FLORIDA SOUTHEAST CONNECTION PROJECT

DRAFT RESOURCE REPORT 10

Alternatives

FERC Docket No. PF14-2-000

Pre-Filing Draft

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RESOURCE REPORT 10—ALTERNATIVES		
Filing Requirement		**Location in Environmental Report**
☒	Address the “no action” alternative. For large projects, address the effect of energy conservation or energy alternatives to the project.	Section 10.3
☒	Identify system alternatives considered during the identification of the project and provide the rationale for rejecting each alternative.	Section 10.4
☒	Identify major and minor route alternatives considered to avoid impact on sensitive environmental areas (e.g., wetlands, parks, or residences) and provide sufficient comparative data to justify the selection of the proposed route.	Sections 10.5 & 10.6
☐	Identify alternative sites considered for the location of major new aboveground facilities and provide sufficient comparative data to justify the selection of the proposed site.	NA

Responses to FERC Comments		
Comment Number	**Comment Text**	**Comment Response and Location of Information**
Response to FERC's 2/12/14 Comments on RR 10		
1.	In section 10.2, FSC indicates that a planned FPL electric generation site, referred to as "Okeechobee," would be in close proximity to the planned FSC Project route. Include a map depicting the location of the Okeechobee facility relative to the planned pipeline.	Refer to 10.2-1
2.	Include a figure depicting the other existing natural gas transportation systems in the FSC Project area, including the Florida Gas Transmission Company, LLC (FGT) and Gulfstream Natural Gas System, LLC systems.	Refer to Figure 10.4-1
3.	Include an update of discussions with the Olney-Alger Family Trust regarding alternatives to avoid impacts at the Padgett and Willis Cemeteries.	The FSC Project is located more than 2,400 feet away from these two cemeteries and will not affect these resources. Refer to FSC's response to Scoping Comments filed May 2, 2014 with the FERC.
4.	For the analysis of major route alternatives and deviations presented in section 10.5:	
4a.	explain the purpose behind each route alternative and deviation considered;	Refer to Section 10.5.1
4b.	include the milepost (MP) of the planned route where each route alternative or deviation would depart from and rejoin the planned route;	Refer to Tables 10.5-4, 10.5-5 and 10.5-6
4c.	thoroughly compare the environmental impacts of each route alternative and deviation only to the correlative segment of the planned route that would be avoided if the route alternative or deviation were selected;	Refer to Tables 10.5-2 through 10.5-6
4d.	utilize the same type of data to compare individual environmental factors (i.e., compare desktop information to desktop information, or survey data to survey data);	Refer to Tables 10.5-2 through 10.5-6
4e.	identify the source of the data used in the comparison (e.g., National Wetland Inventory, field survey, aerial photographic review); and	Refer to Tables 10.5-2 through 10.5-6
4f.	identify any assumptions used in calculating impacts (e.g., construction right-of-way width).	Refer to Tables 10.5-2 through 10.5-6
Response to FERC's 3/18/14 Comments on RR 10		
1.	Clarify whether FSC included private roads when estimating the degree to which the proposed route, route alternatives, and route variations would be collocated with roadways.	Yes, private roads were included in calculation of collocation with roadways. Refer to Tables 10.5-2 through 10.5-6
2.	Provide a figure, similar to that of figure 10-2, which clearly identifies the major utility corridors that the proposed and alternative routes would follow.	Refer to Figure 10.5-3, roads were also included in Figure 10-2.

LIST OF ACRONYMS AND ABBREVIATIONS

Bcf/d	Billion cubic feet per day
DEF	Duke Energy Florida
FEECA	Florida Energy Efficiency and Conservation Act
FERC	Federal Energy Regulatory Commission
FGT	Florida Gas Transmission Company, LLC
FPL	Florida Power & Light Company
FSC	Florida Southeast Connection, LLC
Gulfstream Pipeline	Gulfstream Natural Gas System, LLC
GWh	gigawatt hour
kV	kilovolt
MLV	Mainline valve
MMcf/d	Million cubic feet per day
MP	Milepost
MW	Megawatts
MWh	Megawatt hours
ROW	Right-of-way
USACE	United States Army Corps of Engineers
USDOE	United States Department of Energy

10.0 RESOURCE REPORT 10 – ALTERNATIVES

10.1 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 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. It will also provide additional source diversity through a connection to a new interconnection hub in central Florida ("Central Florida Hub") to be constructed as part of the Sabal Trail Transmission Pipeline Project ("Sabal Trail"). 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 Project will be capable of providing up to 600 million cubic feet per day 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 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 and will traverse Polk, Osceola, Okeechobee, St. Lucie, and Martin Counties, terminating at the FPL Martin Clean Energy Center in Martin County, Florida. The Martin Meter Station will be located at the terminus of the Project at the FPL Martin Clean Energy Center. 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. A complete summary of the FSC Project facilities is provided in Table 1.2-1 of Resource Report 1 and a location map of the FSC Project facilities is provided as Figure 1.2-1 in Resource Report 1.

This resource report contains a discussion of the various alternatives to the FSC Project that could achieve all or some portion of the FSC Project objectives. The range of alternatives considered includes the no action alternative, energy conservation alternative, energy alternatives, system alternatives, route alternatives, minor route variations, and above ground facility alternatives.

10.2 PURPOSE AND NEED

The purpose of the FSC Project is to (i) meet the natural gas fuel supply needs of existing and future electric generators by May 2017 and other natural gas users in Florida; (ii) add a new natural gas transmission pipeline to enhance the reliability to the existing pipeline system serving Florida; and (iii) satisfy the anchor shipper's (FPL) RFP requirement to create new pipeline infrastructure to allow for additional generation sites to be directly served with minimal need for additional facilities. For example, FSC's anchor shipper, FPL, has identified a site called Okeechobee in its 10-year site plan filed with the Florida Public Service Commission that is in very close proximity to the proposed FSC route (See Figure 10.2-1). This site is still in the evaluation stage and has not been selected by FPL. To the extent that the Okeechobee site is selected during FSC's application process, FSC will provide additional information on this site in Resource Report 1. The FSC Project may also permit natural gas Local Distribution Companies to expand natural gas service to parts of Florida that currently are not served given the absence of gas infrastructure, thus permitting industrial and commercial customers the benefits of natural gas. In conjunction with the Sabal Trail Project, FSC will allow diversified access to growing

natural gas supplies for natural gas users in Florida, increase the overall reliability of the region's natural gas transmission grid, reduce reliance on offshore supply sources and lessen the vulnerability to supply disruptions that can result from severe weather in the Gulf of Mexico.

10.3 NO ACTION ALTERNATIVE

If the FSC Project is not authorized by the FERC, the short-term and long-term environmental impacts resulting from FSC Project activities, discussed in other Resource Reports, will not occur. However, in this case, the objectives of the FSC Project would not be met, and FSC would not provide the proposed transportation capacity for FPL's natural gas-fired electric generation that is needed to serve its projected May 2017 customer electrical demand. Assuming the means of providing transportation for the gas required for the additional electric generation is not developed, a demand reduction would have to be achieved by either energy conservation, increased utilization of other energy sources, particularly oil, and/or use of the energy alternatives described below.

10.3.1 Energy Demand Projections

Florida's net energy load for electric generation is expected to grow by approximately 13 percent between 2013 and 2022 (FRCC, 2013). The load profile of Florida is heavily influenced by residential customers, and as such, Florida's generation capacity must be sufficient to meet the changing needs of the residential, industrial, and commercial consumers. Florida currently has 56,725 megawatts ("MW") (winter ratings) of installed capacity (FRCC, 2013). Florida's population growth over the next decade, estimated at 234,000 people per year (BEBR, 2013), will result in greater electricity demand and offset lower energy consumption via energy conservation programs (see Section 10.3.2).

Florida's installed electric generating capacity is based on a variety of different fuel sources: 64 percent natural gas, 20 percent coal, 8 percent nuclear, one percent non-utility generator, one percent renewables, 4 percent from inter-regional interchange, and 2 percent from other sources (FRCC, 2013).The last Florida Energy Plan (2006) forecasted future new natural gas generation capacity to reach 80 percent of net generation, and actual growth in natural gas fired generation has already gone from 25 percent to 64 percent of net generation between 2002 and 2012 (PUSC, 2013). As a result, natural gas will represent an even larger percentage of the future generation fuel mix.

10.3.2 Energy Conservation

Cost-effective energy conservation programs promoted by electric utilities reduce the growth in peak demand (thus reducing the number of new generating units that need to be built) and lower overall energy usage, all while minimizing the impact on electric rates for all customers. In addition, mandated building codes and appliance standards are providing additional reduction of peak demand and energy outside of utility programs. The Florida Energy Efficiency and Conservation Act ("FEECA"), enacted in 1980, places emphasis on reducing weather-sensitive peak electric demand growth rates, reducing and controlling electricity consumption growth rates, and reducing fossil-fuel consumption. The Florida Public Service Commission ("FPSC") encourages energy conservation and other demand-side management programs. The FPSC sets numeric peak demand and energy savings goals for the seven large electric utilities subject to FEECA and monitors their conservation achievements.

As of 2012, the seven FEECA utilities' demand side management programs, in total, have reduced winter peak demand by an estimated 7,095 MW and summer peak demand by an estimated 7,164 MW. These programs have also reduced total energy consumption by an estimated 8,518 gigawatt hour ("GWh"), which lowers fuel consumption at electric generators

(FPSC, 2013). The demand savings from these programs have resulted in the deferral or avoidance of a substantial fleet of base load, intermediate and peak power plants. Since 1981, Florida's investor-owned electric utilities have recovered over $5.7 billion of conservation expenditures through the Energy Conservation Cost Recovery clause, with approximately $2.9 billion of conservation program expenditures in the last ten years. The FPSC's approved demand side management/energy conservation goal for 2010 to 2019 is to save 7,425 GWh, annually (FPSC, 2012).

It is possible that the development and implementation of additional cost-effective energy conservation measures could have some effect on the demand for natural gas; however, substantial new technology development would be needed before the magnitude of cost-effective energy conservation necessary to equal the electricity generated by natural gas delivered from the proposed FSC Project could be implemented.

