



**FLORIDA SOUTHEAST CONNECTION
PROJECT**

RESOURCE REPORT 9

Air and Noise Quality

FERC Docket No. PF14-2-000

Pre-Filing Draft

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RESOURCE REPORT 9 – AIR AND NOISE QUALITY	
Filing Requirement	Location in Environmental Report
<input checked="" type="checkbox"/> Describe existing air quality in the vicinity of the project.	9.2.1
<input checked="" type="checkbox"/> Quantify the existing noise levels (day-night sound level (L_{dn}) and other applicable noise parameters) at the noise sensitive area and at other locations required by state and local noise ordinances.	9.3
<input checked="" type="checkbox"/> Quantify existing and proposed emissions of compressor equipment, plus, construction emissions, including nitrogen oxides (NO_x) and carbon monoxide (CO), and the basis for these calculations. Summarize anticipated air quality impacts for the project.	9.2.2
<input checked="" type="checkbox"/> Describe the existing and proposed compressor units at each station where new, additional, or modified compression units are proposed, including the manufacturer, model number, and horsepower of the compressor units.	Not applicable
<input checked="" type="checkbox"/> Identify any nearby NSA by distance and direction from the proposed compressor unit building/enclosure.	Not applicable
<input checked="" type="checkbox"/> Identify any applicable state or local noise regulations.	9.3.1.2
<input checked="" type="checkbox"/> Calculate the noise impact of the proposed compressor unit modifications or additions, specifying how the impact was calculated including manufacturer's data and proposed noise control equipment.	Not applicable

ACRONYMS AND ABBREVIATIONS

a.m.	ante meridiem
AQCR	air quality control region
A-wt.	A weighting
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalents
dB	decibels
dBA	A-weighted decibels
°F	degree(s) Fahrenheit
FERC	Federal Energy Regulatory Commission
FPL	Florida Power & Light Company
g/VMT	grams per vehicle mile traveled
GHG	greenhouse gas
H&K	Hoover and Keith, Inc.
H ₂ H	high second high
in	inch(s)
km	kilometer(s)
L _{Aeq}	A-weighted L _{eq} in decibels
L _d	day sound level in decibels
L _{dn}	day-night sound level in decibels
L _{eq}	equivalent sound level in decibels
L _n	night sound level in decibels
M&R	metering and regulating
µg/m ³	microgram per cubic meter
MOVES	Mobile Vehicle Emissions Simulator
MP	milepost
NAAQS	National Ambient Air Quality Standards
NGA	Natural Gas Act
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
NONROAD	USEPA's NONROAD model, version NONROAD2008a
NSAs	noise sensitive areas
N ₂ O	nitrous oxide
O.B.	octave band
O ₃	ozone
Pb	lead
PM ₁₀	particulate matter with a diameter ≤ 10 microns
PM _{2.5}	particulate matter with a diameter ≤ 2.5 microns
ppm	parts per million
ROW	right-of-way
Sabal Trail	Sabal Trail Transmission Pipeline Project
Secretary	Secretary of the Commission
SIP	State Implementation Plan



SO ₂	sulfur dioxide
SOTA	state-of-the-art
SPL	sound pressure level
SR	State Road
tpy	ton per year
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound(s)
WRAP	Western Regional Air Partnership

9.0 RESOURCE REPORT 9 – AIR AND NOISE QUALITY

9.1 Introduction

Florida Southeast Connection, LLC (“FSC”), a subsidiary of NextEra Energy, Inc., is seeking a Certificate of Public Convenience and Necessity (“Certificate”) from the Federal Energy Regulatory Commission (“FERC”) pursuant to Section 7(c) of the Natural Gas Act (“NGA”) authorizing the construction and operation of an approximately 127 mile natural gas pipeline known as the Florida Southeast Connection Project (“FSC Project”). The FSC Project is designed to meet the growing demand for natural gas by the electric generation, distribution, and end use markets in Florida. The FSC Project will also provide additional natural gas supply diversity through a connection to the new Sabal Trail Transmission Pipeline Project (“Sabal Trail”) via a new interconnection hub in central Florida (“Central Florida Hub”). The Sabal Trail Project is the subject of a separate, but related, certificate filing to the FERC.

The FSC Project will increase natural gas transportation capacity and availability to southern Florida by adding a new third pipeline in central and southern Florida. Upon the anticipated in-service date of May 2017, the FSC Project will be capable of providing a minimum of 600 million cubic feet per day (“MMcf/d”) of natural gas to an existing gas yard at Florida Power & Light Company’s (“FPL”) Martin Clean Energy Center.

The FSC Project involves the construction and operation of approximately 127 miles of up to 36 -inch-diameter pipeline and the construction and operation of one meter station (known as the Martin Meter Station). The FSC Project pipeline will start in Osceola County, Florida at the interconnection with Sabal Trail within the Central Florida Hub. The pipeline will traverse Polk, Osceola, Okeechobee, St. Lucie, and Martin Counties, terminating at the Martin Meter Station located at the Martin Clean Energy Center in Martin County, Florida. In addition, FSC will install a pig launcher at the start of the FSC Project and a pig receiver at the end of the FSC Project. Resource Report 1 provides a complete summary of the FSC Project facilities (Table 1.2-1) and a location map of the FSC Project facilities (Figure 1.2-1).

This Resource Report addresses air quality (Section 9.2) and noise impacts (Section 9.3) related to the construction and operation of the proposed FSC Project facilities. A checklist showing the status of the FERC filing requirements for Resource Report 9 is included in the table of contents.

9.2 Air Quality

9.2.1 Existing Conditions

9.2.1.1 Climate

The FSC Project is located in central Florida. The climate type is humid sub-tropical, characterized by hot humid summers, short mild winters, and no dry season. The regional climate can be represented by Southeast Regional Data climate center data for Fort Drum 5 NW, Okeechobee County, Florida. Table 9.2-1 provides climate data for this location.

9.2.1.2 National Ambient Air Quality Standards

The United States Environmental Protection Agency (“USEPA”) has promulgated National Ambient Air Quality Standards (“NAAQS”). The NAAQS include primary standards, which are designed to protect human health, including the health of sensitive subpopulations such as children and those with chronic respiratory problems, and secondary standards, which are designed to protect public welfare, including economic interests, visibility, vegetation, animal species, and other concerns. NAAQS currently apply to the following criteria pollutants:

- Particulate matter with a diameter ≤ 10 microns (“PM₁₀”)
- Particulate matter with a diameter ≤ 2.5 microns (“PM_{2.5}”)
- Nitrogen dioxide (“NO₂”)
- Sulfur dioxide (“SO₂”)
- Carbon monoxide (“CO”)
- Ozone (“O₃”)
- Lead (“Pb”)

Each NAAQS is expressed in terms of a pollutant concentration level and an associated averaging period. The current NAAQS are summarized in Table 9.2-2. The NAAQS apply in all FSC Project areas. Notes to Table 9.2-2 list the form of the statistic used to assess compliance with each NAAQS.

States may adopt standards that are more stringent than the NAAQS. Florida repealed its State-specific ambient air quality standards, and adopted the federal NAAQS.

9.2.1.3 Attainment Status

Section 107 of the Clean Air Act (“CAA”) defines an air quality control region (“AQCR”) as a federally-designated area in which NAAQS must be met. An implementation plan is developed for each AQCR describing how ambient air quality standards will be achieved and/or maintained. For each applicable pollutant and averaging period, USEPA designates an area’s attainment status based on monitoring data from the region. Areas that meet the NAAQS are termed “attainment areas.” Areas that do not meet the NAAQS are termed “nonattainment areas.” Areas for which insufficient data are available to determine attainment status are termed “unclassifiable areas.” Areas formerly designated as nonattainment areas that subsequently reached attainment are termed “maintenance areas.” The attainment status designations appear in Title 40 of the Code of Federal Regulations (“CFR”) Part 81.

The FSC Project is located in the following AQCRs:

- Southeast Florida Intrastate AQCR (Okeechobee, St. Lucie, and Martin Counties),
- Central Florida Intrastate AQCR (Osceola County), and
- West Central Florida Intrastate AQCR (Polk County).

Table 9.2-3 shows that, for each pollutant and averaging period, the FSC Project area’s status is attainment or the equivalent.

9.2.1.4 General Conformity

Section 176(c) of the CAA prohibits federal agencies from taking actions in nonattainment or maintenance areas which do not conform to the State Implementation Plan (“SIP”) for the attainment and maintenance of the NAAQS. The purposes of conformity are to (1) ensure federal activities do not interfere with the budgets in the SIPs, (2) ensure actions do not cause or contribute to new violations, and (3) ensure attainment and maintenance of the NAAQS. General Conformity applies only in areas that are designated as NAAQS nonattainment areas or maintenance areas. The FSC Project will be located in attainment areas or the equivalents for all criteria pollutants, and General Conformity does not apply.

9.2.1.5 Existing Ambient Air Quality

Ambient air quality data were obtained from the USEPA AIRDATA database. Monitoring data for 2010 through 2012 are summarized in Table 9.2-4 for the monitors that are nearest or most representative of the FSC Project's areas. For each pollutant and averaging period shown in Tables 9.1-3, the rank generally corresponds to the form of the statistic.

While the data in Table 9.2-4 are the best available, they are not necessarily representative of actual present air quality in the immediate vicinity of the FSC Project.

9.2.2 Air Pollutant Emissions

9.2.2.1 Operating Emissions

There will be no combustion equipment or stationary sources of air pollutant emissions associated with the operation of the FSC Project.

9.2.2.2 Construction Emissions

Table 9.2-5 summarizes the estimated air emissions that will occur as a result of construction of the FSC Project. Appendix 9A provides detailed emissions calculations. Construction emissions will include the following:

- Tailpipe emissions from on-road and off-road construction equipment and vehicles,
- Emissions from construction worker vehicles used for commuting, and vehicles used to deliver equipment and materials to the site,
- Fugitive dust from construction activities and wind erosion of disturbed areas prior to revegetation, and
- Open burning of vegetation.

The following methodologies were used to estimate construction emissions:

- Annual average emission factors for Florida in 2016 and 2017 [grams per horsepower hour ("g/hp-hr")] for NO_x, CO, PM, SO₂, VOC¹, and CO₂ for non-road equipment engines were obtained using the most recent version of the USEPA's NONROAD model (NONROAD, 2008a). Non-road equipment emission factors (grams per gallon of fuel) for CH₄ and N₂O were obtained from the "2014 Climate Registry Default Emission Factors" (2014), and apportioned based on CO₂ emissions.
- Emissions factors [grams per vehicle mile traveled ("g/VMT")] for on-road vehicles were obtained from the USEPA Mobile Vehicle Emissions Simulator ("MOVES") version MOVES, 2010b. Emission factors were obtained for NO_x, CO, PM₁₀, PM_{2.5}, SO₂, VOC, and CO₂, and CO₂e for road types in Florida for 2016 and 2017.
- Fugitive dust emissions were estimated using the methodology described in Section 3.4 of the Western Regional Air Partnership ("WRAP") Fugitive Dust Handbook (2006). Use of this methodology is conservative, as the climates typical of most Western states are more arid than in the FSC Project area.
- Open burning emissions were estimated using the methodology described in AP 42, Fifth Edition, Volume I, Section 13.1, "Wildfires and Prescribed Burning". Emission

¹ NONROAD does not provide emissions factors for VOC. The emission factor for total hydrocarbons was used as a surrogate for VOC.

factors for CO₂, CH₄ and N₂O were obtained from the “2014 Climate Registry Default Emission Factors”.

The impacts of these emissions on air quality are expected to be minor. Construction emissions will be intermittent, temporary, and spread over a large area. Mitigation measures will include the following:

- The construction equipment will be properly maintained and comply with all applicable Federal regulations. Equipment will be operated on an as-needed basis, primarily during daylight hours².
- To the extent practicable, busses or vans will be used to transport construction workers to the work site.
- Fugitive dust emissions will be mitigated by minimizing the extent of the areas disturbed, application of dust suppressants, rinsing construction vehicles before they leave the work site, and avoiding excessive vehicle speeds on unpaved roads. Disturbed areas will be re-vegetated as appropriate. Additionally, all areas disturbed by construction will be stabilized in accordance with FERC’s Plan and Procedures.
- Open burning of vegetation will be conducted in accordance with the permit issued by the Florida Forest Service and in accordance with State and local regulations and ordinances.

9.3 Noise Quality

This section of the Resource Report provides an overview of applicable noise regulations and an assessment of noise impacts associated with the FSC Project.

9.3.1 Applicable Noise Regulations

The unit of noise measurement is the decibel (“dB”), which measures the energy of the noise. Because the human ear is not uniformly sensitive to all noise frequencies, the A-weighted frequency scale (denoted as “A-wt” sound level or “dBA”) was devised to correspond with the ear’s sensitivity.

9.3.1.1 Federal Energy Regulatory Commission

FERC guidelines and typical certificate conditions require that the sound attributable to a compressor station or other operational facilities not exceed a day-night average sound level (i.e., L_{dn}) of 55 dBA at any nearby noise sensitive area (“NSA”), unless such NSAs are established after facility construction. In this case, operation of the FSC Project will not produce noise: Compressor facilities are not proposed as part of the FSC Project and the FSC Project’s meter station and launcher and receiver sites are not considered noise sources.

Construction of the FSC Project will produce noise associated with horizontal directional drilling (HDD), and FERC typically requires that the sound attributable to 24-hour HDD operations should not exceed 55 dBA (L_{dn}) at the NSAs or be 10 dBA over the background (ambient) noise level if the ambient levels are above 55 dBA (L_{dn}). If it is projected that the sound criteria/guidelines could be exceeded at any nearby NSA, it will be necessary to describe noise mitigation measures which would be implemented during drilling activity to reduce the noise impacts of the drilling operations and achieve the sound criteria/guidelines.

