I-95/SR 9 Interchange at 45th Street

Project Development and Environment (PD&E) Study

(Mile Post 31.040)

Palm Beach County, Florida

FPID No.: 436519-1-22-01 | FAP No.: 0951-682-1 | ETDM No.: 14225

LOCATION HYDRAULICS REPORT

August 2017

Prepared for:
Florida Department of Transportation
District Four

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated December 14, 2016 and executed by FHWA and FDOT.

LOCATION HYDRAULICS REPORT

I-95/SR 9 Interchange at 45th Street
Project Development and Environment Study
(Mile Post 31.040)

FPID: 436519-1-22-01
FAP No.: 0951-682-1
ETDM No.: 14225

Prepared for:

Florida Department of Transportation
District Four

Palm Beach County, Florida

Prepared by:

Hanson Professional Services Inc.

August 2017

Table of Contents

1. PROJECT DESCRIPTION 1
1.1. Background 4
1.1.1. CDR Short Term Improvements 4
1.1.2. CDR Long Term Improvements 4
1.2. Purpose and Need 5
2. ALTERNATIVES ANALYSIS 11
2.1 No Build Alternative 11
2.2 Transportation Systems Management and Operation 11
2.3 Build Alternatives 12
2.3.1 Alternative 1 12
2.3.2 Alternative 2 13
2.3.3 Alternative 3 14
3.0 EXISTING CONDITIONS 16
4.0 PROPOSED CONDITIONS 19
5.0 FLOODPLAIN ENCROACHMENT 19
6.0 SUMMARY 20

List of Figures

Figure 1- Project Location 2
Figure 2 - I-95 looking north just south of 45th Street. 3
Figure 3 – Typical Sections 15
Figure 4 – Soils Map 17
Figure 5 – FEMA Flood Map 18

List of Tables

Table 1: I-95 Crash Summary (2011 to 2014) 8
Table 2: 45th Street Crash Summary (2011 to 2014) 8

1. PROJECT DESCRIPTION

This report contains information regarding the SR 9/I-95 from South of 45th Street to North of 45th Street Project Development and Environment (PD&E) Study (Mile Post 31.040). This project has been developed in compliance with Title VI of the Civil Rights Act of 1964 and other related federal and state nondiscrimination authorities. Neither the Florida Department of Transportation (FDOT) nor this project will deny the benefits of, exclude from participation in, or subject to discrimination anyone on the basis of race, color, national origin, age, sex, disability, or family status.

The FDOT, District Four is conducting a PD&E Study to identify short-term and long-term needs of I-95 and develop design concepts to address traffic spillback onto I-95, improve interchange operations, reduce congestion, and increase safety at the study interchange. This study will also consider Strategic Intermodal System (SIS) connector improvements needed within the project area and is consistent with plans for the I-95 mainline, including the potential extension of I-95 Express lanes through Palm Beach County. This proposed study will investigate alternatives to improve the overall operating conditions and enhance safety within the interchange.

The improvements to the I-95 Interchange at 45th Street will provide additional capacity for vehicles travelling east-west as well as operational improvements north-south through the interchange. Local and network connectivity for the City of West Palm Beach, the Town of Mangonia Park and Palm Beach County will be improved.

The 45th Street interchange of I-95 is a diamond interchange located in City of West Palm Beach, and in close proximity to the Town of Mangonia Park, and the City of Riviera Beach in North Palm Beach County, Florida (**Figure 1**). The intersections in the area of influence of the interchange are Village Boulevard and Northpoint Boulevard on the west and Corporate Way and North Congress Avenue on the east. The adjacent interchanges

Florida Deparment of Transportation
District Four
3400 West Commercial Boulevard
Fort Lauderdale, FL 33309

I-95/SR-9 Interchange at 45th Street
Project Development and Environment Study
FPID No.: 436519-1-22-01
ETDM No.: 14225

Title:

Location Map

Figure:

1

are Blue Heron Boulevard interchange to the north (1.75 miles) and the Palm Beach Lakes Boulevard interchange to the south (2.80 miles). I-95 is a ten-lane divided interstate freeway providing four general purpose lanes and one high occupancy vehicle (HOV) lane in each direction. Auxiliary lanes are provided on both the northbound and southbound directions between 45th Street and Blue Heron Boulevard to the north. Within the study segment, I-95 passes over 45th Street on a bridge that accommodates ten lanes.(**Figure 2**) I-95 is a designated SIS highway corridor. Both I-95 and 45th Street are designated as evacuation routes. 45th Street is a six-lane divided roadway with a raised landscape median within the vicinity of the I-95 interchange. Sidewalks are provided along both sides of 45th Street throughout the study area. Additionally, a bicycle lane is provided in both directions along 45th Street starting at the Harley Davidson entrance (west of I-95) to Corporate Way (east of I-95). There are two dedicated left-turn lanes in each direction to access the I-95 on-ramps and three through lanes in each direction. A single free-flow right-turn lane is provided on both eastbound and westbound along 45th Street to serve the I-95 on-ramps.

Figure 2 - I-95 looking north just south of 45th Street.

