9, 2023. <https://www.govinfo.gov/content/pkg/FR-2023-01-09/pdf/2023-00158.pdf>

AIR QUALITY ANALYSIS

Air quality emissions for the Proposed Project were calculated using construction equipment activity data provided to ESA by Ricondo, and verified by BCAD, along with emission factors that were modeled using the EPA MOVES model. These combined data resulted in by-year air quality emissions for the Proposed Project that could be contrasted against an appropriate significance threshold.

After construction, the Proposed Project would rely on electricity to power future parking garages, the IMC, and APM. The Proposed Project would not induce passenger levels or result in a change in aircraft activity or operations at FLL. Further, surface traffic levels would not increase as a result of the Proposed Project, but may result in reduced idling due less congestion. Therefore, emissions associated with the operation of the Proposed Project were not performed.

Methodology

The activity levels were produced using the Airport Cooperative Research Program's (ACRP) Airport Construction Emissions Inventory Tool and scaled appropriately to the size of the Proposed Project components. This ACRP tool was originally designed to provide emission estimates for common airport projects, without the need to run a highly detailed and costly analysis. However, since its original publication, the tool's emission factors have become outdated and are no longer recommended for use by the FAA. As such, the tool's sole purpose for this project was to serve as an aid in developing equipment activity levels, with modern EPA MOVES being used to establish the appropriate emission factors.

The MOVES model was run for the years 2026 to 2032 to encompass all phases of the Proposed Project. This ensures that the emissions calculations reflect the full scope of the project activities over time. **Figure B-2** shows Proposed Project implementation schedule for the project activities.

Project Component	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Intermodal Center										
Automated People Mover										
-Phase 1 (Pinched Loop)										
-Phase 2 (Closed Loop)										
Palm Garage Site Redevelopment										
-Phase 1 Demolition, Southern Third										
-Phase 2 Demolition, Remainder of Structure										
-New Palm Garage Redevelopment										
-Commercial Center and Airport Hotel										
Supplemental Roadways and Curbsides										
Cypress Garage Expansion										

LEGEND: Construction/Demolition Design

NOTE:

1/ It is anticipated that the following design components of the proposed action will be procured and awarded together based on project dependencies and overlap: Automated People Mover (Phase 1 and 2), Palm Garage Demolition (Phase 1 and 2), and Supplemental Roadways and Curbsides.

SOURCE: Broward County Aviation Department, 2021 Master Plan Update Validation, 2022.

Figure 2
Proposed Project Implementation Schedule

Emission Factors

Emission factors for the modeling of criteria air pollutants used the EPA's MOVES model. This model is widely recognized for its ability to estimate emissions for mobile sources at the national, county, and project level for criteria air pollutants, GHGs, and air toxics. The MOVES 4.0 model allows us to input specific parameters related to a project including geolocation (state, county), project years, fleet and equipment profile, vehicle miles traveled (VMT), speed range, temperature, and fuel type, among others. By doing so, detailed emission factors can be generated that reflect the unique characteristics of a project.

In the MOVES model, emissions from non-road and on-road sources are computed independently. Non-road emissions come from equipment and vehicles that do not operate on highways. This primarily includes various forms of construction equipment (e.g., excavators, compactors, forklifts). The MOVES model estimates non-road emission factors based on the specific county, equipment population, scrappage, usage, and activity data, as well as local meteorological conditions.

On-road emissions are produced by vehicles that operate on various types of roadways. The MOVES model is capable of estimating emissions from a wide range of on-road vehicles, including passenger cars, trucks, dump trucks, concrete trucks, and motorcycles. Calculation of emission factors for on-road equipment requires that, at a minimum, the user provide information on the years of interest, location, types of equipment, and roadway types. In default scale mode, the model uses these inputs to estimate emissions of criteria air pollutants, GHGs, and any selected air toxics.

In both cases, the MOVES model provides a robust tool for estimating emission factors, but the results are dependent on the accuracy and completeness of the input data including the anticipated activity profile. Therefore, it's crucial to ensure that the inputs reflect the most accurate and current data available.

Post-processing the MOVES outputs provides emission factors in units of grams per hour for all non-road equipment and on-road idling and in units of grams per mile for all on-road activity. Activity data by equipment types associated with each project component are then applied to these emission factors to estimate project emissions.

Activity Data

Activity data that were used with the modeled EPA MOVES outputs were provided by Ricondo. Construction activity emissions are calculated based on the MOVES run output and the project specific anticipated activity profile assumptions that are provided for both on-road and non-road equipment. Non-road activity data includes details such as the year of construction, type of construction activity, equipment used, activity size in square feet (SF), activity rate, and hours of activity. Equipment type provided in the activity assumption were matched with the closest equipment list from the MOVES model. Exhibit 1 shows the total anticipated activity hours associated with each equipment type. The activity, in hours, for each equipment type and phase of

work is calculated as the product of the project-specific development area and the activity rate (hours per square foot) estimated by the ACRP tool.

Additionally, information on on-road equipment categorized by year, equipment type, on-road activity, fuel type, number of non-road equipment, round trip distance in miles, and a scale factor. The scale factor is simply the ratio between the project-specific development size and that estimated by the ACRP tool. For example, to estimate the miles of truck activity for a 210,000 square foot parking structure development, the ACRP tool can be used to establish how many miles are needed for a slightly different development size. The scale factor is then the ratio between the tools estimated area and the project-specific area, which is used to scale the estimated milage accordingly. If the tool's estimate is 80 miles of activity for a 240,000 square foot area and the project is proposing 210,000 square feet of development, then the scaled hours estimate is as follows.

$$\frac{210,000 \text{ sqft}}{240,000 \text{ sqft}} * 80 \text{ miles} = 70 \text{ miles}$$

Construction equipment was categorized into specific equipment types used in MOVES for construction related activities. The equipment types in the MOVES model that were assessed for this project are provided in Table A-5. Additionally, Table A-1 describes how the activity data provided by Ricondo were cross referenced to MOVES equipment types. For on-road equipment, all employee travel was assumed to be in passenger cars and all other on-road activity were classified as either single use short-haul trucks or combination short-haul trucks (cross reference information available in Table A-2). All on-road vehicle miles traveled were assumed to occur at 55 miles per hour.

Construction Emissions

The results of the emission tabulations, by calendar year and project element, are provided in **Table 3**. Additional details on the activity levels and emission factors for both on-road and nonroad equipment are available in **Attachment A**. Of note, even if general conformity were applicable, the annual emissions across all pollutants do not approach the de minimis levels used for areas operating in maintenance. As such, the air quality impacts from the Proposed Project do not result in a significant impact.

TABLE 3
ANNUAL CONSTRUCTION EMISSIONS INVENTORY (TONS)

Element	Year	CO	VOC	NOx	SO2	PM10	PM2.5
APM	2026	1.10	0.18	3.92	0.006	0.16	0.15
	2027	0.35	0.05	1.30	0.002	0.05	0.05
	2028	0.59	0.10	2.41	0.004	0.09	0.08
	2029	0.61	0.10	2.56	0.004	0.09	0.08
	2030	0.94	0.17	4.89	0.008	0.15	0.14
Cypress Garage	2030	0.39	0.07	2.04	0.003	0.06	0.05
	2031	0.23	0.04	1.26	0.002	0.03	0.03
	2032	0.22	0.04	1.23	0.002	0.03	0.02

Element	Year	CO	VOC	NOx	SO2	PM10	PM2.5
IMC	2026	5.34	1.00	24.56	0.033	0.82	0.79
	2027	2.02	0.39	11.84	0.016	0.29	0.28
	2028	1.52	0.30	9.67	0.013	0.22	0.21
Palm Garage	2028	0.20	0.05	1.23	0.002	0.03	0.03
	2029	0.31	0.08	2.13	0.003	0.06	0.05
	2030	1.73	0.38	13.53	0.019	0.30	0.29
	2031	1.59	0.36	13.25	0.019	0.28	0.27
	2032	1.48	0.34	13.03	0.019	0.26	0.26
Supplemental Roadways and Curbsides	2029	0.31	0.07	3.06	0.004	0.05	0.05
APM Total	All	3.59	0.60	15.08	0.02	0.53	0.51
Cypress Garage Total	All	0.84	0.15	4.54	0.01	0.11	0.10
IMC Total	All	8.88	1.68	46.07	0.06	1.33	1.29
Palm Garage Total	All	5.30	1.20	43.16	0.06	0.93	0.90
Supplemental Roadways and Curbsides Total	All	0.31	0.07	3.06	0.004	0.05	0.05

SOURCE: Environmental Science Associates, 2024.

NOTES: CO = carbon monoxide; NOx = oxides of nitrogen; PM10 = particulate matter less than or equal to 10 microns in diameter; PM2.5 = particulate matter less than or equal to 2.5 microns in diameter; SOx = oxides of sulfur; VOC = volatile organic compound.

In addition to assessing the emissions on an element basis, it is also helpful to produce calendar year emission totals to allow for comparison to metrics such as General Conformity de minimis thresholds, even if they don't apply in for this project. **Table 4** provides the construction emissions summed on a calendar year basis. No single year exceeds 30 tons per year, which is well below the maintenance area de minimis threshold of 100 tons per year.

TABLE 4
ANNUAL CONSTRUCTION EMISSIONS INVENTORY (TONS)

Year	CO	VOC	NOx	SO _x	PM10	PM2.5	Above any de minimis?
2026	6.43	1.17	28.48	0.04	0.98	0.95	No
2027	2.37	0.44	13.14	0.02	0.34	0.33	No
2028	2.31	0.45	13.31	0.02	0.34	0.33	No
2029	1.23	0.25	7.75	0.01	0.19	0.19	No
2030	3.06	0.62	20.46	0.03	0.50	0.48	No
2031	1.82	0.40	14.51	0.02	0.31	0.30	No
2032	1.70	0.38	14.26	0.02	0.29	0.28	No

SOURCE: Environmental Science Associates, 2024.

NOTES: CO = carbon monoxide; NOx = oxides of nitrogen; PM10 = particulate matter less than or equal to 10 microns in diameter; PM2.5 = particulate matter less than or equal to 2.5 microns in diameter; SO_x = oxides of sulfur; VOC = volatile organic compound.

Our analysis confirms that the annual emissions from construction activities associated with the Proposed Project remain below the General Conformity Rule de minimis thresholds for each criteria pollutant (refer to Appendix B).

Furthermore, it is essential to emphasize that even if Broward County were to enter a maintenance phase for air quality within a certain timeframe, the Proposed Project's emissions would still fall below the de minimis thresholds. This underscores the project's minimal contribution to air quality impacts, even under potentially changing regulatory conditions.