10.3.3 Energy Alternatives

Use of certain alternative fuels to supply the needs of the market potentially could result in adverse environmental impacts, due to increased air pollutant emissions that otherwise would be minimized through the use of natural gas. In general, alternative energy sources to the FSC Project include oil, coal, biomass, and nuclear fuels. State and federal air pollution control regulations promote the use of clean fuels to minimize adverse air quality impacts. Alternative hydrocarbon energy sources would unnecessarily increase adverse air quality impacts, and these increased impacts may conflict with federal and state long-term energy environmental policies aimed toward improving air quality in non-attainment areas. Moreover, the FSC project will transport natural gas to meet the increasing demands by existing and future natural gas fired generation plants, where the only alternative fuel for such plants is oil.

In 2010, renewable energy sources contributed 8,049 trillion British thermal units to the United States' power supply (EIA, 2011c). This amount accounted for an 8 percent share of the total energy consumption in the United States (EIA, 2011c). However, none of these renewable energy sources have been fully developed in the United States or in the FSC Project area for large-scale application or to the point where they would be viable energy alternatives to the proposed FSC Project (ACEEE, 2003). Conversely, smaller-scale, or individual, renewable energy sources could be combined to meet the energy needs for the proposed FSC Project; however, the number of such individual projects would be numerous, and land requirements will likely substantially increase. Because the combination of these resources would require development of coordinated efforts, which would take time and would not provide the energy in time to meet the FSC Project's market needs, it is evident that these energy alternatives are not viable options when compared to natural gas.

10.3.3.1 Wind

Wind power currently is not an option for providing the existing or projected power needs in the market. Wind energy is not available in the vicinity of the FSC Project presently nor is it likely to be so consistent with the FSC Project timeframe. Wind power also cannot be precisely scheduled based on demand. The proposed FSC Project would provide 640,000 MMcf/d of additional energy (by 2020), which, converted to megawatt hours ("MWh") is approximately 187,565 MWh. To compare the energy provided by the proposed FSC Project to that of other renewable energy sources, such as wind or solar, a unit of power must be calculated. 187,565 MWh equate to 15,629 MW of power, assuming 12 hours of operation/day. Based on the fact that individual wind turbine capacity can range from 1.8 MW up to 5 MW (AWEA, 2012) a total of 5,209 turbines (using an estimated three MW/turbine) would be needed to produce the same amount of energy as the proposed Project. Therefore, wind energy would not provide the

reliable quantity of energy that could be provided by natural gas due to the vast number of wind turbines needed and the area required for their operation. Wind turbines would also require permanent access roads and electric transmission facilities to be constructed. Placing this large number of wind turbines, access roads and electric transmission facilities will likely cause significant impacts to the visual resources and aesthetics of the region. Therefore, wind power would not be a viable option when compared to natural gas.

10.3.3.2 Hydroelectric

The region where the FSC Project is located does not have a potential for hydroelectric power generation, even using low head/low power technologies. As a result, hydroelectric power would not be available for development in the region as an alternative to the natural gas supplied by the FSC Project.

10.3.3.3 Solar Power

Solar power is not a viable alternative to meet the natural gas fuel supply needs of existing and future electric generators by May 2017. Also solar may be less practicable in Florida due to climactic conditions, developmental costs, reliability issues, the need for large expanses of land, and the uncertainty of solar power availability at times of system peak demand. Some of the largest completed solar photovoltaic power plants, also called solar parks or fields, have area efficiency of about 4.5 to 13.5 acres per MW (*Solar by the Watt 2009*). Therefore, it is estimated the land requirements for a solar project that could produce 15,629 MW of power would range from 70,330 to almost 210,990 acres, or about 110,330 square miles. As a result of these extensive land requirements, solar power is not being developed at a pace that would provide for the projected energy needs of the market. While some minimal solar development is underway in Florida, the land requirements needed to generate the amount of energy equivalent to that to be transported by the proposed FSC Project would be cost prohibitive. Due to the relative land impacts required for solar compared to natural gas, solar is not a viable option.

10.3.3.4 Geothermal Power

Geothermal energy is available only at tectonic plate boundaries or at volcanic hotspots. Due to a lack of these features in the FSC Project area, geothermal energy would not be available for development as an alternative to natural gas.

10.3.3.5 Coal

Although a viable alternative to natural gas for power generation, coal is not as clean-burning as natural gas. Coal emits greater regulated pollutants (e.g., sulfur dioxide and nitrogen dioxide), unregulated greenhouse gases (e.g., carbon dioxide), and particulate matter, which require the installation of costly air pollution controls. Coal is associated with significant mine pollution control problems and reclamation issues, as well as storage problems, and costly pollution controls at the burner. Coal consumption in the United States totaled 1,048.3 million short tons for 2009 (EIA, 2011b). This amounts to 21 percent of the total energy used in the United States (EIA, 2011c). Energy generated from the burning of coal is considered a major contributor to acid rain, which continues to be an international ecological and economic problem. Coal also contributes more greenhouse gas emissions than natural gas and petroleum fuels. Further, emissions from coal-burning power plants are the primary source of airborne mercury deposition in the United States, accounting for over 50 percent of all domestic human-caused mercury emissions (EPA, 2005). The mining and transportation of coal to end users have additional and more complex adverse environmental impacts. While coal remains a viable option for serving the energy needs of certain customers, it may result in greater environmental impacts than the production and transport of natural gas via transmission pipelines. The relative environmental benefits and efficiency of natural gas make the fuel an attractive alternative to oil and coal-fired

generation. Compared to the average air emissions from coal-fired power generation, natural gas produces half as much carbon dioxide, less than a third as much nitrogen oxides, and one percent as much sulfur dioxides at the power plant, thereby reducing global warming impacts relative to coal-based sources (EPA, 2007). Therefore, coal does not represent a preferred alternative for replacing the natural gas to be supplied by the proposed FSC Project.

10.3.3.6 Oil

Oil is not a viable alternative energy source for meeting future power generation needs in the market. The use of oil supplies to meet existing or future energy demands could increase reliance on overseas crude petroleum and petroleum products. Though the construction of an oil transmission pipeline has no advantage over natural gas pipeline transmission in regards to area requirements, oil typically necessitates transportation overseas, requires tank distribution and increases air pollutant emissions when burned. These aspects of oil use create the potential for increased adverse environmental impacts, including the increased risk of oil spills, air quality degradation, and potential impacts associated with land use development required for the construction of new, or expansion of existing, refineries to process the oil. Florida utilities have increasingly converted power plants from oil to natural gas because oil is more expensive than natural gas and produces more emissions than natural gas. Therefore, oil does not represent a viable alternative for replacing the natural gas to be supplied by the proposed FSC Project.

10.3.3.7 Nuclear

Nuclear energy development is an option that is considered environmentally viable, especially in terms of limiting pollutant air emissions. Extensive regulatory requirements need to be met in the planning and building of new nuclear facilities, as well as significant public concern. There is significant uncertainty as to the timing and cost of bringing new nuclear facilities into service. Moreover, the time required to design, permit, and construct a nuclear generation facility is measured in years and would be significantly greater than the amount of time required to design, permit, and construct a pipeline to natural gas fired generation plants. Since the nuclear energy alternative would not be available to meet the required short-term energy demands by the market, use of nuclear energy is not a viable alternative to the proposed FSC Project.

10.3.3.8 Fuel Cells

Fuel cells are a developing alternative for generating electricity more directly and cleanly from fossil fuels or hydrogen. Small-scale fuel cell research and development is active, but reliable fuel cell systems representing a magnitude of energy supply equivalent to the proposed FSC Project are not expected to be available or cost-effective in the near future.

10.4 SYSTEM ALTERNATIVES

System alternatives are alternatives to the proposed action that would make use of other existing, modified, or proposed pipeline systems to meet the stated objectives of the FSC Project. A system alternative would make it unnecessary to construct all or part of the FSC Project, although some modifications or additions to the alternative systems may be required to increase their capacity or provide receipt and delivery capability consistent with that of the FSC Project. These modifications or additions would result in environmental impacts that may be less than, comparable to, or greater than those associated with construction of the FSC Project. System alternatives that would result in significantly less environmental impact might be preferable to the FSC Project. However, a viable system alternative must also be technically and economically feasible and practicable, and must satisfy necessary contractual commitments made with shippers supporting the development of the FSC Project.

A viable system alternative to the FSC Project would have to meet the following FSC Project objectives while resulting in less of an environmental effect than the FSC Project:

- Provide 640 MMcf/d of firm transportation capacity;
- Provide a connection to the new Sabal Trail Project or other new pipeline at a central Florida location;
- Provide route diversity to increase reliability of the pipeline system serving Florida;
- Provide the ability to serve existing and future planned generation sites;
- Provide a connection to FPL's Martin Clean Energy Center; and
- Be operational in time to meet the in-service date of May 2017.

Any viable alternative must be compatible with the contractual requirements relating to location and capacity of receipt points, delivery interconnections, and in-service date set forth in these agreements.

FSC considered several system alternatives to the FSC Project as follows:

10.4.1 Florida Gas Transmission ("FGT") Pipeline

The FGT pipeline is an approximately 5,500-mile gas pipeline system that transports natural gas from south Texas to south Florida. The pipeline has a capacity of nearly 3 billion cubic feet per day ("Bcf/d") of natural gas, which is delivered to a diverse customer base in Florida including electric utilities, independent power producers, industrials, and local distribution companies. The pipeline services over 250 delivery points with connections to over 50 natural gas fired electric generation plants. The FGT pipeline passes along the east coast of Florida and provides a connection to FPL's Martin Clean Energy Center (see Figure 10.4-1). Although the FGT pipeline route will interconnect with Sabal Trail in central Florida, it currently does not have sufficient capacity to address FSC Project requirements without construction of substantial additional gas delivery infrastructure. FGT also would not provide a new pipeline system that increases the reliability and route diversity of the existing pipeline system or introduce competition into the Florida market. As this alternative is not available at present, it does not meet the purpose and need of the FSC Project.

10.4.2 Gulfstream Pipeline

The Gulfstream Pipeline is approximately 745 miles long (294 miles in Florida; 15 miles in Alabama & Mississippi; 17 miles offshore processing; 419 miles offshore to Florida) and delivers 1.3 Bcf/d of natural gas from the Mobile Bay, East Louisiana & Mississippi supply area across the Gulf of Mexico to off take locations in Hardee, Polk, Osceola, Manatee, Pinellas, and Palm Beach Counties in Florida (Gulfstream, 2013). The diameter of the pipeline ranges from 16 to 36 inches. Gulfstream Pipeline currently has contracts with nine different entities that total Gulfstream Pipeline's entire capacity of 1.3 MMcf/d. Thus while the Gulfstream Pipeline provides a connection point to Martin Clean Energy Center (see Figure 10.4-1), it has no unsubscribed capacity (Gulfstream, 2013) and is not able to send additional gas without the addition of new capacity through a larger diameter line. Gulfstream Pipeline also would not provide a new pipeline system that increases the reliability and route diversity of the existing pipeline system and introduces competition into the Florida market. As this alternative is not available at this time, it does not meet the purpose and need of the FSC Project.