² The atmospheric stability conditions during daytime typically promote more rapid dispersion of pollutants than during nighttime.

9.3.1.2 State and Local Noise Regulations

The State of Florida does not have a noise standard. Of the proposed HDDs only the one in Martin County and the proposed alternate northern crossing of the Kissimmee River will be within 0.5 miles of an NSA. Martin County has a noise ordinance, Section 824 of the County Code, which prohibits construction on projects within the county between the hours of 9:00 p.m. to 7:00 a.m. In addition, the ordinance limits noise in residential areas (the applicable land use for the HDD site work at the SR 710 crossing) to 60 dBA from 7:00 a.m. to 9:00 p.m. and 55 dBA from 9:00 p.m. to 7:00 a.m. but construction related noise levels are exempt from the limits provided construction occurs during allowable hours. The ordinance further requires the use of mufflers on any internal combustion engine used in construction.

The Kissimmee River HDD crossing traverses Polk and Osceola Counties. Polk County has a noise ordinance (Ordinance 04-33) that limits construction to the hours of 6 a.m. to 9 p.m. Osceola County has a noise ordinance (Article IV of the County Code of Ordinances) that limits construction to the hours of 7 a.m. to sunset.

9.3.2 Pipeline Construction

FSC plans to begin construction in 2016 and initiate service in May 2017. The majority of construction of the proposed FSC Project would occur from March 2016 through May 2017 using one or more construction spreads. Construction at any single point along the proposed FSC Project, from initial surveying and clearing to backfilling and finish grading, is expected to last approximately two to four months. Any potential construction noise impacts will therefore be temporary. Construction will typically include the following activities, which would be performed in phases and would result in noise ranges of between 50 to 90 dBA at 50 feet, depending on the activity, and reduced noise levels further away (see Table 9.3-1):

- Trenching and pipe laying;
- Horizontal boring/jacking (if required);
- Backfilling and right of way restoration;

Construction equipment utilized will differ from phase to phase, but will typically include bulldozers, cranes, dump trucks, sidebooms, and loaders. Noise is generated during construction primarily from diesel engines which power the equipment. Exhaust noise usually is the predominant source of diesel engine noise. All equipment will be required to maintain functional mufflers during construction of the facilities. Noise levels of construction equipment typically utilized for this type of project are presented in Table 9.3-2.

The noise levels presented in Tables 9.3-1 and 9.3-2 are those that would be experienced by people outdoors. A building will provide significant attenuation of associated construction noise impacts. For instance, sound levels can be expected to be up to 27 dBA lower indoors with windows closed. Even in homes with windows open, indoor sound levels can be reduced by up to 17 dBA (USEPA, 1978).

9.3.2.1 Pipeline Construction Noise Mitigation Measures

An important factor mitigating noise impact from pipeline construction is that such noise will be of short duration and limited to a relatively small distance: 50-400 foot stretches. Work in these areas will generally last no more than a few days to one week, as typical construction activities move along the corridor. However, as previously stated, construction from initial surveying and clearing to backfilling and finish grading at any one point would last approximately two to four months. Therefore, no single receptor will be exposed to significant noise levels for an extended period. Additionally, because construction equipment does not

operate continually, construction noise is expected to be intermittent. The construction equipment to be used is similar to that used during typical public works projects (e.g., road resurfacing, storm sewer installation, etc.), and will not result in significantly higher noise sources than experienced by the public on such construction projects. As a general construction practice, functional mufflers will be maintained on all equipment to maintain noise levels as low as reasonably achievable.

9.3.3 Horizontal Direction Drilling

HDD techniques are currently proposed to be utilized at three locations along the pipeline route. In accordance with the FERC requirements, FSC assessed impacts from HDD noise on NSA's within 0.5 miles of the HDD entry and exit points. The planned HDD crossings of State Road ("SR") 710 and of the Kissimmee River have NSAs located within 0.5 miles of both the entry and exit points, while the HDD crossing of existing infrastructure between MP 115 and 116 does not have NSAs located within 0.5 miles of either the entry or exit point.

The NSAs were identified through detailed review of aerial photography at each proposed HDD location and confirmed during a site visit. The HDD entry and exit points and the nearest NSA within a 0.5 mile radius of the SR 710 crossing and Kissimmee River crossing are presented in Figures 9.3-1 and 9.3-2, respectively. HDD is currently only planned for daytime hours. As such, this analysis presents the calculated HDD equivalent sound levels (L_{eq}). An additional level of analysis was nonetheless conducted utilizing the L_{dn} in the event that nighttime HDD is required.

9.3.3.1 Existing Ambient Conditions

The land use in the vicinity of the SR710 HDD crossing consists of undeveloped land and low density residential uses, although the FPL Martin Clean Energy Center is located less than two miles to the south of the SR710 HDD crossing. The land use at the Kissimmee River crossing consists of undeveloped land and low density suburban residential. Existing ambient noise levels in the area of both HDD drill sites were estimated by determining the land uses in the areas through a review of aerial photography. General ambient noise levels by land use have been estimated by the USEPA (USEPA, 1978). However, a more detailed estimate is provided in the American National Standards Institute (ANSI) standard 12.9-1993/Part 3. The standard provides estimates of existing L_{eq} and L_{dn} levels based on detailed descriptions of land use categories. The levels are in general agreement with those published by USEPA. The ANSI standard noise estimation divides land uses into six distinct categories. These categories, their descriptions and the estimated existing L_{eq} and L_{dn} levels are provided in Table 9.3-3.

Utilizing the ANSI standard, existing ambient noise levels at the nearest NSA to the entry and exit point for the SR710 HDD crossing were estimated and determined to be in land use category 4 (Quiet Urban and Normal Residential Areas). The estimated ambient noise levels in the area of the Kissimmee River HDD crossing were determined to be in category 5 (Quiet Suburban Residential Areas).

9.3.3.2 HDD Noise Levels

HDD utilizes a number of pieces of equipment that include power generation, control rooms, an excavator, and storage trailers. Of these sources, the diesel engine power generation units are the most significant noise generating sources. Noise level data measured at a typical HDD site where a 600 hp drive drill engine was in use were utilized for this analysis. These data indicate that HDD entry generates a sound level, with equipment at full load, of approximately 85 dBA at 50 feet. Noise levels on the exit side of the HDD, where less equipment is needed, are approximately 79 dBA at 50 feet. Estimated HDD noise levels as L_{eq} levels at each NSA location for this Project were calculated assuming daytime drilling only.

The results of the analysis, including the HDD locations, the distance and direction to the nearest NSA, estimated existing ambient levels, calculated HDD noise levels and projected increases above existing ambient levels, are provided in Table 9.3-4 for an unmitigated case. A calculated noise level of 61.5 dBA is projected at the nearest NSA to the SR710 HDD entry point, with a corresponding increase above ambient of 9.1 dBA. At the nearest NSA to the Kissimmee River HDD entry point, a calculated noise level of 60.8 dBA is projected, with a corresponding increase above ambient of 12.8 dBA. Current plans are for daytime only HDD.

In the event that the residents indicate that the HDD activities either are or will be a disruption to them, FSC is prepared to utilize mitigative measures at the HDD entry site or provide compensation to the landowners for temporary housing at a commercial hotel or motel in the general area during HDD-related construction activities. The nearby NSA will be notified several days prior to beginning work to advise them of the onset and duration of construction.

If additional noise mitigation is required, an onsite evaluation of equipment noise will be completed to further identify the predominant noise sources. Based on this evaluation, additional noise mitigation measures will be recommended which may include:

- Reconfiguring equipment locations to take advantage of natural and artificial noise barriers (e.g., hay bales);
- Installing a partial noise barrier around the hydraulic power unit, including the engine & associated engine jacket-water cooler. For example, cover two sides of power unit with a plywood barrier system or other type of effective noise barrier system;
- Using residential grade silencers or mufflers on engines;
- Using gear box noise blankets and other mechanical noise dampening blankets, acoustical tents, acoustical barriers; and
- Employing “low noise” generators.

Notwithstanding that only daytime HDD activities are currently planned, FSC evaluated potential noise levels in the event that nighttime (24-hour) HDD is required. This additional analysis evaluated L_{dn} noise levels to incorporate the additional potential for noise impacts during nighttime hours. The results of this analysis are provided in Table 9.3-5.

The noise level increases predicted in the analyses described above for 24-hour HDD construction activities are based on unmitigated noise produced by HDD drilling equipment and are therefore considered worst-case. The calculated HDD noise level exceeds FERC’s criteria of 55 dBA L_{dn} and is greater than 10 dBA above the estimated existing L_{dn} level at both HDD entry point NSAs. The noise levels produced by drilling equipment may be reduced by up to 10 to 15 dBA through mitigative actions described previously.

Residents of nearby NSAs will also be notified in advance of any planned overnight HDD-related construction activities to advise them that noise-generating equipment may be operated during night-time hours. Should any HDD require overnight operations, noise surveys will be conducted to determine whether HDD noise levels satisfy the 55 dBA target and the 10 dBA increase criteria. If noise levels cannot be reduced to target levels, then temporary housing will be offered to the occupants of affected NSAs at a commercial hotel or motel in the Project area until nighttime HDD-related construction activities are completed.

9.4 References

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- USEPA. 2005. User's Guide for the Final NONROAD2005, EPA420-R-05-013.
- Western Regional Air Partnership. 2006. Fugitive Dust Handbook, Countess Environmental, Section 3.4.1.

**Table 9.2-1
Regional Climate Data for Okeechobee County, Florida**

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (°F)	74.20	75.90	79.60	83.80	88.00	90.20	91.50	91.60	89.70	85.40	80.10	75.00	83.70
Average Min. Temperature (°F)	49.50	50.80	54.70	57.90	63.30	69.00	70.70	71.20	70.10	64.60	57.80	51.00	60.90
Average Total Precipitation (in.)	2.17	2.36	3.21	2.51	4.03	8.04	7.32	7.22	6.80	3.94	2.06	1.82	51.49
Average Total Snow Fall (in.)	-	-	-	-	-	-	-	-	-	-	-	-	-
Average Snow Depth (in.)	-	-	-	-	-	-	-	-	-	-	-	-	-

Source: Data reported for Fort Drum 5 NW, Okeechobee County, Florida by Southeast Regional Data climate center, University of North Carolina, Chapel Hill, NC, <http://www.sercc.com/index.php> accessed 1/11/14

Period of Record: 8/1/1948 to 5/15/2011
 °F = degrees Fahrenheit
 in. = inches

**Table 9.2-2
National Ambient Air Quality Standards**

Pollutant	Averaging Time	Primary Standard		Secondary Standard		Form
		(ppm)	($\mu\text{g}/\text{m}^3$)	(ppm)	($\mu\text{g}/\text{m}^3$)	
Respirable Particulate (PM ₁₀)	24-hour	---	150	---	150	Not to be exceeded more than once per year on average over 3 years
Fine Particulate (PM _{2.5})	24-hour	---	35	---	35	98 th percentile, averaged over 3 years
	Annual	---	12	---	15	Annual mean, averaged over 3 years
Nitrogen Dioxide (NO ₂)	1-hour	0.100	188	---	---	98 th percentile, averaged over 3 years
	Annual	0.053	100	0.053	100	Annual Mean
Sulfur Dioxide (SO ₂)	1-hour	0.075	196	---	---	99 th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	3-hour	---	---	0.5	1,300	Not to be exceeded more than once per year
Carbon Monoxide (CO)	8-hour	9	10,300	---	---	Not to be exceeded more than once per year
	1-hour	35	40,000	---	---	Not to be exceeded more than once per year
Ozone (O ₃)	1-hour	0.12	236	0.12	236	Not to be exceeded more than once per year
	8-hour (2008)	0.075	147	0.075	147	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
	8-hour (1997)	0.08	157	0.08	157	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Lead (Pb)	3-month rolling	---	0.15	---	0.15	Not to be exceeded

ppm = parts per million
 $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter.
Source: <http://www.epa.gov/air/criteria.html> accessed 02/3/14

Table 9.2-3
Attainment Status of FSC Project Area

Pollutant	Designation Date	Status / Designation
PM ₁₀	11/15/1990	Unclassifiable
24-hour PM _{2.5}	12/13/2009	Unclassifiable / Attainment
Annual PM _{2.5}	04/05/2005	Unclassifiable / Attainment
NO ₂	n/a	Cannot be classified or better than national standards
SO ₂	n/a	Cannot be classified
CO	11/15/1990	Unclassifiable / Attainment
1-hour O ₃	10/18/2000	Unclassifiable / Attainment
8-hour O ₃ (1997 Standard)	06/15/2004	Unclassifiable / Attainment
8-hour O ₃ (2008 Standard)	07/20/2012	Unclassifiable / Attainment
Pb	12/31/2010	Unclassifiable
Source: 40 CFR 81.310		

**Table 9.2-4
Existing Ambient Air Quality Estimated for the FSC Project Area**

Pollutant	Monitoring Station ID	Averaging Time	Years	Concentrations		Rank	Comment
				(ppm)	($\mu\text{g}/\text{m}^3$)		
PM ₁₀	12-105-6006	24-hour	2010 - 2012	n/a	41.7	H2H	1, 2
PM _{2.5}	12-105-6006	Annual	2010 - 2012	n/a	7.5	Annual mean	1, 2
		24-hour		n/a	15.8	98th percentile	
NO ₂	12-095-2002	1-hour	2010 - 2012	0.029	54.6	98th percentile, averaged over 3 years	2, 3
		Annual		0.014	26.0	Annual Mean	
SO ₂	12-095-2002	1-hour	2010 - 2012	0.0037	9.6	99th Percentile	2, 3
		3-hour		0.0044	11.5	H2H	
CO	12-095-2002	8-hour	2010 - 2012	1.37	1,565	H2H	2, 3
		1-hour		1.67	1,909	H2H	
O ₃	12-105-6006	8-hour	2010 - 2012	0.070	137	H4H	1, 2
		1-hour		0.091	179	H2H	
Pb	n/a	n/a	n/a	n/a	n/a	Largest 3-month rolling average	4

1. Baptist Childrens' Home, 1015 Sikes Blvd., Lakeland, Polk County, Florida.
2. Complete data for 2013 were not available when this report was prepared.
3. Winter Park, Morris Blvd., Winter Park, Orange County, Florida.
4. Representative data for Pb are not available.