Mitigation, Avoidance, or Minimization Measures

Project-related emissions for the Proposed Project do not exceed the General Conformity Rule (Section 176(c)(1) of the CAA) de minimis thresholds for any pollutants. Therefore, no mitigation measures are required.

GREENHOUSE GAS ANALYSIS

GHG emissions were calculated using the same methodology described in the Air Quality Analysis methodology section of this report. As with the criteria air pollutants, MOVES was used to determine the emission factors of CO₂, CH₄, and N₂O. One notable exception is N₂O for nonroad equipment. The EPA MOVES model does not estimate emission factors for N₂O when analyzing nonroad equipment. Instead, these emissions were estimated by following guidance described for nonroad equipment in the EPA's port emission inventory guidance.⁷ Additionally, CO₂ equivalents (CO₂e; an industry standard) were calculated using the IPCC AR5 GWP values. As with the criteria pollutants, GHG emissions associated with the operation of the Proposed Project were not performed. The detailed equipment activity and emission factors are provided in Attachment A.

Construction Emissions

The MOVES model was run for the years 2026 to 2032 to encompass all construction phases of the Proposed Project. This ensures that the emissions calculations reflect the full scope of the project activities over time. **Table 5** presents estimated levels of GHG emissions inventory at FLL for the 2026 through 2032 calendar years for each project element.

TABLE 5
2026–2032 GHG EMISSIONS INVENTORY (METRIC TONS)

Element	Year	CO2	CH4	N2O	Total CO2e
APM	2026	1,843	0.01	0.09	1,867
	2027	658	0.003	0.03	667
	2028	1,261	0.01	0.06	1,278
	2029	1,426	0.006	0.070	1,444
	2030	2,778	0.01	0.13	2,813
Cypress Garage	2030	1,075	0.005	0.06	1,090
	2031	653	0.003	0.04	663
	2032	652	0.003	0.04	662
IMC	2026	10,816	0.06	0.56	10,966
	2027	5,223	0.03	0.28	5,299
	2028	4,348	0.02	0.23	4,411
Palm Garage	2028	516	0.003	0.02	522
	2029	917	0.004	0.04	928
	2030	6,284	0.03	0.31	6,366

⁷ Ports Emissions Inventory Guidance: Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emissions, U.S. Environmental Protection Agency, April 2022.
<https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockkey=P1014J1S.pdf>

Element	Year	CO2	CH4	N2O	Total CO2e
	2031	6,281	0.02	0.31	6,363
	2032	6,279	0.024	0.307	6,361
Supplemental Roadways and Curbsides	2029	1,241	0.01	0.06	1,257
APM Total		7,965	0.04	0.39	8,068
Cypress Garage Total		2,380	0.01	0.13	2,415
IMC Total		20,388	0.11	1.08	20,676
Palm Garage Total		20,277	0.08	0.99	20,541
Supplemental Roadways and Curbsides Total		1,241	0.01	0.06	1,257
Overall Total					52,958

SOURCE: Environmental Science Associates, 2024.

NOTES: CO2e = carbon dioxide equivalent. The IPCC Forth Assessment AR5 Global Warming Potential Values (28 for CH4 and 265 for N2O) are applied to determine CO2e. Some rounding may have occurred that leads to slightly different totals if summed from the table directly.

Mitigation, Avoidance, or Minimization Measures

As the FAA has not established a threshold of significance for climate and GHG emissions, the Proposed Action does not exceed a significance threshold for GHG emissions. Therefore, no mitigation measures are required.

Attachment A

Emissions Calculation Tables

TABLE A-1
PROJECT NONROAD EQUIPMENT ACTIVITY (HRS)

Project Component	Ricondo Equipment	MOVES Equipment	2026	2027	2028	2029	2030	2031	2032
Construct APM Bridges & V Circ.	90 Ton Crane	Cranes	169.7	99.2	53.4	192.1	58.7		
Construct APM Bridges & V Circ.	Backhoe	Tractors/Loaders/Backhoes	169.7	99.2	53.4	192.1	58.7		
Construct APM Bridges & V Circ.	Concrete Pump	Cement & Mortar Mixers	6.4	3.7	2.0	7.2	2.2		
Construct APM Bridges & V Circ.	Concrete Ready Mix Trucks	Off-highway Trucks	31.8	18.6	10.0	36.0	11.0		
Construct APM Bridges & V Circ.	Concrete Truck	Off-highway Trucks	12.7	7.4	4.0	14.4	4.4		
Construct APM Bridges & V Circ.	Fork Truck	Rough Terrain Forklifts	1802.1	1054.1	566.7	2040.1	623.4		
Construct APM Bridges & V Circ.	Generator	Other Construction Equipment	159.0	93.0	50.0	180.0	55.0		
Construct APM Bridges & V Circ.	High Lift	Other Construction Equipment	487.7	285.2	153.4	552.1	168.7		
Construct APM Bridges & V Circ.	Man Lift	Other Construction Equipment	1590.0	930.0	500.0	1800.0	550.0		
Construct APM Bridges & V Circ.	Man Lift (Fascia Construction)	Other Construction Equipment	12.7	7.4	4.0	14.4	4.4		
Construct APM Bridges & V Circ.	Material Deliveries	Off-highway Trucks	31.8	18.6	10.0	36.0	11.0		
Construct APM Bridges & V Circ.	Survey Crew Trucks	Off-highway Trucks	5.2	3.1	1.7	5.9	1.8		
Construct APM Bridges & V Circ.	Tool Truck	Off-highway Trucks	393.4	230.1	123.7	445.3	136.1		
Construct APM Bridges & V Circ.	Tractor Trailer- Material Delivery	Tractors/Loaders/Backhoes	437.7	256.0	137.7	495.5	151.4		
Construct APM Bridges & V Circ.	Tractor Trailer- Steel Deliveries	Tractors/Loaders/Backhoes	21.1	12.4	6.7	23.9	7.3		
Construct APM Bridges & V Circ.	Tractor Trailers Temp Fac.	Tractors/Loaders/Backhoes	2.1	1.2	0.6	2.3	0.7		

Project Component	Ricondo Equipment	MOVES Equipment	2026	2027	2028	2029	2030	2031	2032
Construct APM Bridges & V Circ.	Trowel Machine	Other Construction Equipment	6.4	3.7	2.0	7.2	2.2		
Construct APM Maint. Facility	40 Ton Crane	Cranes					1248.0		
Construct APM Maint. Facility	Backhoe	Tractors/Loaders/Backhoes					1664.0		
Construct APM Maint. Facility	Concrete Ready Mix Trucks	Off-highway Trucks					312.0		
Construct APM Maint. Facility	Fork Truck	Rough Terrain Forklifts					8528.0		
Construct APM Maint. Facility	High Lift	Other Construction Equipment					2288.0		
Construct APM Maint. Facility	Man Lift	Other Construction Equipment					6240.0		
Construct APM Maint. Facility	Man Lift (Fascia Construction)	Other Construction Equipment					624.0		
Construct APM Maint. Facility	Material Deliveries	Off-highway Trucks					41.6		
Construct APM Maint. Facility	Survey Crew Trucks	Off-highway Trucks					52.0		
Construct APM Maint. Facility	Tool Truck	Off-highway Trucks					2080.0		
Construct APM Maint. Facility	Tractor Trailer- Material Delivery	Tractors/Loaders/Backhoes					894.4		
Construct APM Maint. Facility	Tractor Trailer- Steel Deliveries	Tractors/Loaders/Backhoes					83.2		
Construct APM Maint. Facility	Tractor Trailers Temp Fac.	Tractors/Loaders/Backhoes					20.8		
Construct APM Stations	40 Ton Crane	Cranes	117.6	117.6	117.6	117.6	117.6		
Construct APM Stations	Fork Truck	Rough Terrain Forklifts	646.8	646.8	646.8	646.8	646.8		
Construct APM Stations	High Lift	Other Construction Equipment	215.6	215.6	215.6	215.6	215.6		
Construct APM Stations	Man Lift	Other Construction Equipment	588.0	588.0	588.0	588.0	588.0		
Construct APM Stations	Man Lift (Fascia Construction)	Other Construction Equipment	58.8	58.8	58.8	58.8	58.8		
Construct APM Stations	Material Deliveries	Off-highway Trucks	3.9	3.9	3.9	3.9	3.9		
Construct APM Stations	Survey Crew Trucks	Off-highway Trucks	4.9	4.9	4.9	4.9	4.9		
Construct APM Stations	Tool Truck	Off-highway Trucks	156.8	156.8	156.8	156.8	156.8		
Construct APM Stations	Tractor Trailer- Material Delivery	Tractors/Loaders/Backhoes	76.4	76.4	76.4	76.4	76.4		

Project Component	Ricondo Equipment	MOVES Equipment	2026	2027	2028	2029	2030	2031	2032
Construct APM Stations	Tractor Trailer- Steel Deliveries	Tractors/Loaders/Backhoes	7.8	7.8	7.8	7.8	7.8		
Construct APM Stations	Tractor Trailers Temp Fac.	Tractors/Loaders/Backhoes	2.0	2.0	2.0	2.0	2.0		
Construct APM Substations	40 Ton Crane	Cranes			72.0		72.0		
Construct APM Substations	Backhoe	Tractors/Loaders/Backhoes			96.0		96.0		
Construct APM Substations	Concrete Ready Mix Trucks	Off-highway Trucks			18.0		18.0		
Construct APM Substations	Fork Truck	Rough Terrain Forklifts			492.0		492.0		
Construct APM Substations	High Lift	Other Construction Equipment			132.0		132.0		
Construct APM Substations	Man Lift	Other Construction Equipment			360.0		360.0		
Construct APM Substations	Man Lift (Fascia Construction)	Other Construction Equipment			36.0		36.0		
Construct APM Substations	Material Deliveries	Off-highway Trucks			2.4		2.4		
Construct APM Substations	Survey Crew Trucks	Off-highway Trucks			3.0		3.0		
Construct APM Substations	Tool Truck	Off-highway Trucks			120.0		120.0		
Construct APM Substations	Tractor Trailer- Material Delivery	Tractors/Loaders/Backhoes			51.6		51.6		
Construct APM Substations	Tractor Trailer- Steel Deliveries	Tractors/Loaders/Backhoes			4.8		4.8		
Construct APM Substations	Tractor Trailers Temp Fac.	Tractors/Loaders/Backhoes			1.2		1.2		
Construct APM Track	90 Ton Crane	Cranes	864.3	400.1	656.2	650.9	240.1		
Construct APM Track	Concrete Pump	Cement & Mortar Mixers	32.4	15.0	24.6	24.4	9.0		
Construct APM Track	Concrete Truck	Off-highway Trucks	64.8	30.0	49.2	48.8	18.0		
Construct APM Track	Fork Truck	Rough Terrain Forklifts	216.3	100.1	164.2	162.9	60.1		
Construct APM Track	Tool Truck	Off-highway Trucks	32.4	15.0	24.6	24.4	9.0		
Construct APM Track	Tractor Trailer- Steel Deliveries	Tractors/Loaders/Backhoes	107.7	49.9	81.8	81.1	29.9		
Construct APM Track	Trowel Machine	Other Construction Equipment	32.4	15.0	24.6	24.4	9.0		
Construct Hotel & Com. Center	90 Ton Crane	Cranes					648.0	648.0	648.0
Construct Hotel & Com. Center	Backhoe	Tractors/Loaders/Backhoes					1296.0	1296.0	1296.0
Construct Hotel & Com. Center	Concrete Pump	Cement & Mortar Mixers					648.0	648.0	648.0