The land use adjacent to the interchange is mainly residential, commercial, institutional and industrial. Commercial and industrial uses are predominant on the west side of I-95, while commercial and healthcare properties are along the east side of I-95. The South Florida Rail Corridor (SFRC)/CSX Railroad passes under I-95 in this area approximately one mile northwest of the 45th Street interchange. The adjacent signalized intersections are: Village Boulevard and Northpoint Boulevard/Metrocentre Boulevard west of the I-95 southbound ramps, and Corporate Way and N. Congress Avenue east of the I-95 northbound ramps.

Improvement to the I-95 interchange at 45th Street is consistent with the Cost Feasible Plan of the Palm Beach County Metropolitan Planning Organization (MPO)'s 2045 Long Range Transportation Plan (LRTP). "*The purpose is to improve interchange operations and reduce congestion, reduce potential for traffic spillback onto I-95, and increase safety. The improvements are needed to ensure that the I-95 interchange will meet FDOT Level-of-Service standards through year 2040."*

1.1. Background

The FDOT made improvements to the I-95 mainline in Palm Beach County in the 1990s and 2000s, adding a High Occupancy Vehicle (HOV) lane and auxiliary lanes from south of Linton Boulevard to north of PGA Boulevard. Minor interchange improvements were also made to eight of the existing 18 interchanges along this section of the corridor. At the time of the project, FDOT committed to re-examine the need for both short-term and long-term improvements at those interchanges that were not improved during the I-95 mainline project. FDOT District Four also identified the need to re-examine the 2003 I-95 Master Plan Study for Palm Beach County to develop new improvements to interchanges based on changes in traffic volumes and updated design standards since the Master Plan was developed.

A Concept Development Report (CDR) was prepared by the FDOT District Four Office of Planning and Environmental Management in August of 2014. The following are the recommendations identified for short-term and long-term improvements:

1.1.1. CDR Short Term Improvements

- Third southbound left-turn lane at the I-95 southbound ramp;
- Third northbound left-turn lane and third right-turn lane at the I-95 northbound ramp;
- Additional westbound through lane from Congress Avenue to the I-95 northbound ramps.

1.1.2. CDR Long Term Improvements

- Fourth through lane on eastbound 45th Street between Village Boulevard and Northpoint Boulevard;
- Fourth through lane on westbound 45th Street east of Congress Avenue;
- Fourth southbound left-turn lane at the I-95 southbound ramp;
- Fourth northbound left-turn lane at the I-95 northbound ramp.

Based on the benefits identified by the proposed improvements listed in the Concept Development Report, it was recommended that FDOT implement this package of proposed improvements to address operational and safety issues/deficiencies through 2040. Due to the proposed impacts and costs associated with the proposed improvements, a PD&E Study was recommended prior to design and project implementation.

1.2. Purpose and Need

The purpose of the study is to identify the short-term and long-term needs of I-95 and develop design concepts to address traffic spillback onto I-95, improve interchange operations, reduce congestion, and increase safety at the study interchange. This study will also consider SIS connector improvements needed within the project area and is consistent with plans for the I-95 mainline, including the potential extension of I-95 Express lanes through Palm Beach County.

Additional considerations for the purpose and need for this project include Capacity, Transportation Demand, Safety, Planning Consistency, Social Demands/Economic Development, Modal Interrelationships, and System Linkage.

Capacity

Traffic operational analyses were conducted at six study intersections on 45th Street to determine the existing delay and Level of Service (LOS).

During the AM and PM peak hours, the existing conditions (2016) are as follows for the following intersections on 45th Street [Name of intersection, overall LOS (AM/PM)]:

- Village Boulevard: (C/C)
- Northpoint Boulevard: (C/C)
- I-95 southbound ramps: (C/C)
- I-95 northbound ramps: (C/C)
- Corporate Way: (C/C)
- Congress Avenue: (C/D)

Operational analyses were conducted to evaluate for year 2040 No Build conditions (without roadway improvements) at the six intersections for AM and PM peak hours. The 2040 No Build conditions are predicted as follows:
[Name of intersection, overall LOS (AM/PM)]:

- Village Boulevard: (D/D)
- Northpoint Boulevard: (D/D)
- I-95 southbound ramps: (F/C)
- I-95 northbound ramps: (F/D)

- Corporate Way: (C/B)
- Congress Avenue: (D/E)

Under the existing conditions scenarios, most of the intersections operate at LOS C. Under the project 2040 No Build conditions, most intersections operate at LOS D or worse. If no improvements are made by 2040, all intersections will experience excessive delays and queuing and operate below acceptable LOS standards (LOS D) during both the AM and PM peak periods.

Transportation Demand

According to the US Census, the county experienced a population growth from 1,320,134 in 2010 to 1,372,171 in 2013, representing an increase of 3.94%. Evaluating the population growth for the City of West Palm Beach, the City has grown from a population of 99,919 in 2010 to 102,436 in 2013 representing an increase of 2.52%. The population of Palm Beach County is projected to increase from 1,372,171 in 2013 to 1,715,300 in 2040 (US Census), representing an increase of 25%. The commercial areas along 45th Street and the new businesses taking advantage of areas designated as special impact zones will further increase the transportation demand along the proposed project area that will contribute to congested conditions. As the population of the county and city increases, developments in the county will continue to grow thereby increasing the amount of traffic. Improvements to the existing interchange is expected to provide mobility to the residents and commuters in this area.