H2H = High second high
H4H = High fourth high
Source: EPA AirData <http://www.epa.gov/airdata/>

**Table 9.2-5
Estimated Construction Emissions**

Year and Source	Emissions by Year (tons)							
	CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}	CO ₂	CO _{2e}
2016								
Construction Equipment	179.72	119.52	0.19	14.12	7.06	7.06	27,958	28,193
Commuting / Deliveries	11.49	24.32	0.07	1.51	0.99	0.96	9,484	9,491
Fugitive Dust	---	---	---	---	160.36	18.45	---	---
Open Burning	709.38	20.12	---	121.75	86.53	86.53	16,001	16,084
Total	900.59	163.96	0.27	137.39	254.95	113.01	53,444	53,767
2017								
Construction Equipment	78.22	52.11	0.09	6.39	3.06	3.06	13,790	13,905
Commuting / Deliveries	5.21	10.58	0.04	0.67	0.42	0.41	4,734	4,738
Fugitive Dust	---	---	---	---	80.18	9.23	---	---
Open Burning	349.40	9.91	---	59.97	42.62	42.62	7,881	7,922
Total	432.83	72.61	0.13	67.02	126.28	55.32	26,405	26,565
Source: Appendix A Table 9.A.1.10								

Table 9.3-1			
Construction Phase Noise Levels for Pipeline Installation			
Construction Phase	Construction Phase Noise Levels (dBA)		
	50 Feet	400 Feet	1000 Feet
Trenching	60 to 90	42 to 72	33 to 63
Pipe Laying	50 to 90	32 to 72	23 to 63
Backfilling	73 to 84	54 to 65	46 to 57
Source: Ebasco Environmental – Sound Cable Project (New York Power Authority, 1987)			

Table 9.3-2 Noise Levels of Major Construction Equipment (dBA)			
Equipment Type	50 Feet	400 Feet	1000 Feet
Trucks	85	66	58
Crane	83	64	56
Roller	89	70	62
Bulldozers	80	61	53
Pickup Trucks	60	41	33
Backhoes	85	66	58
Source: (BBN 1971)			

**Table 9.3-3
Land Use Categories for Estimating Ambient Noise Levels**

Category	Land Use	Description	Estimated Existing Daytime L _{eq}	Estimated Existing L _{dn}
1	Noisy Commercial and Industrial Areas	Very heavy traffic conditions, such as in busy downtown commercial areas, at intersections of mass transportation and other vehicles, including trains, heavy motor trucks and other heavy traffic, and street corners where motor buses and heavy trucks accelerate.	69 dBA	70 dBA
2	Moderate Commercial and Industrial Areas, and Noisy Residential Areas	Heavy traffic areas with conditions similar to Category 1 but with somewhat less traffic, routes of relatively heavy or fast automobile traffic but where heavy truck traffic is not extremely dense, and motor bus routes.	64 dBA	65 dBA
3	Quiet Commercial, Industrial Areas, and Normal Urban and Noisy Residential Areas	Light traffic conditions where no mass transportation vehicles and relatively few automobiles and trucks pass, and where these vehicles generally travel at low speeds. Residential areas and commercial streets and intersections with little traffic comprise this category.	58 dBA	60 dBA
4	Quiet Urban and Normal Residential Areas	These areas are similar to Category 3 above but, for this group, the background is either distant traffic or is unidentifiable.	53 dBA	55 dBA
5	Quiet Suburban Residential Areas	Isolated areas, far from significant sources of sound.	48 dBA	50 dBA
6	Very Quiet, Sparse Suburban or Rural Areas	These areas are similar to Category 5 above but are usually in unincorporated areas and, for this group, there are few if any near neighbors.	43 dBA	45 dBA

Source: ANSI S12.9-1993/Part 3

**Table 9.3-4
HDD L_{eq} Site Noise Analysis – No Noise Mitigation**

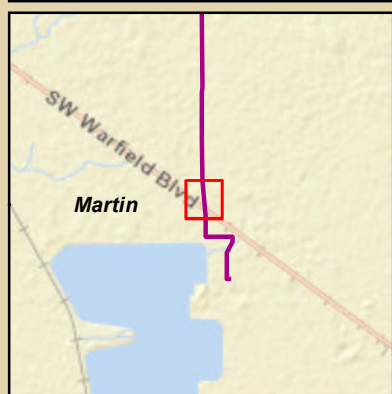
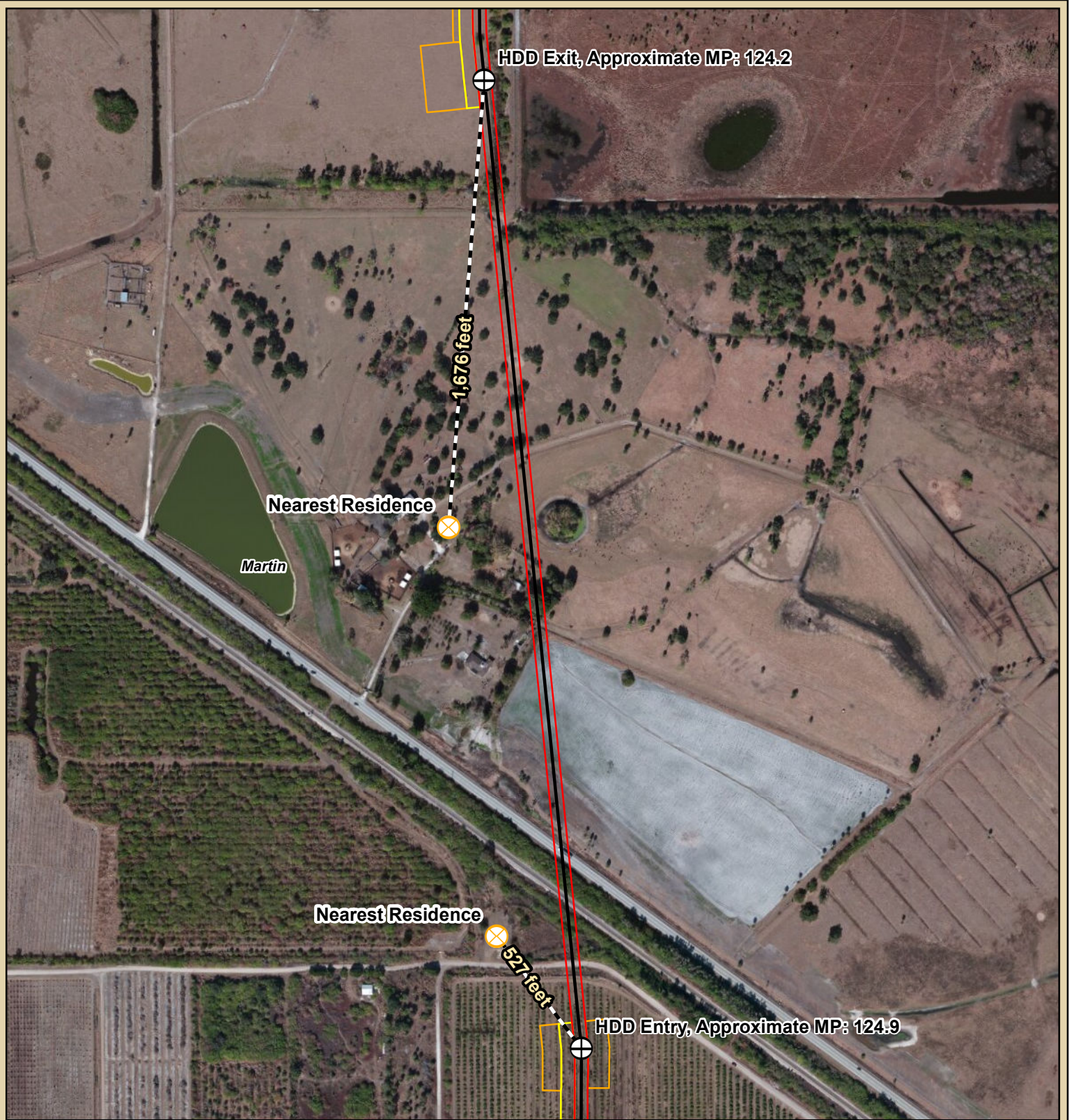
HDD Station	Distance (feet) /Direction to Nearest NSA	Land Use Category ⁽¹⁾	Existing Daytime L _{eq} ⁽¹⁾	Calculated HDD L _{eq} Noise Level (dBA)	Combined Ambient Plus HDD (dBA)	Increase Over Existing Condition (dBA)
SR 710 Crossing Entry	550 / NW	4	53	61.5	62.1	9.1
SR 710 Crossing Exit	1,650 / S	4	53	46.0	53.8	0.8
Kissimmee Crossing Entry	650 / NW	5	48	60.8	60.8	12.8
Kissimmee Crossing Exit	2,400 / NW	5	48	42.1	49.0	1.0

(1) Estimated L_{eq} based on land use as set forth in ANSI 12.9-1993/Part 3.

**Table 9.3-5
HDD L_{dn} Site Noise Analysis – No Noise Mitigation**

HDD Station	Distance (feet) /Direction to Nearest NSA	Land Use Category ⁽¹⁾	Existing L_{dn} ⁽¹⁾	Calculated HDD L_{dn} Noise Level (dBA)	Combined Ambient Plus HDD (dBA)	Increase Over Existing Condition (dBA)
Route 710 Crossing Entry	550 / NW	4	55	67.9	68.1	13.1
Route 710 Crossing Exit	1,650 / S	4	50.55	52.4	56.9	1.9
Kissimmee Crossing Entry	650 / NW	5	50	67.2	67.2	17.2
Kissimmee Crossing Exit	2,400 / NW	5	50	48.5	52.3	2.3

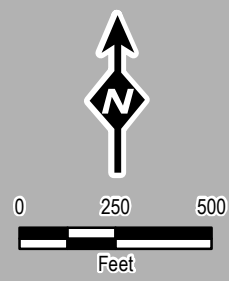
(1) Estimated L_{dn} based on land use as set forth in ANSI 12.9-1993/Part 3.



Legend

- Pipeline Centerline
- NSA Locations
- HDD Entry/Exit points
- Permanent Easement
- Temporary Easement
- Additional TWS

Sources: ESRI, USGS, FSC, TRC



FLORIDA SOUTHEAST CONNECTION™

Figure 9.3-1
Noise Sensitive Areas
Route 710 Crossing

Category 5:
Quiet Suburban Residential Areas:
Isolated areas, far from significant
sources of sound.

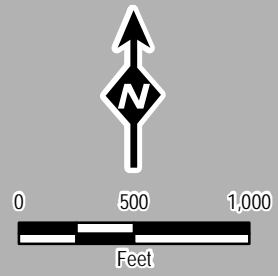
Created: 2/7/2014



Legend

- Pipeline Centerline
- NSA Locations
- HDD Entry/Exit points
- Permanent Easement
- Temporary Easement
- Additional TWS

Sources: ESRI, USGS, FSC, TRC



FLORIDA SOUTHEAST CONNECTION

Figure 9.3-2
Noise Sensitive Areas
Kissimmee River Crossing

Category 5:
 Quiet Suburban Residential Areas:
 Isolated areas, far from significant
 sources of sound.