Project Component	Ricondo Equipment	MOVES Equipment	2026	2027	2028	2029	2030	2031	2032
Construct Hotel & Com. Center	Concrete Ready Mix Trucks	Off-highway Trucks					972.0	972.0	972.0
Construct Hotel & Com. Center	Concrete Truck	Off-highway Trucks					162.0	162.0	162.0
Construct Hotel & Com. Center	Excavator	Excavators					432.0	432.0	432.0
Construct Hotel & Com. Center	Fork Truck	Rough Terrain Forklifts					9612.0	9612.0	9612.0
Construct Hotel & Com. Center	Generator	Other Construction Equipment					216.0	216.0	216.0
Construct Hotel & Com. Center	Grout Mixer	Cement & Mortar Mixers					1134.0	1134.0	1134.0
Construct Hotel & Com. Center	Grout Wheel Truck	Off-highway Trucks					432.0	432.0	432.0
Construct Hotel & Com. Center	High Lift	Other Construction Equipment					2592.0	2592.0	2592.0
Construct Hotel & Com. Center	Man Lift	Other Construction Equipment					13284.0	13284.0	13284.0
Construct Hotel & Com. Center	Material Deliveries	Off-highway Trucks					162.0	162.0	162.0
Construct Hotel & Com. Center	Survey Crew Trucks	Off-highway Trucks					27.0	27.0	27.0
Construct Hotel & Com. Center	Tool Truck	Off-highway Trucks					8370.0	8370.0	8370.0
Construct Hotel & Com. Center	Tractor Trailer- Material Delivery	Tractors/Loaders/Backhoes					7344.0	7344.0	7344.0
Construct Hotel & Com. Center	Tractor Trailer- Steel Deliveries	Tractors/Loaders/Backhoes					972.0	972.0	972.0
Construct Hotel & Com. Center	Tractor Trailers Temp Fac.	Tractors/Loaders/Backhoes					10.8	10.8	10.8
Construct Hotel & Com. Center	Trowel Machine	Other Construction Equipment					108.0	108.0	108.0
Construct Hotel & Com. Center	Truck Tower (Mantiwoc type)	Off-highway Trucks					2484.0	2484.0	2484.0
Construct IMC	40 Ton Rough Terrain	Crawler Tractor/Dozers	1206.0	1072.0	804.0				
Construct IMC	40 Ton Rough Terrain Crane	Cranes	900.0	800.0	600.0				
Construct IMC	90 Ton Crane	Cranes	3600.0	3200.0	2400.0				
Construct IMC	Asphalt Paver	Pavers	594.0	528.0	396.0				
Construct IMC	Backhoe	Tractors/Loaders/Backhoes	3006.0	2672.0	2004.0				
Construct IMC	Caisson Drilling Rig	Bore/Drill Rigs	900.0	800.0	600.0				
Construct IMC	Concrete Boom Pump	Cement & Mortar Mixers	2700.0	2400.0	1800.0				
Construct IMC	Concrete Pump	Cement & Mortar Mixers	675.0	600.0	450.0				

Project Component	Ricondo Equipment	MOVES Equipment	2026	2027	2028	2029	2030	2031	2032
Construct IMC	Concrete Ready Mix Trucks	Off-highway Trucks	4950.0	4400.0	3300.0				
Construct IMC	Excavator	Excavators	1206.0	1072.0	804.0				
Construct IMC	Fork Truck	Rough Terrain Forklifts	4212.0	3744.0	2808.0				
Construct IMC	Forklift	Rough Terrain Forklifts	1800.0	1600.0	1200.0				
Construct IMC	Front Loader	Rubber Tire Loaders	2088.0	1856.0	1392.0				
Construct IMC	Front Loader for Subgrade Materials	Rubber Tire Loaders	594.0	528.0	396.0				
Construct IMC	High Lift	Other Construction Equipment	3006.0	2672.0	2004.0				
Construct IMC	Survey Crew Trucks	Off-highway Trucks	72.0	64.0	48.0				
Construct IMC	Ten Wheelers- Material Delivery	Off-highway Trucks	450.0	400.0	300.0				
Construct IMC	Tool Truck	Off-highway Trucks	1962.0	1744.0	1308.0				
Construct IMC	Tractor Trailer with Boom Hoist- Curbs Del & Place	Tractors/Loaders/Backhoes	306.0	272.0	204.0				
Construct IMC	Tractor Trailer- Material Delivery	Tractors/Loaders/Backhoes	3294.0	2928.0	2196.0				
Construct IMC	Tractor Trailer- Steel Deliveries	Tractors/Loaders/Backhoes	1800.0	1600.0	1200.0				
Construct IMC	Tractor Trailer- Stone Delivery	Tractors/Loaders/Backhoes	1494.0	1328.0	996.0				
Construct IMC	Tractor Trailers Temp Fac.	Tractors/Loaders/Backhoes	36.0	32.0	24.0				
Construct IMC	Trencher	Trenchers	900.0	800.0	600.0				
Construct IMC	Trencher for U/G Piping	Trenchers	1494.0	1328.0	996.0				
Construct IMC	Trowel Machines (4) machines	Other Construction Equipment	1800.0	1600.0	1200.0				
Construct IMC	Truck for Topsoil & Seed Del&Spread	Cranes	306.0	272.0	204.0				
Construct IMC Roadways	Air Compressor	Other Construction Equipment	53.3	53.3	53.3				
Construct IMC Roadways	Concrete Saws	Concrete/Industrial Saws	53.3	53.3	53.3				
Construct IMC Roadways	Concrete Truck	Off-highway Trucks	516.4	516.4	516.4				
Construct IMC Roadways	Curb/Gutter Paver	Pavers	230.4	230.4	230.4				
Construct IMC Roadways	Dozer	Crawler Tractor/Dozers	471.0	471.0	471.0				
Construct IMC Roadways	Dump Truck	Dumpers/Tenders	746.6	746.6	746.6				

Project Component	Ricondo Equipment	MOVES Equipment	2026	2027	2028	2029	2030	2031	2032
Construct IMC Roadways	Dump Truck (12 cy)	Dumpers/Tenders	503.2	503.2	503.2				
Construct IMC Roadways	Excavator	Excavators	237.9	237.9	237.9				
Construct IMC Roadways	Flatbed Truck	Dumpers/Tenders	329.1	329.1	329.1				
Construct IMC Roadways	Grader	Graders	22.4	22.4	22.4				
Construct IMC Roadways	Hydroseeder	Other Construction Equipment	20.2	20.2	20.2				
Construct IMC Roadways	Loader	Rubber Tire Loaders	440.8	440.8	440.8				
Construct IMC Roadways	Off-Road Truck	Off-highway Trucks	20.2	20.2	20.2				
Construct IMC Roadways	Other General Equipment	Other Construction Equipment	1381.3	1381.3	1381.3				
Construct IMC Roadways	Pickup Truck	Off-highway Trucks	1678.5	1678.5	1678.5				
Construct IMC Roadways	Pumps	Other Construction Equipment	18.4	18.4	18.4				
Construct IMC Roadways	Roller	Rollers	334.1	334.1	334.1				
Construct IMC Roadways	Rubber Tired Loader	Rubber Tire Loaders	53.3	53.3	53.3				
Construct IMC Roadways	Scraper	Scrapers	66.6	66.6	66.6				
Construct IMC Roadways	Skid Steer Loader	Skid Steer Loaders	409.6	409.6	409.6				
Construct IMC Roadways	Slip Form Paver	Pavers	53.3	53.3	53.3				
Construct IMC Roadways	Surfacing Equipment (Grooving)	Surfacing Equipment	53.3	53.3	53.3				
Construct IMC Roadways	Tractors/Loader/Backhoe	Tractors/Loaders/Backhoes	530.6	530.6	530.6				
Construct IMC Roadways	Water Truck	Off-highway Trucks	2400.0	2400.0	2400.0				
Construct Supp. Curb Areas	Air Compressor	Other Construction Equipment				4.4			
Construct Supp. Curb Areas	Concrete Saws	Concrete/Industrial Saws				4.4			
Construct Supp. Curb Areas	Concrete Truck	Off-highway Trucks				61.2			
Construct Supp. Curb Areas	Curb/Gutter Paver	Pavers				12.0			
Construct Supp. Curb Areas	Dozer	Crawler Tractor/Dozers				43.9			
Construct Supp. Curb Areas	Dump Truck	Dumpers/Tenders				108.0			
Construct Supp. Curb Areas	Dump Truck (12 cy)	Dumpers/Tenders				41.9			

Project Component	Ricondo Equipment	MOVES Equipment	2026	2027	2028	2029	2030	2031	2032
Construct Supp. Curb Areas	Excavator	Excavators				24.0			
Construct Supp. Curb Areas	Flatbed Truck	Dumpers/Tenders				2.8			
Construct Supp. Curb Areas	Grader	Graders				2.0			
Construct Supp. Curb Areas	Hydroseeder	Other Construction Equipment				1.8			
Construct Supp. Curb Areas	Loader	Rubber Tire Loaders				52.9			
Construct Supp. Curb Areas	Off-Road Truck	Off-highway Trucks				1.8			
Construct Supp. Curb Areas	Other General Equipment	Other Construction Equipment				104.8			
Construct Supp. Curb Areas	Pickup Truck	Off-highway Trucks				154.0			
Construct Supp. Curb Areas	Pumps	Other Construction Equipment				1.6			
Construct Supp. Curb Areas	Roller	Rollers				32.1			
Construct Supp. Curb Areas	Rubber Tired Loader	Rubber Tire Loaders				4.4			
Construct Supp. Curb Areas	Scraper	Scrapers				5.6			
Construct Supp. Curb Areas	Skid Steer Loader	Skid Steer Loaders				27.5			
Construct Supp. Curb Areas	Slip Form Paver	Pavers				4.4			
Construct Supp. Curb Areas	Surfacing Equipment (Grooving)	Surfacing Equipment				4.4			
Construct Supp. Curb Areas	Tractors/Loader/Backhoe	Tractors/Loaders/Backhoes				85.6			
Construct Supp. Curb Areas	Vibratory Compactor	Plate Compactors				24.0			
Construct Supp. Roadway	Air Compressor	Other Construction Equipment				38.9			
Construct Supp. Roadway	Concrete Saws	Concrete/Industrial Saws				38.9			
Construct Supp. Roadway	Concrete Truck	Off-highway Trucks				376.5			
Construct Supp. Roadway	Curb/Gutter Paver	Pavers				168.0			
Construct Supp. Roadway	Dozer	Crawler Tractor/Dozers				343.6			
Construct Supp. Roadway	Dump Truck	Dumpers/Tenders				544.6			
Construct Supp. Roadway	Dump Truck (12 cy)	Dumpers/Tenders				366.9			
Construct Supp. Roadway	Excavator	Excavators				173.6			

