4.14 CLIMATE CHANGE

4.14.1 Methods and Impact Definitions

Impacts on Climate Change by Alternative 1 (Proposed Project) and the alternatives were evaluated by estimating the Greenhouse Gas (GHG) emissions associated with the construction and operation of the Proposed Project and alternatives. GHG emissions were evaluated for the full buildout year, 2038 to best represent the GHG emissions at full operating capacity. Accordingly, a 2038 GHG emissions inventory represents the GHG emissions for all operating years after 2038, and a conservative estimate for interim years between opening year, 2018, and full buildout.

Construction period GHG emissions inventories included emissions from construction equipment exhaust, haul truck trips for importing and exporting material, and worker and vendor commute to and from the construction sites. GHG emissions from each of these activities were quantified using the EPA Motor Vehicle Emissions Simulator (MOVES) model, EPA guidance, activity information provided by Palmetto Railways, and assumptions and other sources where necessary. All GHG emission calculations, assumptions, and model runs are included in the Air Quality and Climate Change Technical Memorandum (Appendix I).

Operational GHG emissions inventories included emissions from locomotive activity, Over-the-Road (OTR) truck trips and idling, Utility Tractor Rig (UTR) truck trips and idling, worker commute, and GHG emissions associated with electricity consumption, water use, wastewater, and solid waste generation. Locomotive GHG emissions were estimated for off-terminal line haul activity, on-terminal line haul activity, and switch locomotive activity. It is common for intermodal container transfer facilities to use off-road equipment such as forklifts and cranes in its operations. Alternative 1 (Proposed Project) and the build alternatives would, however, utilize electric equipment, including gantry cranes. Electric equipment does not directly emit GHGs, although GHG emissions are indirectly emitted at the source of electrical generation and are inherent in the use of electricity. This analysis of operational GHG emissions includes these indirect sources of GHG emissions in the GHG calculations for electricity consumption. The analysis incorporated emission reduction strategies built into the Project. Emission reductions from these Project features were calculated where feasible as minimization. GHG emissions from each of the operational activities were quantified using the EPA MOVES model, EPA guidance, activity information provided by Palmetto Railways, and assumptions and other sources where necessary. All GHG emission calculations, assumptions, and model runs are included in Appendix I.

Individual GHGs have varying heat-trapping properties and atmospheric lifetimes. Table 4.14-1 identifies the CO_2 equivalent (CO_2e) of basic GHGs. Each GHG is compared to CO_2 with respect to its ability to trap infrared radiation, its atmospheric lifetime, and its chemical structure. The CO_2e is a consistent methodology for comparing GHG emissions since it normalizes various GHG emissions to a consistent measure. For example, CH_4 is a GHG that is 25 times more potent than CO_2; therefore,

one metric ton of CH_4 is equal to 25 metric tons CO_2e. When direct calculation to metric tons of CO_2e was not available, GWPs were used to convert calculated CH_4 and N_2O emissions into CO_2e.

Table 4.14-1
Global Warming Potential (GWP) of GHGs

GHG	GWP
CO_2	1
CH_4	25
N_2O	298

Source: IPCC 2007.

Impact criteria for GHGs have not been established by the EPA; however, the Council on Environmental Quality (CEQ) has provided a reference point of 25,000 metric tons (MT) of CO_2e emitted annually below which a GHG emission quantitative analysis is not warranted (CEQ 2014).

Climate Change impacts on the Proposed Project and alternatives were evaluated by analyzing the effects of sea level rise and the increased frequency and intensity of storm events resulting from Climate Change at and on the Project site (Alternatives 1–4) and the River Center project site (Alternatives 5-7). The U.S. Army Corps of Engineers Engineering Circular 1100-2-8162 (2013) recommends that sea level change (SLC) be calculated for projects influenced by tidal waters and reported as a "low," "intermediate," and "high" SLC for consideration of project impacts, as defined in Appendix I, for both "with" and "without" project conditions. The calculations of SLC for the Proposed Project and alternatives are based on the methods recommended in Engineering Circular 1100-2-8162 (2013) (Corps 2013). Storm events, which includes hurricanes, tropical storms, and associated events such as storm surges, can impact infrastructure and equipment through water damage and threaten human safety. The increase in storm events and their intensity increases the risk of infrastructure damage and threat to human safety through inundation. The Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model obtained from NOAA was used to determine storm surge inundation for different hurricane wind categories at high tide (NOAA 2016c). The SLOSH model uses Maximum of Maximums (MOMs), an ensemble product of maximum storm surge heights. MOMs represent the worst case scenario for a given category of storm and initial water level under ideal storm conditions (NOAA 2016c). Climate Change resiliency measures were recommended to minimize and mitigate impacts where possible. Sea level rise and storm event calculations, assumptions, and methods are included in Appendix I.

The CEQ recommends the following be considered when addressing climate change in NEPA documents:

1. The potential effects of a proposed action on climate change as indicated by its GHG emissions; and
2. The implication of climate change for the environmental effects of a proposed action (CEQ 2014).

Climate Change impacts are by nature, cumulative and long term. An individual project cannot generate enough GHG emissions to influence Global Climate Change. The project contributes to this potential impact by its incremental contribution combined with the cumulative increase of all other sources of GHGs, which when taken together create changes in the climate. In addition, once emitted GHG emissions persist in the atmosphere for decades or longer impacting the climate over the long term. Furthermore, according to the CEQ guidance, the ultimate determination of significance remains subject to agency practice for the consideration of context and intensity. As such, impacts by the Proposed Project and alternatives on Global Climate Change will be evaluated comparatively against each alternative with the consideration of context and intensity (Table 4.14-2).

Table 4.14-2
Impact Definitions, Climate Change

Negligible	Minor	Major
Short-term and long-term GHG emissions do not occur or are at negligible levels.	Short-term or long-term GHG emissions may occur. Short-term GHG emissions help make long-term emissions more efficient. Long-term emissions are minimized or mitigated through improved efficiency.	Short or long-term GHG emissions may occur. Long-term GHG emissions are considerable due to inefficient use of fuel and/or resources.

Table 4.14-3
Impact Definitions, Climate Change Impacts on the Proposed Projects and Alternatives

Negligible	Minor	Major
Undetectable changes to on-site structural integrity. No predictable impacts to human health and safety.	Environmental conditions that require reduced on-site operations. Minimal damage to on-site structures that do not alter any structural integrity. No predictable impacts to human health and safety with standard safety precautions applied.	Environmental conditions that require temporary closure of on-site operations. Damage to on-site structures that alter or comprise structural integrity. Predictable unavoidable impacts to human health and safety.