Created: 2/7/2014

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**Table 9.A.1.1 - Florida Southeast Connection
2016 Construction Equipment Criteria Pollutant Tailpipe Emissions**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower	Load Factor	Nonroad Engine Emission Factor (g/hp-hr)						Operating Time (hours)	Pollutant Emissions (tons)					
					On-road Engine Emission Factor (g/VMT)							CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
					CO ²	NO _x ²	SO ₂ ²	VOC ²	PM ₁₀ ²	PM _{2.5} ²							
			/ On-Road Ave MPH														
Build out Yards and set-up field offices																	
D7 Dozer	Diesel	2270002069	235	82%	0.52	1.55	2.9E-03	0.16	0.10	0.10	201	0.02	0.07	1.3E-04	0.01	4.2E-03	4.2E-03
336 Track hoe	Diesel	2270002036	266	82%	0.44	1.34	2.9E-03	0.15	0.08	0.08	201	0.02	0.06	1.4E-04	0.01	3.8E-03	3.8E-03
Pick-up Trucks	Diesel	2016123223	30		1.60	2.02	4.8E-03	0.28	0.10	0.09	1,004	0.05	0.07	1.6E-04	0.01	3.2E-03	3.1E-03
Off Load Rail Cars Transport to Yard and Off Load at Yards																	
Boom Truck	Diesel	2270002045	240	82%	0.43	1.95	3.0E-03	0.17	0.09	0.09	1,607	0.15	0.68	1.1E-03	0.06	0.03	0.03
End Loader	Diesel	2270002066	300	82%	1.93	3.76	3.8E-03	0.54	0.36	0.36	1,607	0.84	1.64	1.7E-03	0.23	0.16	0.16
Pipe Haul Trucks (Sub)	Diesel	2016126123	30		1.39	5.15	0.01	0.30	0.21	0.20	3,214	0.15	0.55	1.5E-03	0.03	0.02	0.02
Pickup Trucks	Diesel	2016123223	30		1.60	2.02	4.8E-03	0.28	0.10	0.09	2,009	0.11	0.13	3.2E-04	0.02	0.01	0.01
Clearing																	
D7 LGP Dozers	Diesel	2270002069	235	82%	0.52	1.55	2.9E-03	0.16	0.10	0.10	1,138	0.13	0.38	7.1E-04	0.04	0.02	0.02
D8 LGP Dozers	Diesel	2270002069	310	82%	0.89	2.22	3.1E-03	0.16	0.13	0.13	1,138	0.28	0.71	1.0E-03	0.05	0.04	0.04
Fecon Shreader(s)	Diesel	2270002081	350	82%	1.42	3.28	3.3E-03	0.22	0.19	0.19	2,277						
336 Track Hoe	Diesel	2270002036	266	82%	0.44	1.34	2.9E-03	0.15	0.08	0.08	1,138	0.12	0.37	7.8E-04	0.04	0.02	0.02
345 Track Hoe	Diesel	2270002036	345	82%	0.77	1.90	3.1E-03	0.15	0.12	0.12	1,138	0.27	0.67	1.1E-03	0.05	0.04	0.04
Grading/Topsoil Segregation																	
D7 LGP Dozers	Diesel	2270002069	235	82%	0.52	1.55	2.9E-03	0.16	0.10	0.10	2,143	0.24	0.71	1.3E-03	0.07	0.04	0.04
D8 LGP Dozers	Diesel	2270002069	310	82%	0.89	2.22	3.1E-03	0.16	0.13	0.13	2,143	0.53	1.33	1.9E-03	0.10	0.08	0.08
336 Track Hoe	Diesel	2270002036	266	82%	0.44	1.34	2.9E-03	0.15	0.08	0.08	3,214	0.34	1.04	2.2E-03	0.12	0.06	0.06
345 Track Hoe	Diesel	2270002036	345	82%	0.77	1.90	3.1E-03	0.15	0.12	0.12	3,214	0.77	1.90	3.1E-03	0.15	0.12	0.12
Stringing Skids and Pipe																	
Skid Truck	Gasoline	2265002072	265	82%	64.68	4.53	0.01	2.00	0.07	0.07	2,411	37.35	2.62	0.01	1.16	0.04	0.04
Boom Truck	Gasoline	2265002045	240	82%	58.03	4.06	0.01	1.78	0.07	0.07	2,411	30.34	2.12	0.01	0.93	0.04	0.04
583 Sideboom	Diesel	2270002045	300	82%	0.74	2.89	3.2E-03	0.18	0.11	0.11	2,411	0.49	1.89	2.1E-03	0.12	0.07	0.07
D6 LGP Dozers	Diesel	2270002069	205	73%	0.52	1.55	2.9E-03	0.16	0.10	0.10	4,821	0.42	1.24	2.3E-03	0.13	0.08	0.08
Athey Wagons	Diesel	2270002069	300	78%	0.89	2.22	3.1E-03	0.16	0.13	0.13	4,821	1.10	2.74	3.9E-03	0.20	0.16	0.16
Pipe Haul Trucks (SUB)	Diesel	2016126123	30		1.39	5.15	0.01	0.30	0.21	0.20	24,105	1.11	4.11	0.01	0.24	0.17	0.16
Field Bending																	
Bender	Diesel	2270002081	50	73%	2.41	3.72	3.6E-03	0.28	0.29	0.29	3,314	0.32	0.50	4.9E-04	0.04	0.04	0.04
125 Air Compressor for mandrel	Gasoline	2265006020	50	73%	21.34	1.89	0.01	0.64	0.07	0.07	3,314	2.85	0.25	1.7E-03	0.09	0.01	0.01
583 Sideboom	Diesel	2270002045	300	64%	0.74	2.89	3.2E-03	0.18	0.11	0.11	3,314	0.52	2.03	2.2E-03	0.13	0.08	0.08
594 Sideboom	Diesel	2270002045	310	64%	0.74	2.89	3.2E-03	0.18	0.11	0.11	3,314	0.54	2.09	2.3E-03	0.13	0.08	0.08

**Table 9.A.1.1 - Florida Southeast Connection
2016 Construction Equipment Criteria Pollutant Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower	Load Factor	Nonroad Engine Emission Factor (g/hp-hr)						Operating Time (hours)	Pollutant Emissions (tons)					
					On-road Engine Emission Factor (g/VMT)							CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
					CO ²	NO _x ²	SO ₂ ²	VOC ²	PM ₁₀ ²	PM _{2.5} ²							
Firing Line Welding																	
125 Air Compressor for mandrel	Gasoline	2265006020	50	55%	21.34	1.89	0.01	0.64	0.07	0.07	3,214	2.08	0.18	1.3E-03	0.06	0.01	0.01
Tack Rig D7 w/ 4 welders	Diesel	2270002069	235	55%	0.52	1.55	2.9E-03	0.16	0.10	0.10	6,428	0.48	1.42	2.7E-03	0.15	0.09	0.09
welder #1	Diesel	2270006025	25	78%	4.09	4.92	4.3E-03	0.93	0.65	0.65	6,428	0.56	0.67	6.0E-04	0.13	0.09	0.09
welder #2	Diesel	2270006025	25	78%	4.09	4.92	4.3E-03	0.93	0.65	0.65	6,428	0.56	0.67	6.0E-04	0.13	0.09	0.09
welder #3	Diesel	2270006025	25	78%	4.09	4.92	4.3E-03	0.93	0.65	0.65	6,428	0.56	0.67	6.0E-04	0.13	0.09	0.09
welder #4	Diesel	2270006025	25	78%	4.09	4.92	4.3E-03	0.93	0.65	0.65	6,428	0.56	0.67	6.0E-04	0.13	0.09	0.09
583 Sideboom	Diesel	2270002045	300	69%	0.74	2.89	3.2E-03	0.18	0.11	0.11	3,214	0.54	2.10	2.3E-03	0.13	0.08	0.08
Morooka Buggies	Diesel	2270002069	300	64%	0.89	2.22	3.1E-03	0.16	0.13	0.13	32,140	6.06	15.11	0.02	1.10	0.87	0.87
Welding Machines	Diesel	2270006025	25	82%	4.09	4.92	4.3E-03	0.93	0.65	0.65	80,350	7.42	8.93	0.01	1.70	1.17	1.17
Field Joint Coating																	
Skid Truck and or Morooka	Diesel	2270002069	300	64%	0.89	2.22	3.1E-03	0.16	0.13	0.13	9,642	1.82	4.53	0.01	0.33	0.26	0.26
FBE Coating Equipment	Gasoline	2265002081	85	87%	65.34	4.58	0.01	2.03	0.07	0.07	6,428	34.04	2.39	0.01	1.06	0.04	0.04
375 Air compressor	Gasoline	2265006020	110	87%	21.34	1.89	0.01	0.64	0.07	0.07	6,428	14.39	1.27	0.01	0.43	0.05	0.05
Ditching																	
336 Track Hoe	Diesel	2270002036	266	82%	0.44	1.34	2.9E-03	0.15	0.08	0.08	7,432	0.78	2.40	0.01	0.27	0.14	0.14
345 Track Hoe	Diesel	2270002036	345	82%	0.77	1.90	3.1E-03	0.15	0.12	0.12	7,432	1.78	4.40	0.01	0.35	0.27	0.27
D7 LGP Dozers	Diesel	2270002069	235	82%	0.52	1.55	2.9E-03	0.16	0.10	0.10	2,477	0.28	0.82	1.5E-03	0.09	0.05	0.05
D8 LGP Dozers	Diesel	2270002069	310	82%	0.89	2.22	3.1E-03	0.16	0.13	0.13	2,477	0.62	1.54	2.2E-03	0.11	0.09	0.09
Lower In and Tie-ins																	
336 Track Hoe	Diesel	2270002036	266	64%	0.44	1.34	2.9E-03	0.15	0.08	0.08	5,223	0.43	1.32	2.8E-03	0.15	0.08	0.08
345 Track Hoe	Diesel	2270002036	345	64%	0.77	1.90	3.1E-03	0.15	0.12	0.12	5,223	0.98	2.41	3.9E-03	0.19	0.15	0.15
583 Sideboom	Diesel	2270002045	300	64%	0.74	2.89	3.2E-03	0.18	0.11	0.11	15,668	2.46	9.58	0.01	0.61	0.37	0.37
594 Sideboom	Diesel	2270002045	310	64%	0.74	2.89	3.2E-03	0.18	0.11	0.11	15,668	2.54	9.90	0.01	0.63	0.38	0.38
Morooka Buggies	Diesel	2270002069	300	55%	0.89	2.22	3.1E-03	0.16	0.13	0.13	10,446	1.69	4.22	0.01	0.31	0.24	0.24
185 Air compressor	Gasoline	2265006020	65	55%	21.34	1.89	0.01	0.64	0.07	0.07	5,223	4.39	0.39	2.7E-03	0.13	0.01	0.01
Welding Machines	Diesel	2270006025	25	64%	4.09	4.92	4.3E-03	0.93	0.65	0.65	17,409	1.25	1.51	1.3E-03	0.29	0.20	0.20
Backfill & Clean-up																	
336 Track Hoe	Diesel	2270002036	266	82%	0.44	1.34	2.9E-03	0.15	0.08	0.08	2,411	0.25	0.78	1.7E-03	0.09	0.05	0.05
345 Track Hoe	Diesel	2270002036	345	82%	0.77	1.90	3.1E-03	0.15	0.12	0.12	2,411	0.58	1.43	2.3E-03	0.12	0.09	0.09
D7 LGP Dozers	Diesel	2270002069	235	82%	0.52	1.55	2.9E-03	0.16	0.10	0.10	4,821	0.54	1.59	3.0E-03	0.17	0.10	0.10
D8 LGP Dozers	Diesel	2270002069	310	82%	0.89	2.22	3.1E-03	0.16	0.13	0.13	4,821	1.20	3.00	4.2E-03	0.22	0.17	0.17
Farm Tractor	Diesel	2270005010	90	82%	4.66	4.34	4.0E-03	0.57	0.38	0.38	4,821	1.83	1.70	1.6E-03	0.22	0.15	0.15

**Table 9.A.1.1 - Florida Southeast Connection
2016 Construction Equipment Criteria Pollutant Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Engine Emission Factor (g/hp-hr) On-road Engine Emission Factor (g/VMT)						Operating Time (hours)	Pollutant Emissions (tons)					
					CO ²	NO _x ²	SO ₂ ²	VOC ²	PM ₁₀ ²	PM _{2.5} ²		CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
Auger Bore Crew																	
Auger Bore Machine 36-600	Diesel	2270002033	116	43%	1.20	4.18	3.3E-03	0.34	0.25	0.25	1,466	0.10	0.34	2.7E-04	0.03	0.02	0.02
3 Axle Flatbed W/12 Ton Crane	Diesel	2270002045	350	43%	0.74	2.89	3.2E-03	0.18	0.11	0.11	1,466	0.18	0.70	7.7E-04	0.04	0.03	0.03
3 Axle Lowboy Tractor & Trailer	Diesel	2016126123	30		1.39	5.15	0.01	0.30	0.21	0.20	1,466	0.07	0.25	6.8E-04	0.01	0.01	0.01
336 Excavator-CAT	Diesel	2270002036	266	59%	0.44	1.34	2.9E-03	0.15	0.08	0.08	1,466	0.11	0.34	7.3E-04	0.04	0.02	0.02
RT-630 Crane-Grove	Diesel	2265002045	160	47%	58.03	4.06	0.01	1.78	0.07	0.07	1,466	7.05	0.49	1.6E-03	0.22	0.01	0.01
SA250 Welding Machine-Lincoln	Diesel	2270006025	40	21%	4.09	4.92	4.3E-03	0.93	0.65	0.65	1,466	0.06	0.07	5.9E-05	0.01	0.01	0.01
G115KW Generator-IR	Diesel	2270006005	125	43%	1.24	4.14	3.3E-03	0.35	0.25	0.25	1,466	0.11	0.36	2.9E-04	0.03	0.02	0.02
3" Ditch Pump	Gasoline	2265006010	4	69%	213.79	2.16	0.02	6.63	0.35	0.35	1,466	0.95	0.01	1.0E-04	0.03	1.6E-03	1.6E-03
HDD Crew																	
Forklift, 8000+ Lbs	Diesel	2270002057	110	59%	0.93	2.30	3.2E-03	0.21	0.21	0.21	161	0.01	0.03	3.7E-05	2.4E-03	2.4E-03	2.4E-03
336 Excavator-CAT	Diesel	2270002036	266	59%	0.44	1.34	2.9E-03	0.15	0.08	0.08	161	0.01	0.04	8.0E-05	4.2E-03	2.2E-03	2.2E-03
580SL Backhoe-Case	Diesel	2270002036	110	59%	0.65	1.49	3.0E-03	0.16	0.15	0.15	161	0.01	0.02	3.4E-05	1.9E-03	1.8E-03	1.8E-03
RT-860B Crane-Grove	Diesel	2265002045	190	47%	58.03	4.06	0.01	1.78	0.07	0.07	161	0.92	0.06	2.1E-04	0.03	1.1E-03	1.1E-03
Sam 400 Welder Lincoln	Diesel	2270006025	57	21%	5.39	5.15	4.4E-03	1.00	0.78	0.78	161	0.01	0.01	9.3E-06	2.1E-03	1.6E-03	1.6E-03
G260KW Generator-IR	Diesel	2270006025	310	21%	3.04	4.35	3.9E-03	0.58	0.38	0.38	161	0.04	0.05	4.4E-05	0.01	4.4E-03	4.4E-03
Light Towers	Diesel	2270002027	13	43%	2.42	4.59	4.0E-03	0.49	0.35	0.35	161	2.4E-03	4.5E-03	3.9E-06	4.8E-04	3.5E-04	3.5E-04
1100K # Drill Rig DD-1100RS	Diesel	2270002033	765	43%	1.50	5.59	3.3E-03	0.39	0.23	0.23	161	0.09	0.33	1.9E-04	0.02	0.01	0.01
Mud Tank Cleaning System	Diesel	2270006010	500	43%	1.20	3.92	3.3E-03	0.28	0.18	0.18	241	0.07	0.22	1.9E-04	0.02	0.01	0.01
625K # Drill Rig DD-625	Diesel	2270002033	600	43%	1.45	4.18	3.3E-03	0.27	0.20	0.20	161	0.07	0.19	1.5E-04	0.01	0.01	0.01
Mud Tank Cleaning System	Diesel	2270006010	460	43%	1.20	3.92	3.3E-03	0.28	0.18	0.18	161	0.04	0.14	1.1E-04	0.01	0.01	0.01
150K# Drill Rig	Diesel	2270002033	300	43%	1.25	4.19	3.3E-03	0.28	0.19	0.19	161	0.03	0.10	7.5E-05	0.01	4.3E-03	4.3E-03
Mud Tank Cleaning System	Diesel	2270006010	460	43%	1.20	3.92	3.3E-03	0.28	0.18	0.18	161	0.04	0.14	1.1E-04	0.01	0.01	0.01
80K# Drill Rig	Diesel	2270002033	200	43%	1.03	3.97	3.3E-03	0.31	0.21	0.21	161	0.02	0.06	5.0E-05	4.7E-03	3.1E-03	3.1E-03
Mud Tank Cleaning System	Diesel	2270006010	87	43%	2.36	4.25	3.7E-03	0.47	0.43	0.43	161	0.02	0.03	2.4E-05	3.1E-03	2.8E-03	2.8E-03
3/4 Ton Crew Cab Truck	Diesel	2016123223	30		1.60	2.02	4.8E-03	0.28	0.10	0.09	161	0.01	0.01	2.5E-05	1.5E-03	5.1E-04	5.0E-04
5 Ton Cargo Truck	Diesel	2016126123	30		1.39	5.15	0.01	0.30	0.21	0.20	161	0.01	0.03	7.5E-05	1.6E-03	1.1E-03	1.1E-03
Total												179.7	119.5	0.2	14.1	7.1	7.1