Traffic Safety

The crash analysis results reveal that there was a total of 869 crashes on I-95 from Palm Beach Lakes Boulevard to Blue Heron Boulevard during the four study years (2011-2014). Of these 869 crashes, rear end crashes were the most common type of crash accounting for 37.5% of total crashes followed by sideswipe crashes accounting for 16.3% of total crashes. The 869 crashes included 1,671 vehicles. There were 627 injuries, 58 severe injuries and 10 fatalities. The average crash rate for the I-95 mainline segment within the study limits is 0.06 and is lower than the statewide average crash rate of 0.75 for similar interstate facilities. Summaries of the crash analysis are provided in **Table 1.**

Table 1: I-95 Crash Summary (2011 to 2014)

Crash Type	Number of Crashes				4-Year Total Crashes	Percent of Total	Mean Crashes Per Year
	Year						
	2011	2012	2013	2014			
Front to Rear (Rear End)	71	67	75	113	326	37.5%	81.5
Front to Front	2	0	1	4	7	0.8%	1.75
Angle	17	28	21	28	94	10.8%	23.5
Sideswipe, same direction	31	31	26	54	142	16.3%	35.5
Sideswipe, opposite direction	2	0	3	0	5	0.6%	1.25
Rear to Side	0	0	0	0	0	0.0%	0
Rear to Rear	0	0	1	0	1	0.1%	0.25
Other	54	60	73	79	266	30.6%	66.5
Unknown	5	5	4	14	28	3.2%	7
Total Crashes	**182**	**191**	**204**	**292**	**869**	**100.0%**	**217.25**

The crash analysis results reveal that there was a total of 174 crashes on 45th Street from Village Boulevard to Congress Avenue during the four study years (2011-2014). Of these 174 crashes, rear end crashes were the most common type of crash accounting for 48.3% of total crashes followed by angled crashes accounting for 25.9% of total crashes. The 174 crashes included 378 vehicles, 4 pedestrians and 2 cyclists. There were 164 injuries, 14 severe injuries and 1 fatality. The average crash rate for 45th Street within within the study limits is 2.72 and is lower than the statewide average crash rate of 3.20 for similar arterial facilities. Summaries of the crash analysis are provided in **Table 2**.

Table 2: 45th Street Crash Summary (2011 to 2014)

Crash Type	Number of Crashes				4-Year Total Crashes	Percent of Total	Mean Crashes Per Year
	Year						
	2011	2012	2013	2014			
Front to Rear (Rear End)	12	13	29	30	84	48.3%	21
Front to Front	1	4	0	3	8	4.6%	2
Angle	8	12	10	15	45	25.9%	11.25
Sideswipe, same direction	0	3	0	6	9	5.2%	2.25
Sideswipe, opposite direction	0	0	1	0	1	0.6%	0.25
Rear to Side	0	0	0	1	1	0.6%	0.25
Rear to Rear	0	0	0	0	0	0.0%	0
Other	2	0	5	4	11	6.3%	2.75
Unknown	12	0	0	3	15	8.6%	3.75
Total Crashes	**35**	**32**	**45**	**62**	**174**	**100.0%**	**43.5**

Plan Consistency

The Palm Beach County MPO 2040 Long Range Transportation Plan (LRTP) identified the I-95 at 45th Street Interchange as a Local Stakeholder Project Request. The Master Comprehensive Bicycle Transportation Plan (MCBTP) - Bicycle Facility Recommendation Map designates 45th Street, both east and west of the I-95 interchange, as a "Re-Stripe Candidate" and the Bicycle Needs Map designates 45th Street, both east and west of I-95 interchange, as "Enhanced Priority, Needs Improvement" (Bike LOS C). These designations will be taken into consideration during the PD&E phase such that the designated bicycle lanes can be provided whenever possible.

The FDOT Five-Year Work Program identifies a traffic operations project to install a new dynamic message sign (DMS) on 45th Street east and west of the I-95 interchange.

Social Demand and Economic Development

The Future Land Use Plan for the City of West Palm Beach (June, 2013) identifies the areas north of the interchange to be Industrial uses in a Special Impact Zone to the west of the interchange and Industrial, Conservation and Community Service to the east. Areas to the south of the interchange are identified to be Commercial in a Special Impact Zone and single family to the west of the interchange, and Conservation, Commercial in Special Impact Zone, and Single Family to the west. Special Impact Zones (SIZ) are areas where the City denotes heighten site plan review and compatibility analysis to reduce potential land use incompatibilities. The proposed improvements on the I-95/45th Street interchange will improve mobility and support the economic development of the local businesses as well as stimulate major construction activities that will contribute to the economic growth within the area.

