PRELIMINARY ENGINEERING REPORT

Volume 1 of 2

This preliminary engineering report contains detailed engineering information that fulfills the purpose and need for project on:

Interstate 95 (I-95) / State Road 9 (SR 9) Project Development and Environment Study

Project Study Limits:

From South of Hallandale Beach Boulevard (SR 858) to
North of Hollywood Boulevard (SR 820), Broward County
Mileposts 0.0 – 3.1

Broward County
FPID Number 436903-1-22-02
ETDM Number 14254

Prepared for:

Florida Department of Transportation – District Four
2300 West Commercial Boulevard
Fort Lauderdale, FL 33309

Prepared by:

The Corradino Group
5200 NW 33rd Avenue, Suite 203
Fort Lauderdale, FL 33309

JUNE 2021

DRAFT

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.

PROFESSIONAL ENGINEER CERTIFICATE

I hereby certify that I am a registered engineer in the State of Florida practicing with The Corradino Group, a Florida Corporation authorized to operate as an engineering business, P.E. #7665, by the State of Florida Department of Professional Regulation, Board of Engineers, and that I have prepared or approved the evaluation, findings, opinions, or technical advice hereby reported for:

FPID Number:	436903-1-22-02
FAP Number:	TBD
ETDM Number:	14254
Project:	Interstate 95 (I-95) / State Road 9 (SR 9) Project Development and Environment Study
County:	Broward
FDOT Project Manager:	Kenzot Jasmin, P.E.

I acknowledge that the procedure and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

Signature______________________________

Name: Ryan Solis-Rios, P.E.
P.E. No.: 63345
Consultant Firm: The Corradino Group

PROFESSIONAL ENGINEER CERTIFICATION
PRELIMINARY ENGINEERING REPORT

Project: Interstate 95 (I-95) / State Road 9 (SR 9)
Project Development and Environment Study

ETDM Number: 14254

Financial Project ID: 436903-1-22-02

Federal Aid Project Number: TBD

This preliminary engineering report contains engineering information that fulfills the purpose and need for the I-95 (SR 9) Project Development and Environment Study from south of Hallandale Beach Boulevard to north of Hollywood Boulevard in Broward County, Florida. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

I hereby certify that I am a registered professional engineer in the State of Florida practicing with The Corradino Group, and that I have prepared or approved the evaluation, findings, opinions, conclusions, or technical advice for this project.

This item has been digitally signed and sealed by Ryan Solis-Rios, P.E. on the date adjacent to the seal.
Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1.0 PROJECT SUMMARY

1.1 PROJECT DESCRIPTION

The Florida Department of Transportation (FDOT) District Four is conducting a Project Development and Environment (PD&E) Study for Interstate 95 (I-95) from south of Hallandale Beach Boulevard (SR 858) to north of Hollywood Boulevard (SR 820), a distance of approximately three miles (see ***Figure 1.1***). The PD&E Study is proposing improvements to the Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard interchanges. The project is located in Broward County, Florida and is contained within the municipalities of Hallandale Beach, Pembroke Park, and Hollywood.

I-95 is the primary north-south interstate facility that links all major cities along the Atlantic Seaboard and is one of the most important transportation systems in southeast Florida. I-95 is one of the two major expressways, Florida's Turnpike being the other, that connects major employment centers and residential areas within the South Florida tri-county area. I-95 is part of the State's Strategic Intermodal System (SIS), the National Highway System and is designated as an evacuation route along the east coast of Florida.

I-95, within the project limits, currently consists of eight general use lanes (four in each direction) and four dynamically tolled express lanes (two in each direction). This segment of I-95 is functionally classified as a Divided Urban Principal Arterial Interstate and has a posted speed limit of 65 miles per hour. The access management classification for this corridor is Class 1.2, Freeway in an existing urbanized area with limited access.

There are three existing full interchanges within the project limits located at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard. All three roadways are classified as Divided Urban Principal Arterials. Hallandale Beach Boulevard consists of four lanes west of I-95 and six lanes east of I-95. Pembroke Road and Hollywood Boulevard each have six lanes west of I-95 and four lanes east of I-95.

This PD&E Study is evaluating the potential modification of existing entrance and exit ramps serving the three interchanges within the project limits. Widening and turn lane modifications at the ramp terminals were evaluated to facilitate the ramp modifications and improve the access and operation of the interchanges.

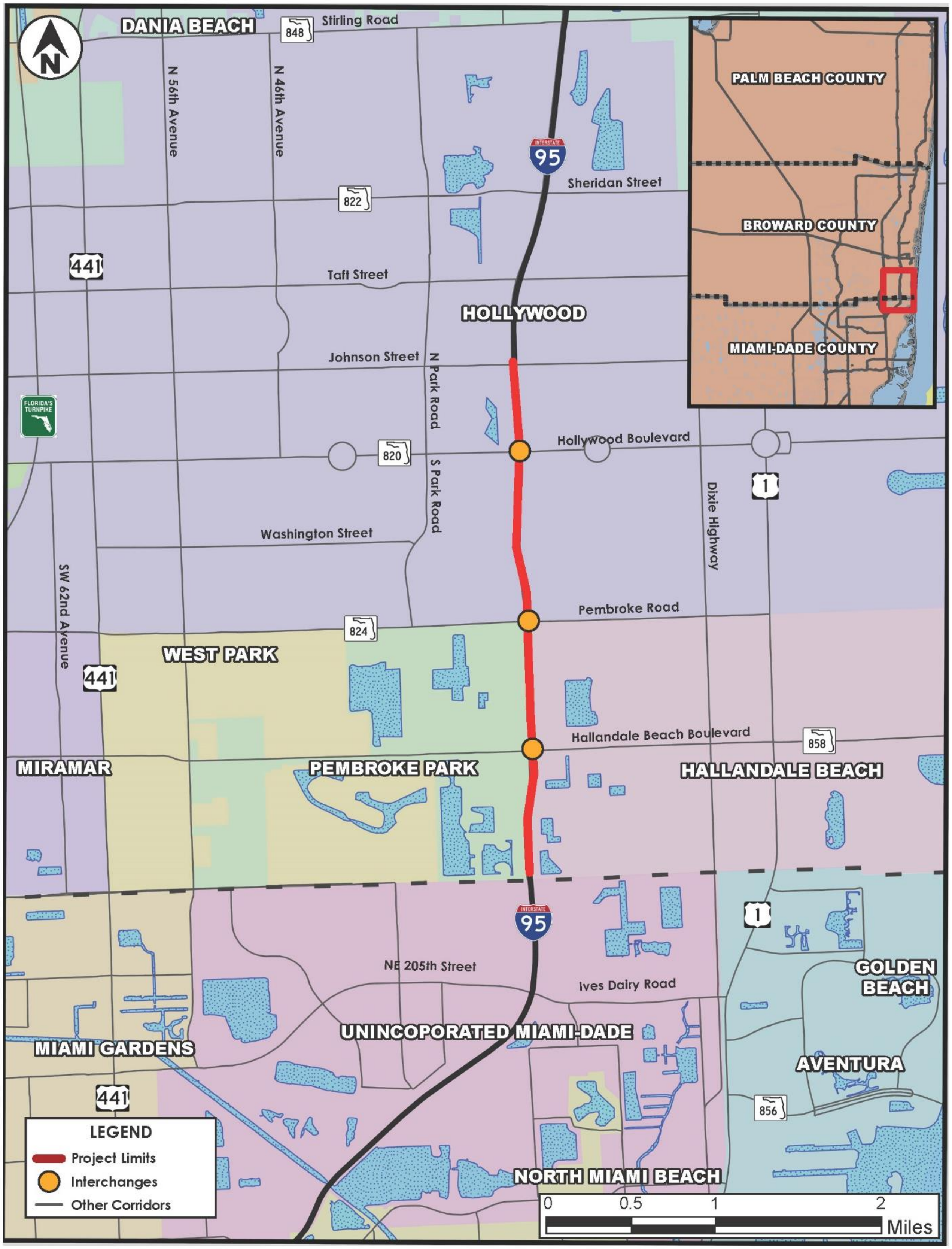


Figure 1.1 – Project Location Map

1.2 Purpose and Need of the Project

The overall goals and objectives of this PD&E Study are described below:

- Evaluate the implementation of potential interchange and intersection improvements that will improve capacity, operations, safety, mobility, and emergency evacuation.
- Identify the appropriate interstate/interchange access improvements that, combined with Transportation Systems Management and Operations (TSM&O) improvements, will service the users of the area, and achieve the Purpose and Need.
- Provide relief from existing and projected traffic congestion.
- Improve the safety of the I-95 mainline corridor by addressing speed differentials and lane weaving deficiencies between interchanges.
- Support the optimal operations of the existing roadway network.
- Maintain consistency with the current I-95 Express Lanes and local projects.
- Prioritize the proposed improvements based on the area needs (short-term vs. long-term), logical segmentation and funding.

The need for this project is to increase interchange and ramp terminals intersection capacity at Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard. Other considerations for the purpose and need of this project include safety, system linkage, modal interrelationships, transportation demand, social demands, economic development, and emergency evacuation. The primary and secondary needs for the project are discussed in further detail below:

Capacity – The I-95 ramps at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard are currently congested and affecting traffic operations along I-95 between the interchange ramps and at the arterial intersections near I-95.

Without future improvements, the driving conditions will continue to deteriorate well below acceptable Level of Service (LOS) standards. The following I-95 freeway segments will operate below LOS D within at least one peak-hour period before the year 2045:

- Ives Dairy Road northbound on-ramp to Hallandale Beach Boulevard northbound off-ramp
- Hallandale Beach Boulevard northbound on-ramp to Pembroke Road northbound off-ramp
- Pembroke Road northbound on-ramp to Hollywood Boulevard northbound off-ramp
- Hollywood Boulevard northbound on-ramp to Sheridan Street northbound off-ramp
- Sheridan Street southbound on-ramp to Hollywood Boulevard southbound off-ramp
- Pembroke Road southbound on-ramp to Hallandale Beach Boulevard southbound off-ramp
- Hallandale Beach Boulevard southbound on-ramp to Ives Dairy Road southbound off-ramp

Additionally, the following intersections will fall below LOS D during at least one peak-hour period before the year 2045:

- Hallandale Beach Boulevard northbound ramp terminal
- Hallandale Beach Boulevard southbound ramp terminal
- Hollywood Boulevard southbound ramp terminal
- Hollywood Boulevard/28th Avenue

The improvements proposed as part of this project will increase the capacity of the interchanges and the ramp terminal intersections.

Safety – The crash safety analysis indicates that the I-95 study area segments have experienced greater overall number of crashes for the years 2012 through 2014 than what would typically be anticipated on similar facilities. A review of the crash data indicates that traffic operational improvements could address some of the safety issues.

Additional I-95 entry and exit ramp capacity at these interchanges will improve the safety and overall flow of traffic within the project corridor and adjacent intersections.

System Linkage – I-95 is part of the State's SIS and the National Highway System. I-95 provides limited access connectivity to other major arterials such as I-595 and Florida's Turnpike. The project is not proposing to change system linkage.

However, potential interchange modifications would improve movements within the existing network systems.

Modal Interrelationships – There are sidewalks in both directions and public transit routes along Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard. Additionally, there is a Tri-Rail Station in the northwest quadrant of the I-95/Hollywood Boulevard Interchange.

Capacity improvements within the study area will enhance the mobility of people and goods by alleviating current and future congestion at the interchanges and on the surrounding freight and transit networks. Reduced congestion will serve to maintain and improve viable access to the major transportation facilities and businesses in the area.

Transportation Demand – The I-95 PD&E Study phase from south of Hallandale Beach Boulevard to north of Hollywood Boulevard is included in the Broward Metropolitan Planning Organization (MPO) 2045 Long Range Transportation Plan (LRTP), Transportation Improvement Program (TIP), FDOT Work Program, FDOT State TIP, and FDOT SIS Five Year Plan.

Social Demands and Economic Development – Social and economic demands on the I-95 corridor will continue to increase as population and employment increase. The Broward County MPO LRTP predicted that the population would grow from 1.9 million in 2018 to 2.2 million by 2045, an increase of 16 percent. Jobs were predicted to increase from 0.9 to 1.2 million during the same period, an increase of 25 percent.

The project intersects the cities of Hallandale Beach, Pembroke Park, and Hollywood, the third largest city in Broward County.

Emergency Evacuation – The project is anticipated to improve emergency evacuation capabilities by enhancing connectivity and accessibility to major arterials designated on the state evacuation route. I-95, Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard serve as part of the emergency evacuation route network designated by the Florida Division of Emergency Management and by Broward County. Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard move traffic from the east to I-95. I-95 is critical in facilitating traffic during emergency evacuation periods as it connects to other major arterials and highways in the state evacuation route network (i.e., I-595 and the Florida's Turnpike).

1.3 COMMITMENTS

FDOT has made a series of commitments and recommendations during the PD&E Study pertaining to the I-95 PD&E Study project. The following section summarizes the commitments and recommendations that will be adhered to during future transportation phases.

1. Prior to commencing construction activities, the FDOT is committed to re-surveying the project corridor for features that could serve as potential roosting habitat and signs of the Florida bonneted bat. If any signs of the Florida bonneted bat are observed, the FDOT is committed to reinitiating consultation with the U.S. Fish and Wildlife Services to determine the appropriate course of action.
2. During the construction phase of this project, the FDOT's contractor will adhere to the most recent version of the Florida Fish and Wildlife Conservation Commission's Standard Manatee Conditions for In-Water Work to minimize the potential for adverse effects.
3. During the construction phase of this project, the FDOT's contractor will employ the most recent version of the U.S. Fish and Wildlife Service's Standard Protection Measures for the Eastern Indigo Snake to minimize the potential for adverse effects.
4. Six publicly owned parks exist adjacent to the project corridor: Ives Estate Park, Oreste Blake Johnson Park, McNicol Community Center, Orangebrook Golf Course and Country Club, Lions Park, and Stan Goldman Memorial Park. FDOT's contractor will not stage materials or make temporary use of these parks during construction.
5. Construction noise and vibration impacts to the project corridor will be minimized by adherence to the controls listed in the latest edition of the FDOT's Standard Specifications for Road and Bridge Construction.

Commitments may be revised and/or updated after the public hearing process.

1.4 Alternatives Analysis Summary

The objective of this PD&E Study is to evaluate interchange alternatives that will address existing and projected traffic operating deficiencies along this section of I-95. In order to keep up with the growing traffic demand within the study area, three build alternatives (Alternatives 1, 2 and 3) were considered in this PD&E Study. All three alternatives propose potential modifications to the existing entrance and exit ramps serving the three interchanges within the project limits. Ramp terminal intersection modifications were evaluated at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard to improve the access and operations to and from I-95.

The PD&E Study Build Alternatives analysis and evaluation were performed and completed between September 2016 and December 2018, prior to the hold of the study in 2019. In 2019, FDOT District Six completed an I-95 Planning Study between US 1 (downtown Miami) and the Miami-Dade/Broward County Line. Around the same time, FDOT District Four was moving forward with geometric changes from an Alternative Technical Concept (ATC) as part of the I-95 Express Phase 3C Construction Project, which covers from south of Hollywood Boulevard to north of Interstate 595 (I-595). Because of the overlapping limits of these two projects with the I-95 PD&E Study and changes to the I-95 Express Lanes access points by both districts, FDOT District Four decided to put the I-95 PD&E Study on hold and perform an I-95 Corridor Planning Study (CPS) to evaluate how these three projects will interact with each other. Therefore, the analysis summarized in this section did not include the FDOT District Six I-95 Planning Study, District Four I-95 CPS, and the recent changes to the I-95 Express Phase 3C Project.

Alternative 1 – Alternative 1 proposes braided ramps between interchanges to improve substandard weaving movements along I-95. In this alternative, the on-ramps from each interchange will remain unchanged. However, the off-ramps to Pembroke Road and Hollywood Boulevard in the northbound direction and to Pembroke Road and Hallandale Beach Boulevard in the southbound direction will be located one interchange prior to the destination interchange. For example, travelers destined northbound to Pembroke Road would use an exit ramp located just south of the Hallandale Beach Boulevard corridor right after the Hallandale Beach Boulevard off-ramp. The new exit ramp will continue separated from the I-95 mainline braiding over the Hallandale Beach Boulevard on-ramp and continuing along the right of way line until reaching the cross-street ramp terminal. This new exit ramp bypasses and avoids conflicts with the Hallandale

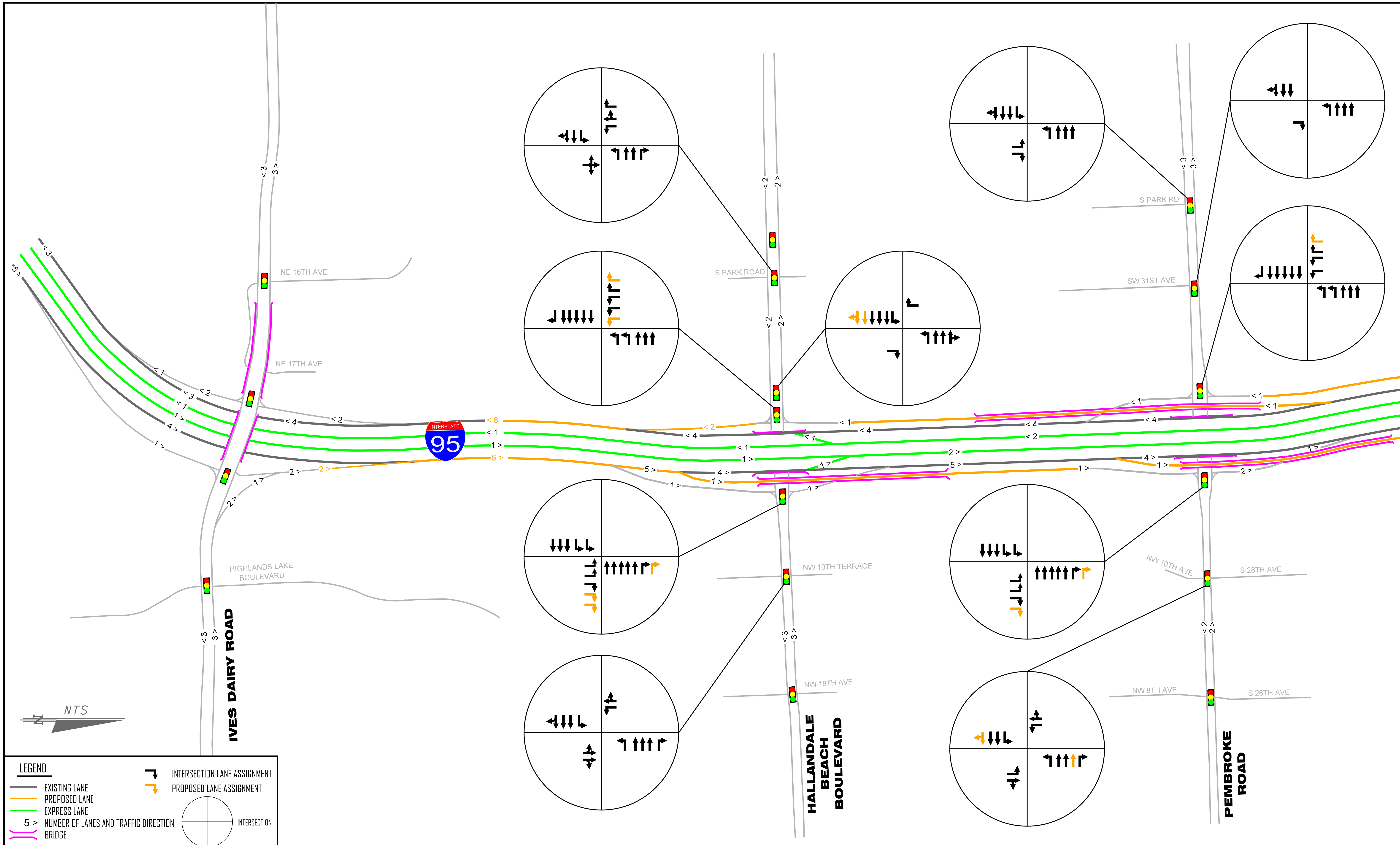
Beach Boulevard on-ramp. The same design continues northbound to Hollywood Boulevard and southbound to Pembroke Road and Hallandale Beach Boulevard. ***Figure 1.2*** shows the schematic geometric layout of Alternative 1.

Alternative 2 – Alternative 2 proposes a collector distributor roadway system within the I-95 mainline project area. The collector distributor roadway system will remove the Pembroke Road Interchange from directly interacting with the I-95 mainline. In the northbound direction, all exiting traffic to Pembroke Road and Hollywood Boulevard will utilize a new collector distributor off-ramp just south of Hallandale Beach Boulevard. The collector distributor roadway system will extend to just north of Hollywood Boulevard serving the exit traffic to Pembroke Road, entry traffic from Pembroke Road and entry traffic from Hollywood Boulevard. In the southbound direction, the new collector distributor roadway system will not be continuous, it will end and begin at Pembroke Road. The first section combines the off-ramps to Hollywood Boulevard and Pembroke Road and the second section moves the Pembroke Road on-ramp to enter I-95 south of the Hallandale Beach Boulevard on-ramp. ***Figure 1.3*** shows the schematic geometric layout of Alternative 2.

Alternative 3 – Alternative 3 proposes to eliminate all left-turn movements from the off-ramp terminal intersections. The left-turn movements will be converted to right-turn movements by relocating the left-turn movements to a successive off-ramp that becomes a U-turn ramp over the interstate touching down to the opposite ramp terminal intersection. For example, the northbound exiting interstate traffic destined westbound will conventionally use the northbound off-ramp and make a left turn. However, in this alternative, the northbound exiting interstate traffic destined westbound will use the interstate U-turn off-ramp to access the southbound off-ramp right-turn movement. This alternative reduces the number of phases needed at the interchange ramp terminals. ***Figure 1.4*** shows the schematic geometric layout of Alternative 3.

Interchange Alternatives – Four types of interchange configurations were evaluated along each cross street for each I-95 interchange at Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard.

1. Diamond Interchange
2. Diverging Diamond Interchange (DDI)
3. Displaced Left-Turn Lane Interchange (DLT)
4. Continuous Flow Intersection (CFI)



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JUNE 2018

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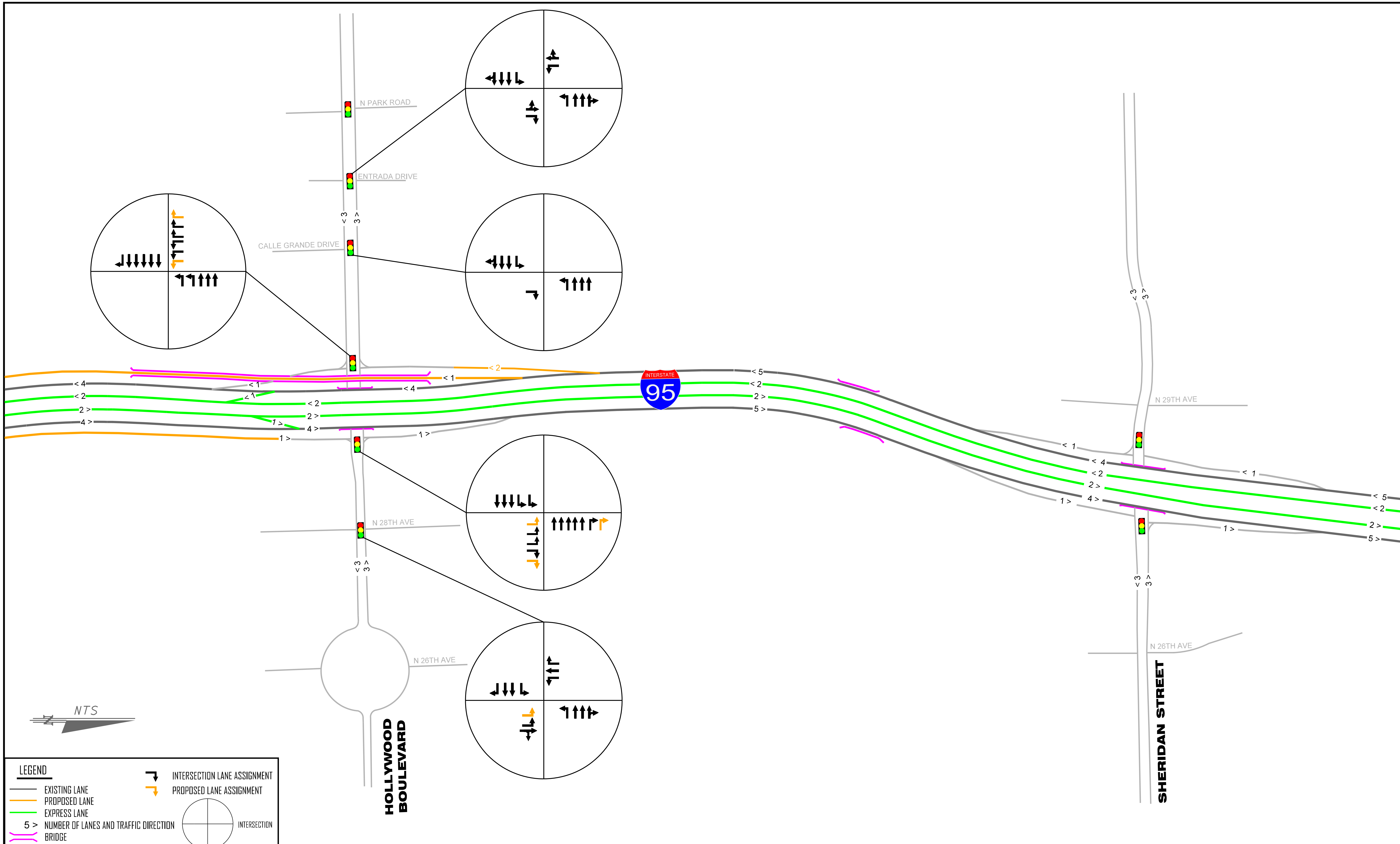
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
ALTERNATIVE 1 - SCHEMATIC LINE DIAGRAM

FIGURE
1.2



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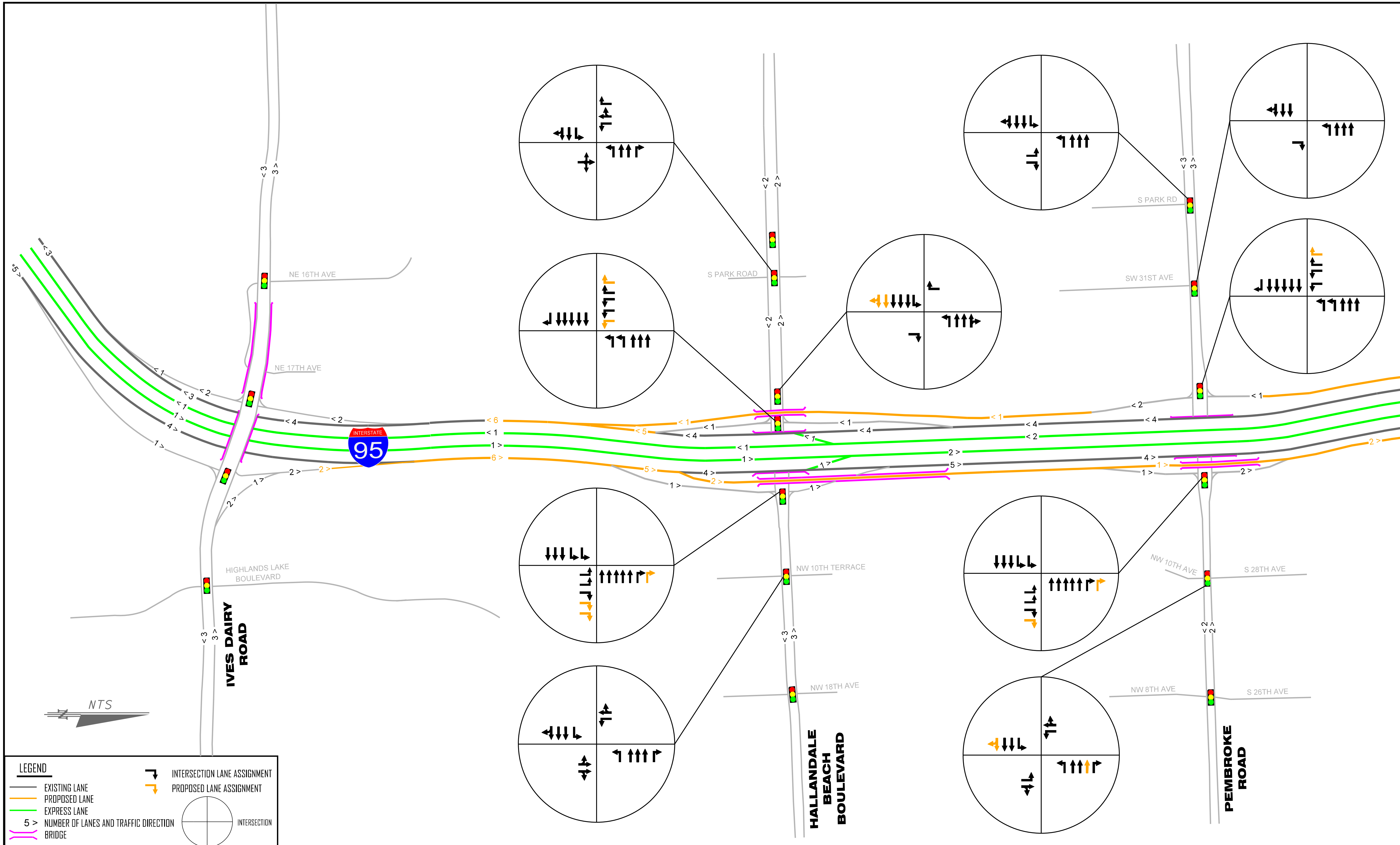
ALTERNATIVE 1 - SCHEMATIC LINE DIAGRAM

FIGURE
1.2
1-10



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ETDM No.: 14254

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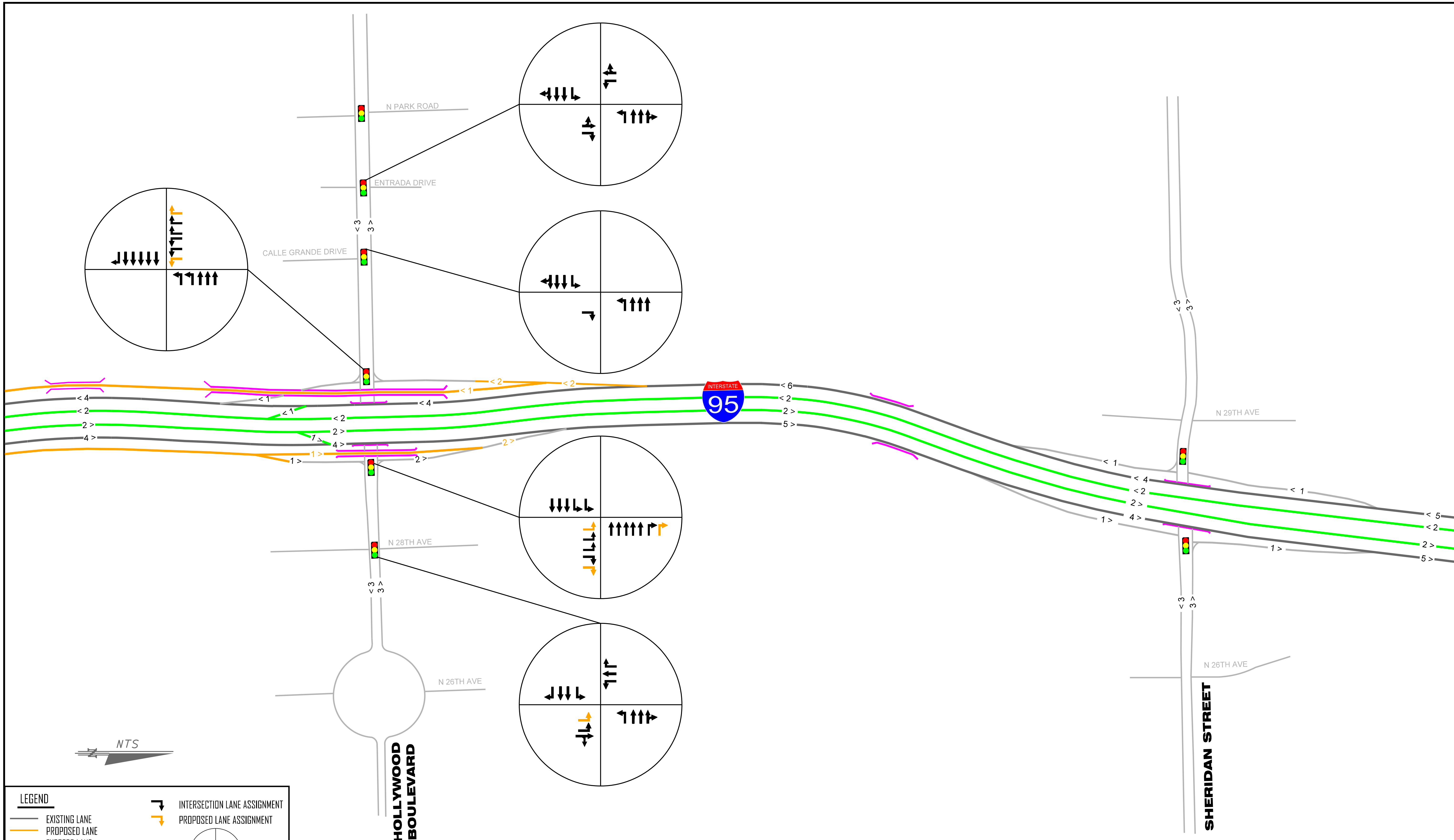
LANE GEOMETRY AND CONFIGURATIONS
ALTERNATIVE 2 - SCHEMATIC LINE DIAGRAM

FIGURE
1.3



LEGEND

- EXISTING LANE
- PROPOSED LANE
- EXPRESS LANE
- 5 > NUMBER OF LANES AND TRAFFIC DIRECTION
- BRIDGE
- INTERSECTION LANE ASSIGNMENT
- PROPOSED LANE ASSIGNMENT
- INTERSECTION

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FPID No.: 436903-1-22-02
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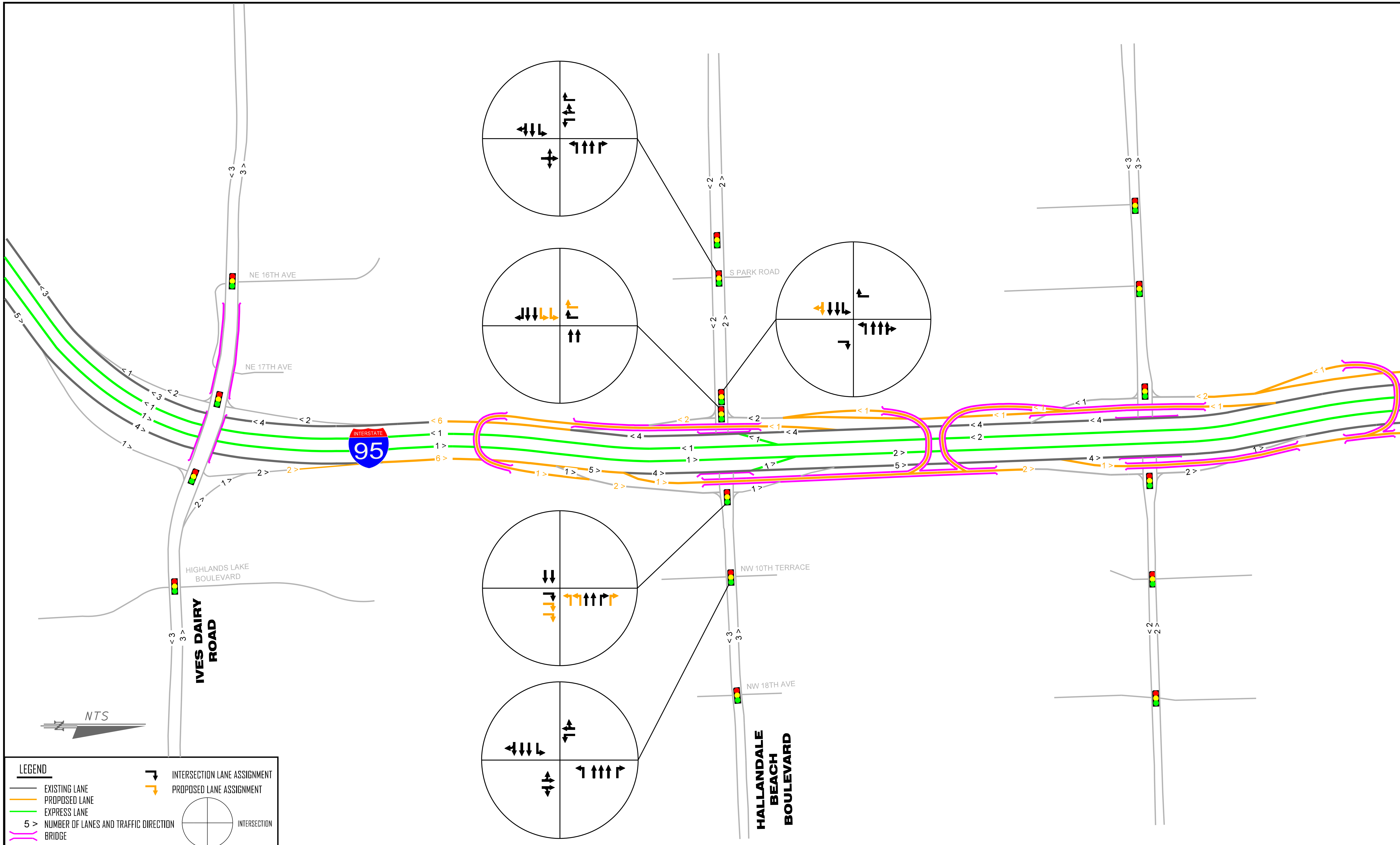
LANE GEOMETRY AND CONFIGURATIONS
ALTERNATIVE 2 - SCHEMATIC LINE DIAGRAM

FIGURE 1.3



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DISTRICT FOUR
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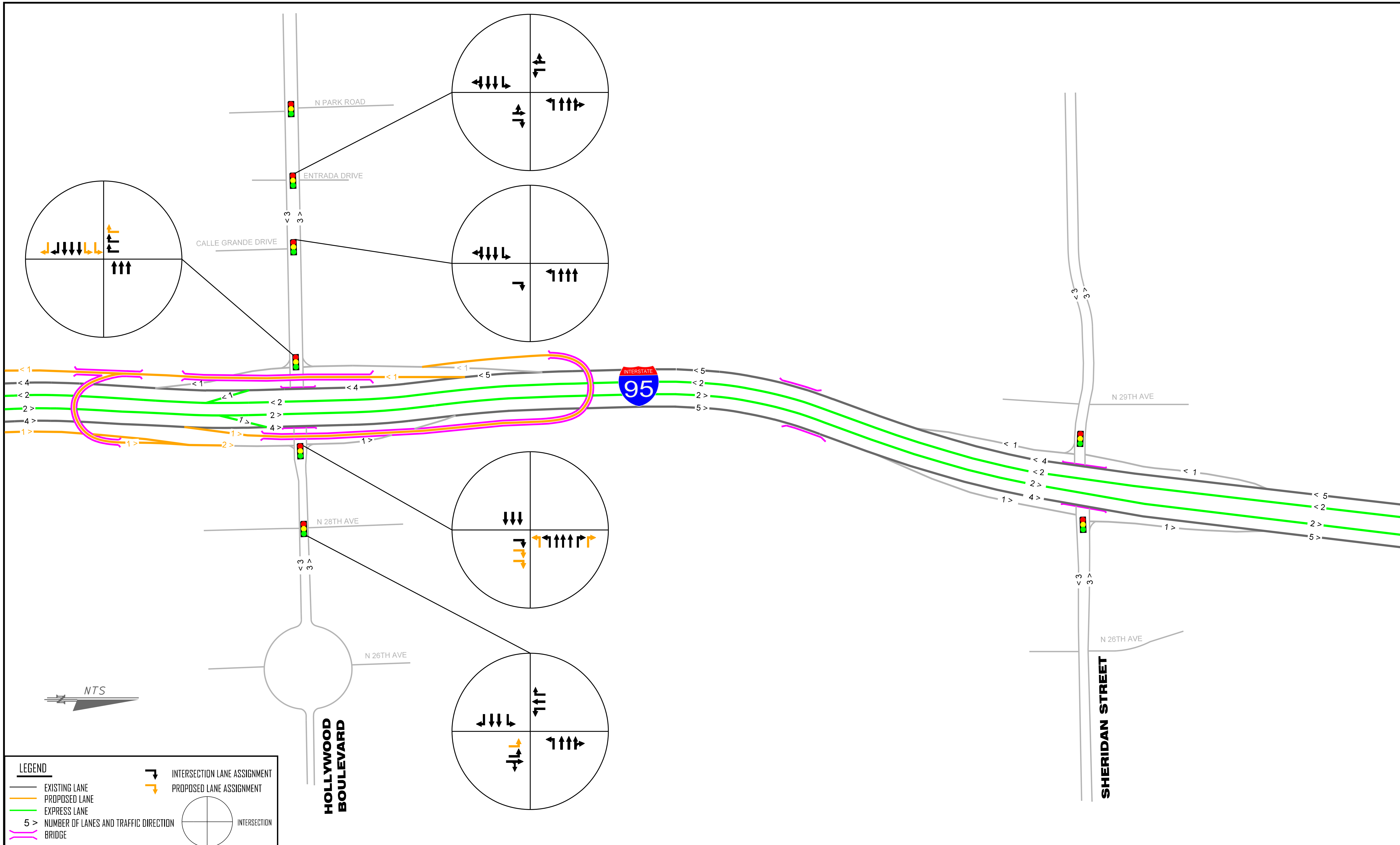
LANE GEOMETRY AND CONFIGURATIONS
ALTERNATIVE 3 - SCHEMATIC LINE DIAGRAM

FIGURE 1.4



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SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
ALTERNATIVE 3 - SCHEMATIC LINE DIAGRAM

FIGURE
1.4

1-14

Alternatives Eliminated – During the alternative analysis and geometrics evaluation, the following alternatives were eliminated from further consideration:

- Alternative 3 – This alternative was eliminated from the PD&E Study for the following reasons:
    - Low U-turn ramp design speed (20 MPH).
    - U-turn bridge ramps will need median piers, which will require a complex maintenance of traffic along I-95. The maintenance of traffic will impact the operations of the express lanes system.
    - Interchange design is not uniformed with the other interchanges, upstream, downstream and throughout the corridor, which impacts driver expectancy and a potential increase in crashes.
    - Interchange design footprint is not compatible with the future I-95 projects north and south of the study limits.

- Diverging Diamond Interchange – This alternative was eliminated from the PD&E Study for the following reasons:
    - Low crossing lanes path design speed (30-35 MPH).
    - Railroad at-grade crossing is too close to the crossing lanes path, which could create wrong way vehicle maneuvers and a complex operation of the railroad crossing gates.

- Displaced Left-Turn Lane Interchange – This alternative was eliminated from the PD&E Study for the following reasons:
    - Requires a larger footprint within the off-ramp interchange quadrants, which increases right of way impacts.
    - Railroad at-grade crossing is too close to the new upstream intersection on the west side.
    - The design requires additional railroad crossing gates and a more complexed crossing gate operation.

- Continuous Flow Intersection – This alternative was eliminated from the PD&E Study because this interchange configuration will work with mainline Alternative 3 only, which was eliminated from the PD&E Study.

Selection of Preferred Alternative – The evaluation methodology used in this study involved a combination of both comparative qualitative and quantitative analyses to determine a preferred alternative, which focused on engineering, socio-economic, environmental and project cost. The key components of the alternative's analysis were purpose and need, travel demand forecasting, geometrics, right of way impacts, construction cost and operational analysis. The alternatives analysis was geared to determine which capacity improvements were necessary to improve traffic operations, safety, transit, system linkage, modal interrelationships, transportation demand, social demand, economic development, interchange access and emergency evacuation. Alternative 2 was selected as the preferred alternative based on the alternatives alignment analysis and the evaluation results documented in this report.

The preferred alternative was selected in early 2019 prior to FDOT District Four decided to put the I-95 PD&E Study on hold and perform the I-95 CPS. The I-95 CPS was completed in April 2020. The I-95 PD&E Study restarted in June 2020 and consisted of the same purpose and need. However, the main difference was that the study assumed that both projects, District Six I-95 Planning Study and District Four I-95 Express Phase 3C improvements, will be in-place by the design year 2045. The I-95 PD&E Study restart approach was to redesign the preferred alternative to fit within the I-95 CPS Alternative 1A footprint and be compatible with the future projects north and south of the study limits.

The preferred alternative refinements and further analyses are documented in ***Sections 1.5*** and ***6.0.***

1.5 Description of Preferred Alternative

The PD&E Study is proposing a collector distributor roadway system adjacent to the I-95 mainline area. The collector distributor roadway system will remove the Pembroke Road Interchange from interacting directly with the I-95 mainline. The 2045 Design Year and 2030 Opening Year proposed improvements are summarized below:

2045 Design Year – In the northbound direction, all exiting traffic to Pembroke Road and Hollywood Boulevard will utilize a new collector distributor off-ramp just south of Hallandale Beach Boulevard. The collector distributor roadway system will extend to just north of Hollywood Boulevard serving the exit traffic to Pembroke

Road, entry traffic from Pembroke Road and entry traffic from Hollywood Boulevard. In the southbound direction, the new collector distributor roadway system will not be continuous, it will end and begin at Pembroke Road. The first section combines the off-ramps to Hollywood Boulevard and Pembroke Road and the second section moves the Pembroke Road on-ramp to enter I-95 south of the Hallandale Beach Boulevard on-ramp.

Ramp terminal intersection modifications were identified at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard to improve the access and operations to and from I-95.

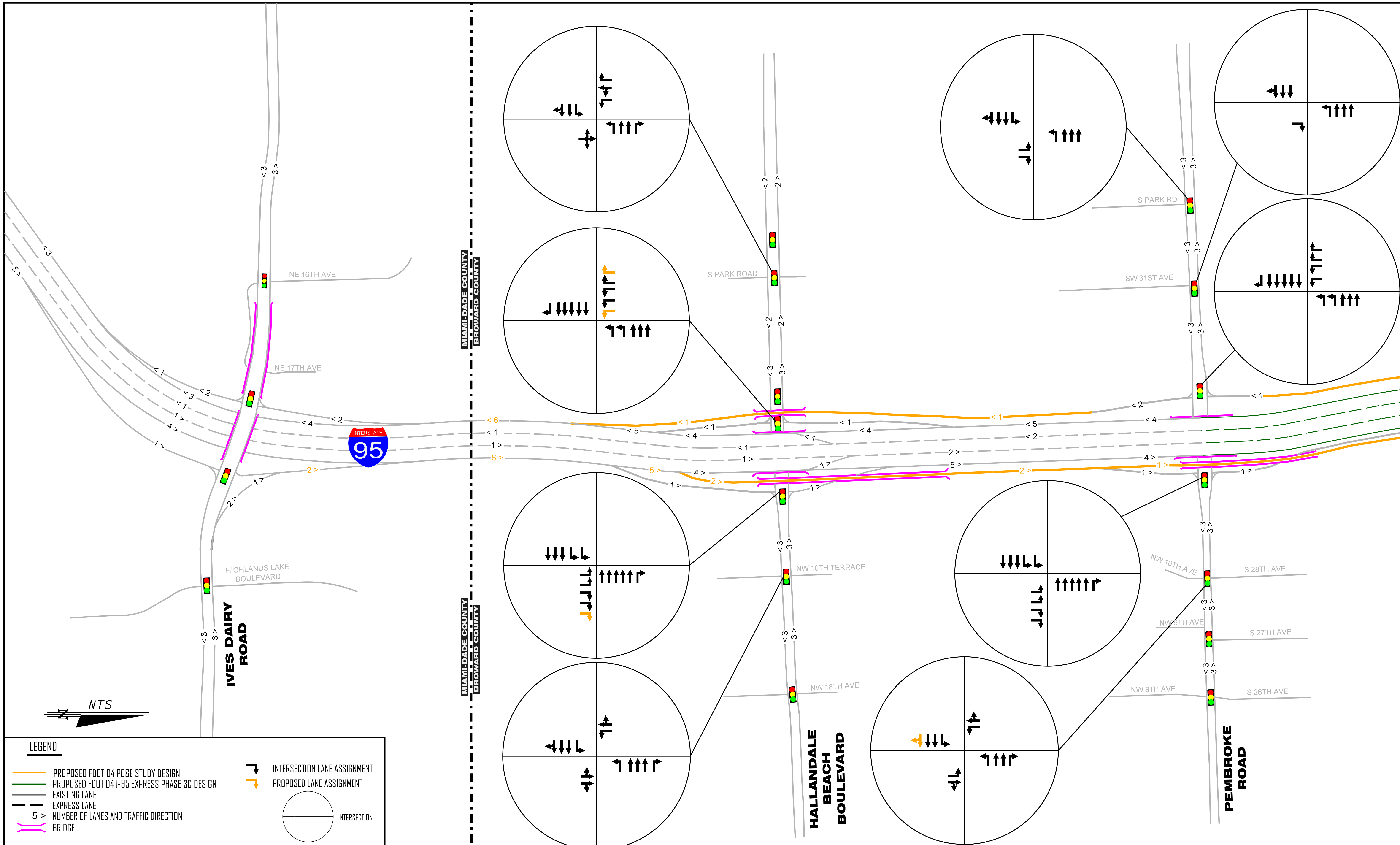
The 2045 preferred alternative design connects to the proposed I-95 corridor improvements from the FDOT District Six I-95 Planning Study. This study is proposing to add additional general use and express lanes south of the Miami-Dade/Broward County Line. The 2045 preferred alternative fits within the proposed corridor improvements footprint from the FDOT District Four I-95 CPS.

In summary, the 2045 preferred alternative design includes the FDOT District Six I-95 Planning Study, District Four I-95 CPS, and the recent changes to the I-95 Express Phase 3C Project.

2030 Opening Year – The 2030 preferred alternative design proposes the same collector distributor roadway system, which removes the Pembroke Road Interchange from interacting directly with the I-95 mainline. However, there are no planned improvements on the I-95 mainline south of Pembroke Road from other projects. Therefore, the PD&E Study is proposing the widening of I-95 between Ives Dairy Road and Hallandale Beach Boulevard to accommodate two auxiliary lanes in each direction to address the congestion and traffic demand along this section of the corridor. The 2030 preferred alternative design includes the recent changes to the I-95 Express Phase 3C Project.

Like in 2045, the 2030 design proposes the same ramp terminal intersection modifications at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard to improve the access and operations to and from I-95.

Figure 1.5 shows the 2030 preferred alternative schematic line diagram. ***Figure 1.6*** shows the 2045 preferred alternative schematic line diagram.



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OCTOBER 2020

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SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
2030 PREFERRED ALTERNATIVE LINE DIAGRAM

FIGURE
1.5

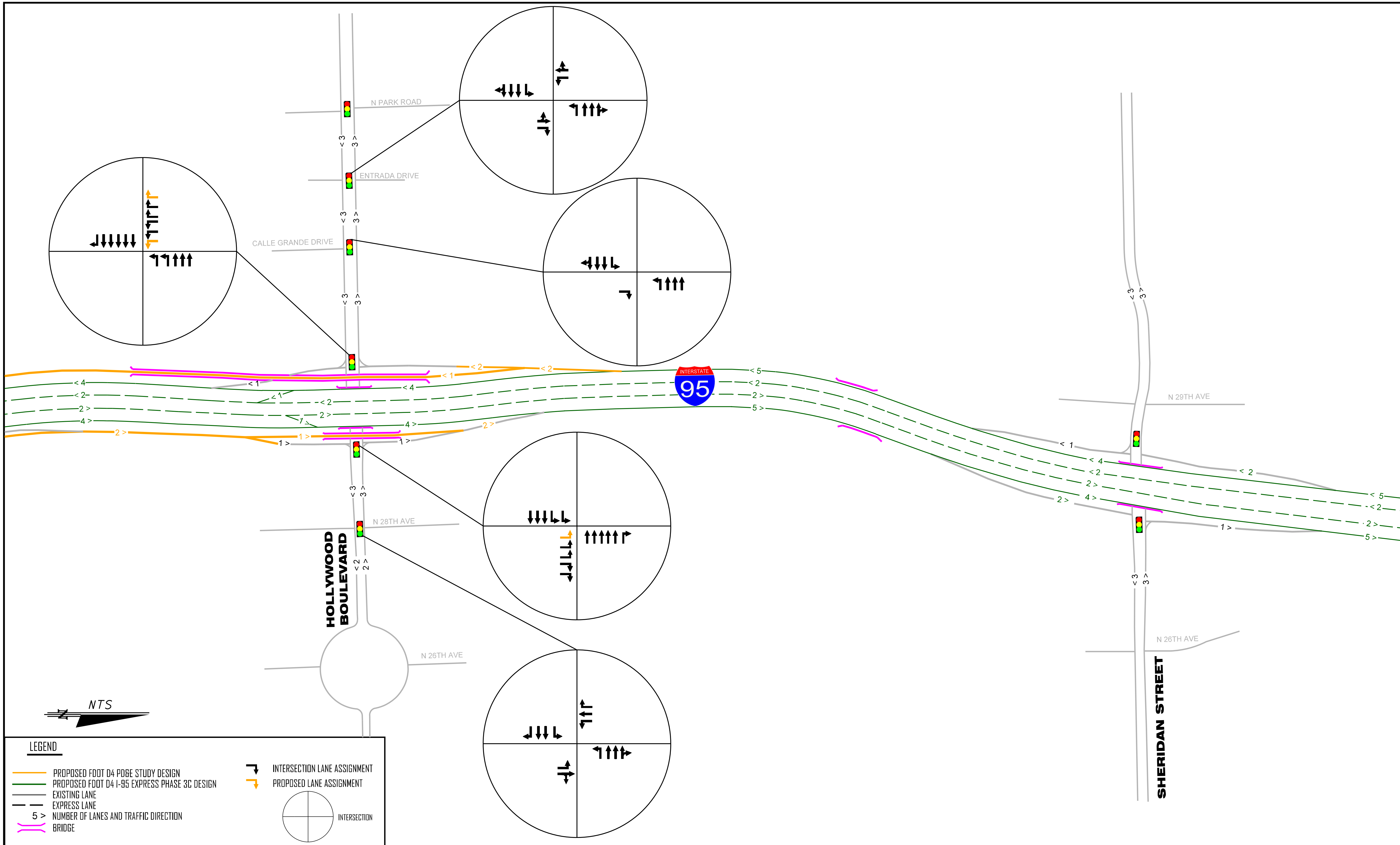

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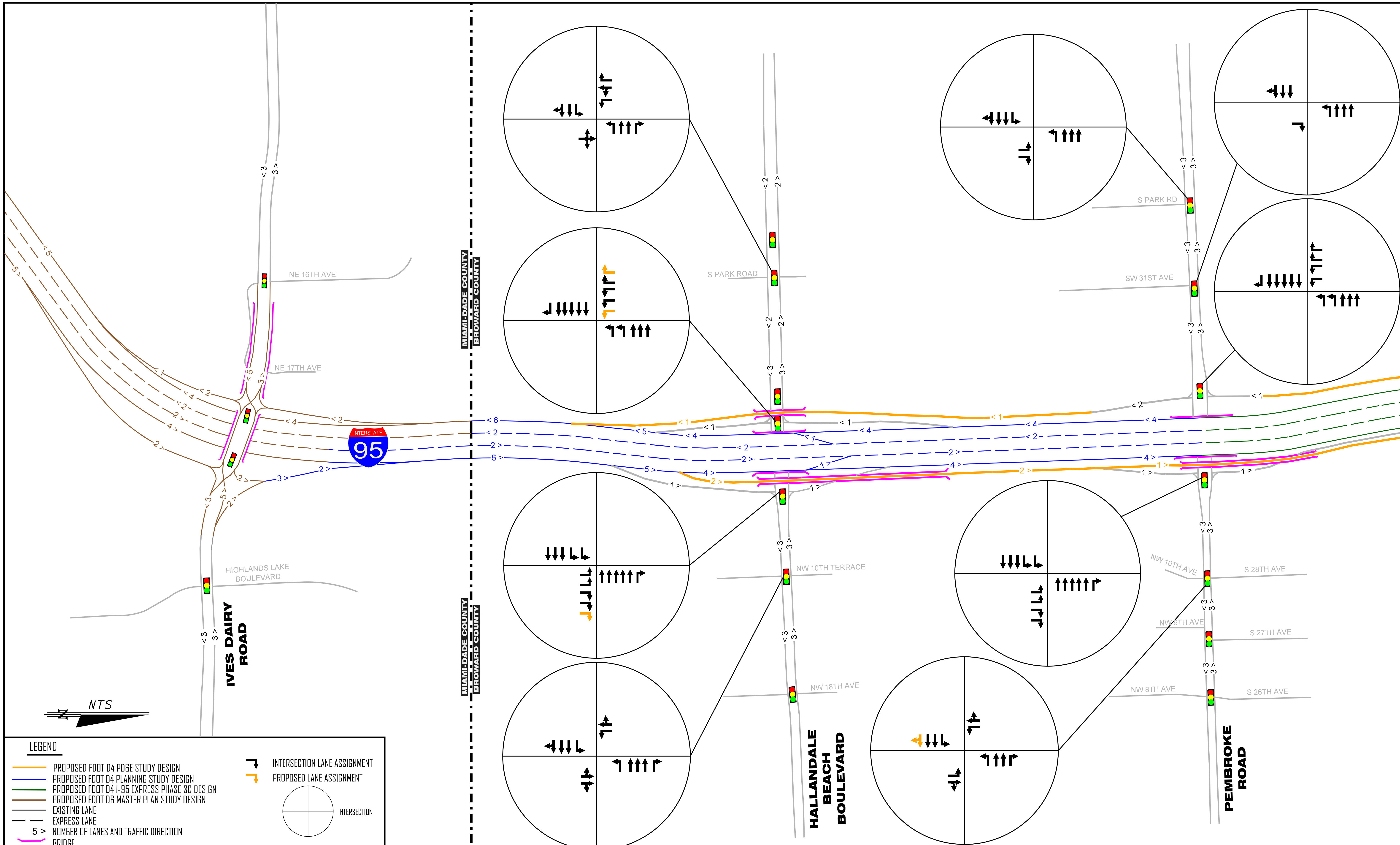
FIGURE 1.5



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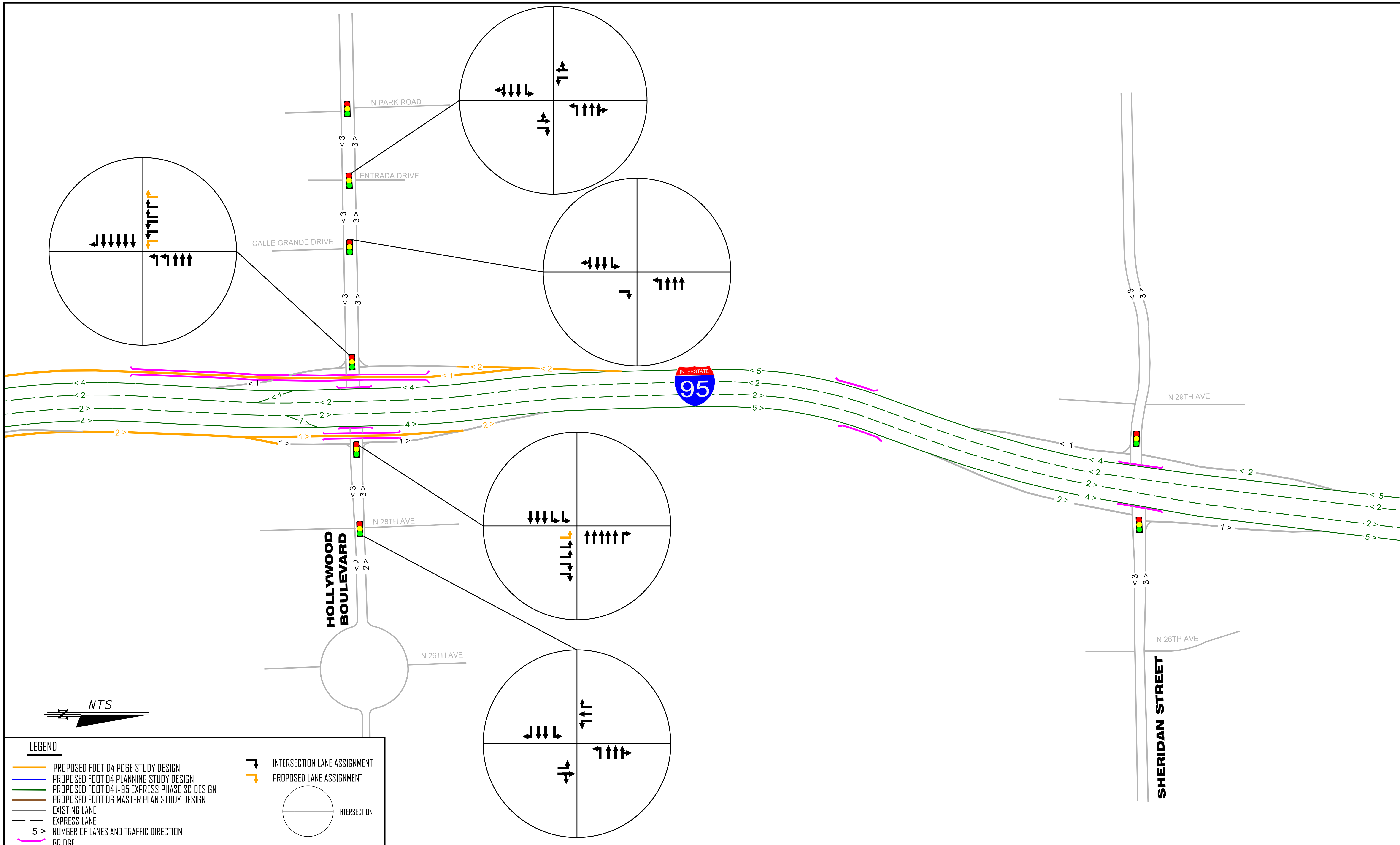
2045 PREFERRED ALTERNATIVE LINE DIAGRAM

FIGURE 1.6



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OCTOBER 2020

INTERSTATE 95

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
2045 PREFERRED ALTERNATIVE LINE DIAGRAM

FIGURE
1.6

The I-95 mainline roadway typical section varies slightly and consists primarily of four 11-foot (11') wide express lanes (two in each direction), four 12-foot (12') wide general use lanes (two in each direction), four 11-foot (11') wide general use lanes (two in each direction), a 3-foot (3') wide buffer area with pavement markings and express lane markers separating the general use lanes from the express lanes, 5-foot to 12-foot (5'–12') wide inside shoulders, 12-foot (12') wide outside shoulders, 12-foot (12') wide auxiliary lanes at selected locations, and a 2.5-foot (2.5') wide center barrier wall.

The PD&E Study proposed changes to the I-95 corridor roadway section are listed below:

- Two 12-foot (12') wide auxiliary lanes in each direction between Ives Dairy Road and Hallandale Beach Boulevard.
- Two-lane 24-foot (24') wide collector distributor roadway ramp between south of Hallandale Beach Boulevard and north of Hollywood Boulevard with 6-foot (6') wide inside shoulder and 10-foot (10') wide outside shoulder.
- On-lane 15-foot (15') wide southbound collector distributor roadway ramp with 6-foot wide inside and outside shoulders.

The three I-95 roadway cross sections between interchanges are depicted in ***Figures 1.7*** through ***1.9.***

As part of the preferred alternative six new bridges are anticipated to be added and one bridge is anticipated to be widened.

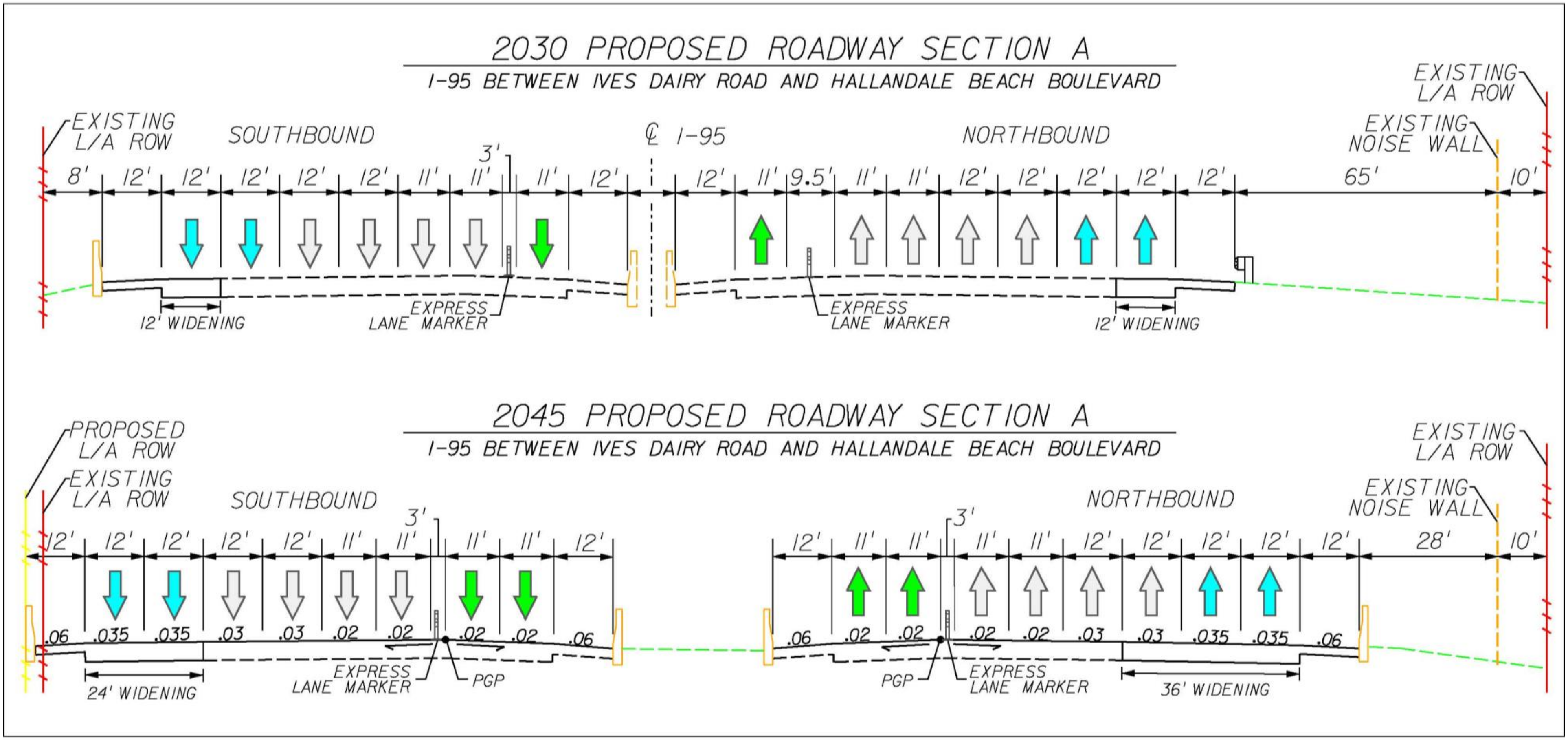


Figure 1.7 – Preferred Alternative Roadway Section A

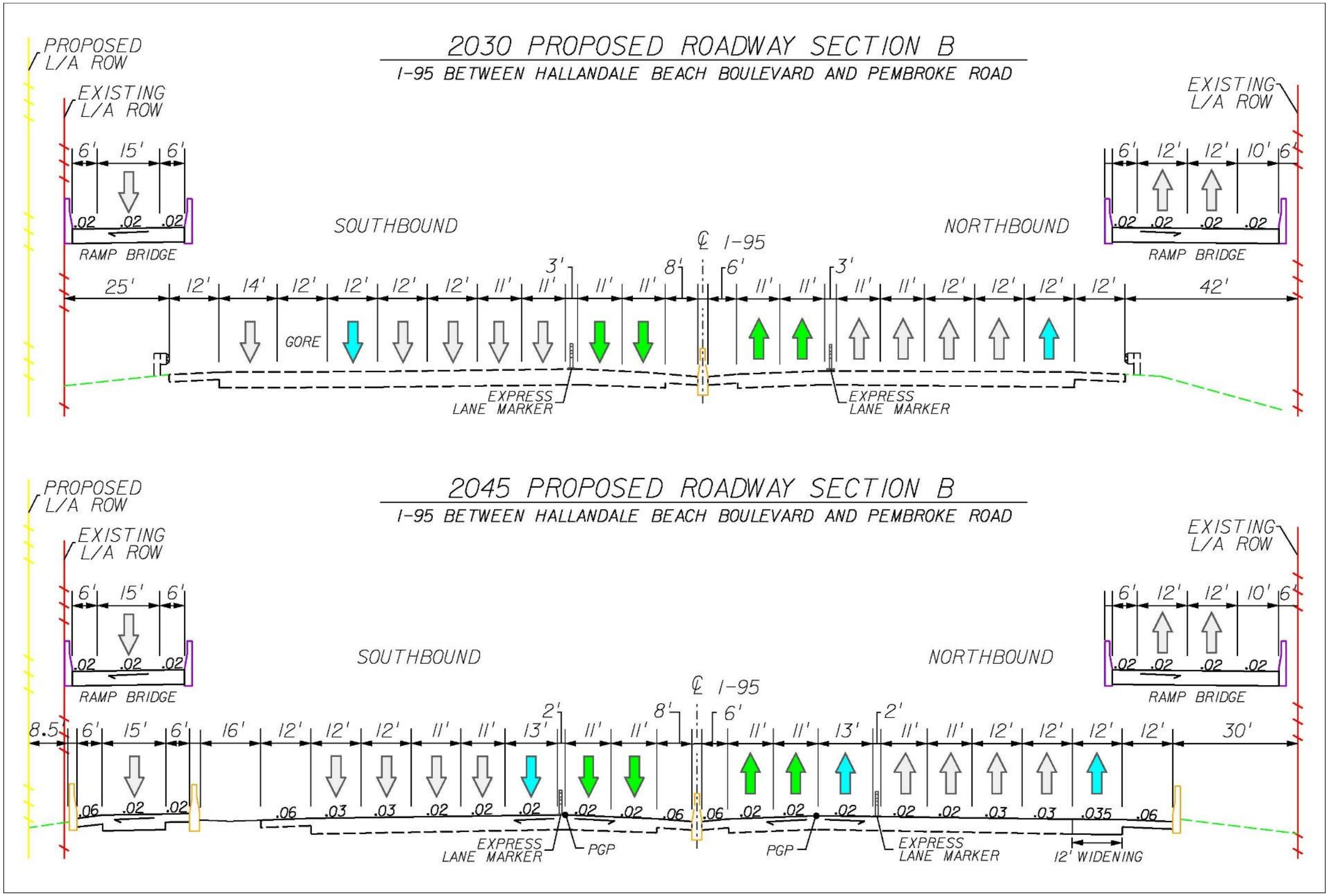


Figure 1.8 – Preferred Alternative Roadway Section B

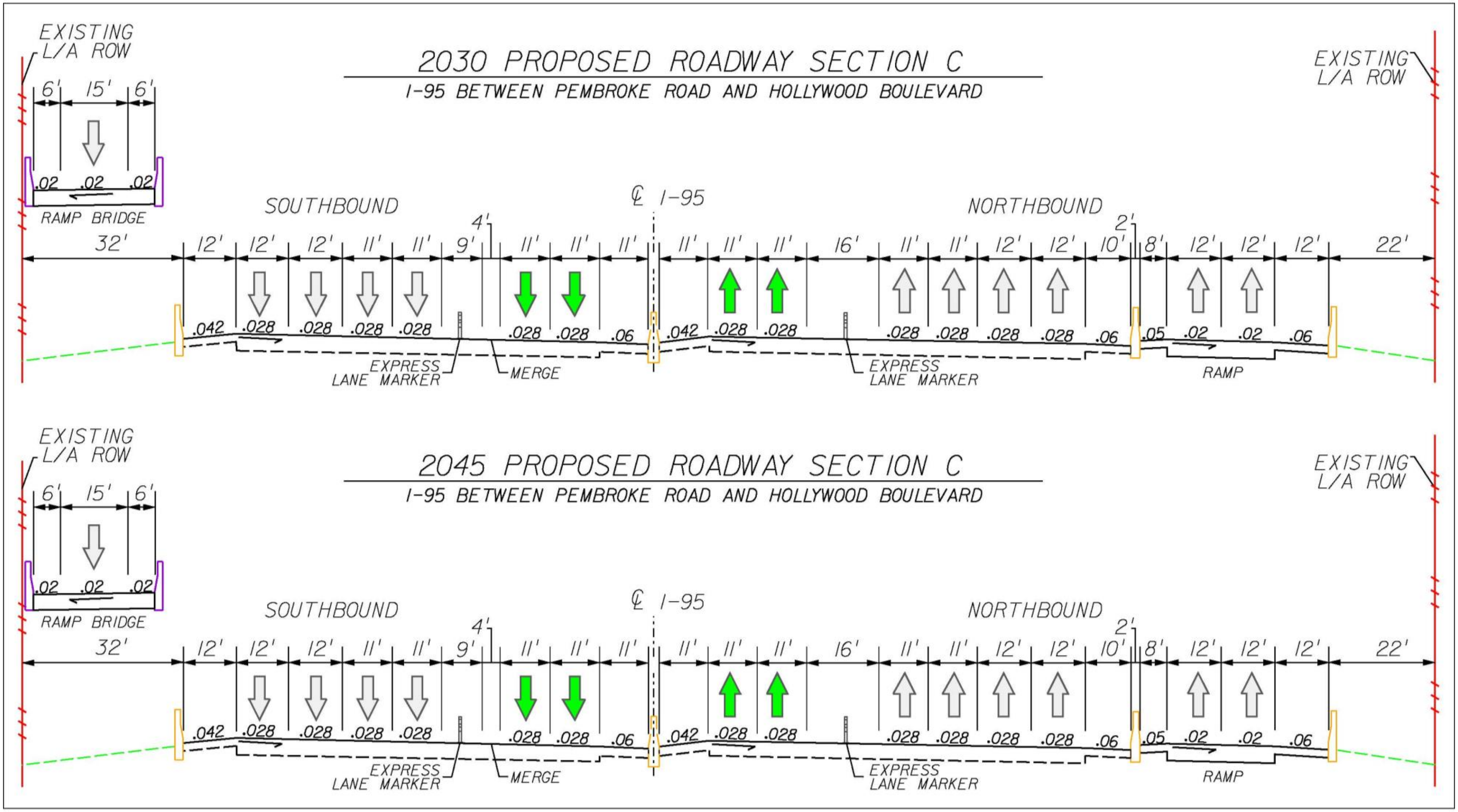


Figure 1.9 – Preferred Alternative Roadway Section C

The total cost estimate for the preferred alternative is approximately $276.7 million.

Table 1.1 – Total Cost Estimate

Category	Cost
Construction Cost	$141.2 million
Maintenance of Traffic (10%)	$14.1 million
Mobilization (8%)	$12.5 million
Project Unknown (15%)	$21.2 million
Utilities	$4.3 million
Design (8%)	$11.3 million
Right of Way	$58.0 million
Construction Engineering and Inspection (10%)	$14.1 million
Total Cost Estimate	$ 276.7 million

Alternative 2 was selected based on the alternative alignment analysis and the evaluation results summarized as part of the PD&E Study. Alternative 2 will add the capacity improvements necessary to improve traffic operations, safety, transit, system linkage, modal interrelationships, transportation demand, social demand, economic development, interchange access and emergency evacuation. Alternative 2 is the most prudent when compared with Alternative 1 for the following reasons:

- **Capacity –** The collector distributor roadway system removes I-95 mainline traffic, which provides more capacity to several mainline segments of I-95. Alternative 2 will add the capacity improvements necessary to improve the traffic operations of the I-95 mainline and interchanges.
- **Safety –** Reduces the number of entrances and exits to and from I-95, which improves the overall operations of the I-95 mainline, ramps, and interchanges. Reduces long-term crashes related to heavy congestion,

mainline weaving maneuvers, mainline and ramp speed differentials, and interstate access. Provides more off-ramp storage and requires less signage on the mainline due to less access points.

- **System Linkage –** Alternative 2 will match the planned improvements for the adjacent projects south and north of the project limits. Removing the Pembroke Road Interchange from directly interacting with I-95 improves the mobility and access in and out of Pembroke Road and adjacent roadways.
- **Modal Interrelationships –** The additional capacity provides the ability to enhance/improve bus service, which offers an alternative to auto travel and addresses needs of low-income users and disadvantaged groups.
- **Transportation Demand –** Alternative 2 adds capacity to I-95. The additional auxiliary lanes, collector distributor roadway system and interchange ramps address the transportation demand within the study limits. These improvements are consistent with the local and State transportation plans.
- **Social Demand and Economic Development –** Social and economic demands within the study limits will continue to increase as population and employment increase. The proposed improvements will add the necessary capacity to improve access to the cities of Hallandale Beach, Pembroke Park, and Hollywood, which will allow the economic development to take advantage of the added capacity to reach the destinations of I-95 and surrounding cities.
- **Evacuation Route –** In the case of an evacuation event, I-95 will have additional lanes with Alternative 2. The additional lanes will make the corridor more effective during emergency evacuation events and emergency response.

Based on the evaluation conducted and documented in this report, it is clear that Alternative 2 will meet the purpose and need of the project and the overall project objectives of this PD&E Study.

1.6 List of Technical Documents

Table 1.2 – List of Technical Documents

Technical Document	Date
Public Involvement:	
Public Involvement Plan	May 2017
Engineering:	
Methodology Letter of Understanding	September 2017
Methodology Letter of Understanding Addendum	June 2021
Design Traffic Technical Memorandum	June 2021
Traffic Analysis Technical Memorandum	June 2021
VISSIM Existing Conditions Model Development and Calibration Report	April 2021
Systems Interchange Modification Report	June 2021 (Draft)
Location Hydraulics Report	June 2021
Conceptual Drainage Report	June 2021
Pond Siting Report	June 2021
Preliminary Engineering Report (PER)	June 2021(Draft)
Bridge Analysis Report (Appendix to the PER)	June 2021 (Draft)
Preliminary Geotechnical Report	May 2021
Value Engineering Study Report	July 2019
Environmental:	
Cultural Resource Assessment Report	August 2018
Section 106 Effects Case Study	January 2019
Cultural Resource Assessment Addendum	December 2020
Sociocultural Effects Technical Memorandum	June 2021
Natural Resources Evaluation	June 2021
Air Quality Technical Memorandum	February 2021
Contamination Screening Evaluation Report	June 2021
Type 2 Categorical Exclusion Report	June 2021
Section 4(f) Determination of Applicability	June 2021
Section 4(f) No Use Forms	June 2021
Water Quality Impact Evaluation (WQIE) Checklist	June 2021
Noise Report Study	June 2021
Conceptual Stage Relocation Plan	Pending

2.0 EXISTING CONDITIONS

The methodology utilized for evaluating the existing conditions along I-95 consisted of data gathering in the areas of roadway, bridge, and environmental characteristics. The existing conditions assessment began with the collection and review of all data pertaining to the existing facility through reviewing existing documents, conducting on-site inventories and collecting pertinent data that would serve as a basis for evaluation. The following sections describe the existing conditions within the study limits.

2.1 ROADWAY

The existing I-95 mainline roadway typical section varies slightly and consists primarily of four 11-foot (11') wide express lanes (two in each direction), four 12-foot (12') wide general use lanes (two in each direction), four 11-foot (11') wide general use lanes (two in each direction), a 3-foot (3') wide buffer area with pavement markings and express lane markers separating the general use lanes from the express lanes, 5-foot to 12-foot (5' – 12') wide inside shoulders, 12-foot (12') wide outside shoulders, 12-foot (12') wide auxiliary lanes at selected locations, and a 2.5-foot (2.5') wide center barrier wall.

Figures 2.1 – 2.4 show the existing I-95 roadway cross sections within the study limits between interchanges.

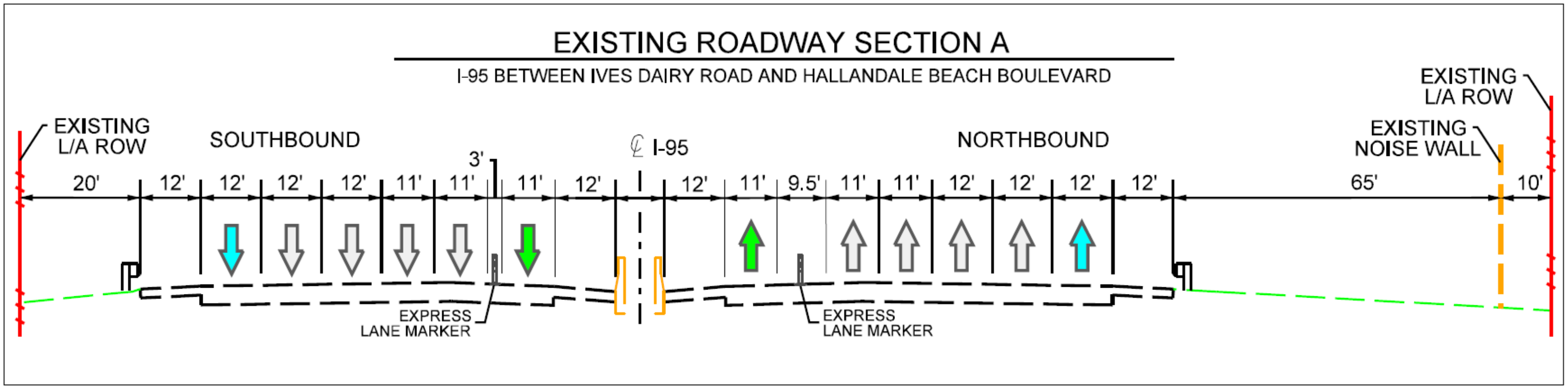


Figure 2.1 – Existing Roadway Section A

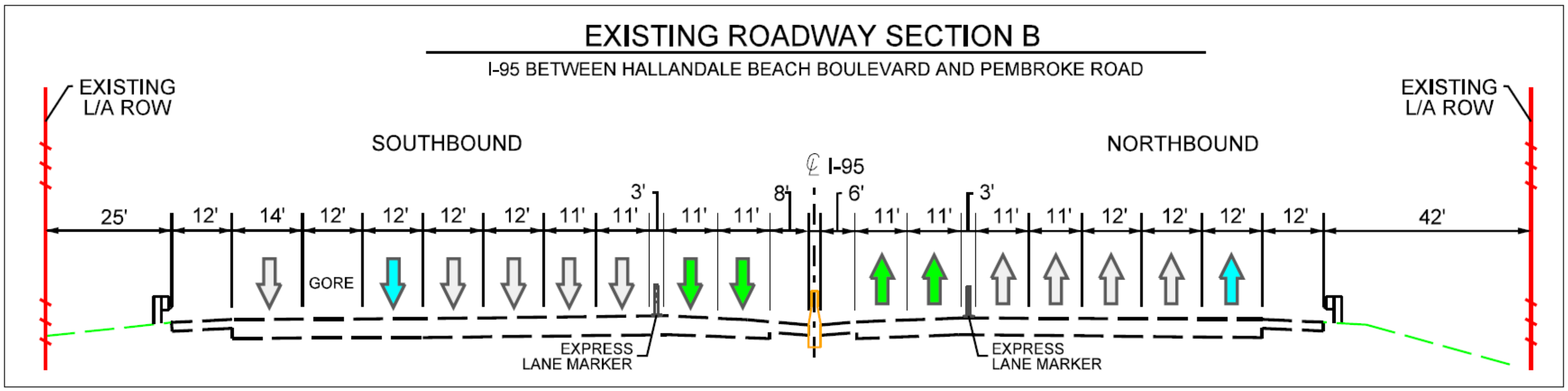


Figure 2.2 – Existing Roadway Section B

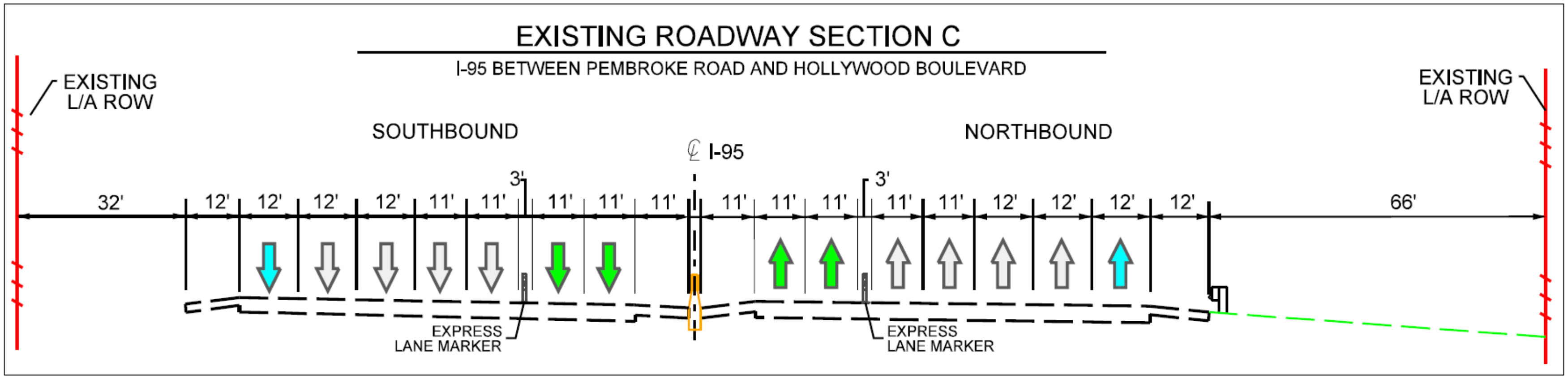


Figure 2.3 – Existing Roadway Section C

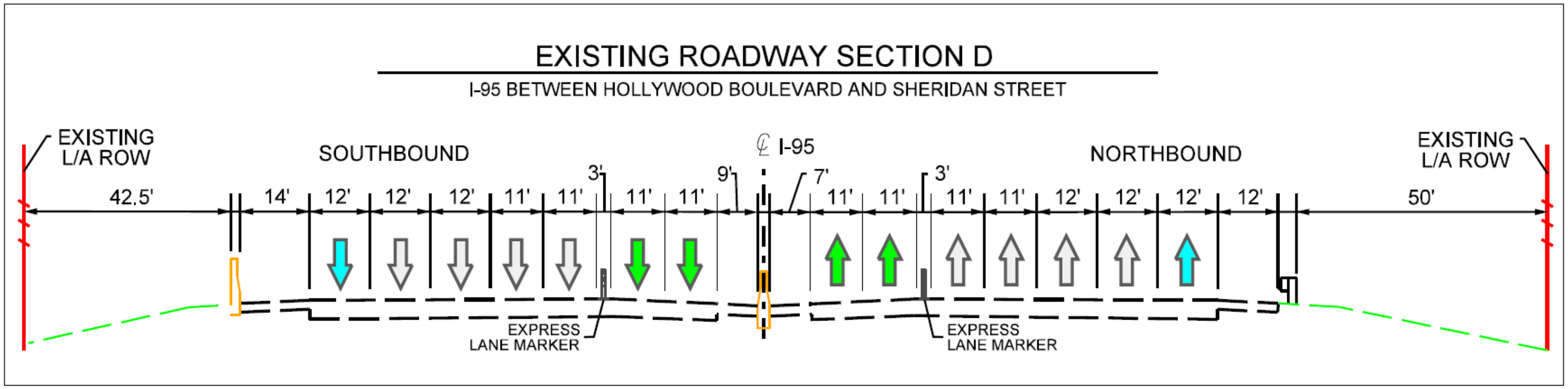


Figure 2.4 – Existing Roadway Section D

2.2 Right of Way

The existing limited access right of way varies slightly within the study limits. The right of way is generally consistent throughout the corridor except at the interchanges, where it varies to accommodate entrance and exit ramps. ***Table 2.1*** summarizes the available right of way along the corridor. ***Appendix A***, Corridor Base Maps, illustrates the existing right of way within the study limits.