4.14.2 No-Action Alternative

Under the No-Action Alternative, the application for DA permit would be denied; the Proposed Project would not occur; CSX and NS would undertake operational and structural modifications to Ashley Junction and 7-Mile rail yards; and future use of the Project site and River Center project site would likely be mixed-use and industrial (e.g., rail-served warehousing distribution center). As such, the site would need to be built for these uses and construction activities would occur. Other existing rail yards would facilitate the transfer of the additional containers by rail. CSX and NS would do so by increasing the length of existing trains to accommodate more containers per train. Additional trains and locomotive engines would not be used under the No-Action Alternative.

4.14.2.1 Impacts on Climate Change by the No-Action Alternative: Construction GHG Emissions Inventory

The No-Action Alternative would result in construction period GHG emissions. Construction period GHG emissions would be short term. Therefore, impacts to Global Climate Change resulting from the No-Action Alternative construction GHG emissions would be minor adverse.

4.14.2.2 Impacts on Climate Change by the No-Action Alternative: Operational GHG Emissions Inventory

There would be no increase in GHG emissions due to locomotive activity for the No-Action Alternative. The Corps assumes that the existing facility workers would be sufficient for the increase in container throughput; therefore, there are no increase in GHG emissions due to worker commute for the No-Action Alternative. Further, under the No-Action Alternative, the Proposed Project site and River Center project site would not be constructed and operated, including the private drayage road. Therefore, the Corps assumes that additional UTR trucks would not be operated under the No-Action Alternative, and OTR trucks would be used to transport all additional containers from existing terminals to the CSX and NS facilities. Although CSX and NS would undertake operational and structural modifications to Ashley Junction and 7-Mile rail yards, it is assumed CSX and NS would not

increase their facility's energy use, water use, wastewater and solid waste generation. Therefore, there would be no increase in GHG emissions due to energy use, water use, wastewater and solid waste generation for the No-Action Alternative. It is common for intermodal container transfer facilities to use off-road equipment such as forklifts and cranes in its operations. However, CSX and NS crane and forklift activity was unavailable. Although it is reasonable to assume that some activity would take place, GHG emissions from on-site off-road equipment was not quantified.

Therefore, GHG emissions due to operational activities of the No-Action Alternative would include running emissions from OTR truck trips and idling emissions from idling on-site at the Ashley Junction and 7-Mile rail yards. An idle time of 15 minutes was assumed per truckload, while trucks idle in queu to enter the facility, enter the facility, unload containers, and exit the facility. The operational GHG emissions inventory for the No-Action Alternative is in Table 4.14-3.

Table 4.14-4
Alternative Annual Operational GHG
Emissions Inventory, No-Action Alternative

Activity	CO_2e (MT)
Off-Terminal Line Haul Locomotive	0
On-Terminal Line Haul Locomotive	0
Switch Locomotive	0
UTR Truck Running	0
UTR Truck Idling	0
OTR Truck Running	34,773
OTR Truck Idling	1,287
Worker Commute	0
Electricity	0
Water	0
Wastewater	0
Solid Waste	0
On-site Offroad Equipment	0
Total	**36,060**
Exceed 25,000 MT CO_2e?	**YES**

Source: IPCC 2007, EPA 2014f.

Operation of the No-Action Alternative would generate annual GHG emissions above the CEQ reference point of 25,000 MT CO_2e / year. When considering context and intensity, this analysis looks at both short-term and long-term effects and benefits associated with phases of a single proposed action. Table 4.14-3 summarizes operational phase emissions, which provides a review of long-term effects. The long-term effect of the operational phase of the No-Action Alternative is an inefficient

movement of goods between the Port and the destination of the goods. This is due to the extensive use of OTR trucks to facilitate the movement of goods, compared to the increased use of rail and UTR trucks on the private drayage road under Alternatives 1-7. This is also due to the longer truck idling time (15 minutes) assumed for the No-Action Alternative in comparison to the shorter idle time (7.5 minutes) that would be expected under Alternative 1 (Proposed Project) and alternatives which would include an automated gate system for OTR trucks entering and exiting the facility. As demonstrated in the following sections, the No-Action Alternative has a higher annual operational GHG emissions inventory than under Alternatives 1-7. This comparison is important when considering the context and intensity of the impacts. Due to the higher annual operational GHG emissions inventory from the inefficient use of resources, the No-Action Alternative's long-term effects on Global Climate Change would be more severe than those in Alternatives 1-7. Because of this, impacts of the long-term effects on Global Climate Change from the No-Action Alternative are major adverse. Short-term and long-term effects of Alternative 1 (Proposed Project) and alternatives are analyzed in comparison to the No-Action Alternative and summarized in section 4.14.11.

4.14.2.3 Impacts on the No-Action Alternative by Climate Change: Sea Level Rise

Assuming a project life of 50 years from opening year, 2018, SLC was calculated through the year 2068 using the local "low" SLC rate obtained by NOAA data and the SLC calculator for the "intermediate" and "high" SLC rates, as detailed in Appendix I. Table 4.14-5 provides the summary of all estimated SLC rates for the estimated 50-year lifespan.

Table 4.14-5
Summary of SLC Estimates between the Years 2018 and 2068

Method	Estimate	SLC Rise Estimate	
		(meters)	(feet)
Historic Tide Gauge Trend	Low	0.16	0.52
NRC Curve I	Intermediate	0.30	0.97
NRC Curve III	High	0.73	2.41

Method outlined in Appendix I.

Source: NOAA 2016a, Corps 2013, Corps 2016.

Under the No-Action Alternative, future use of the Proposed Project and River Center project sites would likely be mixed-use and industrial (e.g., rail-served warehousing distribution center), so impacts of sea level rise at both of these locations were evaluated. The current elevation of both the Project site and the River Center project site is 13 feet above mean sea level (amsl) (FEMA 2004a, 2004b). Applying the "high" SLC estimate of 2.41 feet, which is the highest (and, therefore, most conservative estimate), the mean sea level is not expected to rise high enough to inundate either site by 2068. Applying the most conservative estimate, sea level rise is not expected to cause the mean sea level to inundate the Project site or River Center project site in 2068.