The Florida Division of Emergency Management designates specific routes that residents and visitors can use in case of emergency situations to vacate specific areas. Based on Palm Beach County's Evacuation Routes and Zones Map, 45th Street is classified as an evacuation route from SR 809 to SR A1A, which includes the section of 45th Street in the vicinity of I-95. Serving as part of the evacuation route network, I-95 and 45th Street play an important role in facilitating traffic movement during emergency evacuation periods. As the population of the County continues to increase, the proposed improvements on the I-95 and 45th Street interchange will enhance capacity and mobility for residents during evacuation.

Currently, along 45th Street are commercial properties consisting of retail and professional offices with a few industrial and non-residential properties. To the north are retail/offices such as North Village Square, Lockheed Martin, Boys & Girls Club, and various corporate plazas that house different commercial establishments. To the south are also mainly hotel and commercial and food establishments, and an educational facility, Lincoln College of Technology. There is a residential area in the southwest portion of the interchange.

Modal Interrelationships

Currently, there are sidewalks and crosswalks along both sides of 45th Street within the vicinity of the interchange; however, not all sidewalks and crosswalks meet the Americans with Disabilities Act (ADA) requirements. Bicycle lanes are currently provided along 45th Street from Corporate Way and continuing west through Village Boulevard, except for a missing section just east of Northpoint Boulevard. As part of the proposed improvements for the interchange, sidewalks and crosswalks within the limits of construction shall be upgraded to meet ADA standards. Bicycle lanes are recommended in conjunction with the recommended lane widening both east of Corporate Way as well as the missing section east of Northpoint Boulevard.

The Mangonia Park Tri-Rail Station is located on 45th Street, approximately 1.3 miles east of the I-95 interchange. The station provides 272 parking spaces and also provides a park-and-ride designated area. The Mangonia Park Tri-Rail Station is accessed by Palm Beach County Transit, Palm Tran, Routes 2, 31, and 33. 45th Street in the vicinity of the I-95 interchange is served by Palm Tran Route 31. Congress Avenue and 45th Street are also served by transit routes. 45th Street is designated as a SIS Connector from I-95 to the Tri-Rail Station. The proposed improvements on the I-95 and 45th Street interchange will improve access to the Tri-Rail Station thus encouraging ridership.

System Linkage

The proposed project at I-95 and 45th Street will help improve connectivity and capacity within the roadway network by addressing traffic spillback onto I-95 and improving interchange connections. The proposed project enhances mobility to the residential and commercial areas along 45th Street, which provides east-west access in North West Palm Beach and Palm Beach County.

The primary need of the project is to alleviate existing and future traffic congestion thereby improving safety at the interchange. Recent studies completed in the region such as the I-95 Interchange at 45th Street Interchange Concept Development Report completed in 2014 identified operational deficiencies at ramps, the terminal intersections, and the adjacent intersections. Existing observations also show increased truck traffic from I-95 to Congress Avenue heading to the Port of Palm Beach contributing to the congestions in the study area. If no operational and safety improvements are made within the interchange area, conditions will become progressively worse as traffic volumes continue to increase, thereby increasing the number of crashes and deteriorating access of this interchange.

2. ALTERNATIVES ANALYSIS

All concepts were evaluated and analyzed in order to select a recommended alternative. The concepts developed were further refined with the objective of elimination and reduction of impacts. The following describes the alternatives considered for this project. Typical sections for each alternative are depicted in **Figure 2**.

2.1 No Build Alternative

The No Build Alternative proposes to keep the existing interchange roadway network into the future without improvements. This alternative is considered to be a viable alternative during the public hearing and final selection phase to serve as a comparison to the study alternatives.

The 45th Street typical section within the project limits consists of a six-lane urban divided roadway with a raised landscaped median. There are two dedicated left-turn lanes to access the I-95 on-ramps and three through lanes in each direction underneath the I-95 overpass. The EB and WB lanes are separated by median containing a raised concrete barrier wall as well as support piers for the I-95 overpass.

The No Build Alternative has a number of positive aspects, since it would not require expenditure of public funds for design, right-of-way acquisition, construction, or utility relocation. Traffic would not be disrupted due to construction, therefore, avoiding inconveniences to local residents and businesses. Also, there would be no direct or secondary impacts to the environment, the socio-economic characteristics, or community cohesion of the area.

However, the No Build Alternative fails to fulfill the purpose and need of the project. Operational and safety conditions within the interchange area will become progressively worse as traffic volumes continue to increase, thereby increasing the number of crashes and deteriorating access of this interchange.

2.2 Transportation Systems Management and Operation

The Transportation Systems Management and Operations (TSM&O) alternative is comprised of minor improvement options that are typically developed to alleviate specific traffic congestion/safety problems, or to get the maximum utilization out of the

existing facility by improving operational efficiency. TSM&O alternatives may include intersection improvements such as increasing turning radii, adding turn-lanes, increasing turn-lane lengths, or intelligent transportation system (ITS) enhancements such as closed circuit television (CCTV), dynamic message signs (DMS) with real-time driver information or signalization upgrades and/or optimization.