Table 2.1 – Summary of Existing Limited Access Right of Way

Roadway Section	Right of Way Width (feet)
Miami-Dade/Broward County Line – Hallandale Beach Boulevard	303
Hallandale Beach Boulevard – Pembroke Road	300
Pembroke Road – Hollywood Boulevard	315
Hollywood Boulevard – Sheridan Street	343

2.3 Roadway Classification & Context Classification

I-95, within the study limits, is classified as an urban principal arterial interstate. The access management classification is Class 1.2, Freeway in an Existing Urbanized Area with Limited Access. I-95 is an integral part of the Strategic Intermodal System (SIS) and National Highway System (NHS) networks. Context classification is not applied to limited-access facilities.

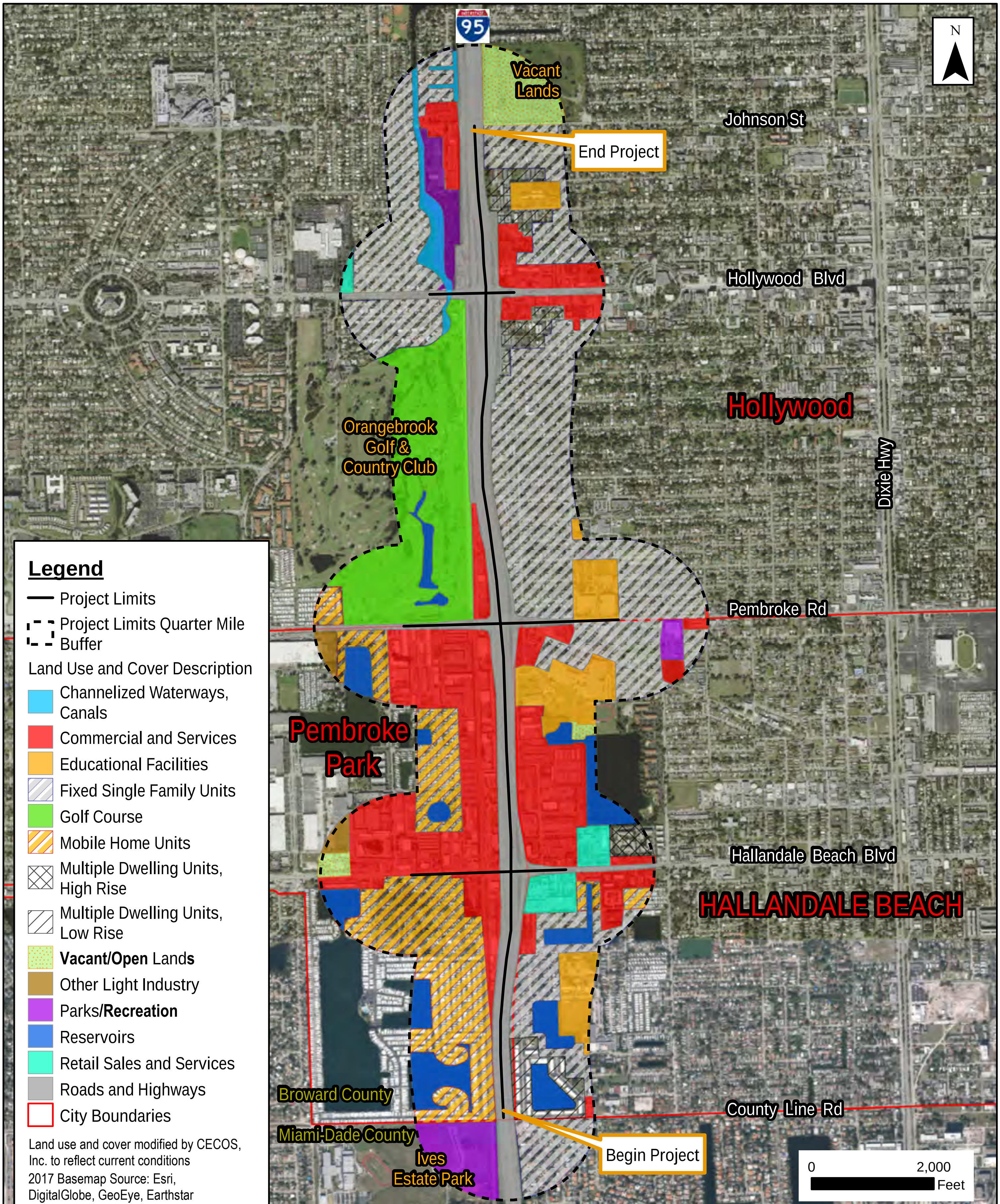
Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard, within the study limits, are classified as an urban principal arterial other.

2.4 Adjacent Land Use

The I-95 project corridor segment is located within Broward County and crosses three municipalities (City of Hallandale Beach, Town of Pembroke Park, and the City of Hollywood). Land use was classified using the South Florida Water Management District (SFWMD) land use and cover nomenclature. The project corridor traverses a number of land use categories which are illustrated in ***Figure 2.5***. In general, the project study area encompasses the following land uses:

- Fixed Single Family Units
- Mobile Home Units
- Multiple Dwelling Units
- Commercial
- Retail Sales and Services
- Oil and Gas Processing
- Other Light Industrial
- Institutional
- Educational Facilities
- Golf Courses
- Recreational Parks
- Disturbed Lands/Vacant
- Roads and Highways
- Water Supply Plants

The project is located within a completely urban landscape with the above land use comingled throughout.



FDOT	SR9/I-95 from South of SR858/Hallandale Beach Blvd. to North of SR820/Hollywood Blvd. PD&E Study Broward County	**Existing** Land Use and Cover Map Source: SFWMD & FDOT (2015)	Figure 2.5 Date Prepared: 05/24/2021

2.5 Access Management Classification

The I-95 access management classification is Class 1.2, Freeway in an existing urbanized area with limited access.

Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard are designated as Class 5 for access management, where the highway is distinguished by restrictive medians, and the adjacent land is highly developed.

2.6 Design and Posted Speeds

The design and posted speed for I-95 is 65 miles per hour (mph). The design and posted speed for Hallandale Beach Boulevard is 40 mph east of I-95 and 35 mph west of I-95. The design and posted speed for Pembroke Road is 35 mph east of I-95 and 40 mph west of I-95. The design and posted speed for Hollywood Boulevard is 35 mph.

2.7 Vertical and Horizontal Alignment

The I-95 existing geometric elements information was obtained from the as-built plans provided by the FDOT and from the project survey.

2.7.1 Cross Sections

The existing typical pavement cross slope of the corridor is consistent throughout the study limits except for the segments within horizontal curves, where the superelevation rates range from reverse crown (RC) to 0.056.

2.7.2 Horizontal Alignment

The existing horizontal alignment was reviewed and evaluated in order to identify the existing geometric characteristics along the corridor. The evaluation also verified if the existing facility meets the current design standards for horizontal curves and sight distance. The design elements reviewed during the evaluation of the existing horizontal alignment conditions included curve radius, curve length, stopping sight distance (SSD), and superelevation of the roadway surface.

The mainline alignment contains eleven horizontal curves within the study limits. The radius of each horizontal curve meets current American Association of State

Highway and Transportation Officials (AASHTO) criteria for 65 MPH. ***Table 2.2*** and ***Table 2.3*** summarize the geometric characteristics for the existing horizontal alignment. For stationing references, see ***Appendix A***, Corridor Base Maps. Based on the current design standards for horizontal curves and sight distance, ***Table 2.2*** shows that the I-95 corridor does not meet superelevation FDOT requirements and has four locations that does not meet FDOT stopping sight distance requirements. ***Table 2.3*** shows that the ramps meet all minimum requirements.

Table 2.2 – Existing I-95 Horizontal Alignment Geometric Characteristics

Location/Adjacent Cross Road	Station	Milepost	Direction	Radius of Curve (ft.)	Length of Curve (ft.)	Degree of Curve D	Deflection Angle	Design Speed	Superelevation e	Superelevation per FDM e	Existing SSD	SSD per FDM	SSD per AASHTO	Meets FDOT Criteria Superelevation/SSD	Meets AASTHO Criteria SSD	Curve No.
North of SW 11th Street	PC 212+81.15 PI 220+88.75 PT 228+90.63	0.120 0.273 0.425	NB & SB	7,813.11	1,609.49	0°44'00"	11°48'10" (RT)	65	0.023	0.025	964	730	645	X/√	√	B1
South of Hallandale Beach Blvd. Interchange	PC 234+30.66 PI 238+67.88 PT 243+03.41	0.527 0.610 0.693	NB & SB	5,729.58	872.74	1°00'00"	8°43'39" (LT)	65	0.030	0.033	857	730	645	X/√	√	B2
North of Pembroke Road (SR 824) Interchange	PC 291+89.96 PI 294+51.08 PT 297+11.10	1.618 1.668 1.717	NB & SB	3,274.04	521.15	1°45'00"	9°07'12" (LT)	65	0.050	0.056	658	730	645	X/X	√	B3
Washington Street	PC 303+76.77 PI 312+51.06 PT 321+16.01	1.843 2.008 2.172	NB & SB	6,875.49	1,739.24	0°50'00"	14°29'37" (RT)	65	0.025	0.028	953	730	645	X/√	√	B4
South of Hollywood Blvd. Interchange	PC 330+33.30 PI 333+47.41 PT 336+61.16	2.346 2.405 2.465	NB & SB	7,639.44	627.87	0°45'00"	4°42'32" (LT)	65	0.023	0.025	948	730	645	X/√	√	B5
North of Hollywood Blvd. Interchange	PC 346+71.57 PI 349+56.20 PT 352+40.50	2.656 2.710 2.764	NB & SB	6,875.49	568.92	0°50'00"	4°44'28" (LT)	65	0.023	0.028	899	730	645	X/√	√	B6
Pierce Street	PC 358+78.49 PI 361+59.15 PT 364+39.50	2.885 2.938 2.991	NB & SB	6,875.49	561.01	0°50'00"	4°40'30" (RT)	65	0.023	0.028	899	730	645	X/√	√	B7

X = Does not meet criteria ✓ = Meets required criteria

Table 2.3 – Existing Ramps Horizontal Alignment Geometric Characteristics

Location/Adjacent Cross Road	Station	Direction	Radius of Curve (ft.)	Length of Curve (ft.)	Degree of Curve D	Deflection Angle	Design Speed	Superelevation e	Superelevation per FDM e	Existing SSD	SSD per FDM	SSD per AASHTO	Meets FDOT Criteria Superelevation/SSD	Meets AASTHO Criteria SSD	Curve No.
NB OFF-RAMP TO HALLANDALE	PC 236+67.58 PI 238+25.40 PT 239+82.90	NB	2,864.79	315.32	2° 00' 00"	06° 18' 23"	45	0.034	0.034	>360	360	360	√/√	√	7
SB ON-RAMP FROM HALLANDALE	PC 338+29.56 PI 339+48.72 PT 340+67.74	SB	2,864.79	238.18	2° 00' 00"	04° 45' 49"	45	0.034	0.034	>360	360	360	√/√	√	9
	PC 340+67.74 PI 341+53.29 PT 342+38.79	SB	2,879.79	171.05	1° 59' 23"	03° 24' 11"	45	0.034	0.034	>360	360	360	√/√	√	10
SB OFF-RAMP TO HALLANDALE	PC 463+01.67 PI 464+01.71 PT 465+01.67	SB	2,864.79	200.00	2° 00' 00"	4° 00' 00"	45	0.034	0.034	>360	360	360	√/√	√	11
NB ON-RAMP FROM HALLANDALE	PC 551+56.51 PI 555+35.21 PT 559+12.82	NB	5,729.58	756.31	1° 00' 00"	7° 33' 47"	40	NC	NC	>305	305	305	√/√	√	12
	PC 559+92.95 PI 560+50.14 PT 561+07.31	NB	3,834.72	114.37	1° 29' 39"	1° 42' 32"	45	0.030	0.030	>360	360	360	√/√	√	13
	PC 561+07.31 PI 563+02.62 PT 564+97.60	NB	3,819.72	390.29	1° 30' 00"	5° 51' 15"	45	0.030	0.030	>360	360	360	√/√	√	15
NB OFF-RAMP TO PEMBROKE	PC 276+80.74 PI 278+14.13 PT 279+47.41	NB	3,819.72	266.67	1° 30' 00"	4° 00' 00"	45	0.026	0.026	>360	360	360	√/√	√	22
	PC 282+33.50 PI 284+04.20 PT 285+74.66	NB	3,819.72	341.16	1° 30' 00"	5° 07' 03"	35	RC	RC	>250	250	250	√/√	√	24
SB ON-RAMP FROM PEMBROKE	PC 376+82.90 PI 379+22.16 PT 381+61.14	SB	5,729.58	478.24	1° 00' 00"	4° 46' 57"	45	0.030	RC	>360	360	360	√/√	√	26
	PC 381+61.14 PI 381+92.35 PT 382+23.56	SB	5,744.58	62.42	0° 59' 51"	0° 37' 21"	45	0.030	RC	>360	360	360	√/√	√	27
	PC 382+52.57 PI 385+23.02 PT 387+93.07	SB	5,729.58	540.5	1° 00' 00"	5° 24' 18"	30	NC	NC	>200	200	200	√/√	√	28

Table 2.3 – Existing Ramps Horizontal Alignment Geometric Characteristics (Continued)

Location/Adjacent Cross Road	Station	Direction	Radius of Curve (ft.)	Length of Curve (ft.)	Degree of Curve D	Deflection Angle	Design Speed	Superelevation e	Superelevation per FDM e	Existing SSD	SSD per FDM	SSD per AASHTO	Meets FDOT Criteria Superelevation/SSD	Meets AASTHO Criteria SSD	Curve No.
SB OFF-RAMP TO PEMBROKE	PC 395+08.51 PI 397+09.84 PT 399+09.51	SB	2,864.79	400.00	2° 00' 00"	8° 00' 00"	30	RC	RC	>200	200	200	√/√	√	30
	PC 406+95.56 PI 408+99.00 PT 411+02.05	SB	3,819.72	406.49	1° 30' 00"	6° 05' 51"	45	0.026	0.026	>360	360	360	√/√	√	32
NB ON-RAMP FROM PEMBROKE	PC 493+03.58 PI 496+03.44 PT 499+01.13	NB	2,864.79	597.55	2° 00' 00"	11° 57' 04"	30	RC	RC	>200	200	200	√/√	√	33
	PC 506+09.65 PI 508+67.75 PT 511+25.30	NB	4,583.66	515.65	1° 15' 00"	6° 26' 44"	45	0.030	0.030	>360	360	360	√/√	√	35
NB OFF-RAMP TO HOLLYWOOD	PC 231+68.95 PI 233+55.09 PT 235+40.93	NB	3,819.72	371.98	1° 30' 00"	5° 34' 47"	45	0.026	0.026	>360	360	360	√/√	√	42
SB ON-RAMP FROM HOLLYWOOD	PC 330+75.57 PI 332.74.98 PT 334+74.02	SB	3,819.72	398.45	1° 30' 00"	5° 58' 36"	45	0.030	0.026	>360	360	360	√/√	√	43
	PC 334+74.02 PI 335+38.33 PT 336+02.62	SB	3,834.72	128.60	1° 29' 39"	1° 55' 17"	45	0.030	0.026	>360	360	360	√/√	√	44
SB OFF-RAMP TO HOLLYWOOD	PC 1450+79.12 PI 1452+79.14 PT 1454+79.13	SB	16,000	400.01	0° 21' 29"	1° 25' 57"	45	NC	NC	>360	360	360	√/√	√	1
	PC 1454+79.13 PI 1456+79.15 PT 1458+79.14	SB	16,000	400.01	0° 21' 29"	1° 25' 57"	45	NC	NC	>360	360	360	√/√	√	2
NB ON-RAMP FROM HOLLYWOOD	PC 547+11.33 PI 549+74.90 PT 552+37.63	NB	3,819.72	526.30	1° 30' 00"	7° 53' 40"	35	RC	RC	>250	250	250	√/√	√	45
	PC 559+49.07 PI 562+84.94 PT 566+20.05	NB	5,729.58	670.98	1° 00' 00"	6° 42' 35"	45	0.030	RC	>360	360	360	√/√	√	47

2.7.3 Vertical Alignment

The existing vertical alignment was reviewed and evaluated in order to identify the existing geometric characteristics along the corridor. The evaluation also verified if the existing facilities meet the current design standards for vertical curves and sight distance. The following components were verified during the review: percent grade, changes in grade, SSD, length of vertical curve, and K value.

The K value of a vertical curve is simply the length of the curve divided by the change in grade of the curve. The minimum K value set forth in the FDOT *Florida Design Manual FDM Part 2, Chapter 210, Table 210.10.3* and *Chapter 211, Table 211.9.2* is based on design speed. If the curve K value meets the minimum criteria, the SSD criterion is also met. The minimum K value assigned to a crest vertical curve is based on the driver's ability to see over the curve, while for a sag vertical curve is based on the headlight illumination distance. The minimum lengths of the vertical curves and the percent grades were also verified against the criteria in *Table 210.10.4 and Table 211.9.3 of the FDM.*

Table 2.4 and ***Table 2.5*** list the vertical curve parameters and existing characteristics. For stationing references, see ***Appendix A***, Corridor Base Maps.

Table 2.4 – Existing I-95 Vertical Alignment Geometric Characteristics

Facility/Location	Type of Curve	VPI Station	Mile Post	VPI Elevation (ft)	PGL High/Low (ft)	Grade (Back) %	Grade (Ahead) %	Length of Curve (ft)	K-Value	Design Speed (MPH)	K-Value Required for FDOT	K-Value Required for AASHTO	Min. Length FDOT	Meets FDOT Criteria K-Value/Length	Meets AASHTO Criteria K-Value
South of Hallandale Beach Blvd. interchange	Sag	38+33.33	0.537	11.47	10.67	0.20	2.69	800	321	65	181	157	800	√/√	√
Hallandale Beach Blvd. Interchange	Crest	50+58.53	0.769	44.42	33.33	2.69	-2.69	1,650	307	65	401	193	1800	X/X	√
North of Hallandale Beach Blvd. interchange	Sag	63+04.43	1.005	10.90	10.90	2.69	0.00	800	297	65	181	157	800	√/√	√
South of Pembroke Road (SR 824) Interchange	Sag	78+47.78	1.297	10.90	10.90	0.00	2.88	800	278	65	181	157	800	√/√	√
Pembroke Road (SR 824) Interchange	Crest	91+22.78	1.539	47.62	35.02	2.88	-2.88	1,750	304	65	401	193	1800	X/X	√
North of Pembroke Road (SR 824) Interchange	Sag	104+35.97	1.787	9.80	9.80	2.88	0.00	800	278	65	181	157	800	√/√	√
South of Hollywood Blvd. Interchange	Sag	132+65.29	2.323	9.80	9.80	0.00	2.78	800	289	65	181	157	800	√/√	√
Hollywood Blvd. Interchange	Crest	145+17.81	2.561	44.62	32.80	2.78	-2.78	1,700	306	65	401	193	1800	X/X	√
North of Hollywood Blvd. Interchange	Sag	159+57.59	2.833	4.59	10.75	-2.78	2.70	900	164	65	181	157	800	X/√	√
Johnson Street	Crest	172+60.52	3.080	39.77	28.57	2.70	-2.70	1,650	306	65	401	193	1000	X/√	√

✓ = Meets required criteria **X** = Does not meet criteria

Table 2.5 – Existing Ramps Vertical Alignment Geometric Characteristics

Facility/Location	Type of Curve	VPI Station	VPI Elevation (ft)	PGL High/Low (ft)	Grade (Back) %	Grade (Ahead) %	Length of Curve (ft)	K-Value	Design Speed (MPH)	K-Value Required for FDOT	K-Value Required for AASHTO	Min. Length FDOT	Meets FDOT Criteria K-Value/Length	Meets AASHTO Criteria K-Value	Curve No.
I-95 NB Off-Ramp to Hallandale Beach Boulevard	Sag	234+71.00	8.86	8.89	-0.03	2.00	175	86.2	45	79	79	135	√/√	√	Ramp A
I-95 NB Off-Ramp to Hallandale Beach Boulevard	Crest	237+50.00	14.44	13.75	2.00	-0.60	300	115.4	45	98	61	135	√/√	√	Ramp A
I-95 SB On-Ramp from Hallandale Beach Boulevard	Sag	338+50.00	11.48	10.43	0.70	2.00	300	230.7	45	79	79	135	√/√	√	Ramp B
I-95 SB On-Ramp from Hallandale Beach Boulevard	Crest	343+00.00	20.99	18.97	2.00	2.00	400	100	45	98	61	135	√/√	√	Ramp B
I-95 SB Off-Ramp to Hallandale Beach Boulevard	Sag	461+30.00	9.16	9.16	0.00	0.48	100	208.3	30	37	37	90	√/√	√	Ramp C
I-95 SB Off-Ramp to Hallandale Beach Boulevard	Crest	463+30.00	9.88	9.88	0.48	0.00	100	208.3	30	31	19	90	√/√	√	Ramp C
I-95 SB Off-Ramp to Hallandale Beach Boulevard	Crest	464+65.00	9.88	9.88	0.00	-0.69	100	144.9	30	31	19	90	√/√	√	Ramp C
I-95 SB Off-Ramp to Hallandale Beach Boulevard	Sag	466+40.00	8.67	8.76	-0.69	0.19	100	113.6	30	37	37	90	√/√	√	Ramp C
I-95 NB On-Ramp from Hallandale Beach Boulevard	Crest	559+50.00	17.81	16.69	1.40	-1.60	300	100	45	98	61	135	√/√	√	Ramp D
I-95 NB Off-Ramp to Pembroke Road	Sag	275+40.00	8.64	8.77	-0.21	1.00	150	123.7	45	79	79	135	√/√	√	Ramp A
I-95 NB Off-Ramp to Pembroke Road	Crest	277+80.74	11.05	10.66	1.00	-0.65	200	121.2	45	98	61	135	√/√	√	Ramp A
I-95 NB Off-Ramp to Pembroke Road	Sag	280+19.20	9.50	9.50	-0.65	0.00	100	153.8	45	79	79	135	√/√	√	Ramp A
I-95 SB On-Ramp from Pembroke Road	Crest	384+50.00	24.01	21.01	2.00	-3.00	500	100	45	98	61	135	√/√	√	Ramp B
I-95 SB Off-Ramp to Pembroke Road	Sag	403+83.50	8.70	8.91	-0.20	1.00	200	166.7	45	79	79	135	√/√	√	Ramp C
I-95 SB Off-Ramp to Pembroke Road	Crest	407+20.50	12.07	12.01	1.00	-0.08	150	138.8	45	98	61	135	√/√	√	Ramp C
I-95 NB On-Ramp from Pembroke Road	Crest	502+55.95	15.18	14.52	0.61	-1.60	300	135.7	45	98	61	135	√/√	√	Ramp D
I-95 NB On-Ramp from Pembroke Road	Sag	507+04.70	8.00	8.04	-1.60	0.03	250	153.3	45	79	79	135	√/√	√	Ramp D
I-95 NB Off-Ramp to Hollywood Boulevard	Sag	229+50.00	7.32	7.28	-0.21	1.17	200	144.9	45	79	79	135	√/√	√	Ramp A
I-95 NB Off-Ramp to Hollywood Boulevard	Crest	232+50.00	11.02	10.85	1.17	-0.20	200	146	45	98	61	135	√/√	√	Ramp A
I-95 SB On-Ramp from Hollywood Boulevard	Crest	337+00.00	18.65	17.00	1.82	-1.50	400	120.5	45	98	61	135	√/√	√	Ramp B
I-95 SB Off-Ramp to Hollywood Boulevard	Sag	1446+32.14	5.84	6.06	-2.25	0.42	120	44.9	30	37	37	90	√/√	√	1
I-95 NB On-Ramp from Hollywood Boulevard	Crest	555+50.00	13.87	13.22	0.75	-1.02	300	169.5	45	98	61	135	√/√	√	Ramp D
I-95 NB On-Ramp from Hollywood Boulevard	Sag	561+30.00	7.85	9.64	-1.02	2.58	450	125	45	79	79	135	√/√	√	Ramp D

✓ = Meets required criteria **X** = Does not meet criteria

The existing vertical components of the corridor meet all the current FDOT and AASHTO criteria for 65 MPH, except at the following locations within the study limits:

- The length of a crest vertical curve along the mainline on an Interstate is not to be less than 1,000 feet for open highway and 1,800 feet within interchanges as per *FDM Part 2, Chapter 211, Table 211.9.3.* The following crest vertical curves do not meet the criteria for minimum length of curve:
    - Hallandale Beach Boulevard, Station 50+58.53
    - Pembroke Road (SR 824) Interchange, Station 91+22.78
    - Hollywood Boulevard Interchange, Station 145+17.81
- The required K-value of a crest vertical curve is 401 as per *FDM Part 2, Chapter 211, Table 211.9.2* (65 MPH, interstate). The following crest vertical curves do not meet the criteria for minimum K-value:
    - Hallandale Beach Boulevard, Station 50+58.53
    - Pembroke Road (SR 824) Interchange, Station 91+22.78
    - Hollywood Boulevard Interchange, Station 145+17.81
    - Johnson Street, Station 172+60.52
- The required K-value of a sag vertical curve is 181 as per *FDM Part 2, Chapter 211, Table 211.9.2* (65 MPH, interstate). The following sag vertical curves do not meet the criteria for minimum K-value:
    - North of Hollywood Boulevard Interchange, Station 159+57.59

Based on the current design standards for vertical curves and sight distance, the evaluation shows that the I-95 corridor has 5 locations that do not meet FDM stopping sight distance requirements and 3 locations that do not meet FDM length of curve requirements. The ramps meet all minimum requirements. The I-95 corridor and ramps met AASHTO criteria.

2.7.4 Horizontal and Vertical Clearances

Horizontal Clearance – The horizontal clearance relates to the lateral clearance between the travel way and any roadside obstruction. This roadside recovery area, called recoverable terrain, can be used by an errant vehicle to potentially regain control of the vehicle or by disabled vehicles as a place of refuge. Horizontal clearance requirements vary depending on the design speed, typical section, traffic volumes, lane type and roadside obstruction or feature.

Highways with flush shoulders where right of way is not restricted have sufficient widths to provide clear zones. Therefore, the horizontal clearance requirements for certain features and objects are based on maintaining a clear zone wide enough to provide the recoverable terrain. As set forth in the *FDM, Part 2, Chapter 215, Table 215.2.1,* the recoverable terrain widths for a design speed greater than 55 MPH are as follows:

- Travel lanes and multilane ramps: 36 feet.
- Auxiliary lanes and single lane ramps: 24 feet.

Another horizontal clearance component is the border width. A border width is a roadside area that accommodates signing, drainage features, guardrail, fencing, maintenance access and utilities. Border width on limited access facilities is measured from the edge of the outside traffic lane to the right of way line. The criteria shown in the *FDM, Part 2, Chapter 211, Section 211.6,* for freeways including interchanges ramps, indicates a required border width of 94 feet. The border widths along the mainline and within the interchanges (for each quadrant) are included in ***Table 2.6*** and ***Table 2.7***.

Based on the current design standards for border width, ***Table 2.6*** and ***Table 2.7*** show that the project corridor, within the study limits, does not meet border width requirements.

Table 2.6 – Summary of Existing Border Width – Mainline

Roadway Section	Border Width (Feet)			Border Width Required (Feet)	
	Northbound	Southbound	Length (feet)		
Ives Dairy Road - Hallandale Beach Boulevard	50 - 105	30 - 65	7,638	94	✗
Hallandale Beach Boulevard - Pembroke Road (SR 824)	65 - 80	65 - 85	4,054	94	✗
Pembroke Road (SR 824) - Hollywood Boulevard (SR 820)	50 - 120	22 - 160	5,414	94	✗
Hollywood Boulevard (SR 820) - Sheridan Street (SR 822)	30 - 172	50 - 150	8,094	94	✗

✗ = Does not meet criteria ✓ = Meets required criteria

Table 2.7 – Summary of Existing Border Width – Interchanges

Interchange	Border Width (feet)				Border Width Required	
	NW[1]	NE[1]	SW[1]	SE[1]		
Hallandale Beach Boulevard	8-35	10-130	10-15	10-145	94	✗
Pembroke Road	12-65	12-50	6-25	7-60	94	✗
Hollywood Boulevard	6-65	7-150	12-60	10-150	94	✗

Source: Project Survey ✗ = Does not meet criteria ✓ = Meets required criteria
Note: [1]Interchange Quadrant

Vertical Clearance – The vertical clearance relates to the adequate clear height of an overpass/overhead or underpass structure/facility to the roadway and shoulder areas. In accordance with the _FDM Part I, Chapter 260, Section 260.6, Table 260.6.1_, the vertical clearance criteria for a bridge over a roadway is 16'-6", for a roadway over railroad is 23'-6", and for a pedestrian bridge over a roadway is 23'-6". AASHTO requires a minimum vertical clearance of 16' for structures passing over a roadway. The vertical clearance along the I-95 corridor is below the FDM minimum clearance for 2 bridges in one direction and below the AASHTO minimum clearance for 2 bridges in one direction. The characteristics for each bridge, including vertical clearance, are summarized in ***Table 2.25*** (see ***Section 2.22***).

2.8 Pedestrian Accommodations

I-95 is a limited access facility. There will continue to be no designated pedestrian accommodations along I-95, as pedestrians are not permitted on limited access corridors.

The crossing roadway interchanges have existing pedestrian accommodations. These accommodations are summarized below:

Hallandale Beach Boulevard – The corridor has a five-foot wide sidewalk along both sides of the roadway and continues through the interchange. Designated pedestrian crossings exist at all the corridor intersections.

Pembroke Road – The corridor has a five-foot wide sidewalk along both sides of the roadway east of the interchange and continues through the interchange. West of the interchange the corridor has five-foot to seven-foot wide sidewalks along both sides of the roadway, which continues through the interchange. Designated pedestrian crossings exist at all the corridor intersections.

Hollywood Boulevard – The corridor has a five-foot wide sidewalk along both sides of the roadway west of the interchange and continues through the interchange. East of the interchange the corridor has five-foot to seven-foot wide sidewalks along both sides of the roadway, which continues through the interchange. Designated pedestrian crossings exist at all the corridor intersections.

2.9 Bicycle Facilities

I-95 is a limited access facility. There will continue to be no bicycle accommodations along I-95, as bicycles are not permitted on limited access corridors.

The crossing roadway interchanges have existing bicycle accommodations. These accommodations are summarized below:

Hallandale Beach Boulevard – The corridor has a four-foot wide bicycle lane along both sides of the roadway and continues through the interchange.

Pembroke Road – The corridor has a three to four-foot wide bicycle lane along both sides of the roadway and continues through the interchange.

Hollywood Boulevard – The corridor has a four-foot wide bicycle lane along both sides of the roadway and continues through the interchange.

2.10 TRANSIT FACILITIES

Along the corridor, within the study limits, there is a wide variety of modes of public transportation. Some of these modes of public transportation are:

- Transit Services
- Railroads
- Van-Pool/Car-Pool
- Park and Ride Facilities
- Multimodal/Intermodal Facilities
- Private Passenger Services

Appendix A, Corridor Base Maps, depicts the location of these facilities along the corridor within the study limits.

Transit Services – There is a variety of transit services provided within the limits of the study. Within Broward County is Broward County Transit (BCT), which is regionally coordinated by the South Florida Regional Transportation Authority (SFRTA).

The BCT provides fixed-stop bus service within and across the study area. The BCT bus routes 5, 6, 7, 9, 15, 28, 110 and 114 operate within the study limits (see ***Appendix B***). BCT also assists the following municipalities with their community bus services.

- City of Hallandale Beach – Routes 3 and 4
- City of Hollywood – Hollywood Trolley

In addition to general bus service, BCT provides the following services within the study area:

- TOPS – The TOPS (Transportation Options Paratransit Service) is for ADA-eligible citizens, on a reservation basis.
- Emergency Services – BCT uses their bus fleet for emergency evacuation service during hurricane events.

SFRTA has shuttle bus services (bus routes SS-1 and FLA-1) that originate from selected Tri-Rail stations.

Railroads – The South Florida Rail Corridor is a dual railroad track that runs parallel to the west side of the I-95 project corridor. This railroad line is currently under the jurisdiction of the SFRTA and owned by the FDOT. It was formerly owned by CSX Transportation and continues to carry CSX freight trains. The SFRTA also operates the commuter rail service called Tri-Rail on these tracks. Within the study limits, there is one Tri-Rail station, Hollywood Boulevard Station.

Amtrak also operates passenger trains on the South Florida Rail Corridor. North of the study limits, the Sheridan Amtrak Station is co-located with the Tri-Rail Station.

Van-Pool/Car-Pool – The FDOT offers a regional commuter assistance program, the South Florida Commuter Services (SFCS) Program, to promote alternatives to drive-alone commuting. SFCS includes car-pool (for 2-4 people) and van-pool (7-12 people) programs. These car-pool and van-pool services use daily the park and ride facilities within the I-95 study corridor.

Park and Ride Facilities – Within the study limits, there is one Park and Ride lot located at the Hollywood Boulevard Trai-Rail Station.

Multimodal/Intermodal Facilities – A multimodal facility is any facility which combines two or more modes of travel, for example from bus to airplane, or from ship to rail. Within the study limits there is one intermodal facility located at the Hollywood Boulevard Tri-Rail Station (Taxi, Amtrak, Park and Ride).

Private Passenger Services – In addition to the public transportation modes noted above, Greyhound bus lines, a private passenger service, also serves the general I-95 project corridor area. The nearest bus terminal is located at the Sheridan Tri-Rail Station.

2.11 Pavement Condition

The FDOT annually performs an evaluation of pavement referred to as a pavement condition survey. Each section of pavement is rated for cracking, ride, and rutting on a 0-10 scale: with 0 being the worst and 10 the best. If any of these categories falls under its respective critical value, the pavement is considered deficient. A crack rating of 6.4 or less is considered deficient. The minimum threshold for the ride criteria is 6.5 for speed limits greater than 45 MPH. For speed limits less than or equal to 45 MPH, ride rating of 5.4 or less is considered deficient.

Based on the FDOT's *Pavement Conditions Forecast Report* dated January 2018, the rated pavement conditions within the study area is summarized in ***Table 2.8***.

Table 2.8 – Pavement Condition Survey

Direction	Section BMP	Section EMP	2019		
			Crack	Ride	Rut
I-95 Mainline – Broward County					
Northbound	0.000	0.755	10.0	8.1	9.0
	0.755	3.100	10.0	8.2	9.0
Southbound	0.000	0.755	10.0	8.4	9.0
	0.755	3.100	9.0	8.6	9.0
Hallandale Beach Boulevard					
Eastbound	2.235	3.568	10.0	6.1	9.0
Westbound	2.235	3.568	9.0	6.0	9.0
Pembroke Road					
Eastbound	4.760	6.097	10.0	7.3	10.0
Westbound	4.760	6.097	9.0	6.6	10.0
Hollywood Boulevard					
Eastbound	16.042	16.807	8.5	6.8	10.0
Westbound	16.042	16.807	6.0	6.0	9.0

Based on ***Table 2.8***, the project corridor pavement conditions are within acceptable thresholds except for the crack rating of westbound Hollywood Boulevard.

2.12 Traffic Volumes and Operational Conditions

2.12.1 Data Collection

FDOT collected 2016 traffic data prior to the PD&E Study. The collected traffic data documentation included the following information:

- Traffic data collection efforts
- Existing conditions peak-hour arterial traffic volumes
- Existing conditions peak-hour interchange ramp traffic volumes
- Existing conditions peak-hour interstate mainline traffic volumes (combined express lane and general use lane)
- Existing conditions AADT interstate mainline volumes
- Existing conditions AADT arterials volumes

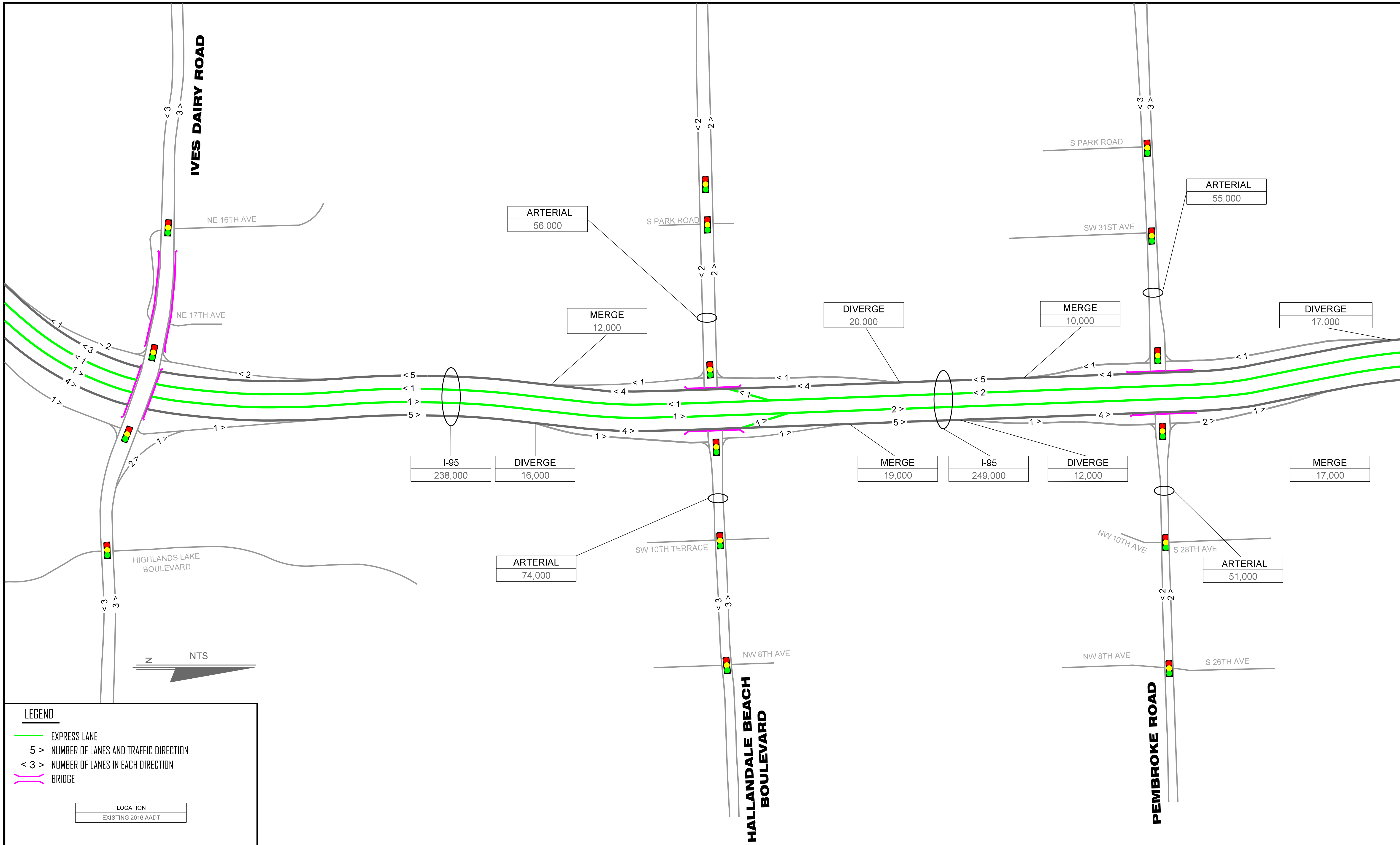
Traffic data from the following sources were obtained during the PD&E Study:

- Telemetered Traffic Monitoring Site (TTMS)
- SunGuide Intelligent Transportation System (ITS)
- Regional Integrated Transportation Information System (RITIS)
- 2015 and 2016 Florida Traffic Information (FTI)

A TTMS dataset received from FDOT included traffic volume data from two TTMS locations (Station ID #862493, and Station ID #862499) for February 15, 2015. These stations were located along I-95 near Davie Boulevard and Sunrise Boulevard, respectively. SunGuide ITS was another data source used for the analysis. This dataset was received from FDOT and had traffic volume data for the January - February 2017 period for northbound traffic only. Because the TTMS and SunGuide ITS traffic data locations were outside the PD&E Study limits and the SunGuide data did not have the southbound traffic volumes, neither of these data sets was utilized in the analysis. Traffic data from RITIS was obtained for the period of January 1 to February 28, 2017.

Seasonal factors and volumes were reviewed for volume development and checks using the 2015 and 2016 FTI (TTMS sites #86-0331 and #86-0384). This effort was completed and documented in the FDOT 2016 traffic data collection efforts prior to the PD&E Study.

Existing intersection and ramp traffic data were collected from March to April 2016 on typical weekdays (Tuesday, Wednesday, and Thursday). Due to construction activity south of Hallandale Beach Boulevard along I-95, mainline traffic counts were not collected. Traffic data obtained from the I-95 station north of Hallandale Beach Boulevard (TTMS Site: #86-0331) was used as anchor point for the I-95 mainline traffic volume development. Existing AADT volumes are summarized in ***Figure 2.6***. Peak-hour traffic volumes and intersection turning movement volumes are summarized in **Figure 2.7** and **Figure 2.8.** The mainline existing peak-hour volumes documented along I-95 combined the express lanes and general use lanes traffic.



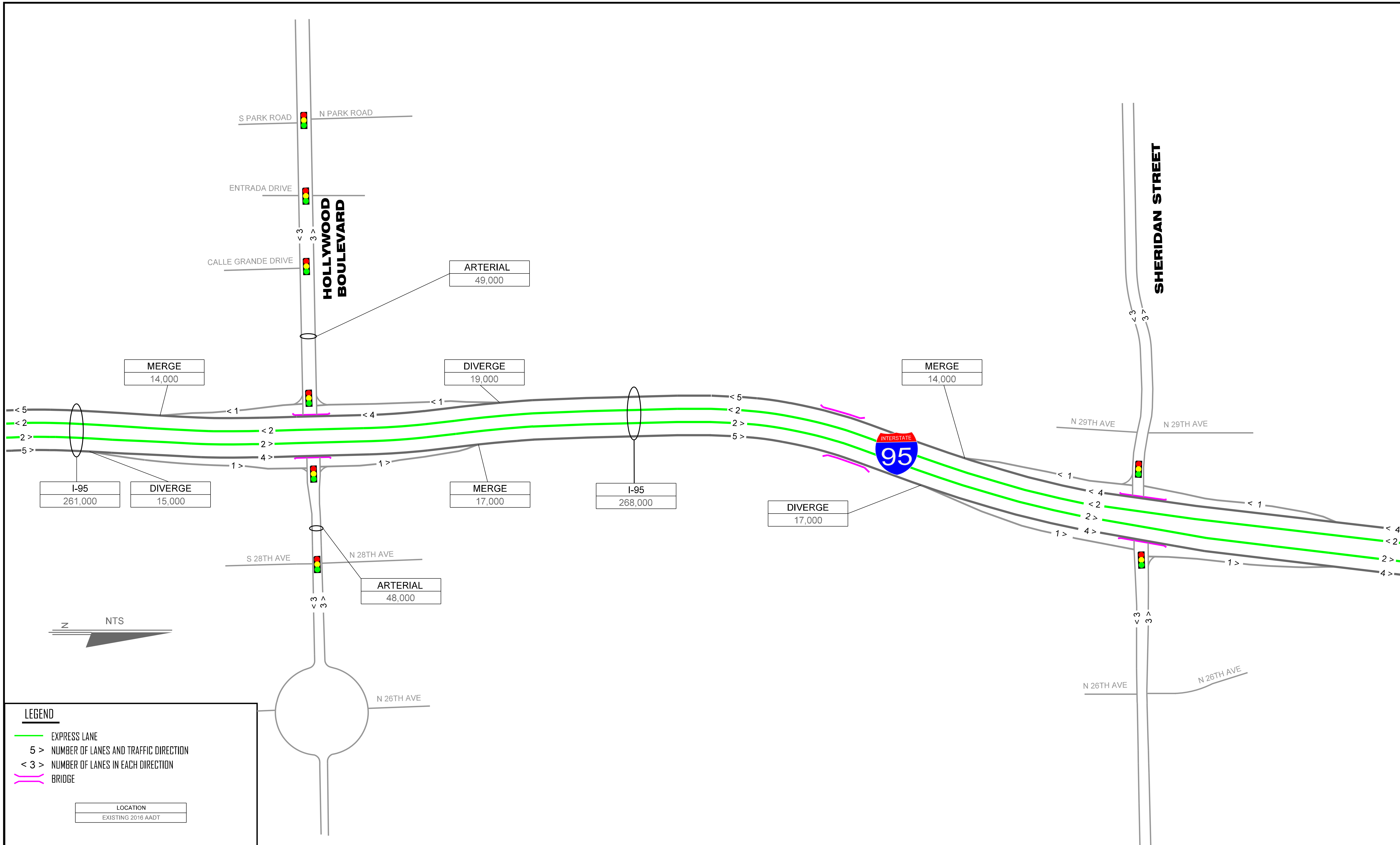
FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

FEBRUARY 2018

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

2016 ANNUAL AVERAGE DAILY TRAFFIC (AADT) VOLUMES

FIGURE 2.6



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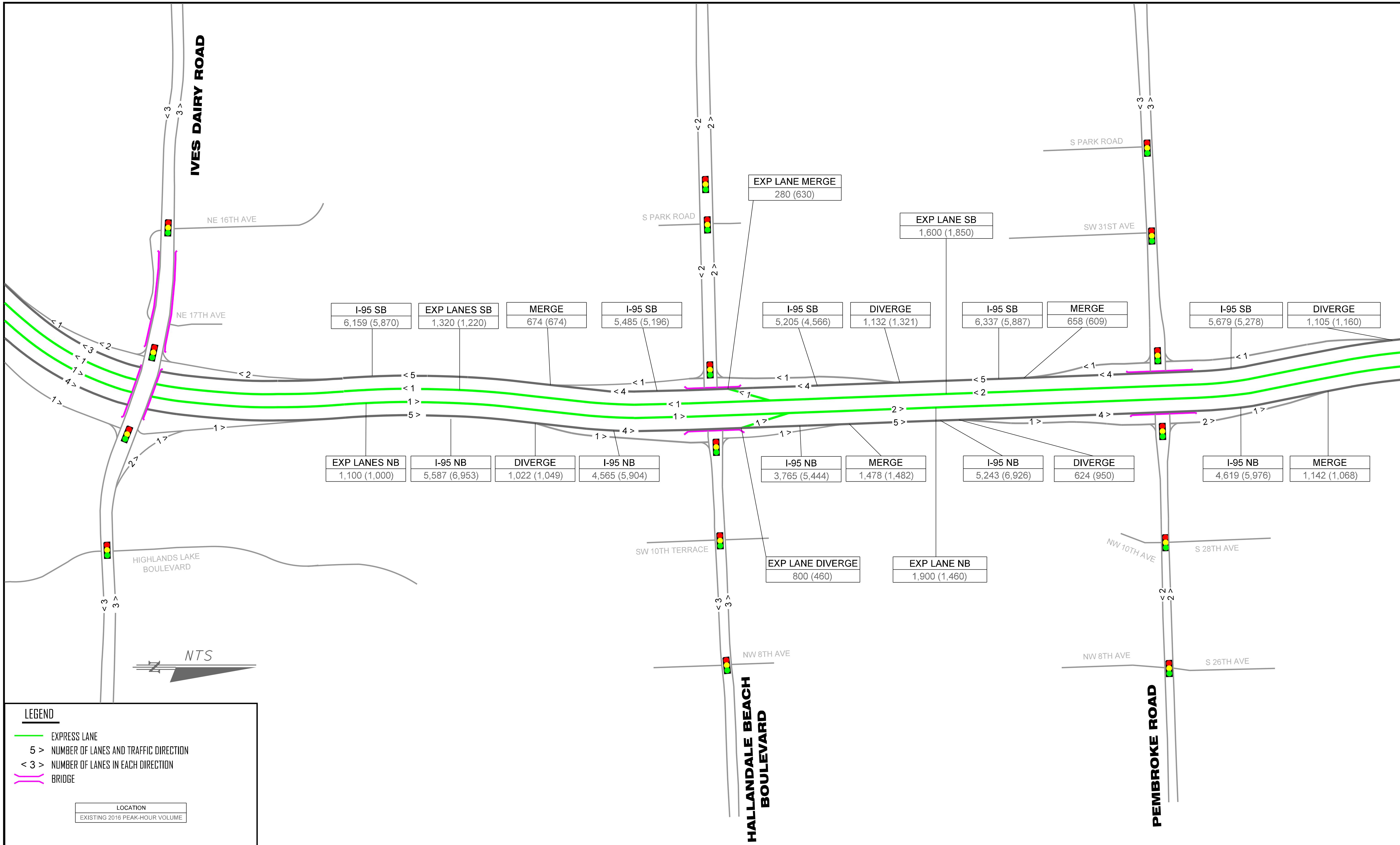

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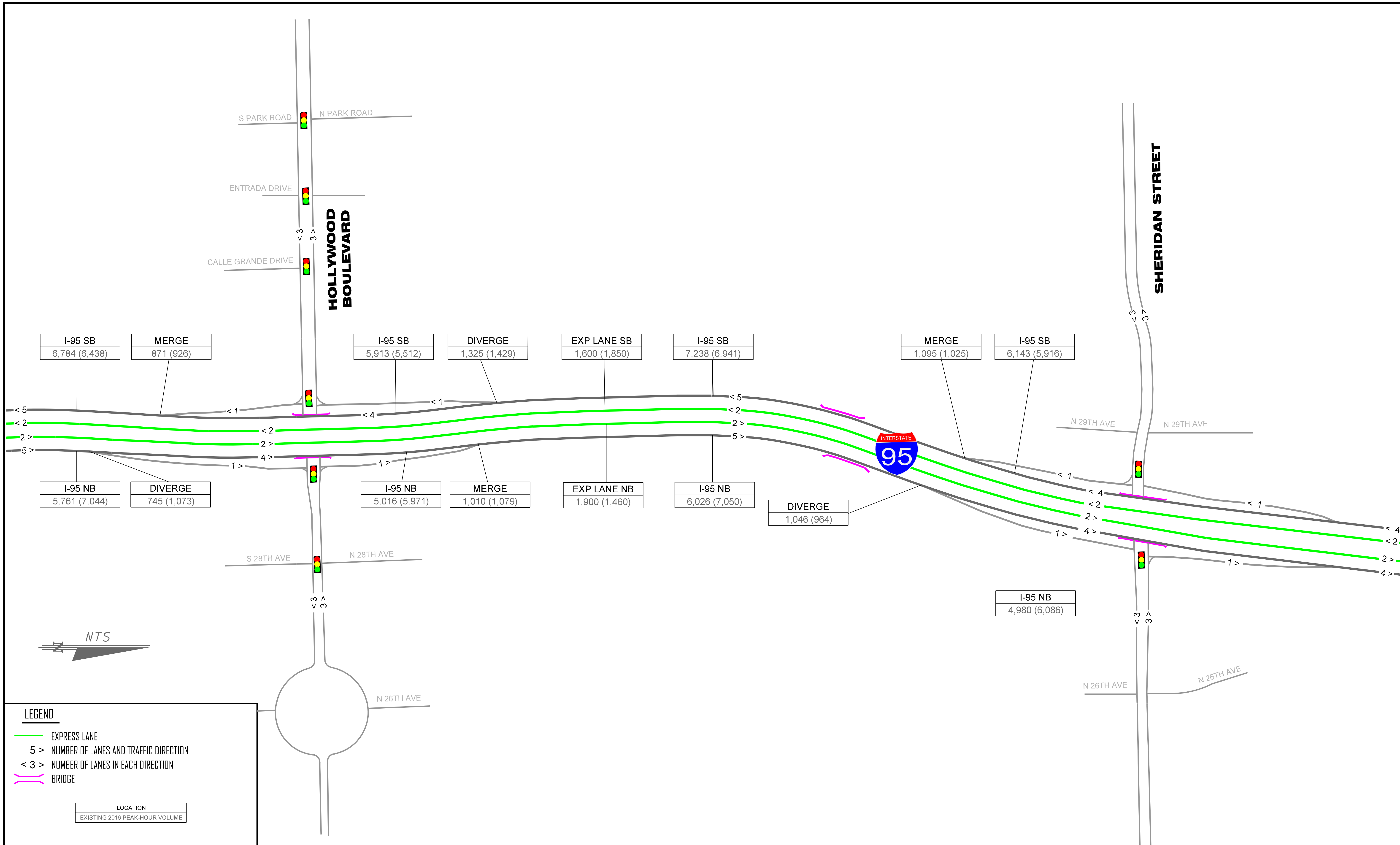
2016 I-95 PEAK-HOUR VOLUMES

FIGURE 2.7



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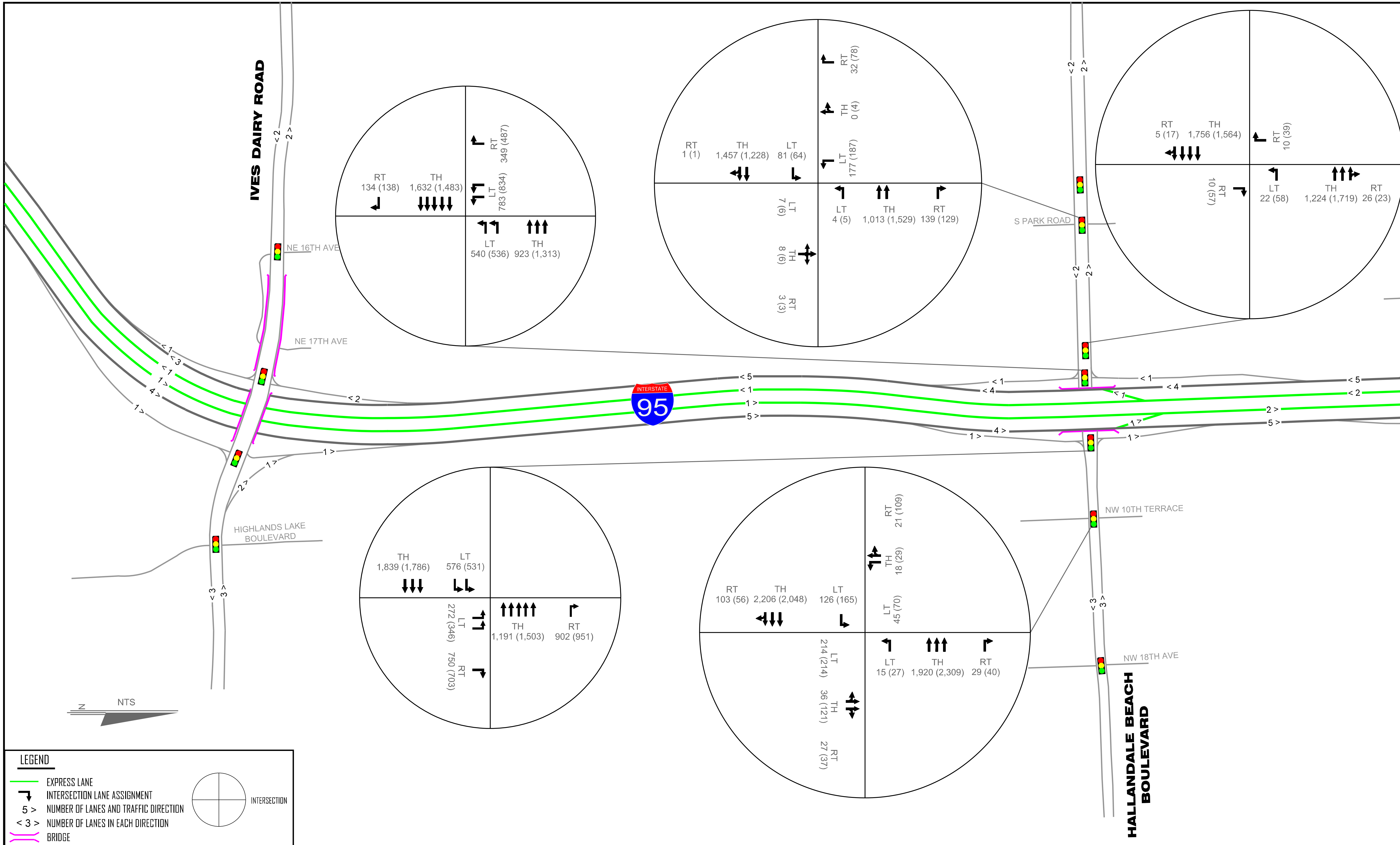
2016 I-95 PEAK-HOUR VOLUMES

FIGURE 2.7



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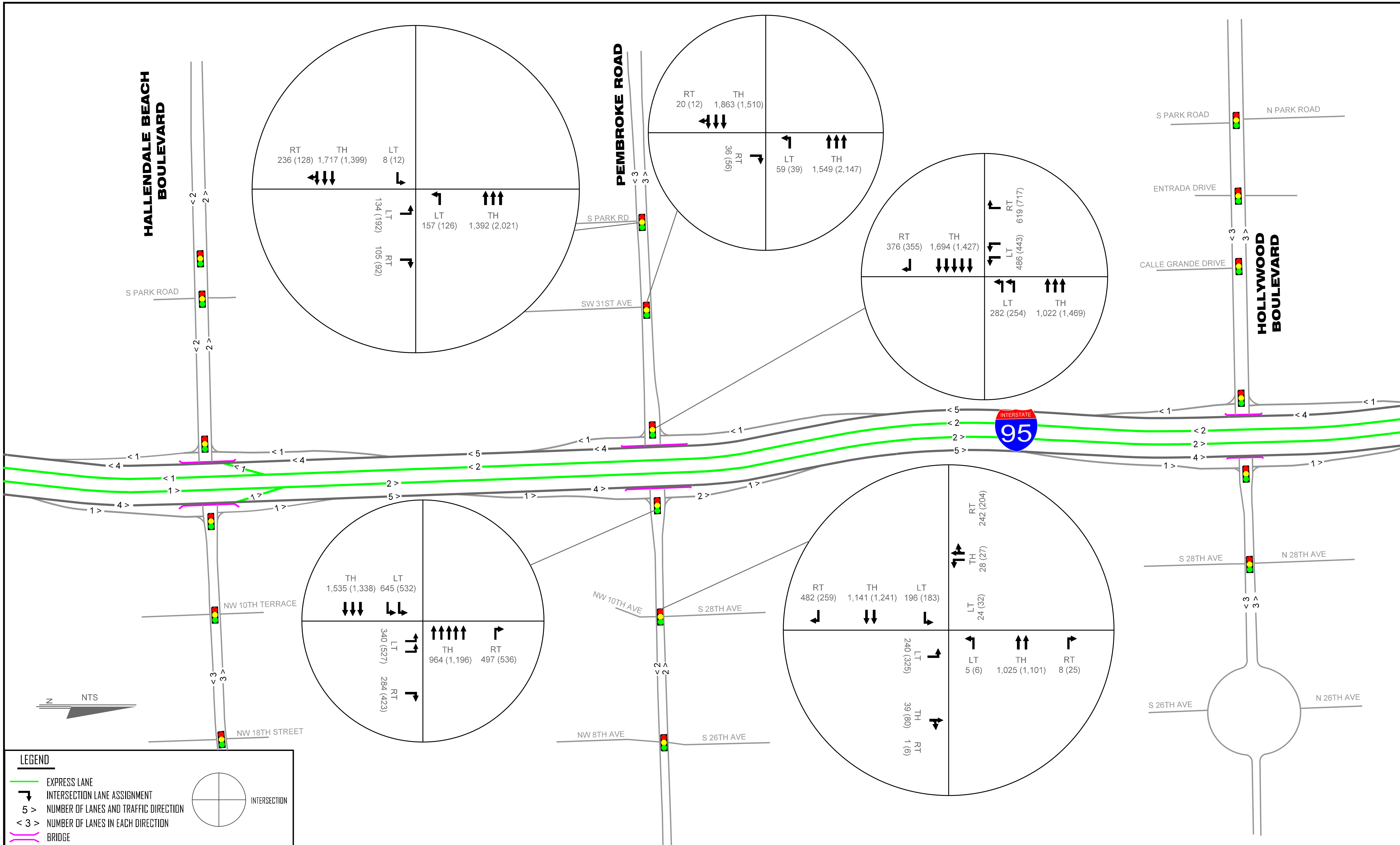
2016 INTERSECTION TURNING MOVEMENT VOLUMES

FIGURE 2.8



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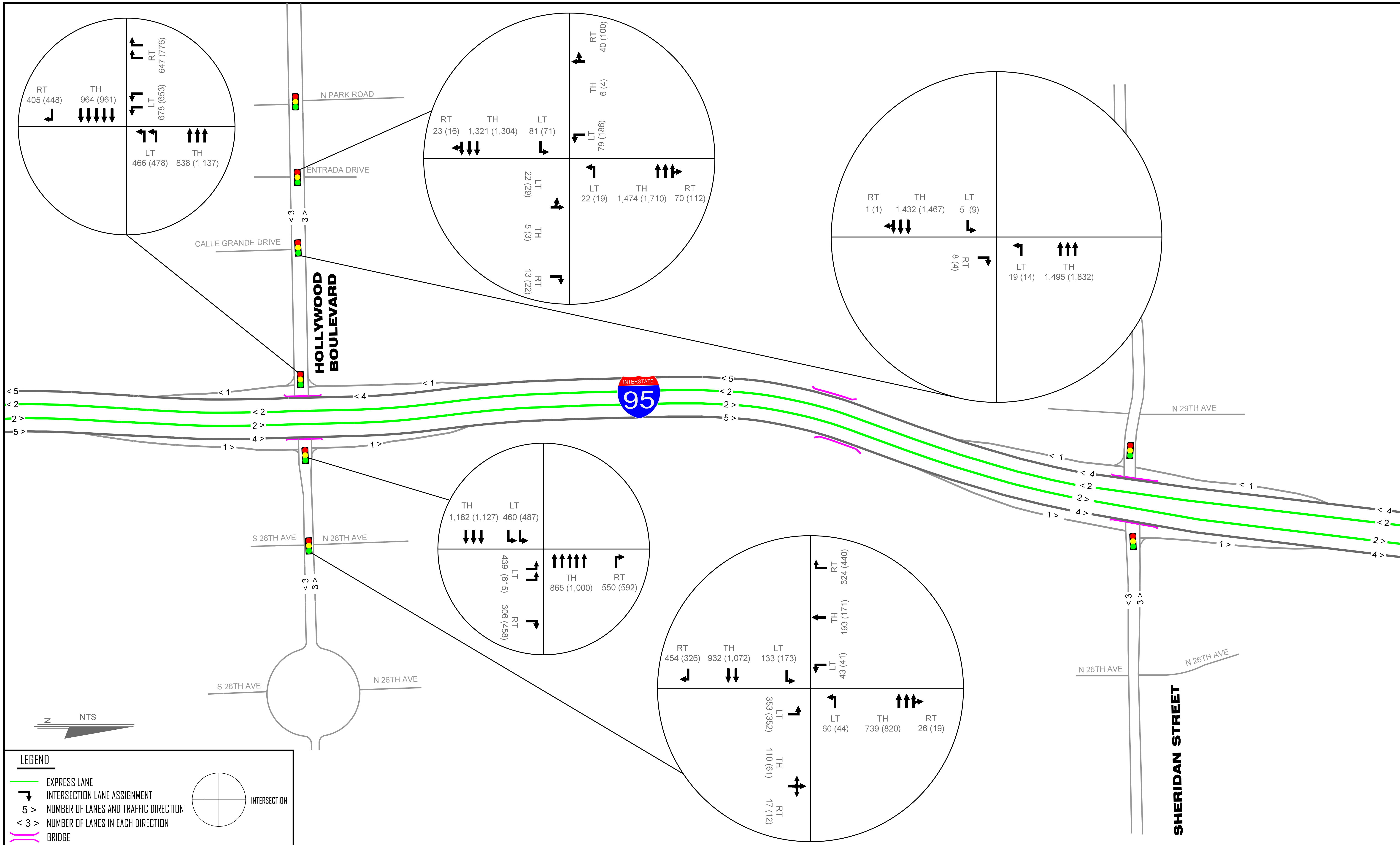
2016 INTERSECTION TURNING MOVEMENT VOLUMES

FIGURE 2.8



FDOT

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DISTRICT FOUR
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FEBRUARY 2018

INTERSTATE 95

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

2016 INTERSECTION TURNING MOVEMENT VOLUMES

FIGURE 2.8

2.12.2 Traffic Operational Analysis

The information presented in this section is a summary of the traffic operational analysis conducted as part of this PD&E Study.

The Highway Capacity Manual (HCM), 2010 Edition, as well as the Highway Capacity Software Version 6.6 (HCS) and Synchro/SimTraffic Version 9.0 were used for the operational analysis. Operational analyses were performed on mainline segments, ramp merge/diverge junctions, weaving sections, and ramp terminals. The HCS was used for the interstate mainline segments, ramp merge/diverge junctions and weaving sections. Synchro was used for the evaluation of the intersections and arterial segments. This software uses the methodology of the HCM to determine intersection/arterial capacity and LOS.

The I-95 freeway segments were analyzed as a single facility to accommodate the effects of the adjacent interchanges and the express lane facility. Due to the proximity of the Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard interchanges, each of the interchanges has an influence on the adjacent interchanges. Also, the presence of express lane ingress and egress access points makes it difficult to investigate the performance of facilities independently.

Based on the HCM 2010 methodology, the maximum length over which weaving movements may exist is greater than the actual distance for the segment between Hallandale Beach Boulevard and Pembroke Road, the segment between Pembroke Road and Hollywood Boulevard, and the segment between Pembroke Road and Sheridan Street, respectively. Therefore, these segments were treated as weaving segments. In accordance with the approved Methodology Letter of Understanding (MLOU), speed, density and LOS of each freeway facility were included as measures of effectiveness (MOEs).

The mainline/basic, weaving, and ramp merge/diverge analysis results for the northbound and southbound directions are summarized in ***Table 2.9*** *and* ***Table 2.10*** and in ***Figure 2.9***.

Table 2.9 – 2016 Existing Northbound Freeway Analysis Results

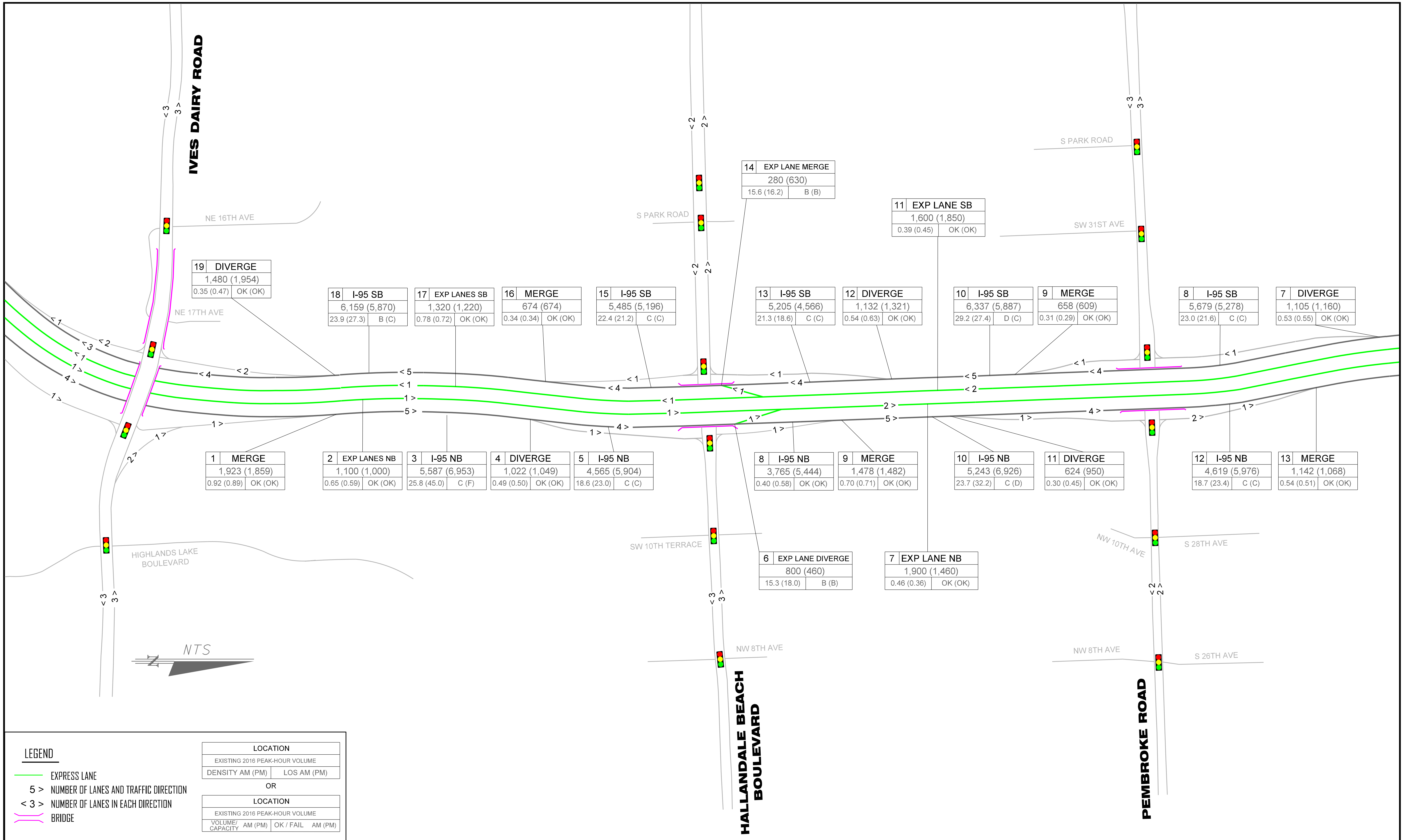
#	I-95 Northbound Segment 2016 Existing	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway V/C Ratio	Ramp V/C Ratio	Density (pc/mi/ln)	LOS
19	Sheridan Street Off-Ramp	Diverge	1	1,046 (964)	-	0.50 (0.46)	-	-
18	Hollywood Boulevard On-Ramp to Sheridan Street Off-Ramp	Weave	5	6,026 (7,050)	0.80 (0.79)	-	29.1 (30.6)	D (D)
17	Hollywood Boulevard On-Ramp	Merge	1	1,010 (1,079)	-	0.48 (0.51)	-	-
16	Hollywood Boulevard Off-Ramp to Hollywood Boulevard On-Ramp	Basic	4	5,016 (5,971)	0.62 (0.67)	-	23.5 (23.3)	C (C)
15	Hollywood Boulevard Off-Ramp	Diverge	1	745 (1,073)	-	0.35 (0.51)	-	-
14	Pembroke Road On-Ramp to Hollywood Boulevard Off-Ramp	Weave	5	5,761 (7,044)	0.70 (0.82)	-	25.4 (31.1)	C (D)
13	Pembroke Road On-Ramp	Merge	1	1,142 (1,068)	-	0.54 (0.51)	-	-
12	Pembroke Road Off-Ramp to On-Ramp	Basic	4	4,619 (5,976)	0.52 (0.67)	-	18.7 (23.4)	C (C)
11	Pembroke Road Off-Ramp	Diverge	1	624 (950)	-	0.30 (0.45)	-	-
10	Hallandale Beach Boulevard On-Ramp to Pembroke Road Off-Ramp	Weave	5	5,243 (6,926)	0.77 (0.93)	-	23.7(32.2)	C (D)
9	Hallandale Beach Boulevard On-Ramp	Merge	1	1,478 (1,482)	-	0.70 (0.71)	-	-
8	Express Lane Ingress to Hallandale Beach Boulevard On-Ramp	Basic	4	3,765 (5,444)	0.40 (0.58)	-	-	-
7	Express Lane North of Hallandale Beach Boulevard	Basic	2	1,900 (1,460)	0.46 (0.36)	-	-	-
6	Express Lane Ingress	Diverge	1	800 (460)	0.52 (0.65)	0.39 (0.22)	15.3 (18.0)	B (B)
5	Hallandale Beach Blvd Off-Ramp to Express Lane Ingress	Basic	4	4,565 (5,904)	0.52 (0.67)	-	18.6 (23.0)	C (C)
4	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,022 (1,049)	-	0.49 (0.50)	-	-
3	Ives Dairy Road On-Ramp to Hallandale Beach Boulevard Off-Ramp	Weave	5	5,587 (6,953)	0.99 **(1.08)**	-	25.8 (45.0)	C **(F)**
2	Express Lane South of Hallandale Beach Boulevard	Basic	1	1,100 (1,000)	0.65 (0.59)	-	-	-
1	Ives Dairy Road On-Ramp	Merge	1	1,923 (1,859)	-	0.92 (0.89)	-	-

- segment number

Table 2.10 – 2016 Existing Southbound Freeway Analysis Results

#	I-95 Southbound Segment 2016 Existing	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway V/C Ratio	Ramp V/C Ratio	Density (pc/mi/ln)	LOS
1	Sheridan Street On-Ramp	Merge	1	1,095 (1,025)	-	0.52 (0.49)	-	-
2	Sheridan Street On-Ramp to Hollywood Boulevard Off-Ramp	Weave	5	7,238 (6,941)	0.87 (0.90)	-	26.9 (32.6)	C (D)
3	Hollywood Boulevard Off-Ramp	Diverge	1	1,325 (1,429)	-	0.63 (0.68)	-	-
4	Hollywood Boulevard Off-Ramp to Hollywood Boulevard On-Ramp	Basic	4	5,913 (5,512)	0.66 (0.62)	-	24.0 (22.5)	C (C)
5	Hollywood Boulevard On-Ramp	Merge	1	871 (926)		0.41 (0.44)	-	-
6	Hollywood Boulevard On-Ramp to Pembroke Road Off-Ramp	Weave	5	6,784 (6,438)	0.74 (0.77)	-	30.7 (29.5)	D (D)
7	Pembroke Road Off-Ramp	Diverge	1	1,105 (1,160)	-	0.53 (0.55)	-	-
8	Pembroke Road Off-Ramp to On-Ramp	Basic	4	5,679 (5,278)	0.63 (0.60)	-	23.0 (21.6)	C (C)
9	Pembroke Road On-Ramp	Merge	1	658 (609)	-	0.31 (0.29)	-	-
10	Pembroke Road On-Ramp to Hallandale Beach Boulevard Off-Ramp	Weave	5	6,337 (5,887)	0.69 (0.73)	-	29.2 (27.4)	D (C)
11	Express Lane North of Hallandale Beach Boulevard	Basic	2	1,600 (1,850)	0.39 (0.45)	-	-	-
12	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,132 (1,321)	-	0.54 (0.63)	-	-
13	Hallandale Beach Blvd Off-Ramp to Express Lane Ingress	Basic	4	5,205 (4,566)	0.59 (0.52)	-	21.3 (18.6)	C (C)
14	Express Lane Ingress	Merge	1	280 (630)	0.62 (0.59)	0.14 (0.30)	15.6 (16.2)	B (B)
15	Express Lane Ingress to Hallandale Beach Boulevard On-Ramp	Basic	4	5,485 (5,196)	0.62 (0.59)	-	22.4 (21.2)	C (C)
16	Hallandale Beach Boulevard On-Ramp	Merge	1	674 (674)	-	0.34 (0.34)	-	-
17	Express Lane South of Hallandale Beach Boulevard	Basic	1	1,320 (1,220)	0.78 (0.72)	-	-	-
18	Hallandale Beach Boulevard On-Ramp to Ives Dairy Road Off-Ramp	Weave	5	6,159 (5,870)	0.56 (0.96)	-	23.9 (27.3)	B (C)
19	Ives Dairy Road Off-Ramp	Diverge	2	1,480 (1,954)	-	0.35 (0.47)	-	-

- segment number



FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

JANUARY 2021

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

2016 EXISTING YEAR OPERATIONAL ANALYSIS RESULTS

FIGURE 2.9

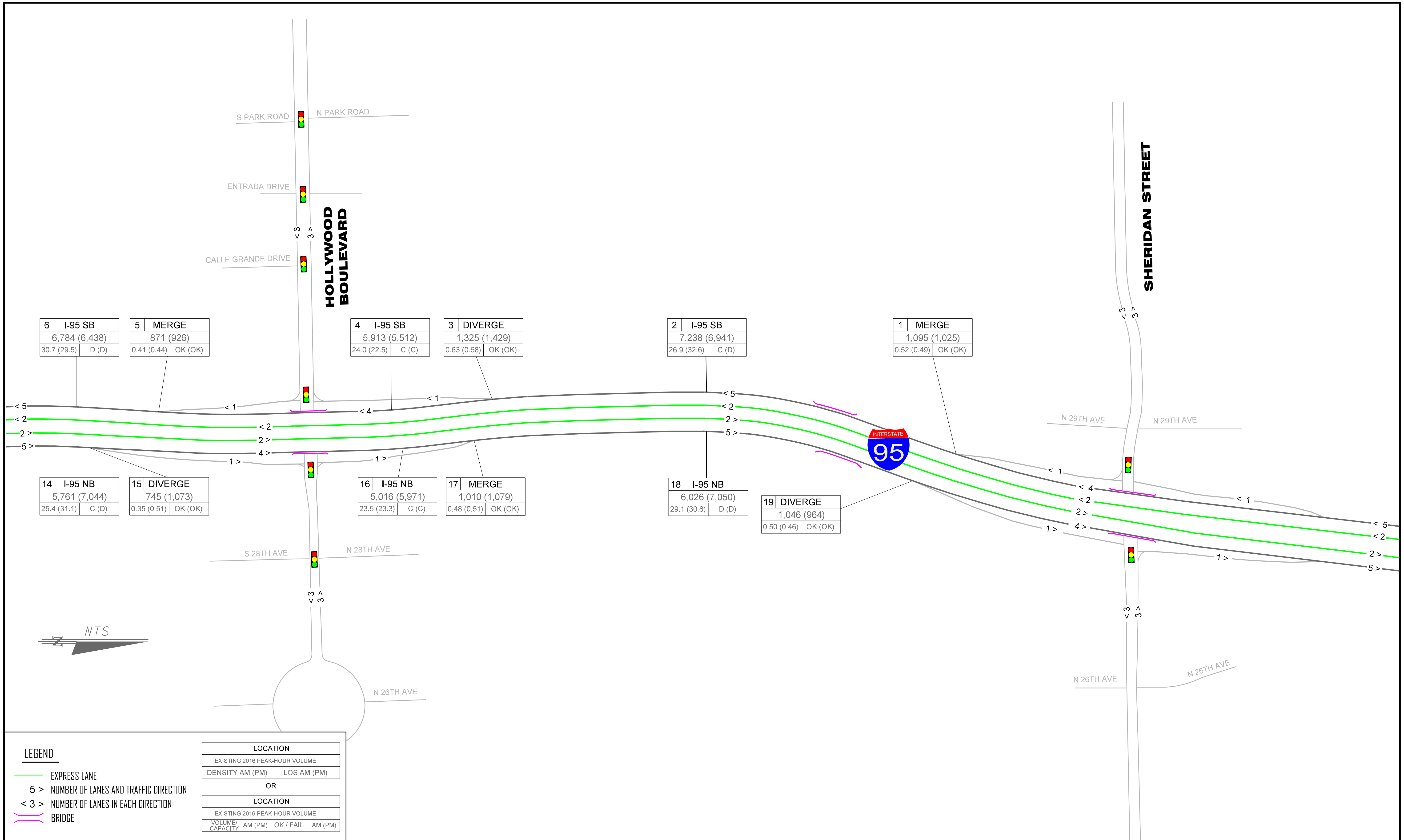


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FIGURE 2.9

Basic Freeway Analysis – The freeway mainline, within the study limits, was divided into segments for the purpose of evaluating each segment for the existing conditions. The capacity analysis shows that all basic freeway segments are currently operating at an acceptable LOS D or better except for the I-95 northbound segment between Ives Dairy Road on-ramp and Hallandale Beach Boulevard off-ramp. This segment is operating at LOS F in the PM peak-hour.

Micro-simulation – The existing year traffic operations micro-simulation models were calibrated to replicate the observed traffic conditions. Traffic congestion is experienced for several hours of the day within the study area due to high traffic volume on the I-95 ramps and congestion from outside the study area for extended periods of the day. Peak direction during the AM peak period is southbound, while the peak direction during the PM peak period is northbound. The following traffic conditions are typical for average weekday AM and PM peak periods in the existing year.

AM Peak Period – The I-95 AM peak direction of flow is southbound. The AM peak period is 6:00 AM to 10:00 AM. Simulation included a 30-minute seed time. Hour 1 is considered a pre-peak-hour, Hour 2 is the peak-hour, and Hours 3 and 4 are the post-peak hours. Therefore, the simulation duration is 4.5 hours. Congestion tends to form during the AM peak period on I-95 southbound south of the Ives Dairy Road off-ramp. In addition, congestion occurs northbound on the northern portion of the corridor north of Sheridan Street, which is considered outside the project area.

PM Peak Period – The PM peak period is 3:00 PM to 7:00 PM. The simulation hours breakdown is the same as the AM peak with a simulation duration of 4.5 hours. The PM peak period is generally the reversal of the AM peak period in terms of directionality. The northbound direction is the peak direction of flow during the PM peak. However, major congestion is evident on I-95 southbound at the Ives Dairy Road off-ramp and south of the Ives Dairy Road interchange outside of the project area. This congestion is a result of capacity constraints at Ives Dairy Road as well as spillback from interchanges further south of the project area. Congestion from the Ives Dairy Road southbound off-ramp spillbacks onto the mainline and impacts traffic operations at the upstream interchanges.

A major north-south railroad corridor exists within the project area with three at-grade crossings and a railroad station. The railroad corridor is located to the west of I-95. The at-grade crossings are located at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard. The Tri-Rail Station is located at Hollywood Boulevard. To accurately simulate the train activities during both peak periods, the Tri-Rail train schedule was obtained and cross-referenced with the *2016 Railroad Grade Crossing Data Collection and Analysis Report* to determine at what times the train stops at the Hollywood Boulevard Tri-Rail Station during the peak periods. Using an average transit speed of 40 mph, it was determined that the train takes approximately two minutes and 58 seconds to reach the station from the southbound entry link and approximately seven minutes and 53 seconds from the northbound entry link. The time at which the train stops at the station along with the time it takes for the train to travel from the entry link to the Hollywood Boulevard Station and the simulation start time was used to back calculate the time the train should enter the network in order to arrive at the station according to schedule. This process was done for both the northbound and southbound trains for both peak periods. According to the data obtained from the aforementioned report, the average time the train remains at the station is approximately 27 seconds. Therefore, a dwell time of 30 seconds was used.

Information regarding the gate closure durations was also obtained from the aforementioned report and used to estimate the average duration for the gates to remain closed at the at-grade crossings. To simulate the at-grade crossings, signal control elements were placed in the model to replicate the gate closures. The gate closure duration along with the train speed was then used to calculate the distance in which the detector must be placed on the railroad corridor to allow for the needed gate closure time at each at-grade crossing in both directions. Pre-emption data from the signal timing plans was also referenced to determine the correct phases for track clear, dwell, and return for each at-grade crossing and corresponding interchange.

Additional traffic micro-simulation information can be found in the SIMR, dated June 2021, a companion document to this PD&E Study.

2.13 Intersection Layout and Traffic Control

There are three interchanges within the study limits. All interchanges have a conventional diamond configuration. The interchanges provide system-to-service connections to and from major arterial/collector facilities along the I-95 corridor within the study limits.

There are 16 signalized intersections under consideration within the area of influence along the arterials. These intersections are listed below:

1. Hallandale Beach Boulevard/Park Road/1st Street
2. Hallandale Beach Boulevard/SW 30th Avenue
3. I-95/Hallandale Beach Boulevard southbound Ramp Terminal
4. I-95/Hallandale Beach Boulevard northbound Ramp Terminal
5. Hallandale Beach Boulevard/10th Terrace
6. Pembroke Road/Park Road
7. Pembroke Road/SW 31st Avenue
8. Pembroke Road/SW 30th Avenue
9. I-95/Pembroke Road southbound Ramp Terminal
10. I-95/Pembroke Road northbound Ramp Terminal
11. Pembroke Road/NW 10th Avenue/S 28th Avenue
12. Hollywood Boulevard /Entrada Drive
13. Hollywood Boulevard/Calle Grande Drive
14. I-95/Hollywood Boulevard southbound Ramp Terminal
15. I-95/Hollywood Boulevard northbound Ramp Terminal
16. Hollywood Boulevard/28th Avenue

Intersection Analysis – Intersection analysis for ramp terminals and adjacent intersections was performed at all interchanges using existing turning movement volumes, existing lane geometry, signal timing, other relevant information obtained from Broward County and field reviews. The data was input to the Synchro software to determine the LOS and delay based on HCM methodology. A summary of the results is presented in ***Table 2.11*** and in ***Figure 2.10***.

