



**SOUTH FLORIDA EAST COAST
CORRIDOR TRANSIT ANALYSIS STUDY**

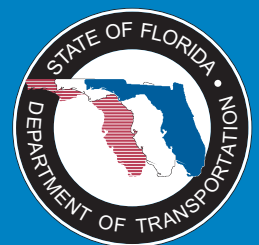
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***Phase 2 Indirect & Cumulative Effects (ICE)
Technical Memorandum***

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To: Scott Seeburger
From: Rob McMullen
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Subject: South Florida East Coast Corridor Transit Analysis (SFECCTA) Study:
Indirect and Cumulative Effects (ICE) Technical Memorandum

INTRODUCTION

Purpose

The purpose of this technical memorandum is to offer a preliminary discussion on the potential indirect effects, both beneficial and detrimental, of the proposed project on the natural and social environment. Indirect effects were considered mainly for the screening of proposed station areas, Operations & Maintenance (O&M) facilities and transit-highway crossings proposed for closure because of the potential for these improvements to influence changes in land use and/or affect property values. Transit stations in support of a transit service could influence changes in land use surrounding the stations in the form of transit-oriented development (TOD) or other development.

In addition, this technical memorandum provides a qualitative discussion of possible cumulative effects in relation to greenhouse gas (GHG) emissions and climate change (CC). A key component of any cumulative effects discussion is a determination of whether the proposed transit improvements, when considered with past, present, and reasonably foreseeable projects, would degrade a resource or produce adverse social or economic effects.

Project Description

The Florida Department of Transportation (FDOT) initiated the multi-phased South Florida East Coast Corridor Transit Analysis (SFECCTA) study in December 2005 recognizing that the Florida East Coast (FEC) Railway was and is a unique transportation asset that should be evaluated and developed in the context of regional transportation issues, priorities and needs. The SFECCTA study is designed to evaluate the reintroduction of passenger service along a portion of the FEC Railway corridor from Miami to Jupiter. In its second phase, the SFECCTA study continued the Alternative Analysis (AA) – Early Scoping process that was initiated in Phase 1. A discussion of the Phase 1 AA may be found in the Phase 1 Conceptual Alternatives Analysis/Environmental Screening Report (AA/ESR) on the project website (<http://www.sfecstudy.com/>).

Phase 2 of the SFECCTA was initiated in January 2009 and was designed to build upon the Phase 1 AA to refine and further develop through an iterative process the alternatives identified at the conclusion of the first phase. The primary focus of Phase 2 was to identify a locally preferred alternative (LPA) within the study area, in accordance with Federal Transit Administration (FTA) and FDOT project development processes, that could ultimately be submitted to FTA for federal assistance in the form of New Starts funding. A Phase 2 Draft Detailed Environmental Screening Report (ESR) has been prepared to describe

the detailed environmental screening approach conducted as part of the Phase 2 AA and is supported by a series of technical memoranda and reports like the one presented here.