The proposed TSM&O options are as follows:

- Provide one additional right turn lane and one additional left turn lane at the I-95 southbound off-ramp intersection;
- Provide new overhead signage at the I-95 southbound off-ramp to indicate 3 lanes to East 45th Street and 3 lanes to West 45th Street;
- Provide one additional right turn lane and one additional left turn lane at the I-95 northbound off-ramp intersection;
- Provide new overhead signage at the I-95 northbound off-ramp to indicate 3 lanes to West 45th Street, 1 lanes to North Congress Avenue, and 2 lanes to East 45th Street;
- Provide travel information system;
- Develop signal system strategies.

2.3 Build Alternatives

All conceptual build alternatives were evaluated in a general manner and analyzed in order to select the recommended Build Alternative. The concepts developed were further refined with the objective of elimination and reduction of impacts. The engineering decisions to achieve this objective are thoroughly documented in the Preliminary Engineering Report.

2.3.1 Alternative 1

- Widen 45th Street to add one through lane in each direction from Northpoint Boulevard to Congress Avenue;
- Provide one bike lane in each direction from Northpoint Boulevard to Congress Avenue;
- Extend the eastbound to southbound on-ramp to start just east of Northpoint Boulevard;
- Provide one additional right turn lane and one additional left turn lane at the I-95 southbound off-ramp intersection;
- Provide new overhead signage at the I-95 southbound off-ramp to indicate 3 lanes to East 45th Street and 3 lanes to West 45th Street;

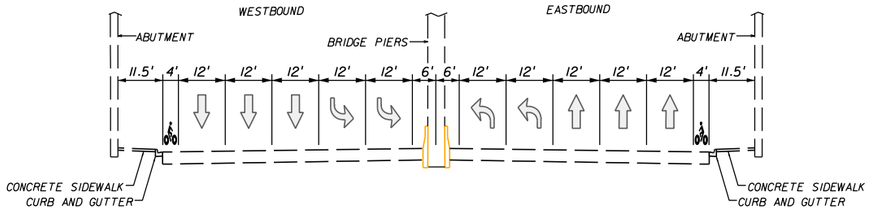
- Provide one additional right turn lane and one additional left turn lane at the I-95 northbound off-ramp intersection;
- Provide new overhead signage at the I-95 northbound off-ramp to indicate 3 lanes to West 45th Street, 1 lanes to North Congress Avenue, and 2 lanes to East 45th Street;
- Widen the existing bridge along 45th Street over the C-17 Canal to accommodate one additional through lane and one bike lane in each direction;
- Add one additional left turn lane from eastbound 45th Street to northbound Congress Avenue to provide triple left turns at the intersection;
- Add one additional left turn lane from northbound Congress Avenue to westbound 45th Street to provide triple left turns at the intersection;

2.3.2 Alternative 2

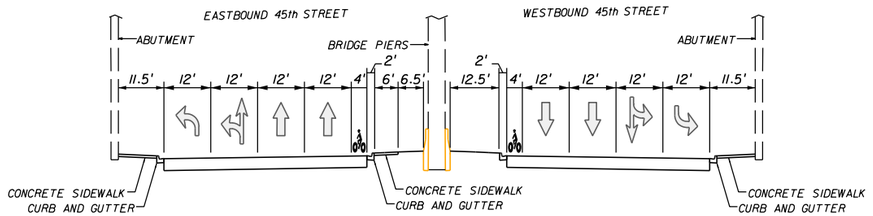
- Modify the existing Diamond Interchange to a Diverging Diamond Interchange (DDI) configuration, which provides 3 continuous through lanes through the interchange with 2 free flow left turn lanes into the I-95 on ramps;
- Provide one bike lane in each direction from Northpoint Boulevard to Congress Avenue;
- Extend the 45th Street eastbound to I-95 southbound on-ramp to start at Northpoint Boulevard;
- Provide one additional left turn lane at the I-95 southbound off-ramp intersection;
- Provide new overhead signage at the I-95 southbound off-ramp to indicate 3 lanes to East 45th Street and 2 lanes to West 45th Street;
- Provide one additional right turn lane at the I-95 northbound off-ramp intersection;
- Provide new overhead signage at the I-95 northbound off-ramp to indicate 2 lanes to West 45th Street, 1 lanes to North Congress Avenue, and 2 lanes to East 45th Street;
- Widen the existing bridge along 45th Street over the C-17 Canal to accommodate one bike lane in each direction;
- Add one additional left turn lane from eastbound 45th Street to northbound Congress Avenue to provide triple left turns at the intersection;
- Add one additional left turn lane from northbound Congress Avenue to westbound 45th Street to provide triple left turns at the intersection;
- Provide travel information system;
- Develop coordinated signal system strategies.