Project Component	Ricondo Equipment	MOVES Equipment	2026	2027	2028	2029	2030	2031	2032
Construct Supp. Roadway	Flatbed Truck	Dumpers/Tenders				240.0			
Construct Supp. Roadway	Grader	Graders				16.4			
Construct Supp. Roadway	Hydroseeder	Other Construction Equipment				14.7			
Construct Supp. Roadway	Loader	Rubber Tire Loaders				321.6			
Construct Supp. Roadway	Off-Road Truck	Off-highway Trucks				14.7			
Construct Supp. Roadway	Other General Equipment	Other Construction Equipment				1007.5			
Construct Supp. Roadway	Pickup Truck	Off-highway Trucks				1224.5			
Construct Supp. Roadway	Pumps	Other Construction Equipment				13.6			
Construct Supp. Roadway	Roller	Rollers				243.7			
Construct Supp. Roadway	Rubber Tired Loader	Rubber Tire Loaders				38.9			
Construct Supp. Roadway	Scraper	Scrapers				48.6			
Construct Supp. Roadway	Skid Steer Loader	Skid Steer Loaders				298.7			
Construct Supp. Roadway	Slip Form Paver	Pavers				38.9			
Construct Supp. Roadway	Surfacing Equipment (Grooving)	Surfacing Equipment				38.9			
Construct Supp. Roadway	Tractors/Loader/Backhoe	Tractors/Loaders/Backhoes				387.1			
Construct Supp. Roadway	Water Truck	Off-highway Trucks				1920.0			
Demo Palm Garage	Bob Cat	Skid Steer Loaders			2160.0	3840.0			
Demo Palm Garage	Dump Truck	Dumpers/Tenders			2160.0	3840.0			
Demo Palm Garage	Excavator with Bucket	Excavators			1080.0	1920.0			
Demo Palm Garage	Generator Sets	Other Construction Equipment			1080.0	1920.0			
Demo Palm Garage	Pickup Truck	Off-highway Trucks			1260.0	2240.0			
Demo Roadways for Curbside Exp.	Excavator with Bucket	Excavators				53.3			
Demo Roadways for Curbside Exp.	Excavator with Hoe Ram	Excavators				53.3			

Project Component	Ricondo Equipment	MOVES Equipment	2026	2027	2028	2029	2030	2031	2032
Demo Roadways for Curbside Exp.	Pickup Truck	Off-highway Trucks				106.7			
Demo Roadways for Cyp G. Exp.	Excavator with Bucket	Excavators					50.0		
Demo Roadways for Cyp G. Exp.	Excavator with Hoe Ram	Excavators					50.0		
Demo Roadways for Cyp G. Exp.	Pickup Truck	Off-highway Trucks					100.0		
Expand Cypress Garage	40 Ton Rough Terrain	Crawler Tractor/Dozers					140.7	201.0	201.0
Expand Cypress Garage	40 Ton Rough Terrain Crane	Cranes					105.0	150.0	150.0
Expand Cypress Garage	90 Ton Crane	Cranes					420.0	600.0	600.0
Expand Cypress Garage	Asphalt Paver	Pavers					69.3	99.0	99.0
Expand Cypress Garage	Backhoe	Tractors/Loaders/Backhoes					350.7	501.0	501.0
Expand Cypress Garage	Caisson Drilling Rig	Bore/Drill Rigs					105.0	150.0	150.0
Expand Cypress Garage	Concrete Boom Pump	Cement & Mortar Mixers					315.0	450.0	450.0
Expand Cypress Garage	Concrete Pump	Cement & Mortar Mixers					78.8	112.5	112.5
Expand Cypress Garage	Concrete Ready Mix Trucks	Off-highway Trucks					577.5	825.0	825.0
Expand Cypress Garage	Excavator	Excavators					140.7	201.0	201.0
Expand Cypress Garage	Fork Truck	Rough Terrain Forklifts					491.4	702.0	702.0
Expand Cypress Garage	Forklift	Rough Terrain Forklifts					210.0	300.0	300.0
Expand Cypress Garage	Front Loader	Rubber Tire Loaders					243.6	348.0	348.0
Expand Cypress Garage	Front Loader for Subgrade Materials	Rubber Tire Loaders					69.3	99.0	99.0
Expand Cypress Garage	High Lift	Other Construction Equipment					350.7	501.0	501.0
Expand Cypress Garage	Survey Crew Trucks	Off-highway Trucks					8.4	12.0	12.0
Expand Cypress Garage	Ten Wheelers- Material Delivery	Off-highway Trucks					52.5	75.0	75.0
Expand Cypress Garage	Tool Truck	Off-highway Trucks					228.9	327.0	327.0
Expand Cypress Garage	Tractor Trailer with Boom Hoist- Curbs Del & Place	Tractors/Loaders/Backhoes					35.7	51.0	51.0
Expand Cypress Garage	Tractor Trailer- Material Delivery	Tractors/Loaders/Backhoes					384.3	549.0	549.0

Project Component	Ricondo Equipment	MOVES Equipment	2026	2027	2028	2029	2030	2031	2032
Expand Cypress Garage	Tractor Trailer- Steel Deliveries	Tractors/Loaders/Backhoes					210.0	300.0	300.0
Expand Cypress Garage	Tractor Trailer- Stone Delivery	Tractors/Loaders/Backhoes					174.3	249.0	249.0
Expand Cypress Garage	Tractor Trailers Temp Fac.	Tractors/Loaders/Backhoes					4.2	6.0	6.0
Expand Cypress Garage	Trencher	Trenchers					105.0	150.0	150.0
Expand Cypress Garage	Trencher for U/G Piping	Trenchers					174.3	249.0	249.0
Expand Cypress Garage	Trowel Machines (4) machines	Other Construction Equipment					210.0	300.0	300.0
Expand Cypress Garage	Truck for Topsoil & Seed Del&Spread	Cranes					35.7	51.0	51.0
Interior Ren. for APM Stations	Fork Truck	Rough Terrain Forklifts	777.6			576.0			
Interior Ren. for APM Stations	Man Lift	Other Construction Equipment	777.6			576.0			
Interior Ren. for APM Stations	Tool Truck	Off-highway Trucks	97.2			72.0			
Interior Ren. for APM Stations	Tractor Trailer- Material Delivery	Tractors/Loaders/Backhoes	97.2			72.0			
Pile Driving for APM	Dozer	Crawler Tractor/Dozers	15.2	15.2	15.2	15.2	15.2		
Pile Driving for APM	Dump Truck (12 cy)	Dumpers/Tenders	22.4	22.4	22.4	22.4	22.4		
Pile Driving for APM	Excavator	Excavators	4.5	4.5	4.5	4.5	4.5		
Pile Driving for APM	Pickup Truck	Off-highway Trucks	11.9	11.9	11.9	11.9	11.9		
Pile Driving for APM	Roller	Rollers	7.9	7.9	7.9	7.9	7.9		
Pile Driving for APM	Scraper	Scrapers	5.6	5.6	5.6	5.6	5.6		
Reconstruct Palm Garage	40 Ton Rough Terrain	Crawler Tractor/Dozers					271.4	271.4	271.4
Reconstruct Palm Garage	40 Ton Rough Terrain Crane	Cranes					202.5	202.5	202.5
Reconstruct Palm Garage	90 Ton Crane	Cranes					810.0	810.0	810.0
Reconstruct Palm Garage	Asphalt Paver	Pavers					133.7	133.7	133.7
Reconstruct Palm Garage	Backhoe	Tractors/Loaders/Backhoes					676.4	676.4	676.4
Reconstruct Palm Garage	Caisson Drilling Rig	Bore/Drill Rigs					202.5	202.5	202.5
Reconstruct Palm Garage	Concrete Boom Pump	Cement & Mortar Mixers					607.5	607.5	607.5
Reconstruct Palm Garage	Concrete Pump	Cement & Mortar Mixers					151.9	151.9	151.9
Reconstruct Palm Garage	Concrete Ready Mix Trucks	Off-highway Trucks					1113.8	1113.8	1113.8

Project Component	Ricondo Equipment	MOVES Equipment	2026	2027	2028	2029	2030	2031	2032
Reconstruct Palm Garage	Excavator	Excavators					271.4	271.4	271.4
Reconstruct Palm Garage	Fork Truck	Rough Terrain Forklifts					947.7	947.7	947.7
Reconstruct Palm Garage	Forklift	Rough Terrain Forklifts					405.0	405.0	405.0
Reconstruct Palm Garage	Front Loader	Rubber Tire Loaders					469.8	469.8	469.8
Reconstruct Palm Garage	Front Loader for Subgrade Materials	Rubber Tire Loaders					133.7	133.7	133.7
Reconstruct Palm Garage	High Lift	Other Construction Equipment					676.4	676.4	676.4
Reconstruct Palm Garage	Survey Crew Trucks	Off-highway Trucks					16.2	16.2	16.2
Reconstruct Palm Garage	Ten Wheelers- Material Delivery	Off-highway Trucks					101.3	101.3	101.3
Reconstruct Palm Garage	Tool Truck	Off-highway Trucks					441.5	441.5	441.5
Reconstruct Palm Garage	Tractor Trailer with Boom Hoist- Curbs Del & Place	Tractors/Loaders/Backhoes					68.9	68.9	68.9
Reconstruct Palm Garage	Tractor Trailer- Material Delivery	Tractors/Loaders/Backhoes					741.2	741.2	741.2
Reconstruct Palm Garage	Tractor Trailer- Steel Deliveries	Tractors/Loaders/Backhoes					405.0	405.0	405.0
Reconstruct Palm Garage	Tractor Trailer- Stone Delivery	Tractors/Loaders/Backhoes					336.2	336.2	336.2
Reconstruct Palm Garage	Tractor Trailers Temp Fac.	Tractors/Loaders/Backhoes					8.1	8.1	8.1
Reconstruct Palm Garage	Trencher	Trenchers					202.5	202.5	202.5
Reconstruct Palm Garage	Trencher for U/G Piping	Trenchers					336.2	336.2	336.2
Reconstruct Palm Garage	Trowel Machines (4) machines	Other Construction Equipment					405.0	405.0	405.0
Reconstruct Palm Garage	Truck for Topsoil & Seed Del&Spread	Cranes					68.9	68.9	68.9
Site Prep for APM	Backhoe	Tractors/Loaders/Backhoes	2040.0	384.0	1560.0	1200.0	720.0		
Site Prep for APM	Bob Cat	Skid Steer Loaders	408.0	76.8	312.0	240.0	144.0		
Site Prep for APM	Bulldozer	Crawler Tractor/Dozers	680.0	128.0	520.0	400.0	240.0		
Site Prep for APM	Chain Saws	Other Construction Equipment	680.0	128.0	520.0	400.0	240.0		
Site Prep for APM	Compacting Equipment	Rollers	408.0	76.8	312.0	240.0	144.0		
Site Prep for APM	Concrete Ready Mix Trucks	Off-highway Trucks	408.0	76.8	312.0	240.0	144.0		
Site Prep for APM	Flat Bed or Dump Trucks	Dumpers/Tenders	1360.0	256.0	1040.0	800.0	480.0		