1. User's Guide for the Final NONROAD2005, except as noted Model, EPA420-R-05-013, US EPA, December 2005 (non-road engines)
Motor Vehicle Emission Simulator (MOVES) - User Guide for MOVES2010b, U.S. Environmental Protection Agency, June 2013 (onroad engines)
2. EPA NONROAD2008 run for calendar year 2016, Florida (or nonroad engine), MOVES 2010b (onroad engine)

**Table 9.A.1.2 - Florida Southeast Connection
2016 Construction Equipment Greenhouse Gas Tailpipe Emissions**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Emission Factor (g/hp-hr) On-road Emission Factor (g/VMT)				Operating Time (hours)	Pollutant Emissions (tons)			
					CO ₂ ²	CH ₄ ³	N ₂ O ³	CO ₂ e ⁴		CO ₂	N ₂ O	CH ₄	CO ₂ e
					Build out Yards and set-up field offices								
D7 Dozer	Diesel	2270002069	235	82%	536	0.030	0.014	541	201	23	1.3E-03	5.8E-04	23
336 Track hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	201	26	1.5E-03	6.6E-04	26
Pick-up Trucks	Diesel	2016123223	30		642			643	1,004	21	-	-	21
Off Load Rail Cars Transport to Yard and Off Load at Yards													
Boom Truck	Diesel	2270002045	240	82%	530	0.030	0.014	535	1,607	185	0.01	4.7E-03	187
End Loader	Diesel	2270002066	300	82%	625	0.035	0.016	630	1,607	272	0.02	0.01	275
Pipe Haul Trucks (Sub)	Diesel	2016126123	30		1,939			1,941	3,214	206	-	-	206
Pickup Trucks	Diesel	2016123223	30		642			643	2,009	43	-	-	43
Clearing													
D7 LGP Dozers	Diesel	2270002069	235	82%	536	0.030	0.014	541	1,138	130	0.01	3.3E-03	131
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	1,138	171	0.01	4.4E-03	173
Fecon Shreader(s)	Diesel	2270002081	350	82%	536	0.030	0.014	541	2,277	386	0.02	0.01	390
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	1,138	147	0.01	3.7E-03	148
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	1,138	190	0.01	4.8E-03	192
Grading/Topsoil Segregation													
D7 LGP Dozers	Diesel	2270002069	235	82%	536	0.030	0.014	541	2,143	244	0.01	0.01	246
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	2,143	322	0.02	0.01	325
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	3,214	414	0.02	0.01	418
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	3,214	538	0.03	0.01	542
Stringing Skids and Pipe													
Skid Truck	Gasoline	2265002072	265	82%	745	0.042	0.017	751	2,411	430	0.02	0.01	434
Boom Truck	Gasoline	2265002045	240	82%	737	0.042	0.017	743	2,411	386	0.02	0.01	389
583 Sideboom	Diesel	2270002045	300	82%	530	0.030	0.014	535	2,411	347	0.02	0.01	350
D6 LGP Dozers	Diesel	2270002069	205	73%	536	0.030	0.014	541	4,821	427	0.02	0.01	430
Athey Wagons	Diesel	2270002069	300	78%	536	0.030	0.014	541	4,821	663	0.04	0.02	669
Pipe Haul Trucks (SUB)	Diesel	2016126123	30		1,939			1,941	24,105	1,546	-	-	1,547
Field Bending													
Bender	Diesel	2270002081	50	73%	595	0.034	0.015	601	3,314	79	4.5E-03	2.0E-03	80
125 Air Compressor for mandrel	Gasoline	2265006020	50	73%	709	0.040	0.016	715	3,314	95	0.01	2.2E-03	95
583 Sideboom	Diesel	2270002045	300	64%	530	0.030	0.014	535	3,314	372	0.02	0.01	375
594 Sideboom	Diesel	2270002045	310	64%	530	0.030	0.014	535	3,314	385	0.02	0.01	388

**Table 9.A.1.2 - Florida Southeast Connection
2016 Construction Equipment Greenhouse Gas Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Emission Factor (g/hp-hr) On-road Emission Factor (g/VMT)				Operating Time (hours)	Pollutant Emissions (tons)			
					CO ₂ ²	CH ₄ ³	N ₂ O ³	CO ₂ e ⁴		CO ₂	N ₂ O	CH ₄	CO ₂ e
					Firing Line Welding								
125 Air Compressor for mandrel	Gasoline	2265006020	50	55%	709	0.040	0.016	715	3,214	69	3.9E-03	1.6E-03	70
Tack Rig D7 w/ 4 welders	Diesel	2270002069	235	55%	536	0.030	0.014	541	6,428	491	0.03	0.01	496
welder #1	Diesel	2270006025	25	78%	693	0.039	0.018	699	6,428	95	0.01	2.4E-03	96
welder #2	Diesel	2270006025	25	78%	693	0.039	0.018	699	6,428	95	0.01	2.4E-03	96
welder #3	Diesel	2270006025	25	78%	693	0.039	0.018	699	6,428	95	0.01	2.4E-03	96
welder #4	Diesel	2270006025	25	78%	693	0.039	0.018	699	6,428	95	0.01	2.4E-03	96
583 Sideboom	Diesel	2270002045	300	69%	530	0.030	0.014	535	3,214	386	0.02	0.01	390
Morooka Buggies	Diesel	2270002069	300	64%	536	0.030	0.014	541	32,140	3,648	0.21	0.09	3,681
Welding Machines	Diesel	2270006025	25	82%	693	0.039	0.018	699	80,350	1,258	0.07	0.03	1,270
Field Joint Coating													
Skid Truck and or Morooka	Diesel	2270002069	300	64%	536	0.030	0.014	541	9,642	1,094	0.06	0.03	1,104
FBE Coating Equipment	Gasoline	2265002081	85	87%	745	0.042	0.017	752	6,428	388	0.02	0.01	392
375 Air compressor	Gasoline	2265006020	110	87%	709	0.040	0.016	715	6,428	478	0.03	0.01	482
Ditching													
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	7,432	958	0.05	0.02	967
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	7,432	1,243	0.07	0.03	1,254
D7 LGP Dozers	Diesel	2270002069	235	82%									
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	2,477	372	0.02	0.01	376
Lower In and Tie-ins													
336 Track Hoe	Diesel	2270002036	266	64%	536	0.030	0.014	541	5,223	526	0.03	0.01	530
345 Track Hoe	Diesel	2270002036	345	64%	536	0.030	0.014	541	5,223	682	0.04	0.02	688
583 Sideboom	Diesel	2270002045	300	64%	530	0.030	0.014	535	15,668	1,759	0.10	0.04	1,775
594 Sideboom	Diesel	2270002045	310	64%	530	0.030	0.014	535	15,668	1,818	0.10	0.05	1,834
Morooka Buggies	Diesel	2270002069	300	55%	536	0.030	0.014	541	10,446	1,019	0.06	0.03	1,028
185 Air compressor	Gasoline	2265006020	65	55%	709	0.040	0.018	716	5,223	146	0.01	3.7E-03	147
Welding Machines	Diesel	2270006025	25	64%	693	0.039	0.016	699	17,409	213	0.01	4.8E-03	215
Backfill & Clean-up													
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	2,411	311	0.02	0.01	314
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	2,411	403	0.02	0.01	407
D7 LGP Dozers	Diesel	2270002069	235	82%	536	0.030	0.014	541	4,821	549	0.03	0.01	554
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	4,821	724	0.04	0.02	731
Farm Tractor	Diesel	2270005010	90	82%	594	0.034	0.015	600	4,821	233	0.01	0.01	235

**Table 9.A.1.2 - Florida Southeast Connection
2016 Construction Equipment Greenhouse Gas Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Emission Factor (g/hp-hr) On-road Emission Factor (g/VMT)				Operating Time (hours)	Pollutant Emissions (tons)			
					CO ₂ ²	CH ₄ ³	N ₂ O ³	CO ₂ e ⁴		CO ₂	N ₂ O	CH ₄	CO ₂ e
Auger Bore Crew													
Auger Bore Machine 36-600	Diesel	2270002033	116	43%	530	0.030	0.013	535	1,466	43	2.4E-03	1.1E-03	43
3 Axle Flatbed W/12 Ton Crane	Diesel	2270002045	350	43%	530	0.030	0.014	535	1,466	129	0.01	3.3E-03	130
3 Axle Lowboy Tractor & Trailer	Diesel	2016126123	30		1,939			1,941	1,466	94	-	-	94
336 Excavator-CAT	Diesel	2270002036	266	59%	536	0.030	0.014	541	1,466	136	0.01	3.5E-03	137
RT-630 Crane-Grove	Diesel	2265002045	160	47%	737	0.042	0.017	743	1,466	90	0.01	2.0E-03	90
SA250 Welding Machine-Lincoln	Diesel	2270006025	40	21%	693	0.039	0.016	699	1,466	9	5.4E-04	2.1E-04	9
G115KW Generator-IR	Diesel	2270006005	125	43%	530	0.030	0.012	534	1,466	46	2.6E-03	1.0E-03	46
3" Ditch Pump	Gasoline	2265006010	4	69%	1,228	0.070	0.028	1,238	1,466	5	3.1E-04	1.2E-04	6
HDD Crew													
Forklift, 8000+ Lbs	Diesel	2270002057	110	59%	536	0.030	0.014	541	161	6	3.5E-04	1.6E-04	6
336 Excavator-CAT	Diesel	2270002036	266	59%	536	0.030	0.014	541	161	15	8.5E-04	3.8E-04	15
580SL Backhoe-Case	Diesel	2270002036	110	59%	536	0.030	0.014	541	161	6	3.5E-04	1.6E-04	6
RT-860B Crane-Grove	Diesel	2265002045	190	47%	737	0.042	0.019	744	161	12	6.6E-04	3.0E-04	12
Sam 400 Welder Lincoln	Diesel	2270006025	57	21%	693	0.039	0.018	699	161	1	8.3E-05	3.7E-05	1
G260KW Generator-IR	Diesel	2270006025	310	21%	625	0.035	0.016	630	161	7	4.1E-04	1.8E-04	7
Light Towers	Diesel	2270002027	13	43%	589	0.033	0.015	594	161	1	3.3E-05	1.5E-05	1
1100K # Drill Rig DD-1100RS	Diesel	2270002033	765	43%	530	0.030	0.013	535	161	31	1.8E-03	7.9E-04	31
Mud Tank Cleaning System	Diesel	2270006010	500	43%	530	0.030	0.014	535	241	30	1.7E-03	7.7E-04	31
625K # Drill Rig DD-625	Diesel	2270002033	600	43%	530	0.030	0.014	535	161	24	1.4E-03	6.2E-04	24
Mud Tank Cleaning System	Diesel	2270006010	460	43%	530	0.030	0.014	535	161	19	1.1E-03	4.7E-04	19
150K# Drill Rig	Diesel	2270002033	300	43%	530	0.030	0.014	535	161	12	6.9E-04	3.1E-04	12
Mud Tank Cleaning System	Diesel	2270006010	460	43%	530	0.030	0.014	535	161	19	1.1E-03	4.7E-04	19
80K# Drill Rig	Diesel	2270002033	200	43%	530	0.030	0.013	535	161	8	4.6E-04	2.1E-04	8
Mud Tank Cleaning System	Diesel	2270006010	87	43%	589	0.033	0.015	594	161	4	2.2E-04	9.9E-05	4
3/4 Ton Crew Cab Truck	Diesel	2016123223	30		642			643	161	3	-	-	3
5 Ton Cargo Truck	Diesel	2016126123	30		1,939			1,941	161	10	-	-	10
Total										27,958	1.48	0.66	28,193
<p>1. User's Guide for the Final NONROAD2005, except as noted Model, EPA420-R-05-013, US EPA, December 2005 (non-road engines) Motor Vehicle Emission Simulator (MOVES) - User Guide for MOVES2010b, U.S. Environmental Protection Agency, June 2013 (onroad engines)</p> <p>2. EPA NONROAD2008 run for calendar year 2016, Florida (or nonroad engine), MOVES 2010b (onroad engine)</p> <p>3. 2014 Climate Registry Default Emission Factors, Released: January 10, 2014, Tables 13.1 and 13.7., ratioed based on CO₂ emission factor from NONROAD. http://www.theclimateregistry.org/resources/protocols/general-reporting-protocol/</p> <p>4. For nonroad engines, the GWPs of CO₂, CH₄, and N₂O are 1, 25, and 298, respectively. For on-road engines, CO₂e is obtained directly from MOVES.</p>													