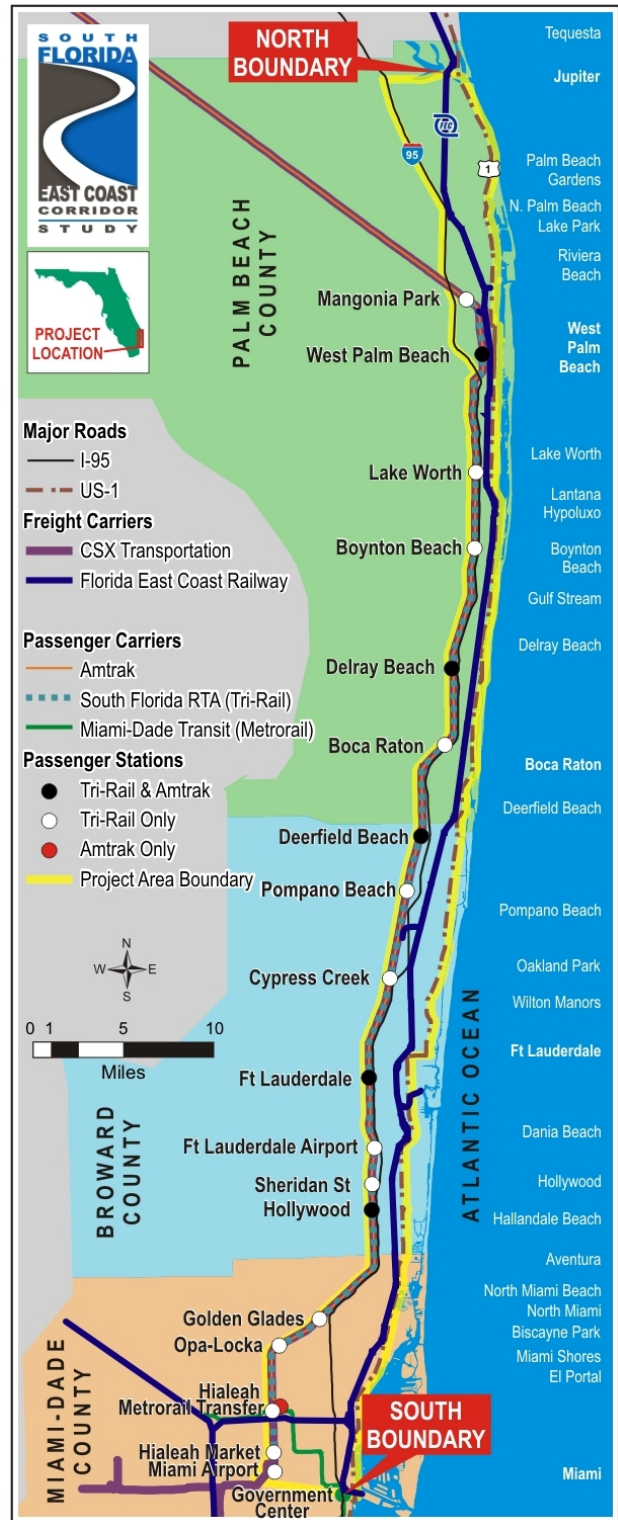
Figure 1: Project Location Map

Project Area

The SFECCTA study project area, illustrated on the Project Location Map (Figure 1), is bounded on the south by Flagler Street, just south of the Miami-Dade Government Center, in the City of Miami and on the north by the southern shoreline of the Loxahatchee River in the Town of Jupiter. The western boundary of the project area runs parallel to and 0.5-miles west of the South Florida Rail Corridor (SFRC)/Tri-Rail corridor from the Miami Intermodal Center (MIC) north to Mangonia Park then continues in a northwesterly direction parallel to and 0.5-mile west of I-95 to the southern shoreline of Southwest Fork of the Loxahatchee River (C-18). The eastern boundary of the project area runs parallel to and 0.5-miles east of Highway US-1 from the Central Business District (CBD) of the City of Miami north to the southern shoreline of the Loxahatchee River in Jupiter.

Within the SFECCTA project area are several unique *study areas* that were developed specifically to define the affected environment and screen/evaluate the various project alternatives. Generally, the affected environment is a Geographic Information System (GIS) inventory of environmental, social, and cultural resources that could be affected by the proposed improvements. The affected environment and screening process are defined and documented in the Phase 2 Draft ESR.

The primary study area, where most of the improvements are expected to occur, is the FEC Railway corridor that extends from the CBD of the City of Miami north to the Town of Jupiter in Palm Beach County (a linear distance of approximately 83 miles). A detailed description of the study areas and environmental screening methodology is provided in Chapter 3 and Appendix A, respectively, of the Draft ESR.



INDIRECT EFFECTS

Indirect impacts are defined as impacts that are caused by the action and are later in time or further removed in distance but are still reasonably foreseeable. Indirect impacts may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 Code of Federal Regulations (CFR) 1508.8).

Land Use/Socioeconomics

Some amount of residential, commercial, and industrial development is expected to be associated with multi-modal improvements along the project corridor, in particular TOD that may be developed within 0.25 to 0.5 miles of proposed passenger transit stations. TOD is typically mixed-use (residential, commercial and retail uses), compact/high density, walkable communities centered or adjacent to high quality transit systems and may include affordable and/or workforce units. This form of development may be referred to as induced development and may occur as a result of improvements to the transit system. Induced development may also occur because of improved infrastructure (i.e., water and sewer lines, drainage, and utilities) associated with the proposed project.