10.5 ROUTE ALTERNATIVES

Several alternatives to the proposed pipeline alignment were evaluated as part of the planning and design process for this FSC Project. The analysis for the alternative pipeline routes was based on environmental and land use impacts, as well as permanent easement acquisitions and overall FSC Project costs.

The selection of the major route alternatives discussed in Section 10.5.1 was dictated by several factors.

- Determination of the most cost-effective technical solution;
- Development of routing criteria;
- Identification of potential routing alternatives;
- Collection of data relative to each alternative;
- Evaluation of potential environmental and land use impacts; and
- Evaluation of routing alternatives against routing criteria.

Sources of information, such as field reconnaissance, aerial photography, topographic maps from the United States Geological Survey, and National Wetland Inventory maps, were used during the route identification and evaluation processes.

The factors used to select the Preferred Route over the alternative routes and deviations considered landowner concerns, minimizing the number of affected landowners, minimizing adverse environmental impacts, ensuring constructability, and promoting safety. Route Alternatives were based on information collected since January 2012 through consultation with stakeholders; civil, environmental, and cultural field surveys; assessments of construction feasibility and safety; and assessments of operational safety. Stakeholders consulted included landowners; local, state and federal government agencies; and advocacy groups. FSC utilized existing sources of information, such as Google Earth™; Geographic Information Systems databases from county, state, and federal sources; aerial photography; United States Geological Survey topographic maps; National Wetlands Inventory maps; and the South Florida Water Management District's Florida Land Use, Cover and Forms Classification System maps, to make preliminary assessments prior to creating an alignment or when survey permissions were not granted by the landowner.

When evaluating routing options for the FSC Project, FSC attempted to collocate with existing utility right-of-ways and roadway corridors to the greatest extent possible. Collocation is defined by FSC as either within an existing right-of-way or easement or adjacent to an existing right-of-way or easement.

The use of co-location as a principal design element by FSC was necessitated not only by Commission guidelines, which stress the corridor concept, but also the existing land use characteristics in the FSC Project area. Siting pipeline facilities along existing corridors and right-of-way reduces the establishment of new corridors in previously undisturbed areas and may limit the number of affected landowners. FSC also attempted to place the pipeline alignment in previously disturbed areas to promote avoidance of potentially sensitive areas, such as water supply watersheds, dense population areas, cultural resources, and forest interior (i.e., areas 300 feet or greater from the forest edge), where possible.

FSC conducted an analysis of route alternatives between the origination and termination point of the FSC Project based on environmental and land use constraints. The Origination Point was

identified as the tie-in with the Sabal Trail Project in Osceola County. The Termination Point was identified as the existing gas yard at FPL's Martin Clean Energy Center.

A two-tier siting criteria approach was applied to first identify corridor alternatives within the study area and then compare the attributes of each corridor alternative. The Tier 1 siting criteria included key constraints to the siting of a natural gas pipeline that were utilized to develop corridor alternatives within the study area. Table 10.5-1 details the Tier 1 and Tier 2 siting criteria developed and applied for the FSC Project.

Utilizing the study area shown on Figure 10.5-1 and the Tier 1 siting criteria, provided in Table 10.5-1, the Preferred Route and two alternative routes were identified, along with three deviations off the Preferred Route (See Figure 10.5-2). Utility and transportation rights-of-way considered for colocation are shown relative to the Preferred Route and Alternative Routes and Deviations in Figure 10.5-3. In addition to desktop review, FSC conducted aerial and ground reconnaissance of the alternatives, as well as additional reconnaissance of the Preferred Route in order to identify any local variations that should be considered.

The major factors differentiating the Preferred Route, Route Alternatives, and deviations off the Preferred Route are presented in Tables 10.5-2 through 10.5-6.

10.5.1 Major Route Alternatives and Deviations

The following information provides descriptions of the Major Route Alternatives and deviations. A Major Route Alternative is an alignment that has the potential to meet the FSC Project objective but would deviate significantly from the Preferred Route. Deviations are smaller alignment/route changes that were considered with respect to the Preferred Route.

The Preferred Route is approximately 127 miles in length, of which approximately 102 miles (79 percent)] are collocated with existing linear facilities. The Preferred Route was chosen to minimize impacts to wetlands and other environmental resources and to collocate with existing utility and roadway rights-of-way where practicable. From its starting point at Sabal Trail, the Preferred Route runs in a southward direction and follows an existing DEF electrical transmission line and Kinder Morgan products pipeline for approximately 18 miles. The Preferred Route then continues south to State Road 60. At this point the Preferred Route follows State Road 60 to Yeehaw Junction, where the route turns south along State Highway 441 for approximately 13 miles. The route then runs southeasterly through pasture periodically interspersed with forested areas, for approximately 41 miles to the Termination Point at FPL's existing gas yard on the Martin Clean Energy Center property.

Major Route Alternative 1

Major Route Alternative 1 is approximately 144.4 miles in length, of which 136 miles (94 percent) are collocated with existing linear facilities. The purpose of Major Route Alternative 1 was to assess environmental impacts of a northern route alternative that runs between the Interconnection with Sabal Trail and the Martin Clean Energy Center and to compare those impacts with the Preferred Route. The route alternative was selected for analysis because it would be collocated with portions of FGT's pipeline right-of-way and FPL's 500-kilovolt ("kV") Transmission Line right-of-way (Refer to Figures 10.5-2 and 10.5-3). Beginning at Sabal Trail, this alternative is collocated with the existing FGT pipeline route as it traverses to the northeast around Kissimmee, Florida, before turning south toward St. Cloud, Florida. This alternative then continues to follow the FGT pipeline route to the east before intersecting with FPL's 500-kV Transmission Line, which it follows south to the Termination Point at FPL's existing gas yard at the Martin Clean Energy Center. No deviations were considered from this route.

Major Route Alternative 2

Major Route Alternative 2 is approximately 146 miles in length, of which 132 miles (89 percent) are collocated with existing linear facilities. The purpose of Major Route Alternative 2 was to assess environmental impacts of a southern route alternative that runs between the Interconnection with Sabal Trail and the Martin Clean Energy Center and to compare those impacts with those of the Preferred Route. Major Route Alternative 2 was selected for analysis because it would be collocated with portions of the right-of-way associated with the DEF electrical line and Kinder Morgan products line, the FGT pipeline, and the Gulfstream Pipeline (Refers to Figures 10.5-2 and 10.5-3). The route begins at the interconnection with Sabal Trail, and proceeds approximately 18 miles southward along a route collocated with an existing DEF electrical transmission line and Kinder Morgan products pipeline. The Route extends southward off the Preferred Route for approximately seven additional miles to a point approximately one mile northeast of Lake Wales, where it turns westward to the FGT pipeline. It then follows this pipeline route, until north of Avon Park, where it turns eastward. At this point, the alternative follows the Gulfstream Pipeline to the Termination Point at FPL's existing gas yard at the Martin Clean Energy Center. No deviations were considered from this route.

Route Deviation 1

Deviation 1 is approximately 51.6 miles in length, of which 42.2 miles (81 percent) are collocated with existing linear facilities. The purpose of Route Deviation 1 was to assess environmental impacts of siting the line along a portion of FPL's 500-kV Transmission right-of-way instead of following the southernmost approximately one-third of the Preferred Route. Route Deviation 1 turns off the Preferred Route at mile post (MP) 84.1, approximately 10.5 miles south of Yeehaw Junction and traverses in an eastward direction until it joins FPL's 500-kV Transmission Line. It then follows FPL's 500 kV Transmission Line southward and terminates at FPL's existing gas yard at the Martin Clean Energy Center Property (Refer to Figures 10.5-2 and 10.5-3).

Route Deviation 2

Deviation 2 is approximately 41.2 miles in length, of which 100 percent is collocated with existing linear facilities. The purpose of Route Deviation 2 was to assess environmental impacts of siting the line along Route 441 and the Gulfstream Pipeline instead of following the southernmost approximately one-third of the Preferred Route. Route Deviation 2 turns off the Preferred Route at MP 87.2 approximately 10.5 miles south of Yeehaw Junction and heads southward along State Highway 441 until it reaches a point north of Okeechobee, Florida, where it then begins to follow the Gulfstream Pipeline to the Termination Point at the Martin Clean Energy Center Property (Refer to Figures 10.5-2 and 10.5-3).

Route Deviation 3

Deviation 3 is approximately 19 miles in length, of which 100 percent is collocated with existing linear facilities. The purpose of Route Deviation 3 was to assess environmental impacts of siting the line along a portion of FPL's 500-kV Transmission Line instead of the following the final 14.4 miles of the Preferred Route. Route Deviation 3 turns off the Preferred Route at MP 112.6 approximately 12.7 miles north of the Martin Clean Energy Center, then runs eastward for approximately 4.6 miles until it reaches the FPL's 500-kV Transmission Line. From there it follows FPL's 500-kV Transmission line until it reaches the Martin Clean Energy Center property (Refer to Figures 10.5-2 and 10.5-3).

10.5.2 Findings and Selection of Preferred Pipeline Route

FSC quantified environmental impacts to compare and contrast the Preferred Route with the alternative routes and route deviations (see Tables 10.5-1 through 10.5-6). In order to allow for a suitable comparison of impacts, the impacts of the entire Preferred Route were compared with the impacts of the entire Alternative Routes 1 and 2 (see tables 10.5-1 and 10.5-2), and the impacts associated with Route Deviation numbers 1, 2, and 3, were compared against impacts of their correlative portions of the Preferred Route (Tables 10.5-3 through 10.5-6).