**Table 9.A.1.3 - Florida Southeast Connection
2017 Construction Equipment Criteria Pollutant Tailpipe Emissions**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower	Load Factor	Nonroad Engine Emission Factor (g/hp-hr)						Operating Time (hours)	Pollutant Emissions (tons)					
					On-road Engine Emission Factor (g/VMT)							CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
					CO ²	NO _x ²	SO ₂ ²	VOC ²	PM ₁₀ ²	PM _{2.5} ²							
			/ On-Road Ave MPH														
Build out Yards and set-up field offices																	
D7 Dozer	Diesel	2270002069	235	82%	0.42	1.28	2.9E-03	0.15	0.08	0.08	99	0.01	0.03	6.0E-05	3.2E-03	1.6E-03	1.6E-03
336 Track hoe	Diesel	2270002036	266	82%	0.32	1.07	2.8E-03	0.15	0.05	0.05	99	0.01	0.03	6.6E-05	3.5E-03	1.3E-03	1.3E-03
Pick-up Trucks	Diesel	2017123223	30		1.49	1.85	4.7E-03	0.25	0.08	0.08	496	0.02	0.03	7.7E-05	4.0E-03	1.4E-03	1.4E-03
Off Load Rail Cars Transport to Yard and Off Load at Yards																	
Boom Truck	Diesel	2270002045	240	82%	0.37	1.67	3.0E-03	0.17	0.07	0.07	793	0.06	0.29	5.1E-04	0.03	0.01	0.01
End Loader	Diesel	2270002066	300	82%	1.77	3.45	3.7E-03	0.50	0.33	0.33	793	0.38	0.74	8.1E-04	0.11	0.07	0.07
Pipe Haul Trucks (Sub)	Diesel	2017126123	30		1.21	4.48	0.01	0.26	0.18	0.17	1,586	0.06	0.23	7.3E-04	0.01	0.01	0.01
Pickup Trucks	Diesel	2017123223	30		1.49	1.85	4.7E-03	0.25	0.08	0.08	991	0.05	0.06	1.5E-04	0.01	2.8E-03	2.7E-03
Clearing																	
D7 LGP Dozers	Diesel	2270002069	235	82%	0.42	1.28	2.9E-03	0.15	0.08	0.08	562	0.05	0.15	3.4E-04	0.02	0.01	0.01
D8 LGP Dozers	Diesel	2270002069	310	82%	0.78	1.93	3.1E-03	0.16	0.11	0.11	562	0.12	0.30	4.8E-04	0.02	0.02	0.02
Fecon Shreader(s)	Diesel	2270002081	350	82%	1.29	3.00	3.2E-03	0.20	0.18	0.18	1,123						
336 Track Hoe	Diesel	2270002036	266	82%	0.32	1.07	2.8E-03	0.15	0.05	0.05	562	0.04	0.14	3.7E-04	0.02	0.01	0.01
345 Track Hoe	Diesel	2270002036	345	82%	0.66	1.63	3.0E-03	0.15	0.10	0.10	562	0.12	0.29	5.2E-04	0.03	0.02	0.02
Grading/Topsoil Segregation																	
D7 LGP Dozers	Diesel	2270002069	235	82%	0.42	1.28	2.9E-03	0.15	0.08	0.08	1,057	0.09	0.29	6.4E-04	0.03	0.02	0.02
D8 LGP Dozers	Diesel	2270002069	310	82%	0.78	1.93	3.1E-03	0.16	0.11	0.11	1,057	0.23	0.57	9.0E-04	0.05	0.03	0.03
336 Track Hoe	Diesel	2270002036	266	82%	0.32	1.07	2.8E-03	0.15	0.05	0.05	1,586	0.12	0.41	1.1E-03	0.06	0.02	0.02
345 Track Hoe	Diesel	2270002036	345	82%	0.66	1.63	3.0E-03	0.15	0.10	0.10	1,586	0.33	0.81	1.5E-03	0.07	0.05	0.05
Stringing Skids and Pipe																	
Skid Truck	Gasoline	2265002072	265	82%	57.59	4.04	0.01	1.77	0.07	0.07	1,189	16.41	1.15	3.8E-03	0.50	0.02	0.02
Boom Truck	Gasoline	2265002045	240	82%	50.38	3.53	0.01	1.53	0.07	0.07	1,189	13.00	0.91	3.4E-03	0.40	0.02	0.02
583 Sideboom	Diesel	2270002045	300	82%	0.67	2.58	3.1E-03	0.18	0.10	0.10	1,189	0.22	0.83	1.0E-03	0.06	0.03	0.03
D6 LGP Dozers	Diesel	2270002069	205	73%	0.42	1.28	2.9E-03	0.15	0.08	0.08	2,379	0.16	0.50	1.1E-03	0.06	0.03	0.03
Athey Wagons	Diesel	2270002069	300	78%	0.78	1.93	3.1E-03	0.16	0.11	0.11	2,379	0.48	1.18	1.9E-03	0.10	0.07	0.07
Pipe Haul Trucks (SUB)	Diesel	2017126123	30		1.21	4.48	0.01	0.26	0.18	0.17	11,895	0.48	1.76	0.01	0.10	0.07	0.07
Field Bending																	
Bender	Diesel	2270002081	50	73%	2.16	3.59	3.6E-03	0.25	0.25	0.25	1,636	0.14	0.24	2.3E-04	0.02	0.02	0.02
125 Air Compressor for mandrel	Gasoline	2265006020	50	73%	18.82	1.67	0.01	0.56	0.07	0.07	1,636	1.24	0.11	8.5E-04	0.04	4.5E-03	4.5E-03
583 Sideboom	Diesel	2270002045	300	64%	0.67	2.58	3.1E-03	0.18	0.10	0.10	1,636	0.23	0.89	1.1E-03	0.06	0.03	0.03
594 Sideboom	Diesel	2270002045	310	64%	0.67	2.58	3.1E-03	0.18	0.10	0.10	1,636	0.24	0.92	1.1E-03	0.06	0.04	0.04

**Table 9.A.1.3 - Florida Southeast Connection
2017 Construction Equipment Criteria Pollutant Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower	Load Factor	Nonroad Engine Emission Factor (g/hp-hr)						Operating Time (hours)	Pollutant Emissions (tons)					
					On-road Engine Emission Factor (g/VMT)							CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
					CO ²	NO _x ²	SO ₂ ²	VOC ²	PM ₁₀ ²	PM _{2.5} ²							
Firing Line Welding																	
125 Air Compressor for mandrel	Gasoline	2265006020	50	55%	18.82	1.67	0.01	0.56	0.07	0.07	1,586	0.90	0.08	6.2E-04	0.03	3.3E-03	3.3E-03
Tack Rig D7 w/ 4 welders	Diesel	2270002069	235	55%	0.42	1.28	2.9E-03	0.15	0.08	0.08	3,172	0.19	0.58	1.3E-03	0.07	0.03	0.03
welder #1	Diesel	2270006025	25	78%	3.59	4.72	4.3E-03	0.80	0.57	0.57	3,172	0.24	0.32	2.9E-04	0.05	0.04	0.04
welder #2	Diesel	2270006025	25	78%	3.59	4.72	4.3E-03	0.80	0.57	0.57	3,172	0.24	0.32	2.9E-04	0.05	0.04	0.04
welder #3	Diesel	2270006025	25	78%	3.59	4.72	4.3E-03	0.80	0.57	0.57	3,172	0.24	0.32	2.9E-04	0.05	0.04	0.04
welder #4	Diesel	2270006025	25	78%	3.59	4.72	4.3E-03	0.80	0.57	0.57	3,172	0.24	0.32	2.9E-04	0.05	0.04	0.04
583 Sideboom	Diesel	2270002045	300	69%	0.67	2.58	3.1E-03	0.18	0.10	0.10	1,586	0.24	0.93	1.1E-03	0.06	0.04	0.04
Morooka Buggies	Diesel	2270002069	300	64%	0.78	1.93	3.1E-03	0.16	0.11	0.11	15,860	2.63	6.49	0.01	0.52	0.39	0.39
Welding Machines	Diesel	2270006025	25	82%	3.59	4.72	4.3E-03	0.80	0.57	0.57	39,650	3.22	4.23	3.8E-03	0.72	0.51	0.51
Field Joint Coating																	
Skid Truck and or Morooka	Diesel	2270002069	300	64%	0.78	1.93	3.1E-03	0.16	0.11	0.11	4,758	0.79	1.95	3.1E-03	0.16	0.12	0.12
FBE Coating Equipment	Gasoline	2265002081	85	87%	58.29	4.09	0.01	1.79	0.07	0.07	3,172	14.98	1.05	3.5E-03	0.46	0.02	0.02
375 Air compressor	Gasoline	2265006020	110	87%	18.82	1.67	0.01	0.56	0.07	0.07	3,172	6.26	0.55	4.3E-03	0.19	0.02	0.02
Ditching																	
336 Track Hoe	Diesel	2270002036	266	82%	0.32	1.07	2.8E-03	0.15	0.05	0.05	3,668	0.29	0.94	2.4E-03	0.13	0.05	0.05
345 Track Hoe	Diesel	2270002036	345	82%	0.66	1.63	3.0E-03	0.15	0.10	0.10	3,668	0.76	1.87	3.4E-03	0.17	0.12	0.12
D7 LGP Dozers	Diesel	2270002069	235	82%	0.42	1.28	2.9E-03	0.15	0.08	0.08	1,223	0.11	0.33	7.4E-04	0.04	0.02	0.02
D8 LGP Dozers	Diesel	2270002069	310	82%	0.78	1.93	3.1E-03	0.16	0.11	0.11	1,223	0.27	0.66	1.0E-03	0.05	0.04	0.04
Lower In and Tie-ins																	
336 Track Hoe	Diesel	2270002036	266	64%	0.32	1.07	2.8E-03	0.15	0.05	0.05	2,577	0.16	0.52	1.3E-03	0.07	0.03	0.03
345 Track Hoe	Diesel	2270002036	345	64%	0.66	1.63	3.0E-03	0.15	0.10	0.10	2,577	0.41	1.02	1.9E-03	0.09	0.06	0.06
583 Sideboom	Diesel	2270002045	300	64%	0.67	2.58	3.1E-03	0.18	0.10	0.10	7,732	1.09	4.23	0.01	0.29	0.16	0.16
594 Sideboom	Diesel	2270002045	310	64%	0.67	2.58	3.1E-03	0.18	0.10	0.10	7,732	1.13	4.37	0.01	0.30	0.17	0.17
Morooka Buggies	Diesel	2270002069	300	55%	0.78	1.93	3.1E-03	0.16	0.11	0.11	5,154	0.73	1.81	2.9E-03	0.15	0.11	0.11
185 Air compressor	Gasoline	2265006020	65	55%	18.82	1.67	0.01	0.56	0.07	0.07	2,577	1.91	0.17	1.3E-03	0.06	0.01	0.01
Welding Machines	Diesel	2270006025	25	64%	3.59	4.72	4.3E-03	0.80	0.57	0.57	8,591	0.54	0.72	6.5E-04	0.12	0.09	0.09
Backfill & Clean-up																	
336 Track Hoe	Diesel	2270002036	266	82%	0.32	1.07	2.8E-03	0.15	0.05	0.05	1,189	0.09	0.31	7.9E-04	0.04	0.02	0.02
345 Track Hoe	Diesel	2270002036	345	82%	0.66	1.63	3.0E-03	0.15	0.10	0.10	1,189	0.25	0.61	1.1E-03	0.06	0.04	0.04
D7 LGP Dozers	Diesel	2270002069	235	82%	0.42	1.28	2.9E-03	0.15	0.08	0.08	2,379	0.21	0.65	1.4E-03	0.08	0.04	0.04
D8 LGP Dozers	Diesel	2270002069	310	82%	0.78	1.93	3.1E-03	0.16	0.11	0.11	2,379	0.52	1.29	2.0E-03	0.10	0.08	0.08
Farm Tractor	Diesel	2270005010	90	82%	4.60	4.33	4.0E-03	0.57	0.37	0.37	2,379	0.89	0.84	7.8E-04	0.11	0.07	0.07