Table 2.11 – 2016 Existing Intersection LOS and Delay Results

Arterial	Intersection	AM		PM	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Hallandale Beach Boulevard	Park Road*	17.0	B	18.8	B
	I-95 Southbound Ramps*	37.2	D	34.9	C
	I-95 Northbound Ramps*	72.1	**E**	60.5	**E**
	NW 10th Terrace	19.8	B	33.8	C
Pembroke Road	Park Road*	16.8	B	13.3	B
	SW 31st Avenue*	4.7	A	3.1	A
	I-95 Southbound Ramps*	25.4	C	31.6	C
	I-95 Northbound Ramps*	22.1	C	21.5	C
	NW 10th Avenue / 28th Avenue*	47.6	D	51.3	D
Hollywood Boulevard	Entrada Drive	7.2	A	27.8	C
	Calle Grande Drive*	2.6	A	2.2	A
	I-95 Southbound Ramps*	28.2	C	33.6	C
	I-95 Northbound Ramps*	37.5	D	37.1	D
	28th Avenue*	50.2	D	57.2	**E**

*HCM 2000 results reported

Intersection Analysis – The capacity analysis shows that the following two intersections are currently operating at an unacceptable LOS (worst peak period LOS):

- Hallandale Beach Boulevard/ Northbound Ramp Terminal (LOS E-AM/PM)
- Hollywood Boulevard/ South 28th Street (LOS E-PM)

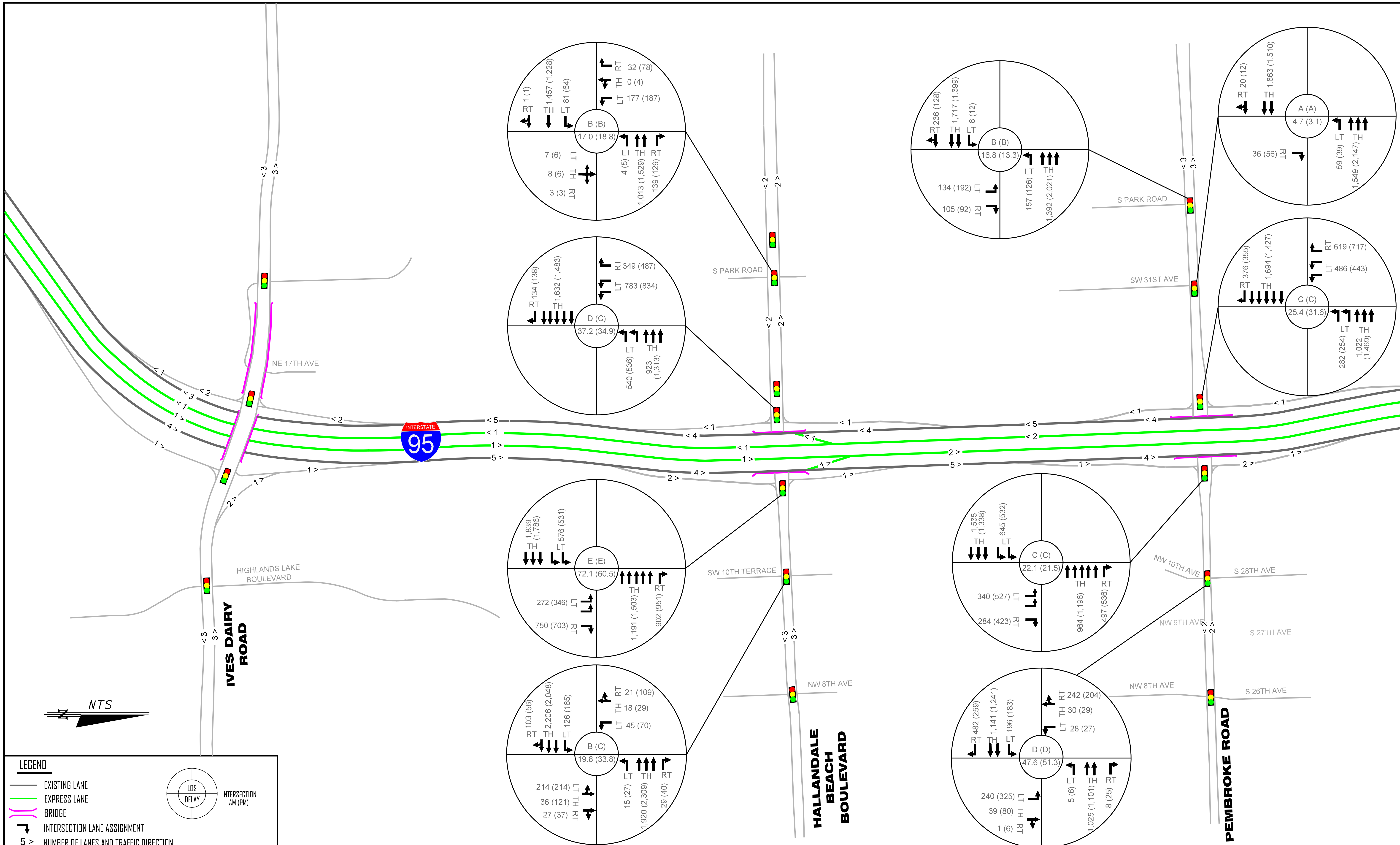

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FIGURE 2.10

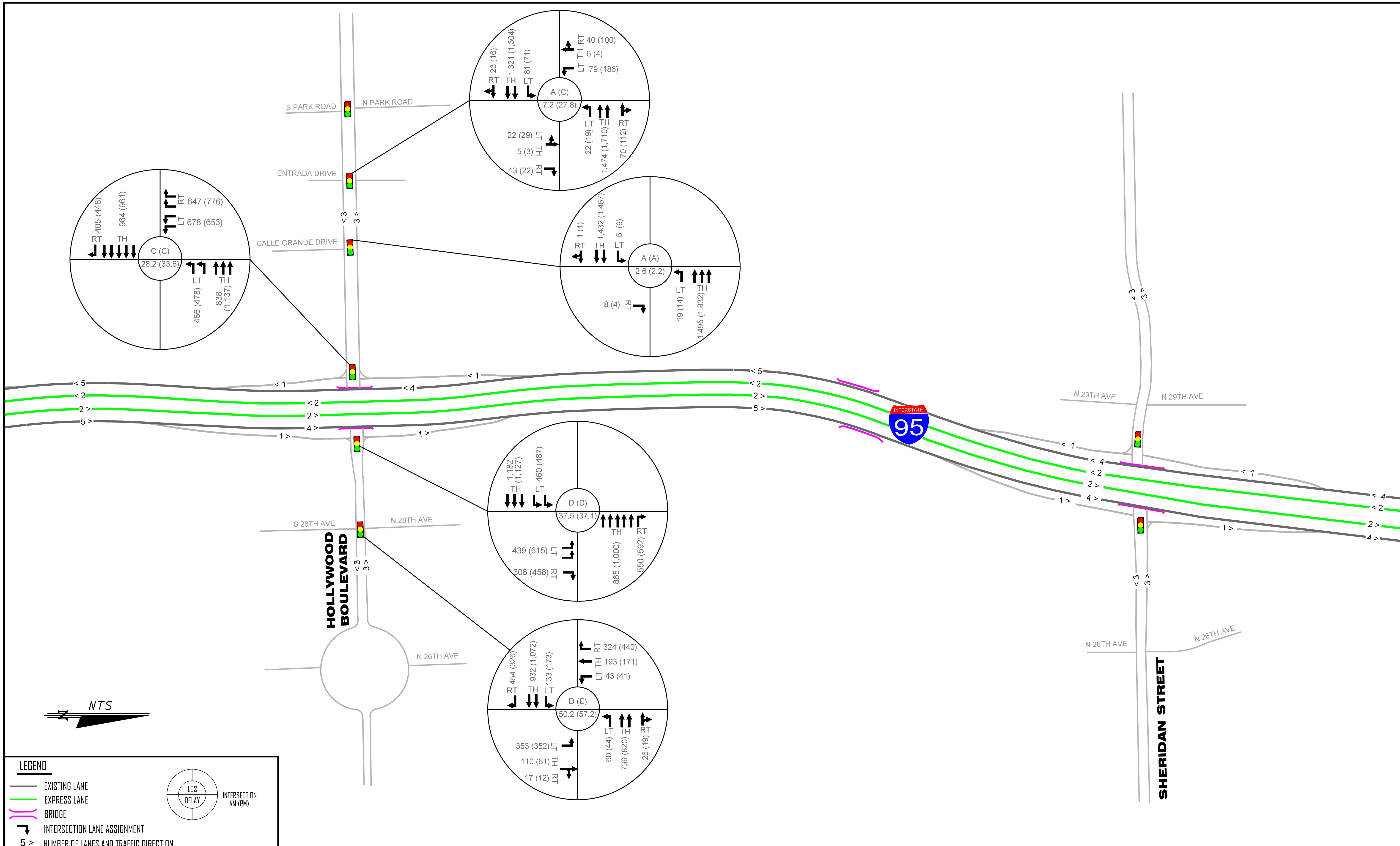

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FIGURE 2.10

2.14 Railroad Crossing

The South Florida Rail Corridor is a dual railroad track that runs parallel to the west side of the I-95 project corridor. This railroad line is currently under the jurisdiction of the SFRTA and owned by the FDOT. It was formerly owned by CSX Transportation and continues to carry CSX freight trains. The SFRTA also operates the commuter rail service called Tri-Rail on these tracks. Within the study limits, there is one Tri-Rail station, Hollywood Boulevard Station.

Amtrak also operates passenger trains on the South Florida Rail Corridor. North of the study limits, the Sheridan Amtrak Station is co-located with the Tri-Rail Station.

2.15 Crash Data and Safety Analysis

The crash analysis efforts were completed by the FDOT Traffic Operations Office prior to the PD&E Study. Four separate Safety Studies were conducted covering I-95, Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard.

I-95 – The I-95 Safety Study was completed in July 2017 between south of Hallandale Beach Boulevard (MP 0.408) and north of Hollywood Boulevard (MP 2.927). Crash data was obtained from the Department's Crash Analysis Reporting (CAR) system and organized into the periods of Pre-Construction (November 2008 – October 2011) and During Construction (November 2011 – December 2015) of the I-95 Express Lanes Phase 2 Project. A total of 2,805 crashes occurred within the study corridor between November 2008 and December 2015. These crashes included 1,250 injury crashes and eight fatal crashes. The total number of crashes increased During Construction. However, the proportion of injury crashes decreased during the same period. ***Table 2.12*** summarizes the number of crashes per year.

Table 2.12 – Existing I-95 Crashes by Year

Year	Crashes
2008 (Nov-Dec)	53
2009	331
2010	303
2011	330
2012	480
2013	523
2014	480
2015	377
Total:	**2,805**

Notable peak period crash locations are summarized below:

- Hollywood Boulevard southbound off-ramp – AM and PM peaks
- Hallandale Beach Boulevard southbound off and on-ramps – AM and PM peaks
- Pembroke Road southbound off and on-ramps – PM peak
- Hollywood Boulevard northbound on-ramp – PM peak
- Hallandale Beach Boulevard northbound off-ramp – AM and PM peaks

Overall, 56% of the crashes (1,573 crashes) occurred in the southbound direction and 44% of the crashes (1,232 crashes) occurred in the northbound direction. The most frequent crash types are rear-end (49%), sideswipe (24%), and lane departure crashes (17%). The lane departure crashes include collisions with concrete barrier walls, guardrails, run off road, and other fixed object crashes. Other than a three percent (3%) increase in sideswipe crashes, the proportions of crash types are similar before and during construction periods.

Crashes were grouped by interchange using the straight-line diagram mileposts. The highest number of crashes occurred at the Hallandale Beach Boulevard interchange, followed by the Hollywood Boulevard and Pembroke Road interchanges. After normalizing for crash data periods, the Hallandale Beach Boulevard and Hollywood Boulevard interchanges each experienced a 57% monthly increase in crashes between the Pre-Construction and During Construction periods, whereas the Pembroke Road interchange experienced an 8% monthly increase during the same period. Based on the increasing trend of crashes during the analysis period, the Hallandale Beach Boulevard and

Hollywood Boulevard interchanges are priority locations for improvements. **Table 2.13** summarizes the crashes by interchange.

Table 2.13 – Existing Crashes by Interchange

Description	Pre-Construction* (36 months)	During Construction** (50 months)	Total	Percentage of Total
Hallandale Beach Boulevard				
Rear End	190	399	589	54%
Sideswipe	82	184	266	24%
Fixed Object	51	106	157	14%
Other Types	21	63	84	8%
Total	344	752	1,096	
Pembroke Road				
Rear End	157	234	391	48%
Sideswipe	62	123	185	23%
Fixed Object	63	74	137	17%
Other Types	41	53	94	12%
Total	323	484	807	
Hollywood Boulevard				
Rear End	121	283	404	45%
Sideswipe	69	160	229	25%
Fixed Object	55	109	164	18%
Other Types	38	67	105	12%
Total	283	619	902	

*Pre-construction period – Nov. '08 – Oct. '11 **During Construction period – Nov. '11 – Dec. '15

The study limits were identified as a high crash segment in each year between 2009 and 2014. The 2015 high crash listing was not available at the time this analysis was prepared. In addition, the following nodes were identified as high crash locations in multiple years:

- Northbound exit to Hallandale Beach Boulevard (MP 0.508)
- Southbound exit to Hallandale Beach Boulevard (MP 1.044)
- Southbound exit to Pembroke Road (MP 1.815)
- Northbound exit to Hollywood Boulevard (MP 2.296)
- Northbound entrance from Hollywood Boulevard (MP 2.771)
- Southbound exit to Hollywood Boulevard (MP 2.827)

Hallandale Beach Boulevard – The Hallandale Beach Boulevard Safety Study was completed in July 2014 covering the interchange limits between MP 2.528 and MP 2.587. Crash data was obtained from the Department's CAR system and organized for the three-year period from 2009 to 2011. A total of 199 crashes occurred within the three-year period. These crashes included 85 injury crashes and no fatalities. ***Table 2.14*** summarizes the number of crashes per year.

Table 2.14 – Existing Hallandale Beach Boulevard Crashes by Year

Year	Crashes
2009	63
2010	79
2011	57
Total:	**199**

The most frequent crash types are rear-end (54%), left-turn (13%), and angle crashes (12%). A review of the crash data indicates that "careless driving" was stated as a contributing cause for 28% of the crashes, followed by "disregarded traffic signal" at 10% and, "followed to closely" at 9.5%, A review of the FDOT High Crash Spot/Segment Lists for the three-year period from 2009 to 2011 indicates that this location was on the High Crash Segment List for the years 2010 and 2011.

Pembroke Road – The Pembroke Road Safety Study was completed in July 2017 covering the interchange limits between MP 5.048 and MP 5.123. Crash data was obtained from the Department's CAR system and organized for the three-year period from 2013 to 2015. A total of 285 crashes occurred within the three-year period. These crashes included 68 injury crashes and one fatality crash. ***Table 2.15*** summarizes the number of crashes per year.

Table 2.15 – Existing Pembroke Road Crashes by Year

Year	Crashes
2013	89
2014	108
2015	88
Total:	**285**

The most frequent crash types are rear-end (56%), sideswipe (22%), and angle crashes (9%). A review of the crash data indicates that "careless or negligent manner" was stated as a contributing cause for 34% of the crashes, followed by "failed to keep in proper lane" at 8.4% and, "followed too closely" at 7.4%. A review of the Department's High Crash Spot Lists for the three-year period indicates that the interchange was identified as a high crash spot for all three years.

Hollywood Boulevard – The Hollywood Boulevard Safety Study was completed in July 2016 covering the interchange limits between MP 16.56 and MP 16.639. Crash data was obtained from the Department's CAR system and organized for the three-year period from 2010 to 2012. A total of 251 crashes occurred within the three-year period. These crashes included 25 injury crashes and no fatalities. ***Table 2.16*** summarizes the number of crashes per year.

Table 2.16 – Existing Hollywood Boulevard Crashes by Year

Year	Crashes
2010	58
2011	87
2012	106
Total:	**251**

The most frequent crash types are rear-end (60%), sideswipes (14%), and left-turn crashes (6%). A review of the crash data indicates a steady increase in crashes from 2020 to 2012. A review of the FDOT High Crash Spot/Segment Lists for the three-year period from 2010 to 2012 indicates that all three intersections were identified as high crash locations.

2.16 Drainage

This section summarizes the existing drainage systems within the study area.

The project area is located within Broward County, Florida under Township 51S, Range 42E, and Sections 16, 17, 20, 21, 28 and 29 and is contained within the municipalities of Hallandale Beach, Pembroke Park, and Hollywood. The agency having stormwater permitting jurisdiction over the study area is the South Florida Water Management District (SFWMD). SFWMD has authority over the C-9 and C-10 Canals, which are the water bodies receiving the stormwater runoff for the project area.

The existing drainage system is divided into three separate basins, typically divided by major east-west arterial crossings at Hallandale Beach Boulevard, Pembroke Road and Johnson Street. The basins have been identified in the latest FDOT I-95 improvement project documents under FPID# 422796-1-52-01 and 422796-2-52-01 as System 4, 5 and 6.

System 4 (Basin 1) – This drainage basin encompasses I-95 from south of the Miami Dade/Broward County Line to Hallandale Beach Boulevard. Runoff from I-95 sheet flows into roadside swales located along both sides of I-95. These dry detention roadside swales provide for water quality treatment and stormwater attenuation using ditch block weirs. Basin 1 has a swale bottom elevation of 2.5 feet North American Vertical Datum of 1988 (NAVD 88) and a discharge elevation of 3.5 feet NAVD 88. The excess stormwater runoff overflows these weirs and discharges south into infield ponds at the I-95 and Ives Dairy Road interchange, which ultimately discharges to the C-9/Snake Creek Canal. This basin is located within the South Florida Water Management District (SFWMD) C-9 East Basin.

System 5 (Basin 2) – This drainage basin encompasses I-95 from Hallandale Beach Boulevard to Pembroke Road. Runoff from I-95 sheet flows into roadside dry detention swales located along both sides of I-95 and a dry pond located at the corner of Hallandale Beach Boulevard and I-95 northbound on-ramp. These dry detention roadside swales provide water quality treatment and stormwater attenuation using ditch block weirs. This system consists of swales with a bottom elevation of 1.5 feet NAVD 88 and discharge elevation of 4.0 feet NAVD 88. According to existing permit information this basin discharges into an FDOT borrow pit called Chaves Lake, which is located at the northeast quadrant of I-95 and Hallandale Beach Boulevard. However, no drainage connection was observed during our field investigation. Excess stormwater runoff from Chaves Lake overflows to the C-10 Canal through a pump station located within the west side of the I-95 right of way between Hallandale Beach Boulevard and Pembroke Road. This basin is located within the SFWMD's C-10 Basin.

System 6 (Basin 3 & 4) – This drainage basin encompasses I-95 from Pembroke Road to Johnson Street. Runoff from I-95 sheet flows into the roadside dry detention swales located along both sides of the I-95 and Hollywood Boulevard interchange infield areas. This system has a swale bottom elevation of 1.5 feet NAVD 88 and discharge elevation of 2.5 feet NAVD 88. These roadside swales and interchange infield areas provide water quality treatment and stormwater attenuation using ditch block weirs. Excess stormwater runoff overflows these weirs and discharges into the C-10 Canal just north of Johnson Street. This basin is located within the SFWMD's C-10 Basin.

Side Street/Arterial Street Drainage – There are three arterial streets within the project limits of the I-95 corridor: Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard. Each of those side streets, beyond the interchanges, has its own drainage system. Since the improvements are mostly at the interchanges, the impact to the existing drainage systems of the side streets beyond interchanges are considered minor.

Offsite System – An offsite storm-sewer system exists along the I-95 corridor within the project limits. The system is designed to alleviate the adverse flooding conditions for the City of Hallandale Beach and the Town of Pembroke Park as described in the SFWMD permit No. 06-02942-P, application 010601-42, dated October 2001. The permitted system includes the Chaves Lake, located within the City of Hallandale Beach, connected to the adjacent Hallandale Beach High School Lake via an open channel. The school lake is connected through an 84" pipe to a main pump station on the west side of I-95 just south of the CSX Railroad. From the pump station a 64" stormwater force main is installed along the west side of I-95 to discharge into the modified CSX western channel. A 42" force main from another pump station located on Behan Lake, within the Town of Pembroke Park, is connected to a 64" force main outfall of the I-95 Pump Station. At the end of the conveyance channel, along the CSX Railroad, a ditch bottom inlet with a 72" diameter pipe is located to discharge the flow to the C-10 canal. This system is not expected to be impacted by the proposed I-95 improvements.

2.17 Soils and Geotechnical Data

The information presented in this section is a summary of the *Geotechnical Report, Roadway Soils Survey and Bridge Structures*, a companion document to this PD&E study. The Soil Map of Broward County published by the United States Department of Agriculture (USDA) was reviewed for general near-surface soil information within the general project vicinity (see ***Figure 2.11***).

Custom Soil Resource Report
Soil Map

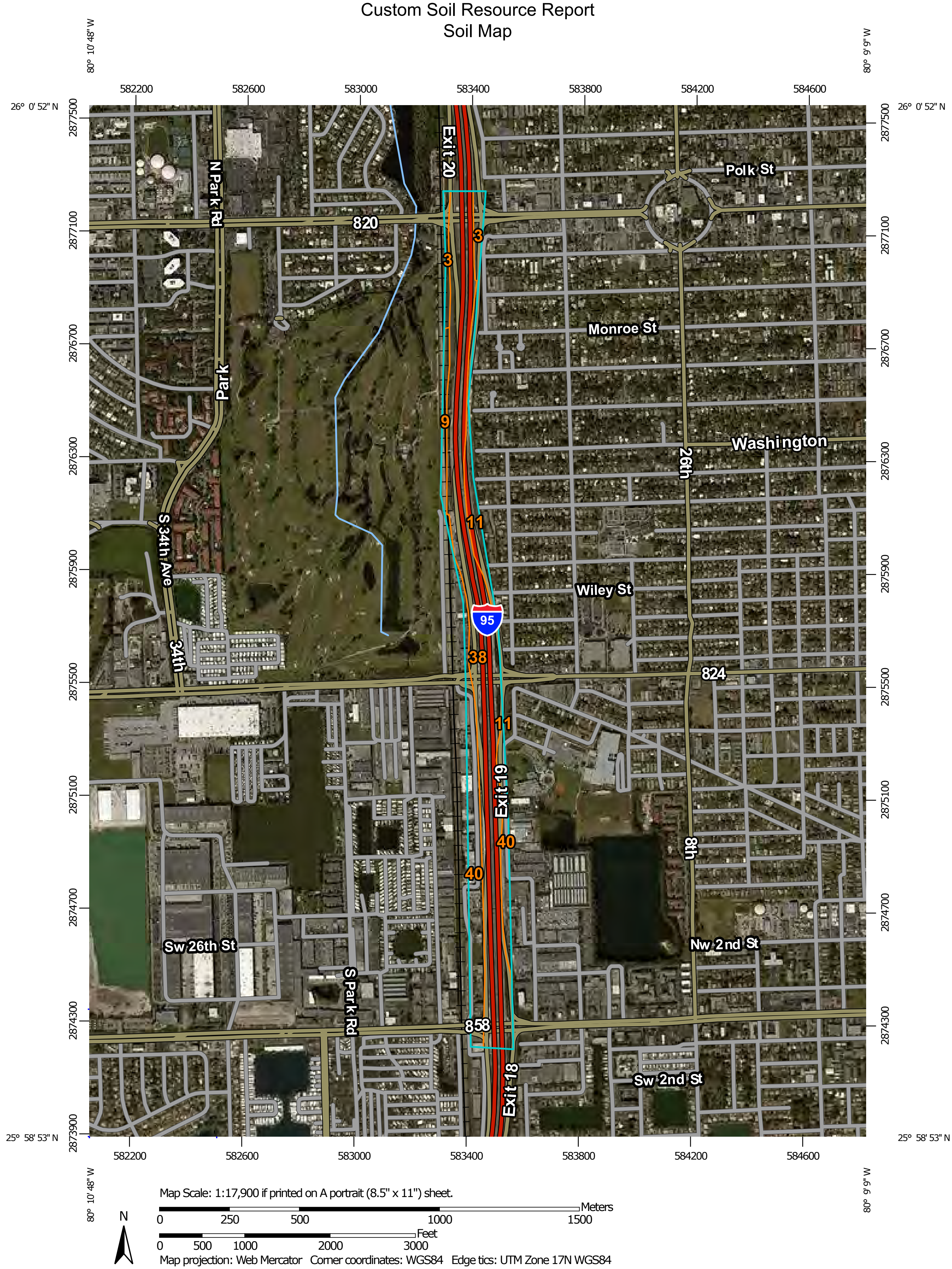


Figure 2.11 - Soil Survey Map

This information indicates that there are five soil mapping units. The map soil units encountered are as follows:

- Arents, organic substratum-Urban land complex
- Dade fine sand
- Dade-Urban land complex
- Udorthents shaped
- Urban land

The most encountered soil was Udorthents shaped, which is characterized by somewhat poorly drained soil.

A description of the general profile of the existing soils, within the study limits, was determined by test borings performed throughout the study limits. The test boring depths ranged from 6 to 15 feet. Soils and soil profiles found in borings drilled for the roadway alignment study generally consisted of five general types:

1. Dark brown sand with trace roots (Topsoil / A-8).
2. Light brown to brown sand with silt, sometimes with trace to few limerock fragments (A-3).
3. Brown silty sand with few to some limerock fragments (A-2-4).
4. Light Brown silty limestone.
5. Black organic Silt (A-8).

Much of the project corridor is underlain with interlayering of Strata 1 and 2. However, Stratum 3 and 4 soils were found at numerous boring locations at various depths along the project corridor. Stratum 5 soils were found at only two boring locations between four and six feet depth interval.

Stratum 1 is topsoil and shall be removed during clearing and grubbing in accordance with section 110 of the FDOT Standard Specifications.

Stratum 2 consists of select material and is adequate for subgrade and embankment support, and should be utilized according to Standard Plans, Index 120-001. However, portions may have slightly fine content and are likely to retain some excess moisture and could be difficult to handle, place and compact compared to ordinary A-3 materials.

Stratum 3 soils are classified as A-2-4 and have a fine content ranging between 11 to 21 percent (with average fines content at 14 percent). Stratum 3 consists mainly of soils with high fines content and are likely to retain some excess moisture and could be difficult to handle, place and compact compared to ordinary A-3 materials. However, these soils may be used in the subgrade with extra caution, and proper supervision and quality control. A-2-4 material placed below the existing water level must contain less than 15% passing the No. 200 U.S. Standard sieve.

Stratum 4 consists of limestone. Specialized tools and equipment are necessary to excavate and/or penetrate the limestone layer.

Stratum 5 soils are classified as A-8. However, only two samples are classified as A-8 with organic content 24 to 80 percent and are between four and six feet below existing grade. In accordance with the FDOT Standard Plans, Index 120-002, these soils need to be removed and replaced with select embankment fill.

The depths of groundwater tables were measured at the locations of the structural bridge borings drilled proximate to the existing bridge structures. In the borings drilled proximate to the I-95 bridges, the groundwater table depths ranged between 0 and 9.5 feet below existing grade of the borings. The depth to the water table was measured in each of the roadway borings. Depth to groundwater measured in the borings drilled for the roadway ranged between 4.0 feet and 8.5 feet below ground surface. However, in many locations, groundwater was not encountered within the depth of the borings. The wide variation in groundwater table depths is attributed to the difference in site grades.

Nine structural borings were performed at selected bridges to depths of 100 feet and fourteen roadway borings to depths of six feet to fifteen feet were also performed. The structural borings, drilled at approximate locations of the proposed bridge structures, generally indicated that the sites are underlain with interlayering of sands, limestone, sometimes mixed with silty sands. Based on the conditions encountered by the structural borings, the soil conditions will provide the required bearing capacity support for a deep foundation system such as 18 to 24-inch square prestressed concrete piles and 36 to 48-inch diameter drilled shafts. The existing substructures are in a slightly aggressive environment, based on four corrosion tests at the proposed structure locations to determine the environment of the area.

Six Borehole Permeability Tests (BHP) were performed along the project corridor. The BHP tests were performed using the usual open-hole, constant head methodology advocated by South Florida Water Management District (SFWMD). The boreholes were ten feet deep and completed as an open well with gravel pack (6-20 silca sand).

2.18 Utilities

Utility Agency Owners (UAOs) located in the vicinity of the I-95 were contacted and requested to provide information regarding their utility facilities within the project area. Existing UAOs and contact information are provided in ***Table 2.17***. Plans showing the approximate location of the utility facilities are provided in ***Appendix C***.

Table 2.17 - Existing UAO Contact List

Utility Company	Facility	Contact Information	
American Traffic Solutions	Not Available	Santiago Martinez 1150 North Alma School Road Mesa, AZ 85201	(480) 596-4595
AT&T Corporation (International)	Fiber Optic	Stefan Eriksson 6000 Metro West Blvd., Suite 201 Orlando, FL 32835	(407) 578-8000 seriksson@pea-inc.net
AT&T Corporation (Transmission)	Telephone	Stefan Eriksson 6000 Metro West Blvd., Suite 201 Orlando, FL 32835	(407) 578-8000 seriksson@pea-inc.net
AT&T Distribution	Telephone & Fiber	Keeve Otis 1120 South Rogers Circle Boca Raton, FL 33487	(305) 428-0510 ok1184@att.com
Broward County Traffic Engineering	Fiber Optic	Robert Blount 2300 West Commercial Boulevard Fort Lauderdale, FL 33309	(954) 847-2745 rblount@broward.org

Table 2.17 – Existing UAO Contact List (Continued)

Utility Company	Facility	Contact Information	
Broward County Water and Wastewater Services	Water and Sewer	Halina Pluta 2555 West Copans Road Pompano Beach, FL 33069	(954) 831-0917 HPLUTA@broward.org
Century Link	Fiber Optic	Mike Fitzgerald Jack Brady 5908-A Hampton Oaks Parkway Tampa, FL 33610	(941) 661-7557 (786) 495-2170 mike.fitzgerald@centurylink.com jack.brady@centurylink.com
City of Hallandale Beach	Water and Sewer	Manga Ebbe 630 NW 2nd Street Hallandale Beach, FL 33009	(954) 457-3043 mebbe@hallandalebeachfl.gov
City of Hollywood Public Works Department	Water & Sewer	Raul Carbonell 7777 Glades Road Suite 410 Boca Raton, FL 33434	(561) 791-9280 rcarbonell@craigasmith.com
Comcast Cable	Cable TV	Christopher Taylor Leonard Maxwell-Newbold 2601 SW 145th Avenue Miramar, FL 33322	(954) 239-8386 (954) 447-8405 Cable-utilities@cwsifl.com Leonard_Maxwell-Newbold@cable.comcast.com
Crown Castle NG	Fiber Optic	Rebecca Caldwell 2000 Corporate Drive Canonsburg, PA 15317	(888) 632-0931 fiber.dig@crowncastle.com
Fiberlight LLC.	Not Available	Troy Gaeta 11700 Great Oaks Way Suite 100 Alpharetta, Ga 33022	(954) 213-3367 troy.gaeta@fiberlight.com
Fibernet Direct	Fiber	Danny Haskett Crown Castle Office 1601 NW 136th Avenue Suite A-200 Sunrise, FL 33323	(786) 246-7827 danny.haskett@fibernetdirect.com

Table 2.17 – Existing UAO Contact List (Continued)

Utility Company	Facility	Contact Information	
Florida City Gas	Gas	Oscar Paez 4045 NW 97th Avenue Doral, FL 33178	(305) 835-3622 fcgeng@aglresources.com opaez@southernco.com
Florida Department of Transportation District 4 - ITS	Fiber Optic	Maria Rosado 2300 West Commercial Boulevard Fort Lauderdale, FL 33309	(954) 847-2690 mrosado@smartsunguide.com
Florida Department of Transportation - Eland Engineering	Fiber Optic	Chris Beaudry/April Rizzo 3323 West Commercial Boulevard Fort Lauderdale, FL 33309	(954) 847-1996 chris.beaudry@dot.state.fl.us april.rizzo@dot.state.fl.us
Florida Power & Light	Electric	Byron Sample 10705 Quail Roost Drive Miami, FL 33157	(386) 586-6403 Byron.A.Sample@fpl.com
HEICO Corporation	Fiber Optic	Joe Asher 3000 Taft Street Hollywood, FL 33021	(954) 984-4000 jasher@heico.com
Level 3 Communications	Fiber Optic	Network Relations 1025 El Dorado Boulevard Broomfield, CO 80021	(877) 366-8344 Ext. 2 level3.networkrelocations@level3.com
MCI	Communications / Fiber Optic	Todd Mars 16563 NW 15th Ave Miami, FL 33169	(786) 886-4238 todd.mars@one.verizon.com
Miami-Dade County Public Works and Traffic	Not Available	Octavio Vidal 13284 SW 120th Street Miami, FL 33186	(305) 412-0891 Ext. 201 ovidal@htlocating.com
Miami-Dade County Water & Sewer	Water and Sewer	Sergio Garcia 3575 South Lejeune Road Miami, FL 33146	(786) 268-5320 sergio.garcia@miamidade.gov
Sprint	Fiber Optic	Mark Caldwell 851 Rafalgar Court Suite 300 Maitland, FL 32751	(321) 287-9942 mark.d.caldwell@sprint.com

Table 2.17 – Existing UAO Contact List (Continued)

Utility Company	Facility	Contact Information	
TECO People Gas South Florida	Gas	David Rivera 5101 NW 21st Avenue Suite 460 Fort Lauderdale, FL 33309	(954) 453-0794 drrivera@tecoenergy.com
Town of Davie – Utilities Department	Water and Sewer	Laura Borgesi 6591 Orange Drive Davie, FL 33314	(954) 797-1096 laura_borgesi@davie-fl.gov
Town of Pembroke Park	Sanitary, Sewer Storm	Raul Carbonell Craig A. Smith and Associates 7777 Glades Road Suite 410 Boca Raton, FL 33434	(561) 791-9280 rcarbonell@craigasmith.com
Windstream Communications	Fiber Optic	David F. Ackerman 929 Marthas Way Hiawatha, IA 52233	(800) 289-1901 David.F.Ackerman@Windstream.com
XO Communications	Fiber Optic	Tony Kowaleski 16563 NW 15th Avenue Miami, FL 33169	(305) 356-3160 anthony.kowaleski@xo.com

Notes: The UAO contact list was developed based on letters sent to each UAO or via responses received from the UAO within the I-95 corridor.

The following is a summary of existing utility facilities within the study limits. The crossing roadways and distances described below are approximate locations.

American Traffic Solutions – The location of the facilities was not provided by American Traffic Solution at this phase. Potential impacts (if any) are to be coordinated with American Traffic Solutions in future phases of the project.

AT&T Corporation (International) – AT&T fiber optic cable (FOC) locations within the study corridor were provided by the UAO. The information was provided via base map markups during the coordination phase. The FOC utilities are indicated to be HDPE in clusters of 6-4" and 4-4". The following are the locations indicated by the UAO:

- Taft Street
- Hallandale Beach Boulevard

AT&T Corporation (Transmission) – According to the review conducted by AT&T Corporation Long Line (Transmission), the UAO does not have existing facilities within the limits of this project. No involvement is anticipated.

AT&T Distribution – AT&T has substantial utility facilities located within the study corridor. The information was provided via base map markups during the coordination phase. These include cabinets, manholes, buried and overhead telephone running from west to east of I-95. The UAO indicated that the depth of existing facilities varies and should be at a minimum of 30 inches cover from existing grades. The following are the locations indicated by the UAO:

- Hallandale Beach Boulevard, ducts with coper, PVC, and flexible pipelines – underground and overhead
- Pembroke Road, ducts with coper and flexible pipe - underground
- Johnson Street, telephone and fiber clusters of 12-4", 18-4" and 6-4" PVC - underground
- Taft Street, ducts with coper pipes – buried
- Sheridan Street, ducts with clusters of 4-4" PVC and 2-3 ½" TRD – underground

Broward County Traffic Engineering – Broward County Traffic Engineering provided a map showing their facilities in the project area. The UAO indicated that the county has fiber optic communication lines on I-95 and other infrastructure may exist in the project area such as streetlights and school flashers. The following is the location indicated by the UAO:

- Buried Underground Fiber – from Hallandale Beach Boulevard to Johnson Street running along the east side of I-95.

Broward County Water and Wastewater Services – Broward County Water and Wastewater Engineering provided ten record drawing sets for the project area with facilities as built plans along Pembroke Road, Hallandale Beach Boulevard, and SW 30th Avenue. The following are the locations indicated by the UAO:

- Along Hallandale Beach Boulevard, 6" CIP water main, 8" water main and 18" water main casing within CSX railroad right of way running on the north side of the road, 8" CAP water main on the south side of the road west of I-95.
- Hallandale Beach Boulevard at SW 30th Avenue – 10" HDPE water main
- Hallandale Beach Boulevard at 31st Avenue – 8" water main
- Hallandale Beach Boulevard at South Park Road – 8" CIP force main
- Along Pembroke Road, 12" water main, 8" force main, valves, and manholes from SW 40th street to west of I-95 running on the south side of the road.
- Along Pembroke Road – 24" raw water main with 42" steel casings within the CSX railroad right of way.
- Pembroke Road at I-95 southbound on-ramp termini and I-95 northbound off-ramp termini crossings running from west of SW 31st Avenue to I-95 off-ramp termini.
- Pembroke Road from west of South Park Road to the golf course west of I-95 on the north side of the road – 4" Water main

Century Link – The UAO identified buried underground FOC facilities within the study limits. The UAO provided the locations of Century Link and Level 3 Communications facilities via base map markups. The following are the locations indicated by the UAO:

- Hallandale Beach Boulevard – fiber optic underground
- Pembroke Road – fiber optic underground
- Along Hallandale Beach Boulevard on the north side – fiber optic underground
- Along Pembroke Road on the north side – fiber optic underground

City of Hallandale Beach – City of Hallandale Beach provided utility records within the study limits. Their facilities are located east of I-95 and consist of water and sanitary sewer mains along the study corridor. The following are the locations indicated by the UAO:

- Along Hallandale Beach Boulevard – 8", 12" and 16" sanitary sewer from Ansin Boulevard to NW 6th Avenue

- NW 10th Terrace – 10" sanitary sewer
- NW 10th Avenue – 10" sanitary sewer
- NW 9th Terrace – 12" sanitary sewer
- Along Hallandale Beach Boulevard – 8" and 10" water main from Ansin Boulevard to NW 6th Avenue and 14" water main east of NW 6th Avenue
- NW 10th Terrace – 8" water main
- NW 10th Avenue – 6" water main
- NW 9th Terrace – 6" water main
- Martin Luther King Jr./SW 8th Ave – 6" water main
- NW 7th Avenue – 6" water main
- NW 6th Avenue – 10" water main

City of Hollywood Public Works Department – City of Hollywood Public Works Department provided a base map showing the location of their facilities from north of Pembroke Road to Hollywood Boulevard. The following are the locations indicated by the UAO:

- Along Hollywood Boulevard from east of Calle Grande Drive to west of 28th Avenue – 8" and 30" water main
- Along Hollywood Boulevard from Calle Largo Drive to west of Jaycee Boulevard – 8" VCP sanitary sewer
- I-95 crossing at Washington Street – 24" water main
- I-95 crossing at Fletcher Street – 8" water main

Comcast Cable – Comcast Cable facilities include underground and aerial lines. The following are the locations indicated by the UAO:

- I-95 at Miami-Dade/Broward County line – underground crossing
- Along Hallandale Beach Boulevard north side of the road – aerial
- Hallandale Beach Boulevard at CSX railroad and I-95 – underground crossing
- Hallandale Beach Boulevard – aerial crossing at South Park Road
- Hallandale Beach Boulevard – aerial crossing at Bryan Road
- Hallandale Beach Boulevard – underground crossing at SW 30th Avenue
- Hallandale Beach Boulevard – aerial crossing at NW 10th Terrace
- Along the west side of I-95 limited access right of way line south of Pembroke Road
- Pembroke Road – aerial crossing east of SW 30th Avenue

- Hollywood Boulevard – underground crossing at NW 31st Avenue
- Hollywood Boulevard – underground crossing at NW 28th Avenue
- Along Johnson Street south side of the road Boulevard – aerial
- Johnson Street – underground crossing at NW 30th Road
- Johnson Street – underground crossing at I-95
- Along Taft Street north side of the road – aerial
- Sheridan Street – underground crossing at I-95

Crown Castle NG – Fiber optic cable (FOC) locations within the study corridor were provided by the UAO. The FOC utilities are indicated to be buried underground. The following are the locations indicated by the UAO:

- Hallandale Beach Boulevard from west of SW 40th Avenue to east of Dixie Highway – buried

Fiberlight LLC – The location of the facilities was not provided by Fiberlight LLC at this phase. Potential impacts (if any) are to be coordinated with Fiberlight LLC in future phases of the project.

Florida City Gas – Florida City Gas has substantial utility facilities located within the study corridor. The UAO provided maps to show the location and material of their gas utilities within the study corridor. Florida City Gas utilities are located within or adjacent the right of way of the study limits. The following are the locations indicated by the UAO:

- Hallandale Beach Boulevard from west of SW 40th Avenue to South Park Road north side – 2" and 4" steel gas main
- Hallandale Beach Boulevard from South Park Road to SW 31st Avenue north side – 4" steel gas main
- Pembroke Road line from SW 40th Avenue to 1st Street south side – 4" steel gas main

Fibernet Direct – The UAO provided the location of FOC within the PD&E Study limits. The FOC utilities are indicated to be buried underground. The following are the locations indicated by the UAO:

- Buried Underground Fiber – Within the existing I-95 right of way (west side), from north of I-95 southbound off-ramp to Ives Dairy Road to Hallandale

Beach Boulevard and from I-95 southbound off-ramp to Hallandale Beach Boulevard to I-95 northbound off-ramp to Pembroke Road

- Buried Underground Fiber – west of I-95 right of way (west side), from north of off-ramp to Ives Dairy Road to Hallandale Beach Boulevard
- Buried Underground Fiber – in the vicinity of the existing I-95 right of way (east side), from of I-95 northbound off-ramp to Pembroke Road to Pembroke Road ramp termini
- I-95 crossing north of Ives Dairy Road overpass – buried
- Along Hallandale Beach Boulevard on the south side from west of the I-95 southbound on ramp termini to Ansin Boulevard and on the south side from NW 10th Terrace to the east of Hallandale Beach Boulevard
- Hallandale Beach Boulevard at Ansin Boulevard crossing – buried
- Hallandale Beach Boulevard at NW 10th Terrace crossing – aerial
- Along Pembroke Road on the south side from NW 31st Avenue to east of NW 8th Avenue – buried
- Pembroke Road at 28th Avenue crossing – buried
- Pembroke Road at 27th Avenue crossing – buried
- Along Hollywood Boulevard on both side of the road from 28th Avenue to the Arts Park at Young Circle – buried
- Hollywood Boulevard at 28th Avenue crossing – buried
- Along Johnson Street on the south side from west of CSX railway to east of I-95 – buried
- Along Taft Street on the south side from west of I-95 to east of I-95 – buried
- Along Sheridan Street on the north side from west of CSX railway to east of I-95 – buried

Florida Department of Transportation (ITS) – The Florida Department of Transportation ITS provided as built plans of the location of buried fiber optic within the study limits. The following are the location indicated by the agency:

- Along I-95 northbound on the east side from Miami-Dade County/Broward County line to north of Johnson Street
- Along Hallandale Beach Boulevard on the south side from Lake Shore Drive to SW 10th Terrace and from NW 9th Avenue to SW 8th
- Along Pembroke Road on the south side from I-95 to South 26th Avenue
- Along Hollywood Boulevard from west of Entrada Drive to east of S 28th Avenue.

Florida Power & Light – The UAO provided documentation of the location of existing distribution facilities, which consist of overhead and underground lines within the study limits. The following are the locations of FPL's distribution lines:

- Miami-Dade/Broward County Line – overhead 13K power line
- Running in the proximity of to I-95 northbound right of way line 300 feet north from Miami-Dade/Broward County Line – overhead 13K power line
- Running parallel to CSX railroad right of way line east and west side from Ives Dairy Road to Hallandale Beach Boulevard – buried and overhead 13K power line
- Hallandale Beach Boulevard – overhead 13k power line
- Pembroke Road – overhead 13k power line
- I-95 crossing at Washington Street crossing – overhead 13k power line
- I-95 crossing south of Johnson Street – underground 13k power line
- Johnson Street – overhead 13k power line
- Taft Street – overhead 13k power line

HEICO Corporation – According to the review conducted by HEICO Corporation, the UAO does not have existing facilities within the limits of this project. No involvement is anticipated.

Level 3 Communications – The UAO provided the locations of Level 3 Communications and Century Link facilities via base map markups. The following are the locations indicated by the UAO:

- Hallandale Beach Boulevard – fiber optic underground
- Pembroke Road – fiber optic underground
- Along Hallandale Beach Boulevard on the north side – fiber optic underground
- Along Pembroke Road on the north side – fiber optic underground

MCI – According to the review conducted by MCI/Verizon, the UAO does have existing facilities within the limits of this project. The location of their facilities is within CSX railway right of way. Potential impacts within these areas are to be coordinated with MCI.

Miami-Dade County Public Works and Traffic – The location of the facilities was not provided by Miami-Dade Public Works and Traffic at this phase. Potential impacts to street lighting and traffic signals (if any) are to be coordinated with Miami-Dade County Public Works and Traffic in future phases of the project.

Miami-Dade Water & Sewer – According to the review conducted by Miami Dade Water and Sewer Department, the UAO does not have existing facilities within the limits of this project. No involvement is anticipated.

Sprint – The location of the facilities was not provided by Sprint at this phase. Potential impacts (if any) are to be coordinated with Sprint in future phases of the project.

TECO Peoples Gas South Florida – The UAO indicated that does not have existing facilities that would be affected within the PD&E study limits. The following is the location indicated by the UAO:

- 2" Gas main along Ansin Boulevard and parallel to I-95 in Hallandale Beach

Town of Davie (Utilities Department) – According to the review conducted by the Town of Davie Utilities Department, the UAO does not have existing facilities within the limits of this project. No involvement is anticipated.

Town of Pembroke Park – According to the review conducted by the Town of Pembroke Park, the UAO does not have existing facilities within the limits of this project. No involvement is anticipated.

Windstream Communications – The UAO provided the location of FOC within the PD&E Study limits. The following is the location indicated by the UAO:

- Hallandale Beach Boulevard from SW 40th Avenue to NW 8th Avenue south side

XO Communications – According to the review conducted by the XO Communications, the UAO does have existing facilities within the limits of this project. Fibernet Direct controls and maintains these area facilities. The location of XO Communications facilities was not provided by Fibernet Direct at this phase.

2.19 LIGHTING

The existing lighting system along the I-95 corridor consists of conventional High-Pressure Sodium cobra head luminaires mounted on aluminum poles within the project limits. Lighting is provided along the I-95 mainline concrete median barrier. Roadway lighting on the ramps and arterials also consist of conventional cobra head luminaires located adjacent to the travel lanes. The maintaining agency for roadway lighting along the I-95 corridor and ramps is the Florida Department of Transportation.

2.20 SIGNS

2.20.1 ROADWAY SIGNING

An existing corridor sign inventory was performed along the I-95 mainline within the study limits. Signs are typically classified as regulatory, warning, guide, motorist information signs (general service signs) and Intelligent Transportation System (ITS).

As part of the documentation effort, each major roadway sign was photographed, inventoried, numbered, classified, and located on aerial photography. The sign structure numbers were also collected where available. As summarized in ***Table 2.18***, a total of 115 major signs were found within the study limits. ***Appendix D*** depicts the locations of all the signs. The following quantities of major signs and classifications were identified within the study limits:

Table 2.18 – Roadway Signing Inventory

Type of Sign	Quantity
Regulatory Signs	13
Warning Signs	2
Guide Signs	83
Motorist Information Signs	11
Intelligent Transportation System	6
Total	**115**

Source: Sign Inventory and Field Review

2.20.2 Intelligent Transportation System

The I-95 corridor within the project limits is currently monitored, analyzed, and managed from the FDOT District Four SunGuide^{SM} Transportation Management Center (TMC) using SunGuide^{SM} software to control and monitor ITS. ***Appendix E*** graphically shows the existing system within the study limits.

The ITS System was recently reconstructed within the project limits by the I-95 Express Phase 2 project (FPID# 422796-1-52-01 and 422796-2-52-01), which completed construction in 2016. The purpose of the Phase 2 project was to construct one to two express lanes in the northbound and southbound directions. The ITS scope included the installation of two 144 count single-mode (SM) fiber optic cable (FOC) backbones, replacement and installation of Microwave Vehicle Detection System (MVDS) approximately every 1/3 mile, replacement and installation of Closed Circuit Television (CCTV) Cameras for surveillance and dedicated use, relocation of existing Wireless Access Points (WAP), relocation of the existing Highway Advisory Radio (HAR) Beacons, removal of existing Voice over IP (VoIP) devices, replacement and installation of Dynamic Message Signs (DMS) for both general use lanes and express lanes, and installation of Lane Status DMS (LS-DMS), Toll Rate DMS (TR-DMS), and toll gantries for express lanes operation.

There are three arterials within the project limits: Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard. The ITS system along Hallandale Beach Boulevard includes an arterial DMS, MVDS, and CCTV in the eastbound direction east of Park Road. Along Pembroke Road there is an arterial DMS, MVDS, and CCTV in the westbound direction west of S 27th Avenue. Along Hollywood Boulevard there is an arterial DMS and WAP in the westbound direction east of 28th Avenue.

The following is a description of the existing ITS components:

- **Pan-Tilt-Zoom (PTZ) Closed Circuit Television (CCTV) cameras**: Surveillance CCTV cameras currently provide nearly 100 percent coverage of the project corridor and enable traffic monitoring and early incident detection capabilities. Within or approaching the project limits, the District Four SunGuide^{SM} TMC operates 14 surveillance CCTV cameras. There are also dedicated CCTV (D-CCTV), which provide verification of DMS messaging throughout the corridor. The District Four SunGuide^{SM} TMC operates 7 D-CCTV cameras within the project limits. The existing CCTV locations are listed in ***Table 2.19***.

Table 2.19 – Closed-Circuit Television Location and Structure Type

ID Number	Location	Station	CCTV Type	Structure Type
CCTV-95-16.51	NB I-95 S of Ives Dairy Rd	170+00	Surveillance	On Pole
D-CCTV 95-16.61	SB I-95 N of Ives Dairy Rd	175+50	Dedicated	Sign Structure
D-CCTV 95-17.17	NB I-95 S of the Miami-Dade / Broward county line	204+84	Dedicated	On Pole
CCTV 95-17.28	NB I-95 N of the Miami-Dade / Broward county line	211+05	Surveillance	On Pole
D-CCTV 95-17.38	NB I-95 N of the Miami-Dade / Broward county line	216+22	Dedicated	Sign Structure (Phase 3)
D-CCTV 95-17.53	NB I-95 N of the Miami-Dade / Broward county line	224+31	Dedicated	On Pole
D-CCTV 95-17.66	NB I-95 S of Hallandale Beach Blvd	232+00	Dedicated	Sign Structure
D-CCTV 95-17.85	SB I-95 S of Hallandale Beach Blvd on ramp	242+22	RSS Dedicated	Pole (Phase 3)
CCTV 95-17.95	NB I-95 S of Hallandale Beach Blvd	246+08	Surveillance	On Pole
D-CCTV 95-17.95	NB I-95 S of Hallandale Beach Blvd	246+08	Dedicated	On Pole
D-CCTV 95-18.02	NB I-95 N of Hallandale Beach Blvd on ramp	249+63	RSS Dedicated	Pole (Phase 3)
N/A	EB Hallandale Beach Blvd W of I-95	143+75	Surveillance	On Mast Arm
N/A	EB Pembroke Rd W of I-95	08+90	Surveillance	On Pole
CCTV 95-18.47	NB I-95 S of Pembroke Rd	273+62	Dedicated	On Pole (Phase 3)
D-CCTV 95-18.59	SB I-95 S of Pembroke Rd	280+00	Dedicated	On Pole (Phase 3)
D-CCTV 95-18.61	NB I-95 S of Pembroke Rd	280+80	Dedicated	On Pole (Phase 3)
CCTV 95-18.71	NB I-95 N of Pembroke Rd	289+78	Surveillance	On Pole
D-CCTV 95-18.90	NB I-95 N of Pembroke Rd	300+00	Dedicated	On Pole (Phase 3)
D-CCTV 95-18.91	NB I-95 N of Pembroke Rd	300+30	Dedicated	On Pole (Phase 3)
CCTV 95-19.13	SB I-95 N of Pembroke Rd	308+50	Surveillance	On Pole
D-CCTV 95-19.28	SB I-95 N of Pembroke Rd	316+63	Dedicated	On Pole (Phase 3)
CCTV 95-19.28	SB I-95 N of Pembroke Rd	316+63	Surveillance	On Pole (Phase 3)

Table 2.19 – Closed-Circuit Television Location and Structure Type (Continued)

ID Number	Location	Station	CCTV Type	Structure Type
D-CCTV 95-19.47	NB I-95 S of Hollywood Blvd	326+52	Dedicated	On Pole
D-CCTV 95-19.53	SB I-95 S of Hollywood Blvd	329+60	Dedicated	On Pole (Phase 3)
D-CCTV 95-19.67	SB I-95 S of Hollywood Blvd	337+00	Dedicated	On Pole (Phase 3)
CCTV 95-19.73	NB I-95 S of Hollywood Blvd	340+47	Surveillance	On Pole
NA	EB Hollywood Blvd E of I-95	297+37	Surveillance	On Mast Arm
N/A	WB Hollywood Blvd W of I-95	294+80	Surveillance	On Pole
D-CCTV 95-19.86	SB I-95 N of Hollywood Blvd	347+00	Dedicated	Sign Structure
D-CCTV 95-19.94	SB I-95 N of Hollywood Blvd	351+00	Dedicated	Pole (Phase 3)
D-CCTV 95-19.95	NB I-95 N of Hollywood Blvd	351+56	Dedicated	Pole (Phase 3)
D-CCTV 95-20.52	SB I-95 N of Johnson St	382+00	Dedicated	Pole (Phase 3)
CCTV 95-20.78	NB I-95 S of Taft St	395+63	Surveillance	On Pole
CCTV 95-21.37	NB I-95 N of Sheridan St	426+59	Surveillance	On Pole
N/A	EB Hallandale Beach Blvd E of Park Rd	130+00	Surveillance	Sign Structure
N/A (Sheet 22)	WB Pembroke Rd W of S 27th Ave	25+44	Surveillance	Sign Structure

- **Dynamic Message Signs (DMS)**: Full color DMS signs are currently deployed along the project corridor to inform motorists of current traffic conditions and incidents such as crashes, disabled vehicles, road work, car fires, hazmat spills, evacuations, and emergency alerts. Walk-In DMS are provided over the general use lanes and front-access DMS are provided over the express lanes. In addition, Lane Status and Toll Rate DMS are deployed to provide pricing and status information related to the express lanes. Front access arterial DMS are also provided along the arterials. The District Four SunGuide℠ TMC currently operates 3 general use lane DMS, 2 express lanes DMS, 2 Toll Rate DMS, 3 Lane Status DMS, and 3 arterial DMS within the project limits. The existing DMS locations are listed in ***Table 2.20***.

Table 2.20 – Dynamic Message Sign Location and Structure Type

ID Number	Location	Station	DMS Type	Structure Type
DMS 95-17.08-SB	SB I-95 S of the Miami-Dade / Broward county line	200+40	General Purpose	Overhead Truss
TR-DMS 95-17.25-NB	NB I-95 N of the Miami-Dade / Broward county line	209+50	Toll Rate	Overhead Truss
DMS 95-17.38-NB	NB I-95 N of the Miami-Dade / Broward county line	216+22	General Purpose	Overhead Truss
S-DMS 95-17.53-NB	NB I-95 N of the Miami-Dade / Broward county line	224+00	Lane Status	Overhead Cantilever
TR-DMS 95-17.66-NB	NB I-95 S of Hallandale Beach Blvd	232+00	Toll Rate	Overhead Truss
S-DMS 95-17.89-NB	NB I-95 S of Hallandale Beach Blvd	243+00	Lane Status	Overhead Truss
S-DMS 95-18.04-NB	NB I-95 N of Hallandale Beach Blvd	251+00	Lane Status	Overhead Cantilever
T-DMS 95-18.36-SB	SB I-95 S of Pembroke Rd	268+00	Toll Rate	Overhead Truss
S-DMS 95-18.55-NB	NB I-95 S of Pembroke Rd	278+00	Lane Status	Overhead Cantilever
T-DMS 95-18.70-NB	NB I-95 S of Pembroke Rd	286+00	Toll Rate	Overhead Truss
DMS 95-18.85-SB	SB I-95 N of Pembroke Rd	294+00	General Purpose	Overhead Truss
E-DMS 95-18.98-SB	SB I-95 N of Pembroke Rd	301+00	Express Lane	Overhead Truss
E-DMS 95-19.06-NB	NB I-95 N of Pembroke Rd	305+00	Express Lane	Overhead Truss
E-DMS 95-19.39-SB	SB I-95 N of Pembroke Rd	322+50	Express Lane	Overhead Cantilever
E-DMS 95-19.69-SB	SB I-95 S of Hollywood Blvd	338+00	Express Lane	Overhead Butterfly
E-DMS 95-19.69-NB	NB I-95 S of Hollywood Blvd	338+00	Express Lane	Overhead Cantilever
DMS 95-19.73-SB	SB I-95 S of Hollywood Blvd	340+00	General Purpose	Overhead Truss
DMS 95-20.14-NB	NB I-95 S of Hollywood Blvd	361+68	General Purpose	Overhead Truss
S-DMS 95-20.35-SB	SB I-95 N of Johnson St	373+00	Lane Status	Overhead Cantilever
N/A	EB Hallandale Beach Blvd E of Park Rd	130+00	Arterial	Overhead Cantilever
N/A	WB Pembroke Rd W of Park Rd	25+44	Arterial	Overhead Cantilever
N/A	WB Hollywood Blvd E of N 28th Ave	N/A	Arterial	Overhead Cantilever

- **Microwave Vehicle Detection System**: Microwave Vehicle Detection System (MVDS) sensors are deployed within the project limits as part of the District Four Vehicle Detection System. These devices are non-intrusive mounted on poles or sign structures along the shoulders and collect volume, vehicle type, average speed, lane occupancy, and long vehicle count data. The data from the MVDS are also used to calculate the dynamic toll pricing for the express lanes. Within the project limits, the District Four SunGuide^{SM} TMC currently operates 45 MVDS. The existing MVDS locations are listed in ***Table 2.21***.

Table 2.21 – Microwave Vehicle Detection System Location and Structure Type

ID Number	Location	Station	Structure Type
MVDS 95-16.64-NB	SB I-95 N of Ives Dairy Rd	177+15	On Pole
MVDS 95-16-64-SB	SB I-95 N of Ives Dairy Rd	177+15	On Pole
MVDS 95-16.98-NB	NB I-95 N of Ives Dairy Rd	195+00	On Pole
MVDS 95-16-98-SB	NB I-95 N of Ives Dairy Rd	195+00	On Pole
MVDS 95-17.36-SB-A	SB I-95 S of the Miami-Dade / Broward county line	215+00	Sign Structure
MVDS 95-17.36-SB-B	SB I-95 S of the Miami-Dade / Broward county line	215+00	Sign Structure
MVDS 95-17.38-NB-A	NB I-95 N of the Miami-Dade / Broward county line	216+22	Sign Structure
MVDS 95-17.38-NB-B	NB I-95 N of the Miami-Dade / Broward county line	216+22	Sign Structure
MVDS 95-17.66-A	NB I-95 S of Hallandale Beach Blvd	231+00	Pole (Phase 3)
MVDS 95-17.66-R	NB I-95 S of Hallandale Beach Blvd	232+00	Sign Structure
MVDS 95-17.91-SB-A	SB I-95 S of Hallandale Beach Blvd	244+00	On Pole
MVDS 95-17.91-SB-B	SB I-95 S of Hallandale Beach Blvd	244+00	On Pole
MVDS 95-17.95-NB-A	NB I-95 S of Hallandale Beach Blvd	246+08	On Pole
MVDS 95-17.95-NB-B	NB I-95 S of Hallandale Beach Blvd	246+08	On Pole
MVDS 95-18.13-NB-A	NB I-95 N of Hallandale Beach Blvd	255+61	On Pole
MVDS 95-18.13-NB-B	NB I-95 N of Hallandale Beach Blvd	255+61	On Pole
MVDS 95-18.14-NB-A	SB I-95 N of Hallandale Beach Blvd	256+00	On Pole
MVDS 95-18.14-NB-B	SB I-95 N of Hallandale Beach Blvd	256+00	On Pole
MVDS 95-18.36-SB-A	SB I-95 N of Hallandale Beach Blvd	267+67	Sign Structure
MVDS 95-18.36-SB-B	SB I-95 N of Hallandale Beach Blvd	267+67	Sign Structure

Table 2.21 – Microwave Vehicle Detection System Location and Structure Type (Continued)

ID Number	Location	Station	Structure Type
MVDS 95-18.36-NB-A	NB I-95 N of Hallandale Beach Blvd	267+95	Sign Structure
MVDS 95-18.36-NB-B	NB I-95 N of Hallandale Beach Blvd	267+95	Sign Structure
MVDS 95-18.59-SB	SB I-95 S of Pembroke Rd	280+00	On Pole
MVDS 95-18.61-NB	NB I-95 S of Pembroke Rd	280+80	On Pole
MVDS 95-18.71-NB	NB I-95 N of Pembroke Rd	289+78	On Pole
MVDS 95-18.71-SB	NB I-95 N of Pembroke Rd	289+78	On Pole
MVDS 95-18.85-SB-A	SB I-95 N of Pembroke Rd	294+00	Sign Structure
MVDS 95-18.85-SB-B	SB I-95 N of Pembroke Rd	294+00	Sign Structure
MVDS 95-18.91-NB-A	NB I-95 N of Pembroke Rd	300+30	On Pole
MVDS 95-18.91-NB-B	NB I-95 N of Pembroke Rd	300+30	On Pole
MVDS 95-19.13-SB-A	SB I-95 N of Pembroke Rd	308+50	On Pole
MVDS 95-19.13-SB-B	SB I-95 N of Pembroke Rd	308+50	On Pole
MVDS 95-19.20-NB-A	NB I-95 N of Pembroke Rd	312+40	Sign Structure
MVDS 95-19.20-NB-B	NB I-95 N of Pembroke Rd	312+40	Sign Structure
MVDS 95-19.28-SB	SB I-95 N of Pembroke Rd	316+63	On Pole
MVDS 95-19.31-NB	NB I-95 N of Pembroke Rd	318+00	On Pole
MVDS 95-19.39-R	NB I-95 S of Hollywood Blvd	322+11	Sign Structure
MVDS 95-19.53-SB	SB I-95 S of Hollywood Blvd	329+60	Pole (Phase 3)
MVDS 95-19.53-SB	SB I-95 S of Hollywood Blvd	329+60	Pole (Phase 3)
MVDS 95-19.67-R	SB I-95 S of Hollywood Blvd	337+00	Pole (Phase 3)
MVDS 95-19.67-SB	SB I-95 S of Hollywood Blvd	337+00	Pole (Phase 3)
MVDS 95-19.69-SB-A	SB I-95 S of Hollywood Blvd	338+10	On Pole
MVDS 95-19.69-SB-B	SB I-95 S of Hollywood Blvd	338+10	On Pole
MVDS 95-19.73-NB-A	NB I-95 S of Hollywood Blvd	340+47	On Pole
MVDS 95-19.73-NB-B	NB I-95 S of Hollywood Blvd	340+47	On Pole
MVDS 95-19.94-SB	SB I-95 N of Hollywood Blvd	351+00	On Pole (Phase 3)
MVDS 95-19.95-NB	NB I-95 N of Hollywood Blvd	351+56	On Pole (Phase 3)
MVDS 95-20.06-NB	NB I-95 N of Hollywood Blvd	358+00	On Pole (Phase 3)
MVDS 95-20.14-SB-A	SB I-95 S of Johnson St	362+00	Sign Structure
MVDS 95-20.14-SB-B	SB I-95 S of Johnson St	362+00	Sign Structure
MVDS 95-20.30-NB-A	NB I-95 N of Johnson St	370+30	On Pole
MVDS 95-20.30-NB-B	NB I-95 N of Johnson St	370+30	On Pole

Table 2.21 – Microwave Vehicle Detection System Location and Structure Type (Continued)

ID Number	Location	Station	Structure Type
MVDS 95-20.31-NB-A	SB I-95 N of Johnson St	370+86	On Pole (Phase 3)
MVDS 95-20.31-NB-B	NB I-95 N of Johnson St	370+90	On Pole (Phase 3)
MVDS 95-20.52-NB-A	SB I-95 N of Johnson St	382+00	On Pole (Phase 3)
MVDS 95-20.52-NB-B	NB I-95 N of Johnson St	382+00	On Pole (Phase 3)
MVDS 95-20.75-SB-A	SB I-95 S of Taft St	394+00	Sign Structure
MVDS 95-20.75-SB-B	SB I-95 S of Taft St	394+00	Sign Structure
MVDS 95-20.78-NB-A	NB I-95 S of Taft St	395+63	On Pole
MVDS 95-20.78-NB-B	NB I-95 S of Taft St	395+63	On Pole
MVDS 95-20.98-R	NB I-95 N of Taft St	406+12	Sign Structure
MVDS 95-21.30-SB-A	SB I-95 S of Sheridan St	423+00	On Pole
MVDS 95-21.30-SB-B	SB I-95 S of Sheridan St	423+00	On Pole
MVDS 95-21.37-NB-A	NB I-95 N of Sheridan St	426+59	On Pole
MVDS 95-21.37-NB-B	NB I-95 N of Sheridan St	426+59	On Pole
N/A	EB Hallandale Beach Blvd E of Park Rd	130+00	Sign Structure
N/A	WB Pembroke Rd W of S 27th Ave	25+44	Sign Structure

- **Highway Advisory Radio (HAR) System:** The corridor HAR system includes TMC equipment which is connected to each transmitter site over a fiber optic communications link. This allows complete remote control of each transmitter from the TMC, via downloading of messages in digital form. The existing HAR location is listed in ***Table 2.22***.

Table 2.22 – Highway Advisory Radio Location and Structure Type

ID Number	Location	Station	Structure Type
HAR 95-17.47-NB	NB I-95 S of Hallandale Beach Blvd	221+00	HAR Beacon

- **Wireless Access Point (WAP) System:** The corridor WAP system is typically utilized for wireless communication between arterial DMS and the FOC backbone for locations where FOC is not installed. Within the project limits, the District Four SunGuide℠ TMC currently operates 7 WAP. The existing WAP locations are listed in ***Table 2.23***.

Table 2.23 – Wireless Access Point Location and Structure Type

ID Number	Location	Station	Structure Type
WAP 95-17.95-WB	NB I-95 S of Hallandale Beach Blvd	246+08	On Pole
WAP 95-17.95-EB	NB I-95 S of Hallandale Beach Blvd	246+08	On Pole
WAP 95-19.73-EB	NB I-95 S of Hollywood Blvd	340+47	On Pole
WAP 95-19.78-WB	NB I-95 N of Hollywood Blvd	342+75	On Pole
WAP 95-21.37-EB	NB I-95 N of Sheridan St	426+59	On Pole
WAP 95-21.37-WB	NB I-95 N of Sheridan St	426+59	On Pole
N/A	WB Hollywood Blvd E of N 28th Ave	N/A	Sign Structure

- **Toll Gantry System:** With the installation of the express lanes with I-95 Phase 2, toll gantries were installed along the corridor to collect tolls from motorists choosing to utilize the express lanes. The toll sites include a full span gantry, toll building, pull-off area, median pull-boxes, and loop detectors. There is currently one toll gantry within the project limits as per ***Table 2.24***.

Table 2.24 – Toll Gantry Location and Structure Type

ID Number	Location	Station	Structure Type
Toll Site 2	NB I-95 S of Hollywood Blvd	324+50	Overhead Truss

- **Fiber Optic Communication System**: The Fiber Optic Communication system for the currently deployed ITS equipment was installed by the I-95 Express Phase 2 Project and is typically located along the east side of I-95 near the right of way. The FOC backbone consists of 144 count single-mode (SM) FOC with 24 SM FOC for the drop cables. There is one Master HUB within the project limits located in the toll building at Toll Site 2 south of Hollywood Boulevard. Multiple MVDS along the southbound side of the roadway are connected to cabinets on the northbound side utilizing composite cable.

2.21 Aesthetics Features

There are no scenic views, vistas, or special landscaping within the I-95 study limits. I-95 is an urban limited access freeway corridor. However, there are some minor vegetation at the interchanges with welcome signs to the local cities.

2.22 Bridges and Structures

There are six existing bridges located within the study limits. ***Figure 2.12*** depicts the location of the bridges.

- Five bridges over roadways – Hallandale Beach Boulevard, Pembroke Road, Hollywood Boulevard, and Johnson Street
- One bridge over water – Hollywood Canal

Table 2.25 identifies the locations, descriptions, and specific details about each of the bridges within the study limits. Location, geometrics, alignment, type of structure, and condition data was collected and analyzed for each structure. The information presented in this section is a summary of the *Bridge Analysis Report*, a companion document to this PD&E Study (see ***Appendix F***).

2.22.1 Type Of Structure

All the existing bridges, within the study limits, are composed of prestressed concrete girder superstructures (AASHTO Beams) supported on multi-column bents, except for the Hollywood Boulevard bridge over the Hollywood Canal (Bridge No. 860599), which is a Concrete Deck Slab (CIP).

The type of structure for each bridge along the corridor is summarized in ***Table 2.25.***

2.22.2 Condition

The FDOT performs biennial inspections and evaluations of all fixed bridges under its jurisdiction as part of the "National Bridge Inventory (NBI) and Structural Inventory and Appraisal Program" required by the FHWA. The latest available bridge inspection reports were obtained through the FDOT for all the existing bridges. These reports were reviewed for every bridge and the pertinent information was recorded, including the sufficiency rating, the health index, vertical and horizontal clearances, and noted deficiencies.

SUMMARY OF STRUCTURES	
ITEM	QUANTITY
EXISTING BRIDGES	6

Figure 2.12 - Existing Bridge Location Map

Table 2.25 – Existing Bridge Characteristics

LOCATION			GEOMETRICS					ALIGNMENT					STRUCTURAL					CONDITION					
Bridge ID No.	Bridge Location	Direction	Structure Length (ft)	Deck Width (ft)	Shoulder Width		No. of Lanes	Skew Angles (Degrees)	Horizontal Clearance		Min. Vertical Clearance (ft)	Underneath Roadway Designation	Number of Spans	Max. Span (ft)	Superstructure Type	Exterior Beam Type	Substructure Type	Year Built/ Widened	Sufficiency Rating (%)	Health Index	Load Rating	Inspection Date	Significant Deficiencies
					Inside	Outside			Inside (LF)	Outside (RT)													
860529	SR 9 / I-95 Over Hallandale Beach Boulevard (SR 858)	NB/SB	244	187.08	NB = 6'-8" SB = 8'-0"	NB = 13'-4" SB = 12'-0"	12 (6 in each direction)	0.00	13.00	14.67	16.50	SR 858 Hallandale Beach Blvd.	4	84	Prestressed Concrete Beams w/ CIP Concrete Deck	Prestressed FIB 45	Reinforced Concrete Column Piers and Abutments	Built in 1990, Widened in 2013	98.00	99.96	RF = 1.04, 37.4 Tons (Inv LRFR)	8/20/2015	None Visible
860531	SR 9 / I-95 Over Pembroke Road (SR 824)	NB/SB	243.5	187.08	NB = 6'-6" SB = 7'-9"	NB = 13'-6" SB = 12'-3"	12 (6 in each direction)	0.00	14.25	15.25	16.50	SR 824 Pembroke Road	4	84	Prestressed Concrete Beams w/ CIP Concrete Deck	Prestressed FIB 45	Reinforced Concrete Column Piers and Abutments	Built in 1990, Widened in 2013	98.00	99.89	RF = 1.00, 36.0 Tons (Inv LRFR)	8/20/2015	None Visible
860530	SR 9 / I-95 Over Hollywood Blvd.(SR 820)	NB/SB	244.00	187.08	NB = 6'-3" SB = 6'-3"	NB = 13'-9" SB = 13'-9"	12 (6 in each direction)	0.00	13.00	15.00	16.50	SR 820 Hollywood Blvd.	4	84	Prestressed Concrete Beams w/ CIP Concrete Deck	Prestressed FIB 45	Reinforced Concrete Column Piers and Abutments	Built in 1990, Widened in 2013	98.00	99.86	RF = 1.04, 37.4 Tons (Inv LRFR)	8/20/2015	None Visible
860599	SR 820 Over Hollywood Canal	EB/WB	20.25	Varies from 137.83 to 141.41	EB = 0'-0" WB = 0'-0"	EB = 1'-0" * WB = 1'-0"	EB = 6 lanes WB = 3 lanes	0.00	N/A	N/A	1.85 over DHW	Bridge Over Canal	1	20.25	CIP Concrete Deck Slab	N/A	Reinforced Conc. Abutments Supported on 18" sq Prest. Conc. Piles and Type II Anchor Beams	1971-1996	90.80	98.92	RF = 1.27 45.7 Tons (Inv LFR)	8/21/2015	None Visible
860102	I-95 OverJohnson St. SB	SB	147.00	97.67	10'-10 1/2"	10'-0"	6 Lanes	0.00	N/A	14.17	14.42	Johnson St.	3	71	Prestressed Concrete Beams w/ CIP Concrete Deck	AASHTO Type III	Reinforced Concrete Column Piers and Abutments (Bridges 860102 and 860101 share same substructure)	Built in 1962, Widened in 1990, 2nd widening 2020	89.70	99.95	RF = 1.28 46.1 Tons (Inv LRFR)	12/12/2017	Vertical Clearence
860202	I-95 OverJohnson St. NB	NB	147.00	97.67	10-10 1/2"	10'-0"	6 Lanes	0.00	N/A	15.47	15.47	Johnson St.	3	71	Prestressed Concrete Beams w/ CIP Concrete Deck	AASHTO Type III		Built in 1962, Widened in 1990, 2nd widening 2020	89.70	99.95	RF = 1.28 46.1 Tons (Inv LRFR)	12/12/2017	Vertical Clearence

The health index is a tool that measures the overall condition of a bridge. A lower health index indicates that more work is needed to bring the bridge to an ideal condition. The sufficiency rating is an index tool used to determine whether a bridge that is structurally deficient or functionally obsolete should be repaired or replaced and is not a direct reflection of the bridges' ability to carry traffic loads. The sufficiency rating considers several factors, approximately half of which relates to the condition of the bridge itself and the rest relates to the obsolescence of its design and its importance to the public.

The sufficiency ratings are assigned on a scale of 0 to 100, with 0 failing and 100 excellent. The sufficiency rating is the formula used to evaluate the remaining service of a bridge by rating four groups of factors:

1. Structural Adequacy and Safety
2. Serviceability and Functional Obsolescence
3. Essential for Public Use
4. Special Reductions

A review of the existing bridge inspection reports indicated that all bridges have acceptable health indexes varying from 98.92 to 99.96 and acceptable sufficiency ratings varying from 89.7 to 98.0. Bridge load rating capacity forms were also obtained from FDOT and reviewed to verify the structural capacity for each bridge. The forms indicate both the inventory and operating ratings. Based on the inspection reports, all bridges are in good condition with some deficiencies. In the case of the I-95 bridge over Johnson Street, load rating information of the 2020 widening indicates that another bridge widening is feasible. The condition of each of the bridges is summarized in ***Table 2.25. Appendix F*** includes additional detailed information about the existing bridge structure conditions.

2.22.3 Vertical Clearance

Vertical Clearance – The vertical clearance relates to the adequate clear height of an overpass/overhead or underpass structure/facility to the roadway and shoulder areas. In accordance with the *FDM Part I, Chapter 260, Section 260.6, Table 260.6.1*, the vertical clearance criteria for a bridge over a roadway is 16'-6", for a roadway over railroad is 23'-6", and for a pedestrian bridge over a roadway is 17'-6". AASHTO requires a minimum vertical clearance of 16' for structures passing over a roadway. The two I-95 bridges over Johnson Street do not meet the FDM minimum vertical clearance criteria. As part of this study, the existing clearance at these bridges will be maintained at their current level. In order to move forward with a bridge widening where there is a substandard vertical clearance, an approval will be required through an FDOT design variation or exception.

3.0 Project Design Controls and Criteria

3.1 Roadway Context Classification

Context classification does not apply to limited-access facilities.

3.2 Design Control and Criteria

Design standards are well defined for Florida's limited access facilities. Design standards and criteria provide the framework for evaluating the current geometry, existing deficiencies, and future design to meet the mobility needs of the corridor. Specifically, they help establish the roadway typical section, cross-sections, and acceptable interchange configurations.

Roadway design elements and applicable design standards considered in the design of the proposed improvements for the corridor are summarized in ***Table 3.1***.

Table 3.1 – Roadway Design Elements and Standards

Design Element	Design Standard								Source
Lane Width									
Mainline I-95	12 ft								FDM, Part 2, Section 211.2, page 2
Arterial Urban	Travel (feet)			Travel (feet)			Two-Way Left Turn (feet)		FDM, Part 2, Table 210.2.1, page 3
	Design Speed (mph)			Design Speed (mph)			Design Speed (mph)		
	23-35	40-45	≥50	23-35	40-45	≥50	25-35	40	
	10	11	12	10	11	12	11	12	
One Lane Ramp	15 ft (Tangent)								FDM, Part 2, Table 211.2.1, page 3
Two Lanes Ramp	24 ft (Tangent)								
Express Lanes (separated or concurrent flow)	12 ft								FDM, Part 2, Section 2.11.2, page 2
Median Width									
Mainline With Barrier	26 ft								FDM, Part 2, Table 211.3.1, page 10
Arterial Urban	**Curbed Roadways and Flush Shoulder Roadways (feet)**								FDM, Part 2, Table 210.3.1, page 18
	Design Speed (mph)								
	25-35				**40-45**				
	15.5 ft				22 ft				
Shoulder Width	**Without Shoulder Gutter**				**With Shoulder Gutter**				
	Full Width		**Paved Width**		**Full Width**		**Paved Width**		
	Outside	**Median/Left**	**Outside**	**Median/Left**	**Outside**	**Median/Left**	**Outside**	**Median/Left**	
Mainline I-95	12 ft	12 ft	10 ft	10 ft	15.5 ft	15.5 ft	8 ft	8 ft	FDM, Part 2, Table 211.4.1, page 20
One Lane Ramp	6 ft	6 ft	4 ft	2 ft	11.5 ft	11.5 ft	4 ft	4 ft	
Two Lanes Ramp	10 ft	8 ft	8 ft	4 ft	15.5 ft	13.5 ft	8 ft	6 ft	
One Lane (Express Lane)	12 ft	8 ft	10 ft	4 ft	15.5 ft	13.5 ft	8 ft	6 ft	
Two Lanes (Express Lane)	12 ft	8 ft	10 ft	4 ft	15.5 ft	13.5 ft	8 ft	6 ft	
Arterial 4-Lanes or more	10 ft	10 ft	5 ft	4 ft	15.5 ft	15.5 ft	8 ft	8 ft	FDM, Part 2, Table 210.4.1, page 33
Arterial 3-Lanes	10 ft	10 ft	5 ft	0 ft	15.5 ft	15.5 ft	8 ft	8 ft	
Arterial 1-Lane & 2-Lanes	10 ft	8 ft	5 ft	0 ft	15.5 ft	13.5 ft	8 ft	6 ft	
Arterial Auxiliary Lanes	10 ft	8 ft	5 ft	0 ft	15.5 ft	11.5 ft	4 ft	4 ft	
Bridge Shoulder Width									
Mainline-Two Lanes	6 ft Inside, 10 ft Outside								FDM, Part 2, Figures 260.1.1 – 260.1.4
Mainline-Three Lanes +	10 ft Inside and Outside								
Arterial	6 ft Inside, 10 ft Outside								
Ramp-One Lane	6 ft Inside and Outside								
Ramp-Two Lanes	6 ft Inside, 10 ft Outside								
Separation Width for Express Lane									
Express Lanes (one lane or concurrent flow)	Minimum buffer width is 4ft								FDM 211.3.3, page 14
Roadway Mainline Cross Section Slope									
Roadway Standard Pavement	0.03 maximum (> 45 MPH)								FDM, Part 2, Figure 211.2.1, page 5
	0.04 maximum (≤ 45 MPH)								
Inside Shoulder	0.05								FDM, Part 2, Section 211.4.2, page 21
Outside Shoulder	0.06								
Maximum Shoulder Cross Slope Break	0.06								
Bridge Deck	0.02								FDM, Part 2, Section 260.4, page 7
Maximum algebraic difference between adjacent through lanes	0.04								FDM, Part 2, Table 211.2.2, page 4
Front Slope	1:6 when the height of fill is between 0 ft to 5 ft								FDM, Part 2, Table 215.2.3, page 17
	1:6 to edge of clear zone then 1:4 when the height of fill is between 5 ft to 10 ft								
	1:6 to edge of clear zone then 1:3 when the height of fill is between 10 ft to 20 ft								
	1:2 with guardrail when height of fill is greater than 20 ft								
Back Slope	1:4 or 1:3 with a standard width trapezoidal ditch and 1:6 front slope								
Transverse Slope	1:10 or flatter (freeway), 1:4 (others)								

Table 3.1 – Roadway Design Elements and Standards (Continued)

<table>
<tr><th>Design Element</th><th colspan="3">Design Standard</th><th>Source</th></tr>
<tr><td colspan="5">Roadway Arterial Cross Section Slope</td></tr>
<tr><td>Outside Shoulder</td><td colspan="3">0.06</td><td rowspan="2">FDM, Part 2, Section 210.4.1, page 34</td></tr>
<tr><td>Median</td><td colspan="3">0.05</td></tr>
<tr><td colspan="5">Border Width</td></tr>
<tr><td>Mainline I-95</td><td colspan="3">94 ft (1)</td><td>FDM, Part 2, Section 211.6, page 29</td></tr>
<tr><td rowspan="3">Arterial Urban</td><td colspan="2">Curbed and High-Speed Curbed Design Speed (mph)</td><td>Flush Shoulder Design Speed (mph)</td><td rowspan="3">FDM, Part 2, Table 210.7.1, page 48</td></tr>
<tr><td>25-35</td><td>45</td><td>25-45</td></tr>
<tr><td>12 ft</td><td>14 ft</td><td>33 ft</td></tr>
<tr><td colspan="5">Recoverable Terrain (Clear Zone)</td></tr>
<tr><td>Mainline I-95</td><td colspan="3">36 ft</td><td rowspan="5">FDM, Part 2, Table 215.2.1, page 4</td></tr>
<tr><td>One Lane Ramp</td><td colspan="3">10 - 18 ft</td></tr>
<tr><td>Two Lane Ramp</td><td colspan="3">12 - 30 ft</td></tr>
<tr><td>Auxiliary Lane</td><td colspan="3">24 ft</td></tr>
<tr><td>Arterial</td><td colspan="3">12 - 24 ft</td></tr>
<tr><td colspan="5">Roadway Base Clearance</td></tr>
<tr><td></td><td colspan="3">3.0 ft above the Base Clearance Water Elevation</td><td>FDM, Part 2, Section 210.10.3, page 48</td></tr>
</table>

Note: FDOT Design Manual, January 1, 2021

[1] Measured from the edge of the outside travel lane to the right of way line.

3.2.1 Horizontal and Vertical Alignment

Design elements and applicable design standards considered in the design of the horizontal and vertical alignments such as profiles, curves, and vertical clearances are summarized in ***Table 3.2***.

Table 3.2 – Horizontal and Vertical Alignment Design Elements and Standards

Design Element	Design Standard	Source
Design Vehicle		
Mainline I-95	WB-20 [WB-67]	AASHTO, page 2-5
Mainline I-95	WB-62FL	FDM, Part 2, Figure 201.6.1
For Structural Loading	HL-93	AASHTO, page 8-4
Design Speed		
Mainline I-95	65 MPH	FDM Part 2, Table 201.5.1
CD Systems	55 MPH	FDM, Part 2, Section 201.5.1.1
Ramps	30-50 MPH	FDM Part 2, Table 201.5.2
Arterials (Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard)	35-40 MPH	N/A
Maximum Deflection without curve		
Mainline I-95	0° 45' 00" for V ≥ 50 MPH	FDM, Part 2, Section 210.8.1
Ramps (without Curb and Gutter)	0° 45' 00" for V ≥ 45 MPH	
	2° 00' 00" for V ≤ 40 MPH	
Arterials	2° 00' 00"	
Length of Horizontal Curve		
Mainline I-95 (Desired Length=30x Design Speed)	1950 ft for V = 65 MPH	FDM, Part 2, Table 210.8.1, Table 211.7.1
Mainline I-95 (Minimum Length=15x Design Speed)	975 ft for V = 65 MPH	
Ramps, Arterials (Length=15x Design Speed)	450 ft for V = 30 MPH	
Ramps, (Length=15x Design Speed)	750 ft for V = 50 MPH	
Ramps, Arterials (Minimum)	400 ft	

Table 3.2 – Horizontal and Vertical Alignment Design Elements and Standards (Continued)

Design Element	Design Standard	Source
Maximum Degree of Curve		
Mainline I-95	4° 15' (65 mph) with R = 1348	FDM, Part 2, Table 210.9.1
Ramps	24° 45' (30 mph) with R = 231.5 ft	
	8° 15' (50 mph) with R = 695 ft	
Arterials	14° 15' (35 mph) with R = 402 ft	FDM, Part 2, Table 210.9.2
	10° 45' (40 mph) with R = 533 ft	
Maximum Profile Grade		
Mainline I-95	3%	FDM, Part 2, Table 211.9.1
Ramps	7% (25-30 MPH)	
	6% (35-40 MPH)	
	5% (45-50 MPH)	
Maximum Change in Grade without Vertical Curve		
Mainline I-95	0.30%	FDM, Part 2, Table 210.10.2
Ramps	1.00% - 0.6%	
Minimum Stopping Sight Distance		
Mainline I-95	730 ft	FDM, Part 2, Table 211.10.1
Ramps	200 ft - 425 ft	FDM, Part 2, Table 211.10.2
Arterials	250 ft – 305 ft	FDM, Part 2, Table 210.11.1

Table 3.2 – Horizontal and Vertical Alignment Design Elements and Standards (Continued)

Design Element	Design Standard	Source
Minimum Crest Vertical Curve Length		
Mainline I-95	1000 ft (Expressway open highway)	FDM, Part 2, Table 211.9.3
	1800 ft (Expressway within interchanges)	
Ramps (Length=3x Design Speed)	90 ft (30 MPH) - 300 ft (50 MPH)	
K value for Crest Vertical Curve		
Mainline I-95	313(65 MPH)	FDM, Part 2, Table 211.9.2
Minimum Sag Vertical Curve Length		
Mainline I-95	800 ft (Interstate)	FDM, Part 2, Table 211.9.3
Ramps (Length=3x Design Speed)	90 ft (30 MPH) – 200 (50 MPH)	
K value for Sag Vertical Curve		
Mainline I-95	181 (65 MPH)	FDM, Part 2, Table 211.9.2
Superelevation (e)		
Maximum Superelevation for Interstate	0.1	FDM, Part 2, Table 210.9.1
Superelevation Transition Rate (65-70 mph)	1:200 for 3 lanes	FDM, Part 2, Table 210.9.3
	1:190 for 4 lanes	
Superelevation Transition Ratio (Curve:Tangent)	20:80 preferred	FDM, Part 2, Section 210.9.1
	50:50 minimum	
Minimum Vertical Clearances		
Bridge over Roadways	16.5 ft	FDM, Part 2, Table 260.6.1
Roadway over Railroad	23.5 ft	
Pedestrian Bridge over Roadway	17.5 ft	
Overhead Sign Structure	17.5 ft	FDM, Part 2, Section 210.10.3
Overhead DMS Structures	19.5 ft	

Table 3.2 – Horizontal and Vertical Alignment Design Elements and Standards (Continued)

Design Element	Design Standard	Source
Minimum Spacing Between Ramps		
Off-ramp to Off-ramp	1000 ft	AASHTO Figure 10-68, page 10-106
On-ramp to On-ramp	1000 ft	
On-ramp to Off-ramp (Weaving)	2000 ft	
Off-ramp to On-ramp	500 ft	

3.2.2 Drainage Criteria

The design criteria presented in this section are based on the design parameters outlined in the following references:

- 2021 FDOT, Drainage Manual (DM)
- 2021 FDOT, Florida Design Manual (FDM)
- 2021-22 FDOT Standard Plans for Roadway and Bridge Construction
- 2021 FDOT, Standard Specifications for Roadway and Bridge Construction
- 2014 SFWMD, Environmental Resource Permit Information Manual, Volume IV

Design criteria considered in the development of the drainage for this project are summarized in ***Table 3.3***.