As stated by the Corps in Engineering Circular 1100-2-8162 (2013), the SLC rates are meant to provide guidance in determining how sensitive projects are to these rates of future local mean SLC, how the sensitivity affects calculated risk, and what design or operations and maintenance measures should be implemented to adapt to SLC to minimize adverse consequences while maximizing local benefits (Corps 2013). The performance should be evaluated in terms of human health and safety, economic costs and benefits, environmental impacts, and other social effects. To best evaluate how sea level rise would impact the Proposed Project and River Center project sites, high tides and extreme water levels were also included in the analysis. Sea level rise would also affect the increased frequency and intensity of storms; however, this is further addressed in Section 4.14.2.4.

"King Tides" is a non-scientific term used to describe the highest seasonal tides that occur each year. For example, in Charleston, the average high tide range is about 5.5 feet, whereas during a King Tide event the high tide range may reach 7 feet or higher (SCDHEC 2015). NOAA calculates annual exceedance probability curves to indicate the highest and lowest water levels as a function of return period in years (NOAA 2016b). NOAA measures the exceedances in meters above Mean Higher High Water (MHHW), the average of the higher high water height of each tidal day, also known as high tide. The results of these curves for the NOAA tide gauge station 8665530 (Charleston station) are shown in Table 4.14-6 (NOAA 2016b).

Table 4.14-6
NOAA Annual Exceedance Probability Curve, 8665530 Charleston, SC

Return Period (years / 100 years)	Meters above MHHW	Feet above MHHW
1	1.3	4.3
10	0.8	2.6
50	0.6	2.0
99	0.4	1.3

Source: NOAA 2016b.

As shown in Table 4.14-6, at least once per year (return period of 99 years / 100 years), Charleston could have sea level approximately 1.3 feet higher than the average high tide. Once in 100 years (return period of 1 year / 100 years), sea level approximately 4.3 feet higher than the average high tide could be experienced in the Charleston area. This represents an extreme event that is possible to occur over the life of the No-Action Alternative and is used to analyze the effect of sea level rise at the Proposed Project and River Center project sites. Table 4.14-7 shows the combination of how SLC, high tide, and an extreme water level event (return period of 1 year / 100 years) would have when combined at the Proposed Project and River Center project sites.

Table 4.14-7
Estimated Extreme Water Level in Year 2068

SLC Rise Estimate		High Tide (feet)	Feet above MHHW (Return Period of 1 year/100 years)	Total Increase in Water Level during Return Period of 1 year/100 years	Current BFE (feet)	Does Estimated Extreme Water Level Exceed Current BFE?
Estimate	(feet)					
Low	0.52	5.5	4.3	10.32	13	**No**
Intermediate	0.97	5.5	4.3	10.77	13	**No**
High	2.41	5.5	4.3	12.21	13	**No**

Sources: NOAA 2016a, Corps 2013, Corps 2016, SCDHEC 2015, NOAA 2016b, FEMA 2004a, 2004b

As shown in Table 4.14-7, the effects of SLC, high tides, and extreme water level events would not raise sea levels above the current BFE. This assumes the uses on the Proposed Project and River Center project sites would not occur below its BFE. The sea level rise would not cause detectable changes to on-site structural integrity, nor would it cause predictable impacts to human health and safety. Therefore, impacts due to sea level rise at the Proposed Project and River Center project sites would be negligible.

4.14.2.4 Impacts on the No-Action Alternative by Climate Change: Increased Frequency and Intensity of Storm Events

Most tropical systems to make landfall in South Carolina are tropical storms and Category 1 hurricanes. Since 1851, only seven hurricanes to make landfall in the South Carolina and Georgia were considered major (Category 3-5), occurring once approximately every 25 years (NWS 2016). However, a predicted result of Climate Change is the increase in storm event frequency and intensity (NOAA 2017).

Inundation from storm surges can damage infrastructure, such as buildings, roads, and bridges, through erosion. The structural integrity of the infrastructure could be compromised from intense storm events, or many lesser intense events over a longer period of time. Inundation can threaten human safety by blocking roadways and making roadway travel dangerous. The evacuation route for North Charleston is along I-26 (SCDOT 2015). The SLOSH model obtained from NOAA was used to determine storm surge inundation for different hurricane wind categories at high tide (NOAA 2016c). The maximum inundation shown on each site is listed in Table 4.14-8.

Table 4.14-8
SLOSH Storm Surge Inundation MOM Estimates

Hurricane Category	MOM Inundation Depth	
	Proposed Project Site	River Center Project Site
1	Up to 3 feet above ground	No Inundation
2	Greater than 3 feet above ground	Greater than 3 feet above ground
3	Greater than 9 feet above ground	Greater than 6 feet above ground
4	Greater than 9 feet above ground	Greater than 9 feet above ground
5	Greater than 9 feet above ground	Greater than 9 feet above ground

Source: NOAA 2016c.

Although major hurricanes make landfall in South Carolina and Georgia approximately once every 25 years, it is likely the Proposed Project and River Center project sites would experience at least one over the life of the Project, between 2018 and 2068. According to the SLOSH model estimates shown in Table 4.14-8, the Proposed Project site would likely experience a storm surge of greater than 9 feet above ground, and the River Center project site would likely experience a storm surge of greater than 6 feet above ground (NOAA 2016c). This level of inundation could damage on-site structures to the point of altering their structural integrity, move and damage heavy equipment, and pose a threat to human health and safety of people on-site. Because of this, impacts from increased frequency and intensity of storms on the Proposed Project and River Center project sites would be major. Mitigation measures are listed in section 4.14.12.

4.14.3 Alternative 1: Proposed Project (South via Milford / North via Hospital District)

Under Alternative 1, the Proposed Project would be constructed. As such, GHG emissions from construction activities, including operation of construction equipment, haul truck trips for the import and export of material, and commutes by construction workers and vendors, would occur. GHG emissions from operational activities including operation of locomotives, UTR trucks, OTR trucks, and commutes by workers would also occur, as well as GHG emissions associated with electricity use, water use, wastewater, and solid waste.

4.14.3.1 Impacts on Climate Change by the Proposed Project: Construction GHG Emissions Inventory

Total GHG emissions from construction of Alternative 1 (Proposed Project) are shown below in Table 4.14-9.

Table 4.14-9
Total Construction GHG Emissions Inventory, Alternative 1

Activity	Total CO_2e (MT)
Construction Equipment Exhaust	90,624
Haul Truck Exhaust	2,631
Worker and Vendor Commute	1,361
Total	**94,616**
Annual Average	**18,923**
Exceed 25,000 MT CO_2e?	**No**

Note: Construction activity is scheduled to occur over 5 years.