**Table 9.A.1.3 - Florida Southeast Connection
2017 Construction Equipment Criteria Pollutant Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Engine Emission Factor (g/hp-hr) On-road Engine Emission Factor (g/VMT)						Operating Time (hours)	Pollutant Emissions (tons)					
					CO ²	NO _x ²	SO ₂ ²	VOC ²	PM ₁₀ ²	PM _{2.5} ²		CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
Auger Bore Crew																	
Auger Bore Machine 36-600	Diesel	2270002033	116	43%	1.10	3.87	3.3E-03	0.32	0.23	0.23	724	0.04	0.15	1.3E-04	0.01	0.01	0.01
3 Axle Flatbed W/12 Ton Crane	Diesel	2270002045	350	43%	0.67	2.58	3.1E-03	0.18	0.10	0.10	724	0.08	0.31	3.7E-04	0.02	0.01	0.01
3 Axle Lowboy Tractor & Trailer	Diesel	2017126123	30		1.21	4.48	0.01	0.26	0.18	0.17	724	0.03	0.11	3.3E-04	0.01	4.3E-03	4.1E-03
336 Excavator-CAT	Diesel	2270002036	266	59%	0.32	1.07	2.8E-03	0.15	0.05	0.05	724	0.04	0.13	3.5E-04	0.02	0.01	0.01
RT-630 Crane-Grove	Diesel	2265002045	160	47%	50.38	3.53	0.01	1.53	0.07	0.07	724	3.02	0.21	8.0E-04	0.09	4.1E-03	4.1E-03
SA250 Welding Machine-Lincoln	Diesel	2270006025	40	21%	3.59	4.72	4.3E-03	0.80	0.57	0.57	724	0.02	0.03	2.9E-05	0.01	3.8E-03	3.8E-03
G115KW Generator-IR	Diesel	2270006005	125	43%	1.15	3.85	3.3E-03	0.33	0.23	0.23	724	0.05	0.17	1.4E-04	0.01	0.01	0.01
3" Ditch Pump	Gasoline	2265006010	4	69%	213.79	2.16	0.02	6.63	0.35	0.35	724	0.47	4.8E-03	4.9E-05	0.01	7.7E-04	7.7E-04
HDD Crew																	
Forklift, 8000+ Lbs	Diesel	2270002057	110	59%	0.82	1.99	3.1E-03	0.19	0.19	0.19	79	4.7E-03	0.01	1.8E-05	1.1E-03	1.1E-03	1.1E-03
336 Excavator-CAT	Diesel	2270002036	266	59%	0.32	1.07	2.8E-03	0.15	0.05	0.05	79	4.4E-03	0.01	3.8E-05	2.0E-03	7.5E-04	7.5E-04
580SL Backhoe-Case	Diesel	2270002036	110	59%	0.51	1.20	2.9E-03	0.15	0.12	0.12	79	2.9E-03	0.01	1.6E-05	8.7E-04	6.6E-04	6.6E-04
RT-860B Crane-Grove	Diesel	2265002045	190	47%	50.38	3.53	0.01	1.53	0.07	0.07	79	0.39	0.03	1.0E-04	0.01	5.4E-04	5.4E-04
Sam 400 Welder Lincoln	Diesel	2270006025	57	21%	5.05	4.98	4.3E-03	0.93	0.72	0.72	79	0.01	0.01	4.5E-06	9.7E-04	7.5E-04	7.5E-04
G260KW Generator-IR	Diesel	2270006025	310	21%	2.79	4.05	3.8E-03	0.53	0.35	0.35	79	0.02	0.02	2.2E-05	3.0E-03	2.0E-03	2.0E-03
Light Towers	Diesel	2270002027	13	43%	2.40	4.55	4.0E-03	0.47	0.35	0.35	79	1.2E-03	2.2E-03	1.9E-06	2.3E-04	1.7E-04	1.7E-04
1100K # Drill Rig DD-1100RS	Diesel	2270002033	765	43%	1.39	5.36	3.2E-03	0.37	0.22	0.22	79	0.04	0.15	9.3E-05	0.01	0.01	0.01
Mud Tank Cleaning System	Diesel	2270006010	500	43%	1.10	3.65	3.2E-03	0.26	0.16	0.16	119	0.03	0.10	9.1E-05	0.01	4.6E-03	4.6E-03
625K # Drill Rig DD-625	Diesel	2270002033	600	43%	1.35	3.89	3.2E-03	0.25	0.18	0.18	79	0.03	0.09	7.3E-05	0.01	4.1E-03	4.1E-03
Mud Tank Cleaning System	Diesel	2270006010	460	43%	1.10	3.65	3.2E-03	0.26	0.16	0.16	79	0.02	0.06	5.6E-05	4.5E-03	2.8E-03	2.8E-03
150K# Drill Rig	Diesel	2270002033	300	43%	1.15	3.89	3.2E-03	0.26	0.17	0.17	79	0.01	0.04	3.7E-05	3.0E-03	2.0E-03	2.0E-03
Mud Tank Cleaning System	Diesel	2270006010	460	43%	1.10	3.65	3.2E-03	0.26	0.16	0.16	79	0.02	0.06	5.6E-05	4.5E-03	2.8E-03	2.8E-03
80K# Drill Rig	Diesel	2270002033	200	43%	0.93	3.66	3.2E-03	0.29	0.19	0.19	79	0.01	0.03	2.4E-05	2.2E-03	1.4E-03	1.4E-03
Mud Tank Cleaning System	Diesel	2270006010	87	43%	2.21	3.98	3.6E-03	0.44	0.40	0.40	79	0.01	0.01	1.2E-05	1.5E-03	1.3E-03	1.3E-03
3/4 Ton Crew Cab Truck	Diesel	2017123223	30		1.49	1.85	4.7E-03	0.25	0.08	0.08	79	3.9E-03	4.8E-03	1.2E-05	6.5E-04	2.2E-04	2.2E-04
5 Ton Cargo Truck	Diesel	2017126123	30		1.21	4.48	0.01	0.26	0.18	0.17	79	3.2E-03	0.01	3.7E-05	6.9E-04	4.7E-04	4.5E-04
Total												78.2	52.1	0.1	6.4	3.1	3.1

1. User's Guide for the Final NONROAD2005, except as noted Model, EPA420-R-05-013, US EPA, December 2005 (non-road engines)
Motor Vehicle Emission Simulator (MOVES) - User Guide for MOVES2010b, U.S. Environmental Protection Agency, June 2013 (onroad engines)
2. EPA NONROAD2008 run for calendar year 2017, Florida (or nonroad engine), MOVES 2010b (onroad engine)

**Table 9.A.1.4 - Florida Southeast Connection
2017 Construction Equipment Greenhouse Gas Tailpipe Emissions**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Emission Factor (g/hp-hr) On-road Emission Factor (g/VMT)				Operating Time (hours)	Pollutant Emissions (tons)			
					CO ₂ ²	CH ₄ ³	N ₂ O ³	CO ₂ e ⁴		CO ₂	N ₂ O	CH ₄	CO ₂ e
					Build out Yards and set-up field offices								
D7 Dozer	Diesel	2270002069	235	82%	536	0.030	0.014	541	99	11	6.4E-04	2.9E-04	11
336 Track hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	99	13	7.3E-04	3.3E-04	13
Pick-up Trucks	Diesel	2017123223	30		639			640	496	10	-	-	10
Off Load Rail Cars Transport to Yard and Off Load at Yards													
Boom Truck	Diesel	2270002045	240	82%	531	0.030	0.014	535	793	91	0.01	2.3E-03	92
End Loader	Diesel	2270002066	300	82%	625	0.036	0.016	631	793	134	0.01	3.4E-03	136
Pipe Haul Trucks (Sub)	Diesel	2017126123	30		1,939			1,941	1,586	102	-	-	102
Pickup Trucks	Diesel	2017123223	30		639			640	991	21	-	-	21
Clearing													
D7 LGP Dozers	Diesel	2270002069	235	82%	536	0.030	0.014	541	562	64	3.6E-03	1.6E-03	65
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	562	84	4.8E-03	2.1E-03	85
Fecon Shreader(s)	Diesel	2270002081	350	82%	536	0.030	0.014	541	1,123	191	0.01	4.9E-03	192
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	562	72	4.1E-03	1.8E-03	73
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	562	94	0.01	2.4E-03	95
Grading/Topsoil Segregation													
D7 LGP Dozers	Diesel	2270002069	235	82%	536	0.030	0.014	541	1,057	120	0.01	3.1E-03	122
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	1,057	159	0.01	4.0E-03	160
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	1,586	205	0.01	0.01	206
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	1,586	265	0.02	0.01	268
Stringing Skids and Pipe													
Skid Truck	Gasoline	2265002072	265	82%	738	0.042	0.017	744	1,189	210	0.01	4.8E-03	212
Boom Truck	Gasoline	2265002045	240	82%	730	0.042	0.017	736	1,189	188	0.01	4.3E-03	190
583 Sideboom	Diesel	2270002045	300	82%	530	0.030	0.014	535	1,189	171	0.01	4.4E-03	173
D6 LGP Dozers	Diesel	2270002069	205	73%	536	0.030	0.014	541	2,379	210	0.01	0.01	212
Athey Wagons	Diesel	2270002069	300	78%	536	0.030	0.014	541	2,379	327	0.02	0.01	330
Pipe Haul Trucks (SUB)	Diesel	2017126123	30		1,939			1,941	11,895	763	-	-	763
Field Bending													
Bender	Diesel	2270002081	50	73%	595	0.034	0.015	601	1,636	39	2.2E-03	1.0E-03	40
125 Air Compressor for mandrel	Gasoline	2265006020	50	73%	707	0.040	0.016	713	1,636	47	2.6E-03	1.1E-03	47
583 Sideboom	Diesel	2270002045	300	64%	530	0.030	0.014	535	1,636	184	0.01	4.7E-03	185
594 Sideboom	Diesel	2270002045	310	64%	530	0.030	0.014	535	1,636	190	0.01	4.8E-03	191

**Table 9.A.1.4 - Florida Southeast Connection
2017 Construction Equipment Greenhouse Gas Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Emission Factor (g/hp-hr) On-road Emission Factor (g/VMT)				Operating Time (hours)	Pollutant Emissions (tons)			
					CO ₂ ²	CH ₄ ³	N ₂ O ³	CO ₂ e ⁴		CO ₂	N ₂ O	CH ₄	CO ₂ e
Firing Line Welding													
125 Air Compressor for mandrel	Gasoline	2265006020	50	55%	707	0.040	0.016	713	1,586	34	1.9E-03	7.7E-04	34
Tack Rig D7 w/ 4 welders	Diesel	2270002069	235	55%	536	0.030	0.014	541	3,172	242	0.01	0.01	245
welder #1	Diesel	2270006025	25	78%	693	0.039	0.018	700	3,172	47	2.7E-03	1.2E-03	47
welder #2	Diesel	2270006025	25	78%	693	0.039	0.018	700	3,172	47	2.7E-03	1.2E-03	47
welder #3	Diesel	2270006025	25	78%	693	0.039	0.018	700	3,172	47	2.7E-03	1.2E-03	47
welder #4	Diesel	2270006025	25	78%	693	0.039	0.018	700	3,172	47	2.7E-03	1.2E-03	47
583 Sideboom	Diesel	2270002045	300	69%	530	0.030	0.014	535	1,586	191	0.01	4.9E-03	192
Morooka Buggies	Diesel	2270002069	300	64%	536	0.030	0.014	541	15,860	1,800	0.10	0.05	1,817
Welding Machines	Diesel	2270006025	25	82%	693	0.039	0.018	700	39,650	621	0.04	0.02	627
Field Joint Coating													
Skid Truck and or Morooka	Diesel	2270002069	300	64%	536	0.030	0.014	541	4,758	540	0.03	0.01	545
FBE Coating Equipment	Gasoline	2265002081	85	87%	738	0.042	0.017	744	3,172	190	0.01	4.3E-03	191
375 Air compressor	Gasoline	2265006020	110	87%	707	0.040	0.016	713	3,172	235	0.01	0.01	237
Ditching													
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	3,668	473	0.03	0.01	477
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	3,668	613	0.03	0.02	619
D7 LGP Dozers	Diesel	2270002069	235	82%									
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	1,223	184	0.01	4.7E-03	185
Lower In and Tie-ins													
336 Track Hoe	Diesel	2270002036	266	64%	536	0.030	0.014	541	2,577	259	0.01	0.01	262
345 Track Hoe	Diesel	2270002036	345	64%	536	0.030	0.014	541	2,577	336	0.02	0.01	339
583 Sideboom	Diesel	2270002045	300	64%	530	0.030	0.014	535	7,732	868	0.05	0.02	876
594 Sideboom	Diesel	2270002045	310	64%	530	0.030	0.014	535	7,732	897	0.05	0.02	905
Morooka Buggies	Diesel	2270002069	300	55%	536	0.030	0.014	541	5,154	503	0.03	0.01	507
185 Air compressor	Gasoline	2265006020	65	55%	707	0.040	0.018	713	2,577	72	4.1E-03	1.8E-03	72
Welding Machines	Diesel	2270006025	25	64%	693	0.039	0.016	699	8,591	105	0.01	2.4E-03	106
Backfill & Clean-up													
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	1,189	153	0.01	3.9E-03	155
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	1,189	199	0.01	0.01	201
D7 LGP Dozers	Diesel	2270002069	235	82%	536	0.030	0.014	541	2,379	271	0.02	0.01	273
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	2,379	358	0.02	0.01	361
Farm Tractor	Diesel	2270005010	90	82%	594	0.034	0.015	600	2,379	115	0.01	2.9E-03	116