10.5.2.1 Comparison of Preferred Route with Alternative Route 1

The Preferred Route is 17.3 miles shorter than Alternative Route 1 and thus has significantly less construction and permanent right-of-way area and associated impacts. The Preferred Route has 57 fewer acres of temporary wetland impacts, 53 fewer acres of permanent wetland impacts, 278 fewer water body crossings, crosses 14.6 fewer miles of critical habitat, crosses 36.9 fewer recreation and special interest areas, is located within 50 feet of 69 fewer homes, and crosses 39 fewer roads than Alternative Route 1. The Preferred Route does have more impacts to forested land and crosses within 300 feet of one more previously recorded cultural resource than Alternative Route 1, but it has significantly fewer impacts to wetlands and other important resources as noted above, which makes it superior to the Alternative Route 1. As stated above, the Preferred Route is shorter, which means there would be less construction time required, less associated construction noise and disruption to both environmental resources and people in the area and it would cost less to construct.

10.5.2.2 Comparison of Preferred Route with Alternative Route 2

The Preferred Route is 19 miles shorter than Alternative Route 2, and thus has significantly less construction and permanent right-of-way area and associated impacts. The Preferred Route has 10 fewer acres of temporary wetland impacts, 17 fewer acres of permanent wetland impacts, 151 fewer water body crossings, crosses 8.2 fewer miles of critical habitat, crosses 4.6 fewer miles of recreation and special interest areas, crosses nine fewer roads, and is within 300 feet of 34 fewer recorded cultural resources than Alternative Route 2. The Preferred Route does have more impacts to forested area and is within 50 feet of 26 more residences, but has significantly fewer impacts to wetlands and other important resources as noted above, which makes it superior to the Alternative Route 2. As stated above, the Preferred Route is shorter, which means there would be less construction time required, less associated construction noise and disruption to both environmental resources and people in the area, and it would cost less to construct.

10.5.2.3 Comparison of Route Deviation 1 with Corresponding Section of Preferred Route

Route Deviation 1 replaces the Preferred Route from MP 84.1 to MP 127.1. This section of the Preferred Route is 8.6 miles shorter than Route Deviation 1, and thus has less construction and permanent right-of-way area and associated impacts. The 43 mile section of the Preferred Route has 10 fewer acres of temporary wetland impacts, 11 fewer acres of permanent wetland impacts, 188 fewer water body crossings, crosses 6.2 fewer miles of critical habitat, crosses 8.8 fewer miles of recreation and special interest areas, crosses five fewer roads, and is within 300 feet of 10 fewer recorded cultural resources than Route Deviation 1. The corresponding portion of the Preferred Route is within 50 feet of three more homes and does have more acres of forest impacts, but has significantly fewer impacts to wetlands and other important resources as noted above, which makes it superior to the Route Deviation 1. As stated above, the corresponding portion of the Preferred Route is shorter than this deviation, which means there would be less construction time required, less associated construction noise and disruption to both environmental resources and people in the area, and it would cost less to construct.

Finally, a disadvantage of Route Deviation 1 is that it runs through the Allapattah Complex Natural Storage and Water Quality Area, an important component of the U.S. Army Corps of Engineers ("USACE") Indian River Lagoon South Restoration Project, designed to improve water quality and restore degraded habitat within two threatened estuaries (USACE 2014). FSC desired to avoid this resource and for the reasons above, did not adopt this deviation.

10.5.2.4 Comparison of Route Deviation 2 with Corresponding Section of Preferred Route

Route Deviation 2 replaces the Preferred Route from MP 87.2 to MP 125.6. This section of the Preferred Route is 2.8 miles shorter than Route Deviation 2, and thus has less construction and permanent right-of-way area and associated impacts. The 38.4 mile section of the Preferred Route has two fewer acres of temporary wetland impacts, two fewer acres of permanent wetland impacts, 78 fewer water body crossings, crosses 1.9 fewer miles of critical habitat, crosses 0.6 fewer miles of recreation and special interest areas, is located within 50 feet of eight fewer homes, and is within 300 feet of two fewer recorded cultural resources than Route Deviation 2. The corresponding portion of the Preferred Route does have more acres of forest impacts, but has significantly fewer impacts to wetlands and other important resources as noted above, which makes it superior to Route Deviation 2. As stated above, the corresponding portion of the Preferred Route is shorter than this deviation, which means there would be less construction time required, less associated construction noise and disruption to both environmental resources and people in the area, and it would cost less to construct.

10.5.2.5 Comparison of Route Deviation 3 with Corresponding Section of Preferred Route

Route Deviation 3 replaces the Preferred Route from MP 112.6 to MP 127.1. This section of the Preferred Route is 4.5 miles shorter than Route Deviation 3, and thus has less construction and permanent right-of-way area and associated impacts. The 14.5 mile section of the Preferred Route has three fewer acres of temporary wetland impacts, three fewer acres of permanent wetland impacts, 32 fewer water body crossings, crosses 4.4 fewer miles of critical habitat, crosses 1.3 fewer miles of recreation and special interest areas, is located within 50 feet of one less home, crosses six fewer roads, and is within 300 feet of seven fewer recorded cultural resources than Route Deviation 3. The corresponding portion of the Preferred Route does have more acres of forest impacts, but has significantly fewer impacts to wetlands and other important resources as noted above, which makes it superior to the Route Deviation 3. As stated above, the corresponding portion of the Preferred Route is shorter than this deviation, which means there would be less construction time required, less associated construction noise and disruption to both environmental resources and people in the area, and it would cost less to construct. Finally, like Route Deviation No. 1, Route Deviation 3 also would have to run through the Allapattah Complex Natural Storage and Water Quality Area, an important component of the USACE Indian River Lagoon South Restoration Project, designed to improve water quality and restore degraded habitat within two threatened estuaries (USACE 2014). FSC desired to avoid this resource and for the reasons above, did not adopt this deviation.

10.6 MINOR ROUTE VARIATIONS

Once the Preferred Route was determined in the initial siting study completed in July 2012, it was further refined in several areas to minimize environmental impact and/or impacts to people in the area. Please refer to Table 10.6-1, which describes these minor route variations and the reasons they were made.

10.7 ABOVEGROUND FACILITY ALTERNATIVES

All aboveground facilities associated with the FSC Project will be co-located with other FSC Project or pipeline-related facilities. The disturbance associated with the FSC Project facilities will be the same for the aboveground facilities. Therefore, no alternative locations for the

aboveground facilities were developed for evaluation. The only aboveground facility that may not be co-located with other FSC Project pipeline-related facilities for all occurrences would be blow down valves associated with main line valves ("MLV") that occur in areas adjacent to electric transmission lines. The owners of these lines typically require that the blow down valves be placed in an area where the electric transmission lines would not be affected by the operation of the valves. Since the blow down valve is part of the MLV facility, the location of the blow down valve is relatively fixed, in that it must be located in close proximity to the MLV but outside the area where its operation could potentially affect the electric transmission line. Consequently, no alternative locations were evaluated.

10.8 REFERENCES

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TABLES

TABLE 10.5-1

Siting Criteria for the FSC Project

Criterion	Resource Area	Unit Measure	Guidance for Siting	Source	Brief Description
TIER 1 SITING CRITERIA					
Collocation with Major Infrastructure	Overall Consideration	% of total length	Preference given to collocated alternatives	Platts Transmission Line Data 2009, FSCL Transmission Line Data; National Pipeline Mapping System 2006, FSC Pipeline Data, ESRI 2010 and FDOT 2011	Collocation with existing compatible linear infrastructure such as other pipelines, transmission lines, major roads, railroads, and other linear facilities can minimize the overall impacts associated with Project implementation.
Proximity to Origination and Termination Points	Overall Consideration	n/a	Project must start and end at origination and termination points (Figure 2-1)	Provided by FSC	The alternatives developed during the alternatives analysis allowed for practicable delivery to desired locations.
Major or Significant Built Features/Infrastructure	Overall Consideration	Number Intersected	Avoidance to the extent practicable	ESRI 2010, and USDA NAIP Aerial Imagery 2010	To the extent practicable, the alternatives developed during the alternatives analysis avoided major public interest facilities, tourist attractions, and infrastructure such as hospitals, churches, parks, and schools.
Reservoirs and Major Waterbodies	Water Resources	Number Intersected	Minimization to the extent practicable; also cross perpendicularly	USGS NHD 2010	The USGS NHD was used to identify reservoirs and major waterbodies, typically defined as greater than 100 feet wide. These may not be avoided entirely due to the linear nature of the Project. However, preference was given to alignments that minimize the intersections with and crossings of major waterbodies and reservoirs.
TIER 2 SITING CRITERIA					
Collocation with Existing Utilities	Overall Consideration	% of total length	Preference given to collocated alternatives	Platts Transmission Line Data 2009; FSC Transmission Line Data; National Pipeline Mapping System 2006	To the extent practicable, the alternatives considered were collocated with existing utility corridors to maintain consistent existing land uses. Within these areas, existing utility corridors were examined for potential collocation opportunities.
Federal Lands	Land Use / Land Cover	Miles	Avoidance and minimization to the extent practicable	ESRI 2010	Crossing of federally managed lands would increase the overall easement and permitting complexity and permit review timeframes for the Project. If federal lands could not be avoided, preference was given to collocating with existing rights-of-way that cross federal lands.
State Lands	Land Use / Land Cover	Miles	Avoidance and minimization to the extent practicable	ESRI 2010	Crossing of state-owned lands would increase the easement and permitting complexity and permit review timeframes for the Project. If state-owned lands could not be avoided, preference was given to collocating with existing rights-of-way that cross state lands.
County or Municipality-owned Lands	Land Use / Land Cover	Miles	Avoidance and minimization to the extent practicable	ESRI 2010	Crossing of county-owned or municipality-owned lands would increase the easement and permitting complexity of the Project. These lands normally consist of small public parks or preserves and could lead to local opposition if crossed. Avoidance of these areas was preferred and typically was accomplished.
Agriculture, Barren Land, and Upland Non-Forested Areas	Land Use / Land Cover	Miles	Open lands are preferable	USDA NAIP Aerial Imagery 2010 and Water Management District FLUCFCS 2008 and 2009	Agricultural and open lands are generally considered compatible with siting of pipelines and would not require land cover conversion. On agricultural lands, care was exercised to minimize the area of land that could be taken out of agricultural production.
Forested Areas	Land Use / Land Cover	Miles	Avoidance and minimization to the extent practicable	USDA NAIP Aerial Imagery 2010 and Water Management District FLUCFCS 2008 and 2009	These areas would require clearing of trees during Project construction and continued maintenance of a permanent right-of-way, which would cause land cover conversion and increased Project costs, so they are considered less desirable for the siting of a pipeline. In addition, clearing forested lands potentially increases impacts on wildlife due to forest loss and/or fragmentation and potentially increased impacts to wetland functions. Maintenance procedures through forested areas are typically more labor intensive and are required at a greater frequency. Required clearing should be adjacent to already cleared areas, to the extent practicable.
Urban and Built-Up	Land Use / Land Cover	Miles	Avoidance and minimization to the extent practicable	USDA NAIP Aerial Imagery 2010 and Water Management District FLUCFCS 2008 and 2009	These lands present a greater potential for socioeconomic impact. Therefore, preference was given to avoidance of dense urban development.
Scenic Routes or Trails	Land Use / Land Cover	Number intersected	Avoidance and minimization to the extent practicable	ESRI 2010	The crossing of scenic routes and/or trails poses concerns about potential impacts on cultural, historical, visual, and/or aesthetic resources. Preference was given to avoidance of scenic routes or trails. Where avoidance was not possible, preference was given to collocation with other infrastructure crossings.
Wild and Scenic Rivers	Land Use / Land Cover	Number intersected	Avoidance and minimization to the extent practicable	FDEP National Wild and Scenic Rivers System 2009	Preference was given to avoiding crossings of Wild and Scenic Rivers, if possible. Where avoidance was not possible, preference was given to collocation with other infrastructure crossings.