County and municipal comprehensive plans encourage intensification of development or redevelopment and expansion of the urban area in a contiguous pattern centered on a network of high-intensity urban centers well connected by multimodal intra-urban transportation facilities. This type of infill development, in particular transit-oriented/mixed-use developments, could increase opportunities for employment and encourage reinvestment in low-income and minority communities. **Table 1** lists the transit-supportive land use regulation status by community along the FEC Railway corridor as of October 2009.

Table 1: SFECCTA Corridor Transit-Supportive Land Use Regulation Status by Community

<i>Community</i>	<i>Land Use Regulation Status</i>
Jupiter	Comprehensive plan in place, zoning in process
Palm Beach Gardens	Comprehensive plan amendment pending, zoning revisions in process
North Palm Beach	No specific land use policies relating to transit
Lake Park	Comprehensive plan and zoning pending
Riviera Beach	Comprehensive plan pending, zoning in place
West Palm Beach	Comprehensive plan and zoning in place
Lake Worth	Comprehensive plan and zoning in place
Lantana	Comprehensive plan and zoning needed
Hypoluxo	No specific policies related to transit
Boynton Beach	Comprehensive plan and zoning in place
Delray Beach	Comprehensive plan and zoning in place
Boca Raton	Big employment center, no plans to increase residential density
Deerfield Beach	No specific policies related to transit
Pompano Beach	Comprehensive plan in place, mixed use regional activity center zoning in place
Oakland Park	Comprehensive plan in place, mixed use regional activity center zoning in place
Wilton Manors	No zoning in place, but transit-friendly development taking place
Fort Lauderdale	Comprehensive plan, and mixed use regional activity center zoning in place
Dania Beach	No comprehensive plan update planned but zoning in place
Hollywood	Comprehensive plan and mixed use regional activity center zoning in place
Hallandale Beach	Adopted city-wide master plan, comprehensive plan amendments underway, zoning to follow
Aventura	High density residential zoning and employment but not transit-friendly patterns
North Miami Beach	Comprehensive plan in process, zoning in place
North Miami	Town center off-corridor, zoning not in place
Biscayne Park	Residential, no changes planned
Miami Shores	Residential, no changes planned
El Portal	No changes planned
Miami	Zoning in place

MEMORANDUM

Such development or redevelopment, particularly in low-income communities, may lead to indirect or induced displacement of residences and/or businesses. Induced displacement may be described as the limiting of housing and/or rental affordability due to increasing property values associated with increased development. However, there are measures local municipalities can take to mitigate the effects of increased property values. Community Redevelopment Areas within the study area may enter into public/private partnerships or offer potential developers incentives, such as Tax Increment Funding (TIF), to ensure affordable and workforce housing are included in new, mixed-use TOD constructed within the CRA. In addition, local policies can include inclusionary zoning ordinances that would require a given share of new residential construction be affordable to people or families with low to moderate incomes.

Table 2 summarizes the approximate percentage of land use types found within a 0.5-mile radius of several alternative elements (alternative elements are components, that when combined, comprise an alternative.). Residential appears to be the dominant land use within a 0.5 mile radius of proposed stations and transit-highway crossings recommended for closure. New development encouraged by transit stations is typically concentrated within 0.25 mile to 0.5 miles from a station site. Induced development and increases in property values will also affect commercial land uses typically found near proposed transit stations.

Indirect economic effects are also a concern associated with the proposed improvements. For example, development of O&M facilities and closure of certain transit-highway crossings may influence long-term land use policies and possibly affect property values. In addition, residences and commercial maritime business along the New River may be adversely affected depending on the waterway crossing alternative chosen. The area surrounding downtown Ft Lauderdale has been referred to as the “Venice of Florida” due to its myriad waterways. Currently, the New River affords vessels almost unlimited vertical clearance, allowing vessels with masts as tall as 95 feet to transit the waterway (see *Navigable Waterway Analysis Technical Memorandum*). Limiting vertical clearance with a new passenger rail bridge over the New River would likely have an adverse affect on maritime businesses that service these unusually tall vessels west of the FEC Railway as well as commercial boat dealers who deliver yachts to destinations west of the FEC Railway Bridge.