Table 3.3 – Drainage Design Criteria

Design Element	Design Standard	Source
Open Channel Design Frequency	10 Year for Ditches/Swales 25 Year for Outfall Ditches and Canals	DM Section 2.2 Table 2.1
Open Channel Minimum Slope	0.0005 ft/ft	DM Section 2.4.2
Channel Velocity (Maximum)	4 fps for Sod Lining 5 fps for Stake Sod Lining 6 fps for Riprap Rubble Lining 10 fps for Rigid Lining	DM Table 2.5
Storm Drain Design Frequency	3 Year for General Design 10 Year for Interstate Facilities	DM Section 3.3 Table 3.1
Storm Drain Design Tailwater	Stormwater Ponds: Peak stage in the pond during storm drain design event French Drains: Design Head over the outlet control structure Regulated Canals: Agency regulated control elevation	DM Section 3.4
Minimum Time of Concentration	10 Minutes	DM Section 3.5.1
Minimum Pipe Slope	Minimum Slope which produces a storm drain velocity of 2.5 fps when full and no greater than 15 fps when the storm drain is flowing full	DM Section 3.6.1
Hydraulic Gradient	When minor the Hydraulic Grade Line (HGL) energy losses are not considered, HGL shall be 1 ft below the theoretical gutter elevation	DM Section 3.6.2
Outlet Velocity	When outlet velocity exceeds 6 fps provide special channel lining and/or energy dissipater	DM Section 3.6.3
Spread Standards	Spread resulting from 4 inches per hour shall be limited to: ½ lane for < 45 MPH 8 ft of lane clear for 45 MPH to 55 MPH No encroachment for > 55 MPH	DM Section 3.9 Table 3.9.1
Minimum Pipe Size	18 inches	DM Section 3.10.1
Maximum Pipe Length	Pipe without French Drains 300 ft for 18 inches pipes 400 ft for 24 to 36 inches pipes 500 ft for > 42 inches pipes French Drains (Minimum Length from Access) 150 ft for 18 to 30 inches pipes 200 ft for > 36 inches pipes	DM Section 3.10.1

Table 3.3 – Drainage Design Criteria (Continued)

Design Element	Design Standard	Source
Cross Drains Design Frequency	50 years for Mainline Interstate and Facilities with projected 20 year ADT > 1500 25 years for Facilities with projected 20 year ADT < 1500 10 years for roadside ditch culverts	DM Section 4.3
Wet Detention and Retention Ponds Maintenance Berm	20 ft minimum between top edge of normal pool elevation and right of way line, 15 ft adjacent to the water sloped at 1:8 or flatter	DM Section 5.4.4.2 SFWMD ERP Manual Section 7.5
Detention and Retention Ponds Freeboard	1 ft freeboard required above peak design stage for ponds and 0.5 foot minimum freeboard for linear treatment swales	DM Section 5.4.4.2
Wet Detention and Retention Ponds Requirements	Total Area = 0.5 acre minimum Slopes between control elevation and 2 ft below it shall be 1:4 or flatter	DM Figure 5-1 SFWMD ERP Manual Section 7.4
Water Quality Requirements	Wet Detention: Greater of 1 inch over total project area or 2.5 inches over total impervious Dry Detention: 75% of wet detention Wet/Dry Retention: 50% of wet or dry detention accordingly	SFWMD ERP Manual Section 5.2.1
Water Quality Requirements	Post Development discharge rate equal to or less than pre development discharge rate for 25 year – 3 day storm event, or rates specified in district criteria	SFWMD ERP Manual Section 6.2 and 6.3
Floodplain Encroachment	No encroachment allowed	SFWMD ERP Manual Section 6.4
Outfall Structures	Structures shall include baffles systems. Structures shall include bleed down notch or orifice that allows ½ inches of the detention volume to be discharged within 24 hours.	SFWMD ERP Manual Section 7.1 and 7.2

4.0 ALTERNATIVE ANALYSIS

4.1 PREVIOUS PLANNING STUDIES

I-95 Broward Interchanges Masterplan – In 2016, FDOT District Four evaluated the feasibility of implementing interchange improvements on I-95 at 16 of the 19 interchanges in Broward County (see ***Figure 4.1***). The planning study, called *I-95 Broward Interchanges Masterplan FPID# 432785-2*, evaluated and screened concepts, which focused on preliminary engineering efforts and future traffic projections. The conceptual design analysis evaluated interchange concepts to identify logical project termini, a preliminary typical section, and the alignment of the proposed improvements. The objective of the study was to address traffic spillback onto I-95, improve interchange operations, reduce congestion, and increase safety. The planning study evaluation process followed seven steps:

1. Existing Conditions Analysis – The analysis consisted of data gathering in the areas of roadway, bridge, and engineering characteristics. The existing conditions assessment began with the collection and review of all data pertaining to the existing facility through reviewing existing documents, conducting on-site inventories, and collecting pertinent data that would serve as a basis for evaluation.

2. Travel Demand Forecasting — This step focused on the validation and calibration of the I-95 Corridor Planning Study model, which was an enhanced version of the Southeast Regional Planning Model (SERPM) 6.5. This model was used to develop 2040 design year traffic.

3. Engineering and Geometrics — This step included the identification and evaluation of several short-term and long-term interchange improvements plus the No-Build scenario. The study area included the I-95 freeway segments, interchanges, ramp terminals and selected adjacent signalized intersections.

4. Traffic Conceptual Analysis — This step evaluated the conditions of the study area future traffic projected for the 2040 design year for each of the interchange improvements evaluated. This effort also included the evaluation of the No-Build scenario and a safety analysis.

Figure 4.1 - I-95 Broward Interchanges Masterplan Location Map

5. Right of Way Impacts — This step evaluated the right of way impacts of each of the considered alternatives. The impacts were categorized by land use.

6. Construction Costs — This step developed an estimated construction cost of each of the proposed improvements evaluated. The construction costs were developed using the FDOT Long Range Estimate (LRE) cost estimating system.

7. Other Impacts — This step evaluated, listed, and documented all potential impacts for each of the proposed improvements evaluated.

The planning study determined that the proposed improvements were feasible, viable and constructible. The study recommended a detailed analysis and further evaluations to support the feasibility and viability of these improvements during the PD&E Study phase. The planning study was documented in separate reports for each interchange called *Interchange Concept Development Report*, dated January 2016.

No future policy assumptions were used in the transportation planning process during the planning study. The only two changes that occurred in the area after the planning study were the final construction of I-95 Express Phase 2 and the beginning of the I-95 Express Phase 3C construction. The recommended planning study concept is depicted in ***Figures 4.2 – 4.4***.

I-95 Corridor Planning Study – In April 2019, FDOT District Six completed an I-95 Planning Study between US 1 (downtown Miami) and the Miami-Dade/Broward County Line. Around the same time, FDOT District Four was moving forward with geometric changes from an Alternative Technical Concept (ATC) as part of the I-95 Express Phase 3C Construction Project, which covers from south of Hollywood Boulevard to north of Interstate 595 (I-595). Because of the overlapping limits of these two projects with the I-95 PD&E Study and changes to the I-95 Express Lanes access points by both districts, FDOT District Four decided to put the I-95 PD&E Study on hold and perform an I-95 Corridor Planning Study (CPS) to evaluate how these three projects will interact with each other.

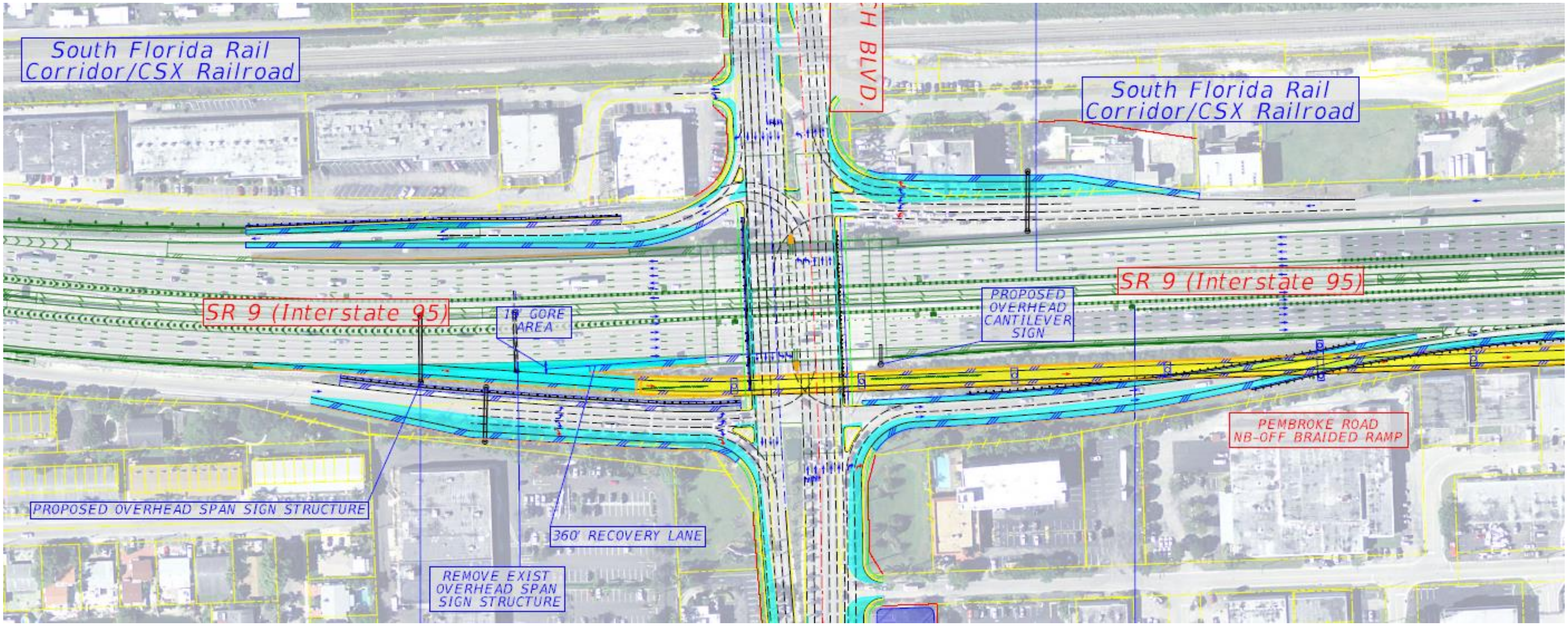


Figure 4.2 – I-95/Hallandale Beach Boulevard Interchange Planning Study Concept

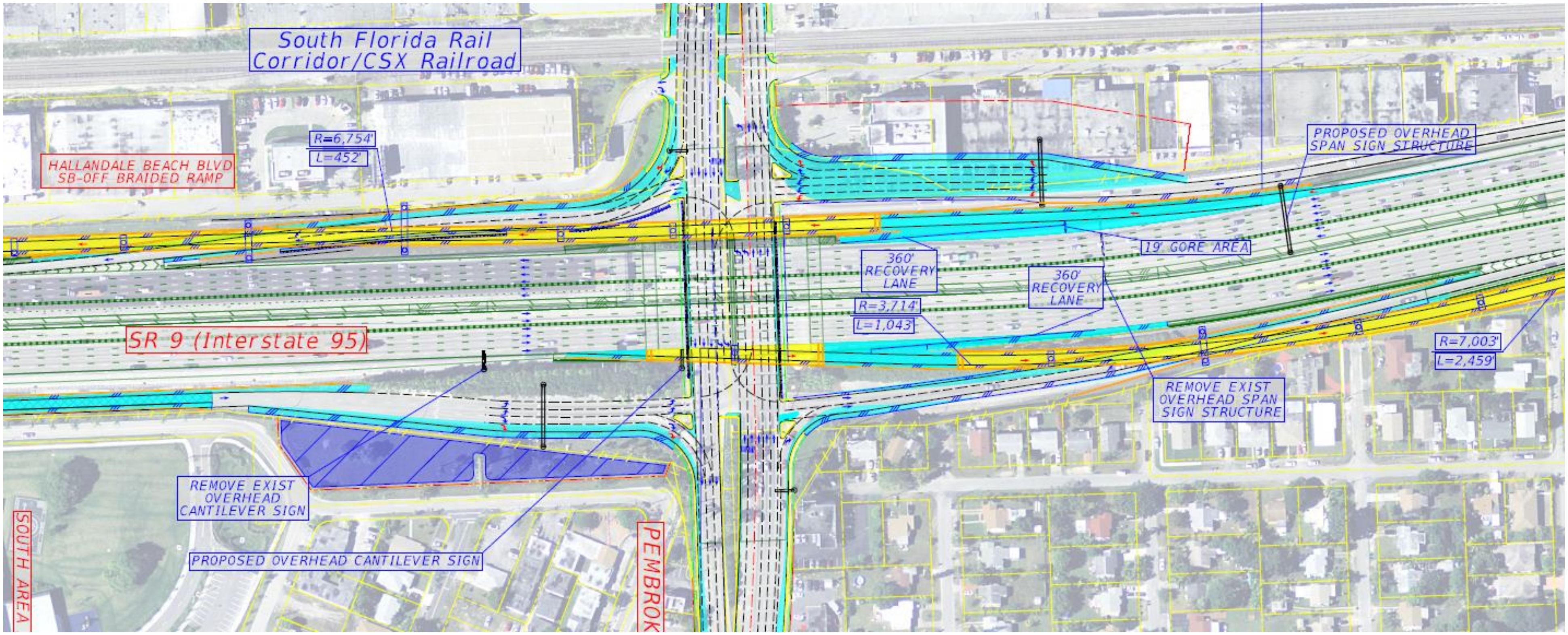


Figure 4.3 – I-95/Pembroke Road Interchange Planning Study Concept

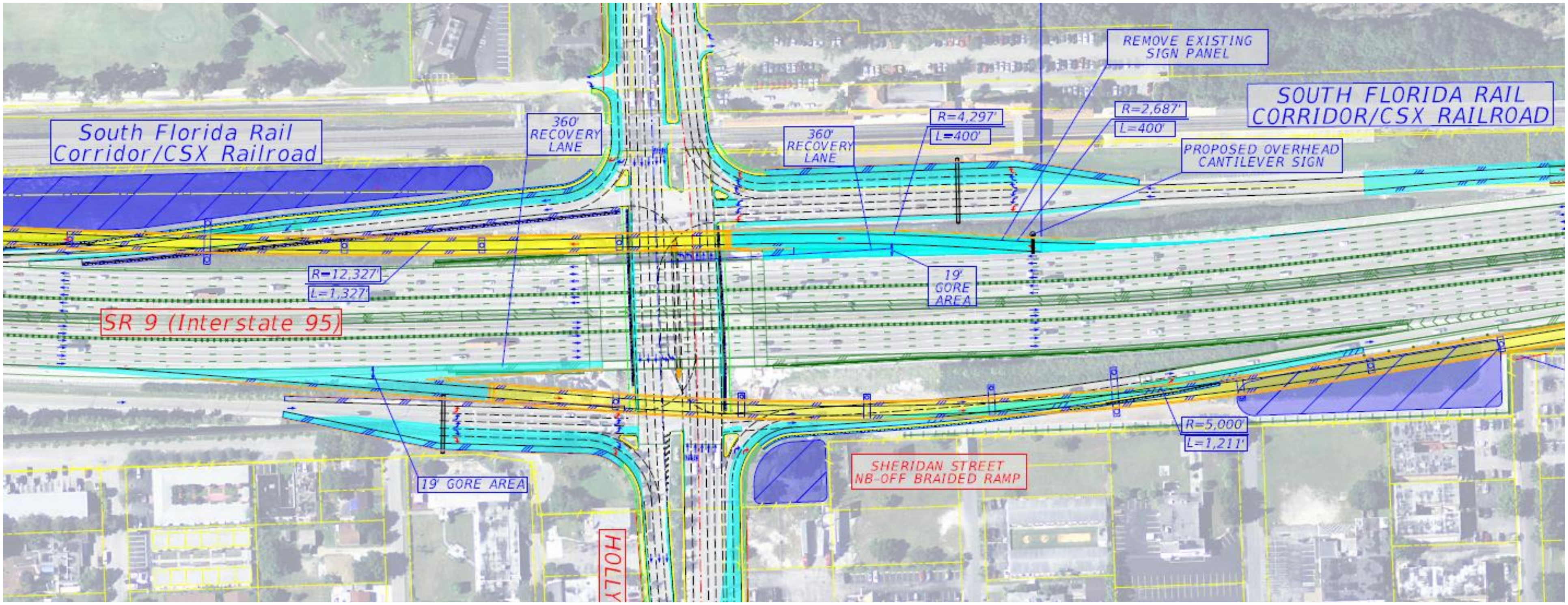


Figure 4.4 – I-95/Hollywood Boulevard Interchange Planning Study Concept

The FDOT District Four CPS began in December 2019 and was completed by April 2020. The limits of the study were from the Golden Glades Interchange (GGI) in Miami-Dade County to I-595 in Broward County (see ***Figure 4.5***). The study had two objectives: 1) the evaluation of converting the I-95 Express Lanes at-grade access points to elevated braided ramps over the I-95 mainline and 2) understand the traffic demand along the corridor with all potential I-95 future projects in place in Miami-Dade and Broward Counties. Alternative 1A was chosen as the CPS recommended alternative. This alternative connects and combines all the improvements from the three projects: District Six Planning Study, District Four PD&E Study, and District Four Construction Project.

The I-95 PD&E Study restarted in June 2020 and consisted of the same purpose and need. However, the main difference is that the study now assumes that both projects, District Six I-95 Planning Study and District Four I-95 Express Phase 3C improvements, will be in-place by the design year 2045. The I-95 PD&E Study restart approach was to design an alternative to fit within the CPS Alternative 1A footprint and be compatible with the future projects north and south of the study limits.

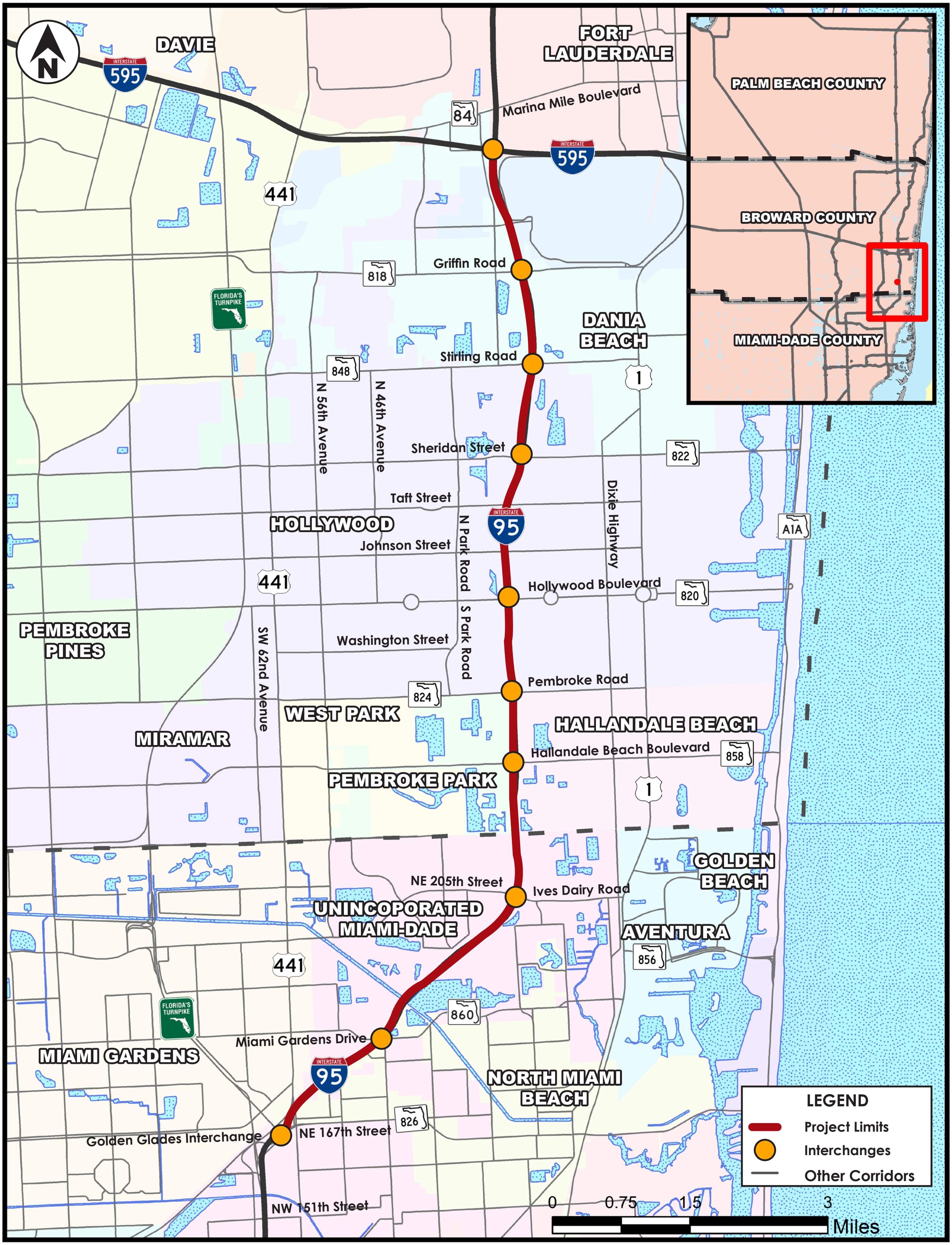


Figure 4.5 - I-95 Corridor Planning Study Limits

4.2 No-Build (No-Action) Alternative

The No-Build Alternative includes the existing transportation network, and any funded, planned or programmed improvements open to traffic by the design year 2045. The No-Build Alternative includes only those improvements that are elements of the MPO's Transportation Improvement Program, the 2045 Cost Feasible LRTP, the FDOT's Adopted Five Year Work Program, any local government comprehensive plans and/or any development mitigation improvement projects that are elements of approved development orders.

2045 – The 2045 No-Build Alternative includes currently planned and programmed improvements. One of the programmed improvements is the safety short-term interim improvements at the Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard interchanges. The No-Build Alternative includes the ongoing District Four I-95 Express Phase 3C Construction Project between south of Hollywood Boulevard and north of I-595. This project will add additional express lane access points (northbound egress and southbound ingress) within the Hollywood Boulevard Interchange. The No-Build Alternative also includes the District Six I-95 Planning Study between US 1 (Downtown Miami) and the Miami-Dade/Broward County Line. This study is proposing to add mainline capacity and interchange improvements.

2030 – The 2030 No-Build Alternative includes currently planned and programmed improvements. One of the programmed improvements are the safety short-term interim improvements at the Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard interchanges. The 2030 No-Build Alternative includes the ongoing District Four I-95 Express Phase 3C Construction Project between south of Hollywood Boulevard and north of I-595. There are no planned improvements on the I-95 mainline south of Pembroke Road.

The three I-95 No-Build roadway cross sections between interchanges are depicted in ***Figures 4.6 – 4.8.***

Figure 4.9 shows the 2030 No-Build Alternative schematic line diagram. ***Figure 4.10*** shows the 2045 No-Build Alternative schematic line diagram.

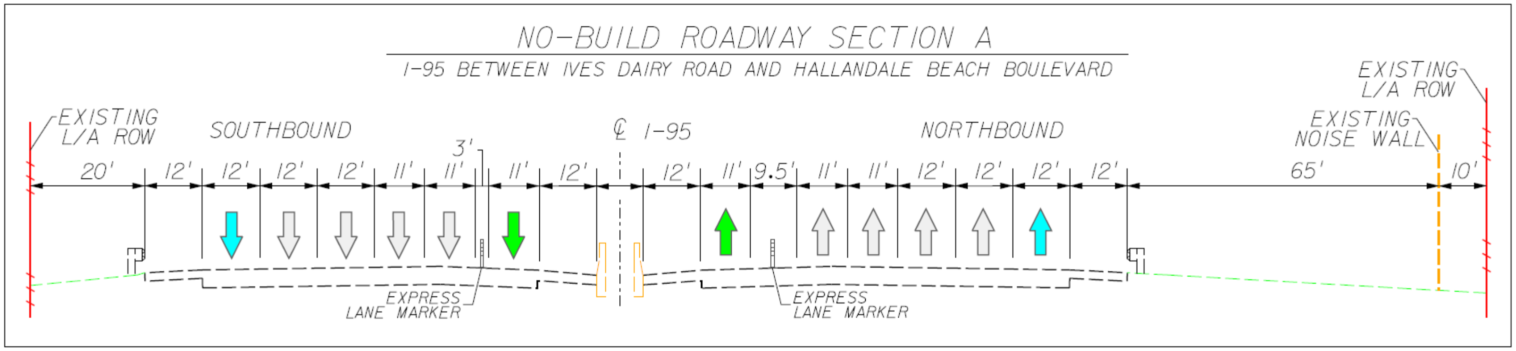


Figure 4.6 – No-Build Alternative Roadway Section A

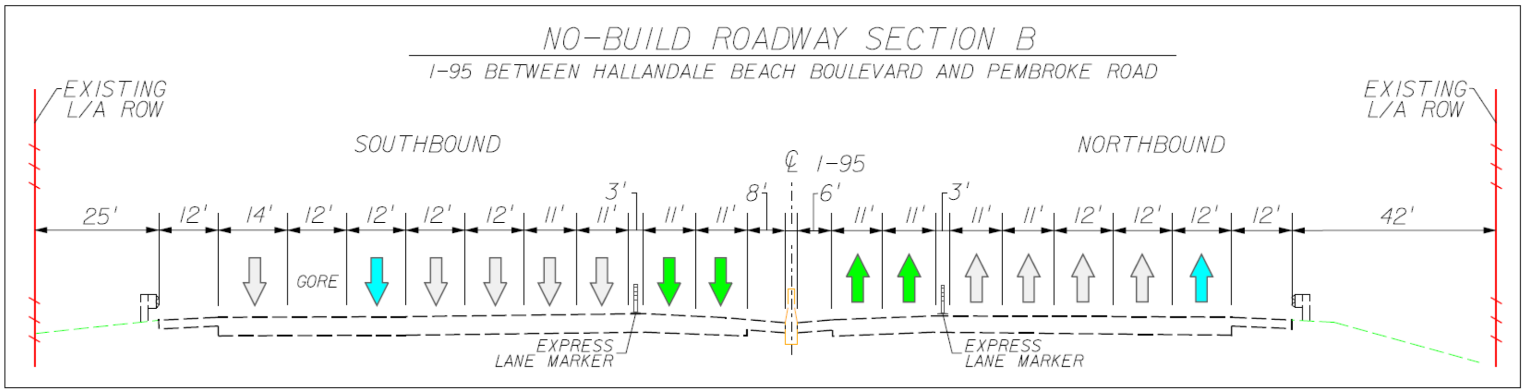


Figure 4.7 – No-Build Alternative Roadway Section B

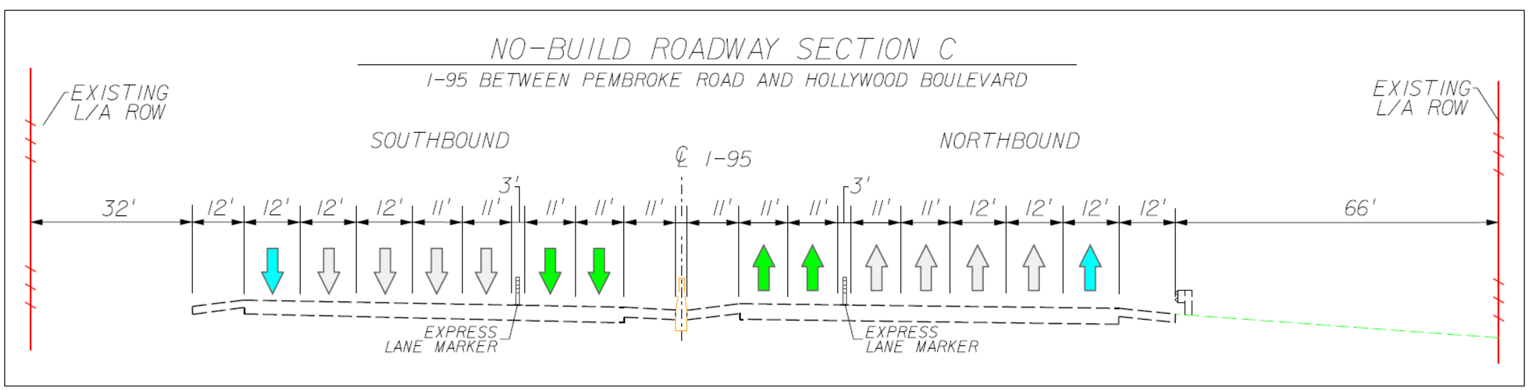
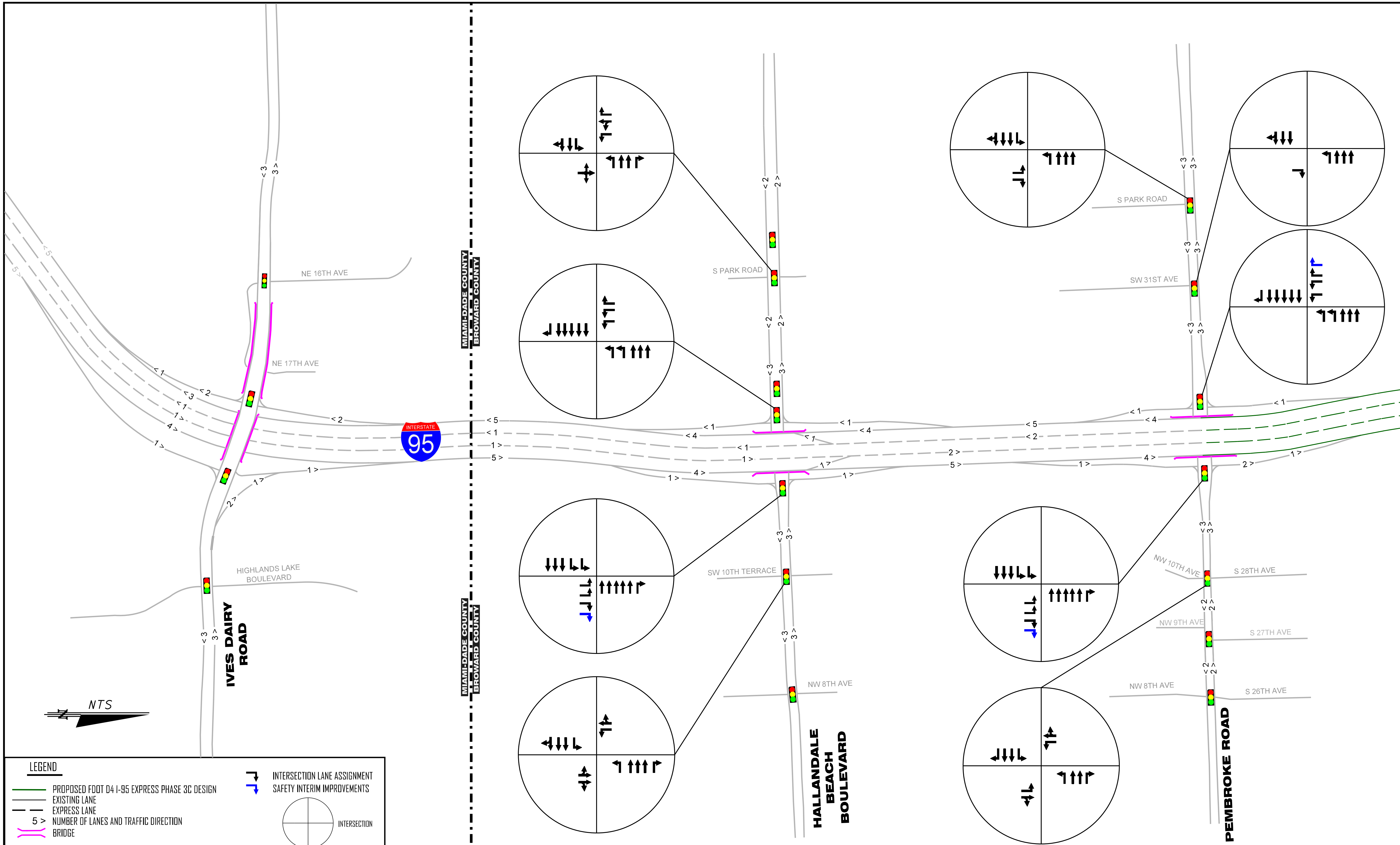


Figure 4.8 – No-Build Alternative Roadway Section C



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DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

OCTOBER 2020

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

SR 9 (INTERSTATE 95) LANE GEOMETRY AND CONFIGURATIONS 2030 NO-BUILD LINE DIAGRAM

FIGURE 4.9

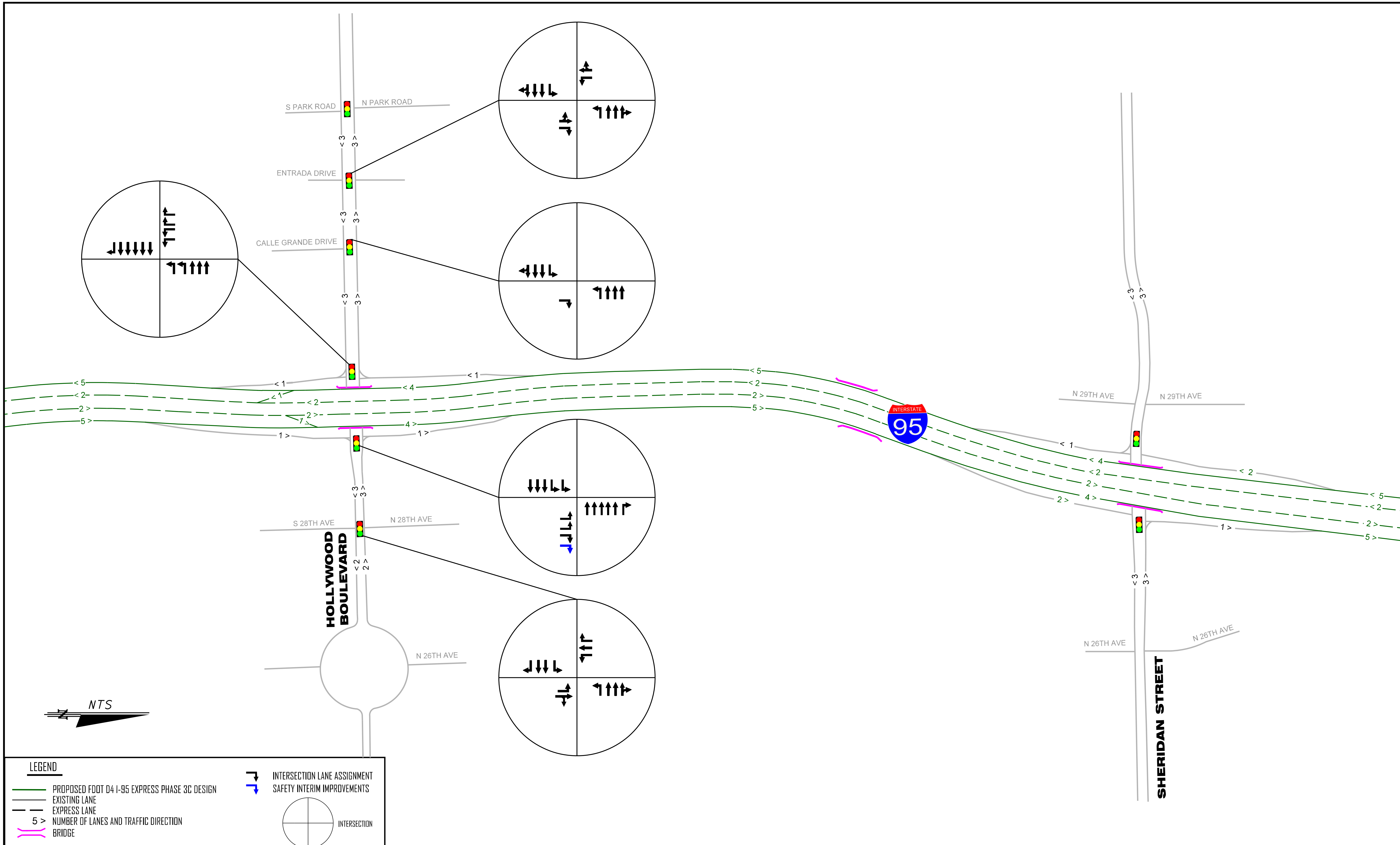

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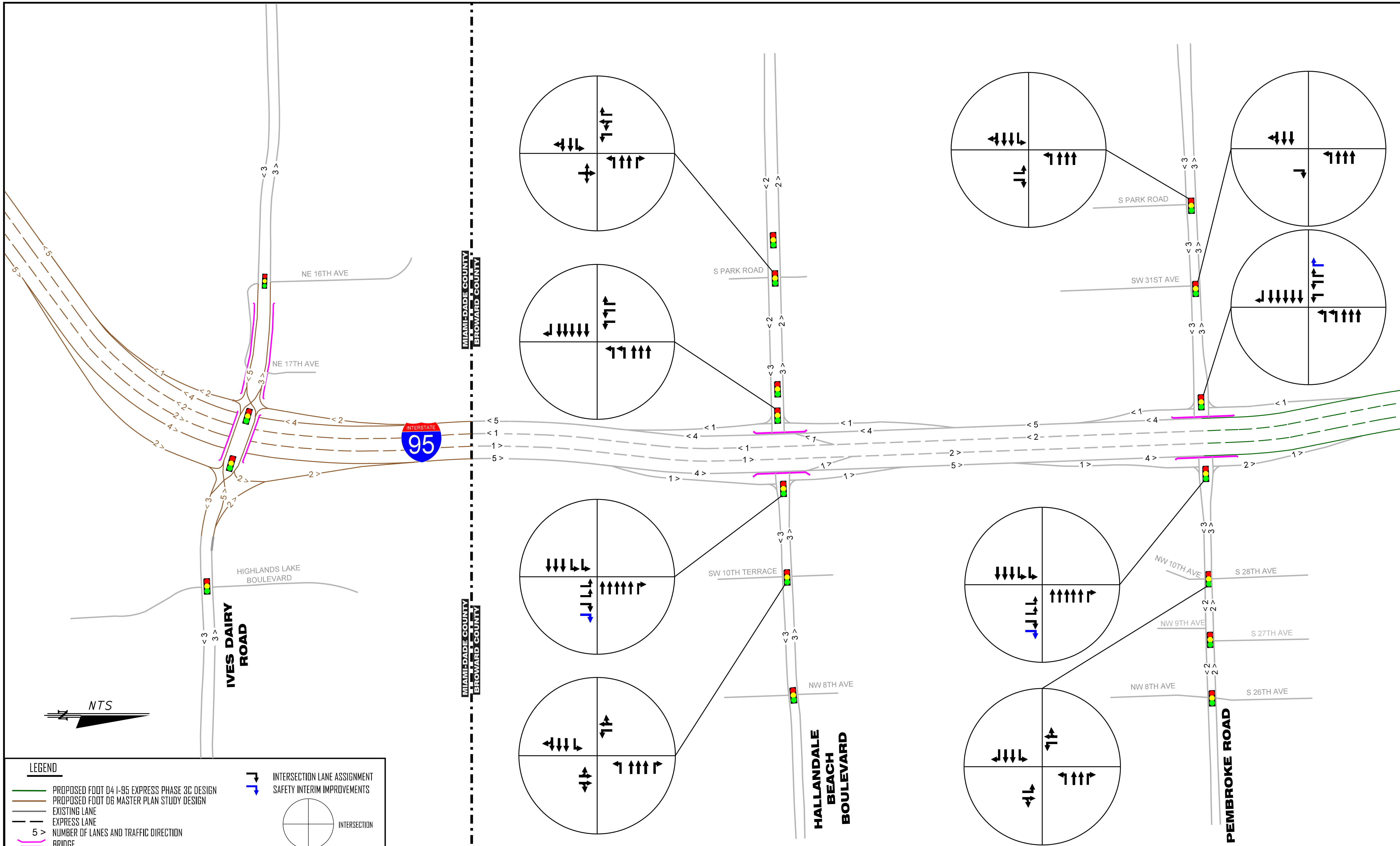
FIGURE 4.9



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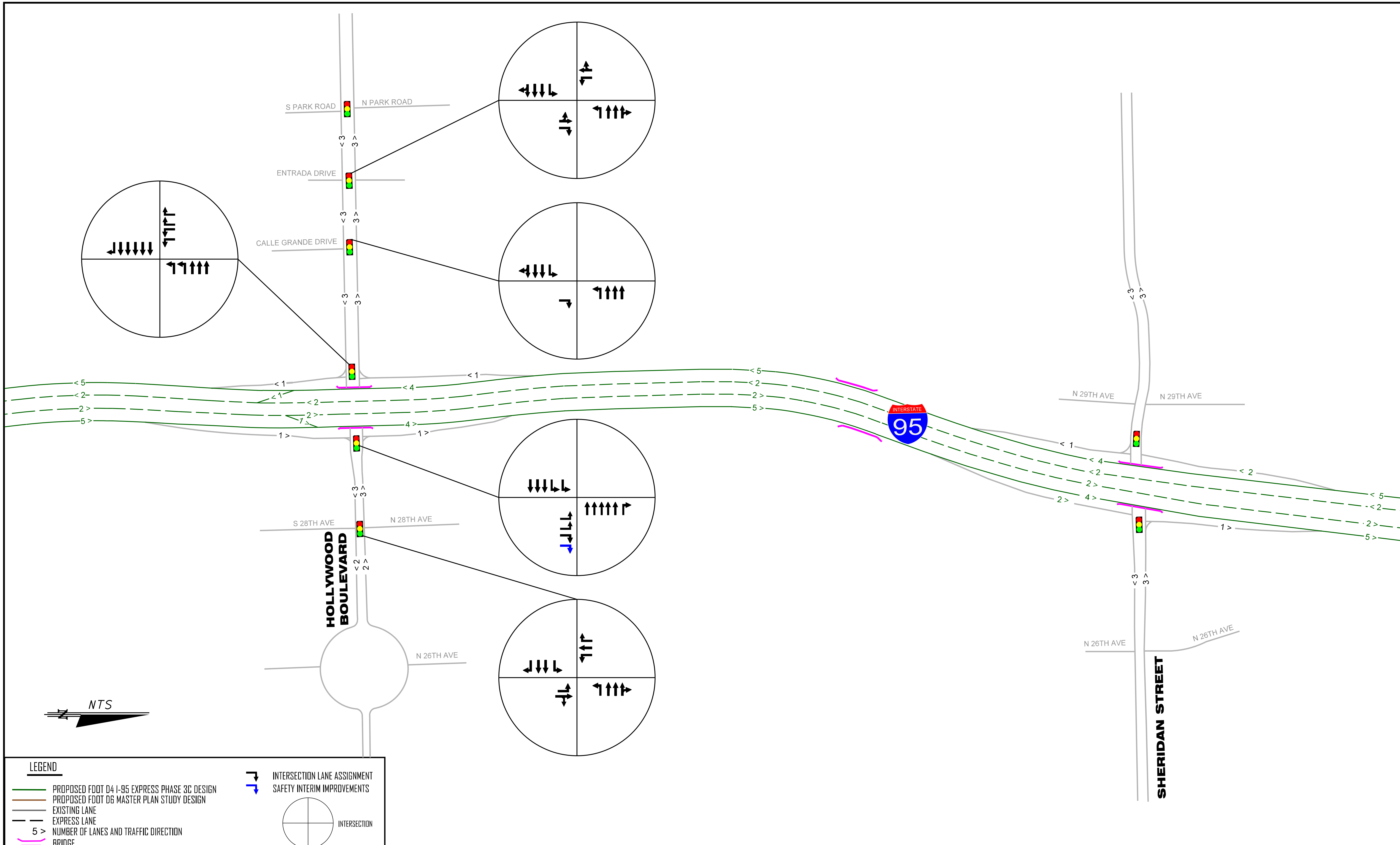
SR 9 (INTERSTATE 95) LANE GEOMETRY AND CONFIGURATIONS 2045 NO-BUILD LINE DIAGRAM

FIGURE 4.10



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SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
2045 NO-BUILD LINE DIAGRAM

FIGURE 4.10

4.2.1 Mainline No-Build Alternative Analysis Results

HCM Operational Analysis Results

Speed, density and LOS of each freeway facility were used as measures of effectiveness (MOEs), which is consistent with the existing conditions analysis. The mainline/basic, weaving, and ramp merge/diverge analysis results for each alternative are summarized in the following sections.

2030 No-Build Alternative – The capacity analysis shows that one location northbound and three locations southbound will operate at an unacceptable LOS (worst peak period LOS) by the year 2030 within the area of influence. ***Tables 4.1 – 4.2*** and ***Figure 4.11*** summarize the 2030 results.

Table 4.1 – 2030 No-Build Alternative Northbound Freeway Analysis Results

#	I-95 Northbound Segment 2030 No-Build Alternative	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway	Ramp	Density (pc/mi/ln)	LOS
					V/C Ratio			
22	Sheridan Street Off-Ramp	Diverge	2	1,161 (1,202)	-	0.28 (0.29)	-	-
21	Hollywood Boulevard On-Ramp to Sheridan Street Off-Ramp	Weave	5	8,410 (8,234)	0.82 (0.91)	-	21.1(21.1)	C (C)
20	Express Lane North of Hollywood Boulevard	Basic	2	1,332 (1,244)	0.32 (0.30)	-	-	-
19	Hollywood Boulevard On-Ramp	Merge	1	1,234 (1,198)	-	0.59 (0.57)	-	-
18	Express Lane Egress to Hollywood Boulevard On-Ramp	Basic	4	7,176 (7,036)	0.83 (0.73)	-	20.8(16.6)	C (B)
17	Express Lane Egress	Merge	1	649 (518)	0.83 (0.73)	0.32(0.25)	22.3(17.7)	B (B)
16	Hollywood Boulevard Off-Ramp to Express Lane Egress	Basic	4	6,527 (6,193)	0.75 (0.67)	-	18.1(14.5)	C (B)
15	Hollywood Boulevard Off-Ramp	Diverge	1	1,019 (1,277)	-	0.49(0.61)	-	-
14	Pembroke Road On-Ramp to Hollywood Boulevard Off-Ramp	Weave	5	7,546 (7,470)	0.86 (0.89)	-	24.0(20.9)	C (C)
13	Pembroke Road On-Ramp	Merge	1	1,240 (1,106)	-	0.59 (0.53)	-	-
12	Pembroke Road Off-Ramp to On-Ramp	Basic	4	6,306 (6,364)	0.71 (0.69)	-	17.2(15.2)	B (B)
11	Pembroke Road Off-Ramp	Diverge	1	972 (1,202)	-	0.46 (0.57)	-	-
10	Hallandale Beach Boulevard On-Ramp to Pembroke Road Off-Ramp	Weave	5	7,278 (7,566)	0.93 (0.98)	-	23.5(22.3)	C (C)
9	Hallandale Beach Boulevard On-Ramp	Merge	1	1,488 (1,484)	-	0.71 (0.71)	-	-
8	Express Lane Ingress to Hallandale Beach Boulevard On-Ramp	Basic	4	5, 790 (6,082)	0.62 (0.65)	-	-	-
7	Express Lane North of Hallandale Beach Boulevard	Basic	2	1,981 (1,762)	0.48 (0.43)	-	-	-
6	Express Lane Ingress	Diverge	1	850 (581)	0.75 (0.73)	0.41(0.28)	18.9(16.6)	B (B)
5	Hallandale Beach Blvd Off-Ramp to Express Lane Ingress	Basic	4	6,640 (6,663)	0.75 (0.73)	-	18.5(18.9)	C (C)
4	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,233 (1,482)	-	0.59 (0.71)	-	-
3	Ives Dairy Road On-Ramp to Hallandale Beach Boulevard Off-Ramp	Weave	5	7,873 (7,945)	**1.27 (1.34)**	-	23.4 (22.6)	**F (F)**
2	Express Lane South of Hallandale Beach Boulevard	Basic	1	1,131 (1,181)	0.67 (0.69)	-	-	-
1	Ives Dairy Road On-Ramp	Merge	1	2,524 (2,432)	-	**1.15 (1.11)**	-	-

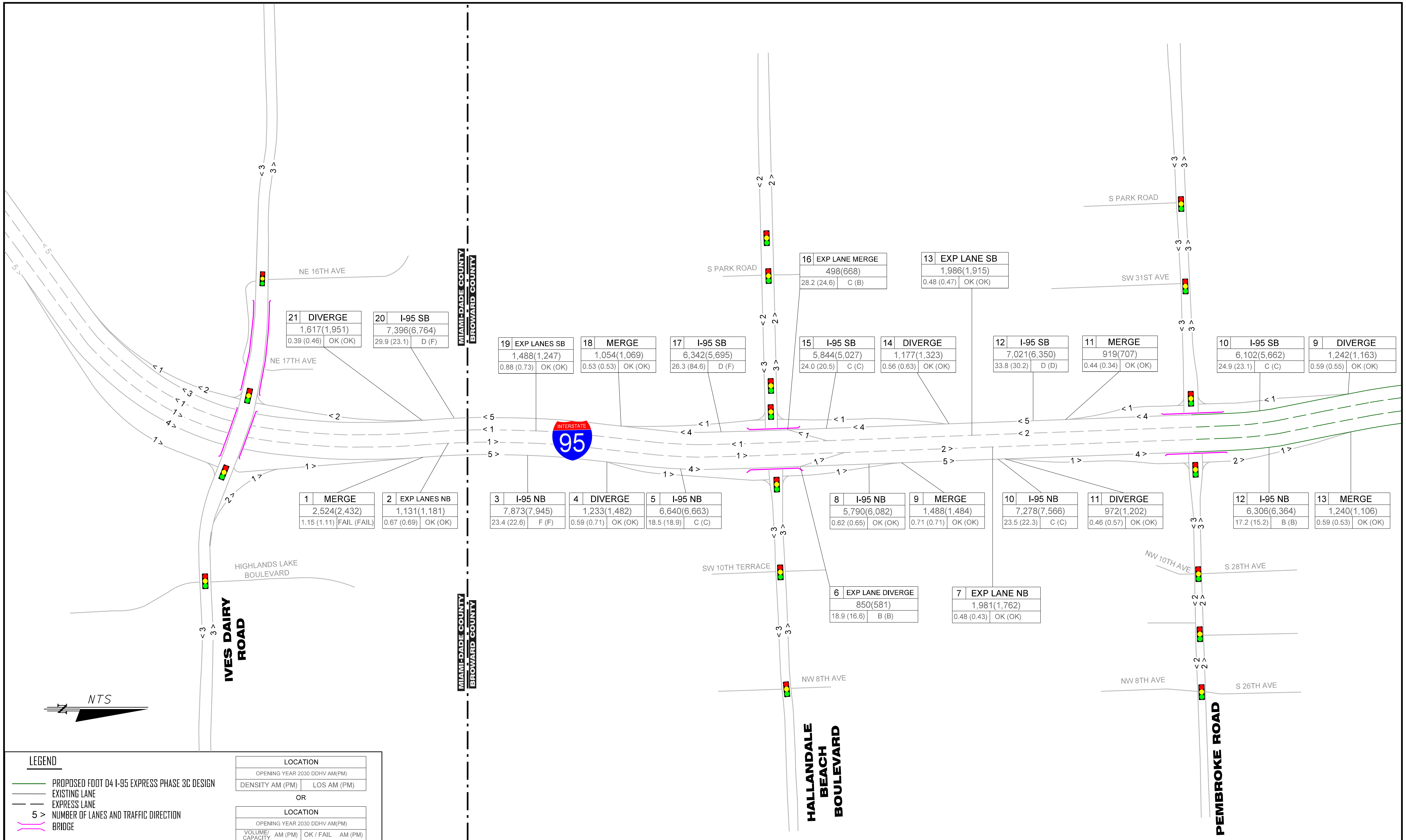
Note:
1) I-95 is operating at over capacity when compared to existing conditions in some locations. The disclaimer in the HCS software indicates that density results from freeway, ramp merge/diverge are not be reliable for oversaturated conditions. Operational results from Vissim microsimulation software should be considered.
2) Additionally, 2030 conditions include the following improvements: new EL access point over Hollywood Blvd and a two-lane northbound off-ramp to Sheridan Street. The redistribution of traffic and operations between the ELs and GULs are different, with more vehicles bypassing the PD&E Study limits cause 2030 No-Build operating better than existing in some locations.
3) # - segment number

Table 4.2 – 2030 No-Build Alternative Southbound Freeway Analysis Results

#	I-95 Southbound Segment 2030 No-Build Alternative	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway V/C Ratio	Ramp V/C Ratio	Density (pc/mi/ln)	LOS
1	Sheridan Street On-Ramp	Merge	1	1,230 (1,071)	-	0.59 (0.51)	-	-
2	Sheridan Street On-Ramp to Hollywood Boulevard Off-Ramp	Weave	5	8,199 (7,911)	0.93 (0.93)	-	38.8 (38.6)	**E (E)**
3	Express Lane North of Hollywood Boulevard	Basic	2	1,400 (1,076)	0.34 (0.26)	-	-	-
4	Hollywood Boulevard Off-Ramp	Diverge	1	1,338 (1,438)	-	0.64 (0.68)	-	-
5	Hollywood Boulevard Off-Ramp to Express Lane Egress	Basic	4	6,861 (6,473)	0.77 (0.73)	-	28.7 (27.0)	D (D)
6	Express Lane Ingress	Diverge	1	586 (839)	0.77 (0.73)	0.28 (0.41)	28.3 (27.1)	D (D)
7	Hollywood Boulevard On-Ramp	Merge	1	1,069 (1,172)	-	0.51 (0.56)	-	-
8	Hollywood Boulevard On-Ramp to Pembroke Road Off-Ramp	Weave	5	7,344 (6,806)	0.86 (0.88)	-	34.7 (32.3)	D (D)
9	Pembroke Road Off-Ramp	Diverge	1	1,242 (1,163)	-	0.59 (0.55)	-	-
10	Pembroke Road On-Ramp to Off-Ramp	Basic	4	6,102 (5,662)	0.68 (0.64)	-	24.9 (23.1)	C (C)
11	Pembroke Road On-Ramp	Merge	1	919 (707)	-	0.44 (0.34)	-	-
12	Pembroke Road On-Ramp to Hallandale Beach Boulevard Off-Ramp	Weave	5	7,021 (6,350)	0.76 (0.77)	-	33.8 (30.2)	D (D)
13	Express Lane North of Hallandale Beach Boulevard	Basic	2	1,986 (1,915)	0.48 (0.47)	-	-	-
14	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,177 (1,323)	-	0.56 (0.63)	-	-
15	Hallandale Beach Blvd Off-Ramp to Express Lane Ingress	Basic	4	5,844 (5,027)	0.66 (0.57)	-	24.0 (20.5)	C (C)
16	Express Lane Ingress	Merge	1	498 (668)	0.72 (0.64)	0.24 (0.32)	28.2 (24.6)	C (B)
17	Express Lane Ingress to Hallandale Beach Boulevard On-Ramp	Basic	4	6,342 (5,695)	0.72 (0.64)	-	26.3 (84.6)	**D (F)**
18	Hallandale Beach Boulevard On-Ramp	Merge	1	1,054 (1,069)	-	0.53 (0.53)	-	-
19	Express Lane South of Hallandale Beach Boulevard	Basic	1	1,488 (1,247)	0.88 (0.73)	-	-	-
20	Hallandale Beach Boulevard On-Ramp to Ives Dairy Road Off-Ramp	Weave	5	7,396 (6,764)	**0.94 (1.02)**	-	29.9 (23.1)	**D (F)**
21	Ives Dairy Road Off-Ramp	Diverge	2	1,617 (1,951)	-	0.39 (0.46)	-	-

Note:

1) I-95 is operating at over capacity when compared to existing conditions in some locations. The disclaimer in the HCS software indicates that density results from freeway, ramp merge/diverge are not be reliable for oversaturated conditions. Operational results from Vissim microsimulation software should be considered.
2) Additionally, 2030 conditions include the following improvements: new EL access point over Hollywood Blvd and a two-lane northbound off-ramp to Sheridan Street. The redistribution of traffic and operations between the ELs and GULs are different, with more vehicles bypassing the PD&E Study limits cause 2030 No-Build operating better than existing in some locations.
3) # - segment number



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DISTRICT FOUR
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JANUARY 2021

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from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

2030 OPENING YEAR NO-BUILD ALTERNATIVE OPERATIONAL ANALYSIS RESULTS

FIGURE 4.11

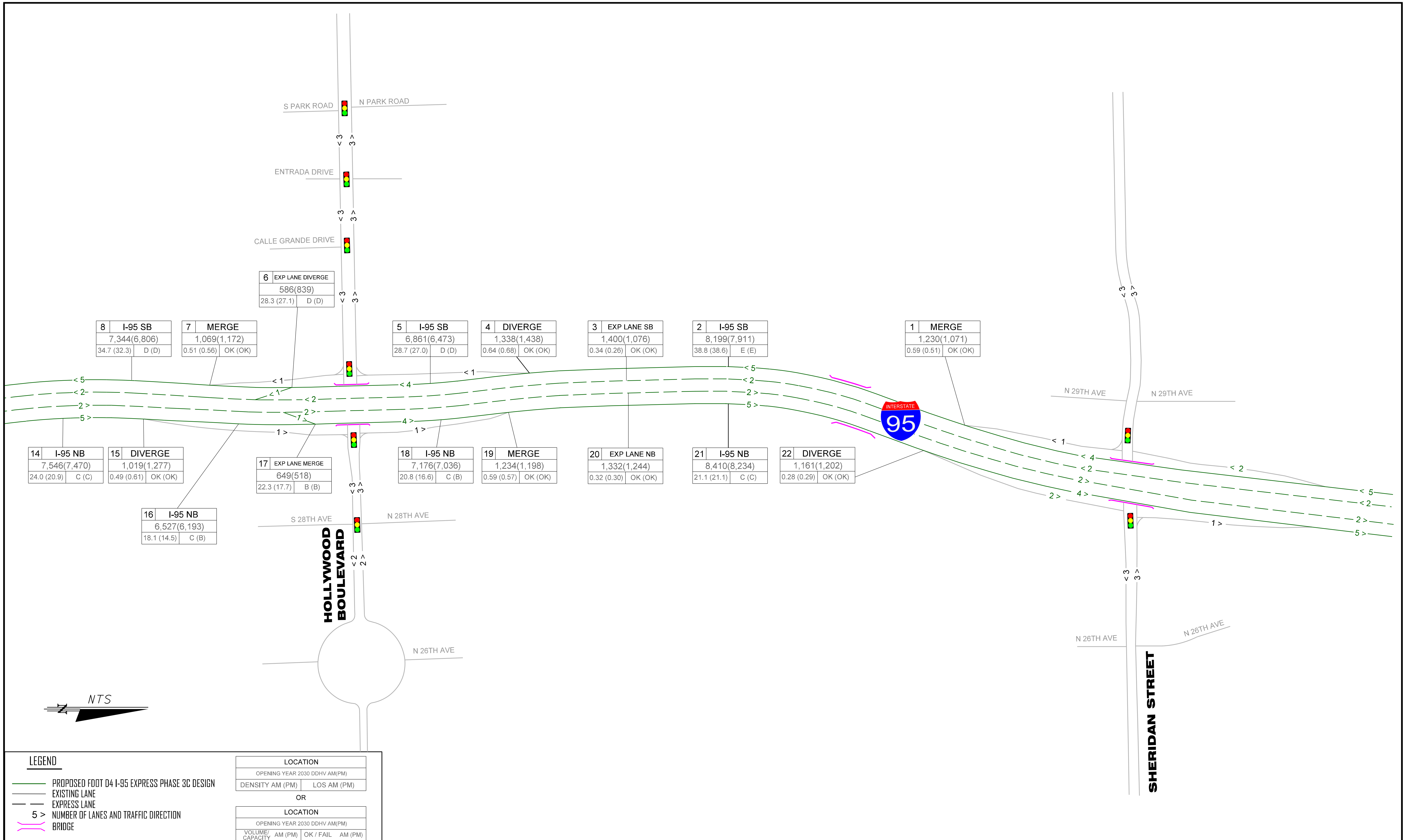

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FIGURE 4.11

2045 No-Build Alternative – The capacity analysis shows that four locations northbound and seven locations southbound will operate at an unacceptable LOS (worst peak period LOS) by the year 2045 within the area of influence. ***Tables 4.3 – 4.4*** and ***Figure 4.12*** summarize the 2045 results.

Table 4.3 – 2045 No-Build Alternative Northbound Freeway Analysis Results

#	I-95 Northbound Segment 2045 No-Build Alternative	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway V/c Ratio AM(PM)	Ramp V/c Ratio AM(PM)	Density (pc/mi/ln)	LOS
22	Sheridan Street Off-Ramp	Diverge	2	1,285 (1,457)	-	0.28 (0.35)	-	-
21	Hollywood Boulevard On-Ramp to Sheridan Street Off-Ramp	Weave	5	9,073 (8,601)	**1.04 (1.06)**	-	22.8 (20.7)	**F (F)**
20	Express Lane North of Hollywood Boulevard	Basic	2	1,332 (1,244)	0.32 (0.30)	-	-	-
19	Hollywood Boulevard On-Ramp	Merge	1	1,475 (1,325)	-	0.70 (0.63)	-	-
18	Express Lane Egress to Hollywood Boulevard On-Ramp	Basic	4	7,598 (7,276)	0.88 (0.81)	-	16.3 (15.6)	B (B)
17	Express Lane Egress	Merge	1	736 (843)	0.88 (0.81)	0.36 (0.40)	17.3 (16.5)	B (B)
16	Hollywood Boulevard Off-Ramp to Express Lane Egress	Basic	4	6,862 (6,433)	0.79 (0.72)	-	13.3 (12.2)	B (B)
15	Hollywood Boulevard Off-Ramp	Diverge	1	1,312 (1,496)	-	0.62 (0.71)	-	-
14	Pembroke Road On-Ramp to Hollywood Boulevard Off-Ramp	Weave	5	8,174 (7,929)	**1.02 (1.00)**	-	19.8 (19.1)	**F** (B)
13	Pembroke Road On-Ramp	Merge	1	1,347 (1,146)	-	0.64 (0.55)	-	-
12	Pembroke Road Off-Ramp to On-Ramp	Basic	4	6,827 (6,783)	0.76 (0.76)	-	13.1 (13.6)	B (B)
11	Pembroke Road Off-Ramp	Diverge	1	1,344 (1,470)	-	0.64 (0.70)	-	-
10	Hallandale Beach Boulevard On-Ramp to Pembroke Road Off-Ramp	Weave	5	8,171 (8,253)	**1.10 (1.10)**	-	20.5 (21.7)	**F (F)**
9	Hallandale Beach Boulevard On-Ramp	Merge	1	1,498 (1,487)	-	0.71 (0.71)	-	-
8	Express Lane Ingress to Hallandale Beach Boulevard On-Ramp	Basic	4	6,673 (6,766)	0.71 (0.72)	-	-	-
7	Express Lane North of Hallandale Beach Boulevard	Basic	2	2,068 (2,068)	0.50 (0.50)	-	-	-
6	Express Lane Ingress	Diverge	1	904 (711)	0.86 (0.84)	0.44(0.34)	16.6 (16.7)	B (B)
5	Hallandale Beach Blvd Off-Ramp to Express Lane Ingress	Basic	4	7,577 (7,477)	0.86 (0.84)	-	16.2 (16.4)	B (B)
4	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,460 (1,531)	-	0.70 (0.73)	-	-
3	Ives Dairy Road On-Ramp to Hallandale Beach Boulevard Off-Ramp	Weave	5	9,037 (9,008)	**1.55 (1.51)**	-	21.4 (22.3)	**F (F)**
2	Express Lane South of Hallandale Beach Boulevard	Basic	1	1,164 (1,375)	0.28 (0.34)	-	-	-
1	Ives Dairy Road On-Ramp	Merge	2	3,150 (2,955)	-	0.72 (0.67)	-	-

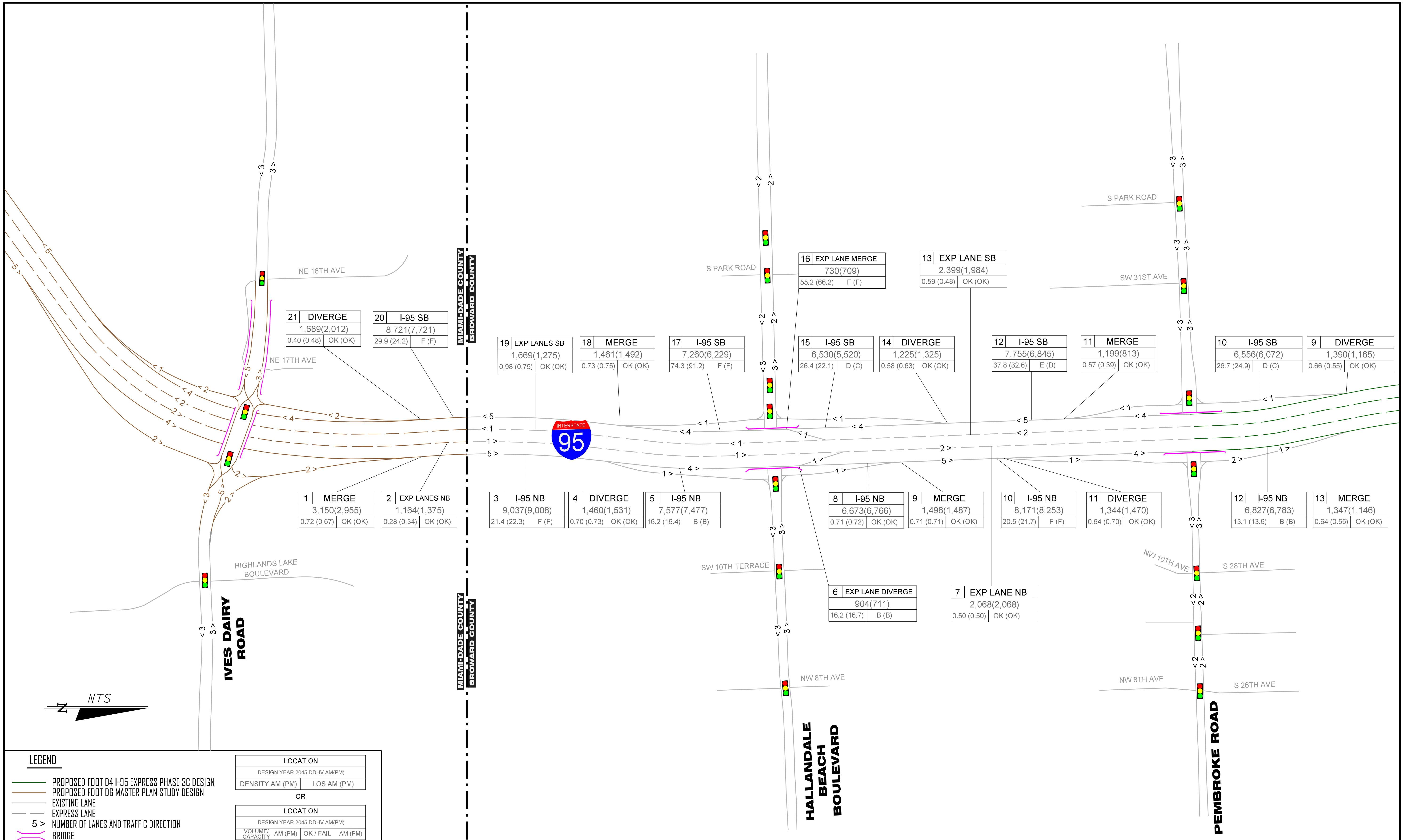
Note:

1) I-95 is operating at over capacity when compared to existing conditions in some locations. The disclaimer in the HCS software indicates that density results from freeway, ramp merge/diverge are not be reliable for oversaturated conditions. Operational results from Vissim microsimulation software should be considered.
2) Additionally, 2045 No-Build conditions include the following improvements: new EL access point over Hollywood Blvd and a two-lane northbound off-ramp to Sheridan Street. The redistribution of traffic and operations between the ELs and GULs are different, with more vehicles bypassing the PD&E Study limits cause 2045 No-Build operating better than existing in some locations.
3) # - segment number

Table 4.4 – 2045 No-Build Alternative Southbound Freeway Analysis Results

#	I-95 Southbound Segment 2045 No-Build Alternative	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway	Ramp	Density (pc/mi/ln)	LOS
					V/c Ratio AM(PM)			
1	Sheridan Street On-Ramp	Merge	1	1,374 (1,121)	-	0.65 (0.53)	-	-
2	Sheridan Street On-Ramp to Hollywood Boulevard Off-Ramp	Weave	5	9,016 (8,117)	0.97 (0.95)	-	44.8 (40.0)	**F (E)**
3	Express Lane North of Hollywood Boulevard	Basic	2	1,400 (1,076)	0.34 (0.26)	-	-	-
4	Hollywood Boulevard Off-Ramp	Diverge	1	1,351 (1,448)	-	0.64 (0.69)	-	-
5	Hollywood Boulevard Off-Ramp to Express Lane Ingress	Basic	4	7,665 (6,669)	0.86 (0.75)	-	33.2 (28.1)	D (D)
6	Express Lane Ingress	Diverge	1	999 (908)	0.86 (0.75)	0.48 (0.44)	31.7 (28.1)	**E (D)**
7	Hollywood Boulevard On-Ramp	Merge	1	1,280 (1,436)	-	0.61 (0.68)	-	-
8	Hollywood Boulevard On-Ramp to Pembroke Road Off-Ramp	Weave	5	7,946 (7,197)	0.99 (0.96)	-	38.9 (35.4)	**E (E)**
9	Pembroke Road Off-Ramp	Diverge	1	1,390 (1,165)	-	0.66 (0.55)	-	-
10	Pembroke Road On-Ramp to Off-Ramp	Basic	4	6,556 (6,032)	0.73 (0.68)	-	26.7 (24.9)	D (C)
11	Pembroke Road On-Ramp	Merge	1	1,199 (813)	-	0.57 (0.39)	-	-
12	Pembroke Road On-Ramp to Hallandale Beach Boulevard Off-Ramp	Weave	5	7,755 (6,845)	0.86 (0.80)	-	37.8 (32.6)	**E (D)**
13	Express Lane North of Hallandale Beach Boulevard	Basic	2	2,399 (1,984)	0.59 (0.48)	-	-	-
14	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,225 (1,325)	-	0.58 (0.63)	-	-
15	Hallandale Beach Blvd Off-Ramp to Express Lane Ingress	Basic	4	6,530 (5,520)	0.74 (0.62)	-	26.4 (22.1)	D (C)
16	Express Lane Ingress	Merge	1	730 (709)	0.82 (0.70)	0.35 (0.34)	55.2 (66.2)	**F (F)**
17	Express Lane Ingress to Hallandale Beach Boulevard On-Ramp	Basic	4	7,260 (6,229)	0.82 (0.70)	-	74.3 (91.2)	**F (F)**
18	Hallandale Beach Boulevard On-Ramp	Merge	1	1,461 (1,492)	-	0.73 (0.75)	-	-
19	Express Lane South of Hallandale Beach Boulevard	Basic	1	1,669 (1,275)	0.98 (0.75)	-	-	-
20	Hallandale Beach Boulevard On-Ramp to Ives Dairy Road Off-Ramp	Weave	5	8,721 (7,721)	**1.06 (1.11)**	-	29.9 (24.2)	**F (F)**
21	Ives Dairy Road Off-Ramp	Diverge	2	1,689 (2,012)	-	0.40 (0.48)	-	-

Note:
1) I-95 is operating at over capacity when compared to existing conditions in some locations. The disclaimer in the HCS software indicates that density results from freeway, ramp merge/diverge are not be reliable for oversaturated conditions. Operational results from Vissim microsimulation software should be considered.
2) Additionally, 2045 No-Build conditions include the following improvements: new EL access point over Hollywood Blvd and a two-lane northbound off-ramp to Sheridan Street. The redistribution of traffic and operations between the ELs and GULs are different, with more vehicles bypassing the PD&E Study limits cause 2045 No-Build operating better than existing in some locations.
3) # - segment number



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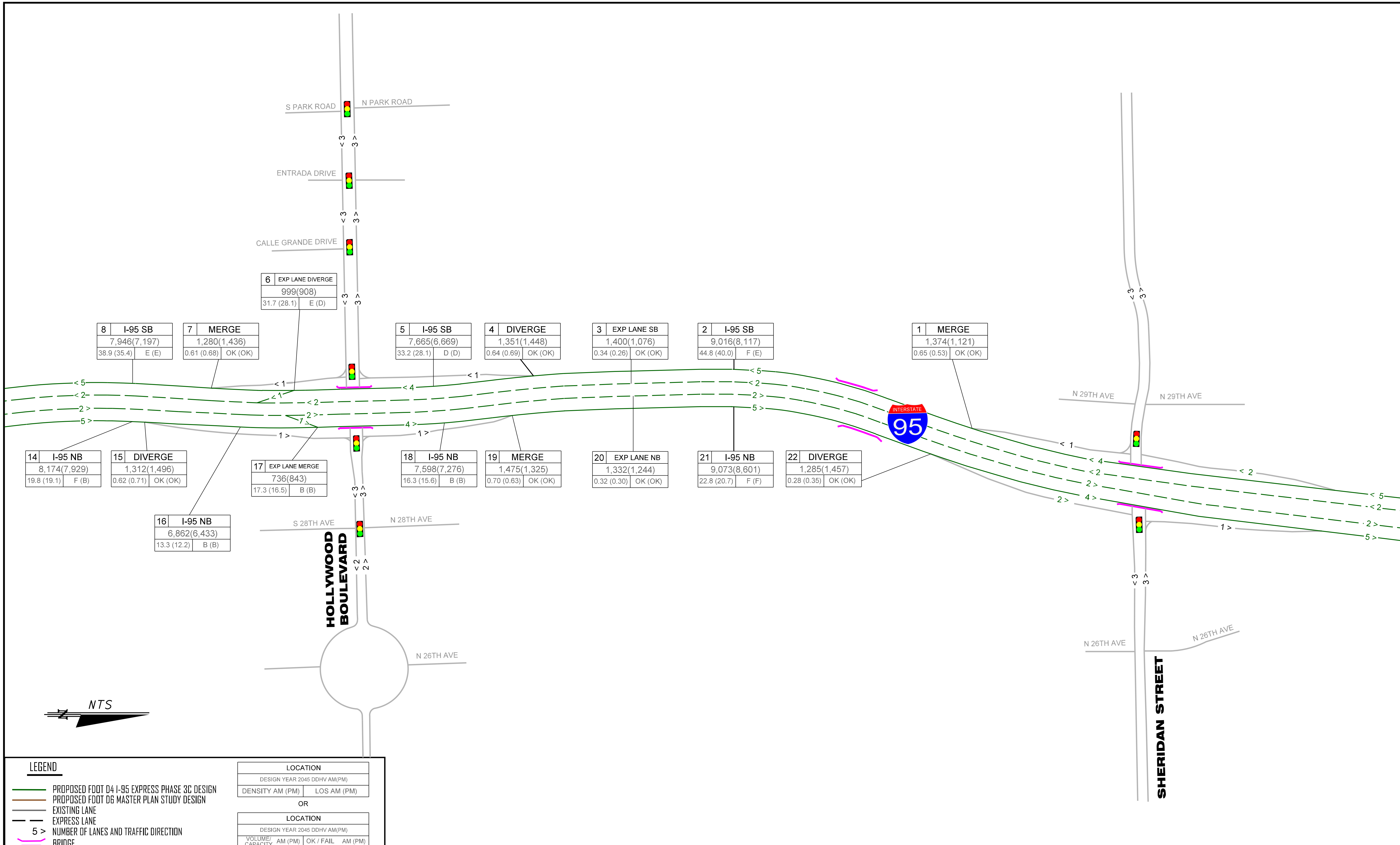
2045 DESIGN YEAR NO-BUILD ALTERNATIVE OPERATIONAL ANALYSIS RESULTS

FIGURE 4.12



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DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

JANUARY 2021

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2045 DESIGN YEAR NO-BUILD ALTERNATIVE
OPERATIONAL ANALYSIS RESULTS

FIGURE
4.12

4.2.2 Intersection No-Build Alternative Analysis Results

Intersection delay and LOS were used as MOEs, which is consistent with the existing conditions analysis. The results are presented in ***Tables 4.5 – 4.10*** and in ***Figures 4.13 – 4.14***.

Table 4.5 – 2030 Hallandale Beach Boulevard Intersection LOS and Delay Results

Hallandale Beach Boulevard Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Park Road*	EBL	11.3	B	22.7	C
	EBT	13.5	B	13.1	B
	WBL	6.3	A	4.8	A
	WBT	6.6	A	9.3	A
	WBR	1.8	A	1.2	A
	NBT	77.8	E	90.7	F
	SBL	75.2	E	82.5	F
	SBT	75.5	E	81.8	F
	SBR	55.3	E	59.3	E
	Int	**14.6**	**B**	**16.0**	**B**
I-95 West Ramp Terminal*	EBT	35.0	D	38.3	D
	EBR	14.5	B	23.7	C
	WBL	84.1	F	68.6	E
	WBT	11.4	B	30.1	C
	SBL	65.9	E	53.4	D
	SBR	53.0	D	93.2	F
	Int	**43.8**	**D**	**46.2**	**D**
I-95 East Ramp Terminal*	EBL	45.8	D	53.1	D
	EBT	31.9	C	41.3	D
	WBT	32.5	C	26.2	C
	WBR	54.1	D	56.9	E
	NBL	41.1	D	43.9	D
	NBR	87.1	F	83.8	F
	Int	**44.9**	**D**	**46.5**	**D**
NW 10th Terrace	EBL	29.6	C	69.0	E
	EBT	19.6	B	29.5	C
	EBR	21.2	C	32.1	C
	WBL	19.4	B	31.3	C
	WBT	20.2	C	38.4	D
	WBR	11.0	B	18.3	B
	NBL	68.7	E	90.8	F
	NBR	49.4	D	48.1	D
	SBL	53.6	D	57.2	E
	SBR	48.6	D	47.9	D
	Int	**23.4**	**C**	**35.8**	**D**

Table 4.6 – 2030 Pembroke Road Intersection LOS and Delay Results

Pembroke Road Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Park Road*	EBT	19.2	B	15.5	B
	WBL	69.0	E	40.8	D
	WBT	4.1	A	1.7	A
	NBL	59.5	E	61.8	E
	NBR	46.3	D	43.6	D
	Int	**17.7**	**B**	**12.5**	**B**
SW 31st Avenue*	EBT	0.5	A	0.4	A
	WBL	68.6	E	66.9	E
	WBT	0.2	A	0.2	A
	NBR	54.8	D	56.4	E
	Int	**2.0**	**A**	**1.8**	**A**
I-95 West Ramp Terminal*	EBT	16.7	B	21.6	C
	EBR	24.9	C	11.1	B
	WBL	49.6	D	45.3	D
	WBT	14.9	B	19.2	B
	SBL	36.3	D	32.2	C
	SBR	49.7	D	45.6	D
	Int	**26.6**	**C**	**25.5**	**C**
I-95 East Ramp Terminal*	EBL	30.4	C	38.0	D
	EBT	9.5	A	14.5	B
	WBT	21.4	C	20.3	B
	WBR	7.9	A	9.5	A
	NBL	48.4	D	43.5	D
	NBR	54.4	D	47.7	D
	Int	**23.3**	**C**	**25.8**	**C**
NW 10th Avenue / South 28th Avenue	EBL	31.7	C	39.5	D
	EBT	22.2	C	29.0	C
	EBR	22.1	C	18.3	B
	WBL	34.2	C	45.0	D
	WBT	33.9	C	43.9	D
	WBR	20.8	C	23.5	C
	NBL	70.8	E	55.1	E
	NBR	31.9	C	30.4	C
	SBL	40.4	D	44.4	D
	SBR	160.1	F	255.6	F
	Int	**40.5**	**D**	**51.4**	**D**

Table 4.7 – 2030 Hollywood Boulevard Intersection LOS and Delay Results

Hollywood Boulevard Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Entranda Drive	EBL	4.9	A	10.9	B
	EBT	7.9	A	17.0	B
	EBR	8.4	A	17.7	B
	WBL	5.9	A	13.1	B
	WBT	1.2	A	1.5	A
	WBR	1.7	A	2.8	A
	NBL	62.0	E	54.2	D
	NBR	58.4	E	46.7	D
	SBL	70.4	E	76.0	E
	SBR	60.1	E	49.8	D
	Int	**7.6**	**A**	**13.7**	**B**
Calle Grande Drive*	EBU	88.2	F	72.7	E
	EBT	0.6	A	1.1	A
	WBL	91.6	F	77.2	E
	WBT	0.9	A	0.4	A
	NBR	0.6	A	0.7	A
	Int	**1.4**	**A**	**1.2**	**A**
I-95 West Ramp Terminal*	EBT	28.6	C	27.0	C
	EBR	26.1	C	68.8	E
	WBL	56.1	E	81.4	F
	WBT	12.9	B	21.2	C
	SBL	53.1	D	50.7	D
	SBR	51.9	D	82.8	F
	Int	**34.6**	**C**	**48.2**	**D**
I-95 East Ramp Terminal*	EBL	52.5	D	58.0	E
	EBT	12.0	B	17.0	B
	WBT	19.2	B	24.9	C
	WBR	28.7	C	26.6	C
	NBL	59.8	E	55.7	E
	NBR	58.9	E	78.4	E
	Int	**31.3**	**C**	**37.0**	**D**

*HCM 2000 results reported

Table 4.7 – 2030 Hollywood Boulevard Intersection LOS and Delay Results (Continued)

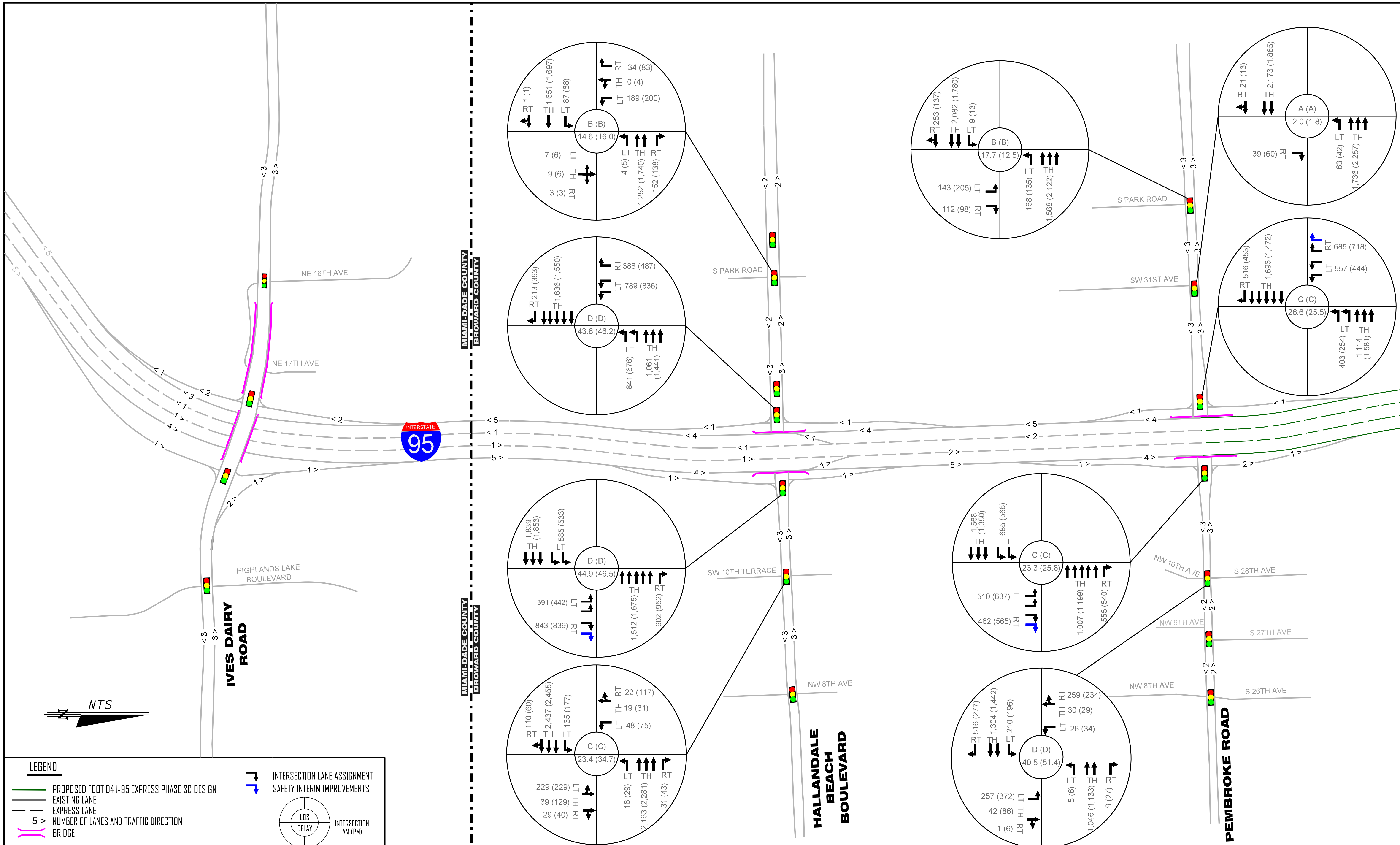
Hollywood Boulevard Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
28th Avenue*	EBL	35.1	D	44.0	D
	EBT	42.8	D	71.4	E
	EBR	36.1	D	16.7	B
	WBL	47.2	D	42.5	D
	WBT	48.6	D	45.3	D
	NBL	107.7	F	153.9	F
	NBT	99.9	F	154.9	F
	SBL	177.4	F	209.7	F
	SBT	52.4	D	58.1	E
	SBR	63.8	E	147.2	F
	Int	**55.0**	**E**	**76.8**	**E**

*HCM 2000 results reported

As shown in ***Table 4.5***, the 2030 No-Build Alternative intersection operational results indicate all four intersections will operate at a LOS D or better.

As shown in ***Table 4.6***, the 2030 No-Build Alternative intersection operational results indicate all five intersections will operate at a LOS D or better.

As shown in ***Table 4.7***, the 2030 No-Build Alternative operational results indicate four intersections will operate at a LOS D or better and one intersection will operate at a LOS E during the AM and PM peak-period.