2.3.3 Alternative 3

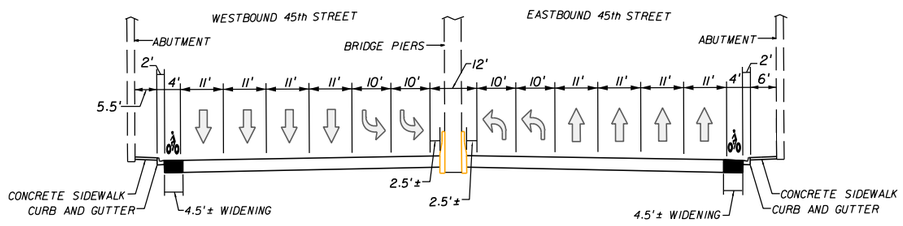
This alternative would provide direct connect ramps from I-95 to SR 710 to and from the south. Northbound traffic on I-95 traveling to SR 710 would exit at the existing 45th Street exit ramp. A one-lane ramp roadway would be constructed over 45th Street adjacent to I-95 and continue north to flyover the CSX Railroad and connect to the inside of eastbound SR 710 at just west of Congress Avenue. Eastbound SR 710 would be realigned to the south to accommodate the new ramp. Westbound traffic on SR 710 traveling to southbound I-95 would exit SR 710 just west of Congress Avenue on a one-lane ramp that would flyover I-95 to connect south to a ramp roadway adjacent to the I-95 mainline. SR 710 traffic would enter southbound I-95 at the existing 45th Street entrance ramp. The intersection at SR 710 and Congress Avenue would be modified to accommodate the new ramps.



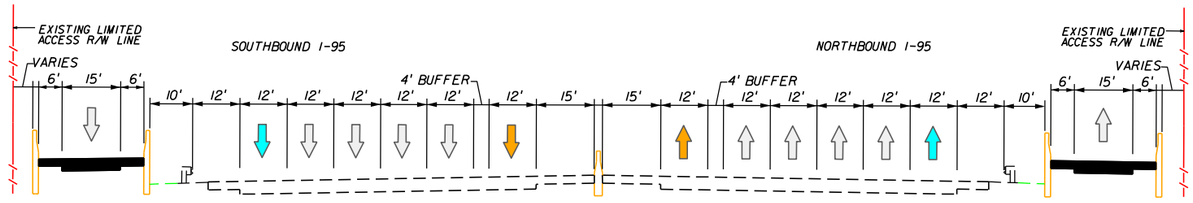
Existing Typical Section
45th Street, Under the I-95 Bridge



Alternative 2: Diverging Diamond
Interchange



Alternative 1: Base



Alternative 3: SR 710 Ramps

Florida Department of Transportation
District Four
3400 West Commercial Boulevard
Fort Lauderdale, FL 33309

I-95/SR 9 Interchange at 45th Street
Project Development & Environment Study
FPID No.: 436519-1-22-01
ETDM No.: 14225

Title:

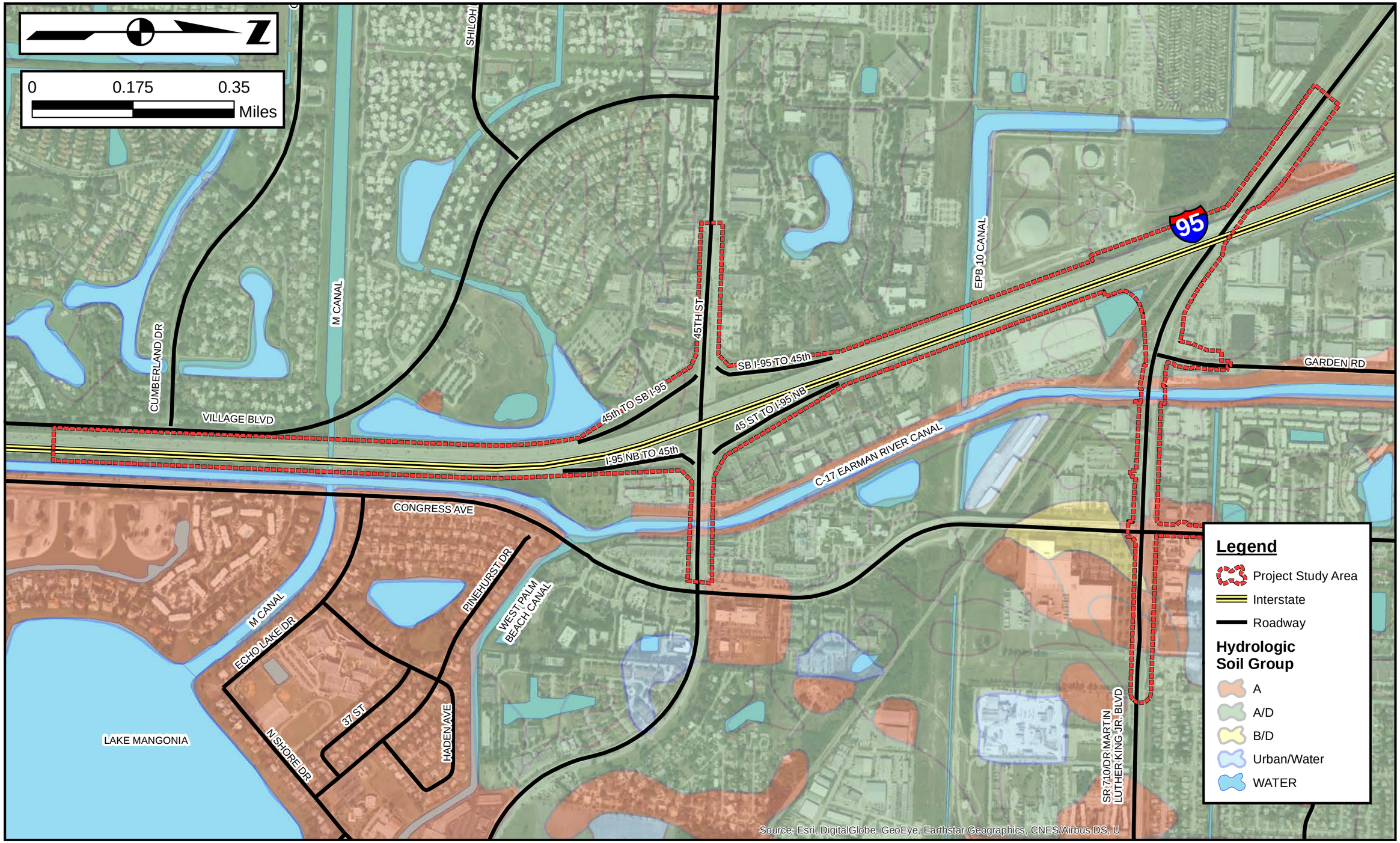
PROPOSED TYPICAL SECTIONS

Figure:
3

3.0 EXISTING CONDITIONS

I-95 within the project area is a ten-lane divided principal arterial interstate from north of the Congress Avenue interchange (southern limit) to north of the PGA Boulevard interchange (northern limit). There are 4 general purpose and 1 High Occupancy Vehicle (HOV) lane in each direction. 45th Street, in the vicinity of I-95, is a six-lane divided urban other principal arterial maintained by Palm Beach County.

The soil within the corridor primarily consist of a mixture of well drained type A and A/D sandy soils along with urban land. The surrounding area consist of a mixture of commercial and business park land use. Refer to **Figure 3** for Soils Map. There is extensive existing stormwater management within the interchange area consisting primarily of dry detention ponds inside the interchange infields and roadside swales. The project area lies within the C-17 Canal basin and includes 14 existing dry detention ponds which serve I-95 and portions of the 45th Street. The study area is approximately 0.62 miles long with a right of way width that generally varies between 300 and 1000 feet. I-95 exhibits a crest vertical curve as it passes over 45th Street and generally the area south of 45th Street drains to the south while the area to the north drains north. South of the interchange stormwater discharges to the C-17 Canal, north of the interchange the project discharged to a secondary canal that ultimately drains to the C-17 Canal as well. There is a sheet pile weir control structure in the C-17 Canal just north of the 45th Street bridge over the canal. This structure may require removal or relocation as part of the project. Existing ground elevations vary from approximately 0 to 46 feet NAVD. I-95 and associated bridges and embankments are generally higher in elevation than the surrounding ground. According to the FEMA Preliminary Flood Insurance Rate Maps, the 100-yr Zone AE floodplain encroaches into the I-95 right of way within the study limits in several locations. Base Flood Elevations range from 12 to 14 feet NAVD 88. Refer to **Figure 4** for the FEMA Flood Zones. At each end of the study area there is a large box culvert that allows secondary canals to pass through the I-95 right of way and connect to the C-17 Canal on the east side of I-95. Appendix A contains photographs of the existing culverts.



Florida Department of Transportation
District Four
3400 West Commercial Boulevard
Fort Lauderdale, FL 33309