TABLE 10.5-1

Siting Criteria for the FSC Project

Criterion	Resource Area	Unit Measure	Guidance for Siting	Source	Brief Description
USFWS-designated Critical Habitat	Biological Resources	Miles	Avoidance and minimization to the extent practicable	USFWS 2012	Preference was given to alternatives that would avoid or minimize the crossing of USFWS-designated critical habitat for federally threatened or endangered species.
Wood Stork Core Foraging Area	Biological Resources	Feet within foraging habitat	Avoidance and minimization to the extent practicable	USFWS 2012	The locations of wood stork rookeries are known and projects with direct impacts to the rookeries would not likely be permitted. Additionally, projects that occur within 18.6 miles of the known rookeries are within core foraging areas and must be constructed utilizing certain best management practices. The traversing of these areas was minimized to the extent practicable.
Wetlands	Water Resources	Miles	Minimization to the extent practicable	NWI, USDA NAIP Aerial Imagery 2010 and Water Management Districts FLUCFCS 2008 & 2009	Wetland resources were mapped using available datasets and aerial photo-interpretation. Rights-of-way traversing wetland areas have the potential to increase impacts to wetlands and wildlife and to increase the complexity and time required for Project permitting. Preference was given to alignments that avoid or minimize the number/length of crossings of wetlands systems, particularly forested wetlands. Wetland fragmentation was also considered. Preference was given to siting accessways outside of wetlands.
Waterbodies	Water Resources	Number intersected	Avoidance and minimization to the extent practicable	USGS NHD 2010	The location and angle of crossing of waterbodies by the proposed right-of-way were taken into consideration so that, to the extent practicable, impacts to the streambed and riparian areas could be avoided or minimized.
Springs	Water Resources	Number within 0.25 mile	Avoidance and minimization to the extent practicable	FDEP 2011 and USGS NHD 2010	Springs normally provide the headwaters of streams or provide a significant inflow of water to streams. These areas have a direct interface with groundwater. To the extent practicable, impacts to springs were avoided or minimized. Preference was given to siting the right-of-way and accessways outside of and 50 feet from springs, to the extent practicable.
Waterbody Classification	Water Resources	Number intersected	Avoidance and minimization to the extent practicable high value designated waterbodies	FDEP Class I and II surface water classification boundaries 2011	Outstanding Florida Waters (as defined in 62-302.700 of the Florida Administrative Code (F.A.C)), high quality waters (as defined in 62-302.400 F.A.C.), and water protection areas (as defined in 62-521 F.A.C) were avoided to the extent practicable.
NRHP Sites	Cultural Resources	Number within 0.25 mile	Avoidance and minimization to the extent practicable	NRHP 2012	The NRHP was used to identify officially designated historic places deemed worthy of preservation. Impacts to registered sites can increase the regulatory review and require offsetting mitigation. Preference was given to alignments that avoid or minimize impacts to registered sites.
Environmentally Regulated Sites	Contamination	Number within 0.25 mile	Avoidance and minimization to the extent practicable	USEPA 2012	The presence of environmentally regulated sites that are likely contaminated and are potentially undergoing site investigation or remediation were mapped if within 0.25 mile of each alternative. The analysis conducted included review of Resource Conservation and Recovery Act (RCRA) sites and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites. Avoidance of these areas to the extent practicable would be beneficial so that issues pertaining to the remediation of contaminated soils or groundwater contamination do not adversely affect the Project (e.g., temporary or permanent removal or relocation of pipelines during removal of contaminated soils).
Total Length	Project Cost	Miles	Preference given to shorter alternatives	Calculated by ESRI ArcMap	Total length was used as a criterion correlating to costs, and preference was given to alignments that will minimize overall length. Preference was also given to minimizing overall length as a means of minimizing overall land use impacts.
Electrical Transmission Line Crossings	Engineering Consideration	Number intersected	Avoidance and minimization to the extent practicable of lines greater than 230kV	Platts Transmission Line Data 2009 and Transmission Line Data	Transmission line crossings were considered during corridor siting process. Any electrical transmission line crossing may present construction constraints that must be considered in the pipeline siting process.
Pipeline Crossings	Engineering Consideration	Number of pipelines intersected	Minimization to the extent practicable the crossing of pipelines by the Project	National Pipeline Mapping System 2006, FSC Pipeline Data	Engineering constraints were considered in areas where the Project would cross pipelines. Construction methods may need to accommodate the presence of the pipeline and, as a result, construction costs could be significantly higher in these areas.
Major Road Crossings	Engineering Consideration	Number of roads intersected	Minimization to the extent practicable the crossing of major roads by the Project	ESRI 2010	Engineering constraints were considered where the Project would cross major roads. Major road crossings can increase construction costs and cause visual disruption for a traveler, which may result in social and political resistance to the Project. Additionally, easements or permits from the state Department of Transportation or local governments are required when crossing major roads.

TABLE 10.5-1

Siting Criteria for the FSC Project

Criterion	Resource Area	Unit Measure	Guidance for Siting	Source	Brief Description

Key:

CERCLA = Comprehensive Environment Response, Compensation and Liability Act
ESRI = Environmental Systems Research Institute, Inc.
F.A.C= Florida Administrative Code
FDEP = Florida Department of Environmental Protection
FDOT = Florida Department of Transportation
FLUCFCS = Florida Land Use, Cover and Forms Classification System
FPL = Florida Power & Light Company
kV = kilovolts
n/a = not applicable
NRHP = National Register of Historic Places
NWI = National Wetlands Inventory
RCRA= Resource Conservation and Recovery Act
USEPA=United States Environmental Protection Agency
USFWS = United States Fish and Wildlife Service
USGS NHD = United States Geological Survey National Hydrography Dataset

Table 10.5-2

Comparison of Preferred Route with Major Route Alternative No. 1

Factor	Preferred Route	Route Alternative 1	Information Sources
Length (miles)	127.1	144.4	1/
Pipeline diameter (inches)	36	36	2/
Length adjacent to existing right-of-way (miles/percent) (includes private roads)	101.9 miles (79%)	136 miles (94%)	1/
Nominal construction right-of-way (feet)	100	100	2/
Construction right-of-way (acres)	1,571	1,687	2/
Permanent right-of-way (acres)	770	875	2/
Construction impact on forest (acres)	283	157	3/
Operation impact on forest (acres)	148	87	3/
Construction impact on wetlands (acres)	131	188	4/
Operation impact on wetlands (acres)	72	125	4/
Karst features crossed (miles)	3.4	1.2	5/
Waterbody crossings (minor-intermediate/major) (no.)	204	482	6/
Critical habitat crossed (miles)	115.0	129.6	7/
Recreation and special interest areas crossed (no./miles)	9/9.2	9/46.1	8/
Previously recorded cultural resources affected (no.) a/	30	29	9/
Landowners affected (no.)	717	399	10/
Residences within 50 feet of the construction right-of-way (no.)	81	150	1/
Road crossings (no.)	21	60	11/
Railroad crossings (no.)	5	3	12/

a/ Archeological and historic resources within 300 ft of right-of-way (no.)

1/ Aerial photography
2/ Preferred Route Design and Workspace is based on the 2/18/2014 Design. Alternative and Deviation Workspace based on 100' wide construction corridor (75' within wetlands) and 50' wide Permanent right-of-way.
3/ Florida Land Use, Cover and Forms Classification System.
4/ National Wetlands Inventory.
5/ Potential Karst Areas were identified using the closed topographical depressions coverage from the Florida Geological Survey, Florida Department of Environmental Protection.
6/ National Hydrology Dataset.
7/ Wood Stork: USFWS; Scrub Jay: Florida Fish and Wildlife Conservation Commission.
8/ Florida Conservation Lands GIS Datalayer and Florida Natural Areas Inventory.
9/ Florida Division of Historic Resources – Florida Master Site File.
10/ Shapefiles from Okeechobee, Martin, St. Lucie, and Indian River County property appraiser.
11/ FDOT GIS Basemap.
12/ Federal Railroad Administration.

Table 10.5-3

Comparison of the Preferred Route with Major Route Alternative No. 2

Factor	Preferred Route	Route Alternative 2	Information Sources
Length (miles)	127.1	146.1	1/
Pipeline diameter (inches)	36	36	2/
Length adjacent to existing right-of-way (miles/percent)	101.9 miles (79%)	132 miles (89%)	1/
Nominal construction right-of-way width on Upland (feet)	100	100	2/
Construction right-of-way (acres)	1,571	1,762	2/
Permanent right-of-way (acres)	770	897	2/
Construction impact on forest (acres)	283	248	3/
Operation impact on forest (acres)	148	133	3/
Construction impact on wetlands (acres)	131	141	4/
Operation impact on wetlands (acres)	72	89	4/
Karst features crossed (miles)	3.4	3.3	5/
Waterbody crossings (minor-intermediate/major) (no.)	204	355	6/
Critical habitat crossed (miles)	115.0	123.2	7/
Recreation and special interest areas crossed (no./miles)	9/9.2	15/13.8	8/
Previously recorded cultural resources affected (no.) a/	30	64	9/
Landowners affected (no.)	717	764	10/
Residences within 50 feet of the construction right-of-way (no.)	81	55	1/
Road crossings (no.)	21	30	11/
Railroad crossings (no.)	5	11	12/

a/ Archeological and historic resources within 300 ft of right-of-way (no.)