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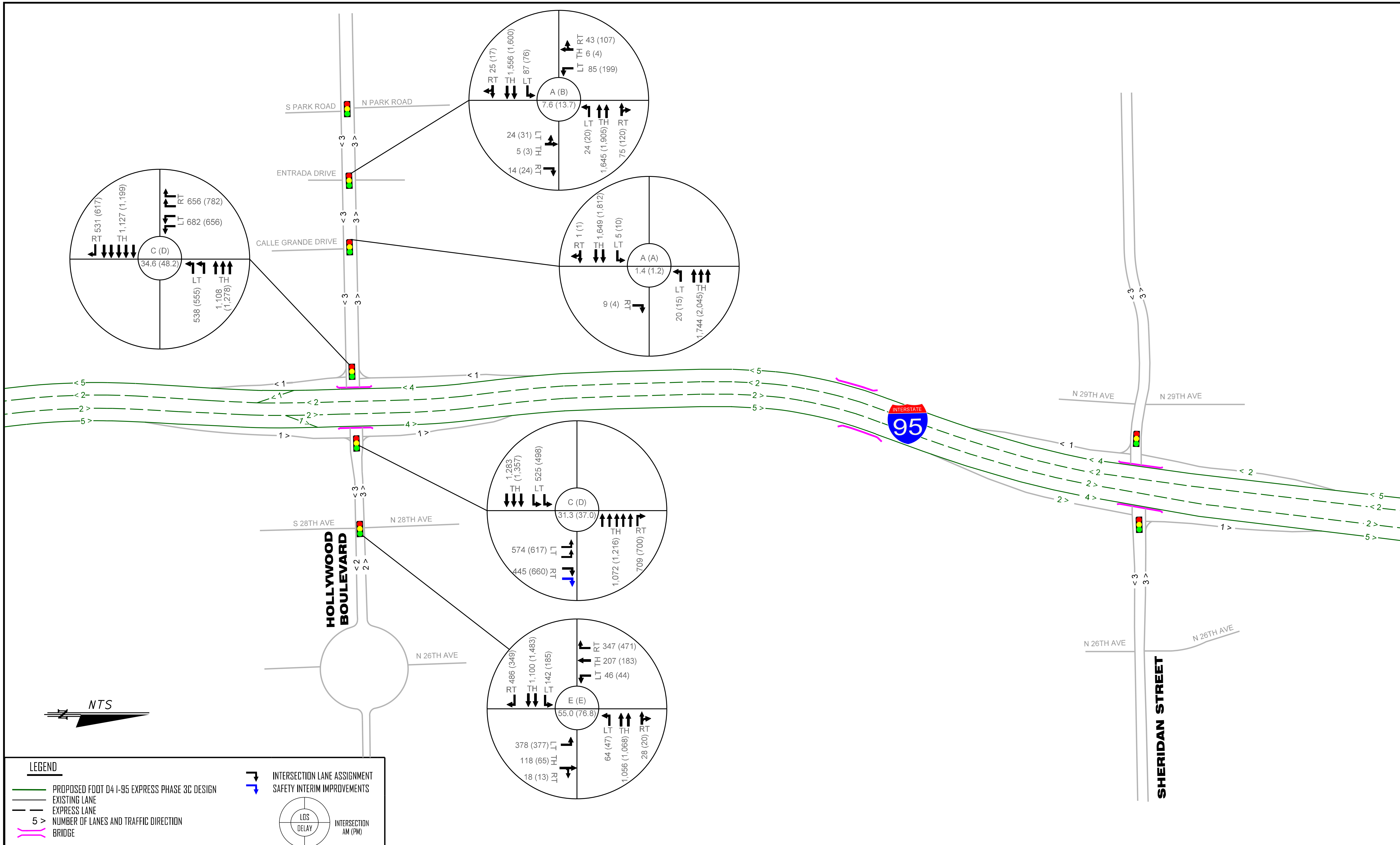
2030 OPENING YEAR NO-BUILD ALTERNATIVE
INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE 4.13



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2030 OPENING YEAR NO-BUILD ALTERNATIVE
INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE 4.13

Table 4.8 – 2045 Hallandale Beach Boulevard Intersection LOS and Delay Results

Hallandale Beach Boulevard Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Park Road*	EBL	14.2	B	33.3	C
	EBT	13.8	B	17.5	B
	WBL	6.3	A	6.0	A
	WBT	6.6	A	10.2	B
	WBR	1.2	A	1.0	A
	NBT	97.6	F	94.5	F
	SBL	93.0	F	98.1	F
	SBT	93.0	F	97.2	F
	SBR	67.1	E	67.3	E
	Int	**15.8**	**B**	**19.3**	**B**
I-95 West Ramp Terminal*	EBT	44.9	D	34.9	C
	EBR	31.2	C	29.4	C
	WBL	129.2	F	135.1	F
	WBT	9.4	A	28.1	C
	SBL	123.6	F	78.2	E
	SBR	105.7	F	163.3	F
	Int	**70.2**	**E**	**62.7**	**E**
I-95 East Ramp Terminal*	EBL	68.8	E	57.1	E
	EBT	41.9	D	44.6	D
	WBT	30.6	C	34.3	C
	WBR	40.9	D	68.9	E
	NBL	51.0	D	50.7	D
	NBR	131.3	F	142.4	F
	Int	**54.4**	**D**	**60.8**	**E**
NW 10th Terrace	EBL	66.3	E	92.5	F
	EBT	22.6	C	33.3	C
	EBR	24.4	C	36.5	D
	WBL	24.1	C	41.0	D
	WBT	28.3	C	47.3	D
	WBR	13.4	B	20.1	C
	NBL	84.8	F	133.0	F
	NBR	57.6	E	54.8	D
	SBL	63.0	E	66.0	E
	SBR	56.8	E	54.6	D
	Int	**30.2**	**C**	**46.8**	**D**

Table 4.9 – 2045 Pembroke Road Intersection LOS and Delay Results

Pembroke Road Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Park Road*	EBT	21.7	C	17.4	B
	WBL	96.4	F	55.2	E
	WBT	0.4	A	2.1	A
	NBL	82.2	F	63.4	E
	NBR	58.6	E	42.9	D
	Int	**19.6**	**B**	**14.1**	**B**
SW 31st Avenue*	EBT	0.6	A	0.4	A
	WBL	81.3	F	67.0	E
	WBT	0.2	A	0.2	A
	NBR	67.9	E	57.6	E
	Int	**2.3**	**A**	**1.8**	**A**
I-95 West Ramp Terminal*	EBT	26.2	C	20.2	C
	EBR	13.7	B	9.6	A
	WBL	75.4	E	44.2	D
	WBT	16.4	B	15.4	B
	SBL	46.2	D	35.3	D
	SBR	68.9	E	60.2	E
	Int	**35.4**	**D**	**25.5**	**C**
I-95 East Ramp Terminal*	EBL	54.1	D	41.8	D
	EBT	17.5	B	16.3	B
	WBT	22.6	C	20.9	C
	WBR	9.1	A	4.8	A
	NBL	59.0	E	42.2	D
	NBR	77.8	E	54.5	D
	Int	**35.3**	**D**	**28.2**	**C**
NW 10th Avenue / South 28th Avenue	EBL	43.7	D	47.6	D
	EBT	30.3	C	34.1	C
	EBR	27.7	C	18.8	B
	WBL	51.3	D	53.1	D
	WBT	41.3	D	47.4	D
	WBR	24.8	C	24.2	C
	NBL	69.3	E	55.1	E
	NBR	37.1	D	30.7	C
	SBL	49.9	D	44.3	D
	SBR	183.3	F	259.2	F
	Int	**48.3**	**D**	**54.2**	**D**

Table 4.10 – 2045 Hollywood Boulevard Intersection LOS and Delay Results

Hollywood Boulevard Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Entranda Drive	EBL	5.6	A	12.5	B
	EBT	9.4	A	22.3	C
	EBR	10.1	B	23.5	C
	WBL	7.2	A	18.1	B
	WBT	1.8	A	1.8	A
	WBR	2.5	A	3.4	A
	NBL	61.2	E	59.8	E
	NBR	57.5	E	50.8	D
	SBL	70.1	E	90.2	F
	SBR	59.3	E	54.4	D
	Int	**8.4**	**A**	**17.4**	**B**
Calle Grande Drive*	EBU	87.6	F	90.7	F
	EBT	0.6	A	0.8	A
	WBL	88.3	F	101.5	F
	WBT	1.1	A	0.4	A
	NBR	0.6	A	0.6	A
	Int	**1.4**	**A**	**1.1**	**A**
I-95 West Ramp Terminal*	EBT	28.8	C	26.3	C
	EBR	19.9	B	43.9	D
	WBL	58.6	E	113.5	F
	WBT	13.1	B	23.2	C
	SBL	54.0	D	64.4	E
	SBR	55.1	E	135.1	F
	Int	**33.5**	**C**	**56.8**	**E**
I-95 East Ramp Terminal*	EBL	54.2	D	67.5	E
	EBT	14.0	B	28.0	C
	WBT	18.2	B	28.9	C
	WBR	40.5	D	33.8	C
	NBL	72.0	E	52.8	D
	NBR	78.1	E	104.2	F
	Int	**38.2**	**D**	**46.5**	**D**

*HCM 2000 results reported

Table 4.10 – 2045 Hollywood Boulevard Intersection LOS and Delay Results (Continued)

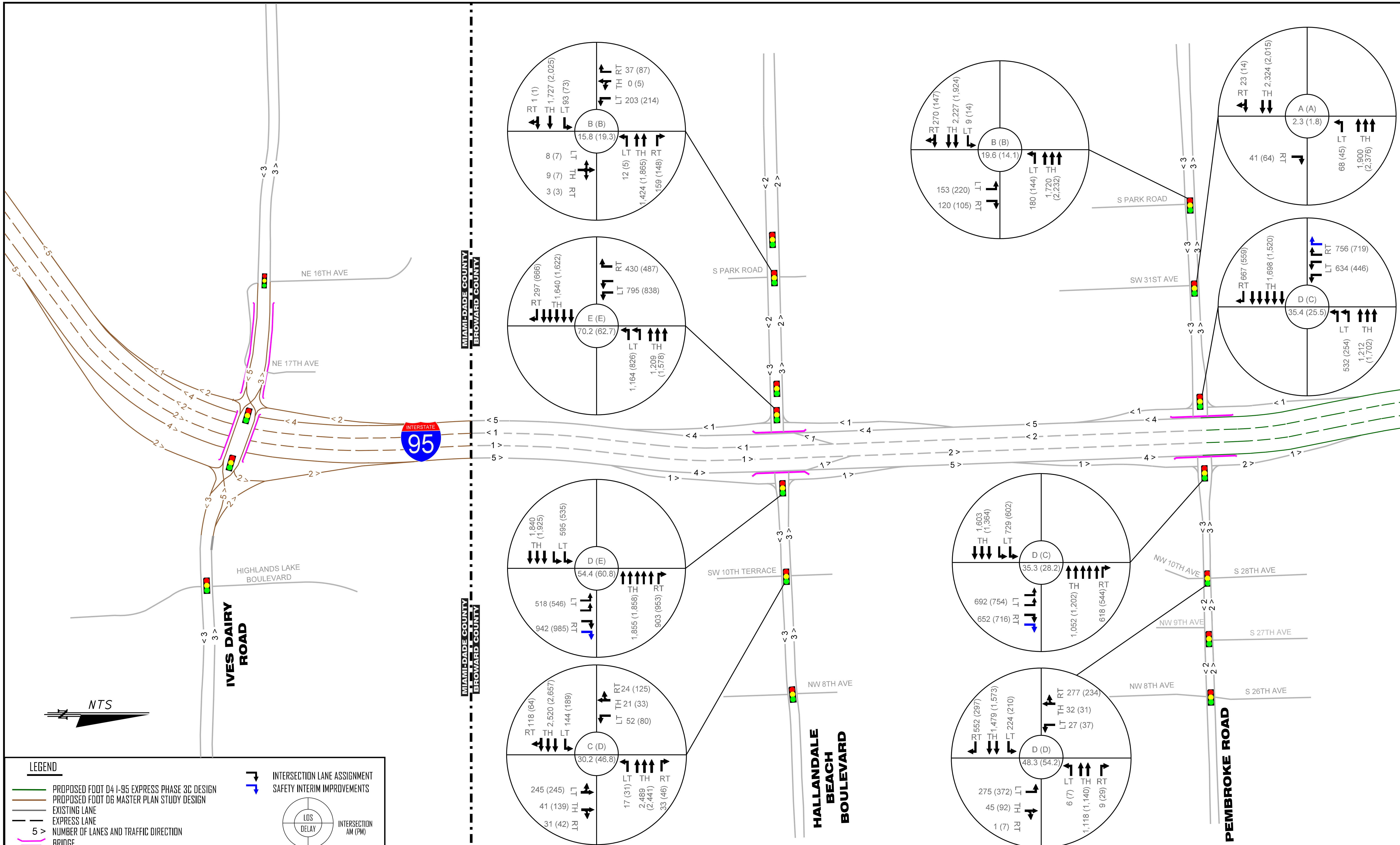
Hollywood Boulevard Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
28th Avenue*	EBL	74.7	E	95.8	F
	EBT	72.8	E	158.2	F
	EBR	33.2	C	16.6	B
	WBL	44.8	D	53.0	D
	WBT	54.9	D	54.3	D
	NBL	141.3	F	176.2	F
	NBT	132.4	F	179.0	F
	SBL	206.4	F	275.7	F
	SBT	55.8	E	65.8	E
	SBR	90.5	F	205.0	F
	Int	**72.1**	**E**	**120.6**	**F**

*HCM 2000 results reported

As shown in ***Table 4.8***, the 2045 No-Build Alternative intersection operational results indicate two intersections will operate at a LOS D or better and two intersections will operate at a LOS E.

As shown in ***Table 4.9***, the 2045 No-Build Alternative intersection operational results indicate all five intersections will operate at a LOS D or better.

As shown in ***Table 4.10***, the 2045 No-Build Alternative operational results indicate three intersections will operate at a LOS D or better, one intersection will operate at a LOS E, and one at a LOS F.



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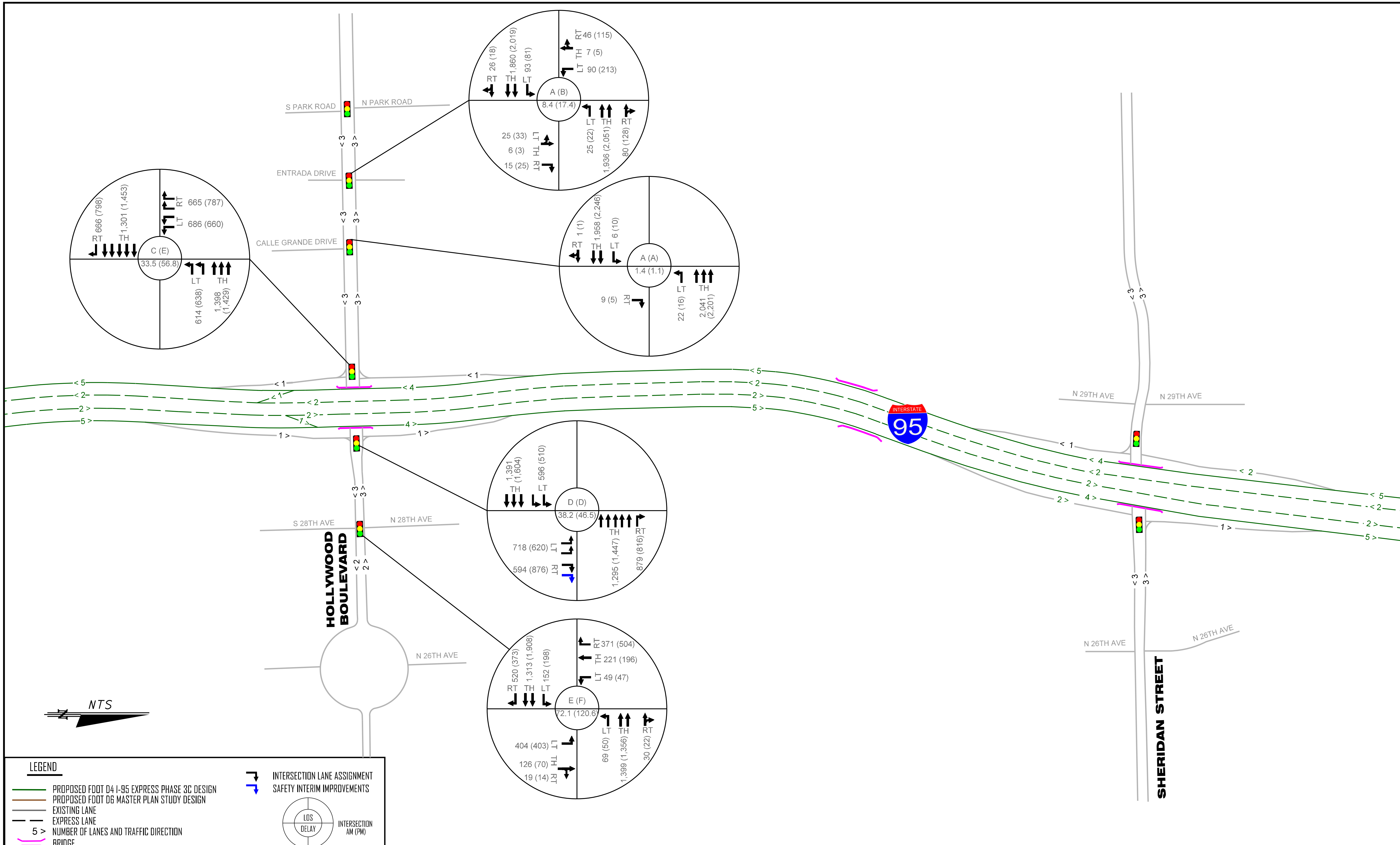
JANUARY 2021

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

2045 DESIGN YEAR NO-BUILD ALTERNATIVE INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE 4.14



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2045 DESIGN YEAR NO-BUILD ALTERNATIVE
INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE
4.14

4.2.3 Exit Ramp Queue Results

Exit off-ramp queue results were used to check the queues against the available storage at each interchange. The results for each interchange are summarized in ***Table 4.11*** and ***Table 4.12***. Storage distances including deceleration distances were measured from the stop bar to the painted gore point on I-95.

Table 4.11 – 2030 Interchange Queue Results

Interchange	Movement	No-Build Alternative	
		AM Peak	PM Peak
		95th Queue* (Storage) in feet	95th Queue* (Storage) in feet
Hollywood Boulevard	NB Off-Ramp	360 (1,500)	#550 (1,500)
	SB Off-Ramp	398 (1,500)	#640 (1,500)
Pembroke Road	NB Off-Ramp	#289 (1,500)	323 (1,500)
	SB Off-Ramp	#414 (1,500)	#402 (1,500)
Hallandale Beach Boulevard	NB Off-Ramp	#648 (1,500)	#676 (1,500)
	SB Off-Ramp	#519 (1,500)	#773 (1,500)

Notes: 95th percentile queue from Synchro, Storage measured from stop bar (does not include deceleration distance) and capped at 1,500 feet.

95th percentile volume exceeds capacity and queue may be longer

Table 4.12 – 2045 Interchange Queue Results

Interchange	Movement	No-Build Alternative	
		AM Peak	PM Peak
		95th Queue (Storage) in feet	95th Queue (Storage) in feet
Hollywood Boulevard	NB Off-Ramp	#493 (1,500)	#812 (1,500)
	SB Off-Ramp	405 (1,500)	#777 (1,500)
Pembroke Road	NB Off-Ramp	#507 (1,500)	#446 (1,500)
	SB Off-Ramp	#573 (1,500)	#460 (1,500)
Hallandale Beach Boulevard	NB Off-Ramp	#890 (1,500)	#948 (1,500)
	SB Off-Ramp	#693 (1,500)	#940 (1,500)

Notes: 95th percentile queue from Synchro, Storage measured from stop bar (does not include deceleration distance) and capped at 1,500 feet.

95th percentile volume exceeds capacity and queue may be longer

4.3 TRANSPORTATION SYSTEM MANAGEMENT AND OPERATIONS ALTERNATIVE

Transportation Systems Management and Operations (TSM&O) alternatives are comprised of minor improvement options that are typically developed to alleviate specific traffic congestion and safety problems, or to get the maximum utilization out of the existing facility by improving operational efficiency. TSM&O alternatives may include, but not limited to, the following improvements to the mainline and interchanges:

- Add auxiliary lanes between interchanges
- Add exclusive turn lanes at the interchange ramp terminals and adjacent intersections
- Increase turn-lane storage at the interchange ramp terminals and adjacent intersections
- Capacity improvements at the ramp junctions
- Signal optimization
- Enhance signage
- New ITS technologies and infrastructure

Short-term safety improvements were evaluated at all three interchanges after the planning study (FPID#s 436111-1, 436303-1, and 439911-1). The improvements at Hallandale Beach Boulevard and Pembroke Road were constructed in 2019. The Hollywood Boulevard improvements are expected to begin construction in late 2021. These improvements bring an immediate relief to the interchange areas, but will not significantly improve the system capacity and/or linkage needs within the entire study area. Long-term improvements are necessary to mitigate the existing traffic conditions and increase capacity to accommodate future travel demand. A TSM&O Alternative will not significantly reduce congestion on the system, nor will it provide the regional area interconnections needed to enhance mobility for this section of Broward County.

The TSM&O Alternative would provide some short-term relief throughout the corridor. However, the TSM&O Alternative alone would not be consistent with the purpose and need of this project. TSM&O improvements are only viable in combination with the build alternative improvements. FDOT is in the process of discussing internally with the District TSM&O Group what strategies are planned along the I-95 corridor and which ones should be considered in the build alternatives. These strategies will be listed and documented in the *System Interchange Modification Report*, a companion document to this PD&E Study.

4.4 FUTURE CONDITIONS

This project is not expected to affect the current or future land use of the area, other than the localized effects of potential relocations for the build alternatives.

The year 2045 travel demand forecasting along I-95 is expected to increase to an average of 303,500 vehicles per day between south of Hallandale Beach Boulevard and north of Hollywood Boulevard (an increase of 22%). The compounded annual growth rate between the years 2016 and 2045 is expected to vary between 0.03% and 2.4% for the ramps, and between 0.5% and 1.7% for the crossing arterials. During peak-hours, the rate is expected to vary between 0.05% and 4% for the ramps, and between 0.2% and 1.9% for the crossing arterials. The Southeast Florida Regional Planning Model Version (SERPM) 7.071 was used to develop the travel demand forecasting for this study. A detailed travel demand forecasting methodology was developed and approved, as documented in the FDOT *Interchange Access Request Methodology Letter of Understanding (MLOU)* dated September 2017, and later updated in June 2021, a companion document to this study.

The I-95 CPS 2045 AADT and DDHV volumes were obtained to develop the design traffic for the PD&E Study. The I-95 mainline and ramp volumes south of Hallandale Beach Boulevard were used as control totals in the future traffic development effort. Ramp terminals were post-processed to ensure there is no negative growth between the projected subarea model turning movements and the corresponding 2016 turning movement counts. Once the ramp terminal volumes were post-processed to avoid any negative turning movements, these were locked as control points for forecasting the adjacent intersections. The through volumes along the crossing arterials east and west of the ramp terminals were established as control points, approaching the adjacent intersections. These volumes were adjusted using left-turn and right-turn volumes. The left and right turns of the adjacent intersections have minor movements, which were determined by using a 0.5% growth rate using the 2016 turning movements counts. The adjacent intersections are in an already built out area. Therefore, a conservative growth rate of 0.5% was appropriate. Once the left-turn and right-turn volumes were calculated, the through volumes were calculated by subtracting the sum of left-turn and right-turn from the volume leaving the terminal/intersection.

The PD&E Study forecasted volumes were verified by performing two reasonableness checks:

- Principle of Reciprocity – Number of vehicles during peak-hour traffic going northbound or eastbound should be similar in range of number of vehicles during peak-hour traffic going southbound or westbound.
- Growth Check – Base year counts and future year volumes were compared to account for a growing trend.

Additional details about the travel demand forecasting are documented in the *Design Traffic Technical Memorandum* dated June 2021 and in the *Systems Interchange Modification Report (SIMR)* dated June 2021, both companion documents to this study.

4.5 BUILD ALTERNATIVES

The PD&E Study Build Alternatives analysis and evaluation were performed and completed between September 2016 and December 2018, prior to the hold of the study in 2019 (as discussed in ***Section 4.1***). Therefore, the analysis documented in this section did not include the FDOT District Six I-95 Planning Study, District Four I-95 CPS, and the recent changes to the I-95 Express Phase 3C Project.

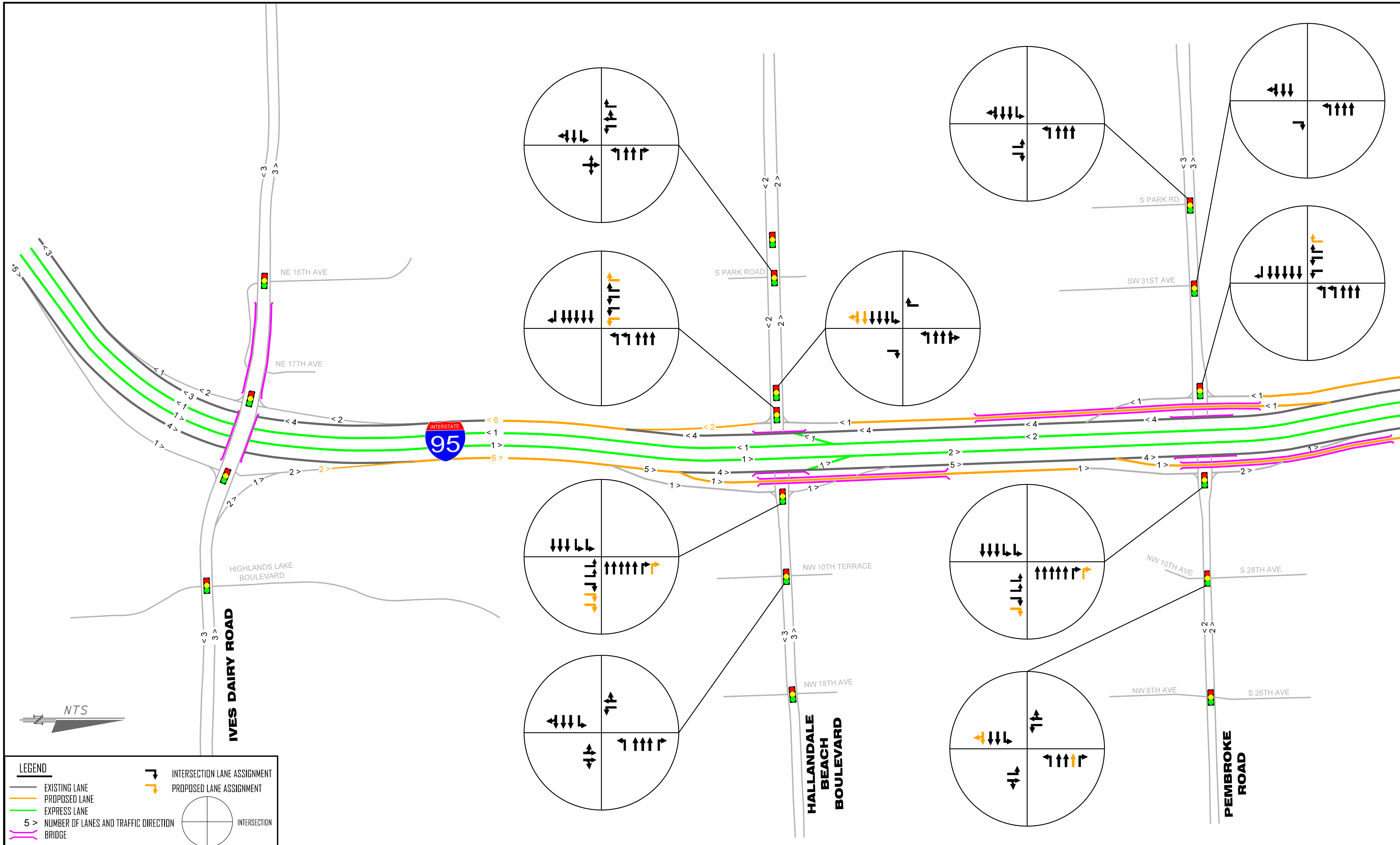
The objective of this PD&E Study is to evaluate interchange alternatives that will address existing and projected traffic operating deficiencies along this section of I-95. In order to keep up with the growing traffic demand within the study area, three build alternatives (Alternatives 1, 2 and 3) were considered in this PD&E Study. All three alternatives propose potential modifications to the existing entrance and exit ramps serving the three interchanges within the project limits. Ramp terminal intersection modifications were evaluated at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard to improve the access and operation to and from I-95.

Appendix G shows the conceptual plans for all three alternatives including, but not limited to, the following elements:

- Project corridor study limits
- Existing limited access right of way
- Existing right of way
- Existing centerline of construction
- Existing bridge structures
- Existing barrier walls
- Proposed corridor improvements
- Proposed new/widened bridge structures
- Bridge structure modifications
- Proposed shoulder pavement
- Proposed barrier/retaining walls
- Proposed limited access right of way
- Proposed pavement markings
- Impacted parcel properties
- Sidewalk
- Median/Greenspace

4.5.1 Alternative 1 – Braided Ramps

Alternative 1 proposes braided ramps between interchanges to improve the substandard weaving movements along I-95. In this alternative, the on-ramps from each interchange will remain unchanged. However, the off-ramps to Pembroke Road and Hollywood Boulevard in the northbound direction and to Pembroke Road and Hallandale Beach Boulevard in the southbound direction will be located one interchange prior to the destination interchange. For example, travelers destined northbound to Pembroke Road would use an exit ramp located just south of the Hallandale Beach Boulevard corridor right after the Hallandale Beach Boulevard off-ramp. The new exit ramp will continue separated from the I-95 mainline braiding over the Hallandale Beach Boulevard on-ramp and continuing along the right of way line until reaching the cross-street ramp terminal. This new exit ramp bypasses and avoids conflicts with the Hallandale Beach Boulevard on-ramp. The same design continues northbound to Hollywood Boulevard and southbound to Pembroke Road and Hallandale Beach Boulevard. ***Figure 4.15*** shows the schematic geometric layout of Alternative 1.



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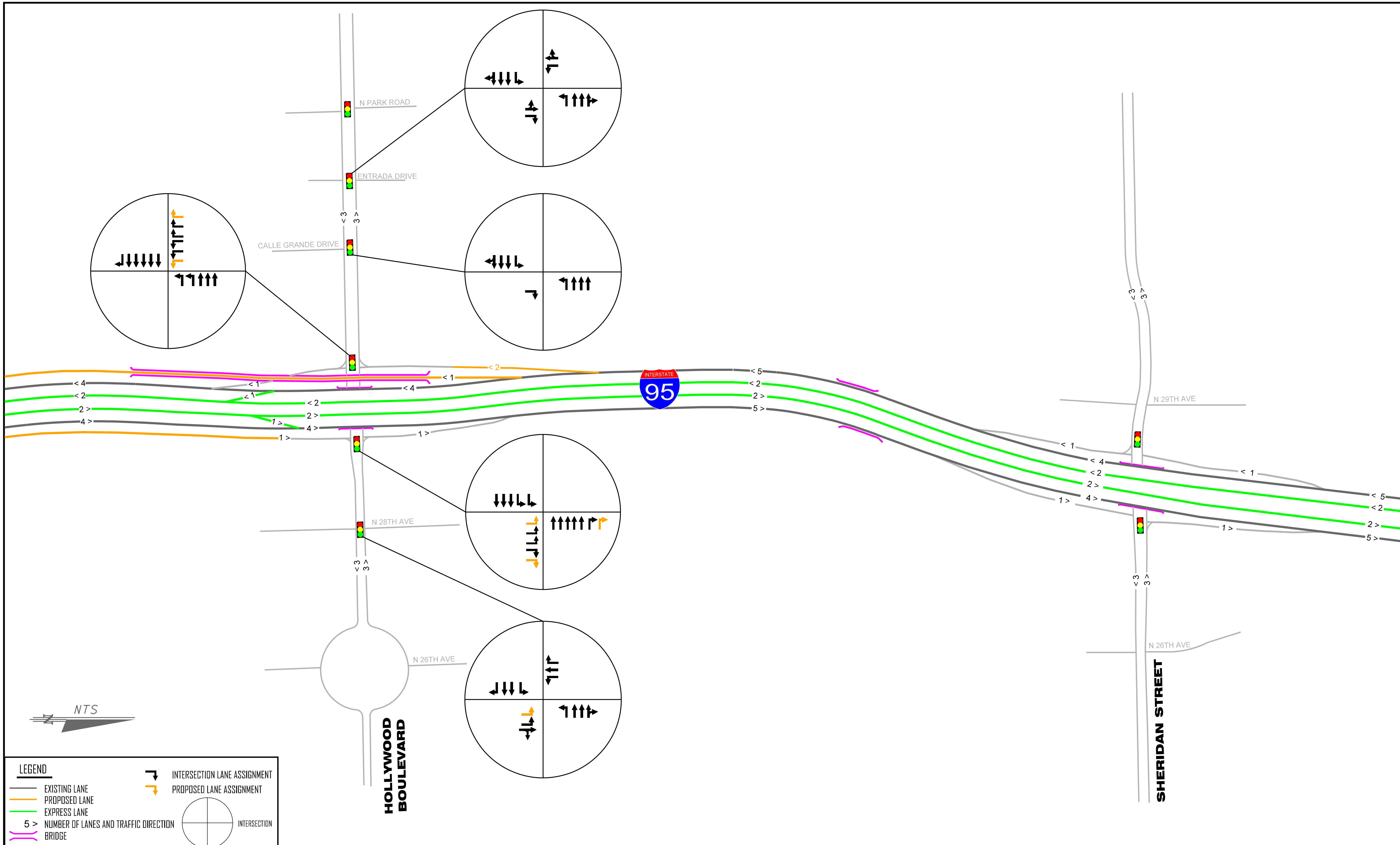
I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

SR 9 (INTERSTATE 95) LANE GEOMETRY AND CONFIGURATIONS ALTERNATIVE 1 - SCHEMATIC LINE DIAGRAM

FIGURE 4.15



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DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

JUNE 2018

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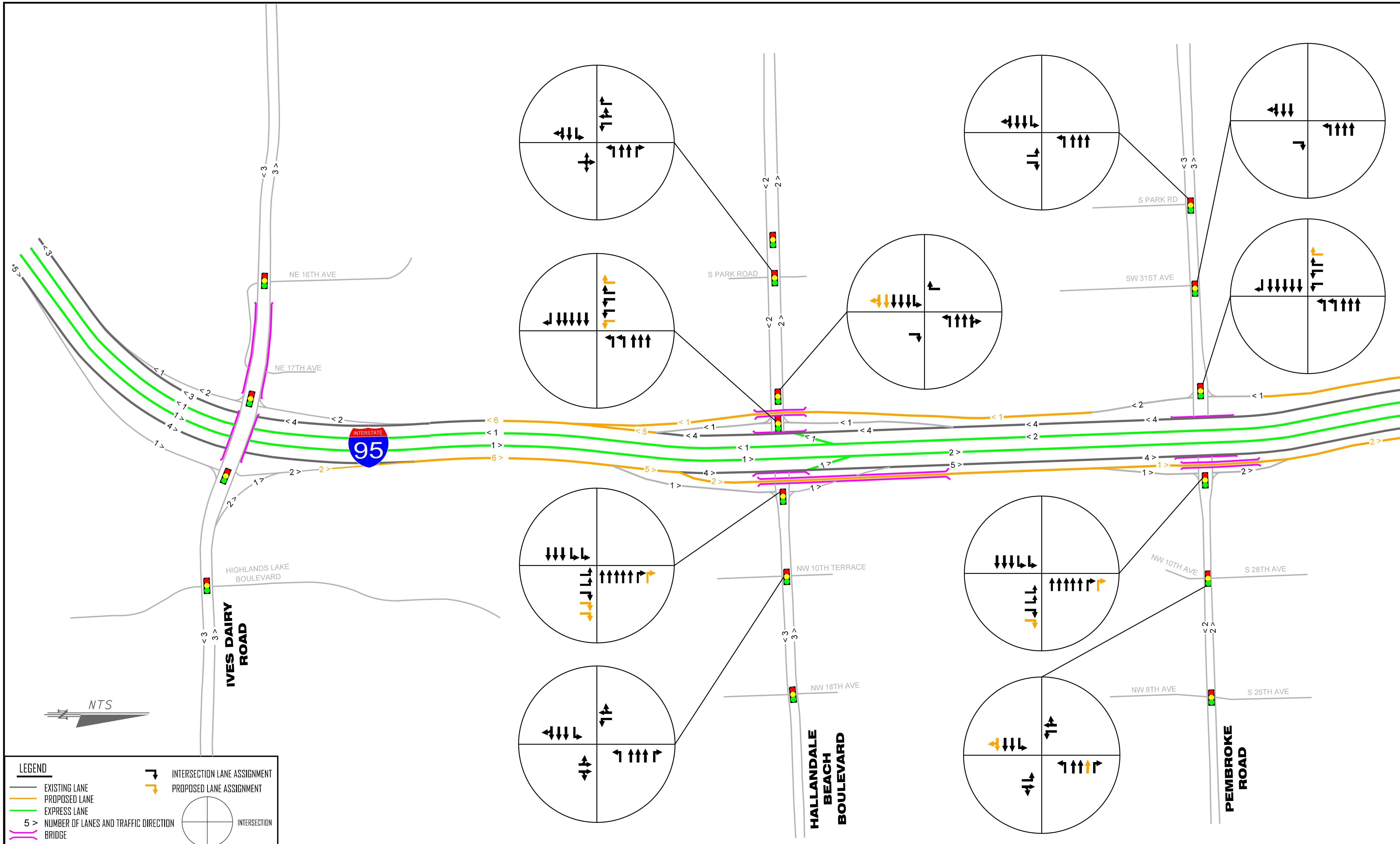
SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
ALTERNATIVE 1 - SCHEMATIC LINE DIAGRAM

FIGURE
4.15

4.5.2 Alternative 2 – Collector Distributor Roadways

Alternative 2 proposes a collector distributor roadway system within the I-95 mainline project area. The collector distributor roadway system will remove the Pembroke Road Interchange from directly interacting with the I-95 mainline. In the northbound direction, all exiting traffic to Pembroke Road and Hollywood Boulevard will utilize a new collector distributor off-ramp just south of Hallandale Beach Boulevard. The collector distributor roadway system will extend to just north of Hollywood Boulevard serving the exit traffic to Pembroke Road, entry traffic from Pembroke Road, exit traffic to Hollywood Boulevard, and entry traffic from Hollywood Boulevard. In the southbound direction, the new collector distributor roadway system will not be continuous, it will end and begin at Pembroke Road. The first section combines the off-ramps to Hollywood Boulevard and Pembroke Road and the second section moves the Pembroke Road on-ramp to enter I-95 south of the Hallandale Beach Boulevard on-ramp. ***Figure 4.16*** shows the schematic geometric layout of Alternative 2.



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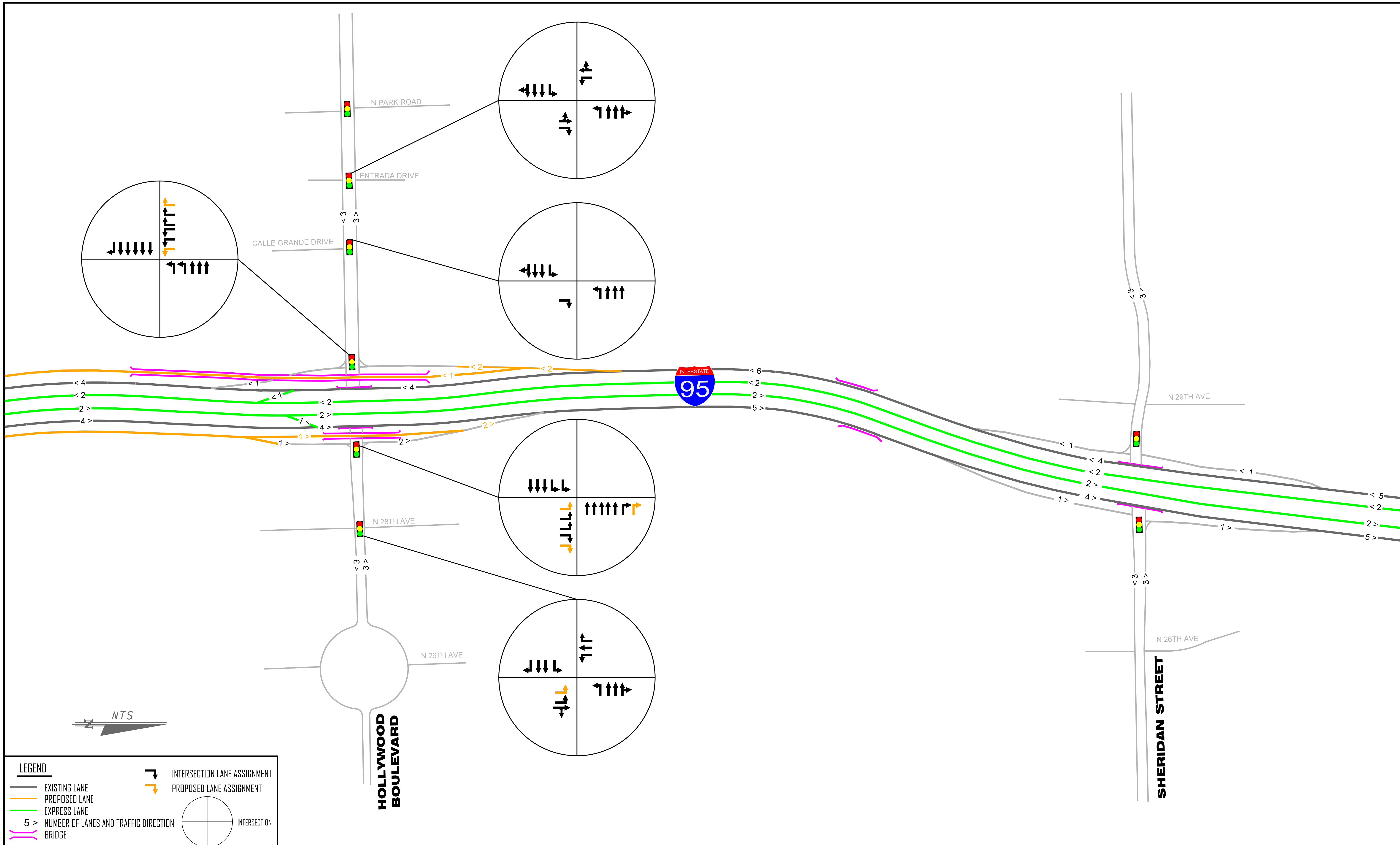
JUNE 2018

INTERSTATE 95

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
ALTERNATIVE 2 - SCHEMATIC LINE DIAGRAM

FIGURE
4.16



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DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

JUNE 2018

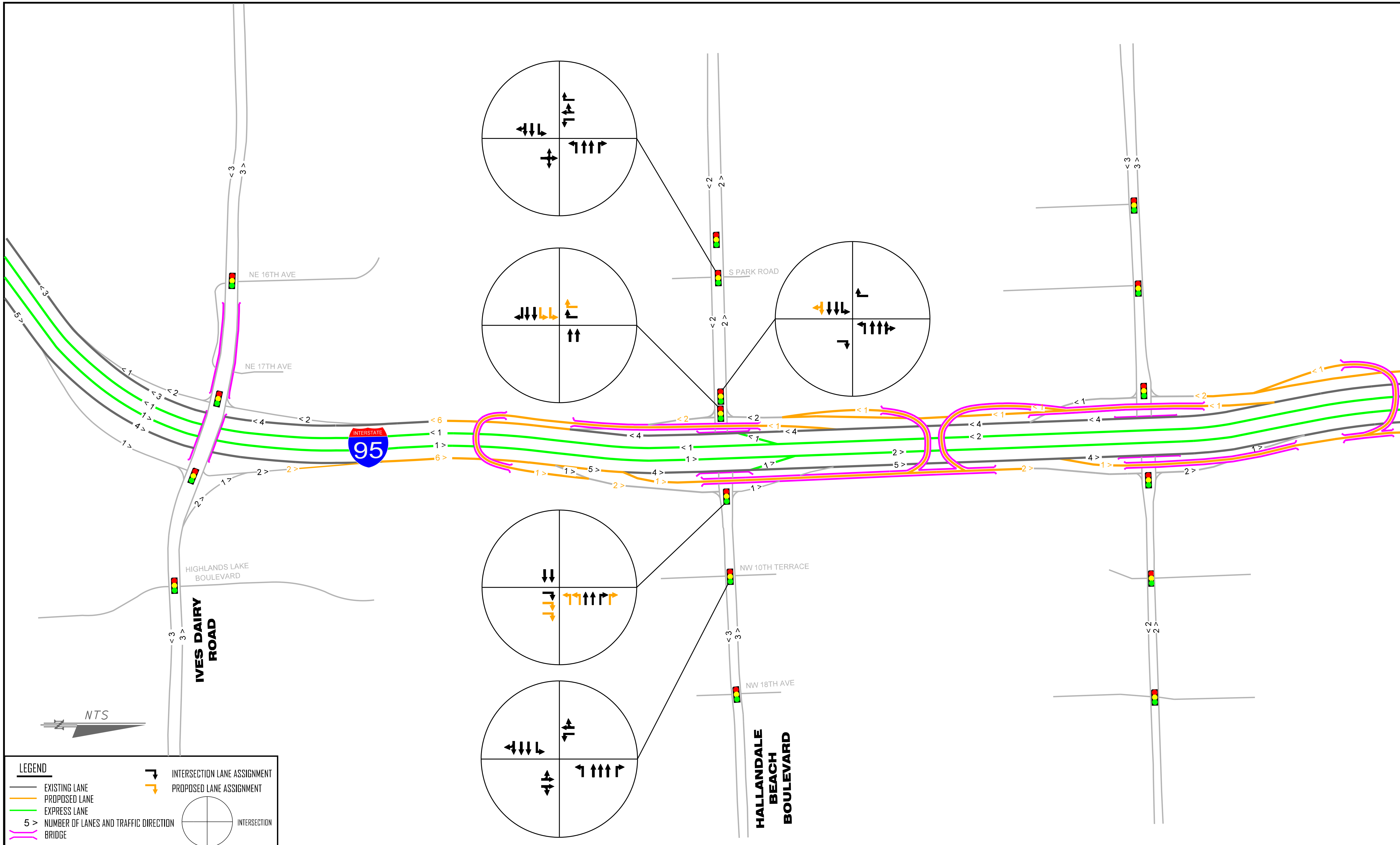
I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
ALTERNATIVE 2 - SCHEMATIC LINE DIAGRAM

FIGURE
4.16

4.5.3 ALTERNATIVE 3 – U-TURN RAMPS

Alternative 3 proposes to eliminate all left-turn movements from the off-ramp terminal intersections. The left-turn movements will be converted to right-turn movements by relocating the left-turn movements to a successive off-ramp that becomes a U-turn ramp over the interstate touching down to the opposite ramp terminal intersection. For example, the northbound exiting freeway traffic destined westbound will conventionally use the northbound off-ramp and make a left turn. However, in this alternative, the northbound exiting freeway traffic destined westbound will use the freeway U-turn off-ramp to access the southbound off-ramp right-turn movement. This alternative reduces the number of phases needed at the interchange ramp terminals. ***Figure 4.17*** shows the schematic geometric layout of Alternative 3.



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3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

JUNE 2018

INTERSTATE 95

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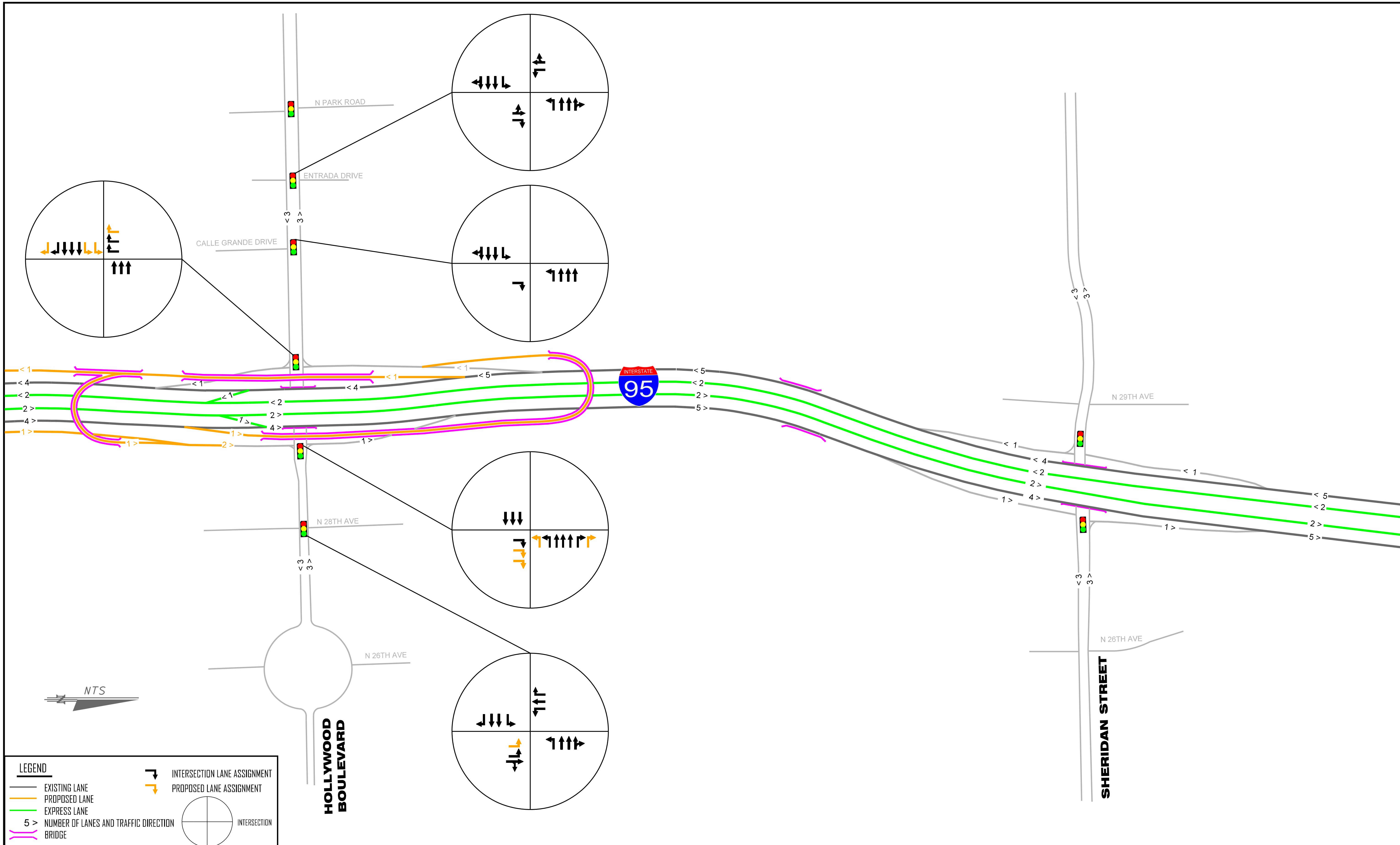
FPID No.: 436903-1-22-02
ETDM No.: 14254

SR 9 (INTERSTATE 95) LANE GEOMETRY AND CONFIGURATIONS ALTERNATIVE 3 - SCHEMATIC LINE DIAGRAM

FIGURE 4.17



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DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
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JUNE 2018

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ETDM No.: 14254

SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
ALTERNATIVE 3 - SCHEMATIC LINE DIAGRAM

FIGURE
4.17

4.5.4 INTERCHANGE ALTERNATIVES

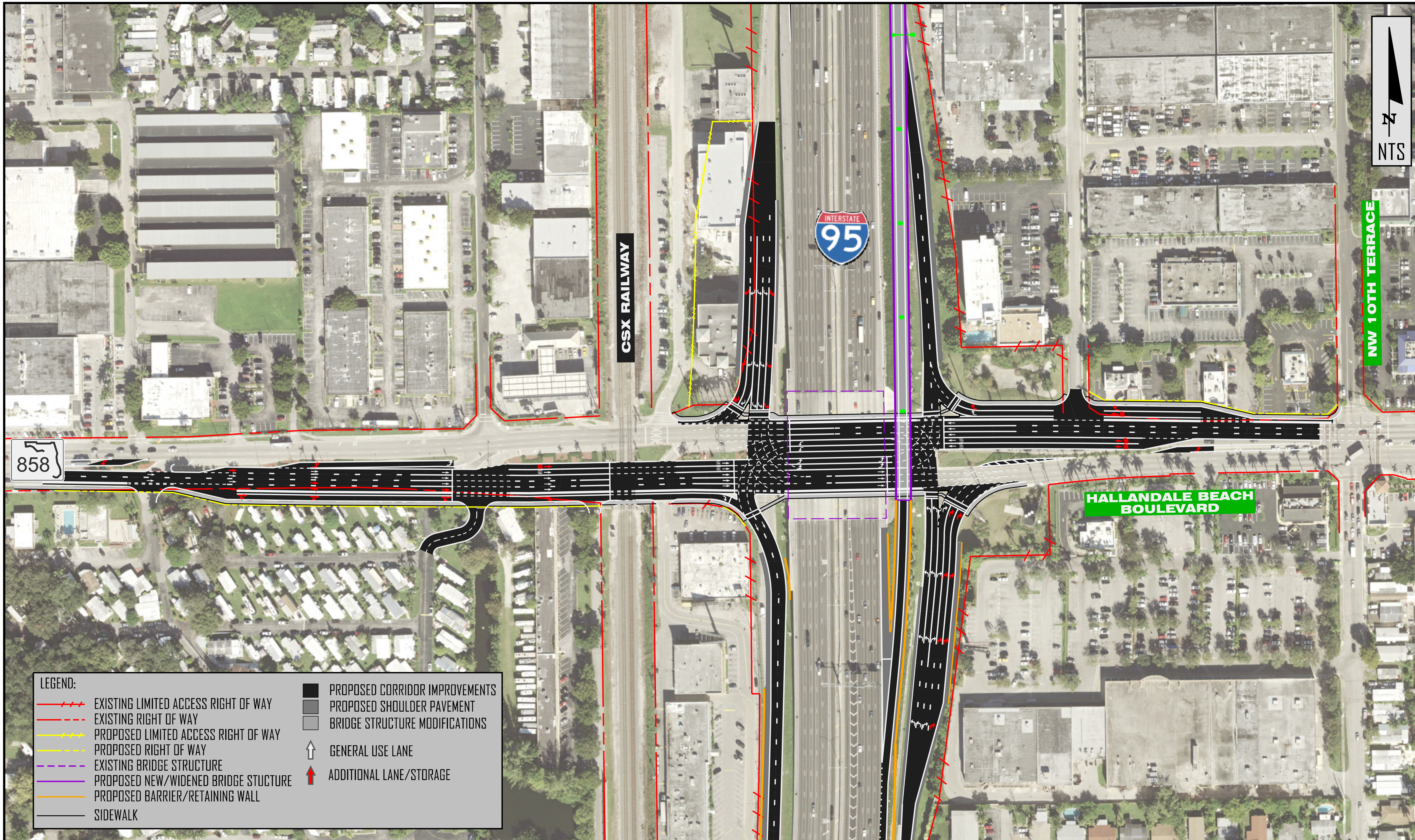
Four types of interchange configurations were evaluated along each cross street for each I-95 interchange at Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard.

- **Diamond Interchange –** This interchange configuration maintains the existing interchange layout but with additional turn lanes, through lanes and/or extended storage bays. ***Figures 4.18 – 4.20*** show the proposed improvements at each interchange. The red arrows depict the locations were additional turn lanes, through lanes and/or extended storage bays are being proposed. This interchange configuration is compatible with mainline Alternatives 1 and 2.

- **Diverging Diamond Interchange (DDI) –** This interchange configuration eliminates the need for on-ramp left-turning vehicles to cross the paths of approaching through vehicles, reducing signal phases at each ramp terminal, and improving safety. The two directions of traffic along the arterials cross to the opposite side on both sides of the bridge at the freeway. ***Figures 4.21 – 4.23*** show the proposed improvements at each interchange. This interchange configuration is compatible with mainline Alternatives 1 and 2.

- **Displaced Left-Turn Lane Interchange –** This interchange configuration main geometric feature is the removal of the left-turn movements from the main intersection to an upstream signalized location. Traffic that would turn left at the main intersection in a conventional design now has to cross opposing through lanes at a signal-controlled intersection several hundred feet upstream and then travel on a new roadway parallel to the opposing lanes. This traffic is now able to execute the left-turn simultaneously with the through traffic at the main intersection. ***Figures 4.24 – 4.26*** show the proposed improvements at each interchange. This interchange configuration will work with mainline Alternatives 1 and 2.

- **Continuous Flow Intersection (CFI) –** This interchange configuration reduces signal phases at the ramp terminal intersections by displacing the on-ramp left-turn movements and by removing the off-ramp left-turn movements. The incoming arterial through traffic only encounters a single signal through the interchange. ***Figures 4.27 – 4.29*** show the proposed improvements at each interchange. This interchange configuration will work with mainline Alternative 3 only.



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3400 WEST COMMERCIAL BOULEVARD
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JUNE 2018

INTERSTATE 95

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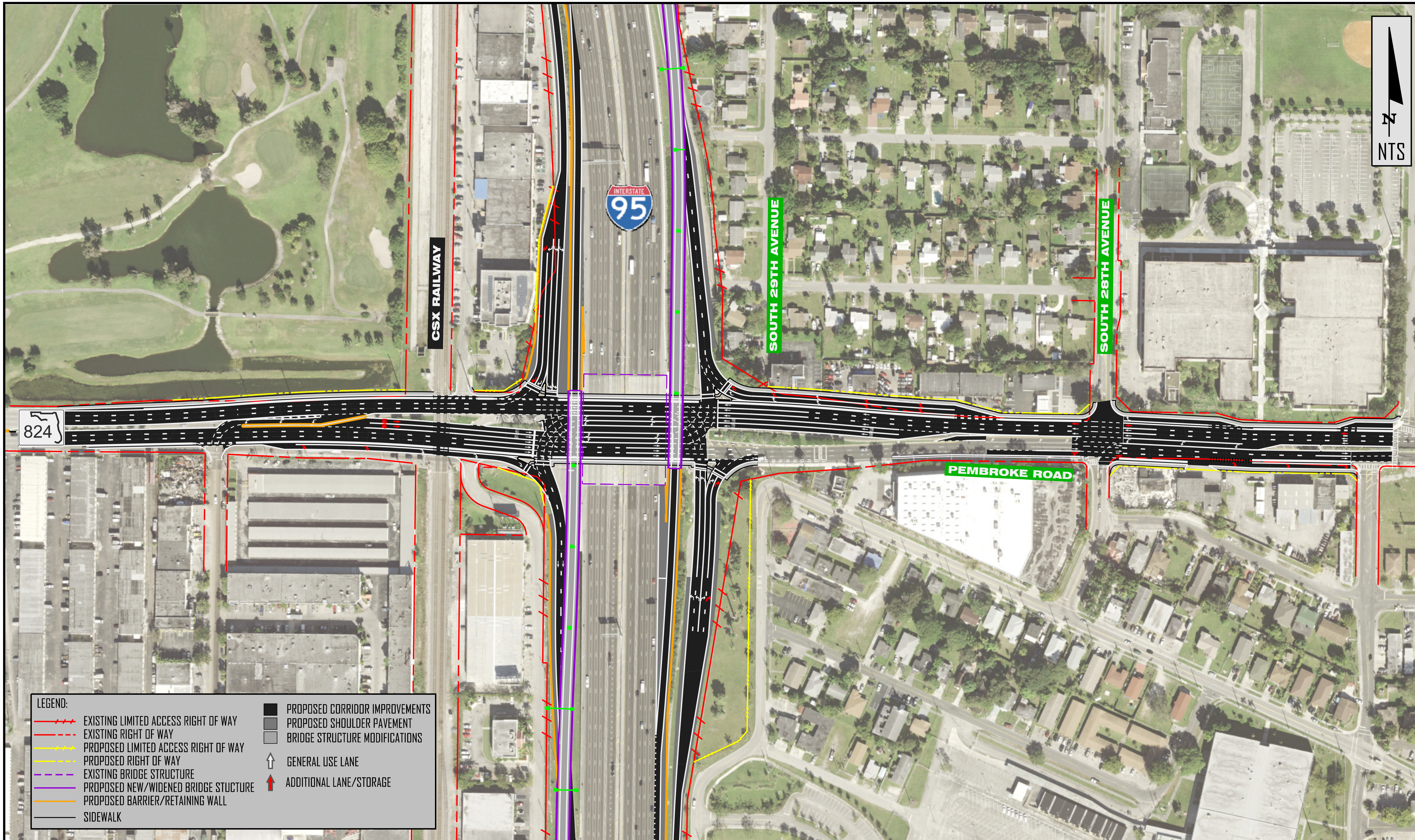
FPID No.: 436903-1-22-02
ETDM No.: 14254

HALLANDALE BEACH BOULEVARD
DIAMOND INTERCHANGE

FIGURE
4.18



LEGEND:

- EXISTING LIMITED ACCESS RIGHT OF WAY
- EXISTING RIGHT OF WAY
- PROPOSED LIMITED ACCESS RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING BRIDGE STRUCTURE
- PROPOSED NEW/WIDENED BRIDGE STUCTURE
- PROPOSED BARRIER/RETAINING WALL
- SIDEWALK
- PROPOSED CORRIDOR IMPROVEMENTS
- PROPOSED SHOULDER PAVEMENT
- BRIDGE STRUCTURE MODIFICATIONS
- GENERAL USE LANE
- ADDITIONAL LANE/STORAGE

FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

JUNE 2018

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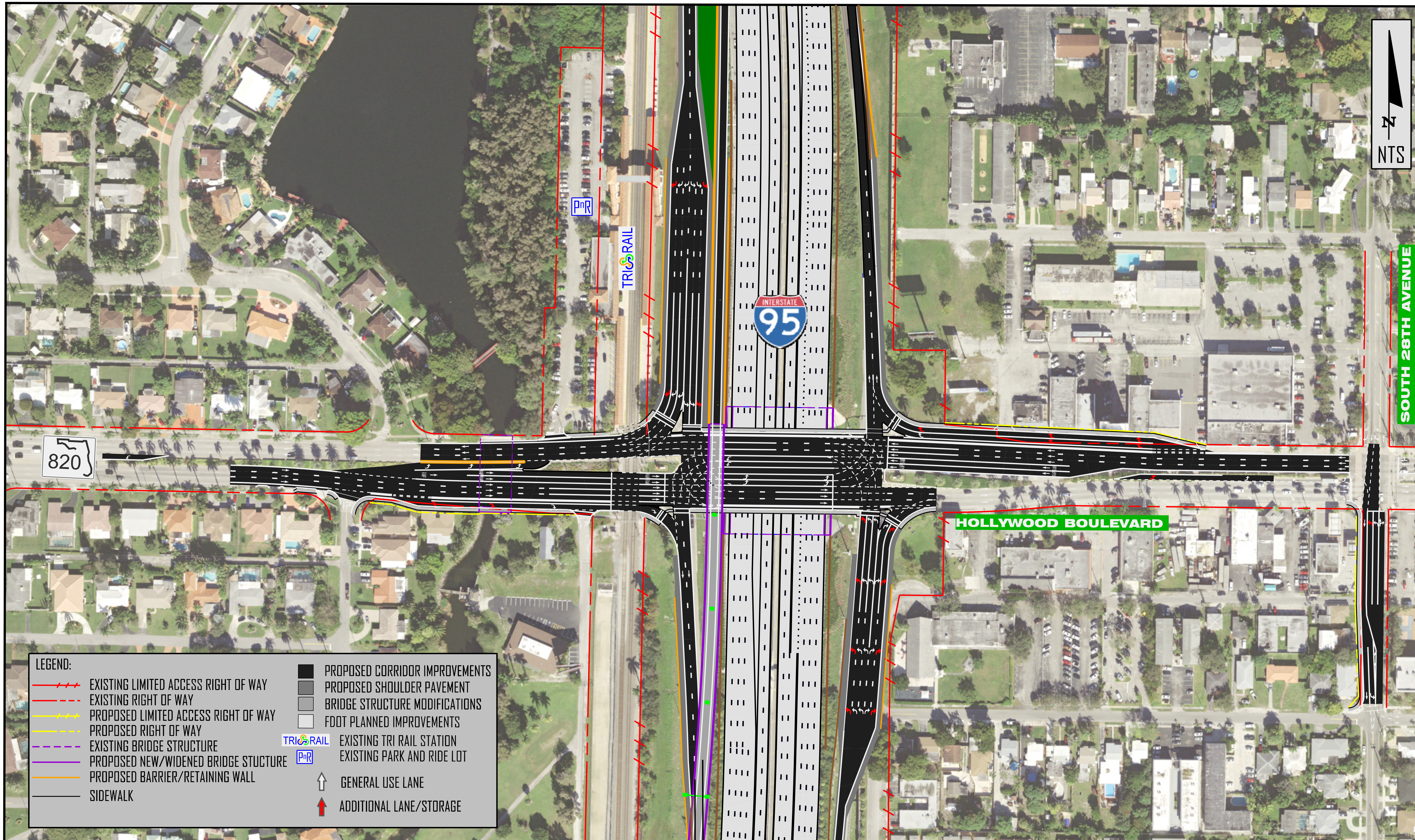
FPID No.: 436903-1-22-02
ETDM No.: 14254

PEMBROKE ROAD
DIAMOND INTERCHANGE

FIGURE
4.19



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DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

JUNE 2018

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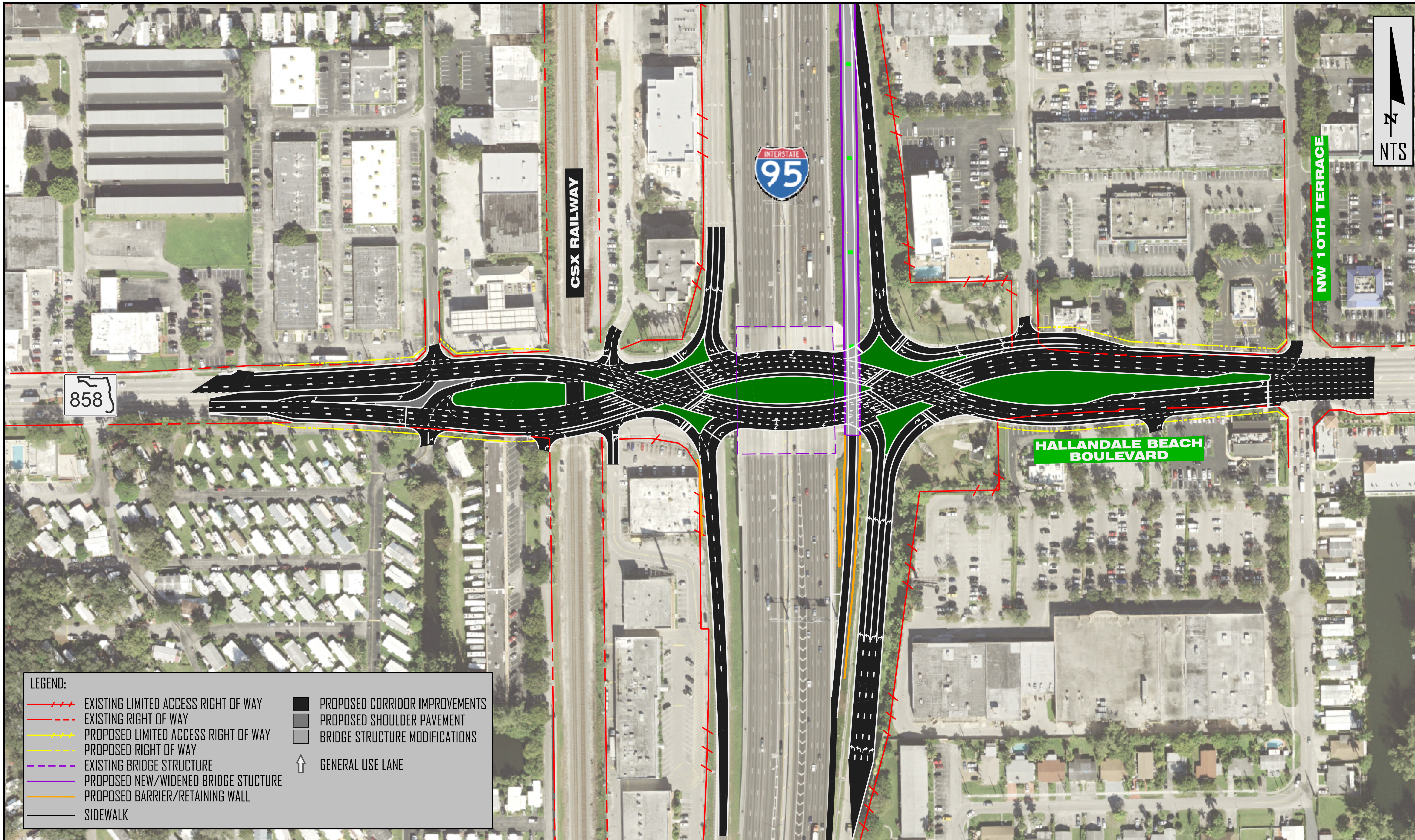
FPID No.: 436903-1-22-02
ETDM No.: 14254

HOLLYWOOD BOULEVARD
DIAMOND INTERCHANGE

FIGURE
4.20



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JUNE 2018

INTERSTATE 95

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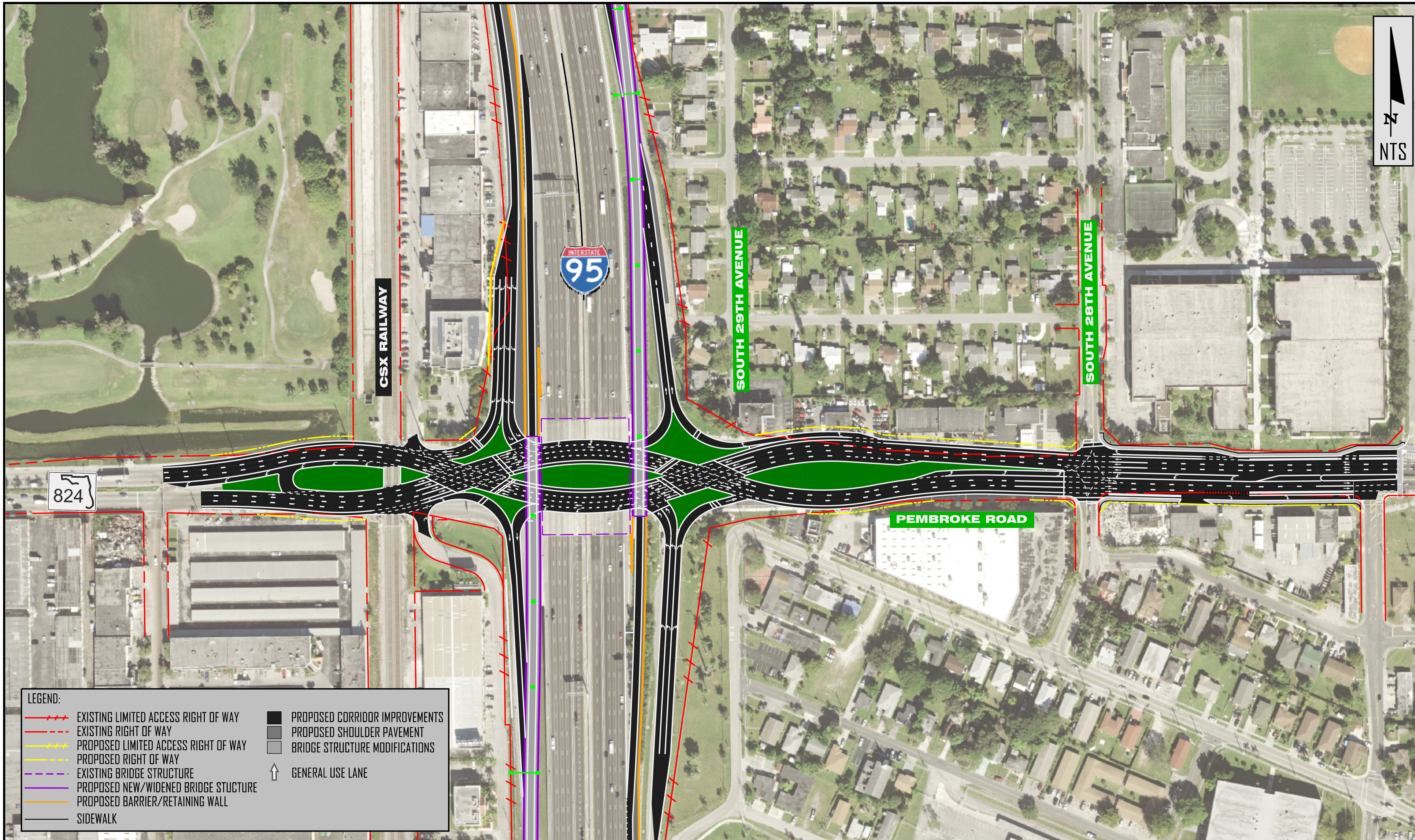
HALLANDALE BEACH BOULEVARD
DIVERGING DIAMOND INTERCHANGE - 35 MPH

FIGURE
4.21



FDOT
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DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

JUNE 2018

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)

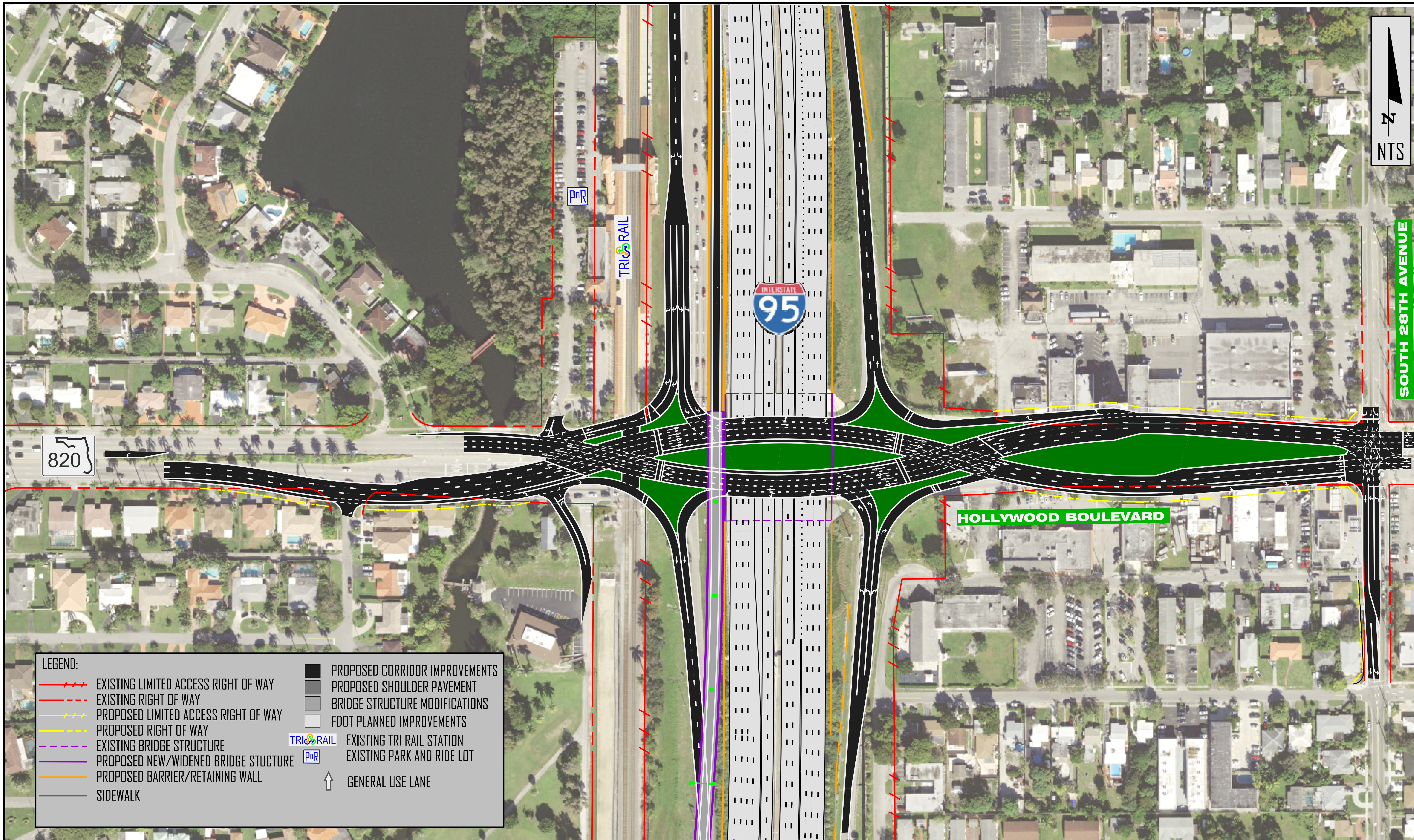
FPID No.: 436903-1-22-02

ETDM No.: 14254

PEMBROKE ROAD

DIVERING DIAMOND INTERCHANGE - 35 MPH

FIGURE 4.22



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I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
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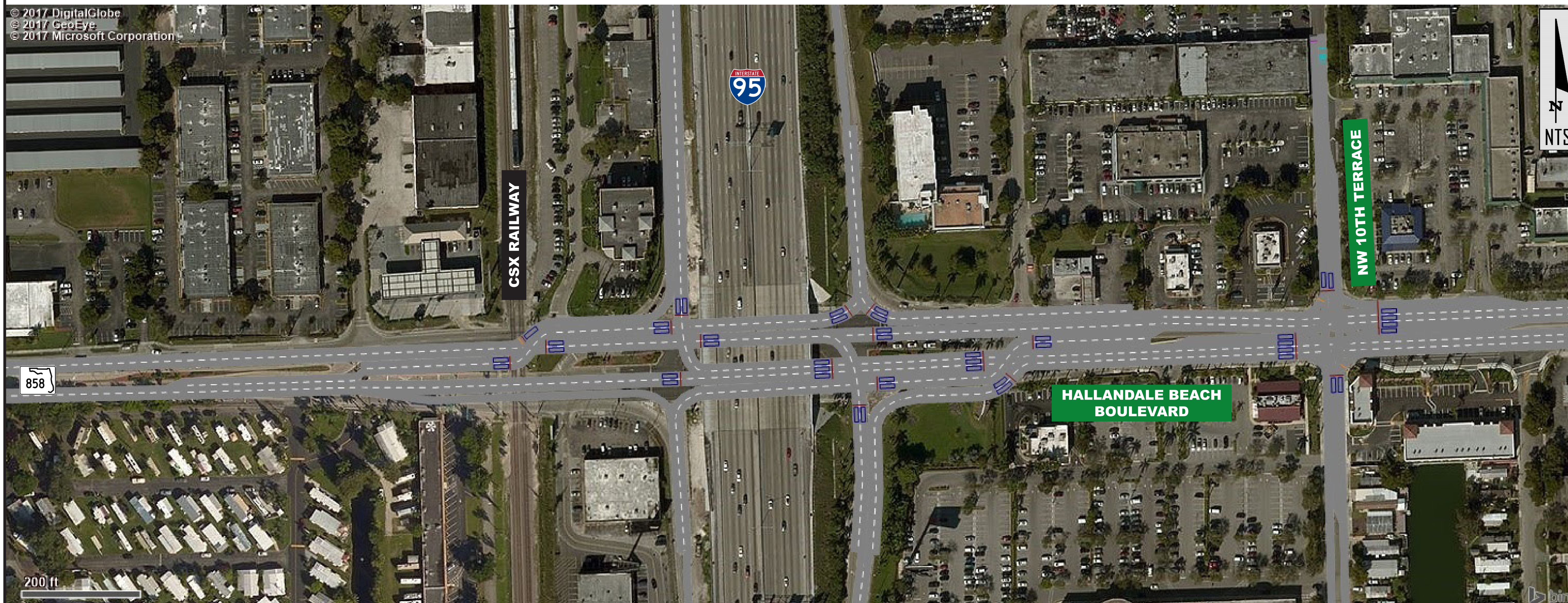
FPID No.: 436903-1-22-02
ETDM No.: 14254

HOLLYWOOD BOULEVARD
DIVERGING DIAMOND INTERCHANGE - 35 MPH

FIGURE 4.23



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JUNE 2018

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
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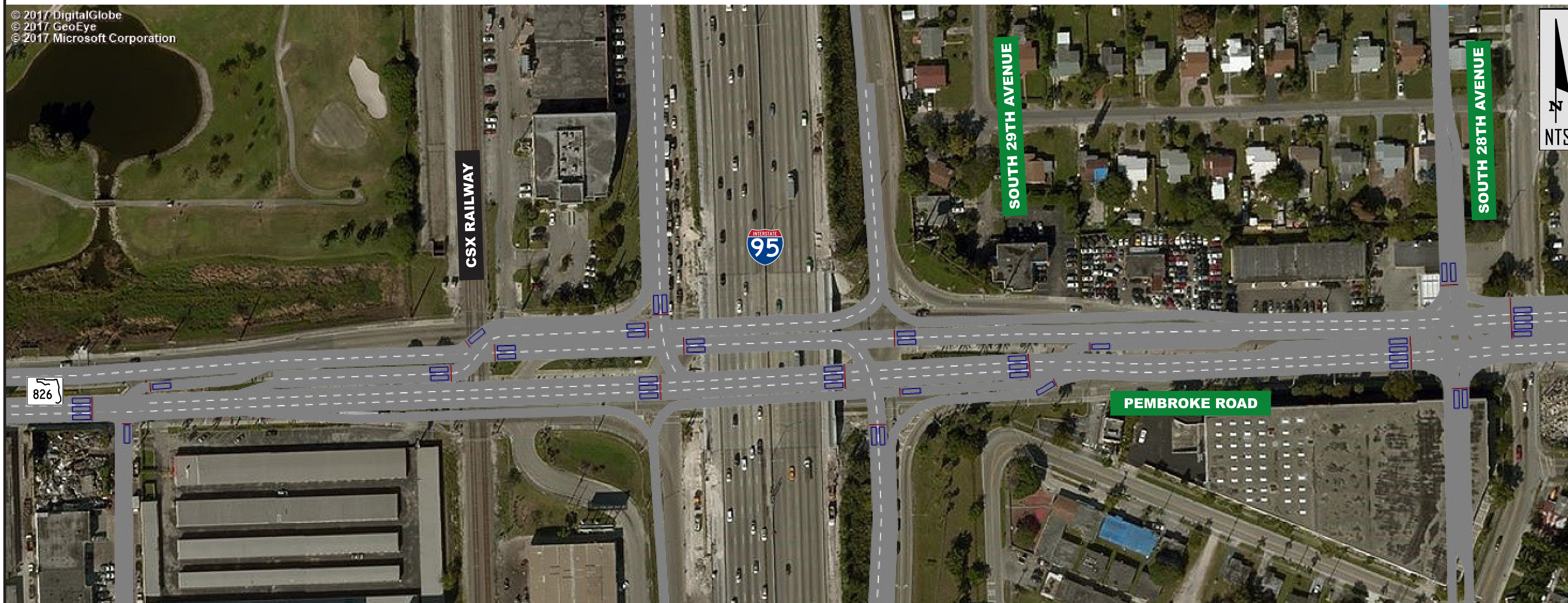
FPID No.: 436903-1-22-02
ETDM No.: 14254

HALLANDALE BEACH BOULEVARD
DISPLACED LEFT TURN LANE INTERCHANGE

FIGURE
4.24



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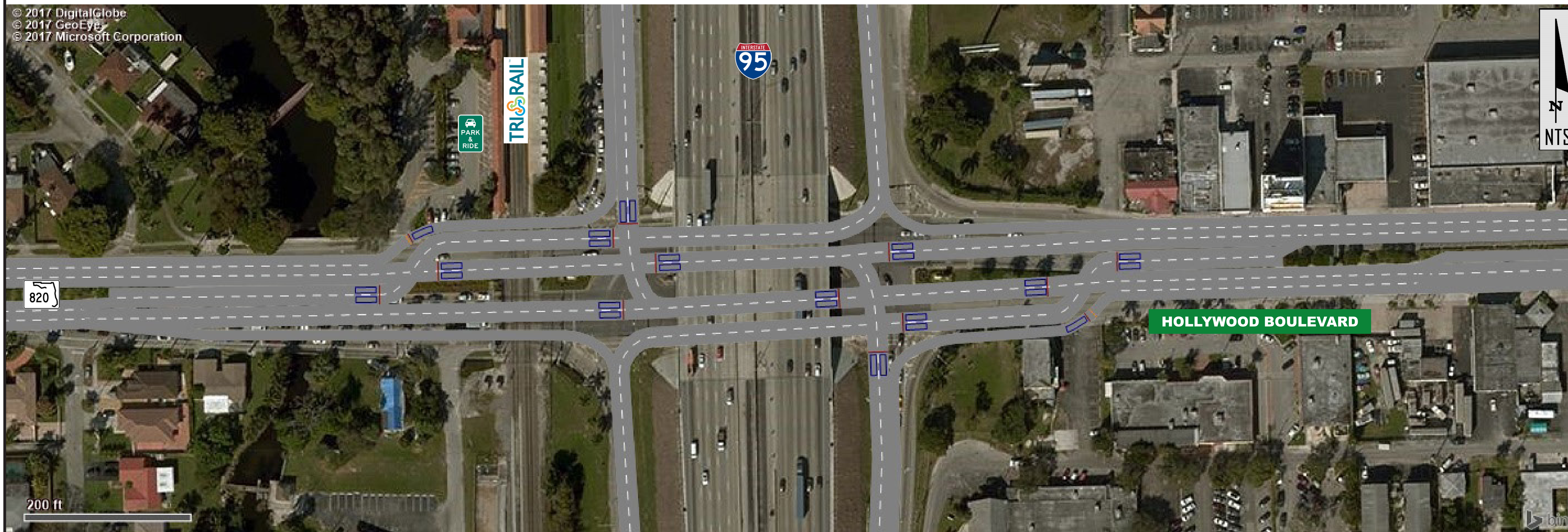
FORT LAUDERDALE, FL 33309

JUNE 2018

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

PEMBROKE ROAD
DISPLACED LEFT TURN LANE INTERCHANGE

FIGURE
4.25



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3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

JUNE 2018

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
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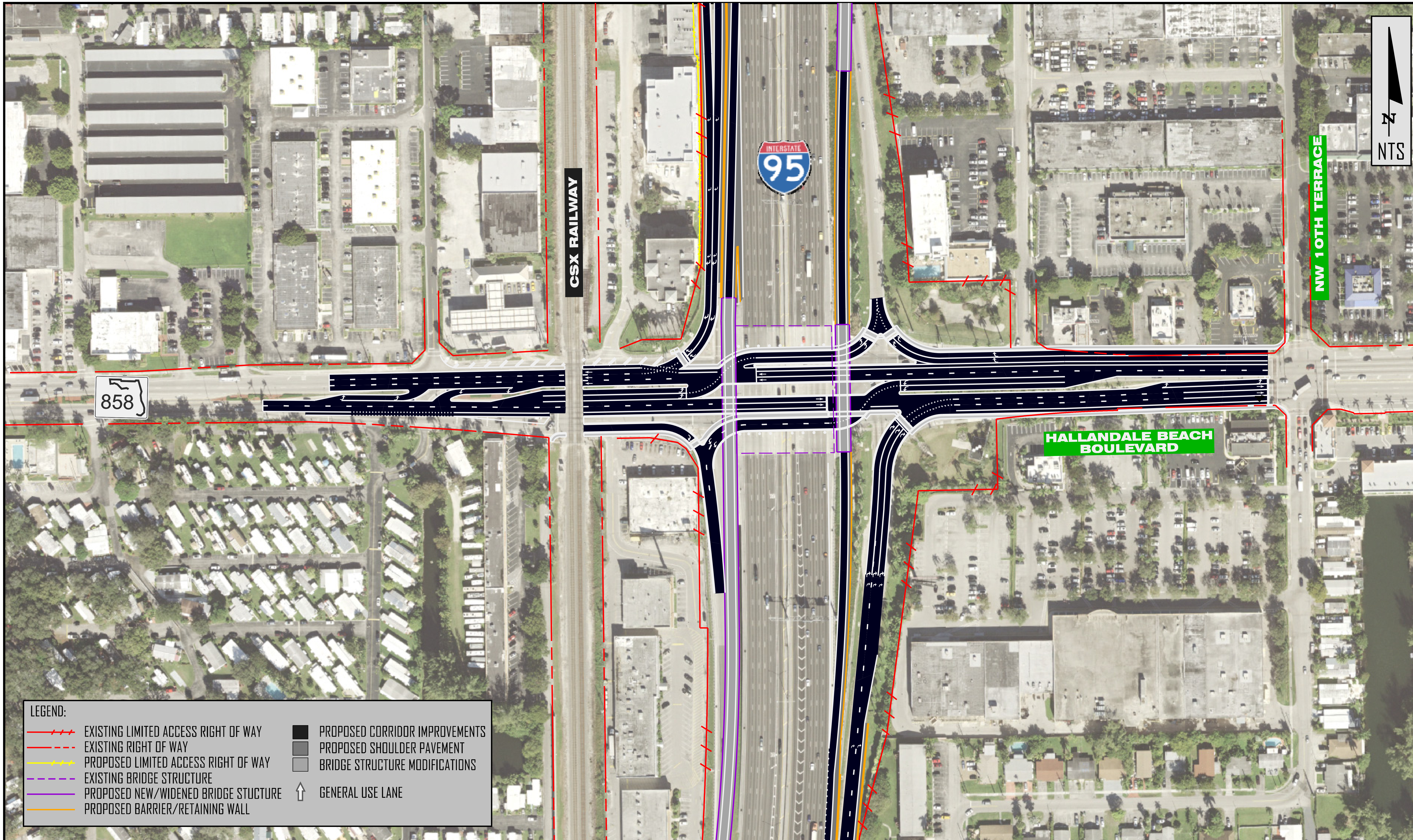
FPID No.: 436903-1-22-02
ETDM No.: 14254

HOLLYWOOD BOULEVARD
DISPLACED LEFT TURN LANE INTERCHANGE

FIGURE
4.26



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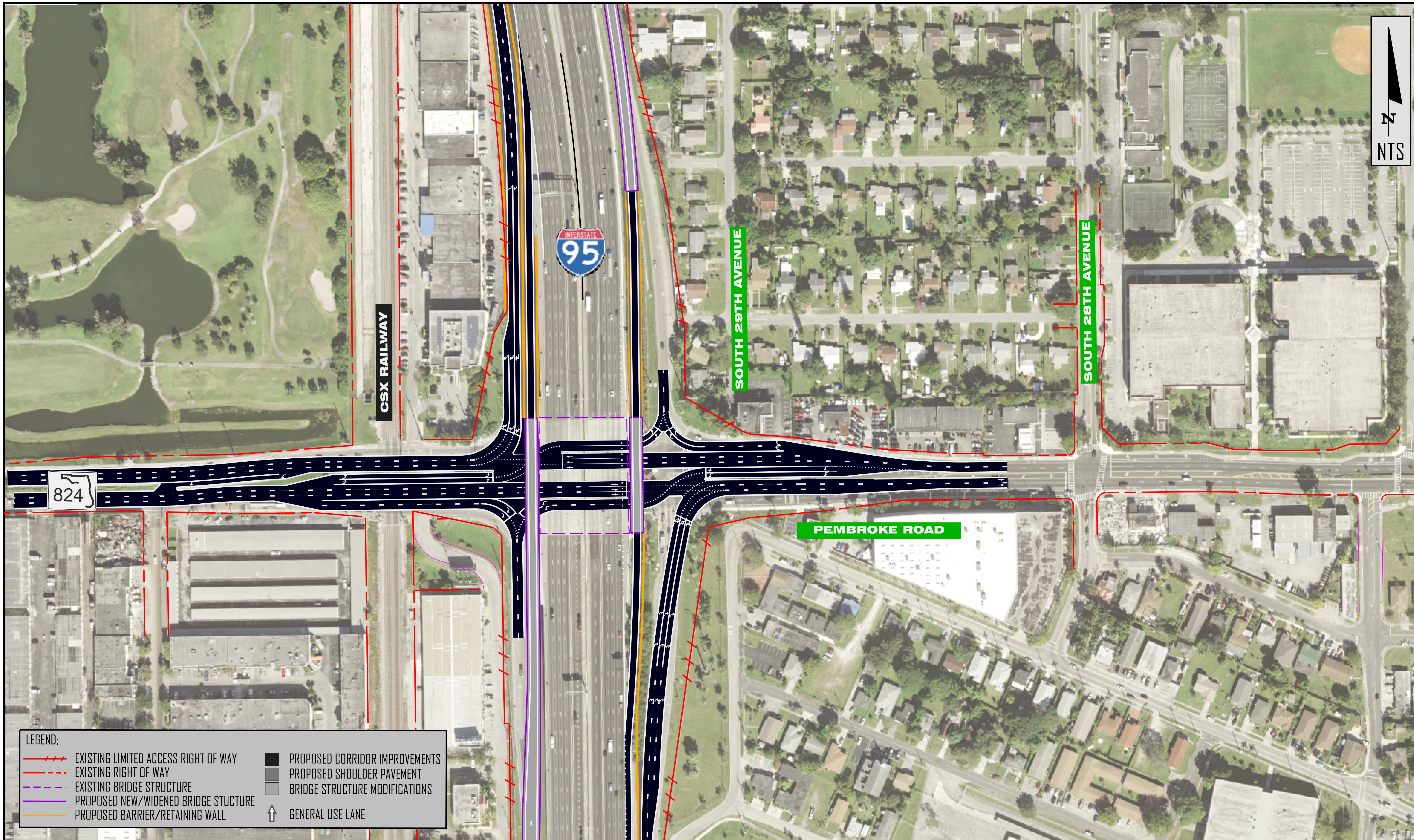
JUNE 2018

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

HALLANDALE BEACH BOULEVARD
CONTINUOUS FLOW INTERSECTION

FIGURE 4.27



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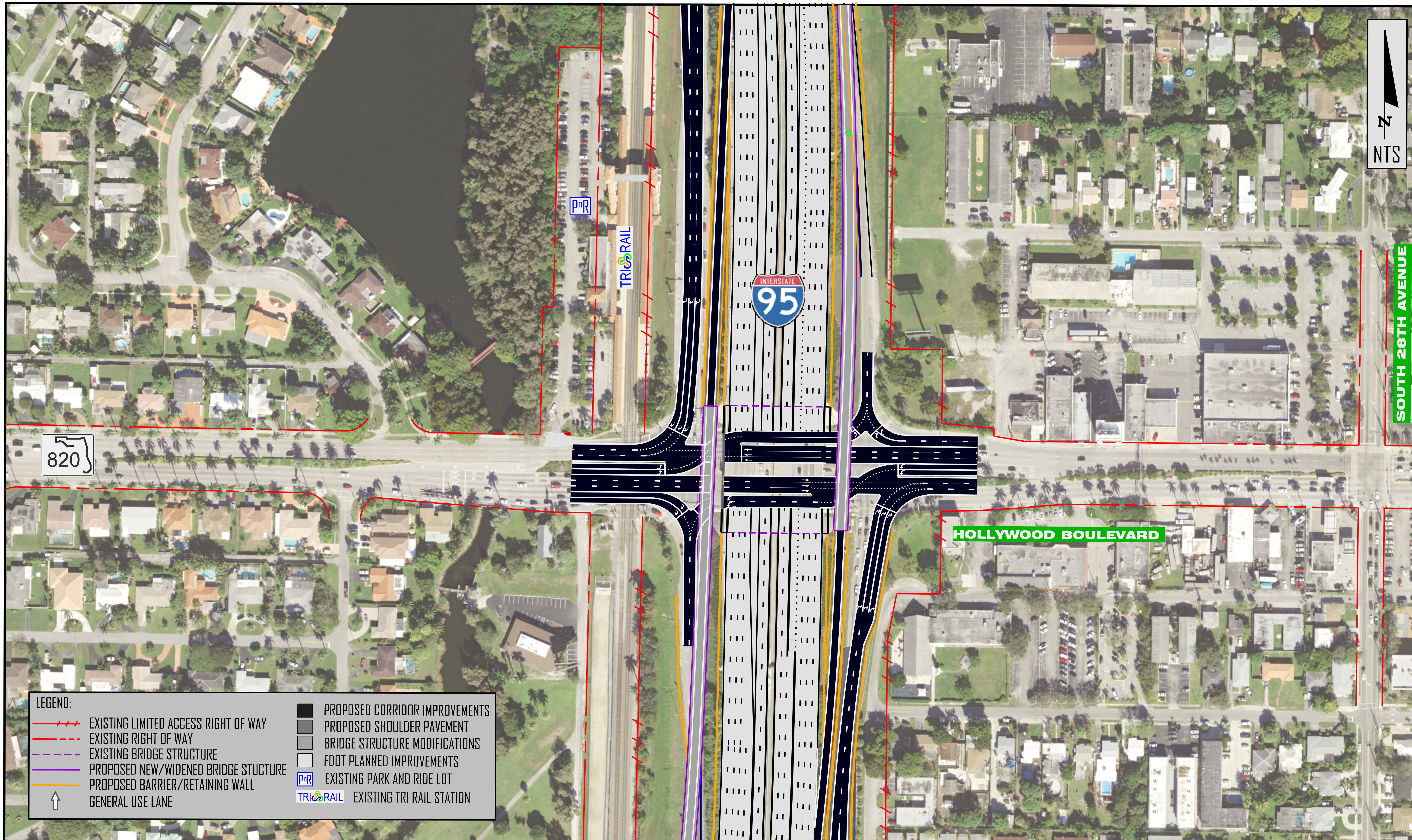
JUNE 2018

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

PEMBROKE ROAD
CONTINUOUS FLOW INTERSECTION

FIGURE
4.28



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JUNE 2018

INTERSTATE 95

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

HOLLYWOOD BOULEVARD
CONTINUOUS FLOW INTERSECTION

FIGURE
4.29

4.5.5 Alternatives Eliminated

During the alternative analysis and geometrics evaluation, the following alternatives were eliminated from further consideration:

- **Alternative 3 –** This alternative was eliminated from the PD&E Study for the following reasons:
    - Low U-turn ramp design speed (20 MPH).
    - U-turn bridge ramps will need median piers, which will require a complex maintenance of traffic along I-95. The maintenance of traffic will impact the operations of the express lanes system.
    - Interchange design is not uniform with the other interchanges, upstream, downstream and throughout the corridor, which impacts driver expectancy and a potential increase in crashes.
    - Interchange design footprint is not compatible with the future I-95 projects north and south of the study limits.