Sources: IPCC 2007; EPA 2010, 2014f, 2014b; FHWA 2011b; CAPCOA 2013.

Construction of Alternative 1 (Proposed Project) would generate annual GHG emissions below the CEQ reference point of 25,000 MT CO_2e / year. When considering context and intensity, this analysis looks at both short-term and long-term effects and benefits associated with phases of a single proposed action. Table 4.14-9 summarizes construction phase emissions, which provides a review of short-term effects. The long-term benefit of the construction phase is that the rail and roadway infrastructure would be built to facilitate an efficient goods movement between the Port facilities and the destination of the goods. The construction phase provides much of the infrastructure improvements needed to facilitate an efficient goods movement. Because the GHG emissions from the construction phase are short-term in nature and provide the needed infrastructure for the increased efficiency in the transport of goods, the impacts from the construction GHG emissions on Global Climate Change would be minor adverse. The long-term effects of the Proposed Project on Global Climate Change are analyzed in section 4.14.3.2. Short-term and long-term effects of the Proposed Project and alternatives are analyzed in comparison to the No-Action Alternative and summarized in section 4.14.11.

4.14.3.2 Impacts on Climate Change by the Proposed Project: Operational GHG Emissions Inventory

Total GHG emissions from operation of Alternative 1 (Proposed Project) are shown below in Table 4.14-10.

Table 4.14-10
Annual Operational GHG Emissions Inventory,
Alternative 1 (Proposed Alternative)

Activity	CO_2e (MT)
On-Terminal Line Haul Locomotive	6,127
Off-Terminal Line Haul Locomotive	5,361
Switch Locomotive	2,612
UTR Truck Running	1,261
UTR Truck Idling	1,051
OTR Truck Running	12,751
OTR Truck Idling	450
Worker Commute	727
Electricity(1)	4
Water	<1
Wastewater	<1
Solid Waste	4
Total	**30,347**
Exceed 25,000 MT CO_2e?	**Yes**

Notes: It is common for intermodal facilities to operate on-site offroad equipment such as gantry cranes. The Navy Base ICTF would operate electric gantry cranes. As such, GHG emissions associated with on-site offroad equipment are included in the GHG emissions associated with electricity consumption.

Source: IPCC 2007, EPA 2014f, 2014b, 2014c.

Operation of the Proposed Project would generate annual GHG emissions above the CEQ reference point of 25,000 MT CO_2e / year. When considering context and intensity, this analysis looks at both short-term and long-term effects and benefits associated with phases of a single proposed action. Table 4.14-10 summarizes operational phase emissions, which provides a review of long-term effects. The long-term benefit of the operational phase of the Proposed Project would be the facilitation and efficient goods movement between the Port and the destination of the goods. The Proposed Project operations provide the improvements needed to facilitate an efficient goods movement through its additional use of rail and UTR trucks. The use of the UTR trucks on the private drayage road takes many OTR trucks off of public roadways compared to the No-Action Alternative. The use of the private drayage road also shortens the length of the trips taken by the UTR trucks, reducing the running emissions of diesel trucks during operation. The Proposed Project also includes minimization measures, outlined in section 4.14.12.1, that the No-Action Alternative does not. These include limiting OTR idle time to 7.5 minutes per truckload and UTR idling time to 5 minutes per truckload through the utilization of an automated gate system for the OTR and UTR trucks. The automated gate system effectively reduces GHG emissions from OTR and UTR truck idling by half of

what they would be without these minimization measures. These minimization measures also include using Tier 4 UTR trucks and Tier 4 Switch locomotive engines. These minimization measures, along with the design of the Proposed Project increase the efficiency of its operations. Although the Proposed Project's annual operational GHG emissions inventory exceeds the CEQ reference point, it is lower than the No-Action Alternative operations inventory and Alternatives 5-7 operational inventories, as shown in sections 4.14.7 through 4.14.9. This comparison is important when considering the context and intensity of the impacts. Due to the lower annual operational GHG emissions inventory, the Proposed Project's long-term effects on Global Climate Change would be less severe than those under the No-Action Alternative and Alternatives 5-7. As a result, impacts of the long-term effects on Global Climate Change from Alternative 1 (Proposed Project) are minor adverse. Short-term and long-term effects of Alternative 1 (Proposed Project) and alternatives are analyzed in comparison to the No-Action Alternative and summarized in section 4.14.11.

4.14.3.3 Impacts on the Proposed Project by Climate Change: Sea Level Rise

As shown in Table 4.14-7, the effects of SLC, high tides, and extreme water level events would not raise sea levels above the current BFE on the Proposed Project site. This assumes the uses on the Proposed Project site would not occur below its BFE. The sea level rise would not cause detectable changes to on-site structural integrity, nor would it cause predictable impacts to human health and safety. Therefore, impacts due to sea level rise at the Proposed Project site would be negligible.

4.14.3.4 Impacts on the Proposed Project by Climate Change: Increased Frequency and Intensity of Storm Events

Although major hurricanes make landfall in the South Carolina and Georgia approximately once every 25 years, it is likely the Proposed Project site would experience at least one over the life of the Project, between 2018 and 2068. According to the SLOSH model estimates shown in Table 4.14-8, the Proposed Project site would likely experience a storm surge of greater than 9 feet above ground (NOAA 2016c). This level of inundation could damage on-site structures to the point of altering their structural integrity, move and damage heavy equipment, and pose a threat to human health and safety of people on-site.

Approximately 5 percent of containers at the ICTF are estimated to hold hazardous materials, as described in Section 4.15. It is possible that an intense storm could lead to a hazardous material spill on-site if the containers of those materials are compromised during handling or derailment. Hazardous materials stored on-site and in containers should be tracked and stored with caution. Hazardous materials would also need to be checked after storm events to confirm no spill occurred. If the storage of hazardous materials is compromised due to the severity of a storm event, human health and safety of on-site employees would be comprised. To prevent such spillage, Palmetto Railways would create and implement an SPCC plan. Implementation of such a plan would make the Proposed Project site more resilient to Climate Change effects. While an SPCC Plan would work to

prevent hazardous material from spilling, there would remain a threat to human health and safety from inundation expected from major hurricanes. Therefore, impacts on Alternative 1 (Proposed Project) by increased frequency and severity of storm events would be major.