1/ Aerial photography
2/ Preferred Route Workspace is based on the 2/18/2014 Design. Alternative and Deviation Workspace based on 100' wide construction corridor (75' within wetlands) and 50' wide Permanent right-of-way.
3/ Florida Land Use, Cover and Forms Classification System
4/ National Wetlands Inventory
5/ Potential Karst Areas were identified using the closed topographical depressions coverage from the Florida Geological Survey, Florida Department of Environmental Protection.
6/ National Hydrology Dataset
7/ Wood Stork: USFWS; Scrub Jay: Florida Fish and Wildlife Conservation Commission
8/ Florida Conservation Lands GIS Datalayer and Florida Natural Areas Inventory
9/ Florida Division of Historic Resources – Florida Master Site File
10/ Shapefiles from Okeechobee, Martin, St. Lucie, and Indian River County property appraiser.
11/ FDOT GIS Basemap
12/ Federal Railroad Administration

Table 10.5-4

Comparison of Deviation 1 with the Corresponding Portion of the Preferred Route

Factor	Section of Proposed Route (MP 84.1 – 127.1)	Route Deviation No. 1	Information Sources
Length (miles)	43	51.6	1/
Pipeline diameter (inches)	36	36	2/
Length adjacent to existing right-of-way (miles/percent)	22 miles (51%)	42 miles (81%)	1/
Nominal construction right-of-way width (feet)	100	100	2/
Construction right-of-way (acres)	544	609	2/
Permanent right-of-way (acres)	257	313	2/
Construction impact on forest (acres)	96	25	3/
Operation impact on forest (acres)	48	15	3/
Construction impact on wetlands (acres)	38	48	4/
Operation impact on wetlands (acres)	21	32	4/
Karst features crossed (miles)	0.6	0.5	5/
Waterbody crossings (minor-intermediate/major) (no.)	102	290	6/
Critical habitat crossed (miles)	45.6	51.8	7/
Recreation and special interest areas crossed (no./miles)	1/0.4	5/9.2	8/
Previously recorded cultural resources affected (no.) a/	6	16	9/
Landowners affected (no.)	60	115	10/
Residences within 50 feet of the construction right-of-way (no.)	7	4	1/
Road crossings (no.)	8	13	11/
Railroad crossings (no.)	2	2	12/

a/ Archeological and historic resources within 300 ft of right-of-way (no.)

1/ Aerial photography
2/ Preferred Route Workspace is based on the 2/18/2014 Design. Alternative and Deviation Workspace based on 100' wide construction corridor (75' within wetlands) and 50' wide Permanent right-of-way.
3/ Florida Land Use, Cover and Forms Classification System
4/ National Wetlands Inventory
5/ Potential Karst Areas were identified using the closed topographical depressions coverage from the Florida Geological Survey, Florida Department of Environmental Protection.
6/ National Hydrology Dataset
7/ Wood Stork: USFWS; Scrub Jay: Florida Fish and Wildlife Conservation Commission
8/ Florida Conservation Lands GIS Datalayer and Florida Natural Areas Inventory
9/ Florida Division of Historic Resources – Florida Master Site File
10/ Shapefiles from Okeechobee, Martin, St. Lucie, and Indian River County property appraiser.
11/ FDOT GIS Basemap
12/ Federal Railroad Administration

Table 10.5-5

Comparison of Deviation 2 with the Corresponding Portion of the Preferred Route

Factor	Section of Preferred Route (MP 87.2 – 127.1)	Route Deviation No. 2	Information Sources
Length (miles)	38.4	41.2	1/
Pipeline diameter (inches)	36	36	2/
Length adjacent to existing right-of-way (miles/percent)	18 miles (47%)	41 miles (100%)	1/
Nominal construction right-of-way width (feet)	100	100	2/
Construction right-of-way (acres)	484	489	2/
Permanent right-of-way (acres)	229	250	2/
Construction impact on forest (acres)	77	60	3/
Operation impact on forest (acres)	39	32	3/
Construction impact on wetlands (acres)	34	32	4/
Operation impact on wetlands (acres)	19	21	4/
Karst features crossed (miles)	0.4	0.6	5/
Waterbody crossings (minor-intermediate/major) (no.)	87	155	6/
Critical habitat crossed (miles)	39.3	41.2	7/
Recreation and special interest areas crossed (no./miles)	1/0.4	2/1.0	8/
Previously recorded cultural resources affected (no.)	6	8	9/
Landowners affected (no.)	70	126	10/
Residences within 50 feet of the construction right-of-way (no.)	4	12	1/
Road crossings (no.)	8	8	11/
Railroad crossings (no.)	2	3	12/

1/ Aerial photography
2/ Preferred Route Workspace is based on the 2/18/2014 Design. Alternative and Deviation Workspace based on 100' wide construction corridor (75' within wetlands) and 50' wide Permanent right-of-way.
3/ Florida Land Use, Cover and Forms Classification System
4/ National Wetlands Inventory
5/ Potential Karst Areas were identified using the closed topographical depressions coverage from the Florida Geological Survey, Florida Department of Environmental Protection.
6/ National Hydrology Dataset
7/ Wood Stork: USFWS; Scrub Jay: Florida Fish and Wildlife Conservation Commission
8/ Florida Conservation Lands GIS Datalayer and Florida Natural Areas Inventory
9/ Florida Division of Historic Resources – Florida Master Site File
10/ Shapefiles from Okeechobee, Martin, St. Lucie, and Indian River County property appraiser.
11/ FDOT GIS Basemap
12/ Federal Railroad Administration

Table 10.5-6

Comparison of Deviation 3 with the Corresponding Portion of the Preferred Route

Factor	Section of Preferred Route (MP 112.6 – 127.1)	Route Deviation No. 3	Information Sources
Length (miles)	14.5	19	1/
Pipeline diameter (inches)	36	36	2/
Length adjacent to existing right-of-way (miles/percent)	5 miles (36%)	19 miles (100%)	1/
Nominal construction right-of-way width (feet)	100	100	2/
Construction right-of-way (acres)	196	225	2/
Permanent right-of-way (acres)	84	114	2/
Construction impact on forest (acres)	25	12	3/
Operation impact on forest (acres)	12	6	3/
Construction impact on wetlands (acres)	7	10	4/
Operation impact on wetlands (acres)	4	7	4/
Karst features crossed (miles)	0.5	0.3	5/
Waterbody crossings (minor-intermediate/major) (no.)	66	98	6/
Critical habitat crossed (miles)	14.5	18.9	7/
Recreation and special interest areas crossed (no./miles)	1/0.4	1/1.7	8/
Previously recorded cultural resources affected (no.) a/	4	11	9/
Landowners affected (no.)	15	40	10/
Residences within 50 feet of the construction right-of-way (no.)	0	1	1/
Road crossings (no.)	2	8	11/
Railroad crossings (no.)	2	2	12/

a/ Archeological and historic resources within 300 ft of right-of-way (no.)

1/ Aerial photography
2/ Preferred Route Workspace is based on the 2/18/2014 Design. Alternative and Deviation Workspace based on 100' wide construction corridor (75' within wetlands) and 50' wide Permanent right-of-way.
3/ Florida Land Use, Cover and Forms Classification System
4/ National Wetlands Inventory
5/ Potential Karst Areas were identified using the closed topographical depressions coverage from the Florida Geological Survey, Florida Department of Environmental Protection.
6/ National Hydrology Dataset
7/ Wood Stork: USFWS; Scrub Jay: Florida Fish and Wildlife Conservation Commission
8/ Florida Conservation Lands GIS Datalayer and Florida Natural Areas Inventory
9/ Florida Division of Historic Resources – Florida Master Site File
10/ Shapefiles from Okeechobee, Martin, St. Lucie, and Indian River County property appraiser.
11/ FDOT GIS Basemap
12/ Federal Railroad Administration