- **Diverging Diamond Interchange –** This alternative was eliminated from the PD&E Study for the following reasons:
    - Low crossing lanes path design speed (30-35 MPH).
    - Railroad at-grade crossing is too close to the crossing lanes path, which could create wrong way vehicle maneuvers and a complex operation of the railroad crossing gates.

- **Displaced Left-Turn Lane Interchange –** This alternative was eliminated from the PD&E Study for the following reasons:
    - Requires a larger footprint within the off-ramp interchange quadrants, which increases right of way impacts.
    - Railroad at-grade crossing is too close to the new upstream intersection on the west side.
    - The design requires additional railroad crossing gates and a more complexed crossing gate operation.

Continuous Flow Intersection (CFI) – This alternative was eliminated from the PD&E Study because this interchange configuration will work with mainline Alternative 3 only, which was eliminated from the PD&E Study.

4.5.6 Typical Sections

Alternative 1 – The I-95 typical section will remain relatively the same as the No-Build Alternative. The roadway typical section varies slightly and consists primarily of four 11-foot (11') wide express lanes (two in each direction), four 12-foot (12') wide general use lanes (two in each direction), four 11-foot (11') wide general use lanes (two in each direction), a three-foot (3') wide buffer area with pavement markings and express lane markers separating the general use lanes from the express lanes, five-foot to 12-foot (5' – 12') wide inside shoulders, 12-foot (12') wide outside shoulders, 12-foot (12') wide auxiliary lanes at selected locations, and a 2.5-foot (2.5') wide center barrier wall.

The only changes to the corridor roadway sections are listed below:

- Two 12-foot (12') wide auxiliary lanes in each direction between Ives Dairy Road and Hallandale Beach Boulevard.
- 15-foot wide braided ramps with 6-foot wide inside and outside shoulders

The three Alternative 1 I-95 roadway cross sections between interchange are depicted in ***Figures 4.30 – 4.32.***

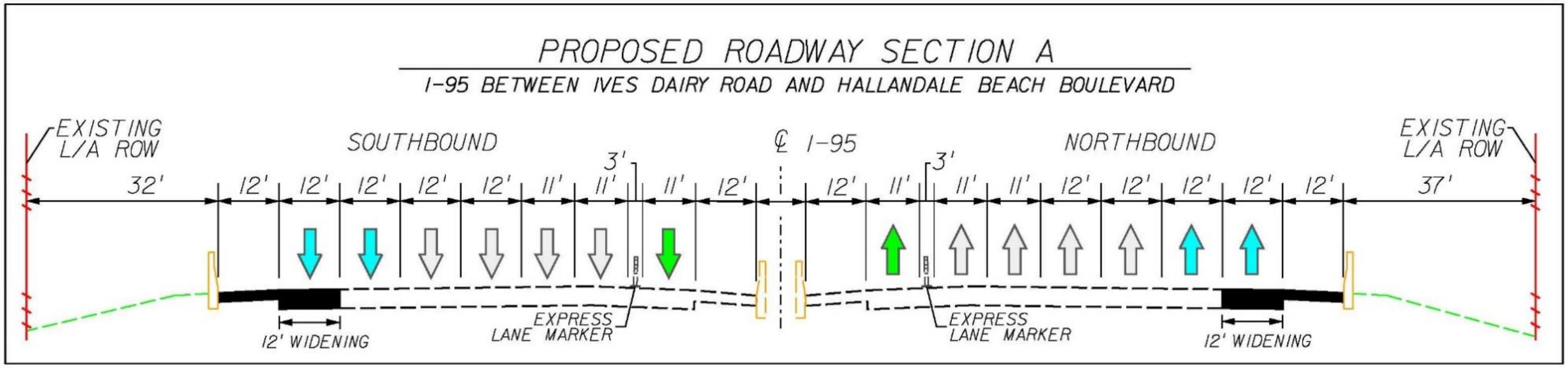


Figure 4.30 – Alternative 1 Typical Section A

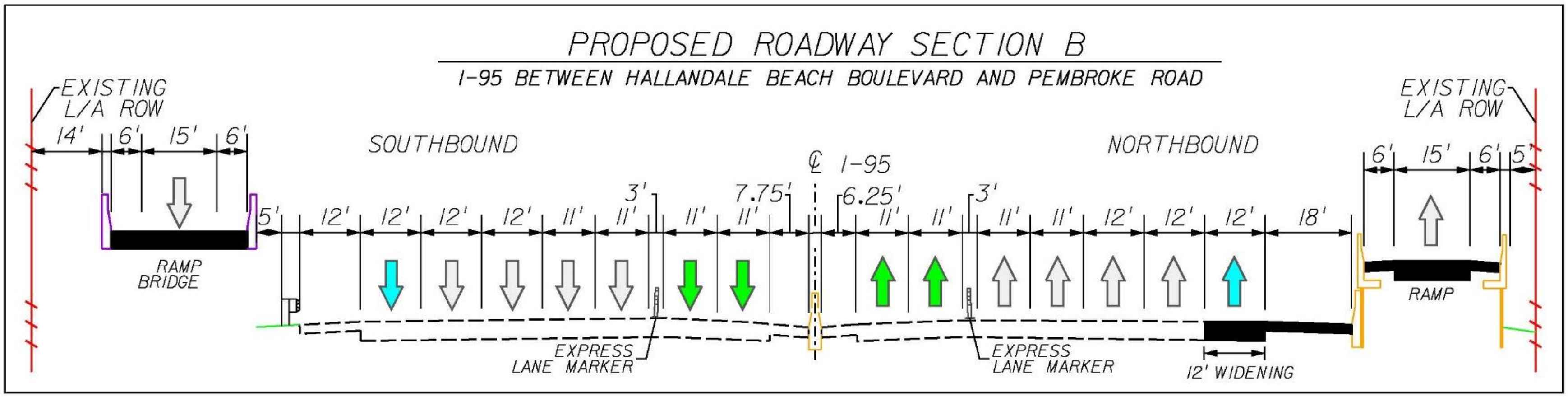


Figure 4.31 – Alternative 1 Typical Section B

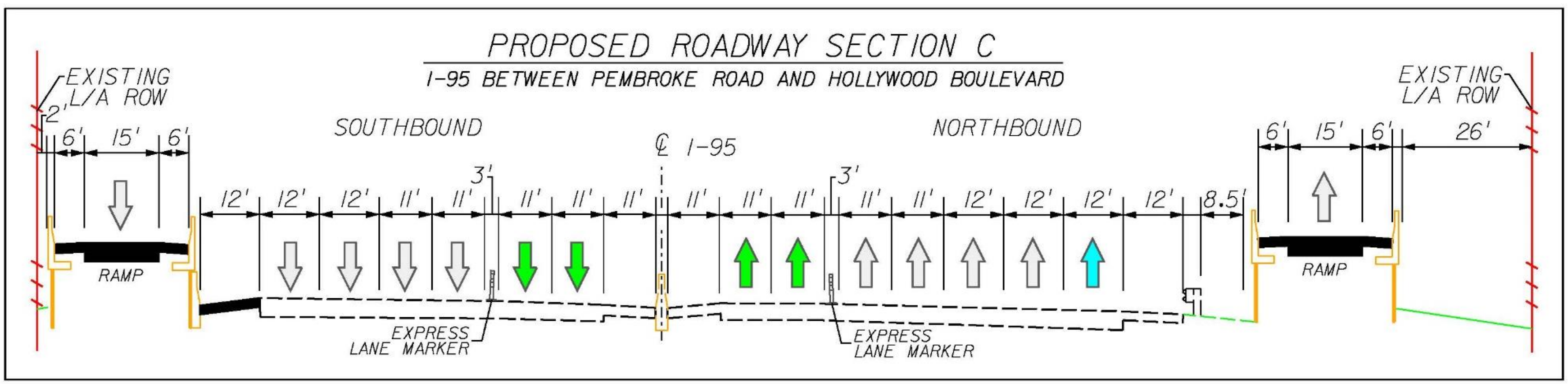


Figure 4.32 – Alternative 1 Typical Section C

Alternative 2 – The I-95 typical section will remain relatively the same as the No-Build Alternative. The roadway typical section varies slightly and consists primarily of four 11-foot (11') wide express lanes (two in each direction), four 12-foot (12') wide general use lanes (two in each direction), four 11-foot (11') wide general use lanes (two in each direction), a three-foot (3') wide buffer area with pavement markings and express lane markers separating the general use lanes from the express lanes, five-foot to 12-foot (5' – 12') wide inside shoulders, 12-foot (12') wide outside shoulders, 12-foot (12') wide auxiliary lanes at selected locations, and a 2.5-foot (2.5') wide center barrier wall.

The only changes to the corridor roadway sections are listed below:

- Two 12-foot (12') wide auxiliary lanes in each direction between Ives Dairy Road and Hallandale Beach Boulevard.
- Two-lane 24-foot (24') wide collector distributor roadway ramp between south of Hallandale Beach Boulevard and north of Hollywood Boulevard. with six-foot (6') wide inside shoulder and 10-foot (10') wide outside shoulder.
- On-lane 15-foot (15') wide southbound collector distributor roadway ramp with six-foot wide inside and outside shoulders.

The three I-95 roadway cross sections between interchange are depicted in ***Figure 4.33 – 4.35.***

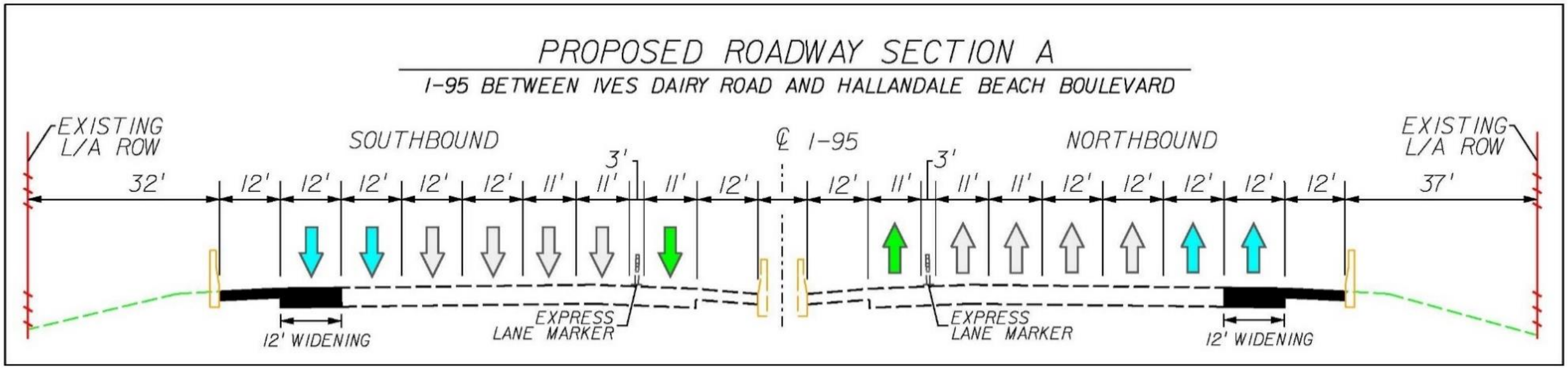


Figure 4.33 – Alternative 2 Typical Section A

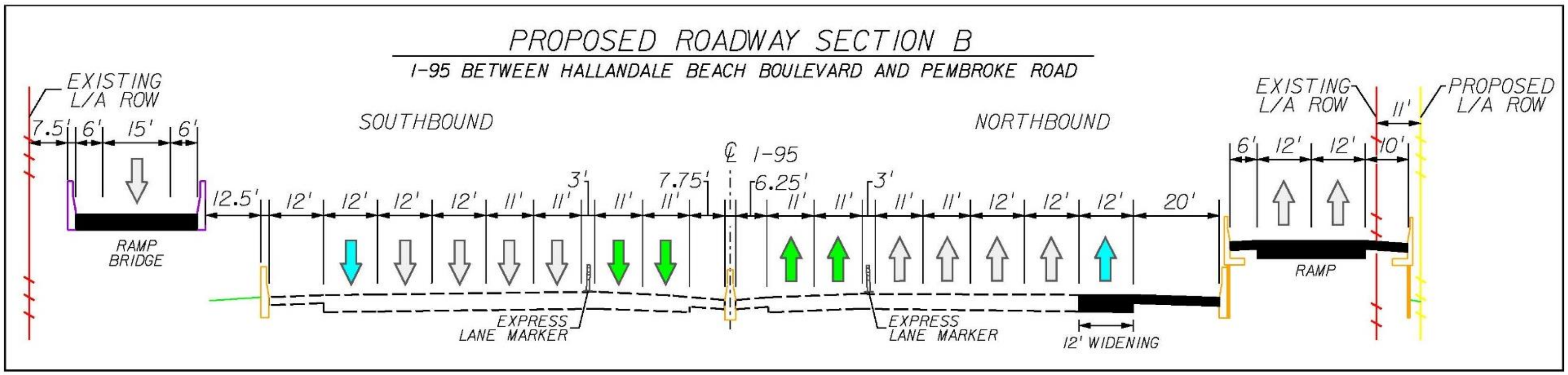


Figure 4.34 – Alternative 2 Typical Section B

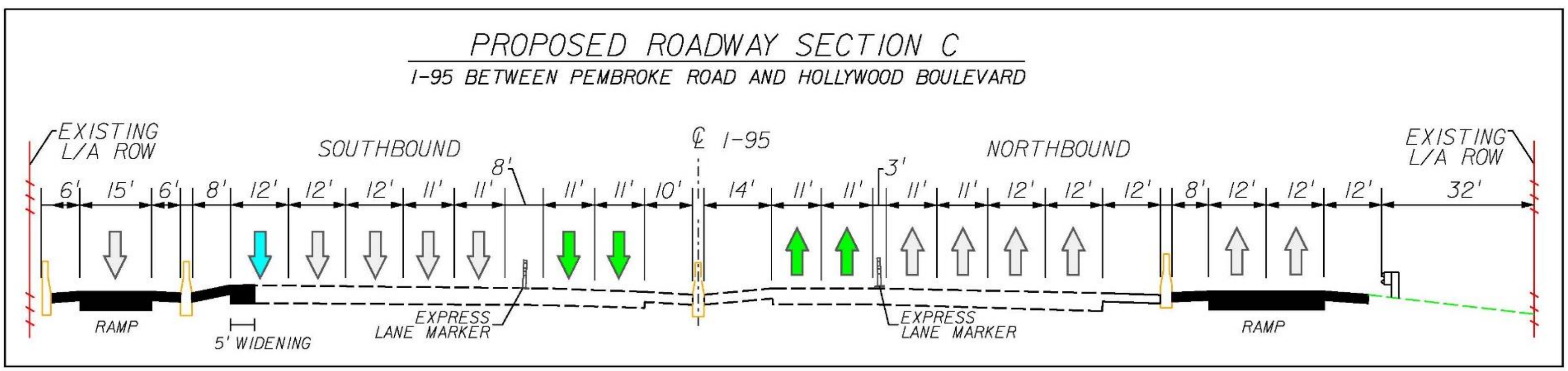


Figure 4.35 – Alternative 2 Typical Section C

4.5.7 Horizontal and Vertical Alignment

The design of the build alternatives strives to adhere to the design standards depicted in ***Section 3.0.*** The section below summarizes the proposed geometric changes for the proposed horizontal and vertical alignments within the study limits.

Horizontal Alignment

The two build alternatives propose to maintain the I-95 and cross streets existing horizontal alignment designs except for the new interchange on- and off-ramps alignment construction areas. Both alternatives consider widening I-95 to the outside between Ives Dairy Road and Hallandale Beach Boulevard to accommodate two auxiliary lanes in each direction.

Alternative 1 – This alternative proposes new construction of braided ramps at each interchange and the widening of other ramp terminals in order to add additional lanes and/or storage areas to accommodate the projected traffic and queue.

Alternative 2 – This alternative proposes new construction of collector distributor roadways in both directions and the widening of ramp terminals in order to add additional lanes and/or storage areas to accommodate the projected traffic and queue. This alternative effectively removes the Pembroke Road access from the I-95 mainline and contains it within the collector distributor systems.

The horizontal footprint of the corridor and interchanges will be wider with the proposed improvements. The extent of the ramp realignments is depicted in ***Appendix G***, Alternatives Concept Plans.

Vertical Alignment

The two build alternatives propose to maintain the I-95 and cross streets existing vertical alignment designs except for the new interchange on- and off-ramps alignment construction areas. Both alternatives consider new grade separations at each interchange to accommodate several on- and off-ramps.

Alternative 1 – This alternative proposes four new braided ramps within the study limits.

1. Northbound off-ramp to Pembroke Road over Hallandale Beach Boulevard and the Hallandale Beach Boulevard northbound on-ramp
2. Northbound off-ramp to Hollywood Boulevard over Pembroke Road and the Pembroke Road northbound on-ramp
3. Southbound off-ramp to Pembroke Road over Hollywood Boulevard and the Hollywood Boulevard southbound on-ramp
4. Southbound off-ramp to Hallandale Beach Boulevard over Pembroke Road, the Pembroke Road southbound on-ramp and the existing pump station

Alternative 2 – This alternative proposes collector distributor roadways in both directions with five braided ramps within the study limits.

1. Northbound off-ramp to Pembroke Road and Hollywood Boulevard over Hallandale Beach Boulevard and the Hallandale Beach Boulevard northbound on-ramp
2. Northbound collector distributor roadway over Pembroke Road
3. Northbound collector distributor roadway over Hollywood Boulevard
4. Southbound off-ramp to Pembroke Road over Hollywood Boulevard and the Hollywood Boulevard southbound on-ramp
5. Southbound on-ramp from Pembroke Road over the existing pump station and Hallandale Beach Boulevard

The design of the new grade separations are depicted in ***Appendix G***, Alternatives Concept Plans.

4.5.8 Right of Way

A right of way cost was determined based on the proposed geometry of each build alternative. The estimated cost was generated based on the proposed conceptual design plans. The cost includes property, support, relocation of personal property/signs and administrative costs. The parcels impacted are business/commercial, residential properties, industrial and vacant. The number of parcels impacted and estimated right of way cost is summarized in ***Table 4.13***.

Table 4.13 – Right of Way Impacts

Type of Parcel	ROW Impact	
	Alternative 1	Alternative 2
Commercial	27	27
Residential	2	5
Vacant	3	3
Total Parcel Impacts	32	35
Estimated Right of Way Cost	$53M	$57M

4.5.9 Access Management

I-95 Mainline – The FDOT Access Management Classification System determines the access class and type of each roadway based on the segment location, spacing between cross streets, posted speed, median type and/or median opening spacing. The access management classification for I-95 is Class 1.2, Freeway in an existing urbanized area with limited access. Based on the access and type, the minimum interchange spacing allowed is two miles in accordance with the *FDM, Part 2, Chapter 201, Table 201.4.1*. The interchange spacing along the corridor is not in compliance with the FDOT Access Management Guideline Rule 14.97 (see ***Table 4.14***).

Table 4.14 – I-95 Access Management/Interchange Spacing

Cross Street	Current Spacing to Next Interchange (Miles)	Complies with Interchange Spacing?
Existing		
Hallandale Beach Boulevard to Pembroke Road	0.773	No
Pembroke Road to Hollywood Boulevard	1.01	No
Proposed – Alternative 1		
Hallandale Beach Boulevard to Pembroke Road	0.773	No
Pembroke Road to Hollywood Boulevard	1.01	No
Proposed – Alternative 2		
Hallandale Beach Boulevard to Hollywood Boulevard	1.79	No

Alternative 1 maintains the current interchange spacing. Therefore, no access management modifications are proposed as part of Alternative 1.

Alternative 2 proposes a collector distributor roadway system, which removes the Pembroke Road Interchange from directly interacting with the I-95 mainline. The interchange spacing is still less than 2 miles. However, Alternative 2 improves the interchange spacing by adding an additional mile.

Arterials – Alternatives 1 and 2 maintain the existing access management along the crossing arterials. The improvements proposed by both alternatives are additional lanes, exclusive turn lanes and/or turn-lane modifications at selective locations. Therefore, access management is not impacted and will remain as existng.

4.5.9.1 Express Lanes

Alternatives 1 and 2 propose to maintain the existing configuration and proposed designs (by the projects to the north and south of this PD&E Study) of the express lanes system.

Two express lanes access points exist within the PD&E Study limits:

1. Within the Hallandale Beach Boulevard Interchange – Northbound Ingress and Southbound Egress
2. Within the Hollywood Boulevard Interchange – Northbound Egress and Southbound Ingress

4.5.10 Bridges and Structures

Alternative 1

Build Alternative 1 includes four proposed new bridges (two concrete and two steel), two proposed bridge widenings and six existing bridges to remain. The proposed improvements of each bridge structure along the corridor are summarized in ***Figure 4.36*** and ***Table 4.15***.

Alternative 2

Build Alternative 2 includes five proposed new bridges (four concrete and one steel), two proposed bridge widenings and six existing bridges to remain. The proposed improvements of each bridge structure along the corridor are summarized in ***Figure 4.37*** and ***Table 4.16***.

Appendix F, Bridge Analysis Report documents the details of each proposed bridge structure, design, and widening approach.

SUMMARY OF STRUCTURES	
ITEM	QUANTITY
PROPOSED NEW BRIDGES STEEL	2
PROPOSED NEW BRIDGES CONCRETE	2
PROPOSED BRIDGE WIDENINGS	2
EXISTING BRIDGES TO REMAIN	6

* CATEGORY 2 STRUCTURES

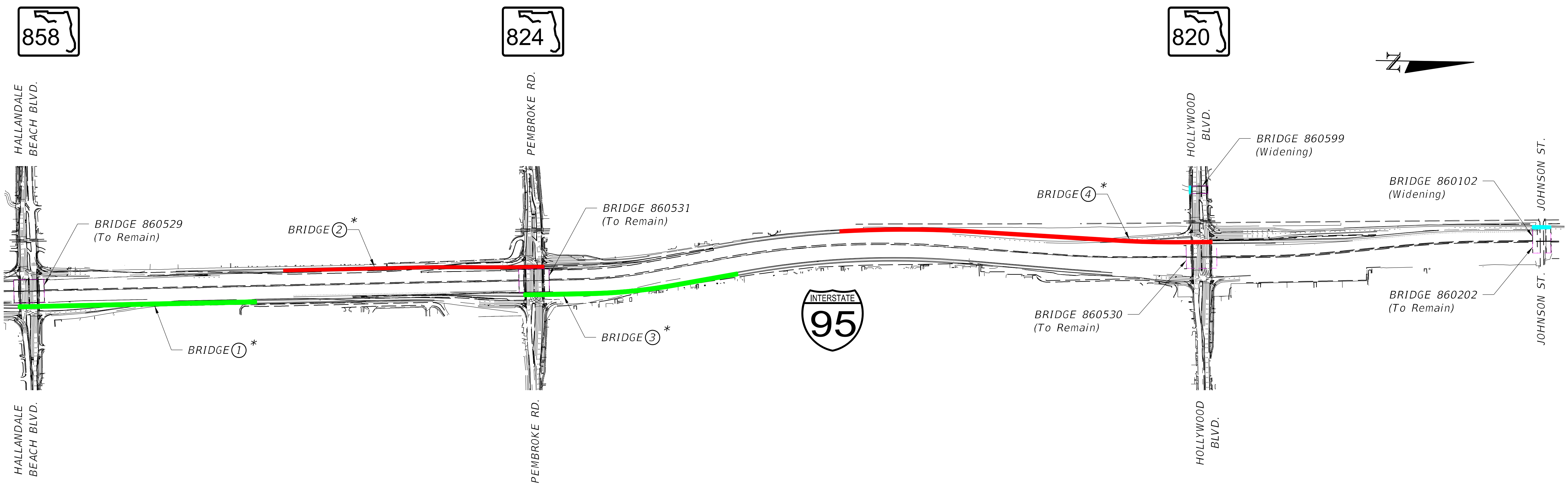


Figure 4.36 - Alternative 1 Bridge Location Map

Table 4.15 – Alternative 1 Proposed Bridge Characteristics

Proposed Bridge Characteristics Alternative 1													
LOCATION			GEOMETRICS					STRUCTURAL					
Bridge ID No.	Bridge Location	Direction	Overall Bridge Length / Span Arrangement (ft)	Deck Width (ft)	Min. Vertical Clearance	Skew Angles (Degrees)	Underneath Roadway Designation	Number of Spans	Max. Span	Superstructure Type	Substructure Type	Approach / Bridge Type	Bridge Category
1	SR 9 / I-95 NB off-ramp to Pembroke Rd.(SR824)	NB	170+(9x180)+126= 1916	29.67	16.50	0.00	SR 858 Hallandale Beach Blvd. and SR 9/ I-95 NB on-ramp from SR 858 Hallandale Beach Blvd.	11	180	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforced Concrete Column Piers and Abutments	Curved Steel, Single Lane	2
2	SR 9 / I-95 SB off-ramp to Hallandale Beach Boulevard (SR 858)	SB	126+(3x180)+200+170+(5x180)+166= 2102	29.67	16.50	0.00	SR 824 Pembroke Road and SR 9/ I-95 SB on-ramp from SR 824 Pembroke Road	12	200	Steel	Reinforced Concrete Column Piers and Abutments	Curved Steel, Single Lane	2
3	SR 9 / I-95 NB off-ramp to Hollywood Blvd. (SR820)	NB	167+(8x180)+126= 1733	29.67	16.50	0.00	SR 824 Pembroke Road and SR 9/ I-95 NB on-ramp from SR 824 Pembroke Road	10	180	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforced Concrete Column Piers and Abutments	Curved Steel, Single Lane	2
4	SR 9 / I-95 SB off-ramp to Pembroke Rd. (SR824)	SB	126+(15x180)+174= 3000	29.67	16.50	0.00	SR 820 Hollywood Blvd.and SR 9 / I-95 SB on-ramp from SR 820 Hollywood Blvd	17	180	Steel	Reinforced Concrete Column Piers and Abutments	Curved Steel, Single Lane	2
860599	SR 820 Over Hollywood Canal	EB/WB	61.00	Varies from 10.73 to 11.92	1.85 over DHW	0.00	N/A Over Canal	1	61	CIP Concrete Deck Slab	Reinforced Conc. Abutments Supported on 18" sq Prest. Conc. Piles	Widening FIBs	1
860102	SR 9 / I-95 Over Johnson Street	SB	38+71+38= 147	Varies from 21.96 to 36.59	14.42	0.00	Johnson St.	3	71	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforced Concrete Column Piers and Abutments	Widening FIBs	1

SUMMARY OF STRUCTURES	
ITEM	QUANTITY
PROPOSED NEW BRIDGES STEEL	1
PROPOSED NEW BRIDGES CONCRETE	4
PROPOSED BRIDGE WIDENINGS	2
EXISTING BRIDGES TO REMAIN	6

* CATEGORY 2 STRUCTURES

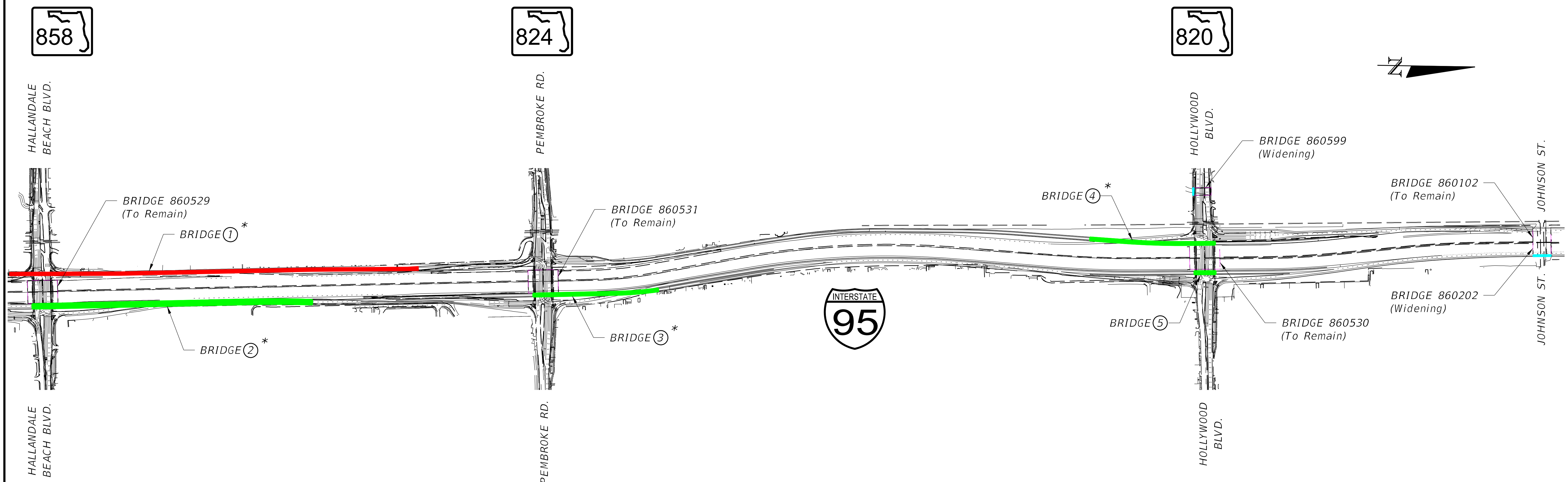


Figure 4.37 - Alternative 2 Bridge Location Map

Table 4.16 – Alternative 2 Proposed Bridge Characteristics

Proposed Bridge Characteristics Alternative 2														
LOCATION			GEOMETRICS					STRUCTURAL						
Bridge ID No.	Bridge Location	Direction	Overall Bridge Length / Span Arrangement (ft)	Deck Width (ft)	Min. Vertical Clearance	Skew Angles (Degrees)	Underneath Roadway Designation	Number of Spans	Max. Span	Superstructure Type	Substructure Type	Approach / Bridge Type	Bridge Category
1	SR 9 / I-95 SB on-ramp over Hallandale Beach Blvd. (SR858	SB	(15x180)+(2x140)+200+140= 3320	Varies from 29.667 to 34.13	16.50	0.00	SR 858 Hallandale Beach Blvd., SR 9/ I-95 SB off-ramp to SR 858 Hallandale Beach Blvd. and I-95 on ramp from Hallandale Beach Blvd.	19	200	Steel	Reinforced Concrete Column Piers and Abutments	Curved Steel, Single Lane	2
2	SR 9 / I-95 NB off-ramp to Pembroke Rd.(SR824)	NB	171+(11x180)+126= 2277	42.67	16.50	0.00	SR 858 Hallandale Beach Blvd.	13	180	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforced Concrete Column Piers and Abutments	Curved Steel, Single Lane	2
3	SR 9 / I-95 NB Ramp Over Pembroke Road (SR 824)	NB	170+(4x180)+130= 1020	29.67	16.50	0.00	SR 824 Pembroke Road	6	180	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforced Concrete Column Piers and Abutments	Curved Steel, Single Lane	3
4	SR 9 / I-95 SB off-ramp to Pembroke Rd. (SR824)	SB	126+(180x4)+174= 1020	29.67	16.50	1.00	SR 820 Hollywood Blvd.and SR 9 / I-95 SB on-ramp from SR 820 Hollywood Blvd	6	180	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforced Concrete Column Piers and Abutments	Curved Steel, Single Lane	2
5	SR 9 / I-95NB Ramp over Hollywood Blvd.(SR 820)	SB	177	29.67	16.50	0.00	SR 820 Hollywood Blvd.	1	177	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforced Concrete Column Piers and Abutments	New Bridge, Prestress Concrete, FIBs	1
860599	SR 820 Over Hollywood Canal	EB/WB	61.00	Varies from 10.73 to 11.92	1.85 over DHW	0.00	N/A Over Canal	1	61	CIP Concrete Deck Slab	Reinforced Conc. Abutments Supported on 18" sq Prest. Conc. Piles	Widening FIBs	1
860202	SR 9 / I-95 Over Johnson Street	NB	38+71+38= 147	17.62	13.14	0.00	Johnson St.	3	71	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforced Concrete Column Piers and Abutments	Widening FIBs	1

4.5.11 Transit Accommodations and Bicycle/Pedestrian Facilities

Alternatives 1 and 2 do not include any additional Transit Accommodations. The following transit projects in ***Table 4.17*** are included in the 2045 LRTP.

Table 4.17 – 2045 LRTP Transit Projects in Study Area

Project	Location	Description	Plan Period
Federal Transit Formula Funding Program	Broward County	Provide Federal transit funding for Broward County Transit	2025 - 2045
Hollywood/Pines Blvd Rapid Bus	Flamingo Rd (Pembroke Pines) To Hollywood (Young Circle)	Implement 10-15 min limited stop bus service, mixed traffic or semi-exclusive Business Access and Transit (BAT) lanes, level boarding stations, use of Transit Signal Priority (TSP)/Queue Jump technologies, mobile ticketing	2026 - 2030

I-95 is a limited access facility. There will continue to be no designated pedestrian or bicycle accommodations along this corridor, as pedestrians and bicycles are not permitted on limited access corridors. Below are the pedestrian and bicycle improvements proposed within the crossing roadway interchange limits:

1. Bicycle lane widths were improved to between five and seven-foot wide where possible.
2. Sidewalk widths were improved to between five and six-foot wide where possible.

4.5.12 Traffic Volumes and Operational Conditions

The PD&E Study Build Alternatives analysis and evaluation were performed and completed between September 2016 and December 2018, prior to the hold of the study in 2019 (as discussed in ***Section 4.1***). Prior to the hold of the study, the design year of the PD&E Study was 2040. Therefore, the information presented in this section is a summary of the 2040 design year traffic operational analysis completed as part of the alternative's analysis. Also, the analysis documented in this section did not include the FDOT District Six I-95 Planning Study, District Four I-95 CPS, and the recent changes to the I-95 Express Phase 3C Project, which were added later to the PD&E Study in 2020.

The purpose of the operational analysis is to present the preliminary results of the future traffic conditions proposed as part of the PD&E process. The objective of the operational analysis is to document the analysis and the screening process of the alternatives considered. This analysis followed the same process and methodology as the existing traffic operational analysis.

The Highway Capacity Manual (HCM), 6th Edition, as well as the Highway Capacity Software Version 7 (HCS7) and Synchro Version 10.0 were used for the operational analysis in this study. Operational analyses were performed on freeway basic segments, ramp merge/diverge junctions, weaving sections, ramp terminals, arterial segments and intersections. The HCS was used for the freeway basic segments, ramp merge/diverge junctions and weaving sections. Synchro was used for the evaluation of the intersections and arterial segments. This software uses the methodology of the HCM to determine intersection/arterial capacity and LOS.

Tables 4.18 – 4.21 and ***Figures 4.38 – 4.41*** summarize the future operational analysis results as well as link-by-link traffic volumes.

4.5.12.1 MAINLINE ALTERNATIVE ANALYSIS RESULTS

<u>HCM Operational Analysis Results</u>

Alternative 1 – The I-95 capacity analysis shows that the corridor will operate at LOS D or better by the year 2040 within the area of influence.

Alternative 2 – The I-95 capacity analysis shows that the corridor will operate at LOS D or better by the year 2040 within the area of influence.

Table 4.18 – 2040 Alternative 1 Northbound Freeway Analysis Results

#	I-95 Northbound Segment 2040 Alternative 1	Analysis Type	Freeway		Ramp		Density pc/mi/ln AM (PM)	LOS AM (PM)
			No. of Lanes	Demand* vph AM (PM)	No. of Lanes	Demand vph AM (PM)		
11	North of Sheridan St	Basic	4	6,198 (7,007)	-	-	25.3 (30.6)	C (D)
10	Hollywood Blvd On-Ramp to Sheridan St Off-Ramp	Weaving	5	6,201 (6,912)	-	-	30.1 (34.2)	D (D)
9	EL Egress to Hollywood Blvd On-Ramp	Basic	4	5,429 (5,918)	1	772 (994)	25.7 (24.3)	C (C)
8	Pembroke Rd On-Ramp to EL Egress	Basic	4	5,429 (5,918)	-	-	22.2 (24.3)	C (C)
7	Pembroke Rd On-Ramp	Merge	4	4,174 (4,411)	1	1255 (1507)	28.2 (31)	D (D)
6	Hollywood Blvd Off-Ramp to Pembroke Rd On-Ramp	Basic	4	4,174 (4,411)	-	-	17 (18)	B (B)
5	EL Ingress	Weave	5	3,304 (3,600)	-	-	22.1 (25.7)	C (C)
4	Pembroke Rd Off-Ramp	Diverge	4	4,554 (4,579)	1	1250 (979)	23.6 (22.2)	C (C)
3	Hallandale Beach Blvd Off-Ramp to Pembroke Rd Off-Ramp	Diverge	4	5,238 (5,617)	1	684 (1038)	28.6 (32)	D (D)
2	Ives Dairy Rd On-Ramp to Hallandale Beach Blvd Off-Ramp	Weave	6	4,272 (4,816)	-	-	29.8 (25.2)	D (C)
1	South Ives Dairy Rd	Basic	4	4,272 (4,816)	-	-	17.4 (19.7)	B (C)

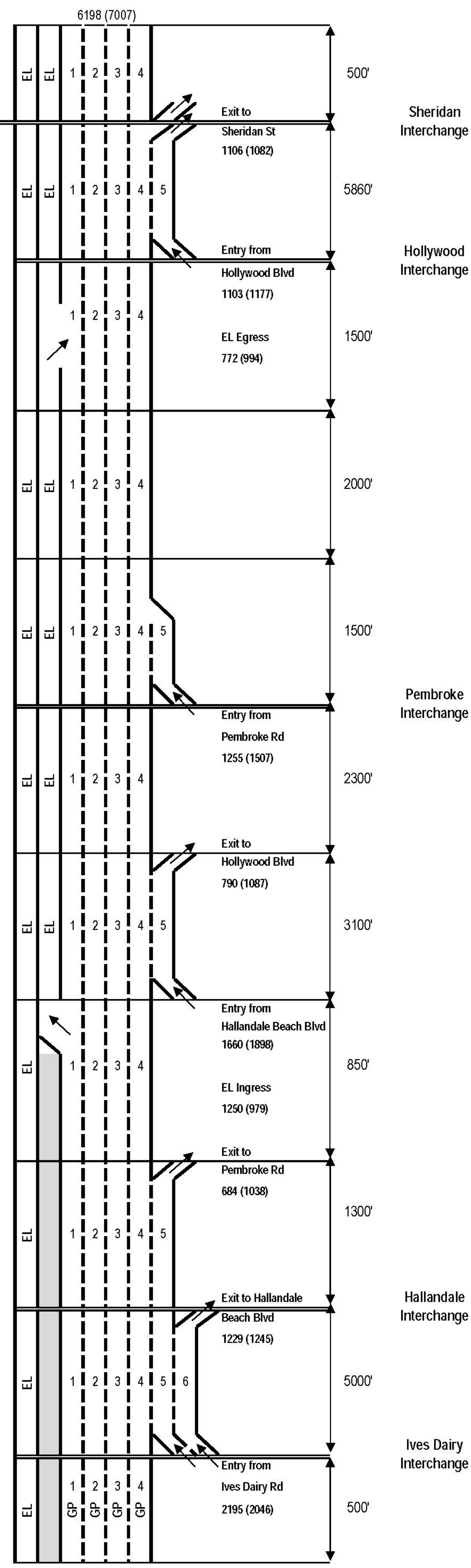
*freeway demand entering segment / # - segment number

Table 4.19 – 2040 Alternative 1 Southbound Freeway Analysis Results

#	I-95 Southbound Segment 2040 Alternative 1	Analysis Type	Freeway		Ramp		Density pc/mi/ln AM (PM)	LOS AM (PM)
			No. of Lanes	Demand* vph AM (PM)	No. of Lanes	Demand vph AM (PM)		
1	North of Sheridan St	Basic	4	7,184 (7,061)	-	-	31.1 (30.3)	D (D)
2	Sheridan St On-Ramp to Hollywood Blvd Off-Ramp	Weave	5	7,184 (7,061)	-	-	34.8 (23.1)	D (C)
3	Pembroke Rd Off-Ramp	Diverge	4	6,959 (6,614)	1	1282 (1166)	31.4 (29.4)	D (D)
4	EL Ingress	Diverge	4	5,677 (5,448)	1	775 (782)	29 (28)	D (C)
5	Hollywood On-Ramp	Merge	4	4,902 (4,666)	1	943 (1220)	19.7 (21.1)	B (C)
6	Hallandale Off-Ramp	Diverge	4	5,845 (5,886)	1	1307 (1357)	34.3 (34.7)	D (D)
7	Hallandale Off-Ramp to Pembroke Rd On-Ramp	Basic	4	4,538 (4,529)	-	-	18.5 (18.5)	C (C)
8	Pembroke Rd On-Ramp	Merge	4	4,538 (4,529)	1	706 (659)	21.1 (20.7)	C (C)
9	Pembroke Rd On-Ramp to EL Egress	Basic	4	5,244 (5,188)	-	-	21.4 (21.2)	C (C)
10	EL Egress	Merge	4	5,244 (5,188)	1	805 (957)	19.8 (20.8)	B (C)
11	EL Egress to Hallandale Beach Blvd On-Ramp	Basic	4	6,049 (6,145)	-	-	24.9 (25.4)	C (C)
12	Hallandale Beach Blvd On-Ramp to Ives Dairy Rd Off-Ramp	Weave	6	6,049 (6,145)	-	-	26.4 (27.2)	C (C)
13	South of Ives Dairy Rd	Basic	4	5,033 (4,703)	-	-	20.6 (19.2)	C (C)

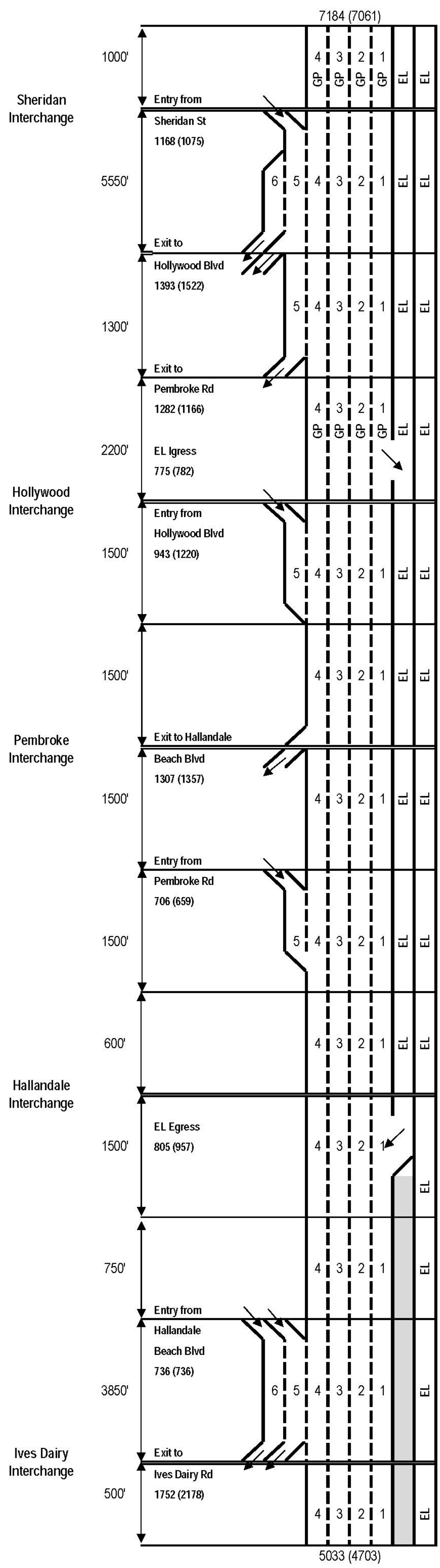
*freeway demand entering segment / # - segment number

#	Segment	Length	Max Weave Length	AM Demand* in vph	AM Density (LOS)	PM Demand* in vph	PM Density (LOS)
11	Basic North of Sheridan St	500'	-	6198	25.3 (C)	7007	30.6 (D)
10	Weaving Hollywood Blvd On-Ramp to Sheridan St Off-Ramp	5860'	5127'	6201	30.1 (D)	6912	34.2 (D)
9	Basic EL Egress	1500'	-	5429	22.2 (C)	5918	24.3 (C)
8	Basic Pembroke Rd On-Ramp to EL Egress	2000'	-	5429	22.2 (C)	5918	24.3 (C)
7	Merge Pembroke Rd On-Ramp	1500'	-	4174	28.2 (D)	4411	31 (D)
6	Basic Hollywood Blvd Off-Ramp to Pembroke Rd On-Ramp	2300'	-	4174	17 (B)	4411	18 (B)
5	Weave EL Ingress	3100'	6536'	3304	22.1 (C)	3600	25.7 (C)
4	Diverge Pembroke Rd Off-Ramp	850'	-	4554	23.6 (C)	4579	22.2 (C)
3	Diverge Hallandale Beach Blvd Off-Ramp to Pembroke Rd Off-Ramp	1300'	-	5238	28.6 (D)	5617	32 (D)
2	Weave Ives Dairy Rd On-Ramp to Hallandale Beach Blvd Off-Ramp	5000'	5228'	4272	29.8 (D)	4816	25.2 (C)
1	Basic South of Ives Dairy Rd	500'	-	4272	17.4 (B)	4816	19.7 (C)



Legend
* freeway demand entering segment
interchange location

Figure 4.38 – 2040 Alternative 1 Northbound Freeway Analysis Results



#	Segment	Length	Max Weave Length	AM Demand* in vph	AM Density (LOS)	PM Demand* in vph	PM Density (LOS)
1	Basic North of Sheridan St	1000'	-	7184	31.1 (D)	7061	30.3 (D)
2	Weave Sheridan St On-Ramp to Hollywood Blvd Off-Ramp	5550'	4918'	7184	34.8 (D)	7061	23.1 (C)
3	Diverge Pembroke Rd Off-Ramp	1300'	-	6959	31.4 (D)	6614	29.4 (D)
4	Diverge EL Ingress	2200'	-	5677	29 (D)	5448	28 (C)
5	Merge Hollywood On-Ramp	1500'	-	4902	19.7 (B)	4666	21.1 (C)
6	Diverge Hallandale Off-Ramp	1500'	-	5845	34.3 (D)	5886	34.7 (D)
7	Basic Hallandale Off-Ramp to Pembroke Rd On-Ramp	1500'	-	4538	18.5 (C)	4529	18.5 (C)
8	Merge Pembroke Rd On-Ramp	1500'	-	4538	21.1 (C)	4529	20.7 (C)
9	Basic Pembroke Rd On-Ramp to EL Egress	600'	-	5244	21.4 (C)	5188	21.2 (C)
10	Merge EL Egress	1500'	-	5244	19.8 (B)	5188	20.8 (C)
11	Basic EL Egress to Hallandale Beach Blvd On-Ramp	750'	-	6049	24.9 (C)	6145	25.4 (C)
12	Weave Hallandale Beach Blvd On-Ramp to Ives Dairy Rd Off-Ramp	3850'	4136'	6049	26.4 (C)	6145	27.2 (C)
13	Basic South of Ives Dairy Rd	500'	-	5033	20.6 (C)	4703	19.2 (C)

Legend
* freeway demand entering segment
interchange location

Figure 4.39 – 2040 Alternative 1 Southbound Freeway Analysis Results

Table 4.20 – 2040 Alternative 2 Northbound Freeway Analysis Results

#	I-95 Northbound Segment 2040 Alternative 2	Analysis Type	Freeway		Ramp		Density pc/mi/ln AM (PM)	LOS AM (PM)
			No. of Lanes	Demand* vph AM (PM)	No. of Lanes	Demand vph AM (PM)		
13	North of Sheridan St	Basic	4	6,198 (7,007)	-	-	25.6 (30)	C (D)
12	Sheridan St Off-Ramp	Diverge	4	7,304 (8,089)	2	1106 (1082)	25.5 (28.5)	C (D)
11	C-D/Hollywood Blvd On-Ramp to Sheridan St Off-Ramp	Basic	5	7,304 (8,089)	-	-	24 (27)	C (D)
10	C-D/Hollywood Blvd On-Ramp	Basic	4	4,946 (5,405)	2	2358 (2684)	31.8 (22.1)	D (C)
9	EL Egress to C-D/Hollywood Blvd On-Ramp	Basic	4	4,946 (5,405)	-	-	20.2 (22.1)	C (C)
8	EL Egress	Merge	4	4,174 (4,411)	1	772 (994)	22.3 (18.5)	C (B)
7	Hallandale Beach Blvd On-Ramp to EL Egress	Basic	4	4,174 (4,411)	-	-	17 (18)	B (B)
6	Hallandale Beach Blvd On-Ramp	Merge	4	2,514 (2,513)	1	1660 (1898)	17.4 (19.3)	B (B)
5	EL Ingress to Hallandale Beach Blvd On-Ramp	Basic	4	2,514 (2,513)	-	-	10.3 (10.3)	A (A)
4	EL Ingress	Diverge	4	3,764 (3,492)	1	1250 (979)	23.3 (20.6)	C (C)
3	C-D	Diverge	4	5,238 (5,617)	2	1474 (2125)	26.6 (31.9)	C (D)
2	Ives Dairy Rd On-Ramp to Hallandale Beach Blvd Off-Ramp	Weave	6	4,272 (4,816)	-	-	22.9 (25.2)	C (C)
1	South of Ives Dairy Rd	Basic	4	4,272 (4,816)	-	-	17.4 (19.7)	B (C)

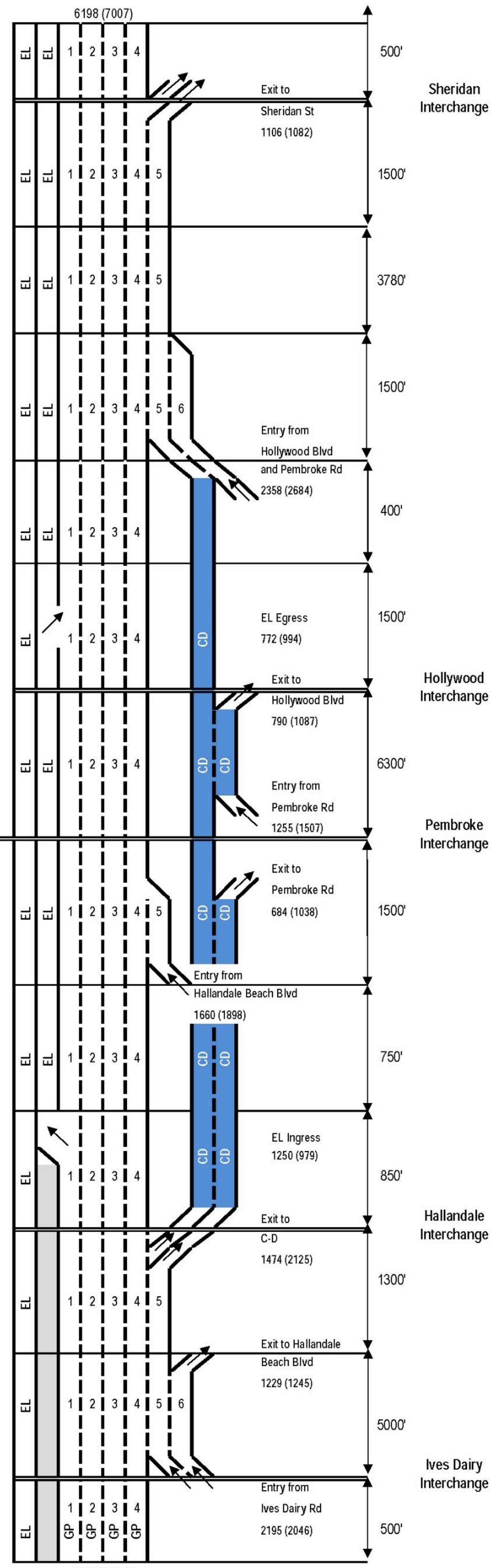
*freeway demand entering segment
- segment number

Table 4.211 – 2040 Alternative 2 Southbound Freeway Analysis Results

#	I-95 Southbound Segment 2040 Alternative 2	Analysis Type	Freeway		Ramp		Density pc/mi/ln AM (PM)	LOS AM (PM)
			No. of Lanes	Demand* vph AM (PM)	No. of Lanes	Demand vph AM (PM)		
1	North of Sheridan St	Basic	4	7,184 (7,061)	-	-	31.1 (30.3)	D (D)
2	Sheridan St On-Ramp to Hollywood Blvd Off-Ramp	Weave	5	7,184 (7,061)	-	-	34 (32.8)	D (D)
3	Hollywood Blvd Off-Ramp to EL Ingress	Basic	4	5,677 (5,448)	-	-	23.3 (22.2)	C (C)
4	EL Ingress	Diverge	4	5,677 (5,448)	1	775 (782)	29 (28)	D (C)
5	EL Ingress to Hollywood On-Ramp	Basic	4	4,902 (4,666)	-	-	20 (19)	C (C)
6	Hollywood On-Ramp	Merge	4	4,902 (4,666)	1	943 (1220)	19.7 (21.1)	B (C)
7	Hollywood On-Ramp to Hallandale Beach Blvd Off-Ramp	Basic	4	5,845 (5,886)	-	-	24 (24.2)	C (C)
8	Hallandale Beach Blvd Off-Ramp	Diverge	4	5,845 (5,886)	1	1307 (1357)	23.5 (23.9)	C (C)
9	Hallandale Beach Blvd Off-Ramp to EL Egress	Basic	4	4,538 (4,529)	-	-	18.5 (18.5)	C (C)
10	EL Egress	Merge	4	4,538 (4,529)	1	805 (957)	21.8 (23)	C (C)
11	Hallandale Beach Blvd On-Ramp	Basic	4	5,343 (5,486)	1	736 (736)	21.8 (22.4)	C (C)
12	Pembroke Rd On-Ramp to Ives Dairy Rd Off-Ramp	Weave	6	6,079 (6,222)	-	-	23.3 (22.9)	C (C)
13	South of Ives Dairy Rd	Basic	4	5,033 (4,703)	-	-	20.6 (19.2)	C (C)

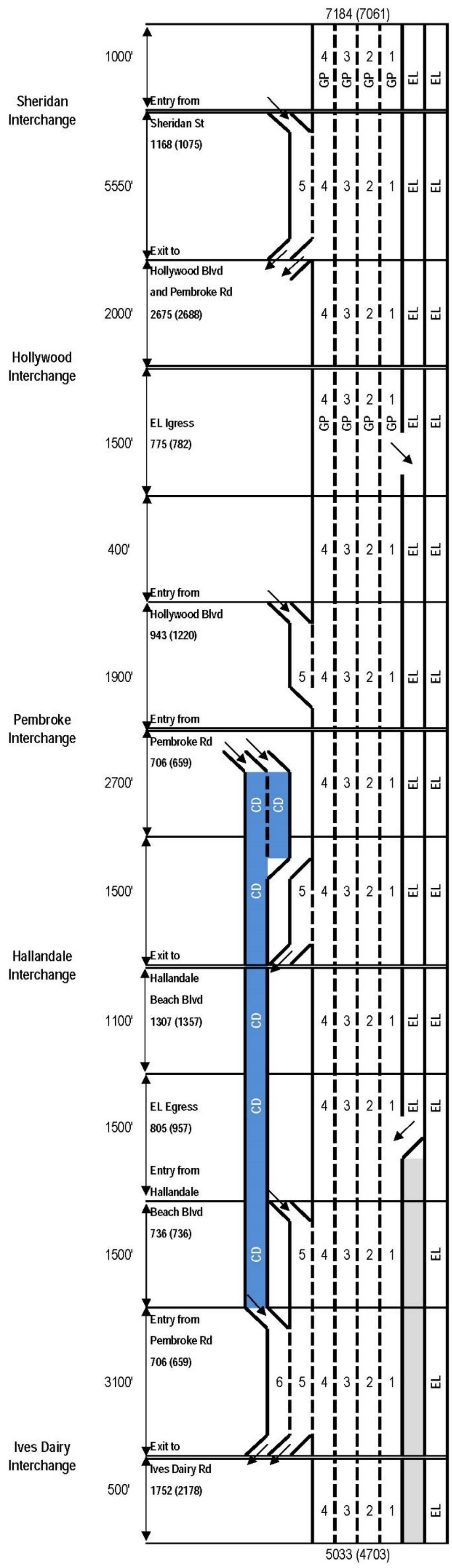
*freeway demand entering segment
- segment number

#	Segment	Length	Max Weave Length	AM Demand* in vph	AM Density (LOS)	PM Demand* in vph	PM Density (LOS)
13	Basic North of Sheridan St	500'	-	6198	25.6 (C)	7007	30 (D)
12	Diverge Sheridan St Off-Ramp	1500'	-	7304	25.5 (C)	8089	28.5 (D)
11	Basic C-D/Hollywood Blvd On-Ramp to Sheridan St Off-Ramp	3780'	-	7304	24 (C)	8089	27 (D)
10	Basic C-D/Hollywood Blvd On-Ramp	1500'	-	4946	31.8 (D)	5405	22.1 (C)
9	Basic EL Egress to C-D/Hollywood Blvd On-Ramp	400'	-	4946	20.2 (C)	5405	22.1 (C)
8	Merge EL Egress	1500'	-	4174	22.3 (C)	4411	18.5 (B)
7	Basic Hallandale Beach Blvd On-Ramp to EL Egress	6300'	-	4174	17 (B)	4411	18 (B)
6	Merge Hallandale Beach Blvd On-Ramp	1500'	-	2514	17.4 (B)	2513	19.3 (B)
5	Basic EL Ingress to Hallandale Beach Blvd On-Ramp	750'	-	2514	10.3 (A)	2513	10.3 (A)
4	Diverge EL Ingress	850'	-	3764	23.3 (C)	3492	20.6 (C)
3	Diverge C-D	1300'	-	5238	26.6 (C)	5617	31.9 (D)
2	Weave Ives Dairy Rd On-Ramp to Hallandale Beach Blvd Off-Ramp	5000'	5115'	4272	22.9 (C)	4816	25.2 (C)
1	Basic South of Ives Dairy Rd	500'	-	4272	17.4 (B)	4816	19.7 (C)



Legend
* freeway demand entering segment
interchange location
CD elevated C-D Road

Figure 4.40 – 2040 Alternative 2 Northbound Freeway Analysis Results



#	Segment	Length	Max Weave Length	AM Demand* in vph	AM Density (LOS)	PM Demand* in vph	PM Density (LOS)
1	Basic North of Sheridan St	1000'	-	7184	31.1 (D)	7061	30.3 (D)
2	Weave Sheridan St On-Ramp to Hollywood Blvd Off-Ramp	5550'	4792'	7184	34 (D)	7061	32.8 (D)
3	Basic Hollywood Blvd Off-Ramp to EL Ingress	2000'	-	5677	23.3 (C)	5448	22.2 (C)
4	Diverge EL Ingress	1500'	-	5677	29 (D)	5448	28 (C)
5	Basic EL Ingress to Hollywood On-Ramp	400'	-	4902	20 (C)	4666	19 (C)
6	Merge Hollywood On-Ramp	1900'	-	4902	19.7 (B)	4666	21.1 (C)
7	Basic Hollywood On-Ramp to Hallandale Beach Blvd Off-Ramp	2700'	-	5845	24 (C)	5886	24.2 (C)
8	Diverge Hallandale Beach Blvd Off-Ramp	1500'	-	5845	23.5 (C)	5886	23.9 (C)
9	Basic Hallandale Beach Blvd Off-Ramp to EL Egress	1100'	-	4538	18.5 (C)	4529	18.5 (C)
10	Merge EL Egress	1500'	-	4538	21.8 (C)	4529	23 (C)
11	Basic Hallandale Beach Blvd On-Ramp	1500'	-	5343	21.8 (C)	5486	22.4 (C)
12	Weave Pembroke Rd On-Ramp to Ives Dairy Rd Off-Ramp	3100'	5681'	6079	23.3 (C)	6222	22.9 (C)
13	Basic South of Ives Dairy Rd	500'	-	5033	20.6 (C)	4703	19.2 (C)

Legend
* freeway demand entering segment
interchange location
CD elevated C-D Road

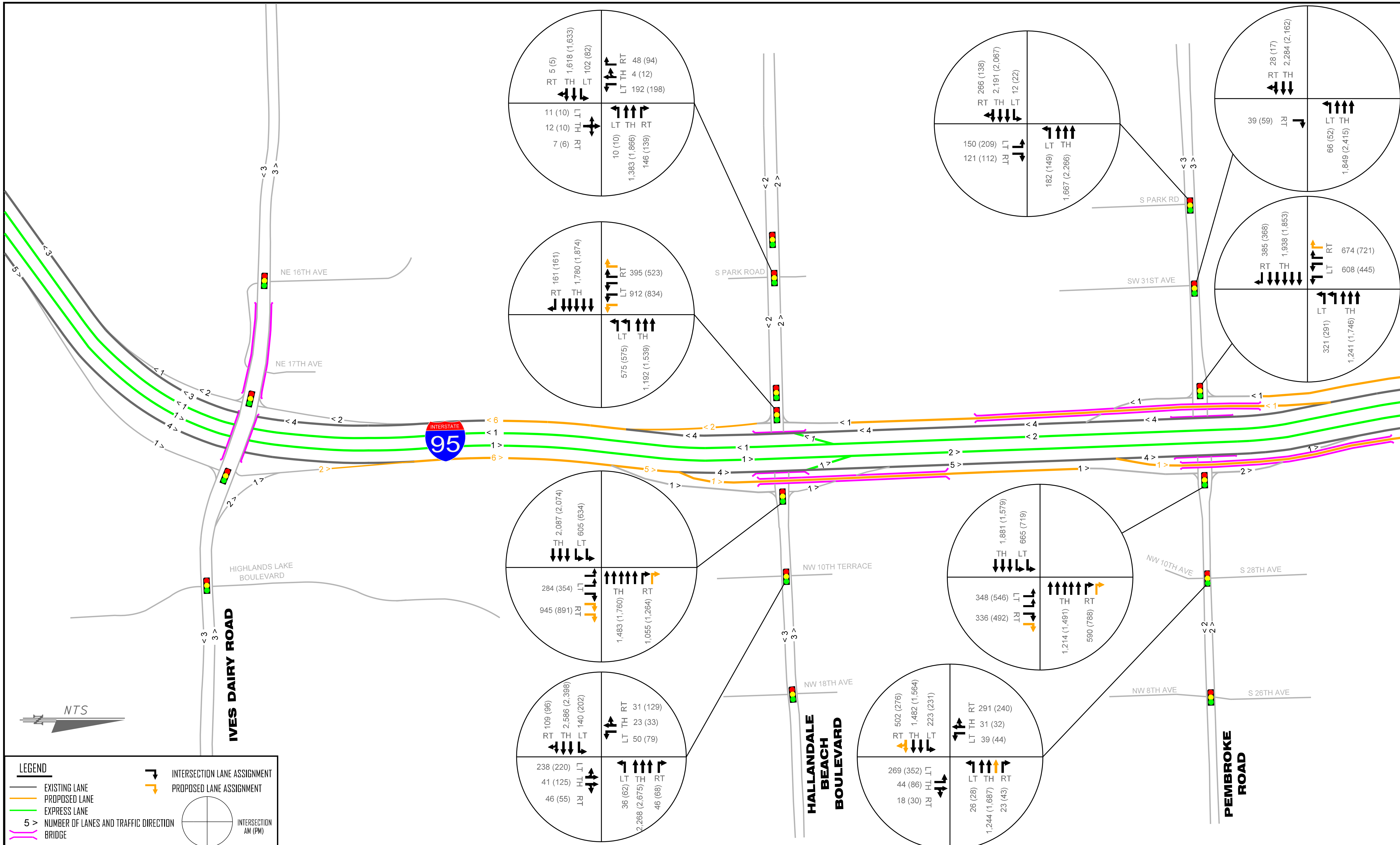
Figure 4.41 – 2040 Alternative 2 Southbound Freeway Analysis Results

4.5.12.2 Interchange Alternative Analysis Results

Design year turning movement volumes for Alternatives 1 and 2 are depicted in **Figures *4.42*** *and* ***Figure 4.43***. The turning movement volumes are the same for both alternatives. The results are presented in ***Tables 4.22 – 4.24***.

Intersection delay and LOS were used as MOEs, which is consistent with the existing conditions analysis. Exit ramp queue results were also used to check the queues against available storage in each alternative.

The signalized intersections have no geometric differences between the two build alternatives. Therefore, the intersections will operate at the same LOS for both 2040 build alternatives.



FDOT

FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

NOVEMBER 2018

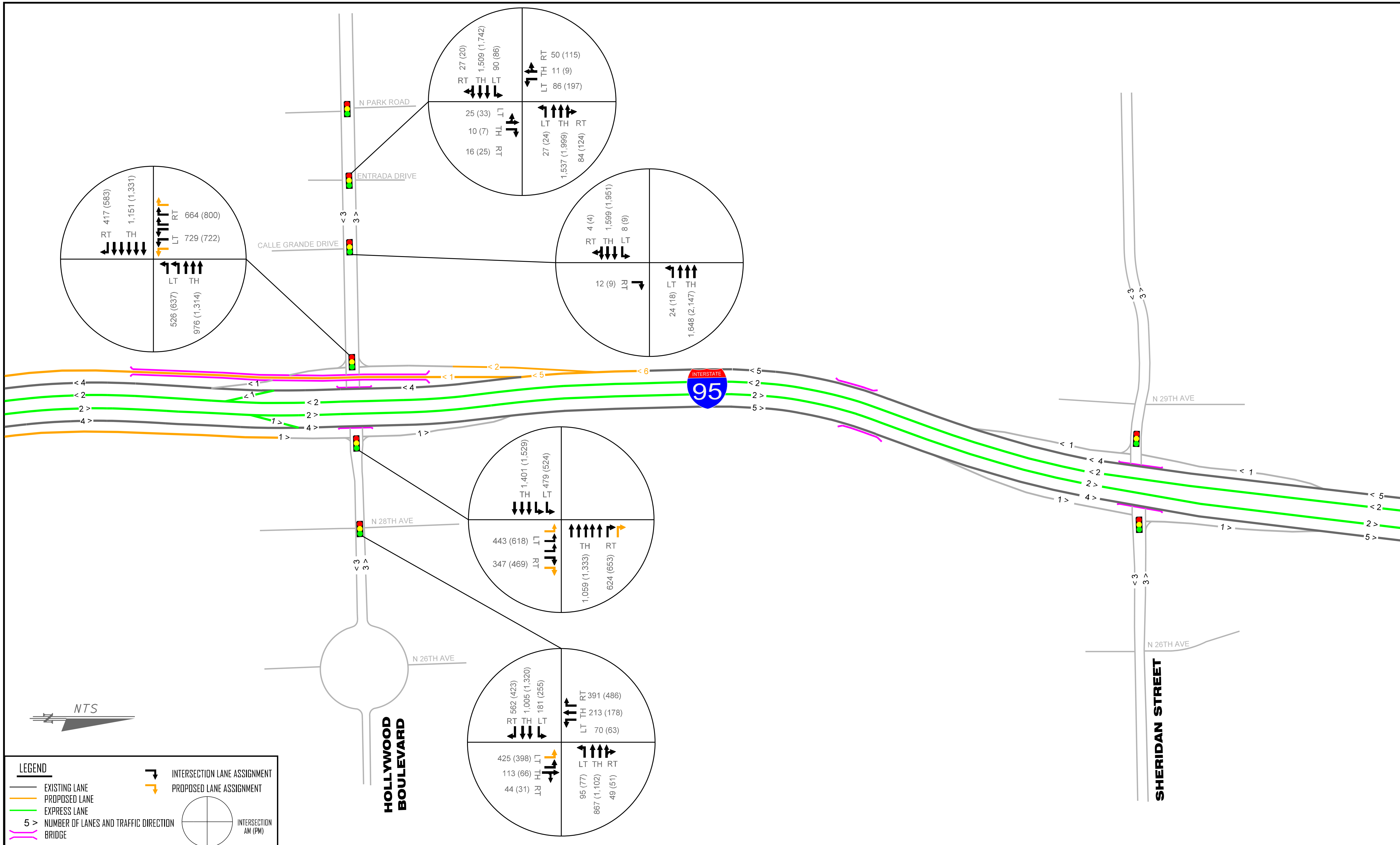
INTERSTATE 95

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

ALTERNATIVE 1
2040
INTERSECTION TURNING MOVEMENT VOLUMES

FIGURE
4.42



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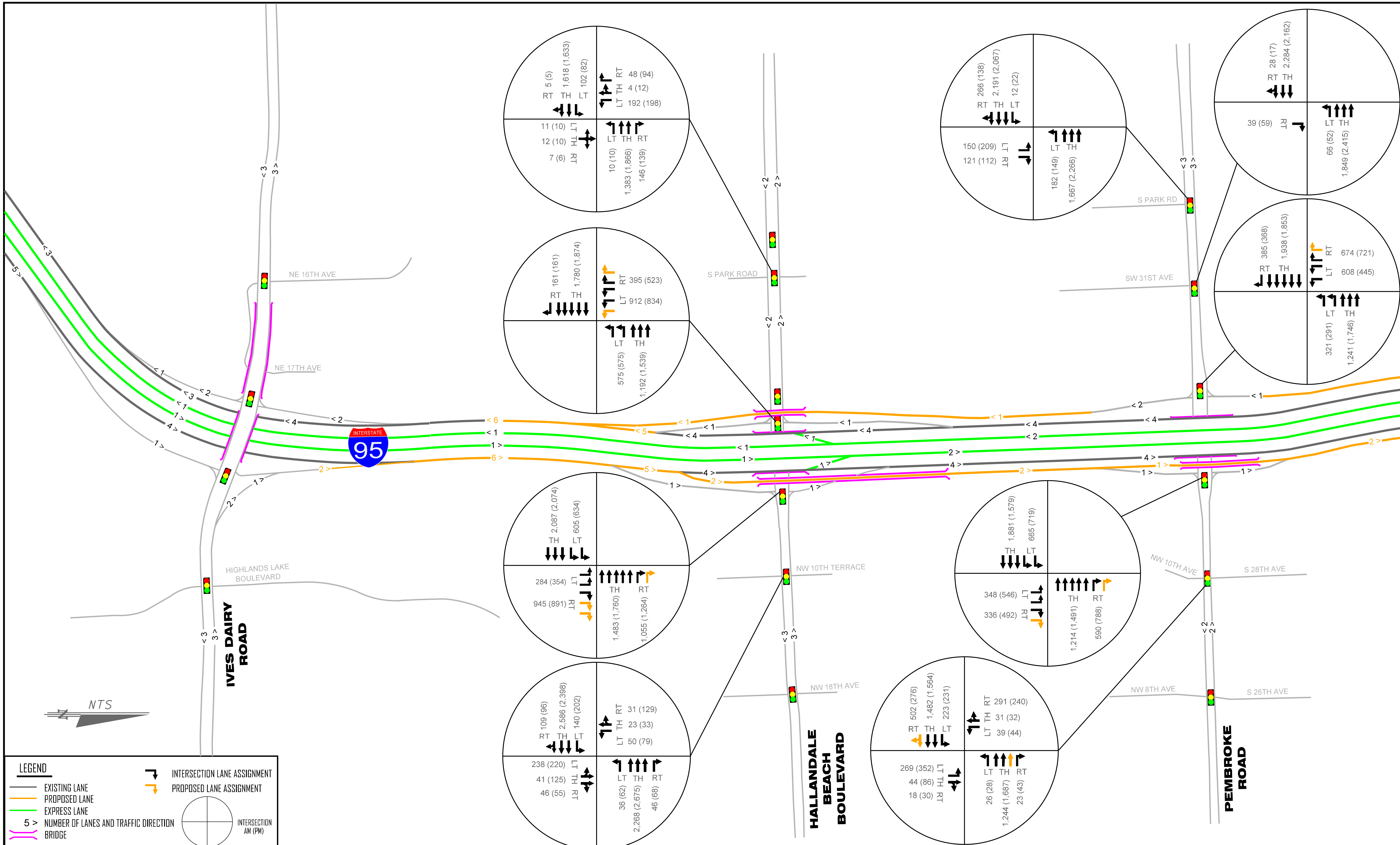
NOVEMBER 2018

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

ALTERNATIVE 1
2040
INTERSECTION TURNING MOVEMENT VOLUMES

FIGURE
4.42



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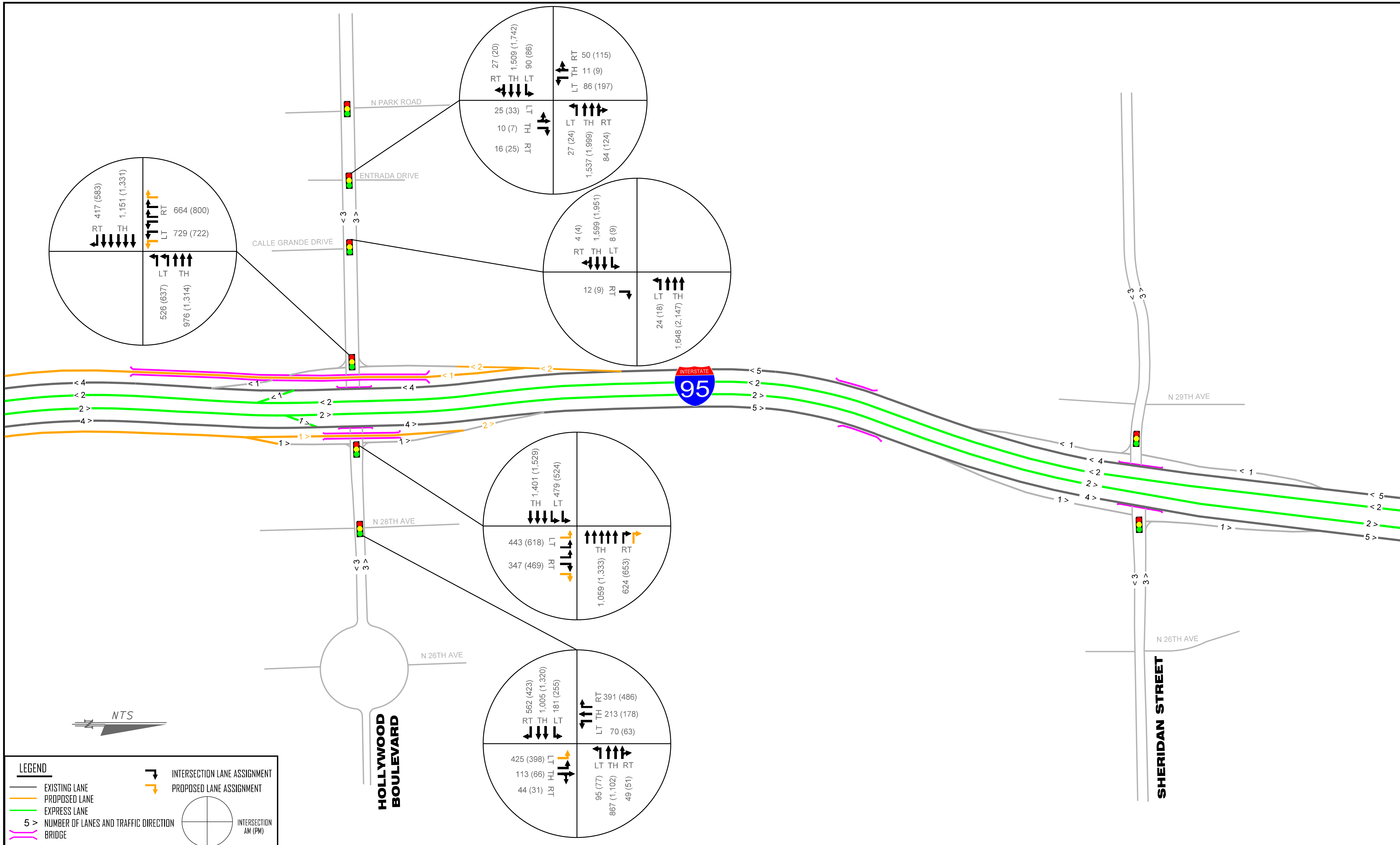
FPID No.: 436903-1-22-02
ETDM No.: 14254

ALTERNATIVE 2
2040
INTERSECTION TURNING MOVEMENT VOLUMES

FIGURE
4.43



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NOVEMBER 2018

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

ALTERNATIVE 2
2040
INTERSECTION TURNING MOVEMENT VOLUMES

FIGURE
4.43

Table 4.22 – 2040 Hallandale Beach Boulevard Interchange LOS and Delay Results

Hallandale Beach Boulevard Intersection	Movement	Build Alternatives			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Park Road*	EBL	17.9	B	46.7	D
	EBT	16.5	B	17.1	B
	EBR	16.5	B	17.1	B
	WBL	23.2	C	23.6	C
	WBT	18.6	B	25.4	C
	WBR	11.0	B	10.1	B
	NBT	77.2	E	79.9	E
	SBL	79.1	E	79.5	E
	SBT	79.1	E	79.0	E
	SBR	56.6	E	57.7	E
	Int	**21.7**	**C**	**25.8**	**C**
I-95 West Ramp Terminal*	EBT	49.5	D	45.6	D
	EBR	38.1	D	34.6	C
	WBL	16.9	B	24.9	C
	WBT	8	A	10.8	B
	SBL	45.5	D	45.3	D
	SBR	41.2	D	45.1	D
	Intersection	**34.2**	**C**	**33.3**	**C**
I-95 East Ramp Terminal*	EBL	38.8	D	38.2	D
	EBT	20.8	C	17.8	B
	WBT	43.7	D	44.2	D
	WBR	39.2	D	40.4	D
	NBL	39.7	D	41.5	D
	NBR	54.9	D	54.1	D
	Intersection	**36.6**	**D**	**36.6**	**D**

Table 4.22 – 2040 Hallandale Beach Boulevard Interchange LOS and Delay Results (Continued)

Hallandale Beach Boulevard Intersection	Movement	Build Alternatives			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
NW 10th Terrace	EBL	47.6	D	73.0	E
	EBT	29.3	C	20.9	C
	EBR	33.5	C	22.7	C
	WBL	37.5	D	29.4	C
	WBT	29.1	C	44.0	D
	WBR	14.5	B	15.3	B
	NBL	76.1	E	280.7	F
	NBT	50.1	D	59.0	E
	NBR	50.1	D	59.0	E
	SBL	55.1	E	71.2	E
	SBT	48.5	D	58.6	E
	SBR	48.5	D	58.6	E
	Int	**33.0**	**C**	**45.0**	**D**

Table 4.23 – 2040 Pembroke Road Interchange LOS and Delay Results

Pembroke Road Intersection	Movement	Build Alternatives			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Park Road*	EBU	19.8	B	21.9	C
	EBT	44.9	D	17.6	B
	EBR	44.9	D	17.6	B
	WBL	54.8	D	75.2	E
	WBT	9	A	8	A
	NBL	62.8	E	89.4	F
	NBR	54.1	D	60.7	E
	Int	**33.0**	**C**	**18.9**	**B**
SW 31st Avenue*	EBT	1	A	3.2	A
	EBR	1	A	3.2	A
	WBL	54.2	D	77.9	E
	WBT	0.2	A	0.4	A
	NBR	52.5	D	74.3	E
	Int	**2.0**	**A**	**3.5**	**A**

Table 4.24 – 2040 Pembroke Road Interchange LOS and Delay Results (Continued)

Pembroke Road Intersection	Movement	Build Alternatives			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
I-95 West Ramp Terminal*	EBT	52.4	D	55	D
	EBR	40.6	D	42.5	D
	WBL	54.7	D	52.5	D
	WBT	12.1	B	20.7	C
	SBL	46.6	D	41.9	D
	SBR	52	D	54.2	D
	Int	**41.2**	**D**	**41.8**	**D**
I-95 East Ramp Terminal*	EBL	52.3	D	53.9	D
	EBT	16.3	B	10.7	B
	WBT	48.5	D	52.9	D
	WBR	42.7	D	44.6	D
	NBL	41.5	D	43.6	D
	NBR	41.8	D	43.9	D
	Int	**35.3**	**D**	**38.3**	**D**
NW 10th Avenue / South 28th Avenue	EBL	38.2	D	82.6	F
	EBT	22	C	23.6	C
	EBR	22	C	23.6	C
	WBL	53.6	D	52.6	D
	WBT	31.8	C	45.4	D
	WBR	23	C	27.1	C
	NBL	61	E	73.3	E
	NBT	47.8	D	44.4	D
	NBR	47.8	D	44.4	D
	SBL	61.2	E	64.4	E
	SBT	82.3	F	85.4	F
	SBR	82.3	F	85.4	F
	Int	**33.8**	**C**	**43.1**	**D**

Table 4.24 – 2040 Hollywood Boulevard Interchange LOS and Delay Results

Hollywood Boulevard Intersection	Movement	Build Alternatives			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Entranda Drive	EBL	5.3	A	32.3	C
	EBT	8.4	A	18.7	B
	EBR	8.8	A	19.6	B
	WBL	6.2	A	14.8	B
	WBT	1.2	A	36.8	D
	WBR	1.6	A	38.4	D
	NBL	65.2	E	53.6	D
	NBT	65.2	E	53.6	D
	NBR	61.1	E	46.0	D
	SBL	74.8	E	78.9	E
	SBT	63.3	E	49.5	D
	SBR	63.3	E	49.5	D
	Int	**8.5**	**A**	**32.2**	**C**
Calle Grande Drive*	EBU	45.1	D	42.6	D
	EBT	10.0	A	14.5	B
	EBR	10.0	A	14.5	B
	WBL	48.6	D	51.6	D
	WBT	10.1	B	10.2	B
	NBR	6.4	D	5.3	D
	Int	**10.3**	**B**	**12.4**	**B**
I-95 West Ramp Terminal*	EBT	41.9	D	46.7	D
	EBR	39	D	45.2	D
	WBL	37.1	D	52.7	D
	WBT	14.6	B	14.9	B
	SBL	54.9	D	49.3	D
	SBR	53.6	D	54.7	D
	Int	**38.9**	**D**	**41**	**D**
I-95 East Ramp Terminal*	EBL	51.4	D	54.2	D
	EBT	8.3	A	14.7	B
	WBT	33.9	C	32.7	C
	WBR	31.9	C	29.7	C
	NBL	54.2	D	54.1	D
	NBR	52.8	D	54.3	D
	Int	**30.9**	**C**	**33.7**	**C**

Table 4.24 – 2040 Hollywood Boulevard Interchange LOS and Delay Results (Continued)

Hollywood Blvd Intersection	Movement	Build Alternatives			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
S 28th Ave*	EBL	27.1	C	46.3	D
	EBT	38.8	D	49.5	D
	EBR	36.2	D	32.4	C
	WBL	38.9	D	52.2	D
	WBT	54.2	D	68.5	E
	WBR	54.2	D	68.5	E
	NBL	73.4	E	73.1	E
	NBT	63.2	E	60.5	E
	NBR	63.2	E	60.5	E
	SBL	54.9	D	53.7	D
	SBT	63.1	E	58.1	E
	SBR	90.9	F	108.6	F
	Int	**52.7**	**D**	**61.9**	**E**

As shown in ***Table 4.22***, the 2040 Build Alternatives intersection operational results indicate all four intersections will operate at a LOS D or better.