Table 2: Existing Land Use by Alternative Element within 0.5-mile Buffer

<i>Alternative Element/Alternative</i>	<i>Land Use Type (%)</i>					
	<i>Residential</i>	<i>Commercial</i>	<i>Institutional /Parks</i>	<i>Industrial</i>	<i>Transportation /Utilities</i>	<i>Vacant</i>
Station Areas	25	20	17	19	3	16
T-H Crossings*	42	13	14	8	15	8
O&M Facilities	33	2	11	20	25	9
TSM Alternative	23	24	10	23	5	10

* T-H = Transit-Highway Crossings - Only transit-highway crossings recommended for closure were considered

Elsewhere along the corridor, commercial business may benefit from increased spending and employment opportunities. An improved regional passenger transit service could indirectly benefit local and regional economies through short-term employment opportunities during construction activities and, in the long term, by increased consumer spending. The development of TOD resulting from the proposed transit stations would benefit residences alike with short and long-term employment opportunities, potential for increased property values, and affordable housing near a transit system.

Due to the potential to adversely affect maritime commercial businesses and the substantial amount of residential uses within the proposed station areas, indirect/induced displacement issues will necessarily be an important component of future socioeconomic assessments. In accordance with Executive Order 12898 and U.S. Department of Transportation Order 5610.2: “disproportionate impacts to low-income and minority populations will be avoided, if practicable, unless avoiding such disproportionate impacts would result in significant adverse impacts on other important social, economic, or environmental resources.”

Historic, Archaeological, Cultural Resources, and Parks/Recreation Areas

Induced development near proposed transit stations or increased industrial development may also have an indirect affect on historic resources and properties protected under Section 4(f), 23 CFR 774, (e.g., public parks) near proposed transit stations and/or O&M facilities. New high-density development will invariably change the aesthetic character and qualities surrounding each station. These changes could result in increased traffic and noise levels near transit station areas while also affecting the viewshed with the construction of station infrastructure. **Table 3** summarizes the approximate number of historic/cultural and Section 4(f) resources within a 0.5 radius of proposed station areas and O&M facilities.

Table 3: Historic Structures & Section 4(f) Resources by Alternative Element within 0.5-mile Buffer

<i>Alternative Element/Alternative</i>	<i>Historic Structures by Classification/Section 4(f)</i>				
	<i>NRHP-Listed</i>	<i>NRHP-Eligible</i>	<i>NRHP-Potentially Eligible</i>	<i>Other*</i>	<i>Section 4(f)</i>
Station Areas	86	268	225	10223	215
O&M Facilities	0	0	0	31	7

* NRHP = National Register of Historic Places

Air Quality

The proposed project has the potential to have an indirect affect on local air quality through increased traffic congestion that may occur during crossing block times (times that the crossing are closed for train movement or maintenance) and around new transit stations. The majority of the transitway-highway crossings along the FEC Railway are located in urban and developed areas along the project corridor. These potential localized effects to air quality along the FEC Railway alignment resulting from traffic congestion may be mitigated through synchronization of traffic control signals. Signal priority for transit and coordination of surrounding traffic signals has the potential to reduce delays in some instances.

Localized, elevated levels of emissions may also occur at transit stations from idling trains, buses and passenger vehicles queuing to pick up passengers, and vehicular traffic entering and exiting the parking area. Increases in vehicular traffic associated with transit-oriented development may further elevate localized emission levels near transit stations. In comparison to the major activities that contribute directly or indirectly to GHG emissions, the effects on air quality from the proposed transit improvements’ are anticipated to be minimal.