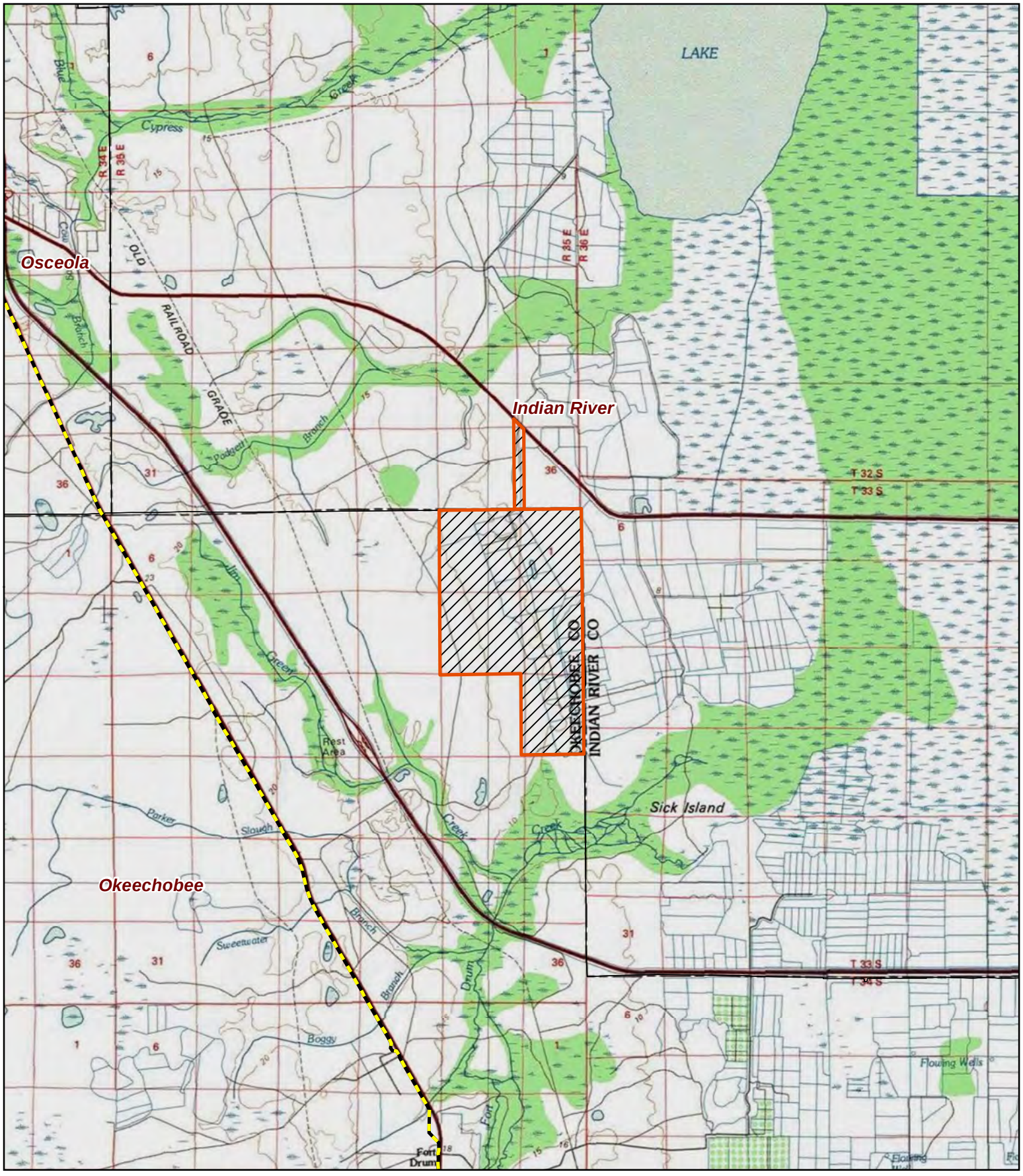
FLORIDA SOUTHEAST CONNECTION

Table 10.6-1

Route Variations Incorporated into the Proposed Project Pipeline Route

Segment/Facility Reroute Name	Milepost Range	Length (miles)	Variation Description	Justification
Providence	1.86-6.00	4.14	The route was relocated at milepost ("MP") 1.8 around the Providence development to avoid potential impacts.	Avoids impacting residential community
LWR Wildlife Refuge	10.84-11.00	0.26	The avoidance of Lake Wales Ridge National Wildlife Refuge in Polk County by utilizing the western side of an existing transmission and natural gas pipeline right-of-way.	Avoids National Wildlife Refuge
Alcoma Reroute	25.55-26.59	1.04	The route was moved to parcel boundary to avoid crossing a proposed mine site	Avoids impacting future mine
Florida Rock Reroute	29.86-31.68	1.82	The route was moved to parcel boundary to avoid crossing an active mine site	Avoids impacting future mine
Saddle Bag Lake	33.5-34.5	0.98	At the intersection with State Road 60, it was determined that the FSC Project can be routed to the south side of State Road 60 in order to avoid Saddlebag Lake and the associated residential community.	Avoids impacting residential community and Saddle Bag Lake
SR 60 Avoidance	30.90-31.70 33.20-33.51 33.70-33.87 34.50-35.00	0.80 0.31 0.17 0.50	The route was altered to avoid existing and future development along State Route (SR) 60 in several areas and to avoid future development build outs in the area.	Avoids existing and future developments
Lake Wales State Forest	44.20-50.40	6.26	The routing of the corridor along the southern boundary of the Lake Wales Ridge State Forest. The initial routing within the State Forest was done in order to avoid higher quality forested habitat located within the privately owned lands along State Road 60 and utilize the agricultural lands within the State Forest. Subsequently, utilizing the southern boundary of the State Forest was done pursuant to feedback from the Florida Forest Service.	Avoids wetland impacts and multiple private land owners
Latt Maxcy Reroute	54.61-57.10	2.49	Landowner requested the route return to SR60 as soon as possible to avoid biodiesel operations	Accommodate landowner concerns
US 441 Restaurant Reroute	85.38-85.53	0.15	Reroute to avoid restaurant parking area	Avoids impacting business frontage
48th Ave Reroute	89.50-92.25	2.75	Route moved to collocate adjacent to existing road and avoid impacting additional landowners	Collocation to avoid impacting landowners
SR 70 Reroute	103.15-106.35	3.2	Routed to follow parcel boundary based on landowner concerns	Accommodate landowner concerns
Bluefield Rd Reroute	106.65-110.20	3.55	Routed to follow parcel boundary based on landowner concerns	Accommodate landowner concerns
Evans Reroute	115.70-117.50	1.8	Routed to follow parcel boundary based on landowner concerns	Accommodate landowner concerns
SR710 HDD	124.55-125.60	1.05	Route adjusted in order to HDD under SR710 and avoid impacting sensitive lands	Avoids sensitive lands
Numerous other smaller expansions or narrowing of the corridor were made to avoid land use or environmental constraints or to accommodate landowner concerns				Accommodate landowner concerns

FIGURES



Legend

- Preferred Route
- Okeechobee Facility

0 0.5 1 2

Miles

FLORIDA SOUTHEAST CONNECTION

Figure 10.2-1
Location of Okeechobee Facility
Relative to FSC Project

6/2/2014

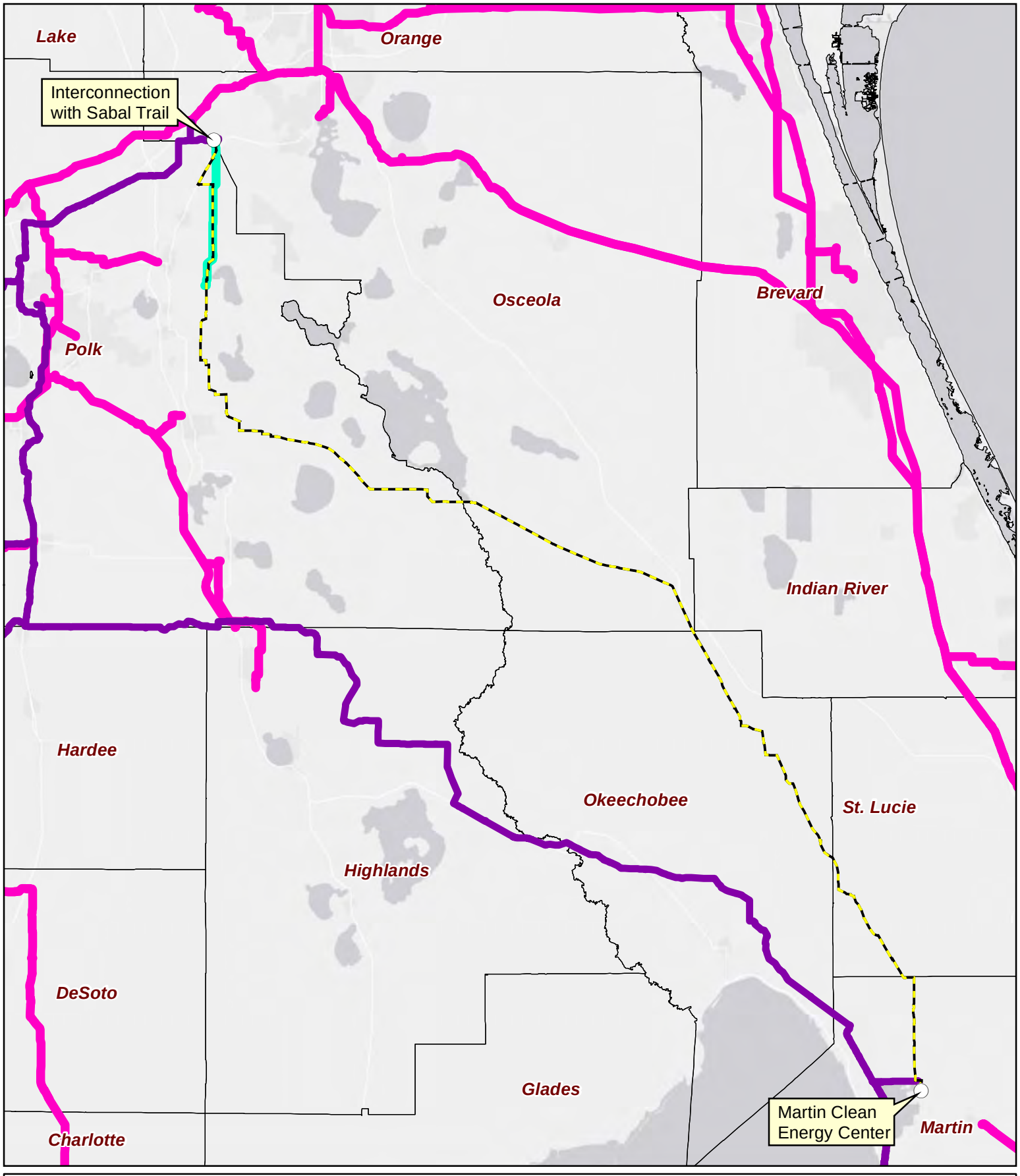
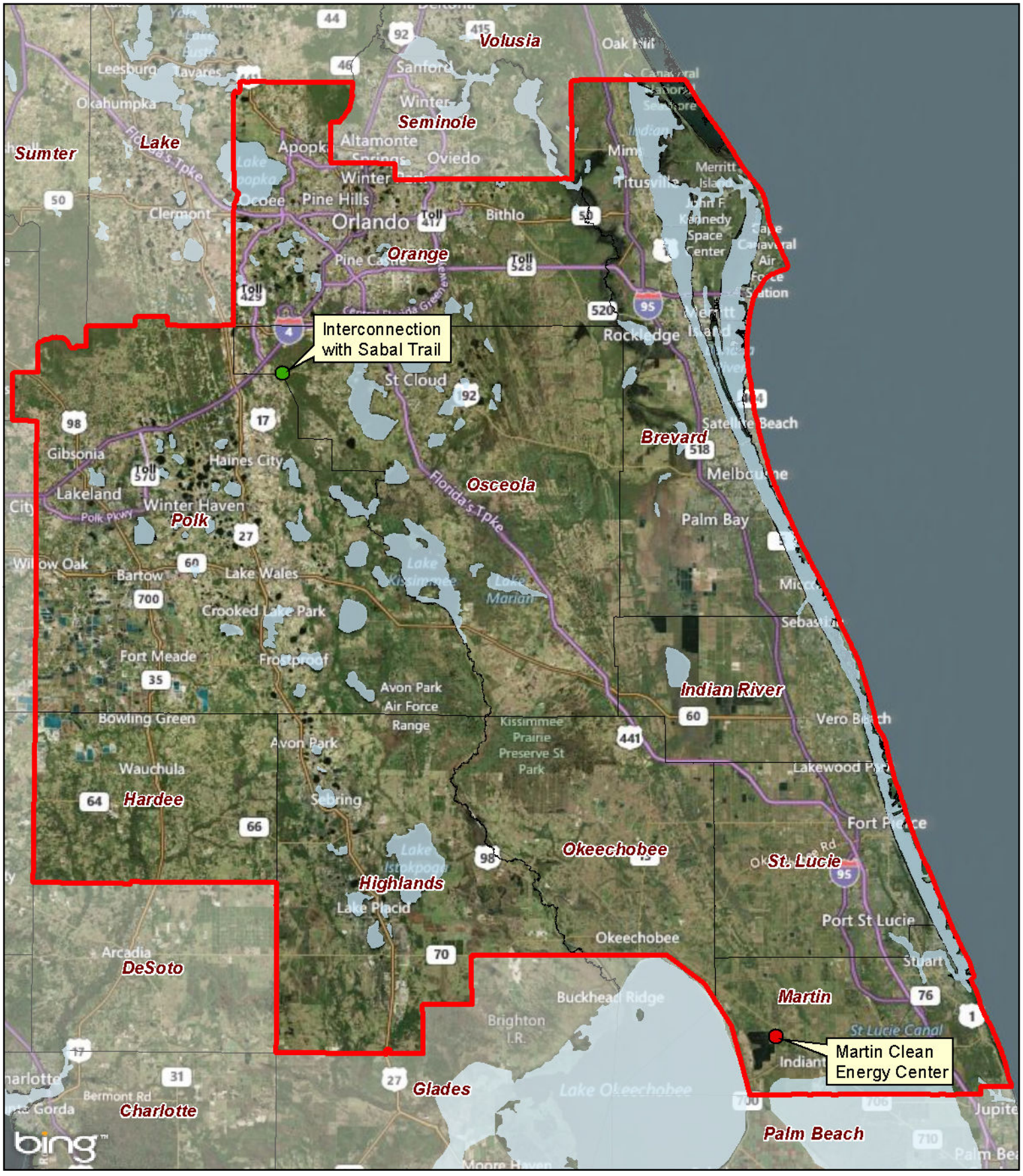