4.14.4 Alternative 2: Proposed Project Site (South via Milford / North via S-line)

Alternative 2 would be constructed as a variation of Alternative 1 (Proposed Project). Alternative 2 differs from Alternative 1 (Proposed Project) where the northern rail connection for NS would be located, and road and rail improvements would be adjusted accordingly to facilitate rail and road traffic as a result of the NS northern rail connection alignment. As such, construction of the rail alignments differs slightly from Alternative 1 (Proposed Project). GHG emissions from construction equipment exhaust are different to reflect the change in length of the NS northern rail connection. Haul truck activities and worker and vendor commute were assumed to be the same as Alternative 1 (Proposed Project). Alternative 2 would also be operated as proposed.

4.14.4.1 Impacts on Climate Change by Alternative 2: Construction GHG Emissions Inventory

Total GHG emissions from construction of Alternative 2 are shown below in Table 4.14-11. Impacts to Global Climate Change by Alternative 2 construction GHG emissions would be similar to Alternative 1 (Proposed Project).

Table 4.14-11
Total Construction GHG Emissions Inventory, Alternative 2

Activity	Total CO_2e (MT)	Comparison to Proposed Project
Construction Equipment Exhaust	91,935	Greater than Proposed Project
Haul Truck Exhaust	2,631	Same as Proposed Project
Worker and Vendor Commute	1,361	Same as Proposed Project
Total	**95,927**	Greater than Proposed Project
Annual Average	**19,185**	Greater than Proposed Project
Exceed 25,000 MT CO_2e?	**No**	

Note: Construction activity is scheduled to occur over 5 years.

Sources: IPCC 2007, EPA 2014f, 2014b, 2010, FHWA 2011b, CAPCOA 2013.

4.14.4.2 Impacts on Climate Change by Alternative 2: Operational GHG Emissions Inventory

GHG emissions from operational activities would be the same as Alternative 1 (Proposed Project). Thus, impacts would be the same as Alternative 1 (Proposed Project).

4.14.4.3 Impacts on Alternative 2 by Climate Change: Sea Level Rise

Impacts would be the same as Alternative 1 (Proposed Project).

4.14.4.4 Impacts on Alternative 2 by Climate Change: Increased Frequency and Intensity of Storm Events

Impacts would be the same as Alternative 1 (Proposed Project).

4.14.5 Alternative 3: Proposed Project Site (South via Kingsworth / North via Hospital)

Alternative 3 would be constructed as a variation of the Alternative 1 (Proposed Project). Alternative 3 differs where the southern rail connection would be located, and road and rail improvements would be adjusted accordingly to facilitate rail and road traffic as a result of the southern rail connection alignments. As such, construction of the rail alignments differs slightly from Alternative 1 (Proposed Project). GHG emissions from construction equipment exhaust are different to reflect the change in length of the southern rail connection. Haul truck activities and worker and vendor commute were assumed to be the same as Alternative 1 (Proposed Project). Alternative 3 would also be operated as proposed.

4.14.5.1 Impacts on Climate Change by Alternative 3: Construction GHG Emissions Inventory

Total GHG emissions from construction of Alternative 3 are shown below in Table 4.14-12. Impacts to Global Climate Change by Alternative 3 construction GHG emissions would be similar to Alternative 1 (Proposed Project).

Table 4.14-12
Total Construction GHG Emissions Inventory, Alternative 3

Activity	Total CO_2e (MT)	Comparison to Proposed Project
Construction Equipment Exhaust	86,808	Less than Proposed Project
Haul Truck Exhaust	2,631	Same as Proposed Project
Worker and Vendor Commute	1,361	Same as Proposed Project
Total	**90,800**	Less than Proposed Project
Annual Average	**18,160**	Less than Proposed Project
Exceed 25,000 MT CO_2e?	**No**	

Note: Construction activity is scheduled to occur over 5 years.
Sources: IPCC 2007, EPA 2014f, 2014b, 2010, FHWA 2011b, CAPCOA 2013.

4.14.5.2 Impacts on Climate Change by Alternative 3: Operational GHG Emissions Inventory

GHG emissions from operational activities would be the same as Alternative 1 (Proposed Project). Thus, impacts would be the same as Alternative 1 (Proposed Project).

4.14.5.3 Impacts on Alternative 3 by Climate Change: Sea Level Rise

Impacts would be the same as Alternative 1 (Proposed Project).

4.14.5.4 Impacts on Alternative 3 by Climate Change: Increased Frequency and Intensity of Storm Events

Impacts would be the same as Alternative 1 (Proposed Project).

4.14.6 Alternative 4: Proposed Project Site (South via Milford)

Alternative 4 would be constructed as a variation of Alternative 1 (Proposed Project). Alternative 4 differs from Alternative 1 (Proposed Project) in that trains would both enter and exit the Navy Base ICTF from a southern rail connection. As such, construction of the rail alignments differs from Alternative 1 (Proposed Project). GHG emissions from construction equipment exhaust are different to reflect the change in length of the southern rail connection. Haul truck activities and worker and vendor commute were assumed to be the same as Alternative 1 (Proposed Project). Alternative 4 would be also operated as proposed.

4.14.6.1 Impacts on Climate Change by Alternative 4: Construction GHG Emissions Inventory

Total GHG emissions from construction of Alternative 4 are shown below in Table 4.14-13. Impacts to Global Climate Change by Alternative 4 construction GHG emissions would be similar to Alternative 1 (Proposed Project).

Table 4.14-13
Total Construction GHG Emissions Inventory, Alternative 4

Activity	Total CO_2e (MT)	Comparison to Proposed Project
Construction Equipment Exhaust	85,943	Less than Proposed Project
Haul Truck Exhaust	2,631	Same as Proposed Project
Worker and Vendor Commute	1,361	Same as Proposed Project
Total	**89,935**	Less than Proposed Project
Annual Average	**17,987**	Less than Proposed Project
Exceed 25,000 MT CO_2e?	**No**	

Note: Construction activity is scheduled to occur over 5 years.

Sources: IPCC 2007, EPA 2014a, 2010, FHWA 2011, CAPCOA 2013.

4.14.6.2 Impacts on Climate Change by Alternative 4: Operational GHG Emissions Inventory

GHG emissions from operational activities would be the same as the Proposed Project. Thus, impacts would be the same as Alternative 1 (Proposed Project).

4.14.6.3 Impacts on Alternative 4 by Climate Change: Sea Level Rise

Impacts would be the same as Alternative 1 (Proposed Project).

4.14.6.4 Impacts on Alternative 4 by Climate Change: Increased Frequency and Intensity of Storm Events

Impacts would be the same as Alternative 1 (Proposed Project).