As shown in ***Table 4.23***, the 2040 Build Alternatives intersection operational results indicate all five intersections will operate at a LOS D or better.

As shown in ***Table 4.24***, the 2040 Build Alternatives operational results indicate four intersections will operate at a LOS D or better and one intersection will operate at a LOS E during the PM peak-period.

4.5.12.3 Exit Ramp Queue Results

The results for the diamond interchange configuration are summarized in ***Table 4.25***. Storage distances were measured from the stop bar to the gore point on I-95. Queues for Alternatives 1 and 2 are accommodated in the available storage.

Table 4.25 – 2040 Interchange Exit Ramp Queue Results

Interchange	Movement	Diamond			
		AM		PM	
		(Alt 1)	(Alt 2)	(Alt 1)	(Alt 2)
		95th Queue[1] (Storage) in feet	95th Queue[1] (Storage) in feet	95th Queue[1] (Storage) in feet	95th Queue[1] (Storage) in feet
Hollywood Blvd	NB Off-Ramp	190 (5,950)	190 (10,000)	260 (5,950)	260 (10,000)
	SB Off-Ramp	285 (2,650)	285 (2,400)	350 (2,650)	350 (2,400)
Pembroke Rd	NB Off-Ramp	195 (4,600)	195 (4,650)	310 (4,600)	310 (4,650)
	SB Off-Ramp	415 (6,500)	415 (7,800)	475 (6,500)	475 (7,800)
Hallandale Beach Blvd	NB Off-Ramp	415 (1,700)	415 (2,100)	380 (1,700)	380 (2,100)
	SB Off-Ramp	320 (4,800)	320 (1,950)	290 (4,800)	290 (1,950)

1 95th percentile queue from Synchro

4.6 Comparative Alternatives Evaluation

4.6.1 Evaluation Matrix

Evaluation of transportation projects to select the most desirable alternative is often based on a wide range of performance criteria that reflect the concerns of all the key stakeholders. The No-Build and Build Alternatives were evaluated based on a selected criterion of variables and parameters.

The various criteria used in the evaluation are summarized in ***Table 4.26***. The evaluation methodology used in this study involves a combination of both comparative qualitative and quantitative analyses to determine the preferred alternative. The evaluation matrix is presented in ***Table 4.27***.

Table 4.26 – Performance Evaluation Criteria

Engineering
Geometric Compliance to Design Criteria: Checks design elements and applicable design standards considered in the study are in compliance with the FDM and AASHTO.
Multimodal Facilities: Measures the availability of multi-modal facilities and their amenities and how each alternative enhances the ability to promote other transportation modes.
Mobility: Measures the ability of an alternative to provide adequate capacity and minimize travel time delay through the corridor.
Safety Improvements: Provides consideration for an alternative's physical, geometric, and operational features identifying to what extent they would minimize actual or potential safety hazards.
Drainage Analysis: Evaluates storm water treatment and attenuation within the project limits. Determines and estimates the storm water management facility requirements to serve the drainage needs of the proposed improvements.
Structures Analysis: Evaluates the needed structural improvements of all the bridges within the project limits. This analysis also determines if new bridges are required to accommodate the proposed improvements.
Utility Impacts: Measures the utility impacts of the alternatives. This includes potential conflicts and relocation of the utility lines that are located within the FDOT right of way.
Maintenance of Traffic: Measures the effectiveness of the proposed traffic control schemes during construction to minimize effects on the residents, businesses, traveling public and emergency management services.
Purpose and Need: Measures the ability of an alternative to comply with the purpose and need of the project.
Traffic: Identifies substandard operations, measures the level of service, evaluates mainline and interchange access and signage requirements.
Socio-Economic
Right of Way Impacts: Identifies the level and type of any residential and/or business disruptions associated with an alternative.
Social and Neighborhood Impacts: Identifies whether an alternative has impacts on social and neighborhood issues, including visual and aesthetic concerns.
Economic and Employment Impacts: Identifies whether an alternative impacts economic issues along the corridor.
Community Services/Features: Measures the effect and/or compatibility of an alternative to meet the surrounding visual environment needs from both the roadway user and the supporting community. Also provides a degree of impact to the community's services (Fire, Police, Parks, etc.)
Environmental
Air Quality: Measures the ability of an alternative to meet pre-established air quality standards.
Contamination: Measures the potential impact on existing or potential hazardous material sites and/or generators.
Listed Species: Identifies the degree of potential effect of threatened and endangered species.
Wetland Impacts: Identifies the degree of potential impacts to wetland habitat.
Cultural/Historic/Archaeological Impacts: Measures the degree of impact associated with historic structures or archaeological sites that may be caused by the development of a specific corridor or concept.
Project Cost
Construction Cost: Compares each alternative based on construction costs. Cost includes construction cost, mobilization, maintenance of traffic and project unknown.
Right of Way/Business Damages: Addresses variations in right of way costs between alternatives.

Table 4.27 – Evaluation Matrix

EVALUATION MATRIX					
Variables/Parameters	No-Build Alternative	Build Alternative 1	Build Alternative 2	Best Build Alternative	
				Alternative 1	Alternative 2
Engineering					
Geometric Compliance to Design Criteria	No change	Meets criteria Substandard interchange spacing Relocation of off-ramps impacts uniformity of the corridor	Meets criteria Combines ramps improving interchange spacing Maintains ramp uniformity		✓
Multimodal Facilities	No change	Provides the ability to enhance bus service operations Improves bicycle and pedestrian facilities Impacts public transportation shuttle route between Pembroke Road and Hollywood Boulevard	Provides the ability to enhance bus service operations Improves bicycle and pedestrian facilities Impacts public transportation shuttle route between Pembroke Road and Hollywood Boulevard	✓	✓
Mobility	Increased congestion	Adds capacity Improves the traffic operations of the area	Adds capacity Improves the traffic operations of the area Removing the Pembroke Road interchange from directly interacting with I-95 improves the mobility and access in and out of Pembroke Road		✓
Safety Improvements	Includes planned/ programmed ramp terminal safety improvements	Reduces long-term crashes related to heavy congestion, mainline weaving maneuvers, mainline and ramp speed differentials and interstate access	Reduces long-term crashes related to heavy congestion, mainline weaving maneuvers, mainline and ramp speed differentials and interstate access Reduces the number of entrances and exits to/from I-95		✓
Drainage Analysis	No impact	Less impacts than Alternative 2 Alternative 1 requires a smaller roadway footprint	More impacts than Alternative 1 Alternative 2 requires a larger roadway footprint	✓	
Structures Analysis	No change	New bridges = 4 Bridge widenings = 2 Less new bridges than Alternative 2	New bridges = 5 Bridge widenings = 2 More new bridges than Alternative 1	✓	
Utility Impacts	No impact	5 Major impacts, 7 Minor impacts	5 Major impacts, 7 Minor impacts	✓	✓
Maintenance of Traffic	No impact	Moderate impacts during construction Less impacts than Alternative 2	Moderate impacts during construction More impacts than Alternative 1	✓	
Purpose and Need	Does not meet	Meets	Meets	✓	✓

EVALUATION MATRIX					
Variables/Parameters	No-Build Alternative	Build Alternative 1	Build Alternative 2	Best Build Alternative	
				Alternative 1	Alternative 2
Traffic					
I-95 Mainline Weave Locations	Northbound = 4 Southbound = 4	Northbound = 3 Southbound = 2	Northbound = 1 Southbound = 2 Alternative 2 has less weave locations than Alternative 1		✓
I-95 Northbound Locations with LOS A/B by 2040 AM (PM)	5 (1) = 6	2 (1) = 3	4 (4) = 8 More locations with LOS B or better		✓
I-95 Northbound Locations with LOS C by 2040 AM (PM)	4 (7) = 11	5 (6) = 11	8 (5) = 13 More locations with LOS C		✓
I-95 Northbound Locations with LOS D by 2040 AM (PM)	0 (1) = 1	4 (4) = 8 More locations with LOS D	1 (4) = 5	✓	
I-95 Northbound Locations with LOS E/F by 2040 AM (PM)	3 (3) = 6	0 (0) = 0	0 (0) = 0	✓	✓
I-95 Southbound Locations with LOS A/B by 2040 AM (PM)	1 (0) = 1	2 (0) = 2 More locations with LOS B or better	1 (0) = 1	✓	
I-95 Southbound Locations with LOS C by 2040 AM (PM)	5 (6) = 11	6 (10) = 16	9 (11) = 20 More locations with LOS C		✓
I-95 Southbound Locations with LOS D by 2040 AM (PM)	5 (5) = 10	5 (3) = 8 More locations with LOS D	3 (2) = 5	✓	
I-95 Southbound Locations with LOS E/F AM (PM)	1 (1) = 2	0 (0) = 0	0 (0) = 0	✓	✓
Number of mainline access points	6 locations Northbound 6 locations Southbound	6 locations Northbound 6 locations Southbound	4 locations Northbound 4 locations Southbound Less mainline access points		✓
Northbound Mainline Access	Hallandale to Pembroke access maintained Pembroke to Hollywood access maintained	Hallandale to Pembroke access not provided Pembroke to Hollywood not provided	Hallandale to Pembroke access not provided Pembroke to Hollywood access maintained via CD Pembroke to Hollywood access is maintained		✓

EVALUATION MATRIX					
Variables/Parameters	**No-Build Alternative**	**Build Alternative 1**	**Build Alternative 2**	**Best Build Alternative**	
				Alternative 1	**Alternative 2**
Southbound Mainline Access	Hollywood to Pembroke access maintained Pembroke to Hallandale access maintained	Hollywood to Pembroke not provided Pembroke to Hallandale not provided	Hollywood to Pembroke not provided Pembroke to Hallandale not provided	✓	✓
Northbound Off-Ramp Storage	Hallandale ~ 1,550 ft Pembroke ~ 1,760 ft Hollywood ~ 1,920 ft	Hallandale ~ 1,800 ft Pembroke ~ 4,575 ft Hollywood ~ 5,950 ft	Hallandale ~ 2,100 ft Pembroke ~ 4,575 ft Hollywood > 5,950 ft Provides more storage for off ramps		✓
Southbound Off-Ramp Storage	Hollywood ~ 1,875 ft Pembroke ~ 2,050 ft Hallandale ~ 1,950 ft	Hollywood ~ 2,625 ft Pembroke ~ 6,500 ft Hallandale ~ 4,880 ft Overall Alternative 1 has more storage when compared to Alternative 2.	1. Hollywood ~ 2,575 ft 2. Pembroke ~ 7,800 ft 3. Hallandale ~ 1.950 ft	✓	
Mainline Traffic	No change	Some traffic is removed from the mainline with the relocation of the off-ramps	More traffic is removed from the mainline with the addition of the C-D system		✓
Mainline Signage	No change	Similar to No-Build	Less signage on mainline due to less access points		✓
Socio-Economic					
Right of Way Impacts	None	Total Number of Parcels Affected = 32 Commercial = 27 Residential = 2 Vacant = 3 *Less right of way impacts than Alternative 2*	Total Number of Parcels Affected = 35 Commercial = 27 Residential = 5 Vacant = 3	✓	
Social and Neighborhood Impacts	None/No change	Provides the ability to enhance/improve bus service which offers an alternative to auto travel and addresses needs of low-income users and disadvantaged groups. Aesthetic effects anticipated to the Highland Garden neighborhood, which is adjacent to an elevated on-ramp	Provides the ability to enhance/improve bus service which offers an alternative to auto travel and addresses needs of low-income users and disadvantaged groups. Aesthetic effects not anticipated to the Highland Garden neighborhood		✓
Economic, Mobiity and Employment Impacts	No change	Improves mobility, throughput, travel speeds and travel time for this vital SIS facility and cross streets Supports economic development and reduces congestion	Improves mobility, throughput, travel speeds and travel time for this vital SIS facility and cross streets Supports economic development and reduces congestion	✓	✓

EVALUATION MATRIX					
Variables/Parameters	No-Build Alternative	Build Alternative 1	Build Alternative 2	Best Build Alternative	
				Alternative 1	Alternative 2
Community Services/Features	No change	Government facilities and public parks are located adjacent to the corridor but no disruption in their function and/or the services provided are anticipated; Service access to St. John's Lutheran Church will be modified. No other access conflicts anticipated, no impacts to emergency services anticipated.	Government facilities and public parks are located adjacent to the corridor but no disruption in their function and/or the services provided are anticipated. Service access to St. John's Lutheran Church will be modified. No other access conflicts anticipated; No impacts to emergency services anticipated.	✓	✓
Environment					
Air Quality	Project is located within an attainment area. Minimal potential impacts may occur from increased congestion.	The project is located within an attainment area, no significant air quality impacts are anticipated. Project is anticipated to decrease congestion.	The project is located within an attainment area, no significant air quality impacts are anticipated. Project is anticipated to decrease congestion.	✓	✓
Contamination	No change	6-High and 6-Medium known/potentially contaminated sites Less impacts than Alternative 2	8-High and 6 -Medium known/potentially contaminated sites	✓	
Listed Species/Wetland Impacts	No impact	Impacts to OSW 4, OSW 5, and Swale 1 Less impacts than Alternative 2	Impacts to OSW 4, OSW 5, Swale 1 and Swale 2	✓	
Water Quality	No impact/No improvement (portions of Hollywood Boulevard, Pembroke Road and Hallandale Beach Boulevard are not permitted by SFWMD)	Equivalent water quality treatment will be provided that meets state water quality criteria Potential for improvement possible based on the proposed drainage system	Equivalent water quality treatment will be provided that meets state water quality criteria Potential for improvement possible based on the proposed drainage system.	✓	✓
Cultural/Historic/ Archaeological Impacts	No impact	3 National Register– eligible historic resources No adverse effects	3 National Register– eligible historic resources No adverse effects	✓	✓
Cost					
Construction Cost	No construction, No cost involved = $0	$127 Million	$105 Million Lower cost when compared to Alternative 1		✓
Right of Way/Business Damages	None = $0	$53 Million	$57 Million	✓	
			Totals	**22**	**25**

The TSM&O Alternative would provide some short-term relief throughout the corridor. However, the TSM&O Alternative alone would not be consistent with the purpose and need of this project. TSM&O improvements are only viable in combination with the build alternative improvements. Therefore, a TSM&O Alternative was not evaluated in detail.

The following TSM&O elements are included in the Build Alternatives:

- Auxiliary lanes between interchanges
- Additional exclusive turn lanes at the interchange ramp terminals
- Additional turn-lane storage at the interchange ramp terminals
- Capacity improvements at the ramp junctions
- Signal optimization
- Enhanced signage
- New ITS technologies and infrastructure

4.6.2 Value Engineering

A Value Engineering (VE) Study was conducted during the week of April 8, 2019 through April 12, 2019. A VE preferred alternative was not identified during the VE Study. However, the VE team developed ten design alternatives and six design recommendations. The PD&E Study team reviewed and accepted three of the VE recommendations. Most of the recommendations will be evaluated further during the Design phase of the project. Details about the Value Engineering Study are documented in the *Value Engineering Study Report* dated May 2019, a companion document to the PD&E Study.

4.7 Selection of Preferred Alternative

The preferred alternative for the I-95 corridor is Alternative 2. Alternative 2 was selected based on the alternative alignment analysis and the evaluation results summarized as part of the PD&E Study. Alternative 2 will add the capacity improvements necessary to improve traffic operations, safety, transit, system linkage, modal interrelationships, transportation demand, social demand, economic development, interchange access and emergency evacuation.

Alternative 2 is the most prudent when compared with Alternative 1 for the following reasons:

- **Capacity –** The collector distributor roadway system removes I-95 mainline traffic, which provides more capacity to several mainline segments of I-95. Alternative 2 will add the capacity improvements necessary to improve traffic operations of the I-95 mainline and interchanges.

  In Alternative 2, average operating speeds along the northbound direction (AM peak, peak direction) increase by at least 10 mph (from 30-45 mph to 55 mph). In the southbound direction (PM peak, peak direction), average operating speeds show an increase of at least 21 mph (from 20-35 mph to 56 mph). At the networkwide level, in terms of average speed, Alternative 2 shows better performance than the No-Build during both peak periods with speed increases of 8% (AM) and 5% (PM). Network delay time reductions were 29% (AM) and 24% (PM).

- **Safety –** Reduces the number of entrances and exits to and from I-95, which improves the overall operations of the I-95 mainline, ramps, and interchanges. Reduces long-term crashes related to heavy congestion, mainline weaving maneuvers, mainline and ramp speed differentials, and interstate access. Provides more off-ramp storage and requires less signage on the mainline due to less access points.

  Data from historical crash records identified multiple high crash segments and high crash spots along I-95. Traffic congestion along I-95 is a contributing factor for much of the crashes experienced along the corridor. The potential for future increase in crashes is largely alleviated by the improvements proposed by Alternative 2. Closely spacing between the three interchanges was maximized to eliminate the existing substandard weaving segments. On-ramp traffic entering I-95 will have a better gap acceptance when mering in with the I-95 mainline traffic.

- **System Linkage –** Alternative 2 will match the planned improvements for the adjacent projects south and north of the project limits. Removing the Pembroke Road interchange from directly interacting with I-95 improves the mobility and access in and out of Pembroke Road and adjacent roadways.

- **Modal Interrelationships –** The additional capacity provides the ability to enhance/improve bus service, which offers an alternative to auto travel and addresses needs of low-income users and disadvantaged groups.

- **Transportation Demand –** Alternative 2 adds capacity to I-95. The additional auxiliary lanes, collector distributor roadway system and interchange ramps address the transportation demand within the study limits. These improvements are consistent with the local and State transportation plans.

  The additional capacity improvements will provide added operational benefits to support future Bus Services, Emergency Response Services and improved travel time reliability in and out of the interstate.

- **Social Demand and Economic Development –** Social and economic demands within the study limits will continue to increase as population and employment increase. The proposed improvements will add the necessary capacity to improve access to the cities of Hallandale Beach, Pembroke Park, and Hollywood, which will allow the economic development to take advantage of the added capacity to reach the destinations of I-95 and surrounding cities.

- **Evacuation Route –** In the case of an evacuation event, I-95 will have additional lanes with Alternative 2. The additional lanes will make the corridor more effective during emergency evacuation events and emergency response.

Based on the evaluation conducted and documented in this report, it is clear that Alternative 2 will meet the purpose and need of the project and the overall project objectives of this PD&E Study.

The preferred alternative was selected in early 2019 prior to FDOT District Four decided to put the I-95 PD&E Study on hold and perform the I-95 CPS (see ***Section 4.1*** for details). The I-95 CPS was completed in April 2020. The I-95 PD&E Study restarted in June 2020 and consisted of the same purpose and need. However, the main difference was that the study assumed that both projects, District Six I-95 Planning Study and District Four I-95 Express Phase 3C improvements, will be in-place by the design year 2045. The I-95 PD&E Study restart approach was to redesign the preferred alternative to fit within the I-95 CPS Alternative 1A footprint and be compatible with the future projects north and south of the study limits.

The preferred alternative refinements and further analyses are documented in ***Section 6.0***.

5.0 PROJECT COORDINATION AND PUBLIC INVOLVEMENT

5.1 AGENCY COORDINATION

Efficient Transportation Decision Making (ETDM) comments were used to provide the Environmental Technical Advisory Team (ETAT) feedback for all PD&E environmental impact topics. ETAT comments were taken into account with the environmental analysis that was conducted for each alternative. The comments provided gave us preliminary insight to the perceived environmental concerns along this corridor. Each comment was addressed through the analysis of the respective environmental impact topic and the results of the analysis was used to develop the alternatives to avoid and/or minimize the potential for significant environmental impacts to result from construction. In addition, if impacts were determined to be unavoidable, the ETDM comments assisted the PD&E team with analyzing potential mitigation options for any unavoidable impacts.

A Public Involvement Plan (PIP) was developed and is being implemented for the I-95 PD&E Study from south of Hallandale Beach Boulevard to north of Hollywood Boulevard in Broward County. The PIP is a working document that is updated and amended throughout the project development process to incorporate the latest public involvement policies and techniques as they evolve during the life of the project. The PIP outlines the public involvement approach and activities required to be undertaken with the project, including lists of the contact persons, such as citizens, private groups (residential/business), officials, agencies, stakeholders, and media, and the means used to involve them in the process.

Briefings were held with the following Elected Officials/Agencies/Stakeholders prior to the Public Meetings:

- City of Hallandale Beach
- Town of Pembroke Park
- City of Hollywood
- City of West Park

A PD&E Study newsletter and project exhibits were presented during these briefings.

5.2 PUBLIC INVOLVEMENT

The PIP focused on the ETDM process, elected official and agency meetings, a series of public informational meetings and several community outreach techniques including a project website and project newsletters. These elements are described herein and in ***Appendix H***, Public Information Records.

Public information meetings began in the spring of 2017 and have continued throughout the study process. Exhibits and project information has been provided for public review and comment at each meeting. Exhibit and project information is also available on the project website. Florida Department of Transportation (FDOT) representatives have been available at each meeting to discuss the project and answer questions, as well as members of the consultant team.

Elected Officials/Agencies/Stakeholders Briefings – Briefings were held with the following Elected Officials/Agencies/Stakeholders prior to the Kick-Off Meetings:

- City of Hallandale Beach
- Town of Pembroke Park
- City of Hollywood
- City of West Park

Kick-Off Meetings – Both an Elected Officials/Agency and Public Kick-Off Meetings were held in May 2017 in Broward County. The purpose of these meetings was to provide the officials and the community a forum through which to learn about the improvements being studied as well as the PD&E process in general, and to provide FDOT with initial concerns and areas to investigate as part of the study. Numerous exhibits and project information were provided for public review. A project newsletter describing the PD&E Study was distributed to all the attendees.

The following is a summary of the items discussed in the meeting:

- PD&E Study Process
- Project Study Area
- Needs of the Project
- No-Build Alternative Conditions

- Existing Conditions
- Adjacent Projects
- PD&E Study Milestone Schedule

The Kick-off meetings were held on Thursday, May 25, 2017 at the Orangebrook Golf & Country Club located at 400 Entrada Drive, Hollywood, Florida 33021. A total of five written comments were received at these meetings. Approximately 48 people attended these meetings.

The following are some of the comment topics provided at the meetings:

- Interchange Improvements
- Noise Walls
- Transit Improvements
- Project Schedule

Elected Officials/Agencies/Stakeholders Briefings – Briefings were held with the following Elected Officials/Agencies/Stakeholders prior to the Alternatives Public Workshop:

- City of Hallandale Beach
- Town of Pembroke Park
- City of Hollywood
- City of West Park

Alternatives Public Workshop – An Alternatives Public Workshop was held in June 2018 in Broward County. The purpose of this workshop was to present alternative highway improvement concepts along the study area. Numerous exhibits and project information were provided for review. A project newsletter with information on the PD&E Study to date was distributed to all the attendees.

The following is a summary of the items discussed in the meeting:

- PD&E Study Process
- Project Study Area
- Needs of the Project
- Existing Conditions

- No-Build Alternative Conditions
- Adjacent Projects
- Milestone Project Schedule
- Alternatives
- Hallandale Beach Boulevard Interchange
- Pembroke Road Interchange
- Hollywood Interchange
- Evaluation Matrix
- Environmental Features

The workshop was held on Thursday, June 7, 2018 at the Orangebrook Golf & Country Club located at 400 Entrada Drive, Hollywood, Florida 33021. A total of four written comments were received at this workshop. Approximately 45 people attended the meeting.

The following are some of the comment topics provided at the meetings:

- Interchange Improvements
- Noise Walls
- Transit Improvements
- Project Schedule

Public Hearing – A Public Hearing is tentatively scheduled for Summer 2021. The purpose of this hearing will be to present to the public the recommended alternative and seek public input. Numerous exhibits and project information will be provided for public review. A project newsletter describing the PD&E study to date will be distributed to all the attendees.

6.0 Design Features of the Preferred Alternative

6.1 Engineering Details of the Preferred Alternative

6.1.1 Typical Sections

The preferred alternative roadway typical section varies slightly and consists primarily of four 11-foot (11') wide express lanes (two in each direction), four 12-foot (12') wide general use lanes (two in each direction), four 11-foot (11') wide general use lanes (two in each direction), a three-foot (3') wide buffer area with pavement markings and express lane markers separating the general use lanes from the express lanes, five-foot to 12-foot (5'–12') wide inside shoulders, 12-foot (12') wide outside shoulders, 12-foot (12') wide auxiliary lanes at selected locations, and a 2.5-foot (2.5') wide center barrier wall.

The PD&E Study proposed changes to the I-95 corridor roadway section by the year 2030 are listed below:

- Two 12-foot (12') wide auxiliary lanes in each direction between Ives Dairy Road and Hallandale Beach Boulevard.
- Two-lane 24-foot (24') wide collector distributor roadway ramp between south of Hallandale Beach Boulevard and north of Hollywood Boulevard with six-foot (6') wide inside shoulder and 10-foot (10') wide outside shoulder.
- One-lane 15-foot (15') wide southbound collector distributor roadway ramp with 6-foot wide inside and outside shoulders.

The three I-95 roadway cross sections between interchange are depicted in ***Figure 6.1*** – ***Figure 6.3.*** These figures depict the 2030 and 2045 preferred alternative roadway cross sections. The 2045 roadway section includes the District Six I-95 Planning Study, District Four I-95 CPS and District Four I-95 Express Phase 3C improvements.

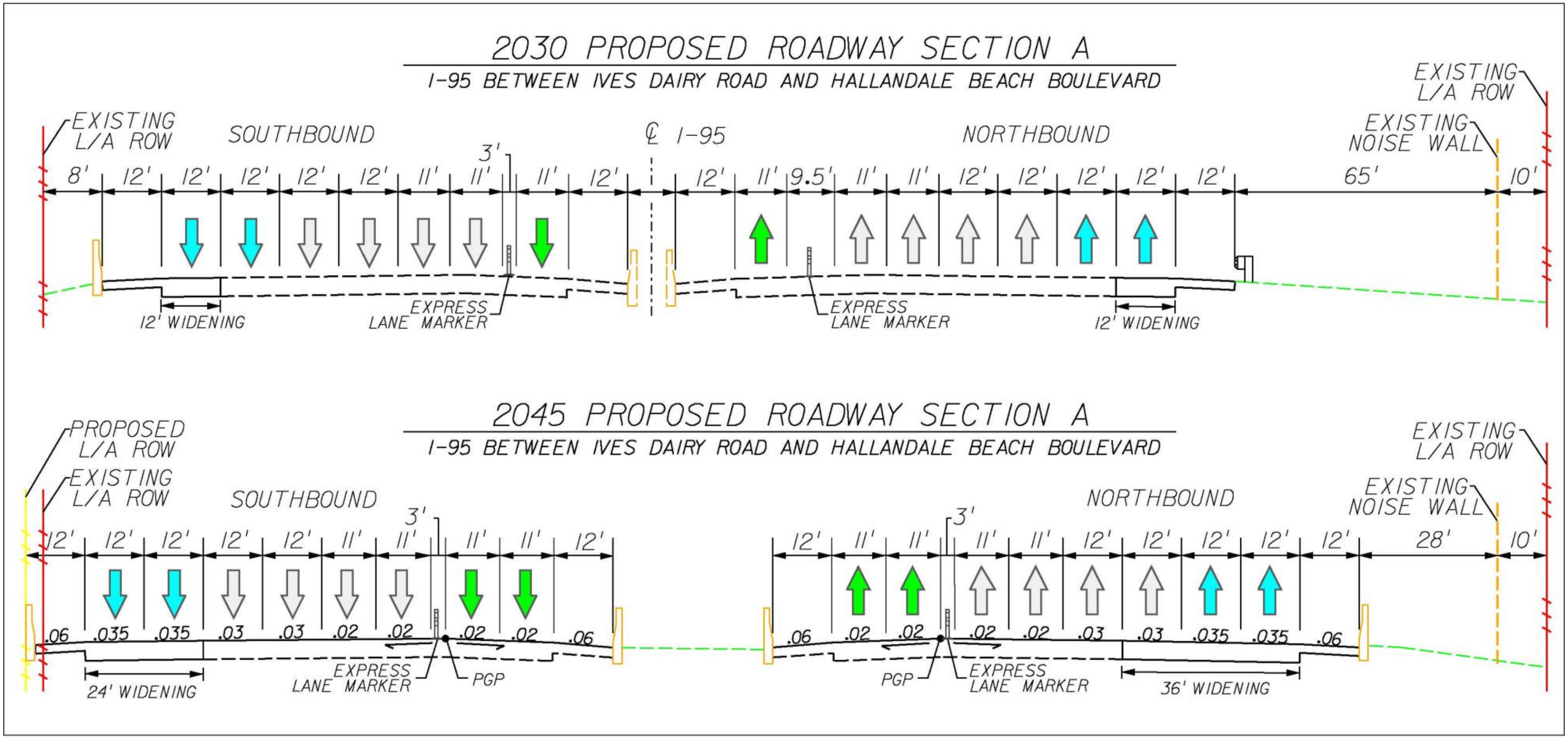


Figure 6.1 – Preferred Alternative Roadway Section A

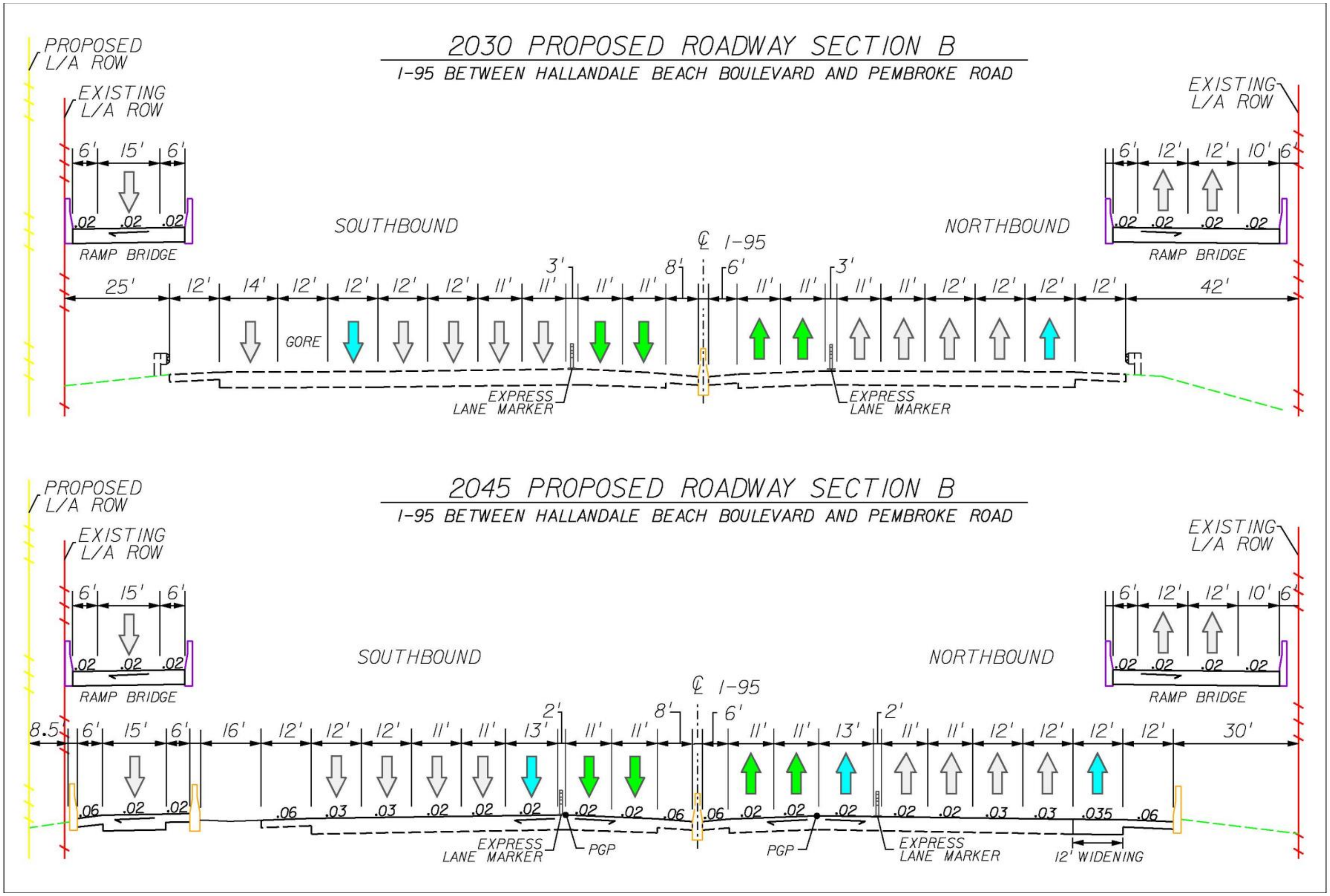


Figure 6.2 – Preferred Alternative Roadway Section B

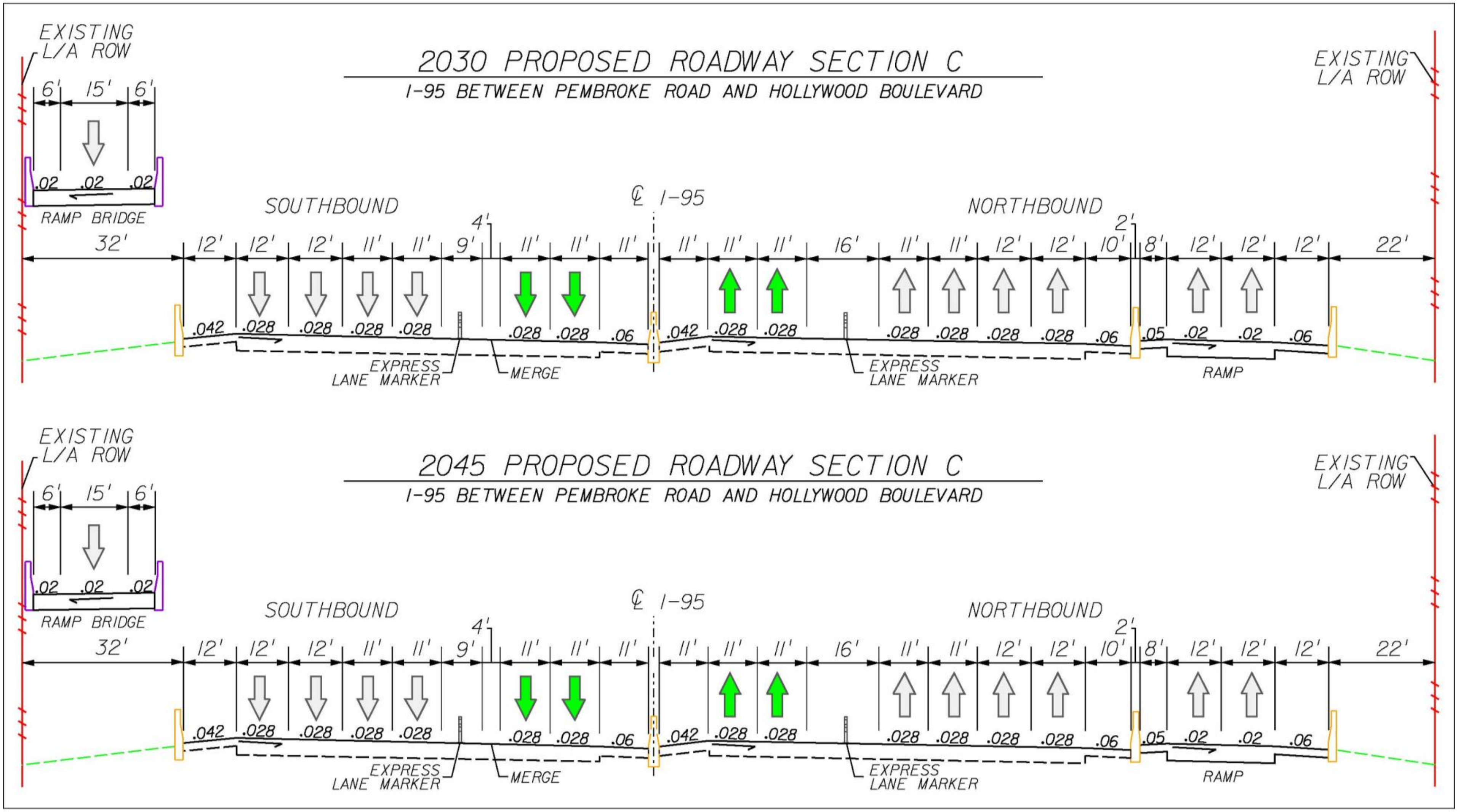


Figure 6.3 – Preferred Alternative Roadway Section C

6.1.2 Bridges and Structures

As part of the preferred alternative six new bridges are anticipated to be added and one bridge is anticipated to be widened (see ***Figure 6.4***). The proposed information of each bridge structure along the corridor is summarized in ***Table 6.1*** and ***Appendix F***, Bridge Analysis Report. ***Appendix F*** details each proposed bridge structure design and widening approach.

Table 6.1 summarizes the proposed geometrics, alignment, minimum vertical clearance, widening, and type of structure.

The study considered two different superstructure alternatives. The superstructure types are prestressed concrete I-Girders and composite steel plate girders. Prestressed I-Girders are typically used in concrete widenings and second level bridges. However, for aesthetic considerations, they are not considered in structures with high visibility and/or third level bridges. Other aesthetic considerations include cantilever piers (C piers) and straddle piers to accommodate the various roadway alignments while minimizing structural depth and optimizing the vertical clearance under the proposed flyover structures.

Different span arrangements were studied in order to maximize the efficiency of the proposed superstructure, enhance appearance, and to satisfy geometric constraints. The proposed concrete structures are made of FIBs 63, 72 and 78; the widening over Johnson Street is proposed using AASHTO Type II beams. The only structure that uses composite steel plate girders is Bridge 1, because the span lengths are beyond the limits allowed for concrete FIBs.

SUMMARY OF STRUCTURES	
ITEM	QUANTITY
PROPOSED NEW BRIDGES STEEL	1
PROPOSED NEW BRIDGES CONCRETE	5
PROPOSED BRIDGE WIDENINGS	1
EXISTING BRIDGES TO REMAIN	5

* CATEGORY 2 STRUCTURES

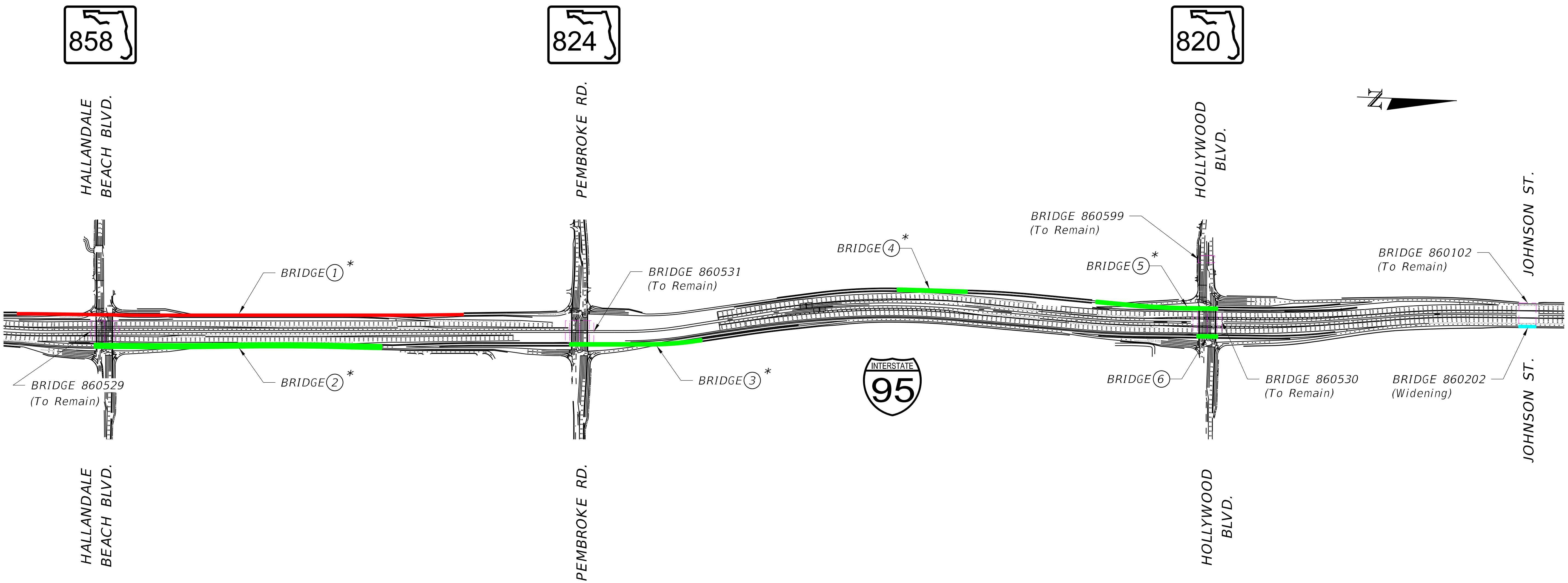


Figure 6.4 - Preferred Alternative Bridge Location Map

Table 6.1 Proposed Bridge Characteristics													
LOCATION			GEOMETRICS					STRUCTURAL					
Bridge ID No.	Bridge Location	Direction	Structure Length (ft)	Deck Width (ft)	Min. Vertical Clearance	Skew Angles (Degrees)	Underneath Roadway Designation	Number of Spans	Max. Span	Superstructure Type	Substructure Type	Approach / Bridge Type	Bridge Category
1	SR 9 / I-95 SB on-ramp over Hallandale Beach Blvd. (SR858	SB	126+(4x180)+(3x170)+(2x130)+(5x180)+(2x125)+(4x170)+220+160= 3826	29.67	16.50	0.00	SR 858 Hallandale Beach Blvd., SR 9/ I-95 SB off-ramp to SR 858 Hallandale Beach Blvd. and I-95 on ramp from Hallandale Beach Blvd.	22	220	Steel	Reinforced Concrete Column Piers C-Piers, Straddle Piers	New Steel Bridge , Single Lane	2
2	SR 9 / I-95 NB off-ramp to Pembroke Rd.(SR824)	NB	171+(4x146.75)+130+153+(10x142)= 2461	42.67	16.50	0.00	SR 858 Hallandale Beach Blvd. and I-95 on ramp from Hallandale Beach Blvd.	14	180	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforced Concrete Column Piers C-Piers, Straddle Piers	New Bridge, Prestress Concrete, FIBs	2
3	SR 9 / I-95 NB Ramp Over Pembroke Road (SR 824)	NB	168+(139x3)+(150x3)+100= 1135	29.67	16.50	0.00	SR 824 Pembroke Road	8	150	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforced Concrete Column Piers C-Piers, Straddle Piers	New Bridge, Prestress Concrete, FIBs	2
4	SR 9 / I-95 SB off-ramp to Pembroke Rd. (SR824)	SB	4x150 = 600	29.67	16.50	0.00	SR 9 / I-95 SB	4	150	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforced Concrete Column Piers C-Piers, Straddle Piers	New Bridge, Prestress Concrete, FIBs	2
5	SR 9 / I-95 SB off-ramp to Pembroke Rd. (SR824)	SB	6x174= 1044	29.67	16.50	0.00	SR 820 Hollywood Blvd.and SR 9 / I-95 SB on-ramp from SR 820 Hollywood Blvd	6	182	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforced Concrete Column Piers C-Piers, Straddle Piers	New Bridge, Prestress Concrete, FIBs	2
6	SR 9 / I-95NB Ramp over Hollywood Blvd.(SR 820)	SB	177	29.67	16.50	0.00	SR 820 Hollywood Blvd.	1	177	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforced Concrete Column Piers and Abutments	New Bridge, Prestress Concrete, FIBs	1
860202	SR 9 / I-95 Over Johnson Street NB	NB	38+71+38= 147	19.34	15.47	0.00	Johnson St.	3	71	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforced Concrete Column Piers and Abutments	Widening FIBs	1

6.1.3 Right of Way and Relocations

A right of way cost was determined based on the proposed geometry of the preferred alternative. The estimated cost was generated based on the proposed conceptual design plans. The cost includes property, support, relocation of personal property/signs and administrative costs. The parcels impacted are business/commercial, residential, industrial, and vacant land. Approximately 7.67 acres of additional right of way will be necessary to accommodate the proposed improvements. The number of parcels impacted and estimated right of way cost is summarized in ***Table 6.2***.

Table 6.2 – Right of Way Impacts

Affected Properties	
Type of Parcel	**Impact**
Commercial	15
Residential	9
Industrial	10
Vacant	4
Total Parcel Impacts	38
Total Area Impact (S.F.)	334,092
Total Area Impact (Acre)	7.67
Estimated Relocations and Right of Way Cost	
Residential	3
Business	71
Personal Property	2
Estimated Right of Way Cost	**$58 Million**

6.1.4 Horizontal and Vertical Geometry

The design of the preferred alternative strives to adhere to the design standards depicted in ***Section 3.0.*** The section below summarizes the proposed geometric changes for the proposed horizontal and vertical alignments within the study limits.

Horizontal Alignment

The preferred alternative proposes to maintain the I-95 and cross streets existing horizontal alignment designs except for the new interchange on- and off-ramps alignment construction areas. This alternative considers widening I-95 to the outside between Ives Dairy Road and Hallandale Beach Boulevard to accommodate two auxiliary lanes in each direction by the year 2030.

The preferred alternative proposes new construction of collector distributor roadways in both directions and the widening of ramp terminals in order to add additional lanes and/or storage areas to accommodate the projected traffic and queue. This alternative effectively removes the Pembroke Road access from the I-95 mainline and contains it within the collector distributor systems.

The horizontal footprint of the corridor and interchanges will be wider with the proposed improvements. The extent of the ramp realignments is depicted in ***Appendix I*** and ***Appendix J***, Preferred Alternative Concept Plans. ***Table 6.3*** summarizes the geometric characteristics for the interchange ramps horizontal alignment.

Table 6.3 – Preferred Alternative Horizontal Alignment Geometric Characteristics

Location/Adjacent Cross Road	Station	Direction	Radius of Curve (ft.)	Length of Curve (ft.)	Degree of Curve D	Deflection Angle	Design Speed	Superelevation e	Superelevation per FDM e	Existing SSD	SSD per FDM	SSD per AASHTO	Meets FDOT Criteria Superelevation/SSD	Meets AASTHO Criteria SSD	Curve No.
I-95 NB Off-Ramp to NB CD	PC 100+00.00 PI 103+12.37 PT 106+24.16	NB	5,890.00	624.16	0° 58' 22"	6° 04' 18" (LT)	45	RC	RC	>360	360	360	√/√	√	N95PEM1
I-95 NB Off-Ramp to NB CD	PC 110+92.40 PI 113+01.94 PT 115+11.46	NB	18,424.00	419.07	0° 18' 40"	1° 18' 12" (LT)	45	NC	NC	>360	360	360	√/√	√	N95PEM2
I-95 NB Off-Ramp to NB CD	PC 122+39.95 PI 124+40.03 PT 126+40.08	NB	17,350.00	400.13	0° 19' 49"	1° 19' 17" (RT)	45	NC	NC	>360	360	360	√/√	√	N95PEM3
I-95 NB Off-Ramp to NB CD	PC 133+48.94 PI 135+49.45 PT 137+49.95	NB	17,715.00	401.01	0° 19' 24"	1° 17' 49" (LT)	45	NC	NC	>360	360	360	√/√	√	N95PEM4
I-95 SB On-Ramp From Hallandale Beach Boulevard	PC 600+00.00 PI 602+16.03 PT 604+31.24	SB	2,865.00	431.24	1° 59' 59"	8° 37' 27" (LT)	45	0.034	0.034	>360	360	360	√/√	√	HALS951
I-95 NB On-Ramp From Hollywood Boulevard	PC 405+43.55 PI 407+95.28 PT 410+46.36	NB	4,030.00	502.80	1° 25' 18"	7° 08' 55" (LT)	45	0.025	0.026	>360	360	360	√/√	√	HOLLN951
I-95 NB On-Ramp From Hollywood Boulevard	PC 412+19.89 PI 415+04.72 PT 417+89.07	NB	5,686.00	569.19	1° 00' 28"	5° 44' 08" (RT)	45	RC	RC	>360	360	360	√/√	√	HOLLN952
I-95 NB CD System to Hollywood Boulevard	PC 202+48.07 PI 204+56.15 PT 206+64.19	NB	12,422.73	416.11	0° 27' 40"	1° 55' 09" (RT)	45	NC	NC	>360	360	360	√/√	√	NCDHOLL1
I-95 NB CD System to Hollywood Boulevard	PC 220+75.53 PI 222+88.21 PT 225+00.11	NB	2,880.00	424.58	1° 59' 22"	8° 26' 48" (LT)	45	0.034	0.034	>360	360	360	√/√	√	NCDHOLL2
I-95 NB CD System to Hollywood Boulevard	PC 229+44.67 PI 231+61.51 PT 233+78.26	NB	8,884.79	433.58	0° 38' 42"	2° 47' 46" (RT)	45	NC	NC	>360	360	360	√/√	√	NCDHOLL3
I-95 NB CD System to Hollywood Boulevard	PC 237+16.35 PI 239+19.17 PT 241+21.62	NB	3,864.00	405.26	1° 28' 58"	6° 00' 33" (RT)	45	0.026	0.026	>360	360	360	√/√	√	NCDHOLL4
I-95 NB CD System to Hollywood Boulevard	PC 241+21.62 PI 244+37.81 PT 247+53.53	NB	6,735.49	631.92	0° 51' 02"	5° 22' 32" (RT)	45	RC	RC	>360	360	360	√/√	√	NCDHOLL5
I-95 NB CD System to Hollywood Boulevard	PC 257+39.73 PI 259+99.60 PT 262+59.10	NB	5,675.00	519.37	1° 00' 35"	5° 14' 37" (LT)	40	NC	NC	>305	305	305	√/√	√	NCDHOLL6

✓ = Meets required criteria ✗ = Does not meet criteria

Table 6.3 – Preferred Alternative Horizontal Alignment Geometric Characteristics (Continued)

Location/Adjacent Cross Road	Station	Direction	Radius of Curve (ft.)	Length of Curve (ft.)	Degree of Curve D	Deflection Angle	Design Speed	Superelevation e	Superelevation per FDM e	Existing SSD	SSD per FDM	SSD per AASHTO	Meets FDOT Criteria Superelevation/SSD	Meets AASTHO Criteria SSD	Curve No.
I-95 NB CD System Over Hollywood Boulevard	PC 300+29.41 PI 303+28.39 PT 306+27.09	NB	7,784.83	597.68	0° 44' 10"	4° 23' 56" (LT)	45	NC	NC	>360	360	360	√/√	√	NCDN951
I-95 NB CD System Over Hollywood Boulevard	PC 316+80.72 PI 319+72.21 PT 322+62.77	NB	4,215.00	582.05	1° 21' 34"	7° 54' 43" (LT)	45	0.024	0.026	>360	360	360	√/√	√	NCDN952
I-95 SB On-Ramp From Pembroke Road	PC 500+00.00 PI 504+08.68 PT 508+16.92	SB	10,015.00	816.92	0° 34' 20"	4° 40' 25" (RT)	50	NC	NC	>425	425	425	√/√	√	PEMS951
I-95 SB On-Ramp From Pembroke Road	PC 510+57.78 PI 512+71.30 PT 514+84.01	SB	2,831.70	426.23	2° 01' 24"	8° 37' 27" (LT)	40	0.028	0.028	>305	305	305	√/√	√	PEMS952
I-95 SB Off-Ramp To Hollywood Boulevard	PC 816+31.12 PI 820+43.25 PT 824+54.72	SB	8,352.00	823.60	0° 41' 10"	5° 39' 00" (RT)	45	NC	NC	>360	360	360	√/√	√	S95HOLL1
I-95 SB Ramp to Pembroke Road	PC 704+87.00 PI 707+05.47 PT 709+22.83	SB	2,500.00	435.83	2° 17' 31"	9° 59' 19" (LT)	40	0.032	0.034	>305	305	305	√/√	√	S95PEM1
I-95 SB Ramp to Pembroke Road	PC 720+48.15 PI 723+80.29 PT 727+11.28	SB	4,599.00	661	1° 14' 45"	8° 15' 41" (RT)	40	RC	RC	>305	305	305	√/√	√	S95PEM2
I-95 SB Ramp to Pembroke Road	PC 733+49.80 PI 736+21.25 PT 738+92.51	SB	8,215.00	541	0° 41' 51"	3° 47' 07" (RT)	40	NC	NC	>305	305	305	√/√	√	S95PEM3
I-95 SB Ramp to Pembroke Road	PC 747+31.01 PI 749+90.20 PT 752+49.07	SB	6,171.00	518.06	0° 55' 42"	4° 48' 36" (LT)	40	NC	NC	>305	305	305	√/√	√	S95PEM4
I-95 SB Ramp to Pembroke Road	PC 758+25.64 PI 761+30.13 PT 764+34.14	SB	6,201.24	608.50	0° 55' 26"	5° 37' 20" (LT)	40	NC	NC	>305	305	305	√/√	√	S95PEM5
Ramp from Pembroke Road to the NB CD	PC 1001+01.13 PI 1003+10.84 PT 1005+20.15	NB	3,990.00	419.02	1° 26' 10"	6° 01' 01" (LT)	30	NC	NC	>200	200	200	√/√	√	PEMNCD1
Ramp from Pembroke Road to the NB CD	PC 1008+26.25 PI 1010+77.17 PT 1013+28.08	NB	27,015.00	501.83	0° 12' 44"	1° 03' 52" (RT)	45	NC	NC	>360	360	360	√/√	√	PEMNCD2
Ramp from Pembroke Road to the NB CD	PC 1015+92.81 PI 1019+96.30 PT 1023+99.25	NB	9,038.88	806.44	0° 38' 02"	5° 06' 43" (RT)	45	NC	NC	>360	360	360	√/√	√	PEMNCD3

✓ = Meets required criteria ✗ = Does not meet criteria

Vertical Alignment

The preferred alternative proposes to maintain the I-95 and cross streets existing vertical alignment designs except for the new interchange on- and off-ramps alignment construction areas. This alternative considers new grade separations at each interchange to accommodate several on- and off-ramps.

This alternative proposes collector distributor roadways in both directions with five braided ramps within the study limits.

1. Northbound off-ramp to Pembroke Road and Hollywood Boulevard over Hallandale Beach Boulevard and the Hallandale Beach Boulevard northbound on-ramp
2. Northbound collector distributor roadway over Pembroke Road
3. Northbound collector distributor roadway over Hollywood Boulevard
4. Southbound ramp to Pembroke Road over Hollywood Boulevard and the Hollywood Boulevard southbound on-ramp
5. Southbound on-ramp from Pembroke Road over the existing pump station and Hallandale Beach Boulevard

The design of the new grade separations is depicted in ***Appendix I***, 2030 Preferred Alternative Concept Plans and ***Appendix K***, Preferred Alternative Plan and Profiles.

Table 6.4 summarizes the vertical curve parameters and characteristics of the interchange ramps.

Table 6.4 – Preferred Alternative Vertical Alignment Geometric Characteristics

Facility/Location	Type of Curve	VPI Station	VPI Elevation (ft)	PGL High/Low (ft)	Grade (Back) %	Grade (Ahead) %	Length of Curve (ft)	K-Value	Design Speed (MPH)	K-Value Required for FDOT	K-Value Required for AASHTO	Min. Length FDOT	Meets FDOT Criteria K-Value/Length	Meets AASHTO Criteria K-Value
I-95 SB On-Ramp From Hallandale Beach Boulevard	Crest	607+67.00	22.04	19.94	1.49	-3.99	385.6	70.3	40	64	64	120	√/√	√
I-95 SB On-Ramp From Hallandale Beach Boulevard	Sag	611+12.00	8.27	6.92	-3.99	-2.25	120	69	40	64	64	120	√/√	√
I-95 NB On-Ramp From Hollywood Boulevard	Sag	402+93.00	7.61	6.72	0.98	3.81	182	64.4	40	64	64	120	√/√	√
I-95 NB On-Ramp From Hollywood Boulevard	Crest	406+88.00	22.64	18.45	3.81	-2.21	600	99.8	45	98	61	135	√/√	√
I-95 NB Off-Ramp to NB CD	Sag	108+33.00	33.32	32.67	0.65	1.45	200	248.5	45	79	79	135	√/√	√
I-95 NB Off-Ramp to NB CD	Crest	116+30.00	44.89	44.05	1.45	-0.59	400	195.8	45	98	61	135	√/√	√
I-95 NB Off-Ramp to NB CD	Crest	131+45.00	35.95	37.13	-0.59	-2.32	400	231.7	45	98	61	135	√/√	√
I-95 NB Off-Ramp to NB CD	Sag	142+77.00	9.72	9.12	-2.32	-0.30	400	198.5	45	79	79	135	√/√	√
I-95 NB CD System to Hollywood Boulevard	Sag	206+20.00	17.30	19.21	-1.78	2.06	400	104.2	45	79	79	135	√/√	√
I-95 NB CD System to Hollywood Boulevard	Crest	214+90.00	35.20	35.76	2.06	0.37	300	178.2	45	98	61	135	√/√	√
I-95 NB CD System to Hollywood Boulevard	Crest	224+70.00	38.86	38.19	0.37	-3.65	400	99.4	45	98	61	135	√/√	√
I-95 NB CD System to Hollywood Boulevard	Sag	232+20.00	11.49	11.03	-3.65	-0.31	300	89.8	45	79	79	135	√/√	√
I-95 NB CD System to Hollywood Boulevard	Crest	260+62.00	13.00	12.77	0.30	-1.16	200	136.8	45	98	61	135	√/√	√
I-95 NB CD System to Hollywood Boulevard	Sag	266+87.00	5.76	6.02	-1.16	0.35	200	132.7	45	79	79	135	√/√	√
I-95 NB CD System Over Hollywood Boulevard	Sag	303+67.00	14.12	13.47	0.65	3.11	200	81.2	45	79	79	135	√/√	√
I-95 NB CD System Over Hollywood Boulevard	Crest	311+40.00	38.17	32.08	3.11	-3.95	700	99.2	45	98	61	135	√/√	√
I-95 NB CD System Over Hollywood Boulevard	Sag	316+81.00	16.82	17.33	-3.95	0.30	360	84.7	45	79	79	135	√/√	√
I-95 SB On-Ramp From Pembroke Road	Sag	509+50.00	8.11	7.66	0.30	4.93	300	64.8	40	64	64	120	√ /√	√

✓ = Meets required criteria ✗ = Does not meet criteria

Table 6.4 – Preferred Alternative Vertical Alignment Geometric Characteristics (Continued)

Facility/Location	Type of Curve	VPI Station	VPI Elevation (ft)	PGL High/Low (ft)	Grade (Back) %	Grade (Ahead) %	Length of Curve (ft)	K-Value	Design Speed (MPH)	K-Value Required for FDOT	K-Value Required for AASHTO	Min. Length FDOT	Meets FDOT Criteria K-Value/Length	Meets AASHTO Criteria K-Value
I-95 SB On-Ramp From Pembroke Road	Crest	518+00.00	49.99	49.43	4.93	-0.32	370	70.4	40	64	64	120	√/√	√
I-95 SB On-Ramp From Pembroke Road	Crest	551+90.00	39.00	39.48	-0.32	-3.03	300	110.8	45	98	61	135	√/√	√
I-95 SB Off-Ramp To Hollywood Boulevard	Sag	815+14.00	7.40	7.69	-0.30	2.35	216	81.5	45	79	79	135	√/√	√
I-95 SB Off-Ramp To Hollywood Boulevard	Crest	820+45.00	19.87	21.37	2.35	1.50	200	236.1	45	98	61	135	√/√	√
SB Ramp to Pembroke Road	Sag	720+86.00	11.01	10.56	0.30	3.66	300	89.3	45	79	79	135	√/√	√
SB Ramp to Pembroke Road	Crest	728+68.00	39.64	37.57	3.66	-1.07	500	105.7	45	98	61	135	√/√	√
SB Ramp to Pembroke Road	Sag	738+00.00	29.67	31.00	-1.07	1.74	400	142.4	45	79	79	135	√/√	√
SB Ramp to Pembroke Road	Crest	747+58.00	46.33	44.40	1.74	-2.18	400	102.2	45	98	61	135	√/√	√
SB Ramp to Pembroke Road	Sag	764+19.34	10.19	9.71	-2.18	-0.48	200	118.1	45	79	79	135	√/√	√

✓ = Meets required criteria ✗ = Does not meet criteria

6.1.5 Bicycle and Pedestrian Accommodations

I-95 is a limited access facility. There will continue to be no designated pedestrian or bicycle accommodations along this corridor, as pedestrians and bicycles are not permitted on limited access corridors. Below are the pedestrian and bicycle improvements proposed within the crossing roadway interchange limits:

Hallandale Beach Boulevard west of I-95

1. The bicycle lane was improved to seven feet wide.
2. The sidewalk width was improved to six feet wide.

Hallandale Beach Boulevard within the interchange area

1. The bicycle lane was improved to seven feet wide.
2. The sidewalk width was improved to six feet wide.

Pembroke Road west of I-95

1. The bicycle lane was improved to seven feet wide.
2. The sidewalk width was improved to six feet wide.

Pembroke Road within the interchange area

1. The bicycle lane was improved to seven feet wide.
2. The sidewalk width was improved to six feet wide.

Pembroke Road east of I-95

1. The bicycle lane was improved to seven feet wide, eastbound only.
2. The sidewalk width was improved to six feet wide.

Hollywood Boulevard within the interchange area

1. The bicycle lane was improved to seven feet wide.
2. The sidewalk width was improved to six feet wide.

6.1.6 Multi-Modal Accommodations

The additional capacity provides the ability to enhance/improve bus service, which offers an alternative to auto travel and addresses needs of low-income users and disadvantaged groups. The preferred alternative improvements were focused on the interchange influence areas with very minor arterial improvements. Therefore, no other multi-modal accommodations are being proposed as part of the preferred alternative.

6.1.7 ACCESS MANAGEMENT

I-95 Mainline – The FDOT Access Management Classification System determines the access class and type of each roadway based on the segment location, spacing between cross streets, posted speed, median type and/or median opening spacing. The access management classification for I-95 is Class 1.2, Freeway in an existing urbanized area with limited access. Based on the access and type, the minimum interchange spacing allowed is two miles in accordance with the *FDM, Part 2, Chapter 201, Table 201.4.1*. The interchange spacing along the corridor is not in compliance with the FDOT Access Management Guideline Rule 14.97 (see ***Table 6.5***).

Table 6.5 – I-95 Access Management/Interchange Spacing

Cross Street	Proposed Spacing to Next Interchange (Miles)	Complies with Interchange Spacing?
Preferred Alternative		
Hallandale Beach Boulevard to Hollywood Boulevard	1.79	No

The preferred alternative proposes a collector distributor roadway system, which removes the Pembroke Road Interchange from directly interacting with the I-95 mainline. The interchange spacing is still less than 2 miles. However, the preferred alternative improves the interchange spacing by adding an additional mile.

Arterials – The preferred alternative maintains the existing access management along the crossing arterials. The improvements proposed are additional lanes, exclusive turn lanes and/or turn-lane modifications at selective locations. Therefore, access management is not impacted and will remain the same.

6.1.7.1 Express Lanes

The preferred alternative proposes to maintain the existing configuration and proposed designs (by the projects to the north and south of this PD&E Study) of the express lanes system.

Two express lanes access points exist within the PD&E Study limits:

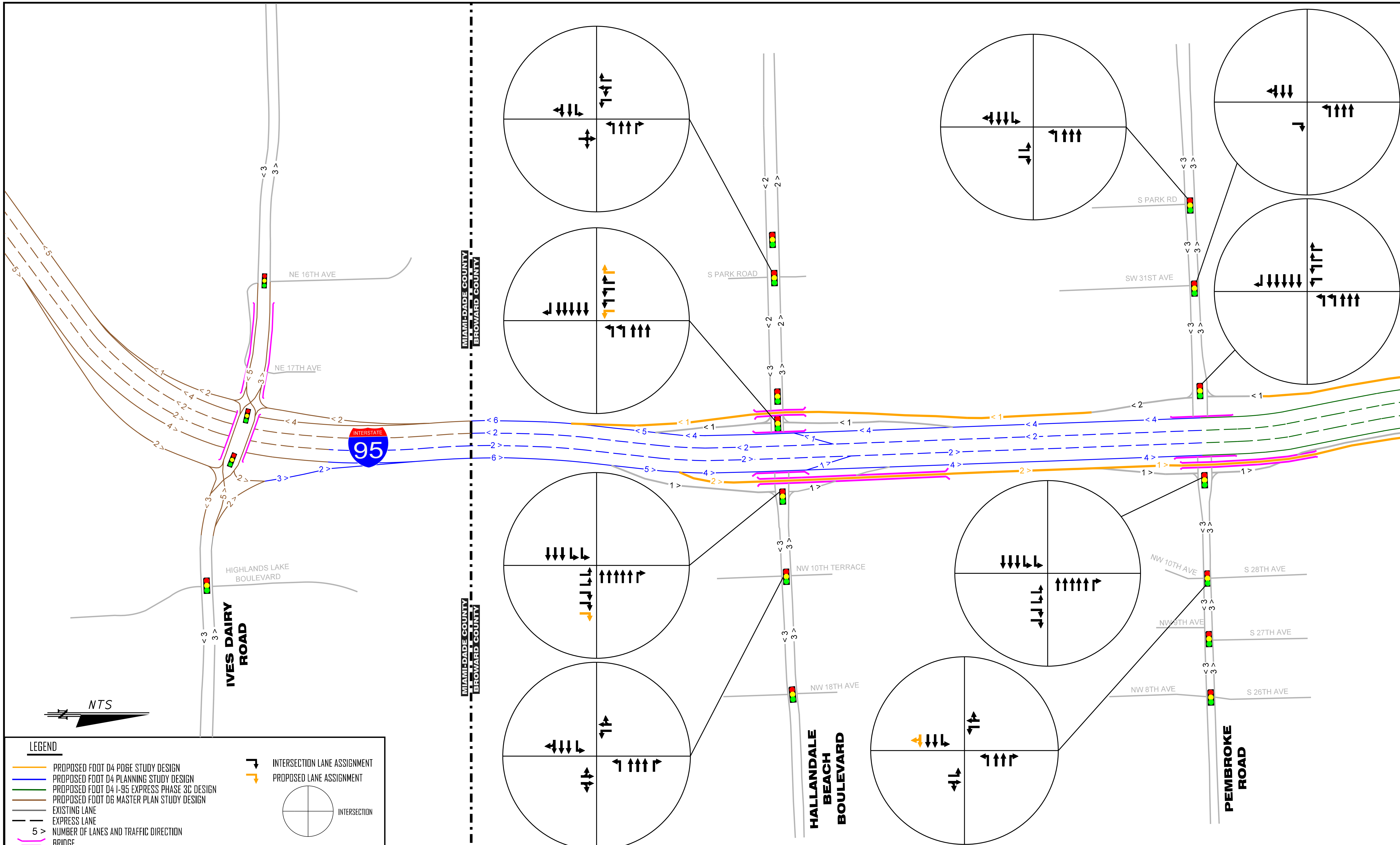
1. Within the Hallandale Beach Boulevard Interchange – Northbound Ingress and Southbound Egress
2. Within the Hollywood Boulevard Interchange – Northbound Egress and Southbound Ingress

6.1.8 Intersection and Interchange Concepts

The preferred alternative is proposing interchange, ramp and intersection improvements to support the optimal operations of the corridor. ***Figure 6.5*** depicts all the improvements proposed by the preferred alternative. ***Appendix J*** shows the 2045 Preferred Alternative Concept Plans.

The approach to evaluate the proposed interchange improvements is summarized below:

- Maintain the existing interchange configuration and interstate bridge structures by adding capacity to the ramps and ramp terminal intersections.
- Additional lane capacity was determined by incrementally increasing the number of lanes until the desired LOS was achieved. This process was limited based on impacts to right of way, adjacent properties and impacts to the existing interstate bridge structures.
- Maximum allowed number of intersections turn lanes were set to three left turn lanes and three right turn lanes.



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FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

OCTOBER 2020

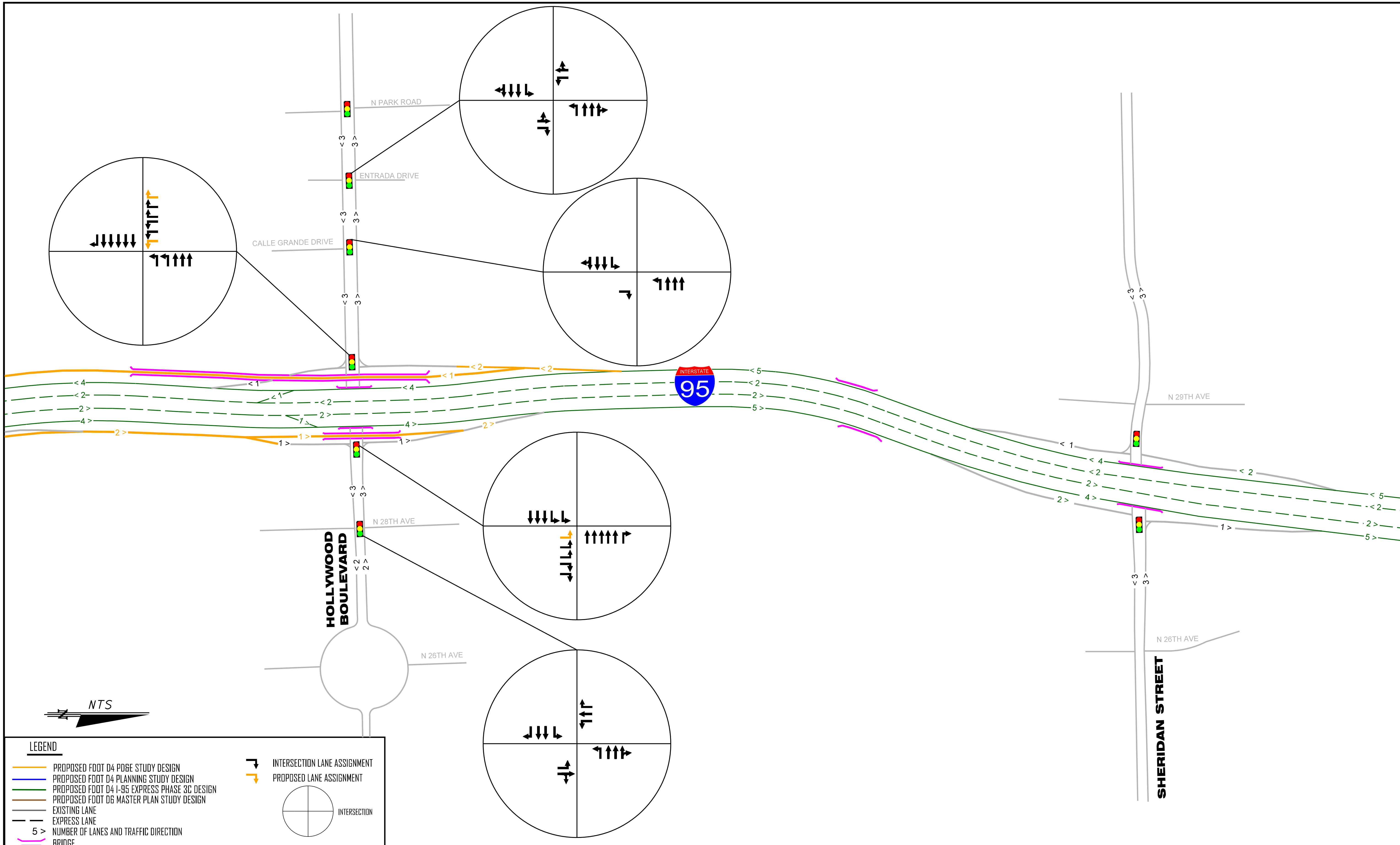
INTERSTATE 95

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
2045 PREFERRED ALTERNATIVE LINE DIAGRAM

FIGURE
6.5



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DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

OCTOBER 2020

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SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
2045 PREFERRED ALTERNATIVE LINE DIAGRAM

FIGURE
6.5

Below is a summary of the overall interchange ramps improvements:

- Hallandale Beach Boulevard
  - Northbound off-ramp terminal intersection widening to triple right-turn lanes
  - Southbound off-ramp terminal intersection widening to triple left-turn lanes and dual right-turn lanes
  - Westbound to northbound right-turn lane extension
  - Eastbound to southbound right-turn lane extension
- Pembroke Road
  - Westbound to northbound right-turn lane extension
  - Eastbound to southbound right-turn lane extension
  - Additional eastbound through right-turn shared at NW 10th Avenue
- Hollywood Boulevard
  - Northbound off-ramp terminal intersection widening to triple left-turn lanes
  - Southbound off-ramp terminal intersection widening to triple left-turn lanes and triple right-turn lanes

A Conceptual Signing Master Plan (CSMP) was developed to confirm that the proposed improvements signage approach is according to the current design guidelines. The plan depicts all the guide signs needed within the study limits for the preferred alternative design configuration. The CSMP is documented in the *Systems Interchange Modification Report*, a companion document to the PD&E Study.

6.1.9 Traffic Volumes and Operational Conditions

This section summarizes the operational analysis of the preferred alternative.

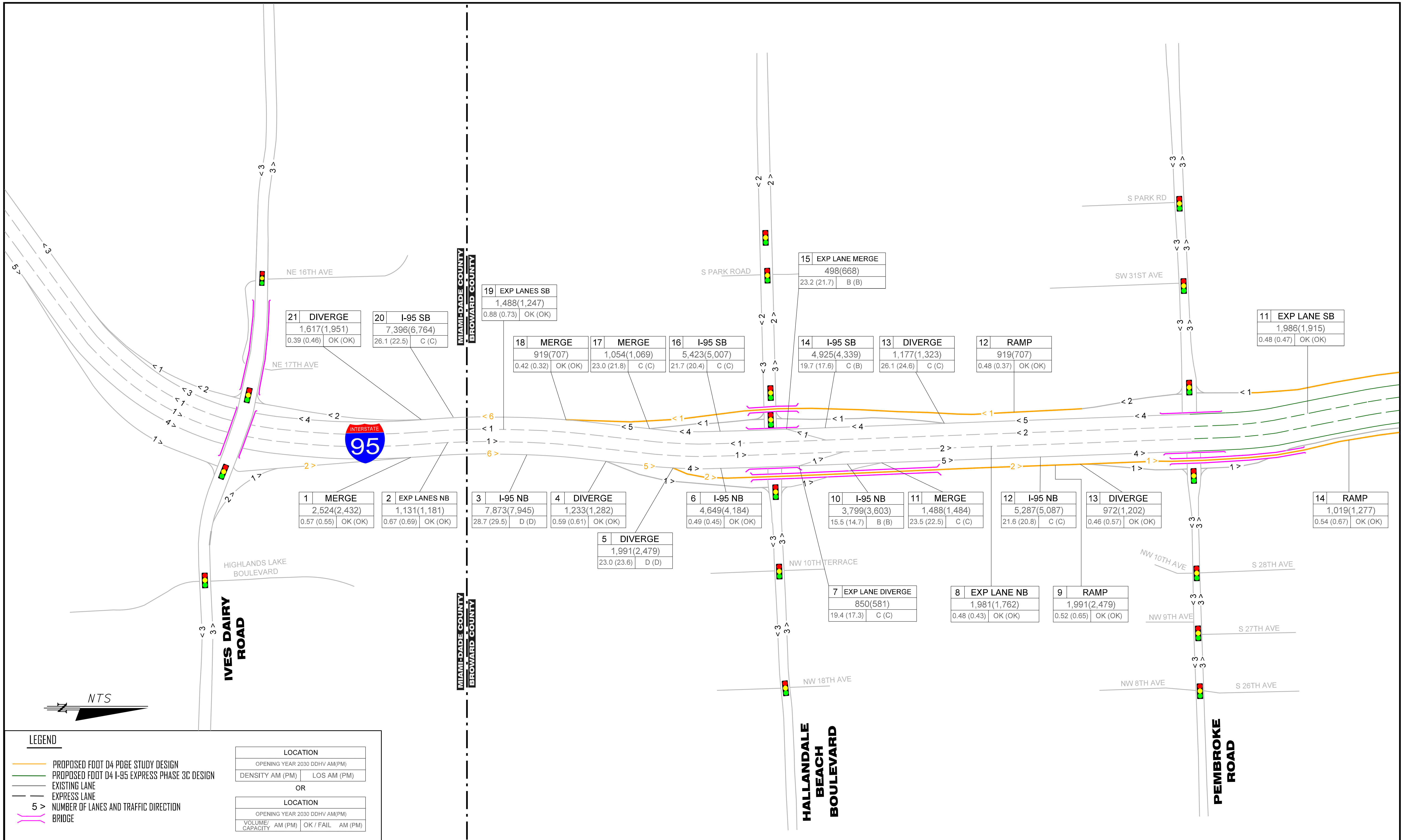
HCM Operational Analysis Results

2030 Preferred Alternative – The capacity analysis shows that all locations will operate at LOS D or better by the year 2030 within the area of influence.

2045 Preferred Alternative – The capacity analysis shows that two locations northbound and one location southbound will operate below LOS D (worst peak period LOS) by the year 2045 within the area of influence.

Figure 6.6 summarizes the 2030 results and ***Figure 6.7*** summarizes the 2045 results.

Intersection Analysis – An intersection analysis for ramp terminals and adjacent intersections was performed at all the interchanges. ***Figure 6.8*** summarizes the 2030 results and ***Figure 6.9*** summarizes the 2045 results.