Figure 10.4-1
Natural Gas Transportation Systems
in the FSC Project Area

6/2/2014



Legend

- Interconnection with Sabal Trail
- Martin Clean Energy Center
- Study Area

N

0 2.5 5 10

Miles

FLORIDA SOUTHEAST CONNECTION

Figure 10.5-1
Study Area

5/9/2014

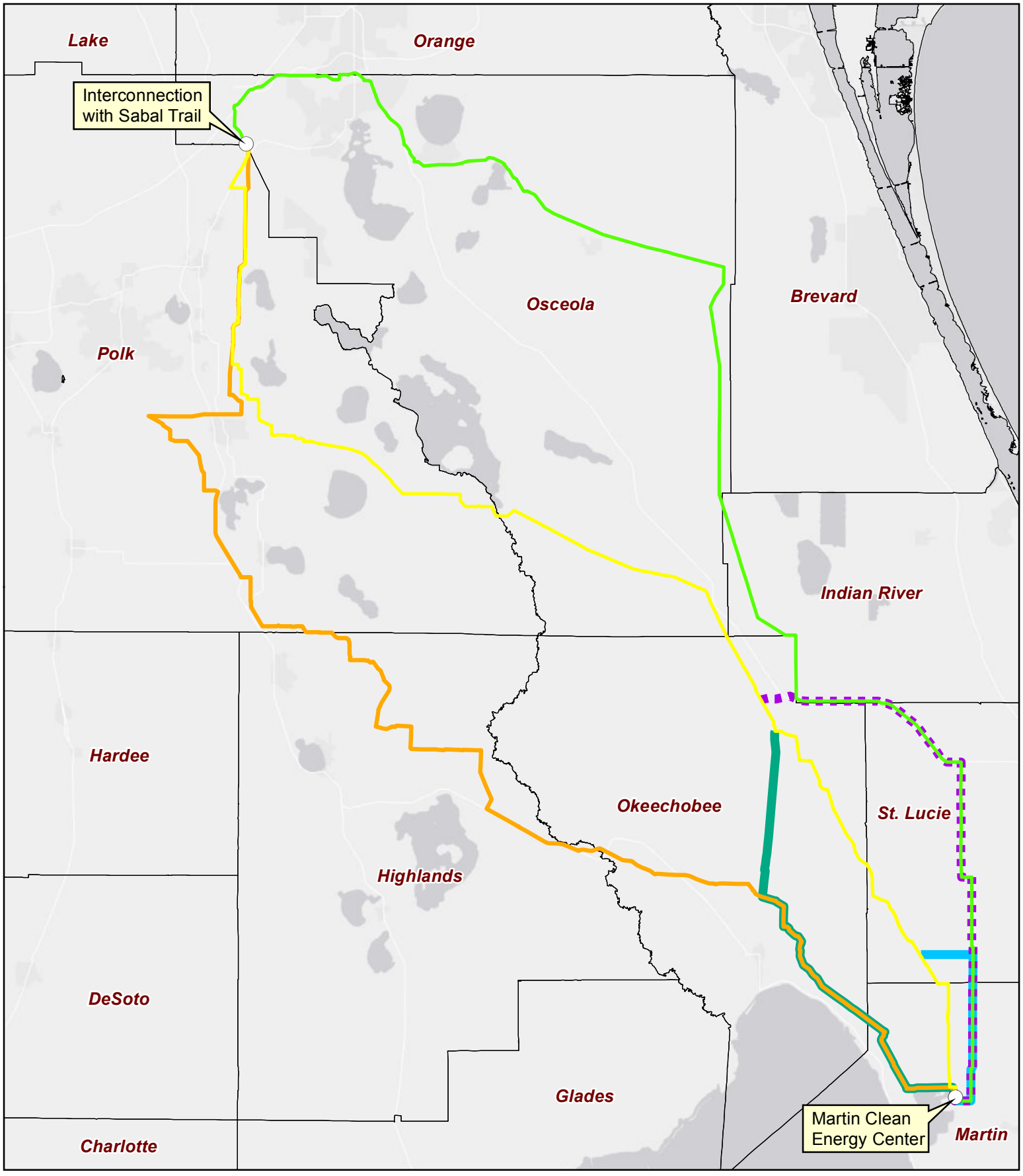


Figure 10.5-2
Alternatives Analysis

5/9/2014

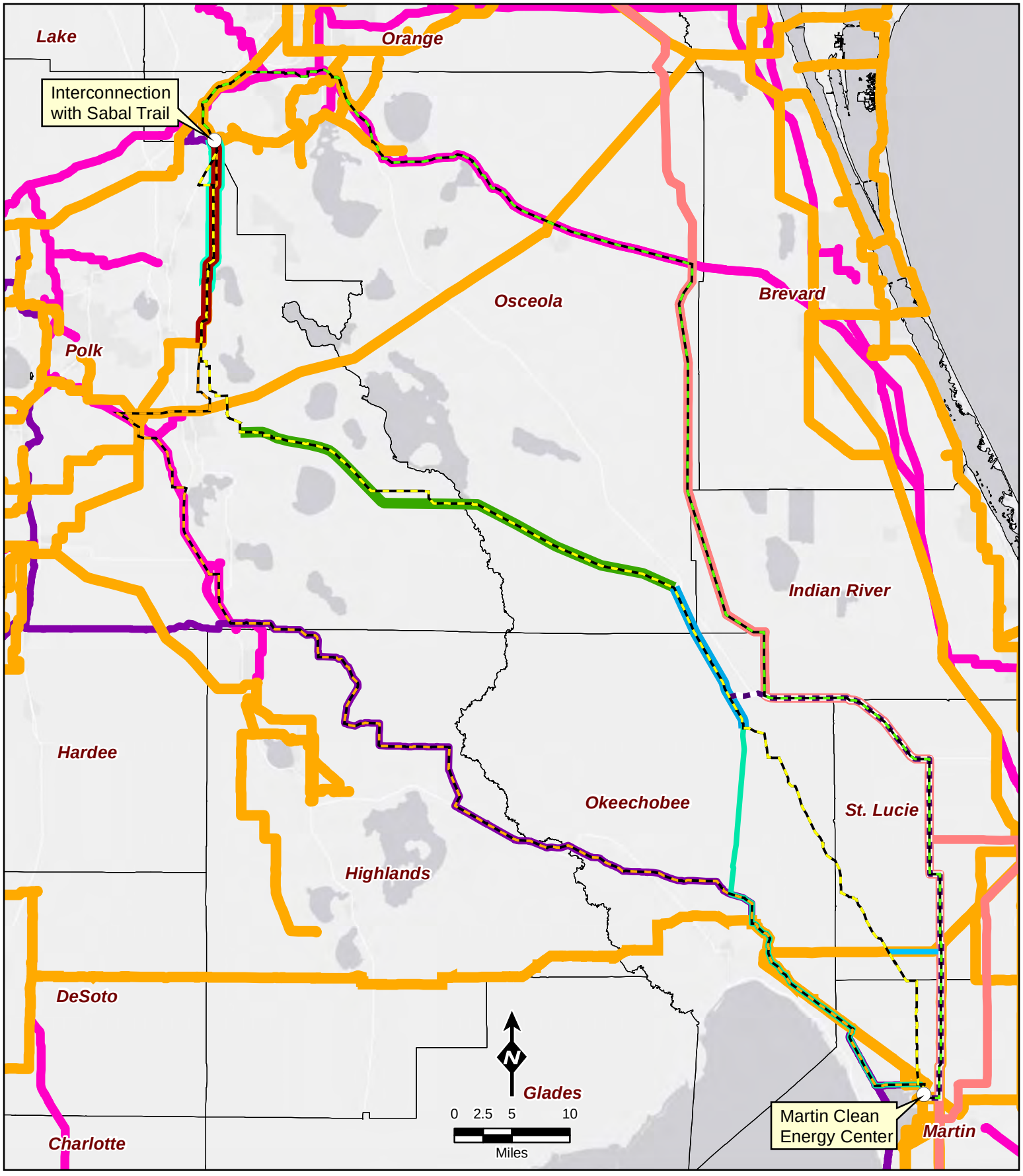


Figure 10.5-3
Utility and Transportation Rights-of-Way in Vicinity of Preferred Route, Alternatives and Deviations

6/6/2014