Project Component	Ricondo Equipment	MOVES Equipment	2026	2027	2028	2029	2030	2031	2032
Site Prep for APM	Fork Truck	Rough Terrain Forklifts	1020.0	192.0	780.0	600.0	360.0		
Site Prep for APM	Forktruck (Hoist)	Rough Terrain Forklifts	1360.0	256.0	1040.0	800.0	480.0		
Site Prep for APM	Front Loader	Rubber Tire Loaders	680.0	128.0	520.0	400.0	240.0		
Site Prep for APM	Grub the site down 2'-0	Other Construction Equipment	680.0	128.0	520.0	400.0	240.0		
Site Prep for APM	Log Chipper	Other Construction Equipment	680.0	128.0	520.0	400.0	240.0		
Site Prep for APM	Mulcher	Other Construction Equipment	680.0	128.0	520.0	400.0	240.0		
Site Prep for APM	Roller	Rollers	680.0	128.0	520.0	400.0	240.0		
Site Prep for APM	Seed Truck Spreader	Other Construction Equipment	272.0	51.2	208.0	160.0	96.0		
Site Prep for APM	Small Dozer	Crawler Tractor/Dozers	408.0	76.8	312.0	240.0	144.0		
Site Prep for APM	Survey Crew Trucks	Off-highway Trucks	170.0	32.0	130.0	100.0	60.0		
Site Prep for APM	Ten Wheelers	Off-highway Trucks	680.0	128.0	520.0	400.0	240.0		
Site Prep for APM	Tractor	Tractors/Loaders/Backhoes	1360.0	256.0	1040.0	800.0	480.0		
Site Prep for APM	Tractor Trailer with Boom Hoist-Delivery	Tractors/Loaders/Backhoes	408.0	76.8	312.0	240.0	144.0		
Site Prep for APM	Tractor Trailer- Material Delivery	Tractors/Loaders/Backhoes	1870.0	352.0	1430.0	1100.0	660.0		
Site Prep for APM	Tractor Trailers Temp Fac.	Tractors/Loaders/Backhoes	68.0	12.8	52.0	40.0	24.0		
Site Prep for Cyp. Garage Exp.	Backhoe	Tractors/Loaders/Backhoes					1200.0		
Site Prep for Cyp. Garage Exp.	Bob Cat	Skid Steer Loaders					240.0		
Site Prep for Cyp. Garage Exp.	Bulldozer	Crawler Tractor/Dozers					400.0		
Site Prep for Cyp. Garage Exp.	Chain Saws	Other Construction Equipment					400.0		
Site Prep for Cyp. Garage Exp.	Compacting Equipment	Rollers					240.0		
Site Prep for Cyp. Garage Exp.	Concrete Ready Mix Trucks	Off-highway Trucks					240.0		
Site Prep for Cyp. Garage Exp.	Flat Bed or Dump Trucks	Dumpers/Tenders					800.0		
Site Prep for Cyp. Garage Exp.	Fork Truck	Rough Terrain Forklifts					600.0		
Site Prep for Cyp. Garage Exp.	Forktruck (Hoist)	Rough Terrain Forklifts					800.0		

Project Component	Ricondo Equipment	MOVES Equipment	2026	2027	2028	2029	2030	2031	2032
Site Prep for Cyp. Garage Exp.	Front Loader	Rubber Tire Loaders					400.0		
Site Prep for Cyp. Garage Exp.	Grub the site down 2'-0	Other Construction Equipment					400.0		
Site Prep for Cyp. Garage Exp.	Log Chipper	Other Construction Equipment					400.0		
Site Prep for Cyp. Garage Exp.	Mulcher	Other Construction Equipment					400.0		
Site Prep for Cyp. Garage Exp.	Roller	Rollers					400.0		
Site Prep for Cyp. Garage Exp.	Seed Truck Spreader	Other Construction Equipment					160.0		
Site Prep for Cyp. Garage Exp.	Small Dozer	Crawler Tractor/Dozers					240.0		
Site Prep for Cyp. Garage Exp.	Survey Crew Trucks	Off-highway Trucks					100.0		
Site Prep for Cyp. Garage Exp.	Ten Wheelers	Off-highway Trucks					400.0		
Site Prep for Cyp. Garage Exp.	Tractor	Tractors/Loaders/Backhoes					800.0		
Site Prep for Cyp. Garage Exp.	Tractor Trailer with Boom Hoist-Delivery	Tractors/Loaders/Backhoes					240.0		
Site Prep for Cyp. Garage Exp.	Tractor Trailer- Material Delivery	Tractors/Loaders/Backhoes					1100.0		
Site Prep for Cyp. Garage Exp.	Tractor Trailers Temp Fac.	Tractors/Loaders/Backhoes					40.0		
Site Prep for IMC	Backhoe	Tractors/Loaders/Backhoes	11040.0	516.0	516.0				
Site Prep for IMC	Bob Cat	Skid Steer Loaders	2208.0	103.2	103.2				
Site Prep for IMC	Bulldozer	Crawler Tractor/Dozers	3680.0	172.0	172.0				
Site Prep for IMC	Chain Saws	Other Construction Equipment	3680.0	172.0	172.0				
Site Prep for IMC	Compacting Equipment	Rollers	2208.0	103.2	103.2				
Site Prep for IMC	Concrete Ready Mix Trucks	Off-highway Trucks	2208.0	103.2	103.2				
Site Prep for IMC	Flat Bed or Dump Trucks	Dumpers/Tenders	7360.0	344.0	344.0				
Site Prep for IMC	Fork Truck	Rough Terrain Forklifts	5520.0	258.0	258.0				
Site Prep for IMC	Forktruck (Hoist)	Rough Terrain Forklifts	7360.0	344.0	344.0				
Site Prep for IMC	Front Loader	Rubber Tire Loaders	3680.0	172.0	172.0				

Project Component	Ricondo Equipment	MOVES Equipment	2026	2027	2028	2029	2030	2031	2032
Site Prep for IMC	Grub the site down 2'-0	Other Construction Equipment	3680.0	172.0	172.0				
Site Prep for IMC	Log Chipper	Other Construction Equipment	3680.0	172.0	172.0				
Site Prep for IMC	Mulcher	Other Construction Equipment	3680.0	172.0	172.0				
Site Prep for IMC	Roller	Rollers	3680.0	172.0	172.0				
Site Prep for IMC	Seed Truck Spreader	Other Construction Equipment	1472.0	68.8	68.8				
Site Prep for IMC	Small Dozer	Crawler Tractor/Dozers	2208.0	103.2	103.2				
Site Prep for IMC	Survey Crew Trucks	Off-highway Trucks	920.0	43.0	43.0				
Site Prep for IMC	Ten Wheelers	Off-highway Trucks	3680.0	172.0	172.0				
Site Prep for IMC	Tractor	Tractors/Loaders/Backhoes	7360.0	344.0	344.0				
Site Prep for IMC	Tractor Trailer with Boom Hoist-Delivery	Tractors/Loaders/Backhoes	2208.0	103.2	103.2				
Site Prep for IMC	Tractor Trailer- Material Delivery	Tractors/Loaders/Backhoes	10120.0	473.0	473.0				
Site Prep for IMC	Tractor Trailers Temp Fac.	Tractors/Loaders/Backhoes	368.0	17.2	17.2				

TABLE A-2
PROJECT ONROAD EQUIPMENT ACTIVITY (MI)

Project Component	Ricondo Equipment	MOVES Equipment	Fuel Type	2026	2027	2028	2029	2030	2031	2032
Construct APM Bridges & V Circ.	Cement Mixer	Single Unit Short-Haul Truck	Diesel	3,677	2,151	1,179	4,163	1,249		
Construct APM Bridges & V Circ.	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel	1,961	1,147	629	2,220	666		
Construct APM Bridges & V Circ.	Passenger Car	Passenger Car	Gasoline	9,353	5,612	2,828	11,223	3,741		
Construct APM Bridges & V Circ.	Tractor Trailer	Combination Short-Haul Truck	Diesel	84	49	27	95	29		
Construct APM Maint. Facility	Cement Mixer	Single Unit Short-Haul Truck	Diesel					12,028		
Construct APM Maint. Facility	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel					6,412		
Construct APM Maint. Facility	Passenger Car	Passenger Car	Gasoline					9,675		
Construct APM Maint. Facility	Tractor Trailer	Combination Short-Haul Truck	Diesel					832		
Construct APM Stations	Cement Mixer	Single Unit Short-Haul Truck	Diesel	1,133	1,133	1,133	1,133	1,133		
Construct APM Stations	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel	604	604	604	604	604		
Construct APM Stations	Passenger Car	Passenger Car	Gasoline	3,870	3,870	3,870	3,870	3,870		
Construct APM Stations	Tractor Trailer	Combination Short-Haul Truck	Diesel	118	118	118	118	118		
Construct APM Substations	Cement Mixer	Single Unit Short-Haul Truck	Diesel			694		694		
Construct APM Substations	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel			370		370		
Construct APM Substations	Passenger Car	Passenger Car	Gasoline			3,225		3,225		
Construct APM Substations	Tractor Trailer	Combination Short-Haul Truck	Diesel			48		48		
Construct APM Track	Cement Mixer	Single Unit Short-Haul Truck	Diesel	18,733	8,673	14,223	14,223	5,203		
Construct APM Track	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel	9,990	4,625	7,585	7,585	2,775		
Construct APM Track	Passenger Car	Passenger Car	Gasoline	2,709	1,134	2,258	2,258	683		
Construct Hotel & Com. Center	Cement Mixer	Single Unit Short-Haul Truck	Diesel					62,438	62,438	62,438
Construct Hotel & Com. Center	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel					33,299	33,299	33,299
Construct Hotel & Com. Center	Passenger Car	Passenger Car	Gasoline					13,932	13,932	13,932
Construct Hotel & Com. Center	Tractor Trailer	Combination Short-Haul Truck	Diesel					6,480	6,480	6,480
Construct IMC	Cement Mixer	Single Unit Short-Haul Truck	Diesel	416,250	371,850	277,500				
Construct IMC	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel	222,000	198,320	148,000				
Construct IMC	Passenger Car	Passenger Car	Gasoline	1,316	12,036	10,965				