4.14.7 Alternative 5: River Center Project Site (South via Milford / North via Hospital District)

Alternative 5 would be variation of Alternative 1 (Proposed Project) with the ICTF being moved to the River Center project site. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the alternative site. As such, construction of the rail and road alignments differs from Alternative 1 (Proposed Project). GHG emissions from construction equipment exhaust are

different to reflect the change in length of the rail connections and road segments. Haul truck activities and worker and vendor commute were assumed to be the same as Alternative 1 (Proposed Project). Alternative 5 would be operated as proposed, with the exception of UTR truck activity on the drayage road. The private drayage road under Alternative 5 is 2 miles long, which is twice the distance of the private drayage road under Alternative 1 (Proposed Project). To maintain the daily container throughput, twice as many UTR trucks at the same rate of daily truckloads would be required for operating Alternative 5 compared to Alternative 1 (Proposed Project).

4.14.7.1 Impacts on Climate Change by Alternative 5: Construction GHG Emissions Inventory

Total GHG emissions from construction of Alternative 5 are shown below in Table 4.14-14.

Table 4.14-14
Total Construction GHG Emissions Inventory, Alternative 5

Activity	Total CO_2e (MT)	Comparison to Proposed Project
Construction Equipment Exhaust	99,512	Greater than Proposed Project
Haul Truck Exhaust	2,631	Same as Proposed Project
Worker and Vendor Commute	1,361	Same as Proposed Project
Total	**103,504**	Greater than Proposed Project
Annual Average	**20,701**	Greater than Proposed Project
Exceed 25,000 MT CO_2e?	**No**	

Note: Construction activity is scheduled to occur over 5 years.
Sources: IPCC 2007, EPA 2014f, 2014b, 2010, FHWA 2011b, CAPCOA 2013.

Construction of Alternative 5 would generate annual GHG emissions greater than Alternative 1 (Proposed Project), but below the CEQ reference point of 25,000 MT CO_2e / year. When considering context and intensity, this analysis looks at both short-term and long-term effects and benefits associated with phases of a single proposed action. Table 4.14-14 summarizes construction phase emissions, which provides a review of short-term effects. The long-term benefit of the construction phase is that the rail and roadway infrastructure would be built to facilitate an efficient goods movement between the Port facilities and the destination of the goods. The construction phase provides much of the infrastructure improvements needed to facilitate an efficient goods movement. Because the GHG emissions from the construction phase are short-term in nature and provide the needed infrastructure for the increased efficiency in the transport of goods, the impacts from construction GHG emissions on Global Climate Change would be minor adverse. The long-term effects of Alternative 5 on Global Climate Change are analyzed in section 4.14.7.2. Short-term and long-term effects of the Alternative 1 (Proposed Project) and alternatives are analyzed in comparison to the No-Action Alternative and summarized in section 4.14.11.

4.14.7.2 Impacts on Climate Change by Alternative 5: Operational GHG Emissions Inventory

GHG emissions from operational activities besides UTR truck running emissions would be the same as the Proposed Project. Alternative 5 would have twice as many GHG emissions from UTR truck running than Alternative 1 (Proposed Project). Total GHG emissions from operation are shown below in Table 4.14-15.

Table 4.14-15
Annual Operational GHG Emissions Inventory, Alternative 5

Activity	CO_2e (MT)	Comparison to Proposed Project
On-Terminal Line Haul Locomotive	6,127	Same as Proposed Project
Off-Terminal Line Haul Locomotive	5,361	Same as Proposed Project
Switch Locomotive	2,612	Same as Proposed Project
UTR Truck Running	2,522	Greater then Proposed Project
UTR Truck Idling	1,051	Same as Proposed Project
OTR Truck Running	12,751	Same as Proposed Project
OTR Truck Idling	450	Same as Proposed Project
Worker Commute	727	Same as Proposed Project
Electricity(1)	4	Same as Proposed Project
Water	<1	Same as Proposed Project
Wastewater	<1	Same as Proposed Project
Solid Waste	4	Same as Proposed Project
Total	**31,608**	Greater then Proposed Project
Exceed 25,000 MT CO_2e?	**Yes**	-

Notes: It is common for intermodal facilities to operate on-site offroad equipment such as gantry cranes. The Navy Base ICTF would operate electric gantry cranes. As such, GHG emissions associated with on-site offroad equipment are included in the GHG emissions associated with electricity consumption.

Source: IPCC 2007, EPA 2014f, 2014b, 2014g, 2009a, 2009b, 2008, SCPA 2013, USDOE 2011, AirProducts 2016, ICBE 2000.

Operation of Alternative 5 would generate annual GHG emissions above the CEQ reference point of 25,000 MT CO_2e / year. When considering context and intensity, this analysis looks at both short-term and long-term effects and benefits associated with phases of a single proposed action. Table 4.14-15 summarizes operational phase emissions, which provides a review of long-term effects. The long-term benefit of the operational phase of Alternative 5 would be similar to Alternatives 1-4. Both Alternative 5 and Alternatives 1–4 operations provide the improvements needed to facilitate an efficient goods movement through additional use of rail and UTR trucks, along with the minimization measures listed in section 4.14.12. The variation for Alternative 5 is the use of the UTR trucks on the

longer private drayage road. It takes more OTR trucks off of public roadways compared to the No-Action Alternative; however, the doubled length of the drayage road compared to Alternatives 1-4 makes Alternative 5 slightly less efficient.

Although the annual operational GHG emissions inventory for Alternative 5 exceeds the CEQ reference point, it is lower than the operational inventory for the No-Action Alternative and slightly higher than the operational inventories for Alternatives 1-4, as shown in section 4.14.3. This comparison is important when considering the context and intensity of the impacts. Due to the lower annual operational GHG emissions inventory than the No-Action Alternative, the long-term effects of Alternative 5 on Global Climate Change would be less severe than those under the No-Action Alternative. Although annual operational GHG emissions inventory of Alternative 5 is slightly higher than Alternatives 1–4 inventories, its long-term effects would likely be very similar. Because of this, impacts of the long-term effects on Global Climate Change from Alternative 5 are minor adverse. Short-term and long-term effects of Alternative 1 (Proposed Project) and alternatives are analyzed in comparison to the No-Action Alternative and summarized in section 4.14.11.

4.14.7.3 Impacts on Alternative 5 by Climate Change: Sea Level Rise

As shown in Table 4.14-7, the effects of SLC, high tides, and extreme water level events would not raise sea levels above the current BFE on the River Center site. This assumes the uses on the River Center site would not occur below its BFE. The sea level rise would not cause detectable changes to on-site structural integrity, nor would it cause predictable impacts to human health and safety. Therefore, impacts due to sea level rise at the River Center site would be negligible.