Natural Resources and Floodplains

Induced development/TOD or increased industrial development encouraged by transit system/infrastructure improvements could contribute to indirect impacts on water quality as well as additional loss of wetlands and sensitive habitats (**Table 4**). The increase in impermeable surface area could contribute to flooding if developing over or near floodplains. However, most of this development is expected to be urban infill by nature, consisting of redevelopment of existing built-up areas, including brownfields, rather than disturbance of natural areas.

Table 4: Natural Resources & Floodplains by Alternative Element within 0.5-mile Buffer

<i>Alternative Element/Alternative</i>	<i>Natural Resources & Floodplains(Acres)</i>		
	<i>Wetlands</i>	<i>Strategic Habitat/Conservation Land</i>	<i>Floodplains</i>
Station Areas	1,872	466	13,709
O&M Facilities	11	44	0

Induced development occurring within natural or sensitive areas would be expected to incorporate best management practices, avoid and minimize direct impacts, and mitigate unavoidable impacts to existing natural resources according to federal, state, and/or local policies and regulations. In addition, revisions to local comprehensive plans, zoning, and capital improvement programs would be made through a coordinated effort between local governments, public, and other stakeholders. These revisions would follow guidelines in the FTA, Office of Planning “Guidelines and Standards for Assessing Transit-Supportive Land Use” that contains provisions for land conservation and management.

Revised zoning ordinances would identify areas where development should be limited and consider the preservation of open space, sensitive habitat, farmland, and area of rural character. As a result, induced development associated with transit improvements at station areas is not expected to occur as inadvertent, uncontrolled sprawl, but as carefully planned development consistent with local and regional planning policies. Indirect impacts to the natural resources from secondary development, particularly around transit stations, will be assessed in subsequent phases.

CUMULATIVE EFFECTS

Cumulative impacts are defined as “the impact on the environment, which results from the incremental impact of the action when added to other past, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7). The following is a qualitative discussion on possible cumulative effects related to energy, GHG and climate change.

Energy

The proposed transit improvements would provide an alternative to automobile travel for access to employment, community resources, institutions, educational centers and other facilities in the Tri-County area. The removal of commuters from personal vehicles and onto commuter transit would have a net reduction in the distance of vehicle miles traveled (VMT) from a higher energy consumption mode to a lower energy consumption mode, resulting in a cumulative reduction in regional energy

MEMORANDUM

consumption. This reduction is due to the efficiency by which commuter trains are able to transport large volumes of riders over significant distances. For this reason commuter trains are more efficient when compared with a personal vehicle, which requires more energy per passenger.

Although the proposed transit improvements would have a cumulative effect, consuming energy (fuel and/or electricity) through the process of regular operation, this increase would be offset by the cumulative reduction of regional energy consumption with the reduction of VMT by automobiles.

Greenhouse Gasses

Carbon dioxide is the primary greenhouse gas emitted by fossil fuel-burning passenger vehicles. The proposed transit improvements are expected to reduce the amount of automobile VMT in the region. This equates to a substantial reduction of GHG emissions over the no-build alternative and therefore a positive indirect effect on the regional emissions of GHG. Due to the operation of modal technologies like diesel locomotives, electrified rail (GHG emissions resulting from electricity production) and buses, each alternative constitutes a unique effect on GHG emissions. However, the combined effect of GHG emissions for the proposed alternatives is substantially less than the combined GHG emissions of the no-build alternative. For GHG emissions screening results conducted in Phase 2 of the study, see *Air Quality Technical Memorandum*.

Climate Change

In comparison to major activities that contribute directly or indirectly to climate change, the negative effects from the proposed transit improvements are anticipated to be minimal. Based on the potential for a reduction in GHG emissions, the proposed transit improvements could have a positive or neutral effect on climate change depending on the source of energy used to operate the modal technologies. The *Air Quality Technical Memorandum* further describes the potential benefits of the project as it relates to climate change.

REFERENCES

United States Department of Transportation, Transportation and Climate Change Clearing house Website, <http://www.climate.dot.gov/about/transportations-role/overview.html>

United States Department of Transportation Federal Transit Administration Website, <http://www.fta.dot.gov>

United States. Department of Energy – Energy Information Administration Website, <http://www.eia.doe.gov/>