Project Component	Ricondo Equipment	MOVES Equipment	Fuel Type	2026	2027	2028	2029	2030	2031	2032
Construct IMC	Tractor Trailer	Combination Short-Haul Truck	Diesel	14,940	13,346	9,960				
Construct IMC Roadways	Cement Mixer	Single Unit Short-Haul Truck	Diesel	39,313	28,444	33,300				
Construct IMC Roadways	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel	20,967	15,170	17,760				
Construct IMC Roadways	Passenger Car	Passenger Car	Gasoline	27,477	20,555	22,898				
Construct Supp. Curb Areas	Cement Mixer	Single Unit Short-Haul Truck	Diesel				2,775			
Construct Supp. Curb Areas	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel				1,480			
Construct Supp. Curb Areas	Passenger Car	Passenger Car	Gasoline				4,580			
Construct Supp. Roadway	Cement Mixer	Single Unit Short-Haul Truck	Diesel				24,281			
Construct Supp. Roadway	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel				12,950			
Construct Supp. Roadway	Passenger Car	Passenger Car	Gasoline				17,286			
Demo Palm Garage	Dump Truck	Single Unit Short-Haul Truck	Diesel			5,556	9,877			
Demo Palm Garage	Passenger Car	Passenger Car	Gasoline			1,125	1,935			
Demo Roadways for Curbside Exp.	Dump Truck	Single Unit Short-Haul Truck	Diesel				2,469			
Demo Roadways for Curbside Exp.	Passenger Car	Passenger Car	Gasoline				293			
Demo Roadways for Cyp G. Exp.	Dump Truck	Single Unit Short-Haul Truck	Diesel					2,315		
Demo Roadways for Cyp G. Exp.	Passenger Car	Passenger Car	Gasoline					194		
Expand Cypress Garage	Cement Mixer	Single Unit Short-Haul Truck	Diesel					48,563	69,375	69,375
Expand Cypress Garage	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel					25,900	37,000	37,000
Expand Cypress Garage	Passenger Car	Passenger Car	Gasoline					9,843	13,158	13,158
Expand Cypress Garage	Tractor Trailer	Combination Short-Haul Truck	Diesel					1,743	2,490	2,490
Interior Ren. for APM Stations	Cement Mixer	Single Unit Short-Haul Truck	Diesel	1,874			1,388			
Interior Ren. for APM Stations	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel	999			740			
Interior Ren. for APM Stations	Passenger Car	Passenger Car	Gasoline	1,032			774			
Interior Ren. for APM Stations	Tractor Trailer	Combination Short-Haul Truck	Diesel	972			720			
Pile Driving for APM	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel	4,176	789	3,197	2,452	1,492		
Pile Driving for APM	Passenger Car	Passenger Car	Gasoline	710	363	710	710	363		
Reconstruct Palm Garage	Cement Mixer	Single Unit Short-Haul Truck	Diesel					93,656	93,656	93,656

Project Component	Ricondo Equipment	MOVES Equipment	Fuel Type	2026	2027	2028	2029	2030	2031	2032
Reconstruct Palm Garage	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel					49,950	49,950	49,950
Reconstruct Palm Garage	Passenger Car	Passenger Car	Gasoline					13,158	13,158	13,158
Reconstruct Palm Garage	Tractor Trailer	Combination Short-Haul Truck	Diesel					3,362	3,362	3,362
Site Prep for APM	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel	20,961	3,946	16,029	12,330	7,398		
Site Prep for APM	Passenger Car	Passenger Car	Gasoline	8,901	1,484	6,659	5,175	3,726		
Site Prep for APM	Tractor Trailer	Combination Short-Haul Truck	Diesel	13,600	2,560	10,400	8,000	4,800		
Site Prep for Cyp. Garage Exp.	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel					12,330		
Site Prep for Cyp. Garage Exp.	Passenger Car	Passenger Car	Gasoline					2,967		
Site Prep for Cyp. Garage Exp.	Tractor Trailer	Combination Short-Haul Truck	Diesel					8,000		
Site Prep for IMC	Dump Truck Subbase Material	Single Unit Short-Haul Truck	Diesel	113,436	5,302	5,302				
Site Prep for IMC	Passenger Car	Passenger Car	Gasoline	4,451	759	759				
Site Prep for IMC	Tractor Trailer	Combination Short-Haul Truck	Diesel	73,600	3,440	3,440				

TABLE A-3
EPA MOVES NONROAD EMISSION FACTORS FOR BROWARD COUNTY (G/HR)

Equipment	Year	CO	VOC	NOx	SO ₂	PM ₁₀	PM ₂₅	CO ₂	CH ₄	N ₂ O
Bore/Drill Rigs	2026	42.38	10.95	169.76	0.12	7.78	7.55	40761.05	0.48	1.88
Bore/Drill Rigs	2027	36.49	9.35	149.72	0.12	6.64	6.44	40765.66	0.41	1.88
Bore/Drill Rigs	2028	31.32	8.04	131.87	0.12	5.73	5.56	40769.30	0.35	1.88
Bore/Drill Rigs	2029	27.14	7.02	117.50	0.12	5.01	4.86	40772.25	0.31	1.88
Bore/Drill Rigs	2030	23.91	6.24	106.84	0.11	4.43	4.30	40774.54	0.28	1.88
Bore/Drill Rigs	2031	21.53	5.65	99.25	0.11	3.99	3.87	40776.22	0.27	1.88
Bore/Drill Rigs	2032	19.75	5.21	93.70	0.11	3.67	3.56	40777.55	0.26	1.88
Cement & Mortar Mixers	2026	15.64	4.21	40.17	0.02	2.42	2.35	7509.13	0.22	0.35
Cement & Mortar Mixers	2027	14.54	3.95	37.53	0.02	2.21	2.14	7509.89	0.22	0.35
Cement & Mortar Mixers	2028	13.30	3.65	34.42	0.02	1.97	1.91	7510.77	0.21	0.35
Cement & Mortar Mixers	2029	12.17	3.38	31.68	0.02	1.77	1.71	7511.55	0.21	0.35
Cement & Mortar Mixers	2030	11.32	3.18	29.69	0.02	1.62	1.57	7512.10	0.20	0.35
Cement & Mortar Mixers	2031	10.76	3.04	28.39	0.02	1.51	1.47	7512.49	0.20	0.35
Cement & Mortar Mixers	2032	10.37	2.94	27.48	0.02	1.44	1.39	7512.78	0.20	0.35
Concrete/Industrial Saws	2026	13.19	2.48	57.95	0.05	1.73	1.68	16589.57	0.27	0.76
Concrete/Industrial Saws	2027	11.63	2.30	56.24	0.05	1.49	1.44	16590.09	0.26	0.76
Concrete/Industrial Saws	2028	10.44	2.17	54.78	0.05	1.30	1.26	16590.49	0.25	0.76
Concrete/Industrial Saws	2029	9.35	2.06	53.77	0.04	1.12	1.09	16590.78	0.24	0.76
Concrete/Industrial Saws	2030	8.30	1.96	52.77	0.04	0.96	0.93	16591.04	0.23	0.76
Concrete/Industrial Saws	2031	7.80	1.92	52.27	0.04	0.88	0.85	16591.13	0.23	0.76
Concrete/Industrial Saws	2032	7.51	1.89	51.99	0.04	0.84	0.81	16591.24	0.23	0.76
Cranes	2026	12.00	2.66	53.14	0.14	2.24	2.18	52949.48	0.21	2.44
Cranes	2027	10.37	2.34	47.25	0.14	1.96	1.90	52950.41	0.18	2.44
Cranes	2028	9.14	2.11	42.61	0.14	1.75	1.70	52951.05	0.16	2.44
Cranes	2029	8.03	1.91	38.13	0.14	1.58	1.53	52951.61	0.15	2.44
Cranes	2030	6.90	1.72	33.53	0.14	1.41	1.37	52952.15	0.12	2.44

Equipment	Year	CO	VOC	NOx	SO2	PM10	PM25	CO ₂	CH ₄	N ₂ O
Cranes	2031	5.87	1.53	29.85	0.14	1.24	1.21	52952.67	0.11	2.44
Cranes	2032	5.20	1.41	27.20	0.14	1.14	1.10	52953.03	0.09	2.44
Crawler Tractor/Dozers	2026	20.08	3.68	93.92	0.22	3.62	3.52	82752.24	0.29	3.81
Crawler Tractor/Dozers	2027	16.06	3.20	85.76	0.22	3.04	2.95	82753.56	0.24	3.81
Crawler Tractor/Dozers	2028	13.26	2.86	79.92	0.22	2.64	2.56	82754.34	0.21	3.81
Crawler Tractor/Dozers	2029	10.79	2.57	75.21	0.22	2.27	2.20	82755.39	0.18	3.81
Crawler Tractor/Dozers	2030	9.01	2.36	71.98	0.22	2.00	1.94	82755.95	0.16	3.81
Crawler Tractor/Dozers	2031	8.11	2.26	70.37	0.22	1.86	1.81	82756.25	0.15	3.81
Crawler Tractor/Dozers	2032	7.49	2.19	69.35	0.22	1.77	1.72	82756.29	0.15	3.81
Crushing/Proc. Equipment	2026	12.48	2.63	68.58	0.10	1.92	1.86	35796.86	0.26	1.65
Crushing/Proc. Equipment	2027	10.95	2.36	64.44	0.10	1.67	1.62	35797.66	0.24	1.65
Crushing/Proc. Equipment	2028	9.75	2.16	61.03	0.10	1.49	1.44	35798.25	0.23	1.65
Crushing/Proc. Equipment	2029	8.86	2.00	58.12	0.10	1.35	1.31	35798.68	0.22	1.65
Crushing/Proc. Equipment	2030	7.97	1.86	55.06	0.10	1.23	1.19	35799.11	0.20	1.65
Crushing/Proc. Equipment	2031	7.12	1.72	52.08	0.10	1.11	1.07	35799.53	0.19	1.65
Crushing/Proc. Equipment	2032	6.38	1.60	49.76	0.10	0.99	0.96	35799.84	0.18	1.65
Dumpers/Tenders	2026	16.82	4.05	23.75	0.02	2.57	2.49	4744.63	0.15	0.22
Dumpers/Tenders	2027	15.23	3.68	22.53	0.01	2.30	2.23	4745.72	0.15	0.22
Dumpers/Tenders	2028	13.61	3.29	21.18	0.01	2.02	1.96	4746.85	0.14	0.22
Dumpers/Tenders	2029	12.14	2.94	20.00	0.01	1.79	1.73	4747.85	0.13	0.22
Dumpers/Tenders	2030	10.97	2.67	19.12	0.01	1.60	1.55	4748.66	0.13	0.22
Dumpers/Tenders	2031	10.12	2.46	18.51	0.01	1.46	1.42	4749.24	0.13	0.22
Dumpers/Tenders	2032	9.52	2.31	18.08	0.01	1.36	1.32	4749.68	0.12	0.22
Excavators	2026	7.21	1.65	36.80	0.15	1.45	1.41	54730.32	0.13	2.52
Excavators	2027	6.32	1.54	34.74	0.15	1.29	1.25	54730.62	0.12	2.52
Excavators	2028	5.72	1.47	33.40	0.14	1.18	1.14	54730.89	0.11	2.52
Excavators	2029	5.32	1.42	32.59	0.14	1.10	1.07	54731.05	0.11	2.52