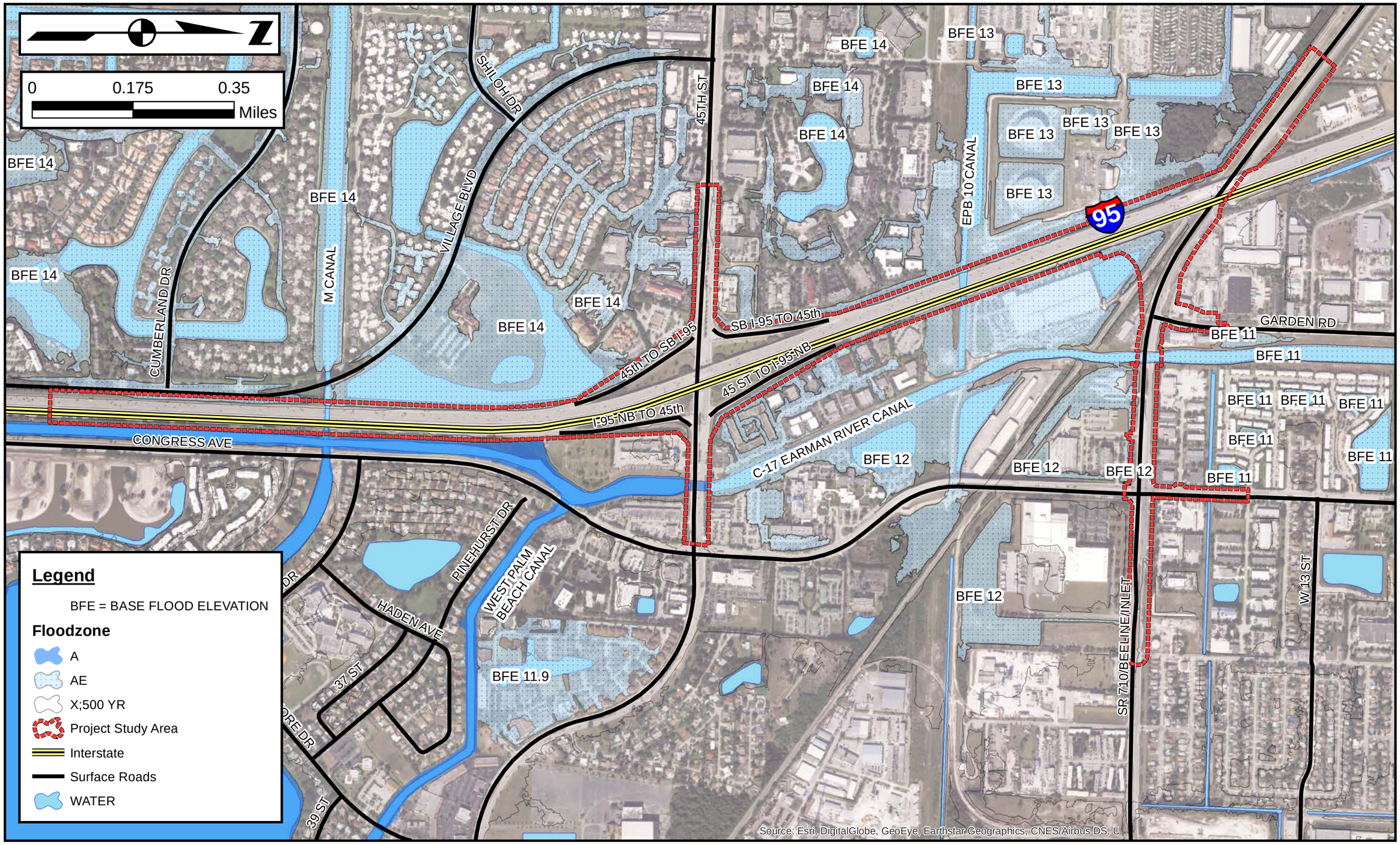
I-95/SR 9 Interchange at 45th Street
Project Development & Environment Study
FPID No.: 436519-1-22-01
ETDM No.: 14225

Title:

SOILS MAP

Figure:

4



Florida Department of Transportation District Four 3400 West Commercial Boulevard Fort Lauderdale, FL 33309	**I-95/SR 9 Interchange at 45th Street** Project Development & Environment Study FPID No.: 436519-1-22-01 ETDM No.: 14225	Title: **FEMA FLOODZONE MAP**	Figure: **5**

4.0 PROPOSED CONDITIONS

The proposed interchange improvement alternatives will impact the existing stormwater management facilities to varying degrees. The existing facilities provide approximately 11 Ac-ft of excess treatment volume that can be used for the proposed alternatives. There are three alternatives that are being evaluated by the PD&E study. Alternative 1, which includes widening of 45th street from Northpoint Boulevard to Congress Avenue. Alternative2, which includes a Diverging Diamond Interchange (DDI) configuration, and Alternative 3 which includes SR 710 Ramps to and from I-95 South. It was assumed that all the ponds within the existing limited access right of way will be available, to some degree, in the proposed condition. Any basins with large impacts to existing treatment within the limited access right of way will have to be treated in offsite ponds or compensated elsewhere within the basin. If necessary, the cross drains at the limits of the study area extended to accommodate a proposed alternative. Alternatives 1 and 2 are unlikely to impact the existing culverts crossing the alignment. However, Alternative 3 will likely require the extension of the culvert under I-95 north of 45th Street on the north side of the FP&L transmission line corridor. Additionally, Alternative 3 may require the widening of the SR 710 bridge crossing the C-17 Canal.

5.0 FLOODPLAIN ENCROACHMENT

Most of the modifications associated with the alternatives lie outside of FEMA Flood Zones. However, there are some areas within the project limits where flood zone Impacts are possible. Encroachments into the floodplain will be transverse and primarily confined within the existing right-of-way. In accordance with Executive Order 11988, FHWA TECHNICAL ADVISORY T 6640.8A, 23 CFR 771, and Chapter 24 of the PD&E manual, the Department must take the appropriate measures to protect floodplains and minimize impacts. For this reason compensating storage will be provided to offset any fill within the floodplain. As a result, the project will result in no increased risks associated with flooding. The project will also result in no adverse impacts to water quality, groundwater recharge, fish and wildlife habitat, plants, open spaces or natural beauty, recreation, agriculture and aquaculture, or forestry. Floodplain and

land use development plans are not necessary since the project is a modification to an existing road.

6.0 SUMMARY

It is assumed that the interchange improvement will not alter the existing profile. These improvements will have no adverse effects to the existing floodplain. It has been determined that there is no significant net floodplain encroachment by this project.