4.14.7.4 Impacts on Alternative 5 by Climate Change: Increased Frequency and Intensity of Storm Events

Although major hurricanes make landfall in South Carolina and Georgia approximately once every 25 years, it is likely the River Center site would experience at least one over the life of the Project, between 2018 and 2068. According to the SLOSH model estimates shown in Table 4.14-8, the River Center project site would likely experience a storm surge of greater than 6 feet above ground (NOAA 2016c). This level of inundation could damage on-site structures to the point of altering their structural integrity, move and damage heavy equipment, and pose a threat to human health and safety of people on-site.

Approximately 5 percent of containers at the ICTF are estimated to hold hazardous materials, as described in Chapter 4.15. It is possible that an intense storm could lead to a hazardous material spill on-site if the containers of those materials are compromised during handling or derailment. Hazardous materials stored on-site and in containers should be tracked and stored with caution. Hazardous materials would also need to be checked after storm events to confirm no spill occurred. If the storage of hazardous materials is compromised due to the severity of a storm event, human

health and safety of on-site employees would be comprised. To prevent such spillage, Palmetto Railways would create and implement an SPCC plan. Implementation of such a plan would make the River Center site more resilient to Climate Change effects. While a SPCC Plan would work to prevent hazardous material from spilling, there would remain a threat to human health and safety from inundation expected from major hurricanes. Therefore, impacts on the River Center site by increased frequency and severity of storm events would be major.

4.14.8 Alternative 6: River Center Project Site (South via Kingsworth / North via Hospital)

Alternative 6 would be a variation of Alternative 1 (Proposed Project) with the ICTF being moved to the River Center project site and the southern rail connection would connect to an existing rail line in the vicinity of Kingsworth Avenue. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the alternative site. As such, construction of the rail and road alignments differs from the Proposed Project. GHG emissions from construction equipment exhaust are different to reflect the change in length of the rail connections and road segments. Haul truck activities and worker and vendor commutes were assumed to be the same as Alternative 1 (Proposed Project). Alternative 6 would be operated as proposed, with the exception of UTR truck activity on the drayage road. The UTR truck activity in Alternative 6 would be the same as the activity in Alternative 5.

4.14.8.1 Impacts on Climate Change by Alternative 6: Construction GHG Emissions Inventory

Total GHG emissions from construction of Alternative 6 are shown below in Table 4.14-16. Impacts to Global Climate Change by Alternative 6 construction GHG emissions would be the same as Alternative 5.

Table 4.14-16
Total Construction GHG Emissions Inventory, Alternative 6

Activity	Total CO_2e (MT)	Comparison to Proposed Project
Construction Equipment Exhaust	94,710	Greater than Proposed Project
Haul Truck Exhaust	2,631	Same as Proposed Project
Worker and Vendor Commute	1,361	Same as Proposed Project
Total	**98,702**	Greater than Proposed Project
Annual Average	**19,740**	Greater than Proposed Project
Exceed 25,000 MT CO_2e?	**No**	

Note: Construction activity is scheduled to occur over 5 years.

Sources: IPCC 2007, EPA 2014a, 2014b, 2010, FHWA 2011b, CAPCOA 2013.

4.14.8.2 Impacts on Climate Change by Alternative 6: Operational GHG Emissions Inventory

GHG emissions from operational activities would be similar to Alternative 5. Thus, impacts would be the similar to Alternative 5.

4.14.8.3 Impacts on Alternative 6 by Climate Change: Sea Level Rise

Impacts would be the same as Alternative 5.

4.14.8.4 Impacts on Alternative 6 by Climate Change: Increased Frequency and Intensity of Storm Events

Impacts would be the same as Alternative 5.

4.14.9 Alternative 7: River Center Project Site (South via Milford)

Alternative 7 would be a variation of the Proposed Project with the ICTF being moved to the River Center project site and trains would enter and exit the Navy Base ICTF from a southern rail connection. Road and rail improvements would be adjusted accordingly to facilitate rail and road traffic at the alternative site. As such, construction of the rail and road alignments differs from the Proposed Project. Alternative 7 would be operated as proposed, with the exception of UTR truck activity on the drayage road. GHG emissions from construction equipment exhaust are different to reflect the change in length of the rail connections and road segments. Haul truck activities and worker and vendor commute were assumed to be the same as the Proposed Project. The UTR truck activity in Alternative 7 would be the same as the activity in Alternative 5.

4.14.9.1 Impacts on Climate Change by Alternative 7: Construction GHG Emissions Inventory

Total GHG emissions from construction of Alternative 7 are shown below in Table 4.14-17. Impacts to Global Climate Change by Alternative 7 construction GHG emissions would be similar to Alternative 5.

4.14.9.2 Impacts on Climate Change by Alternative 7: Operational GHG Emissions Inventory

GHG emissions from operational activities would be the same as Alternative 5. Thus, impacts would be the same as Alternative 5.

Table 4.14-17
Total Construction GHG Emissions Inventory, Alternative 7

Activity	Total CO_2e (MT)	Comparison to Proposed Project
Construction Equipment Exhaust	96,977	Greater than Proposed Project
Haul Truck Exhaust	2,631	Same as Proposed Project
Worker and Vendor Commute	1,361	Same as Proposed Project
Total	**100,969**	Greater than Proposed Project
Annual Average	**20,194**	Greater than Proposed Project
Exceed 25,000 MT CO_2e?	**No**	

Note: Construction activity is scheduled to occur over 5 years.
Sources: IPCC 2007, EPA 2014a, 2014b, 2010, FHWA 2011b, CAPCOA 2013.

4.14.9.3 Impacts on Alternative 7 by Climate Change: Sea Level Rise

Impacts would be the same as Alternative 5.

4.14.9.4 Impacts on Alternative 7 by Climate Change: Increased Frequency and Intensity of Storm Events

Impacts would be the same as Alternative 5.

4.14.10 Related Activities

If the Proposed Project is constructed, new track would be constructed on a section of out-of-service CSX ROW to accept intermodal trains at the proposed new at-grade crossing at Meeting Street. Construction would extend from the vicinity of Discher Street to Misroon Street. Existing track would be reactivated from Misroon Street into Ashley Junction as needed. This Related Activity would apply to Alternatives 1, 2, 4, 5, and 7. Under Alternatives 3 and 6, the Related Activity construction would be the same as Alternatives 1, 2, 4, 5, and 7; however, construction of new track would begin at the proposed new at-grade crossing at Meeting Street in the vicinity of Kingsworth Avenue. Under Alternative 2 an additional Related Activity, reactivating an out-of-service ROW and constructing a new railroad bridge, would be required to connect the NS arrival/departure tracks from the ICTF across a portion of marsh which drains to Noisette Creek to the existing NCTC track along Virginia Avenue.