Equipment	Year	CO	VOC	NOx	SO2	PM10	PM25	CO ₂	CH ₄	N ₂ O
Excavators	2030	5.03	1.38	32.05	0.14	1.05	1.02	54731.20	0.10	2.52
Excavators	2031	4.84	1.36	31.67	0.14	1.02	0.99	54731.17	0.10	2.52
Excavators	2032	4.72	1.34	31.43	0.14	1.00	0.97	54731.23	0.10	2.52
Graders	2026	7.43	1.65	27.38	0.17	1.66	1.61	64847.55	0.11	2.99
Graders	2027	6.06	1.47	23.76	0.17	1.41	1.37	64848.08	0.09	2.99
Graders	2028	5.15	1.36	21.20	0.17	1.25	1.21	64848.36	0.08	2.99
Graders	2029	4.45	1.27	19.35	0.17	1.12	1.09	64848.59	0.07	2.99
Graders	2030	4.00	1.21	18.23	0.17	1.03	1.00	64848.76	0.06	2.99
Graders	2031	3.74	1.18	17.70	0.17	0.98	0.95	64848.97	0.06	2.99
Graders	2032	3.58	1.15	17.39	0.17	0.95	0.92	64848.92	0.06	2.99
Off-Highway Tractors	2026	105.06	19.71	598.47	0.63	16.52	16.02	229328.09	1.55	10.57
Off-Highway Tractors	2027	89.63	17.72	566.57	0.63	14.73	14.28	229334.30	1.39	10.57
Off-Highway Tractors	2028	74.87	15.84	539.57	0.62	12.94	12.55	229339.64	1.25	10.57
Off-Highway Tractors	2029	62.81	14.29	517.09	0.62	11.46	11.12	229343.59	1.14	10.57
Off-Highway Tractors	2030	50.44	12.76	495.89	0.61	9.89	9.59	229348.49	1.02	10.57
Off-Highway Tractors	2031	40.11	11.48	478.90	0.61	8.53	8.27	229351.67	0.92	10.57
Off-Highway Tractors	2032	35.17	10.87	470.74	0.61	7.87	7.64	229353.47	0.87	10.57
Off-highway Trucks	2026	32.15	12.58	643.54	0.66	8.75	8.48	247933.77	1.03	11.43
Off-highway Trucks	2027	28.98	12.16	638.78	0.65	8.32	8.07	247935.49	0.99	11.43
Off-highway Trucks	2028	26.73	11.87	635.54	0.65	8.01	7.77	247936.31	0.96	11.43
Off-highway Trucks	2029	25.33	11.68	633.63	0.65	7.83	7.60	247936.68	0.95	11.43
Off-highway Trucks	2030	24.47	11.58	632.45	0.65	7.73	7.49	247936.41	0.94	11.43
Off-highway Trucks	2031	23.90	11.50	631.68	0.65	7.67	7.44	247937.12	0.93	11.43
Off-highway Trucks	2032	23.70	11.48	631.40	0.65	7.66	7.43	247937.58	0.93	11.43
Other Construction Equipment	2026	65.33	9.79	175.40	0.29	9.39	9.11	104211.91	0.58	4.80
Other Construction Equipment	2027	57.78	8.72	157.33	0.29	8.39	8.13	104214.75	0.52	4.80
Other Construction Equipment	2028	51.11	7.77	141.64	0.29	7.50	7.27	104217.65	0.48	4.80

Equipment	Year	CO	VOC	NOx	SO2	PM10	PM25	CO ₂	CH ₄	N ₂ O
Other Construction Equipment	2029	45.19	6.94	128.27	0.29	6.70	6.50	104220.23	0.44	4.80
Other Construction Equipment	2030	39.55	6.18	115.59	0.28	5.95	5.77	104222.11	0.40	4.80
Other Construction Equipment	2031	35.01	5.59	105.19	0.28	5.37	5.21	104223.77	0.37	4.80
Other Construction Equipment	2032	31.33	5.12	96.59	0.28	4.92	4.77	104225.67	0.35	4.80
Pavers	2026	9.48	1.81	51.23	0.11	1.65	1.60	40390.80	0.19	1.86
Pavers	2027	8.21	1.65	48.55	0.11	1.41	1.37	40391.32	0.18	1.86
Pavers	2028	7.21	1.54	46.38	0.11	1.23	1.20	40391.57	0.17	1.86
Pavers	2029	6.40	1.44	44.61	0.11	1.09	1.06	40391.92	0.16	1.86
Pavers	2030	5.78	1.37	43.18	0.11	0.98	0.95	40392.05	0.15	1.86
Pavers	2031	5.26	1.31	42.03	0.11	0.89	0.86	40392.24	0.14	1.86
Pavers	2032	4.89	1.26	41.18	0.11	0.83	0.80	40392.29	0.14	1.86
Paving Equipment	2026	13.76	2.80	45.95	0.06	2.20	2.13	22837.42	0.26	1.05
Paving Equipment	2027	12.20	2.57	42.04	0.06	1.91	1.86	22838.03	0.24	1.05
Paving Equipment	2028	10.73	2.37	39.42	0.06	1.63	1.58	22838.68	0.23	1.05
Paving Equipment	2029	9.43	2.20	37.26	0.06	1.38	1.33	22839.07	0.21	1.05
Paving Equipment	2030	8.76	2.12	36.05	0.06	1.25	1.21	22839.27	0.21	1.05
Paving Equipment	2031	8.33	2.07	35.26	0.06	1.16	1.13	22839.38	0.20	1.05
Paving Equipment	2032	8.04	2.03	34.68	0.06	1.11	1.07	22839.51	0.20	1.05
Plate Compactors	2026	7.03	2.19	13.15	0.01	0.72	0.70	1905.98	0.19	0.09
Plate Compactors	2027	6.98	2.19	13.12	0.01	0.71	0.69	1905.98	0.19	0.09
Plate Compactors	2028	6.95	2.19	13.11	0.01	0.71	0.69	1905.98	0.19	0.09
Plate Compactors	2029	6.91	2.19	13.10	0.01	0.70	0.68	1905.99	0.19	0.09
Plate Compactors	2030	6.88	2.18	13.09	0.01	0.69	0.67	1905.99	0.19	0.09
Plate Compactors	2031	6.87	2.18	13.09	0.01	0.69	0.67	1906.00	0.19	0.09
Plate Compactors	2032	6.88	2.19	13.09	0.01	0.69	0.67	1905.99	0.19	0.09
Rollers	2026	11.69	2.11	50.33	0.08	1.89	1.83	30461.44	0.21	1.40
Rollers	2027	10.03	1.94	47.65	0.08	1.59	1.54	30461.95	0.20	1.40

Equipment	Year	CO	VOC	NOx	SO2	PM10	PM25	CO ₂	CH ₄	N ₂ O
Rollers	2028	9.07	1.84	45.81	0.08	1.41	1.37	30462.23	0.19	1.40
Rollers	2029	8.28	1.76	44.24	0.08	1.27	1.23	30462.41	0.18	1.40
Rollers	2030	7.54	1.69	42.87	0.08	1.14	1.10	30462.65	0.17	1.40
Rollers	2031	7.04	1.64	41.85	0.08	1.05	1.02	30462.73	0.17	1.40
Rollers	2032	6.66	1.60	41.00	0.08	0.98	0.95	30462.86	0.16	1.40
Rough Terrain Forklifts	2026	17.12	1.99	59.18	0.09	3.00	2.91	32533.98	0.19	1.50
Rough Terrain Forklifts	2027	13.51	1.63	54.24	0.09	2.38	2.31	32534.96	0.16	1.50
Rough Terrain Forklifts	2028	10.56	1.38	50.59	0.09	1.88	1.82	32535.75	0.14	1.50
Rough Terrain Forklifts	2029	8.93	1.23	48.39	0.09	1.59	1.55	32536.16	0.13	1.50
Rough Terrain Forklifts	2030	7.87	1.14	46.83	0.09	1.40	1.36	32536.46	0.12	1.50
Rough Terrain Forklifts	2031	7.02	1.07	45.50	0.09	1.26	1.22	32536.61	0.11	1.50
Rough Terrain Forklifts	2032	6.30	1.01	44.41	0.09	1.13	1.10	32536.73	0.11	1.50
Rubber Tire Loaders	2026	25.59	4.52	107.45	0.21	4.50	4.36	77267.37	0.36	3.56
Rubber Tire Loaders	2027	22.03	4.05	99.29	0.21	3.93	3.81	77268.72	0.32	3.56
Rubber Tire Loaders	2028	19.04	3.66	91.87	0.21	3.48	3.38	77269.98	0.29	3.56
Rubber Tire Loaders	2029	16.18	3.30	84.60	0.21	3.06	2.97	77270.92	0.25	3.56
Rubber Tire Loaders	2030	13.27	2.92	78.12	0.21	2.61	2.53	77272.06	0.22	3.56
Rubber Tire Loaders	2031	11.37	2.67	73.60	0.21	2.32	2.25	77272.89	0.20	3.56
Rubber Tire Loaders	2032	9.70	2.45	69.67	0.21	2.06	2.00	77273.29	0.18	3.56
Scrapers	2026	37.84	5.65	91.37	0.35	5.87	5.69	129642.72	0.45	5.97
Scrapers	2027	29.61	4.81	74.10	0.35	4.83	4.69	129645.23	0.36	5.97
Scrapers	2028	23.04	4.13	61.08	0.35	4.00	3.88	129647.20	0.29	5.97
Scrapers	2029	17.73	3.58	50.93	0.35	3.30	3.20	129648.69	0.23	5.97
Scrapers	2030	13.88	3.19	43.94	0.34	2.77	2.68	129649.89	0.19	5.97
Scrapers	2031	11.73	2.97	40.02	0.34	2.46	2.39	129650.30	0.17	5.97
Scrapers	2032	10.49	2.85	37.76	0.34	2.29	2.22	129650.81	0.16	5.97
Signal Boards/Light Plants	2026	11.64	2.91	33.91	0.02	1.36	1.32	6058.88	0.26	0.28