**Table 9.A.1.4 - Florida Southeast Connection
2017 Construction Equipment Greenhouse Gas Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Emission Factor (g/hp-hr) On-road Emission Factor (g/VMT)				Operating Time (hours)	Pollutant Emissions (tons)			
					CO ₂ ²	CH ₄ ³	N ₂ O ³	CO ₂ e ⁴		CO ₂	N ₂ O	CH ₄	CO ₂ e
Auger Bore Crew													
Auger Bore Machine 36-600	Diesel	2270002033	116	43%	530	0.030	0.013	535	724	21	1.2E-03	5.4E-04	21
3 Axle Flatbed W/12 Ton Crane	Diesel	2270002045	350	43%	530	0.030	0.014	535	724	64	3.6E-03	1.6E-03	64
3 Axle Lowboy Tractor & Trailer	Diesel	2017126123	30		1,939			1,941	724	46	-	-	46
336 Excavator-CAT	Diesel	2270002036	266	59%	536	0.030	0.014	541	724	67	3.8E-03	1.7E-03	68
RT-630 Crane-Grove	Diesel	2265002045	160	47%	730	0.042	0.017	736	724	44	2.5E-03	1.0E-03	44
SA250 Welding Machine-Lincoln	Diesel	2270006025	40	21%	693	0.039	0.016	699	724	5	2.6E-04	1.1E-04	5
G115KW Generator-IR	Diesel	2270006005	125	43%	530	0.030	0.012	534	724	23	1.3E-03	5.2E-04	23
3" Ditch Pump	Gasoline	2265006010	4	69%	1,228	0.070	0.028	1,238	724	3	1.5E-04	6.2E-05	3
HDD Crew													
Forklift, 8000+ Lbs	Diesel	2270002057	110	59%	536	0.030	0.014	541	79	3	1.7E-04	7.7E-05	3
336 Excavator-CAT	Diesel	2270002036	266	59%	536	0.030	0.014	541	79	7	4.2E-04	1.9E-04	7
580SL Backhoe-Case	Diesel	2270002036	110	59%	536	0.030	0.014	541	79	3	1.7E-04	7.7E-05	3
RT-860B Crane-Grove	Diesel	2265002045	190	47%	730	0.041	0.019	736	79	6	3.2E-04	1.5E-04	6
Sam 400 Welder Lincoln	Diesel	2270006025	57	21%	693	0.039	0.018	699	79	1	4.1E-05	1.8E-05	1
G260KW Generator-IR	Diesel	2270006025	310	21%	625	0.035	0.016	630	79	4	2.0E-04	9.1E-05	4
Light Towers	Diesel	2270002027	13	43%	589	0.033	0.015	594	79	0	1.6E-05	7.3E-06	0
1100K # Drill Rig DD-1100RS	Diesel	2270002033	765	43%	530	0.030	0.013	535	79	15	8.7E-04	3.9E-04	15
Mud Tank Cleaning System	Diesel	2270006010	500	43%	530	0.030	0.014	535	119	15	8.5E-04	3.8E-04	15
625K # Drill Rig DD-625	Diesel	2270002033	600	43%	530	0.030	0.014	535	79	12	6.8E-04	3.0E-04	12
Mud Tank Cleaning System	Diesel	2270006010	460	43%	530	0.030	0.014	535	79	9	5.2E-04	2.3E-04	9
150K# Drill Rig	Diesel	2270002033	300	43%	530	0.030	0.014	535	79	6	3.4E-04	1.5E-04	6
Mud Tank Cleaning System	Diesel	2270006010	460	43%	530	0.030	0.014	535	79	9	5.2E-04	2.3E-04	9
80K# Drill Rig	Diesel	2270002033	200	43%	530	0.030	0.013	535	79	4	2.3E-04	1.0E-04	4
Mud Tank Cleaning System	Diesel	2270006010	87	43%	589	0.033	0.015	594	79	2	1.1E-04	4.9E-05	2
3/4 Ton Crew Cab Truck	Diesel	2017123223	30		639			640	79	2	-	-	2
5 Ton Cargo Truck	Diesel	2017126123	30		1,939			1,941	79	5	-	-	5
Total										13,790	0.73	0.32	13,905
<p>1. User's Guide for the Final NONROAD2005, except as noted Model, EPA420-R-05-013, US EPA, December 2005 (non-road engines) Motor Vehicle Emission Simulator (MOVES) - User Guide for MOVES2010b, U.S. Environmental Protection Agency, June 2013 (onroad engines)</p> <p>2. EPA NONROAD2008 run for calendar year 2017, Florida (or nonroad engine), MOVES 2010b (onroad engine)</p> <p>3. 2014 Climate Registry Default Emission Factors, Released: January 10, 2014, Tables 13.1 and 13.7., ratioed based on CO₂ emission factor from NONROAD. http://www.theclimateregistry.org/resources/protocols/general-reporting-protocol/</p> <p>4. For nonroad engines, the GWPs of CO₂, CH₄, and N₂O are 1, 25, and 298, respectively. For on-road engines, CO₂e is obtained directly from MOVES.</p>													

**Table 9.A.1.5 - Florida Southeast Connection
On-Road Material Delivery and Worker Commuting Emission Factors**

Vehicle	Emission Factor (g/VMT) ¹								Trip Distance (2-way) (miles)	Vehicle-months	Vehicle Usage (vehicle-days/year)
	CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}	CO ₂	CO _{2e}			
2016											
Diesel Heavy Trucks	1.39	5.15	0.014	0.295	0.211	0.204	1,939	1,941	200	900	19,554
Diesel Buses	2.00	5.21	0.009	0.379	0.247	0.239	1,241	1,242	50	250	5,432
Diesel Light Trucks	1.60	2.02	0.005	0.277	0.096	0.093	642	643	50		-
Gasoline Passenger Cars	1.88	0.19	0.005	0.044	0.004	0.003	314	315	50	1,733	37,651
Gasoline Passenger Trucks	4.29	0.65	0.007	0.161	0.007	0.006	431	432	50	193	4,193
2017											
Diesel Heavy Trucks	1.21	4.48	0.014	0.262	0.178	0.173	1,939	1,941	200	450	9,777
Diesel Buses	1.77	4.58	0.009	0.338	0.213	0.207	1,241	1,243	50	125	2,716
Diesel Light Trucks	1.49	1.85	0.005	0.247	0.085	0.082	639	640	50		-
Gasoline Passenger Cars	1.79	0.16	0.005	0.038	0.004	0.003	308	309	50	866	18,815
Gasoline Passenger Trucks	4.10	0.60	0.006	0.145	0.007	0.006	422	423	50	96	2,086
1. EPA MOVES2010b											

**Table 9.A.1.6 - Florida Southeast Connection
On-Road Material Delivery and Worker Commuting Emissions**

Vehicle	Vehicle Miles Traveled (VMT)	Emissions (ton/yr)							
		CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}	CO ₂	CO ₂ e
2016									
Diesel Heavy Trucks	3,910,800	5.99	22.21	0.06	1.27	0.91	0.88	8,360	8,366
Diesel Buses	271,600	0.60	1.56	2.7E-03	0.11	0.07	0.07	372	372
Diesel Light Trucks	-	-	-	-	-	-	-	-	-
Gasoline Passenger Cars	1,882,550	3.91	0.40	0.01	0.09	0.01	0.01	652	653
Gasoline Passenger Trucks	209,650	0.99	0.15	1.5E-03	0.04	1.5E-03	1.4E-03	100	100
Total		11.49	24.32	0.07	1.51	0.99	0.96	9,484	9,491
2017									
Diesel Heavy Trucks	1,955,400	2.62	9.66	0.03	0.57	0.38	0.37	4,180	4,183
Diesel Buses	135,800	0.26	0.69	1.4E-03	0.05	0.03	0.03	186	186
Diesel Light Trucks	-	-	-	-	-	-	-	-	-
Gasoline Passenger Cars	940,750	1.86	0.17	4.8E-03	0.04	3.7E-03	3.4E-03	320	320
Gasoline Passenger Trucks	104,300	0.47	0.07	7.4E-04	0.02	7.6E-04	7.0E-04	49	49
Total		5.21	10.58	0.04	0.67	0.42	0.41	4,734	4,738
1. See Table 9.A.1.5 for emission factors									

**Table 9.A.1.7 - Florida Southeast Connection
2016 Fugitive Dust**

Acres Disturbed		1,018						
Dust Control Efficiency		50%						
Activity	Emission Factor (ton/acre-month)		Reference	Duration (months) ^{7,8}	Uncontrolled Emissions (tons)		Controlled Emissions (tons)	
	PM ₁₀	PM _{2.5}			PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}
Construction	1.10E-01	1.10E-02	2, 3	2	224.00	22.40	112.00	11.20
Wind erosion	1.58E-02	2.38E-03	4, 5, 6	6	96.73	14.51	48.36	7.25
Total Emissions					320.73	36.91	160.36	18.45

1. Assume 50% control from water and other approved dust suppressants. (WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Section 3.4.1.)

2. WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Table 3-2, level 1, average conditions

3. PM_{2.5}/PM₁₀ = 0.10 (WRAP Fugitive Dust Handbook, Section 3.4.1)

4. Wind erosion of exposed areas (seeded land, stripped or graded overburden) = 0.38 ton TSP/acre/yr (WRAP Fugitive Dust Handbook, Table 11-6)

5. PM₁₀/TSP = 0.5, PM_{2.5}/PM₁₀ = 0.15, (WRAP Fugitive Dust Handbook, Section 7-2)

6. Emission factor converted from ton/acre-year to ton/acre-month by dividing by 12

7. It is assumed that construction of a given pipeline segment will entail 2 months of continuous activity.

8. It is assumed that, on average, it will require 6 months to fully revegetate disturbed areas.

**Table 9.A.1.8 - Florida Southeast Connection
2017 Fugitive Dust**

Acres Disturbed		509						
Dust Control Efficiency		50%						
Activity	Emission Factor (ton/acre-month)		Reference	Duration (months)^{7,8}	Uncontrolled Emissions (tons)		Controlled Emissions (tons)	
	PM₁₀	PM_{2.5}			PM₁₀	PM_{2.5}	PM₁₀	PM_{2.5}
Construction	1.10E-01	1.10E-02	2, 3	2	112.00	11.20	56.00	5.60
Wind erosion	1.58E-02	2.38E-03	4, 5, 6	6	48.36	7.25	24.18	3.63
Total Emissions					160.36	18.45	80.18	9.23

1. Assume 50% control from water and other approved dust suppressants. (WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Section 3.4.1.)

2. WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Table 3-2, level 1, average conditions

3. $PM_{2.5}/PM_{10} = 0.10$ (WRAP Fugitive Dust Handbook, Section 3.4.1)

4. Wind erosion of exposed areas (seeded land, stripped or graded overburden) = 0.38 ton TSP/acre/yr (WRAP Fugitive Dust Handbook, Table 11-6)

5. $PM_{10}/TSP = 0.5$, $PM_{2.5}/PM_{10} = 0.15$, (WRAP Fugitive Dust Handbook, Section 7-2)

6. Emission factor converted from ton/acre-year to ton/acre-month by dividing by 12

7. It is assumed that construction of a given pipeline segment will entail 2 months of continuous activity.

8. It is assumed that, on average, it will require 6 months to fully revegetate disturbed areas.

**Table 9.A.1.9 - Florida Southeast Connection
Open Burning**

Fuel Loading (tons/acre)	9.0(a)
Proposed Open Burning Areas	
Forested and shrub wetland	454.4 acres
Forested and shrub area	1,152.7 acres
246.32 acres with tree / shrub coverage < 25%	61.6 acres
Total	1,668.7 acres
Percent Burned in 2016	67%
Percent Burned in 2017	33%

Pollutant	Emission Factor		Emission (tons)	
	(lb/ton)	(lb/acre)	2016	2017
CO	141.0(b)	1,269	709.4	349.4
NO _x	4.0(b)	36	20.1	9.9
VOC	24.2(b)	218	121.8	60.0
PM	17.2(b)	155	86.5	42.6
CO ₂	3,180(c)	28,624	16,001.3	7,881.2
CH ₄	0.18(d)	1.62	0.9	0.4
N ₂ O	0.04(d)	0.36	0.2	0.1
CO ₂ e	3,197(e)	28,772	16,083.9	7,921.9

References

(a) AP42 Table 13.1-1 (10/96) (Region 8: Southern)

(b) AP42 page 13.1-2, Southern Region

(c) 2014 Climate Registry Default Emission Factors, Released: January 10, 2014, Table 12.1.

(d) 2014 Climate Registry Default Emission Factors, Released: January 10, 2014, Table 12.4.

(e) The global warming potentials of CO₂, CH₄, and N₂O are 1, 25, and 298, respectively.

**Table 9.A.1.10 - Florida Southeast Connection
Construction Emissions Totals**

Construction Equipment Tailpipe Emissions								
Year and Activity	Annual Emissions (tons)							
	CO	NOx	SO ₂	VOC	PM ₁₀	PM _{2.5}	CO ₂	CO ₂ e
2016								
Construction Equipment ¹	179.72	119.52	0.19	14.12	7.06	7.06	27,958	28,193
Commuting / Deliveries ²	11.49	24.32	0.07	1.51	0.99	0.96	9,484	9,491
Fugitive Dust ³	-	-	-	-	160.36	18.45	-	-
Open Burning ⁴	709.38	20.12	-	121.75	86.53	86.53	16,001	16,084
Total	900.59	163.96	0.27	137.39	254.95	113.01	53,444	53,767
2017								
Construction Equipment ⁵	78.22	52.11	0.09	6.39	3.06	3.06	13,790	13,905
Commuting / Deliveries ²	5.21	10.58	0.04	0.67	0.42	0.41	4,734	4,738
Fugitive Dust ⁶	-	-	-	-	80.18	9.23	-	-
Open Burning ⁴	349.40	9.91	-	59.97	42.62	42.62	7,881	7,922
Total	432.83	72.61	0.13	67.02	126.28	55.32	26,405	26,565
1. Tables 9.A.1.1 and 9.A.1.2 2. Tables 9.A.1.6 3. Tables 9.A.1.7 4. Tables 9.A.1.9 5. Tables 9.A.1.3 and 9.A.1.4 6. Tables 9.A.1.8								