The GHG emissions from the construction and operation of the related activity were included in the construction and operational GHG emissions inventories for Alternatives 1-7. Therefore, impacts from the construction and operation of the related activity are analyzed in section 4.14.3-9.

4.14.11 Summary of Impacts Table

Table 4.14-18 provides a summary of impacts on climate change from Alternative 1 (Proposed Project) and all the alternatives.

Table 4.14-18
Summary of Impacts, Climate Change

Alternative	Impacts of the Alternatives on Climate Change		Impacts of Climate Change on the Alternatives	
	Construction Emissions	Operational Emissions	Sea Level Rise	Increased Frequency and Intensity of Storm Events
No-Action	The No-Action Alternative results in short term construction related greenhouse gas (GHG) emissions and potential short-term impacts would be minor adverse.	Annual Operational GHG Emissions Inventory would be 36,060 MT CO_2e. The No-Action Alternative would be the least efficient. Long-term effects would be major adverse.	The predicted sea level rise would not cause detectable changes to on-site structural integrity at the Proposed Project and River Center project sites, nor would it cause predictable impacts to human health and safety. Impacts due to sea level rise at the Proposed Project and River Center project sites would be negligible.	The Proposed Project site and River Center site are predicted to get a level of storm surge inundation that could damage on-site structures to the point of altering their structural integrity, move and damage heavy equipment, and pose a threat to human health and safety of people on-site. Impacts on the Proposed Project and River Center project sites would be major.
1: Proposed Project: South via Milford / North via Hospital District	Because the GHG emissions from the construction phase provide the needed infrastructure for the increased efficiency in the transport of goods, the short-term impacts would be minor adverse.	Annual Operational GHG Emissions Inventory would be 30,948 MT CO_2e. The Proposed Project would be the most efficient. Long-term effects would be minor adverse.	The predicted sea level rise would not cause detectable changes to on-site structural integrity at the Proposed Project site, nor would it cause predictable impacts to human health and safety. Impacts would be negligible.	The Proposed Project site is predicted to get a level of storm surge inundation that could damage on-site structures to the point of altering their structural integrity, move and damage heavy equipment, and pose a threat to human health and safety of people on-site. Impacts would be major.
2: South via Milford / North via S-line	Similar to Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)
3: South via Kingsworth / North via Hospital District	Similar to Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)
4: South via Milford	Similar to Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)	Same as Alternative 1 (Proposed Project)

Alternative	Impacts of the Alternatives on Climate Change		Impacts of Climate Change on the Alternatives	
	Construction Emissions	Operational Emissions	Sea Level Rise	Increased Frequency and Intensity of Storm Events
5: River Center Project Site: South via Milford / North via Hospital District	Because the GHG emissions from the construction phase provide the needed infrastructure for the increased efficiency in the transport of goods, the short-term impacts would be minor adverse.	Annual Operational GHG Emissions Inventory would be 32,208 MT CO_2e. Alternative 5 would be more efficient than the No-Action Alternative and nearly as efficient as the Proposed Project. Long-term effects would be minor adverse.	The predicted sea level rise would not cause detectable changes to on-site structural integrity at the River Center site, nor would it cause predictable impacts to human health and safety. Impacts would be negligible.	The River Center site is predicted to get a level of storm surge inundation that could damage on-site structures to the point of altering their structural integrity, move and damage heavy equipment, and pose a threat to human health and safety of people on-site. Impacts would be major.
6: River Center Project Site: South via Kingsworth / North via Hospital District	Similar to Alternative 5	Same as Alternative 5	Same as Alternative 5	Same as Alternative 5
7: River Center Project Site: South via Milford	Similar to Alternative 5	Same as Alternative 5	Same as Alternative 5	Same as Alternative 5

Climate Change Impact Definitions

Negligible = Short-term and Long-term GHG emissions do not occur or are at negligible levels.

Minor = Short-term or Long-term GHG emissions may occur. Short-term GHG emissions help make long-term emissions more efficient. Long-term emissions are minimized or mitigated through improved efficiency.

Major = Short or Long-term GHG emissions may occur. Long-term GHG emissions are considerable due to inefficient use of fuel and/or resources.

Climate Change Impacts on the Proposed Project and Alternatives Impact Definitions

Negligible = Undetectable changes to on-site structural integrity. No predictable impacts to human health and safety.

Minor = Environmental conditions that require reduced on-site operations. Minimal damage to on-site structures that do not alter any structural integrity. No predictable impacts to human health and safety with standard safety precautions applied.

Major = Environmental conditions that require temporary closure of on-site operations. Damage to on-site structures that alter or comprise structural integrity. Predictable unavoidable impacts to human health and safety.

4.14.12 Mitigation

4.14.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant's measures to avoid and minimize potential impacts of Alternative 1 (Proposed Project) are summarized below based on information submitted by Palmetto Railways provided in Appendix B. Some of these measures are required under federal, state, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1

(Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact, or one that minimizes an impact.

For Climate Change mitigation, see Air Quality mitigation measures in Section 4.13. The complete list of Applicant-proposed avoidance and minimization measures is also provided in Chapter 6.

4.14.12.2 Additional Potential Mitigation Measures

No additional mitigation measures for Climate Change have been recommended by the Corps. Additional avoidance, minimization, and mitigation may be considered by the Corps in its decision-making process. Final mitigation measures may be adopted as conditions of the DA permit and documented in the Record of Decision (ROD).

4.15 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

4.15.1 Methods and Impact Definitions

The analysis and evaluation of potential HTRW impacts has been conducted using both qualitative and quantitative methods. These methods include literature reviews, presence/absence determinations of known contaminated areas within the study area (through the preparation of Phase 1 and/or Phase 2 ESAs and similar site evaluations), GIS, and professional judgment. The analysis also evaluates and determines the potential for the generation of new HTRW impacts associated with the construction and/or operation of the Navy Base ICTF, including but not limited to the potential processing and handling of HTRW materials in cargo containers and potential use of new ASTs and/or USTs for petroleum and other substances of concern.

The impact definitions are provided in Table 4.15-1.