Equipment	Year	CO	VOC	NOx	SO2	PM10	PM25	CO ₂	CH ₄	N ₂ O
Signal Boards/Light Plants	2027	11.51	2.88	33.71	0.02	1.33	1.29	6058.97	0.26	0.28
Signal Boards/Light Plants	2028	11.40	2.85	33.56	0.02	1.31	1.27	6059.03	0.26	0.28
Signal Boards/Light Plants	2029	11.32	2.83	33.42	0.02	1.29	1.25	6059.09	0.26	0.28
Signal Boards/Light Plants	2030	11.23	2.81	33.29	0.02	1.27	1.24	6059.15	0.26	0.28
Signal Boards/Light Plants	2031	11.17	2.80	33.18	0.02	1.26	1.22	6059.20	0.26	0.28
Signal Boards/Light Plants	2032	11.13	2.78	33.10	0.02	1.25	1.22	6059.23	0.25	0.28
Skid Steer Loaders	2026	29.20	6.18	39.83	0.02	4.84	4.70	7983.66	0.20	0.37
Skid Steer Loaders	2027	25.98	5.47	37.60	0.02	4.28	4.15	7985.69	0.19	0.37
Skid Steer Loaders	2028	21.96	4.62	34.84	0.02	3.57	3.46	7988.16	0.17	0.37
Skid Steer Loaders	2029	18.35	3.89	32.44	0.02	2.96	2.87	7990.28	0.16	0.37
Skid Steer Loaders	2030	15.76	3.37	30.80	0.02	2.55	2.48	7991.78	0.14	0.37
Skid Steer Loaders	2031	14.08	3.02	29.73	0.02	2.27	2.21	7992.77	0.13	0.37
Skid Steer Loaders	2032	12.95	2.78	29.00	0.02	2.08	2.01	7993.51	0.13	0.37
Surfacing Equipment	2026	33.90	5.73	108.06	0.10	4.72	4.58	36158.16	0.38	1.67
Surfacing Equipment	2027	30.20	5.24	101.07	0.10	4.19	4.07	36159.61	0.36	1.67
Surfacing Equipment	2028	27.40	4.87	95.68	0.10	3.78	3.66	36160.66	0.35	1.67
Surfacing Equipment	2029	24.91	4.54	90.83	0.10	3.42	3.32	36161.64	0.33	1.67
Surfacing Equipment	2030	22.55	4.24	86.65	0.10	3.09	2.99	36162.50	0.32	1.67
Surfacing Equipment	2031	20.59	3.99	83.18	0.10	2.81	2.73	36163.22	0.31	1.67
Surfacing Equipment	2032	19.26	3.81	80.66	0.10	2.64	2.56	36163.62	0.31	1.67
Tampers/Rammers	2026	4.54	1.51	7.60	0.00	0.45	0.44	1061.88	0.13	0.05
Tampers/Rammers	2027	4.50	1.51	7.58	0.00	0.44	0.43	1061.88	0.13	0.05
Tampers/Rammers	2028	4.48	1.51	7.57	0.00	0.44	0.43	1061.88	0.13	0.05
Tampers/Rammers	2029	4.45	1.51	7.56	0.00	0.43	0.42	1061.88	0.13	0.05
Tampers/Rammers	2030	4.42	1.51	7.55	0.00	0.43	0.41	1061.88	0.13	0.05
Tampers/Rammers	2031	4.41	1.51	7.55	0.00	0.42	0.41	1061.88	0.13	0.05
Tampers/Rammers	2032	4.41	1.51	7.55	0.00	0.42	0.41	1061.88	0.13	0.05

Equipment	Year	CO	VOC	NOx	SO2	PM10	PM25	CO ₂	CH ₄	N ₂ O
Tractors/Loaders/Backhoes	2026	19.89	4.16	34.08	0.04	3.50	3.39	13059.66	0.17	0.60
Tractors/Loaders/Backhoes	2027	17.87	3.69	32.06	0.04	3.15	3.05	13061.09	0.15	0.60
Tractors/Loaders/Backhoes	2028	16.10	3.28	30.29	0.04	2.84	2.76	13062.26	0.14	0.60
Tractors/Loaders/Backhoes	2029	14.47	2.91	28.65	0.04	2.56	2.49	13063.35	0.13	0.60
Tractors/Loaders/Backhoes	2030	12.86	2.54	27.00	0.04	2.28	2.21	13064.34	0.12	0.60
Tractors/Loaders/Backhoes	2031	11.49	2.23	25.57	0.04	2.04	1.98	13065.24	0.12	0.60
Tractors/Loaders/Backhoes	2032	10.32	1.97	24.34	0.04	1.84	1.79	13066.04	0.11	0.60
Trenchers	2026	17.68	3.05	81.43	0.07	2.35	2.28	25853.70	0.33	1.19
Trenchers	2027	14.89	2.72	78.23	0.07	1.95	1.90	25854.65	0.31	1.19
Trenchers	2028	12.81	2.46	75.60	0.07	1.64	1.59	25855.39	0.30	1.19
Trenchers	2029	11.08	2.26	73.70	0.07	1.38	1.34	25855.95	0.29	1.19
Trenchers	2030	9.61	2.10	72.04	0.07	1.16	1.12	25856.43	0.27	1.19
Trenchers	2031	8.84	2.01	71.08	0.07	1.05	1.01	25856.64	0.27	1.19
Trenchers	2032	8.36	1.96	70.45	0.07	0.98	0.95	25856.77	0.26	1.19

TABLE A-4
EPA MOVES ONROAD EMISSION FACTORS FOR BROWARD COUNTY (g/mi)

Equipment	Year	Fuel Type	Road Type	Speed Bin	CO	VOC	NOx	SO2	PM10	PM25	CO ₂	CH ₄	N ₂ O
Combination Short-Haul Truck	2026	Diesel	Urban Unrestricted	52.5-57.4	1.216	0.094	1.710	0.005	0.033	0.030	1371.120	0.008	0.188
Combination Short-Haul Truck	2027	Diesel	Urban Unrestricted	52.5-57.4	1.166	0.086	1.527	0.005	0.028	0.026	1345.050	0.008	0.188
Combination Short-Haul Truck	2028	Diesel	Urban Unrestricted	52.5-57.4	1.122	0.079	1.359	0.004	0.023	0.021	1321.310	0.008	0.189
Combination Short-Haul Truck	2029	Diesel	Urban Unrestricted	52.5-57.4	1.086	0.073	1.191	0.004	0.019	0.018	1300.400	0.008	0.189
Combination Short-Haul Truck	2030	Diesel	Urban Unrestricted	52.5-57.4	1.058	0.068	1.064	0.004	0.016	0.015	1282.150	0.007	0.189
Combination Short-Haul Truck	2031	Diesel	Urban Unrestricted	52.5-57.4	1.028	0.064	0.944	0.004	0.014	0.013	1266.230	0.007	0.190
Combination Short-Haul Truck	2032	Diesel	Urban Unrestricted	52.5-57.4	1.003	0.061	0.844	0.004	0.012	0.011	1252.460	0.007	0.190
Passenger Car	2026	Gas	Urban Unrestricted	52.5-57.4	2.939	0.063	0.076	0.001	0.002	0.002	259.930	0.006	0.001
Passenger Car	2027	Gas	Urban Unrestricted	52.5-57.4	2.849	0.061	0.070	0.001	0.002	0.002	255.690	0.006	0.001
Passenger Car	2028	Gas	Urban Unrestricted	52.5-57.4	2.746	0.057	0.058	0.001	0.002	0.002	252.136	0.006	0.001
Passenger Car	2029	Gas	Urban Unrestricted	52.5-57.4	2.604	0.053	0.050	0.001	0.002	0.001	249.597	0.005	0.001
Passenger Car	2030	Gas	Urban Unrestricted	52.5-57.4	2.475	0.050	0.040	0.001	0.002	0.001	247.593	0.005	0.001
Passenger Car	2031	Gas	Urban Unrestricted	52.5-57.4	2.321	0.048	0.024	0.001	0.002	0.001	246.050	0.005	0.001
Passenger Car	2032	Gas	Urban Unrestricted	52.5-57.4	2.196	0.047	0.022	0.001	0.002	0.001	244.422	0.005	0.001
Single Unit Short-Haul Truck	2026	Diesel	Urban Unrestricted	52.5-57.4	0.701	0.063	0.722	0.002	0.024	0.022	735.737	0.005	0.097

Equipment	Year	Fuel Type	Road Type	Speed Bin	CO	VOC	NOx	SO2	PM10	PM25	CO ₂	CH ₄	N ₂ O
Single Unit Short-Haul Truck	2027	Diesel	Urban Unrestricted	52.5-57.4	0.679	0.055	0.638	0.002	0.020	0.019	721.764	0.005	0.097
Single Unit Short-Haul Truck	2028	Diesel	Urban Unrestricted	52.5-57.4	0.661	0.049	0.571	0.002	0.016	0.015	709.612	0.005	0.098
Single Unit Short-Haul Truck	2029	Diesel	Urban Unrestricted	52.5-57.4	0.644	0.043	0.494	0.002	0.014	0.012	698.305	0.005	0.098
Single Unit Short-Haul Truck	2030	Diesel	Urban Unrestricted	52.5-57.4	0.634	0.040	0.449	0.002	0.012	0.011	688.688	0.004	0.099
Single Unit Short-Haul Truck	2031	Diesel	Urban Unrestricted	52.5-57.4	0.619	0.036	0.397	0.002	0.010	0.009	680.073	0.004	0.099
Single Unit Short-Haul Truck	2032	Diesel	Urban Unrestricted	52.5-57.4	0.607	0.032	0.354	0.002	0.008	0.008	672.062	0.004	0.099

TABLE A-5
EPA MOVES NONROAD CONSTRUCTION EQUIPMENT TYPES MODELED

Construction Equipment
Bore/Drill Rigs
Cement & Mortar Mixers
Concrete/Industrial Saws
Cranes
Crawler Tractor/Dozers
Dumpers/Tenders
Excavators
Graders
Off-highway Trucks
Other Construction Equipment
Pavers
Plate Compactors
Rollers
Rough Terrain Forklifts
Rubber Tire Loaders
Scrapers
Skid Steer Loaders
Surfacing Equipment
Tractors/Loaders/Backhoes
Trenchers