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DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

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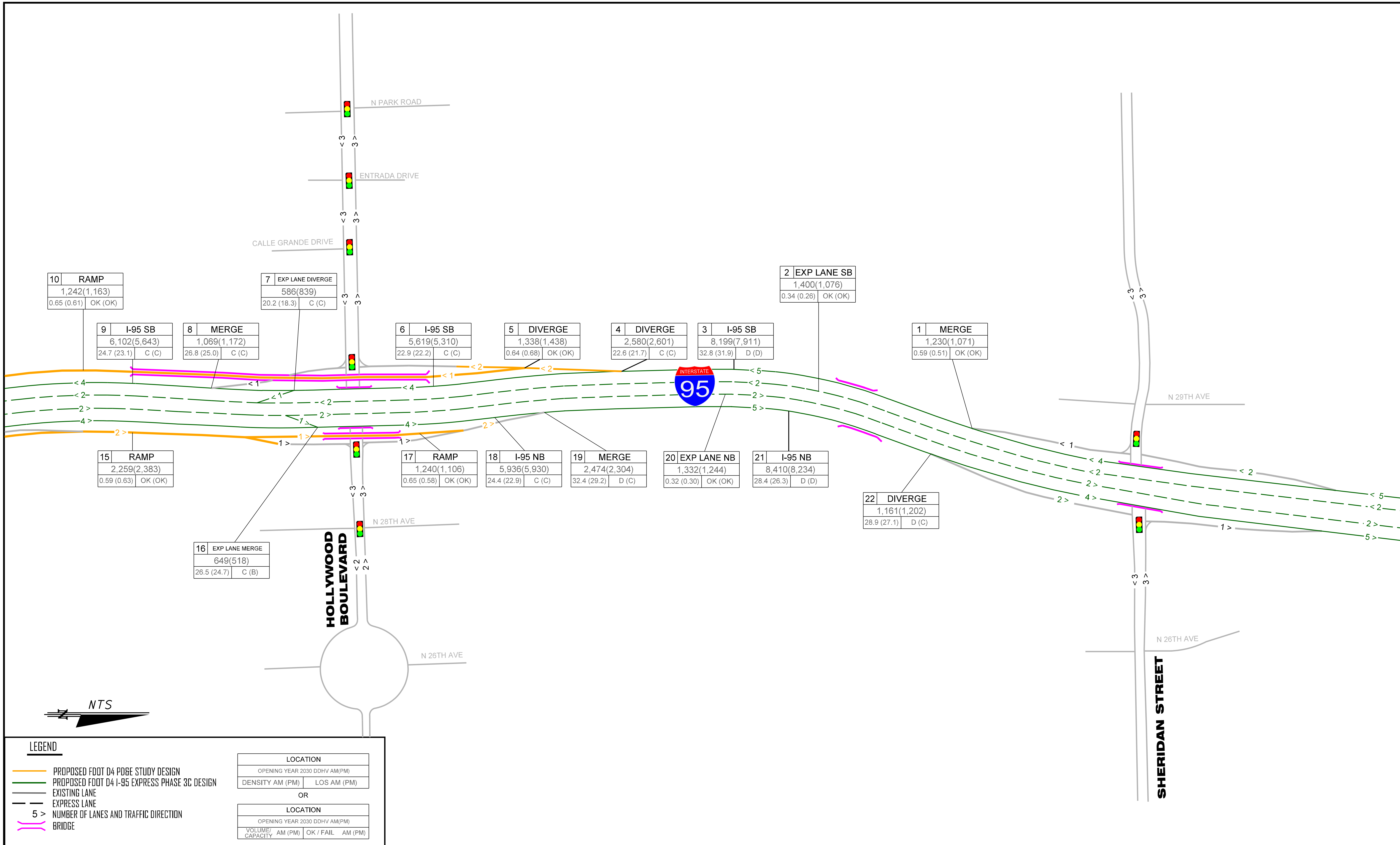
2030 OPENING YEAR PREFERRED ALTERNATIVE OPERATIONAL ANALYSIS RESULTS

FIGURE 6.6



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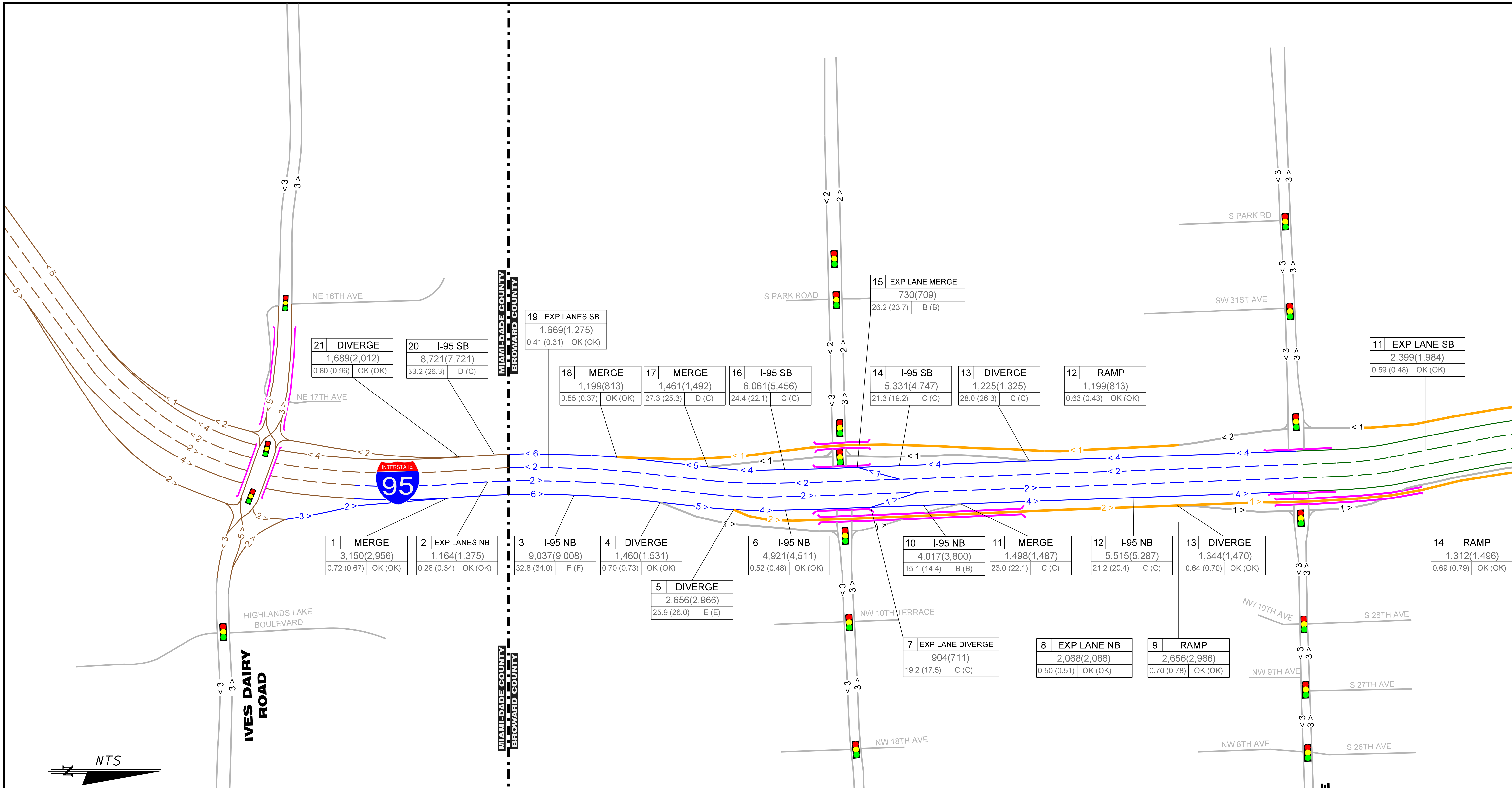
2030 OPENING YEAR PREFERRED ALTERNATIVE OPERATIONAL ANALYSIS RESULTS

FIGURE 6.6



LEGEND

- PROPOSED FDOT D4 PD&E STUDY DESIGN
- PROPOSED FDOT D4 PLANNING STUDY DESIGN
- PROPOSED FDOT D4 I-95 EXPRESS PHASE 3C DESIGN
- PROPOSED FDOT D6 MASTER PLAN STUDY DESIGN
- EXISTING LANE
- EXPRESS LANE
- 5 > NUMBER OF LANES AND TRAFFIC DIRECTION
- BRIDGE

LOCATION	
DESIGN YEAR 2045 DDHV AM(PM)	
DENSITY AM (PM)	LOS AM (PM)

OR

LOCATION	
DESIGN YEAR 2045 DDHV AM(PM)	
VOLUME/CAPACITY AM (PM)	OK / FAIL AM (PM)

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FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

JANUARY 2021

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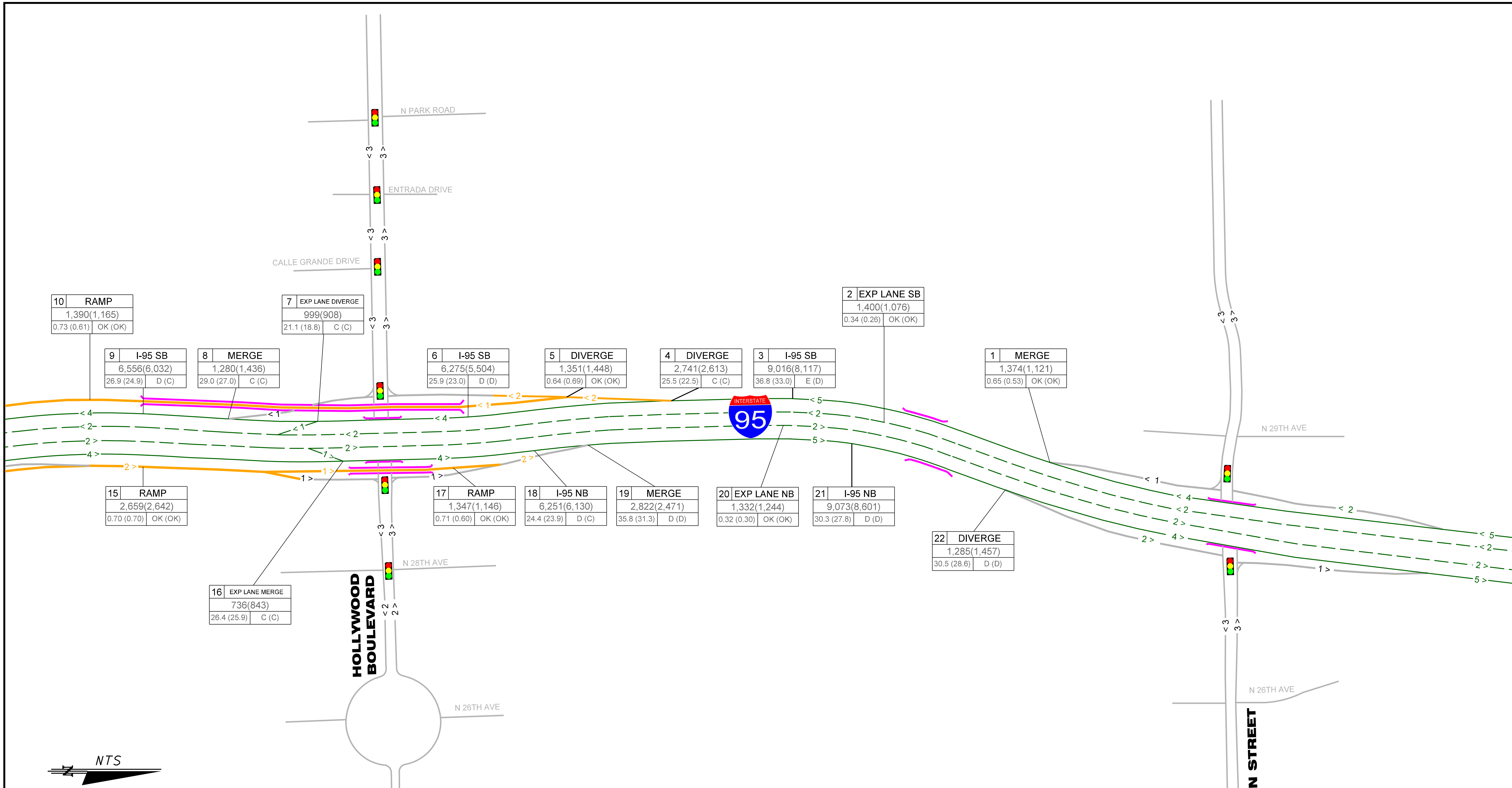
2045 DESIGN YEAR PREFERRED ALTERNATIVE OPERATIONAL ANALYSIS RESULTS

FIGURE 6.7



LEGEND

- PROPOSED FDOT D4 PD&E STUDY DESIGN
- PROPOSED FDOT D4 PLANNING STUDY DESIGN
- PROPOSED FDOT D4 I-95 EXPRESS PHASE 3C DESIGN
- PROPOSED FDOT D6 MASTER PLAN STUDY DESIGN
- EXISTING LANE
- EXPRESS LANE
- 5 > NUMBER OF LANES AND TRAFFIC DIRECTION
- BRIDGE

LOCATION	
DESIGN YEAR 2045 DDHV AM(PM)	
DENSITY AM (PM)	LOS AM (PM)

OR

LOCATION			
DESIGN YEAR 2045 DDHV AM(PM)			
VOLUME/ CAPACITY	AM (PM)	OK / FAIL	AM (PM)

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DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
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JANUARY 2021

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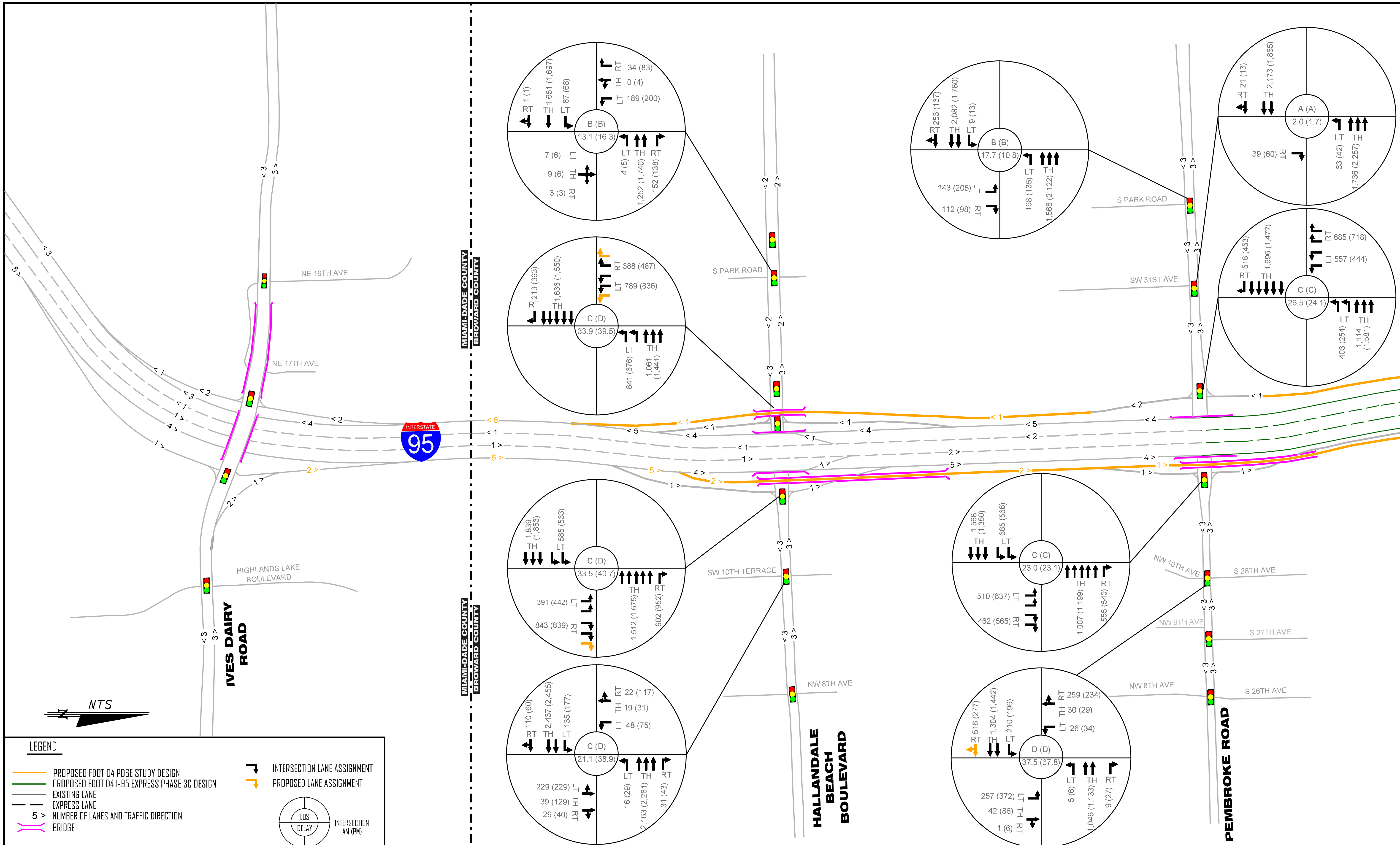
2045 DESIGN YEAR PREFERRED ALTERNATIVE OPERATIONAL ANALYSIS RESULTS

FIGURE 6.7



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3400 WEST COMMERCIAL BOULEVARD
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from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
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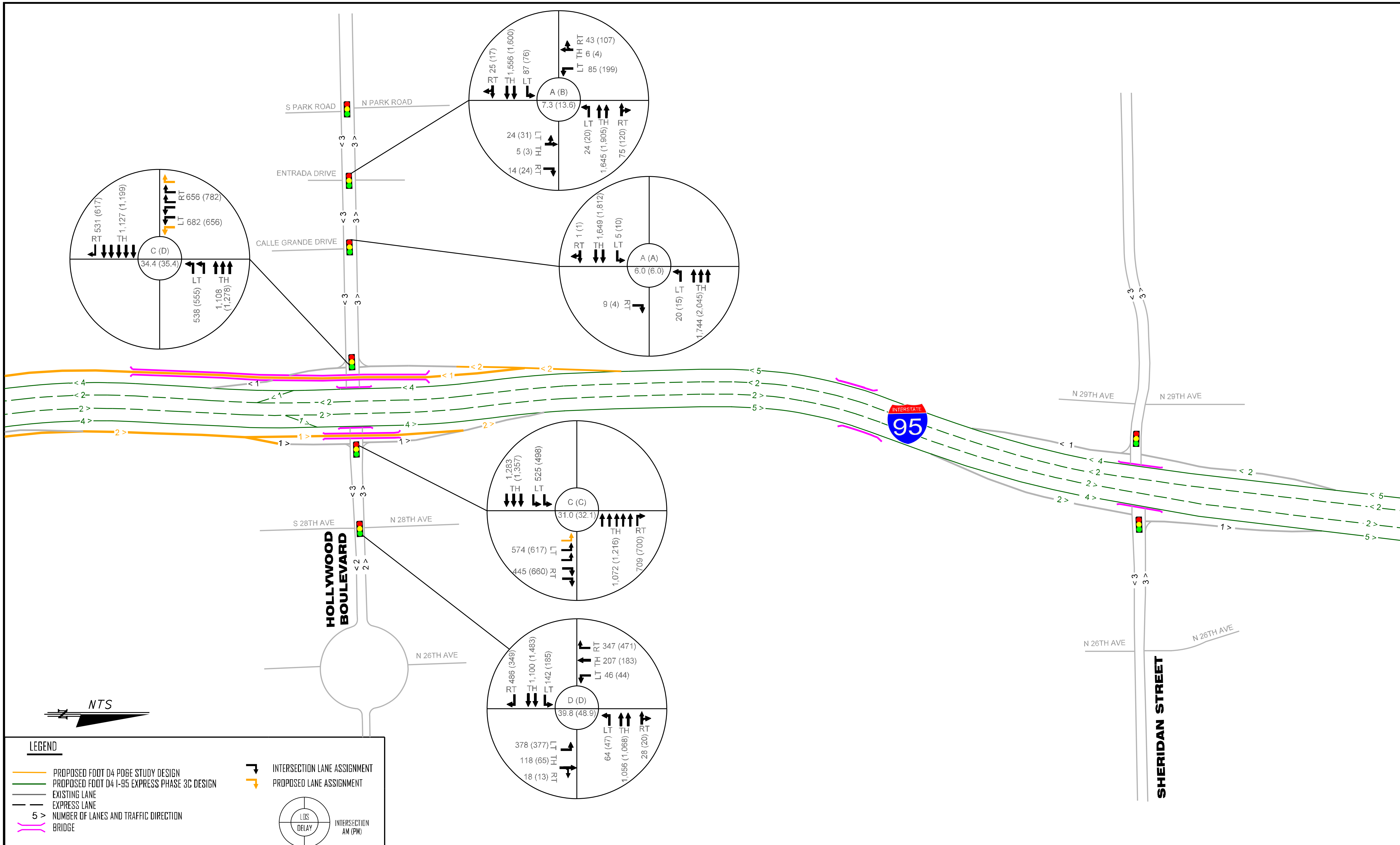
ETDM No.: 14254

2030 OPENING YEAR PREFERRED ALTERNATIVE INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE 6.8



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DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

JANUARY 2021

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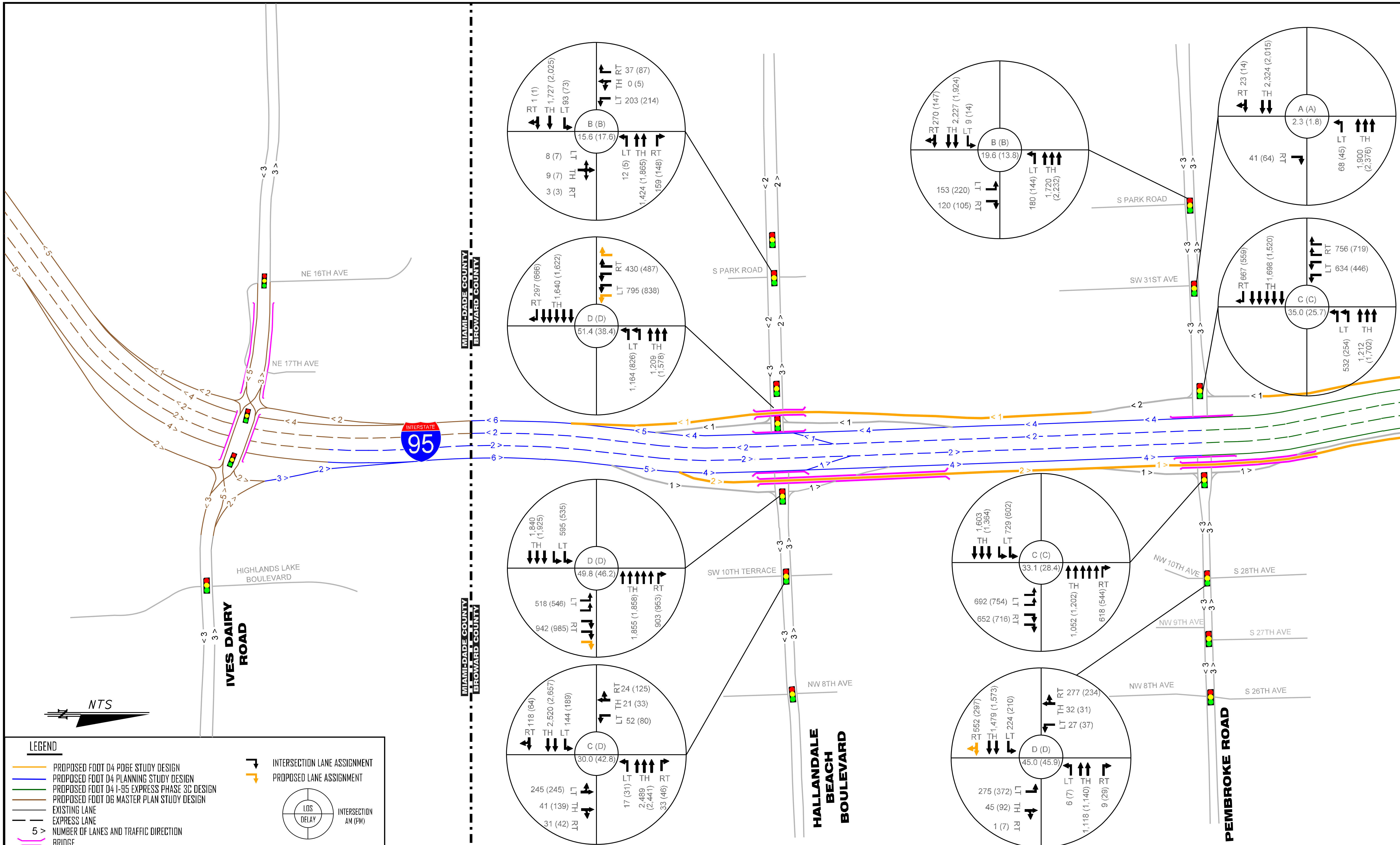
2030 OPENING YEAR PREFERRED ALTERNATIVE INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE 6.8



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DISTRICT FOUR
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FORT LAUDERDALE, FL 33309

JANUARY 2021

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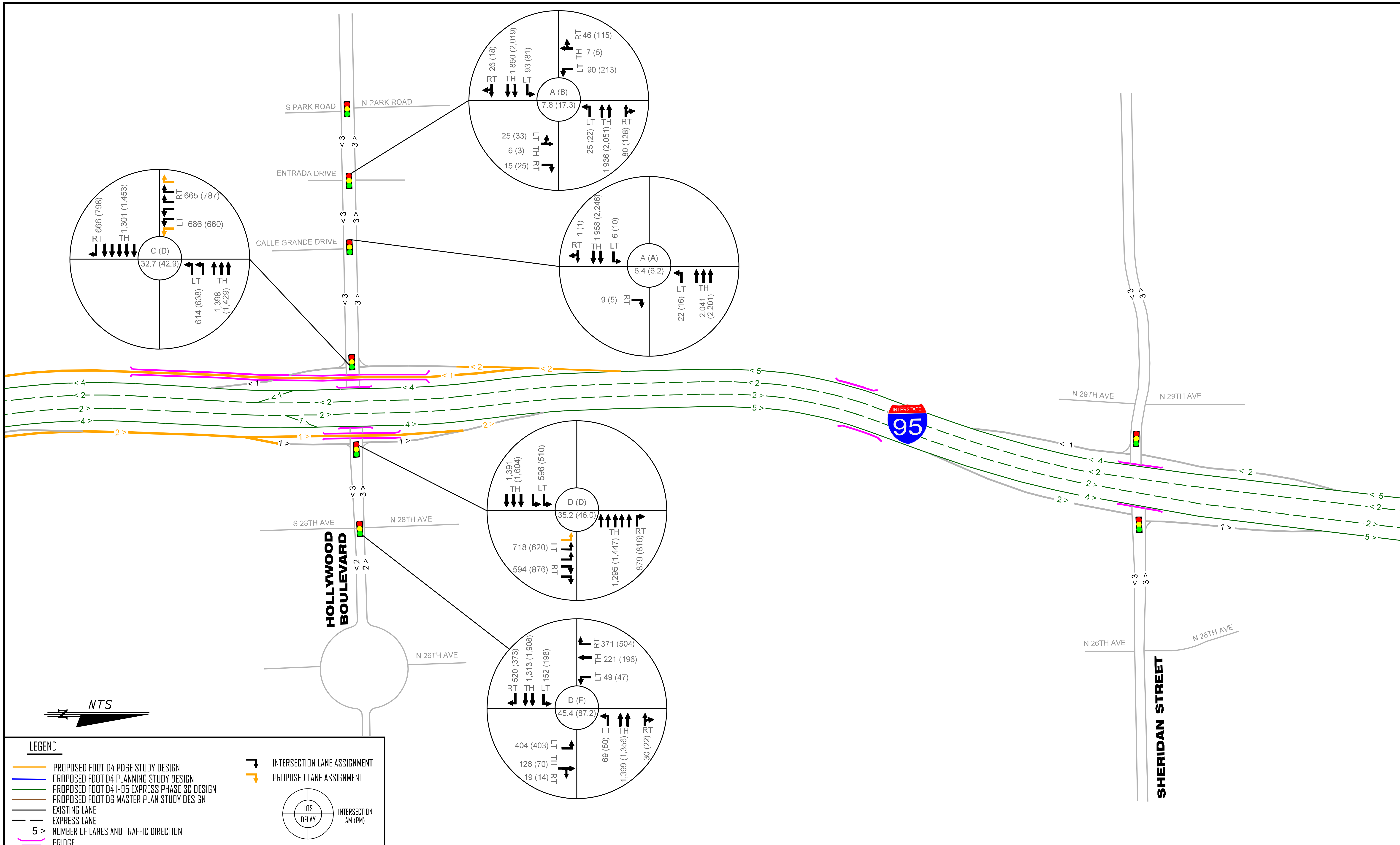
2045 DESIGN YEAR PREFERRED ALTERNATIVE INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE 6.9



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FORT LAUDERDALE, FL 33309

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2045 DESIGN YEAR PREFERRED ALTERNATIVE
INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE
6.9

Micro-Simulation Operational Analysis Results

The information presented in this section is a summary of the I-95 *Systems Interchange Modification Report* (SIMR), companion document to this study. The micro-simulation operational analysis conducted for the SIMR confirmed that the proposed I-95 interchange modifications will not have any significant adverse impacts on safety and operations along I-95. The proposed modifications will improve traffic operations and enhance safety. When compared with the No-Build Alternative, the preferred alternative significantly improves operations along I-95.

Figure 6.10 shows the 2045 preferred alternative results for the AM peak hour. These results show significant improvements over the No-Build Alternative due to the capacity improvements added to the study area. I-95 northbound operates at 57 mph or better for all four hours of simulation throughout the project area (see ***Figure 6.11***). The additional lane available within the northbound weave segment between Ives Dairy Road and Hallandale Beach Boulevard significantly improves operations at this location. The proposed northbound two-lane collector distributor roadway exit is approximately 1,000 feet downstream of the Hallandale Beach Boulevard off-ramp with a total of approximately 4,100 vehicles maneuvering to the right when combining with the Hallandale Beach Boulevard off-ramp volumes. The peak hour volume profile figure illustrates the impact of the proposed collector distributor roadway. When comparing the preferred alternative volume profile to the No-Build Alternative volume profile, a significant amount of traffic volume is removed from the I-95 mainline lanes by the collector distributor roadway. Within the collector distributor roadway influence area the No-Build volume profile ranges between a processed volume of 6,400 vph and 7,700 vph while the preferred alternative ranges between 4,000 vph and 6,000 vph. The additional left-turn lane and increased right-turn lane storage at the Hollywood Boulevard northbound off-ramp, in addition to the proposed collector distributor roadway, significantly reduces the risk of queue spillback from the ramp terminal intersection to the I-95 mainline. The proposed northbound collector distributor roadway shifts the reduced off-ramp queue off the mainline lanes. On average, the maximum queue from the Hollywood Boulevard northbound off-ramp did not exceed beyond the upstream Pembroke Road on-ramp merge on the collector distributor roadway.

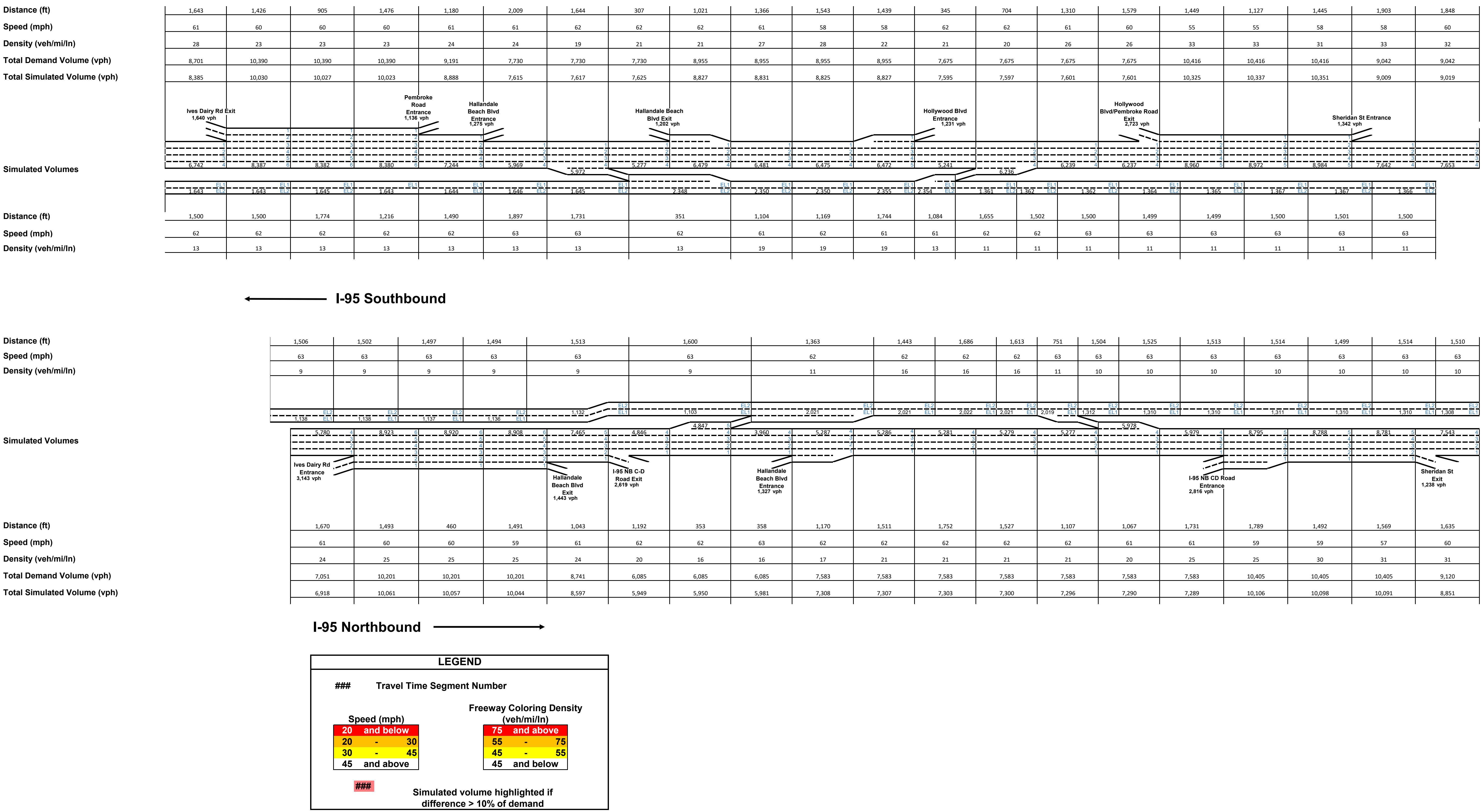


Figure 6.10 - Preferred Alternative AM Peak Lane Schematic Diagram

I-95 Northbound C-D Road →

Ramps:
- I-95 NB Entrance 2,621 vph
- Pembroke Rd Exit 1,329 vph
- Pembroke Rd Entrance 1,319 vph
- Hollywood Blvd Exit 1,284 vph
- Hollywood Blvd Entrance 1,484 vph
- I-95 NB Exit 2,804 vph

Simulated Volumes	2,621	2,617	1,288	1,288	1,287	2,606	1,322	1,320	2,804
Lanes	2	2	1	1	1	2	1	1	2
Distance (ft)	1,500	1,596	1,500	1,500	850	1,829	1,500	887	465
Speed (mph)	47	41	38	37	36	36	36	36	47
Density (veh/mi/ln)	28	32	34	35	36	36	37	37	30
Total Demand Volume (vph)	2,656	2,656	1,312	1,312	1,312	2,659	1,347	1,347	2,822
Total Simulated Volume (vph)	2,621	2,617	1,288	1,288	1,287	2,606	1,322	1,320	2,804

LEGEND

Travel Time Segment Number

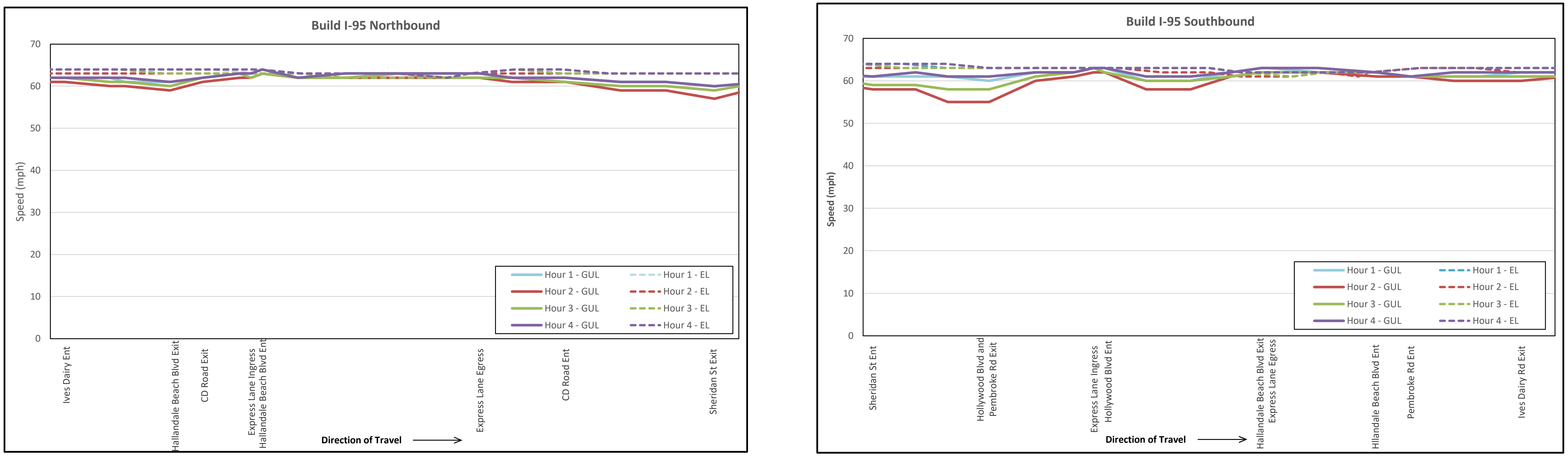
Speed (mph)	
25	and below
25 - 30	
30 - 35	
35	and above

Freeway Coloring Density (veh/mi/ln)	
75	and above
55 - 75	
45 - 55	
45	and below

Simulated volume highlighted if difference > 10% of demand

Figure 6.10 - Preferred Alternative AM Peak Lane Schematic Diagram

AM Peak Period Speed Profiles for I-95



AM Peak Period Volume Profiles for I-95

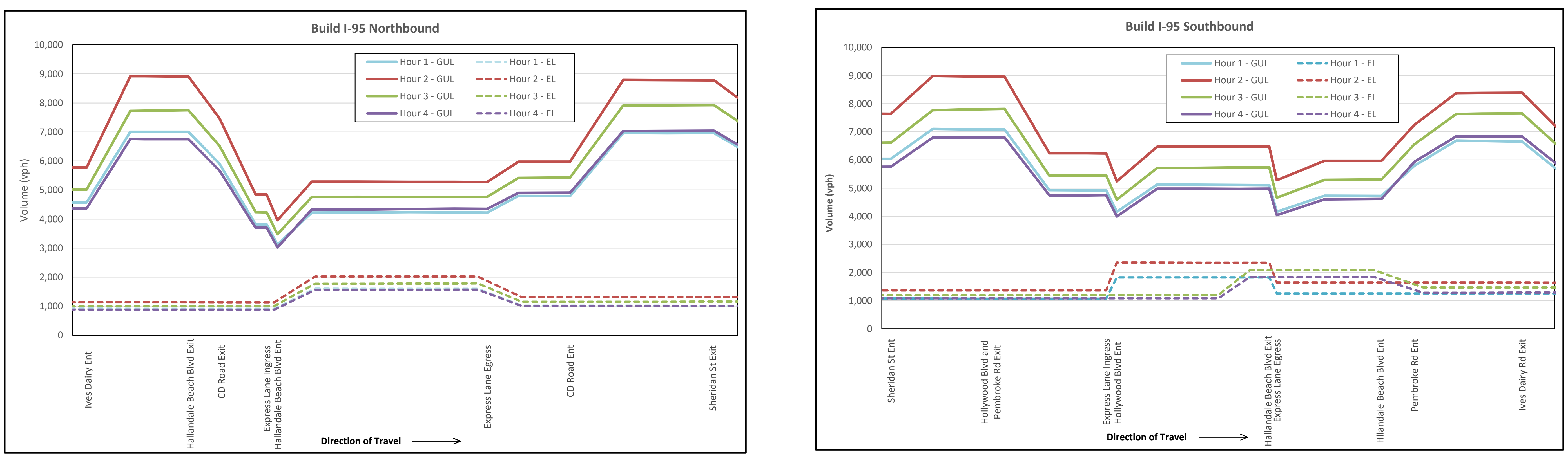


Figure 6.11 - Preferred Alternative AM Peak Speed and Volume Profiles

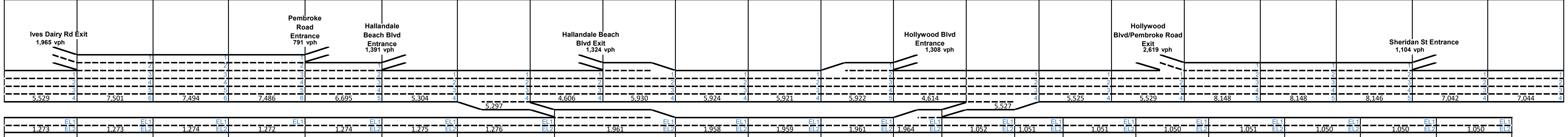
I-95 in the southbound direction operates at or near free-flow conditions throughout the project area. The weave segment upstream of the proposed Hollywood Boulevard and Pembroke Road combined off-ramp experiences speeds of 55 mph and greater in Hour 2. While the weave segment created by the Sheridan Street single lane on-ramp and Hollywood Boulevard/Pembroke Road two-lane off-ramp is approximately 4,000 feet in length, minor turbulence exists with over 2,700 vehicles staging to use the off-ramp. This location improves to a speed of 58 mph in Hour 3 and a speed of 61 mph in Hour 4. The proposed relocation of the Pembroke Road southbound on-ramp to south of the Hallandale Beach Boulevard on-ramp eliminated the turbulence experienced in the No-Build Alternative weave segment between the Pembroke Road on-ramp and Hallandale Beach Boulevard off-ramp.

Figure 6.12 shows the 2045 preferred alternative results for the PM peak hour. These results also show significant improvements over the No-Build Alternative. I-95 northbound operates at 56 mph or better throughout the project area for all four hours of simulation (see ***Figure 6.13***). Like the AM peak hour, the additional lane between Ives Dairy Road and Hallandale Beach Boulevard significantly improves operations at this location. The proposed northbound two-lane collector distributor roadway has a total of approximately 4,500 vehicles maneuvering to the right when combining with the Hallandale Beach Boulevard off-ramp volumes. The peak hour volume profile figure illustrates the impact of the proposed collector distributor roadway. When comparing the preferred alternative volume profile to the No-Build Alternative volume profile, a significant amount of traffic volume is removed from the I-95 mainline lanes by the collector distributor roadway. Within the collector distributor roadway influence area, the No-Build volume profile ranges between a processed volume of 6,100 vph and 7,800 vph while the preferred alternative ranges between 3,800 vph and 6,000 vph. The additional left-turn lane and increased right-turn lane storage at the Hollywood Boulevard northbound off-ramp significantly reduced the ramp queueing. The proposed northbound collector distributor roadway shifts the reduced off-ramp queue off the mainline lanes. On average, the maximum queue from the Hollywood Boulevard northbound off-ramp did not exceed beyond the upstream Pembroke Road on-ramp merge on the collector distributor roadway. In the southbound direction speeds of 59 mph or higher are observed for all four hours of simulation.

I-95 Southbound — General Purpose Lanes

Distance (ft)	1,643	1,426	905	1,476	1,180	2,009	1,644	307	1,021	1,366	1,543	1,439	345	704	1,310	1,579	1,449	1,127	1,445	1,903	1,848
Speed (mph)	62	62	61	61	61	61	62	62	62	61	59	59	62	63	62	61	59	60	61	60	60
Density (veh/mi/ln)	22	20	20	20	22	22	17	19	19	24	25	20	19	18	22	23	28	27	27	29	29
Total Demand Volume (vph)	6,984	8,996	8,996	8,996	8,183	6,691	6,691	6,691	8,016	8,016	8,016	8,016	6,580	6,580	6,580	6,580	9,193	9,193	9,193	8,072	8,072
Total Simulated Volume (vph)	6,802	8,774	8,768	8,758	7,969	6,579	6,573	6,567	7,891	7,882	7,880	7,883	6,578	6,579	6,576	6,579	9,199	9,199	9,196	8,092	8,094

Simulated Volumes



I-95 Southbound — Express Lanes

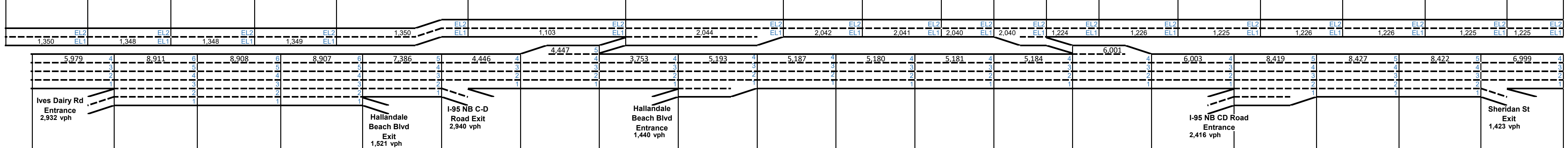
Distance (ft)	1,500	1,500	1,774	1,216	1,490	1,897	1,731	351	1,104	1,169	1,744	1,084	1,655	1,502	1,500	1,499	1,499	1,500	1,501	1,500
Speed (mph)	63	63	63	63	63	63	63	62	62	62	61	62	63	63	63	63	63	63	63	64
Density (veh/mi/ln)	10	10	10	10	10	10	10	11	16	16	16	11	8	8	8	8	8	8	8	8

I-95 Southbound

I-95 Northbound — Express Lanes

Distance (ft)	1,506	1,502	1,497	1,494	1,513	1,600	1,363	1,443	1,686	1,613	751	1,504	1,525	1,513	1,514	1,499	1,514	1,510
Speed (mph)	63	63	63	63	63	62	62	61	61	61	63	63	63	63	63	63	63	63
Density (veh/mi/ln)	11	11	11	11	11	11	11	17	17	17	11	10	10	10	10	10	10	10

Simulated Volumes



I-95 Northbound — General Purpose Lanes

Distance (ft)	1,670	1,493	460	1,491	1,043	1,192	353	358	1,170	1,511	1,752	1,527	1,107	1,067	1,731	1,789	1,492	1,569	1,635
Speed (mph)	61	59	57	56	60	62	62	63	62	62	62	62	62	61	61	59	59	58	60
Density (veh/mi/ln)	25	25	26	27	25	18	14	15	17	21	21	21	21	20	25	24	29	29	29
Total Demand Volume (vph)	7,428	10,384	10,384	10,384	8,853	5,887	5,887	5,887	7,374	7,374	7,374	7,374	7,374	7,374	7,374	9,845	9,845	9,845	8,388
Total Simulated Volume (vph)	7,329	10,259	10,256	10,256	8,736	5,549	5,550	5,797	7,237	7,229	7,221	7,221	7,224	7,225	7,228	9,645	9,653	9,647	8,224

I-95 Northbound

LEGEND

Travel Time Segment Number

Speed (mph)	Freeway Coloring Density (veh/mi/ln)
20 and below	75 and above
20 - 30	55 - 75
30 - 45	45 - 55
45 and above	45 and below

Simulated volume highlighted if difference > 10% of demand

Figure 6.12 - Preferred Alternative PM Peak Lane Schematic Diagram

I-95 Northbound C-D Road →

Simulated Volumes	2,944	2,938	1,497	1,497	1,494	2,618	1,130	1,133	2,392
Lanes	2 / 1	2 / 1	1	1	1	2 / 1	1	1	2 / 1
Distance (ft)	1,500	1,596	1,500	1,500	850	1,829	1,500	887	465
Speed (mph)	45	38	38	36	36	36	37	37	47
Density (veh/mi/ln)	33	39	39	42	42	36	31	31	25
Total Demand Volume (vph)	2,966	2,966	1,496	1,496	1,496	2,642	1,146	1,146	2,471
Total Simulated Volume (vph)	2,944	2,938	1,497	1,497	1,494	2,618	1,130	1,133	2,392

I-95 NB Entrance 2,944 vph

Pembroke Rd Exit 1,441 vph

Pembroke Rd Entrance 1,124 vph

Hollywood Blvd Exit 1,488 vph

Hollywood Blvd Entrance 1,259 vph

I-95 NB Exit 2,392 vph

LEGEND

Travel Time Segment Number

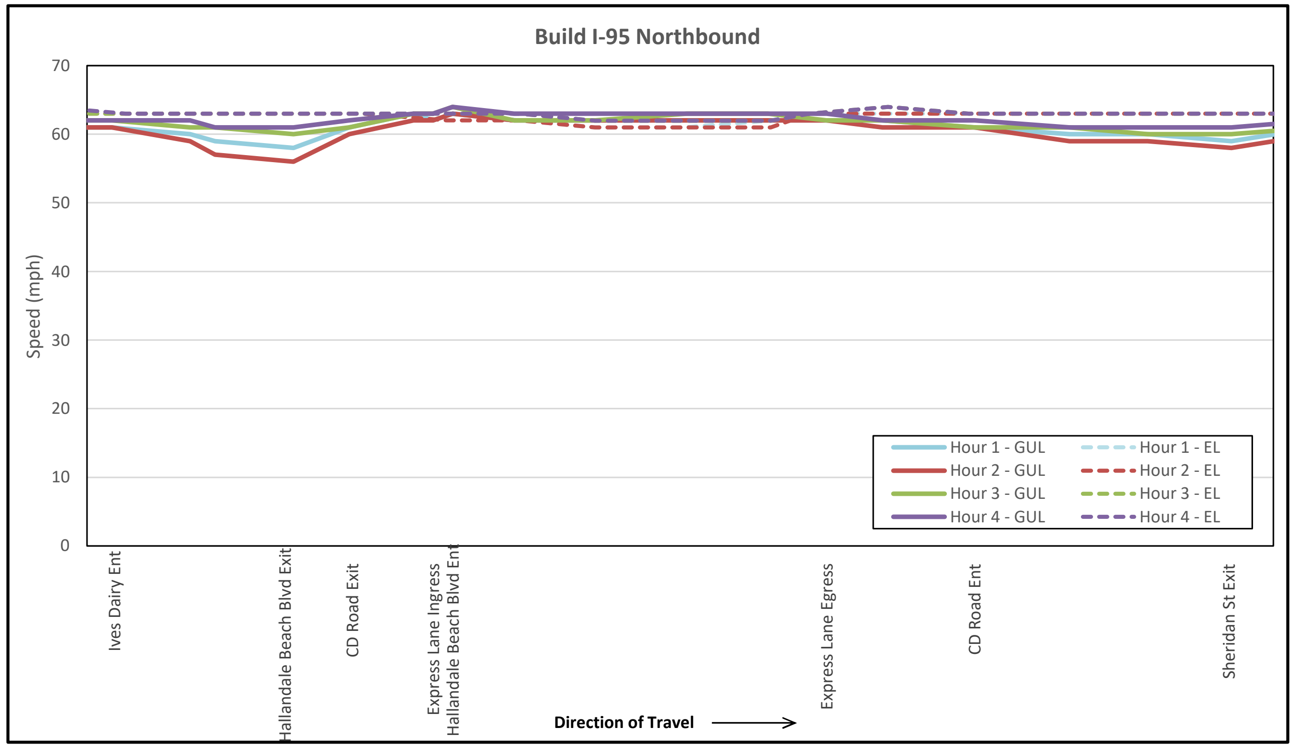
Speed (mph)		
25	and below	
25	-	30
30	-	35
35	and above	

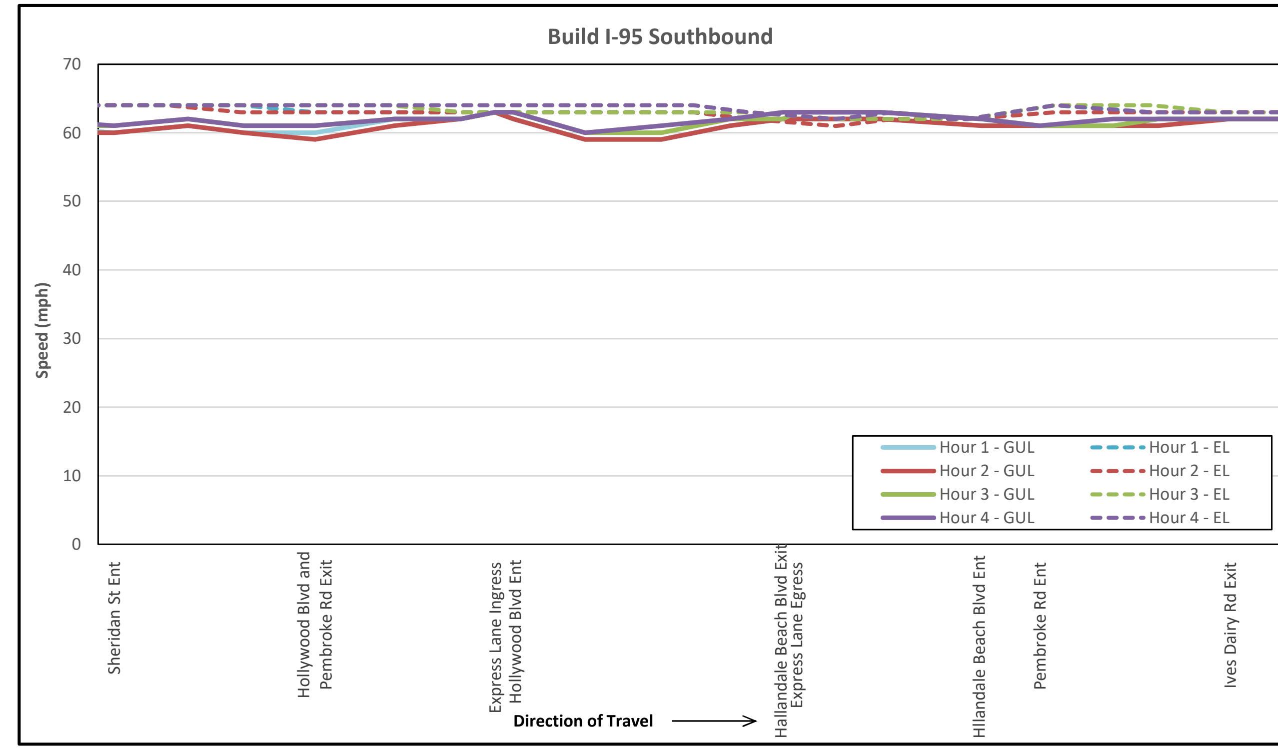
Freeway Coloring Density (veh/mi/ln)		
75	and above	
55	-	75
45	-	55
45	and below	

Simulated volume highlighted if difference > 10% of demand

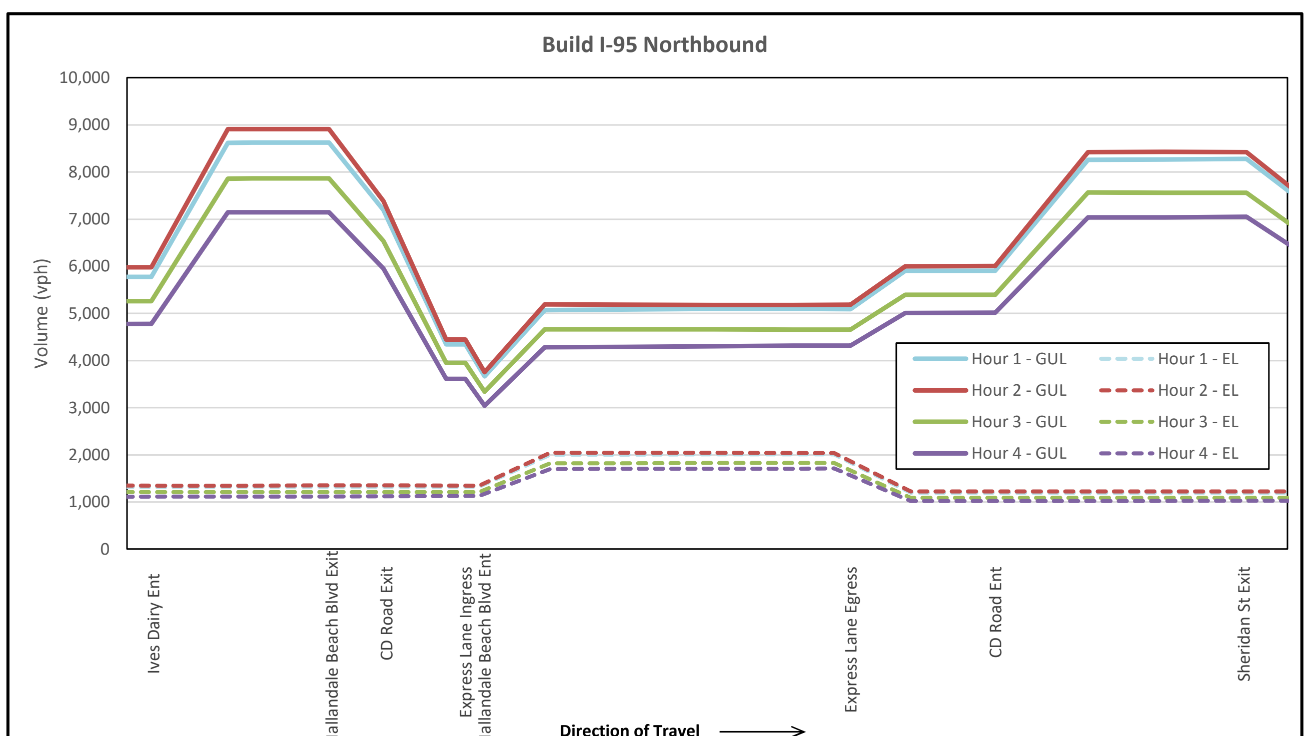
Figure 6.12 - Preferred Alternative PM Peak Lane Schematic Diagram

PM Peak Period Speed Profiles for I-95





PM Peak Period Volume Profiles for I-95



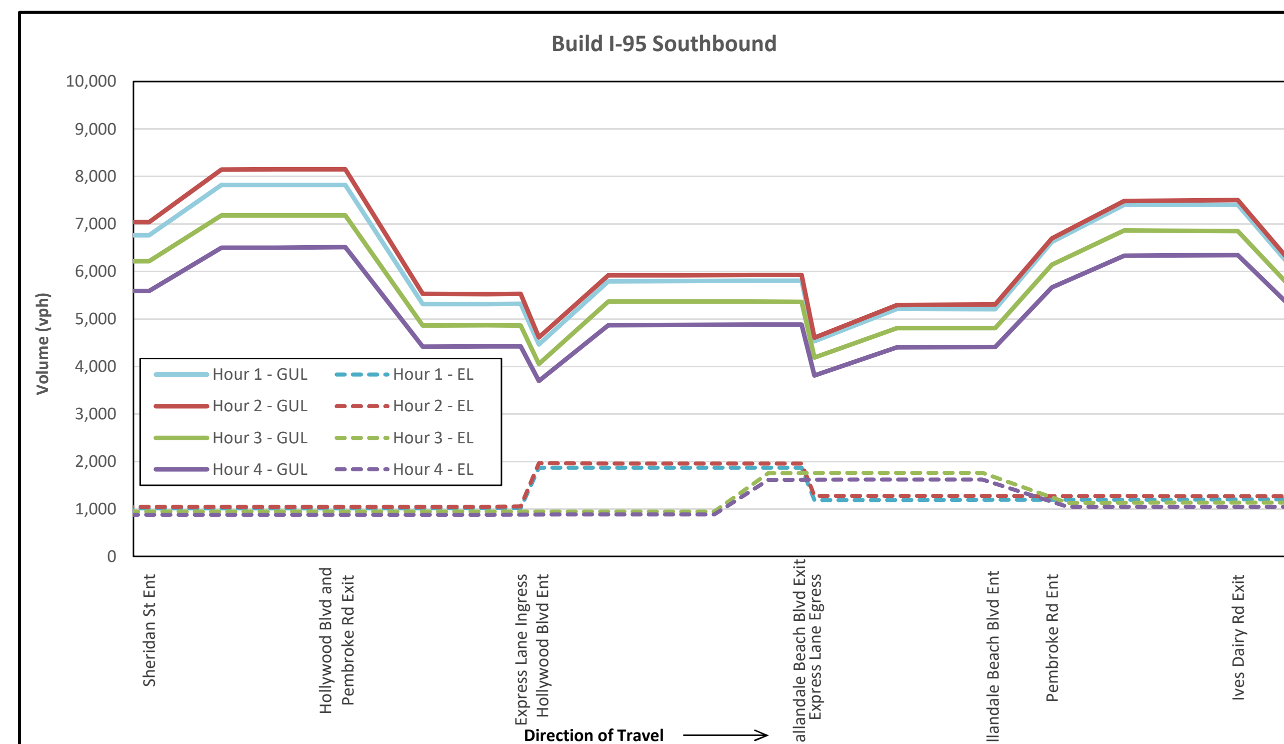


Figure 6.13 - Preferred Alternative AM Peak Speed and Volume Profiles

6.1.10 Intelligent Transportation System and TSM&O Strategies

The I-95 corridor within the project limits is currently monitored, analyzed, and managed from the FDOT District Four SunGuide® Transportation Management Center (TMC) using SunGuide® software to control and monitor ITS. ***Figure 6.14*** graphically shows the existing system within the study limits.

The ITS System was recently reconstructed within the project limits by the I-95 Express Phase 2 project (FPID# 422796-1-52-01 and 422796-2-52-01), which completed construction in 2016. The purpose of the Phase 2 project was to construct one to two express lanes in the northbound and southbound directions. The ITS scope included the installation of two 144 count single-mode (SM) fiber optic cable (FOC) backbones, replacement and installation of Microwave Vehicle Detection System (MVDS) approximately every 1/3 mile, replacement and installation of Closed Circuit Television (CCTV) Cameras for surveillance and dedicated use, relocation of existing Wireless Access Points (WAP), relocation of the existing Highway Advisory Radio (HAR) Beacons, removal of existing Voice over IP (VoIP) devices, replacement and installation of Dynamic Message Signs (DMS) for both general use lanes and express lanes, and installation of Lane Status DMS (LS-DMS), Toll Rate DMS (TR-DMS), and toll gantries for express lanes operation.

The ITS system along Hallandale Beach Boulevard includes an arterial DMS, MVDS, and CCTV in the eastbound direction east of Park Road. Along Pembroke Road there is an arterial DMS, MVDS, and CCTV in the westbound direction west of S 27th Avenue. Along Hollywood Boulevard there is an arterial DMS and WAP in the westbound direction east of N 28th Avenue.

In addition, I-95 Express Phase 3C is currently under construction, which will enhance the Phase 2 ITS by the replacement of the 144 SM FOC backbone, upgrade of CCTV cameras, addition of toll amount DMS, relocation of DMS, retrofit of existing TR-DMS, deployment of Ramp Signaling Systems (RSS) and rearrangement of MVDS spacing to approximately ¼ mile.

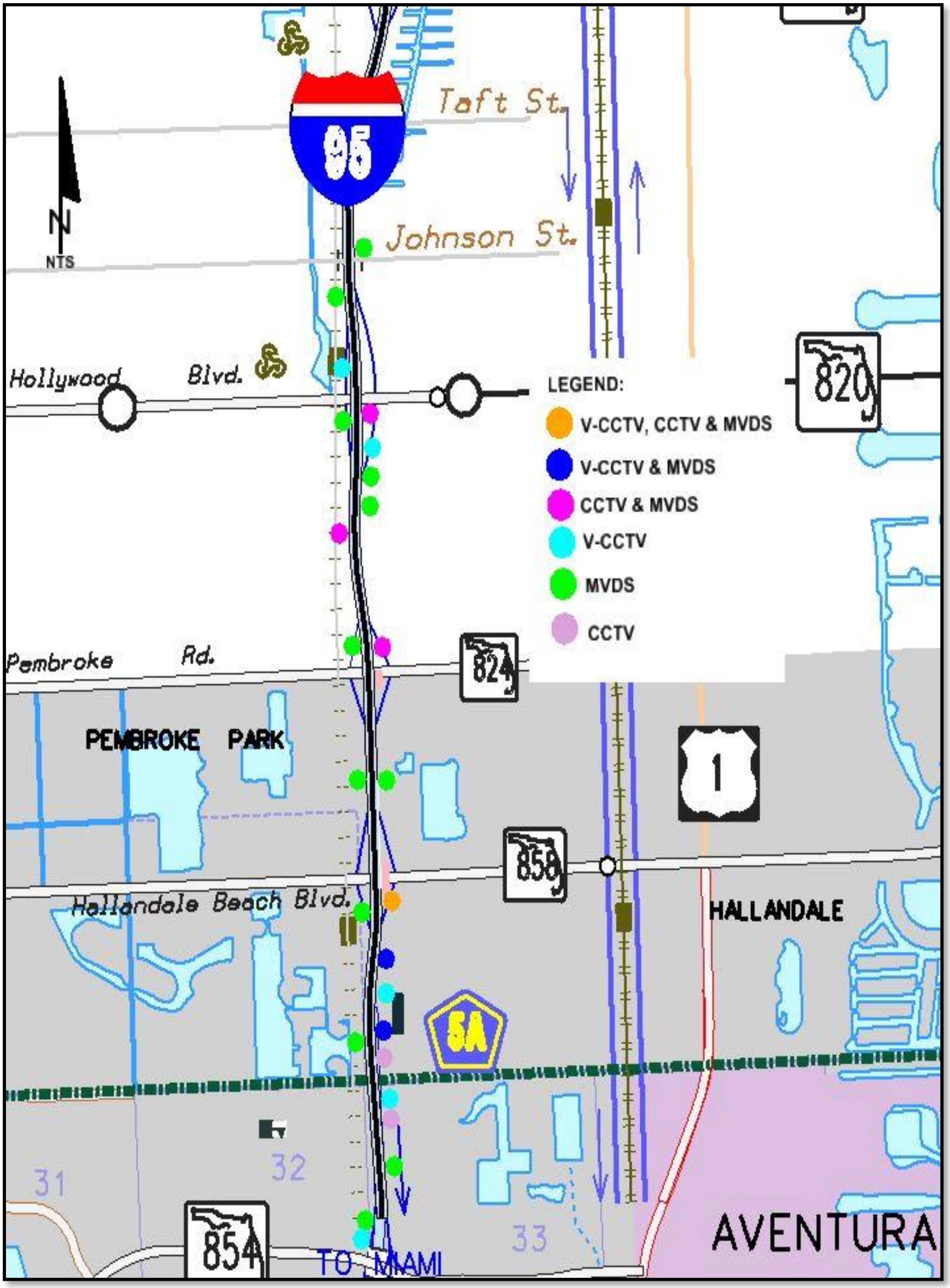


Figure 6.14 – High-Level Overview of the ITS System

Considering the Phase 3C project is currently working on the ITS, the PD&E Study will include those devices being installed in 3C as existing conditions. ***Appendix L*** summarizes the added ITS components by 3C within the study area.

Widening the corridor with the proposed improvements will impact the existing ITS infrastructure. Therefore, the existing infrastructure would have to be upgraded to accommodate the preferred alternative. The proposed ITS infrastructure would include new DMS, ADMS, LSDMS, DMS, CCTV, VCCTV, MVDS, RSS, fiber optic cable trunk line, drop cable system, power distribution system and ITS cabinets. The preferred alternative also proposes to relocate the toll building site located north of Pembroke Road from the east side to the west side to accommodate the new northbound two-lane collector distributor roadway.

A System Engineering document such as Concept of Operations, Project Systems Engineering Management Plan (PSEMP) and ITS functional requirements will be developed during the next phase of the project.

6.1.11 Utilities

Utility Agency Owners (UAOs) located in the vicinity of the I-95 were contacted and requested to provide information regarding their utility facilities within the project area. UAOs and contact information are provided in ***Table 6.6***.

Table 6.6 – UAO Contact List

Utility Company	Facility	Contact Information	
American Traffic Solutions	Not Available	Santiago Martinez 1150 North Alma School Road Mesa, AZ 85201	(480) 596-4595
AT&T Corporation (International)	Fiber Optic	Stefan Eriksson 6000 Metro West Blvd., Suite 201 Orlando, FL 32835	(407) 578-8000 seriksson@pea-inc.net
AT&T Corporation (Transmission)	Telephone	Stefan Eriksson 6000 Metro West Blvd., Suite 201 Orlando, FL 32835	(407) 578-8000 seriksson@pea-inc.net
AT&T Distribution	Telephone & Fiber	Keeve Otis 1120 South Rogers Circle Boca Raton, FL 33487	(305) 428-0510 ok1184@att.com
Broward County Traffic Engineering	Fiber Optic	Robert Blount 2300 West Commercial Boulevard Fort Lauderdale, FL 33309	(954) 847-2745 rblount@broward.org
Broward County Water and Wastewater Services	Water and Sewer	Halina Pluta 2555 West Copans Road Pompano Beach, FL 33069	(954) 831-0917 HPLUTA@broward.org

Table 6.6 – UAO Contact List (Continued)

Utility Company	Facility	Contact Information	
Century Link	Fiber Optic	Mike Fitzgerald Jack Brady 5908-A Hampton Oaks Parkway Tampa, FL 33610	(941) 661-7557 (786) 495-2170 mike.fitzgerald@centurylink.com jack.brady@centurylink.com
City of Hallandale Beach	Water and Sewer	Manga Ebbe 630 NW 2nd Street Hallandale Beach, FL 33009	(954) 457-3043 mebbe@hallandalebeachfl.gov
City of Hollywood Public Works Department	Water & Sewer	Raul Carbonell 7777 Glades Road Suite 410 Boca Raton, FL 33434	(561) 791-9280 rcarbonell@craigasmith.com
Comcast Cable	Cable TV	Christopher Taylor Leonard Maxwell-Newbold 2601 SW 145th Avenue Miramar, FL 33322	(954) 239-8386 (954) 447-8405 Cable-utilities@cwsifl.com Leonard_Maxwell-Newbold@cable.comcast.com
Crown Castle NG	Fiber Optic	Rebecca Caldwell 2000 Corporate Drive Canonsburg, PA 15317	(888) 632-0931 fiber.dig@crowncastle.com
Fiberlight LLC.	Not Available	Troy Gaeta 11700 Great Oaks Way Suite 100 Alpharetta, Ga 33022	(954) 213-3367 troy.gaeta@fiberlight.com
Fibernet Direct	Fiber	Danny Haskett Crown Castle Office 1601 NW 136th Avenue Suite A-200 Sunrise, FL 33323	(786) 246-7827 danny.haskett@fibernetdirect.com

Table 6.6 – UAO Contact List (Continued)

Utility Company	Facility	Contact Information	
Florida City Gas	Gas	Oscar Paez 4045 NW 97th Avenue Doral, FL 33178	(305) 835-3622 fcgeng@aglresources.com opaez@southernco.com
Florida Department of Transportation District 4 - ITS	Fiber Optic	Maria Rosado 2300 West Commercial Boulevard Fort Lauderdale, FL 33309	(954) 847-2690 mrosado@smartsunguide.com
Florida Department of Transportation - Eland Engineering	Fiber Optic	Chris Beaudry/April Rizzo 3323 West Commercial Boulevard Fort Lauderdale, FL 33309	(954) 847-1996 chris.beaudry@dot.state.fl.us april.rizzo@dot.state.fl.us
Florida Power & Light	Electric	Byron Sample 10705 Quail Roost Drive Miami, FL 33157	(386) 586-6403 Byron.A.Sample@fpl.com
HEICO Corporation	Fiber Optic	Joe Asher 3000 Taft Street Hollywood, FL 33021	(954) 984-4000 jasher@heico.com
Level 3 Communications	Fiber Optic	Network Relations 1025 El Dorado Boulevard Broomfield, CO 80021	(877) 366-8344 Ext. 2 level3.networkrelocations@level3.com
MCI	Communications / Fiber Optic	Todd Mars 16563 NW 15th Ave Miami, FL 33169	(786) 886-4238 todd.mars@one.verizon.com
Miami-Dade County Public Works and Traffic	Not Available	Octavio Vidal 13284 SW 120th Street Miami, FL 33186	(305) 412-0891 Ext. 201 ovidal@htlocating.com

Table 6.6 – UAO Contact List (Continued)

Utility Company	Facility	Contact Information	
Miami-Dade County Water & Sewer	Water and Sewer	Sergio Garcia 3575 South Lejeune Road Miami, FL 33146	(786) 268-5320 sergio.garcia@miamidade.gov
Sprint	Fiber Optic	Mark Caldwell 851 Rafalgar Court Suite 300 Maitland, FL 32751	(321) 287-9942 mark.d.caldwell@sprint.com
TECO People Gas South Florida	Gas	David Rivera 5101 NW 21st Avenue Suite 460 Fort Lauderdale, FL 33309	(954) 453-0794 drrivera@tecoenergy.com
Town of Davie – Utilities Department	Water and Sewer	Laura Borgesi 6591 Orange Drive Davie, FL 33314	(954) 797-1096 laura_borgesi@davie-fl.gov
Town of Pembroke Park	Sanitary, Sewer Storm	Raul Carbonell Craig A. Smith and Associates 7777 Glades Road Suite 410 Boca Raton, FL 33434	(561) 791-9280 rcarbonell@craigasmith.com
Windstream Communications	Fiber Optic	David F. Ackerman 929 Marthas Way Hiawatha, IA 52233	(800) 289-1901 David.F.Ackerman@Windstream.com
XO Communications	Fiber Optic	Tony Kowaleski 16563 NW 15th Avenue Miami, FL 33169	(305) 356-3160 anthony.kowaleski@xo.com

Notes: The UAO contact list was developed based on letters sent to each UAO or via responses received from the UAO within the I-95 corridor.

The following is a summary of potential conflicts with the existing utility facilities within the study area. The crossing roadways and distances described below are approximate locations.

American Traffic Solutions

The location of the facilities was not provided by American Traffic Solution at this phase. Potential impacts (if any) are to be coordinated with American Traffic Solutions in future phases of the project.

AT&T Corporation (International)

Potential impacts to buried fiber optic were identified at the north side of Hallandale Beach Boulevard between South Park Road and NW 10th Terrace.

AT&T Distribution

Potential impacts to aerial and buried fiber optic were identified at the following locations:

- South side of Hallandale Beach Boulevard between South Park Road and Ansin Boulevard: ducts with copper, PVC, and flexible pipelines underground.
- North side of Hallandale Beach Boulevard between South Park Road and SW 31st. Avenue: overhead lines.
- North side of Pembroke Road between the I-95 southbound off-ramp and NW 10th Avenue: ducts with coper and flexible pipe underground and overhead lines.
- South side of Pembroke Road underneath I-95: underground.
- South side of Pembroke Road between South Park Road and SW 31st Avenue: underground.

Broward County Traffic Engineering

Potential impacts to buried fiber optic were identified at the following location:

- Buried Underground Fiber – from Hallandale Beach Boulevard to Johnson Street running along the east side of I-95.

Broward County Water and Wastewater Services
Potential impacts were identified at the following locations:

- Along Hallandale Beach Boulevard, 6" CIP water main, 8" water main and 18" water main casing within CSX railroad right of way running on the north side of the road, 8" CAP water main on the south side of the road west of I-95.
- Along Pembroke Road, 12" water main, valves, and manholes from South Park Road to west of I-95.

Century Link
Potential impacts were identified at the following locations:

- North side of Hallandale Beach Boulevard from South Park Road to NW 10th Terrace: fiber optic underground.
- North side of Pembroke Road from South Park Road to east of I-95: fiber optic underground.

City of Hallandale Beach
No impacts.

City of Hollywood Public Works Department
No impacts.

Comcast Cable
Potential impacts were identified at the following locations:

- I-95 at the Miami-Dade/Broward County line: underground crossing
- Along the Hallandale Beach Boulevard north side of the road: aerial
- Hallandale Beach Boulevard at CSX railroad and I-95: underground crossing
- Hallandale Beach Boulevard: aerial crossing at Bryan Road
- Hallandale Beach Boulevard: underground crossing at SW 30th Avenue
- Along the west side of I-95 limited access right of way line south of Pembroke Road: aerial.

Crown Castle NG
Potential impacts were identified at the following locations:

- North side of Hallandale Beach Boulevard from west of SW 40th Avenue to east of Dixie Highway: buried

Fiberlight LLC.
The location of the facilities was not provided by Fiberlight LLC at this phase. Potential impacts (if any) are to be coordinated with Fiberlight LLC in future phases of the project.

Florida City Gas
Potential impacts were identified at the following location:

- Hallandale Beach Boulevard from South Park Road to SW 31st Avenue north side: 4" steel gas main

Fibernet Direct
Potential impacts were identified at the following locations:

- Buried Underground Fiber – Within the existing I-95 right of way (west side), from north of the I-95 southbound off-ramp to Ives Dairy Road to Hallandale Beach Boulevard and from I-95 southbound off-ramp to Hallandale Beach Boulevard to I-95 northbound off-ramp to Pembroke Road
- Buried Underground Fiber – west of the I-95 right of way (west side), from north of the off-ramp to Ives Dairy Road to Hallandale Beach Boulevard
- Buried Underground Fiber – in the vicinity of the existing I-95 right of way (east side), from the I-95 northbound off-ramp to Pembroke Road to the ramp terminal
- Along Hallandale Beach Boulevard on the south side from west of the I-95 southbound on-ramp ramp terminal to Ansin Boulevard: buried
- Hallandale Beach Boulevard at Ansin Boulevard crossing: buried
- Along Pembroke Road on the south side from SW 31st Avenue to east of NW 8th Avenue: buried

Florida Department of Transportation – ITS

Potential impacts were identified at the following locations:

- Along I-95 northbound on the east side from Miami-Dade County/Broward County line to north of Johnson Street
- Along Hallandale Beach Boulevard on the south side from S. Park Rd. to Ansin Blvd.
- Along Pembroke Road on the south side from S. Park Rd. to NW 9th Ave.
- Along Hollywood Boulevard from CSX Crossing to east of I-95 NB off-ramp.

Florida Power & Light

Potential impacts were identified at the following locations:

- Miami-Dade/Broward County Line – overhead 13K power line
- Hallandale Beach Boulevard – overhead 13k power line
- Pembroke Road – overhead 13k power line
- Washington Street crossing I-95 – overhead 13k power line

Level 3 Communications

Potential impacts were identified at the following locations:

- North side of Hallandale Beach Boulevard – fiber optic underground
- North side of Pembroke Road – fiber optic underground

MCI

According to the review conducted by MCI/Verizon, the UAO does have existing facilities within the limits of this project. The location of their facilities is within CSX railway right of way. Potential impacts within these areas are to be coordinated with MCI.

Miami-Dade County Public Works and Traffic

The location of the facilities was not provided by Miami-Dade Public Works and Traffic at this phase. Potential impacts to street lighting and traffic signals (if any) are to be coordinated with Miami-Dade County Public Works and Traffic in future phases of the project.

Sprint
The location of the facilities was not provided by Sprint at this phase. Potential impacts (if any) are to be coordinated with Sprint in future phases of the project.

Windstream Communications
Potential impacts were identified at the following location:

- South side of Hallandale Beach Boulevard from 1st St. to Ansin Blvd.

XO Communications
According to the review conducted by the XO Communications, the UAO does have existing facilities within the limits of this project. Fibernet Direct controls and maintains these area facilities. The location of XO Communications facilities was not provided by Fibernet Direct at this phase.

Coordination with the UAOs will continue during the Design phase. Further refinement of the proposed design and utility field verification (verified vertical and horizontal (VVH) data) will be performed during final design. Special construction equipment and techniques may be utilized to avoid utility conflicts.

The FDOT Utility coordinator is currently working with the UAOs to determine the following information:

- Costs associated with relocating utilities.
- If utilities are located in FDOT right of way by permit or easement.

6.1.12 Drainage and Stormwater Facilities

The agencies with stormwater permitting jurisdiction over the proposed study area and the required permits include:

- South Florida Water Management District (SFWMD) – General Environmental Resource Permit (ERP) and Consumptive Water Use Permit for dewatering and irrigation.
- United States Army Corps of Engineers – Dredge and fill permits are required for proposed work in, under or above surface waters or wetlands.

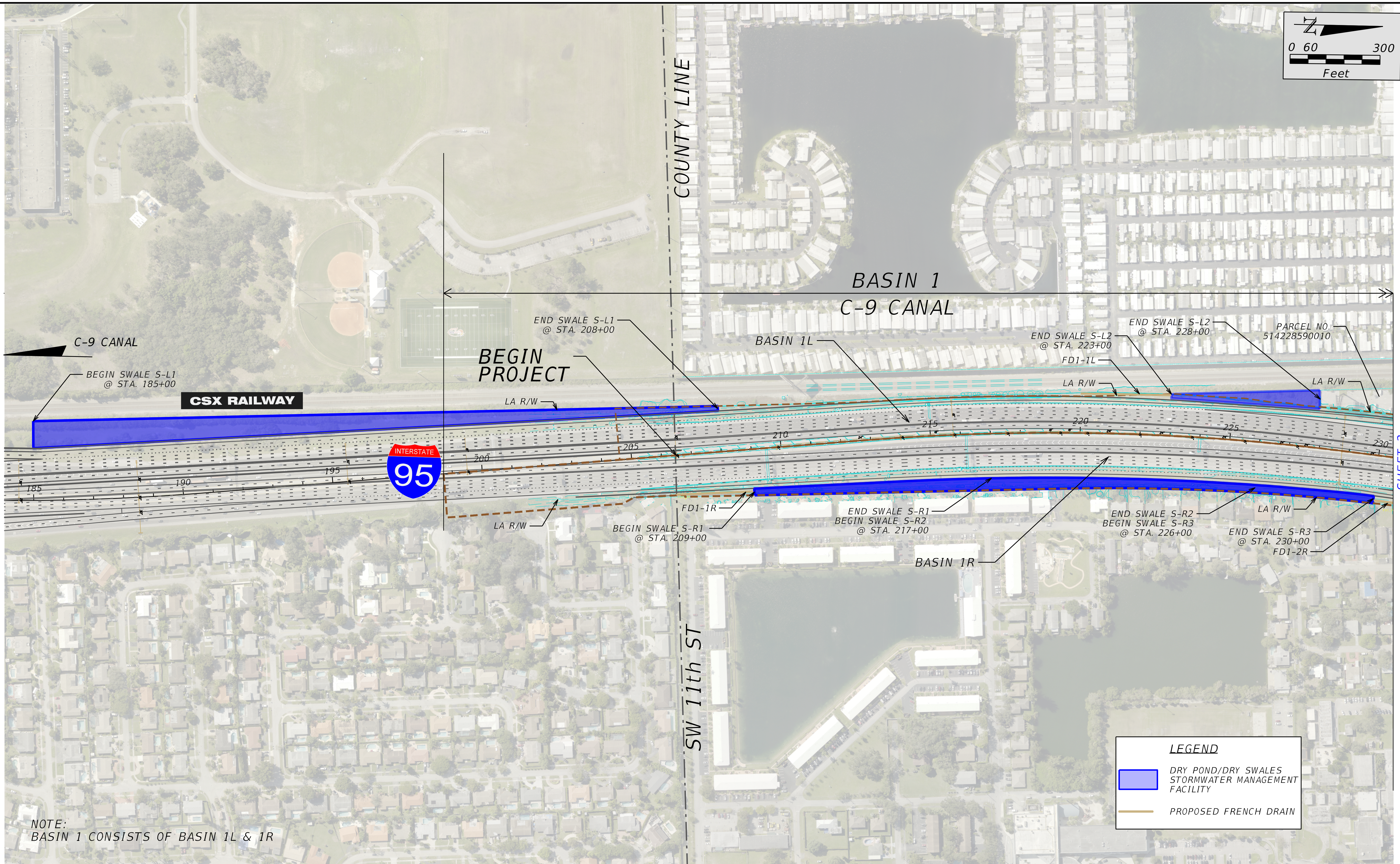
- Florida Department of Environmental protection – An NPDES (Erosion Control Plans, Stormwater Pollution Prevention Plan, Notice of Intent and Notice of Termination) Permit is required due to the disturbance of more than one acre of soil.

SFWMD has established several criteria for water quality, depending on the proposed type of stormwater treatment facility. All proposed stormwater management facilities will provide the necessary water quality treatment volume and limit the post-development peak discharge rate to the pre-development peak discharge rate. Water quality treatment and discharge attenuation will be provided via existing and proposed dry and wet detention/retention ponds, linear swales and French Drains. The proposed stormwater management facilities have been designed to maintain all offsite flows into FDOT right of way while maintaining maximum pre-development flood elevations.

Based on the conceptual drainage design evaluation for the proposed improvements, the stormwater management facilities will meet FDOT drainage criteria as well as SFWMD criteria. The improvements will have no negative drainage impacts to the surrounding areas and the proposed stormwater management facilities will have the capacity to adequately treat and attenuate roadway runoff within the project limits.

A description of the post development conditions at each system is summarized below. Additional details about the drainage features are documented in the *Conceptual Drainage Report*, dated June 2021, a companion document to this PD&E Study.

The proposed drainage system is primarily divided into four separate basins following existing drainage basins as identified in the latest I-95 improvement documents (FDOT project FPID# 422796-1-52-01 and 422796-2-52-01) as System 4, 5 and 6. However, with the improvements at the I-95 interchanges and ramps, the proposed drainage systems will be altered significantly. Each of the proposed basins is subdivided into sub-basins and storage has been calculated accordingly. Proposed drainage systems are based on the preferred stormwater management sites after considering three alternatives and evaluating them with a matrix on the PD&E Study Pond Siting Report, dated June 2021. ***Figure 6.15*** includes the preferred conceptual drainage design for each basin along the corridor within the study limits.



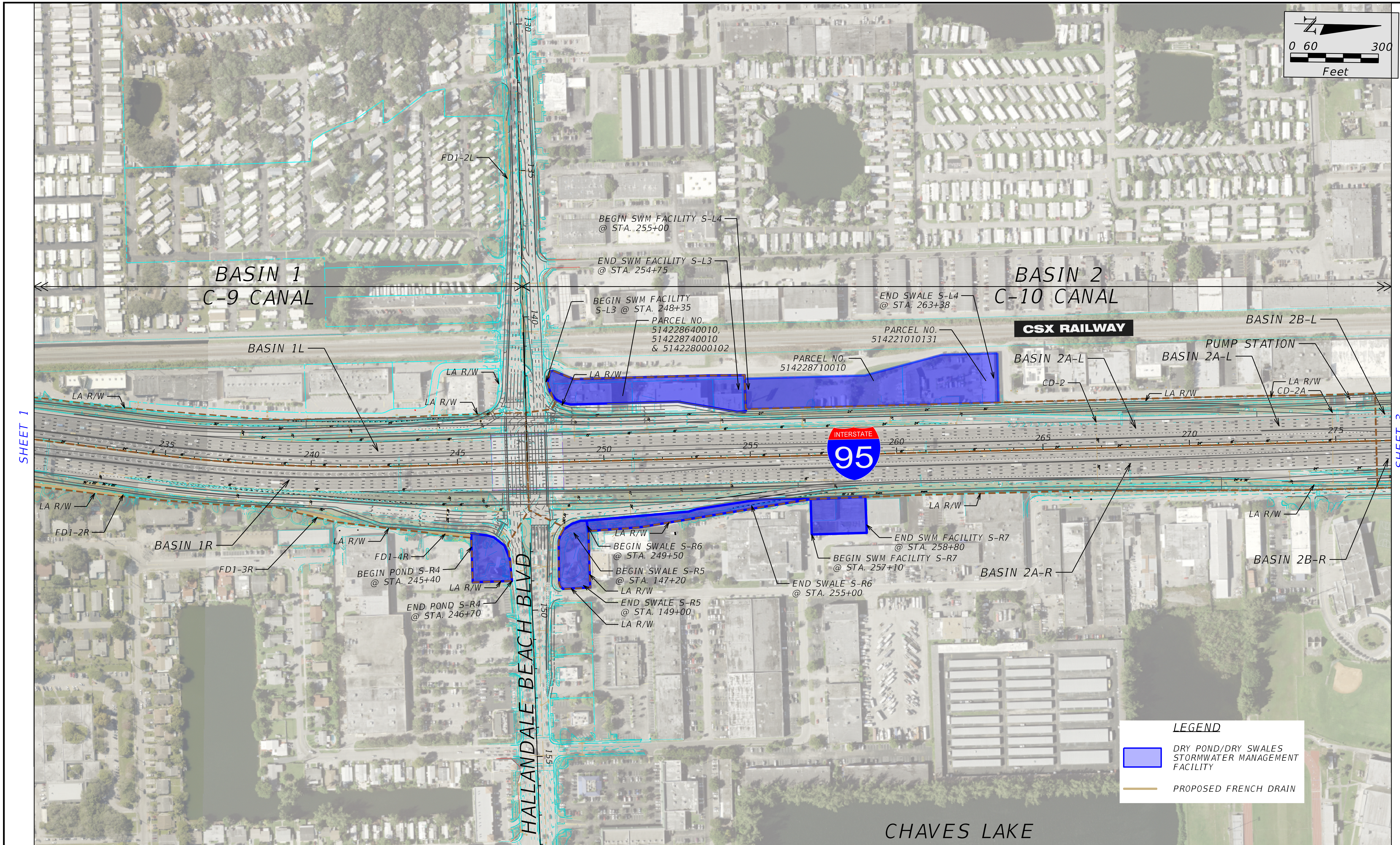
FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

JUNE 2021

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
From South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

I-95 (SR 9)
CONCEPTUAL DRAINAGE MAP

FIGURE
6.15



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I-95 (SR 9)
CONCEPTUAL DRAINAGE MAP

FIGURE
6.15

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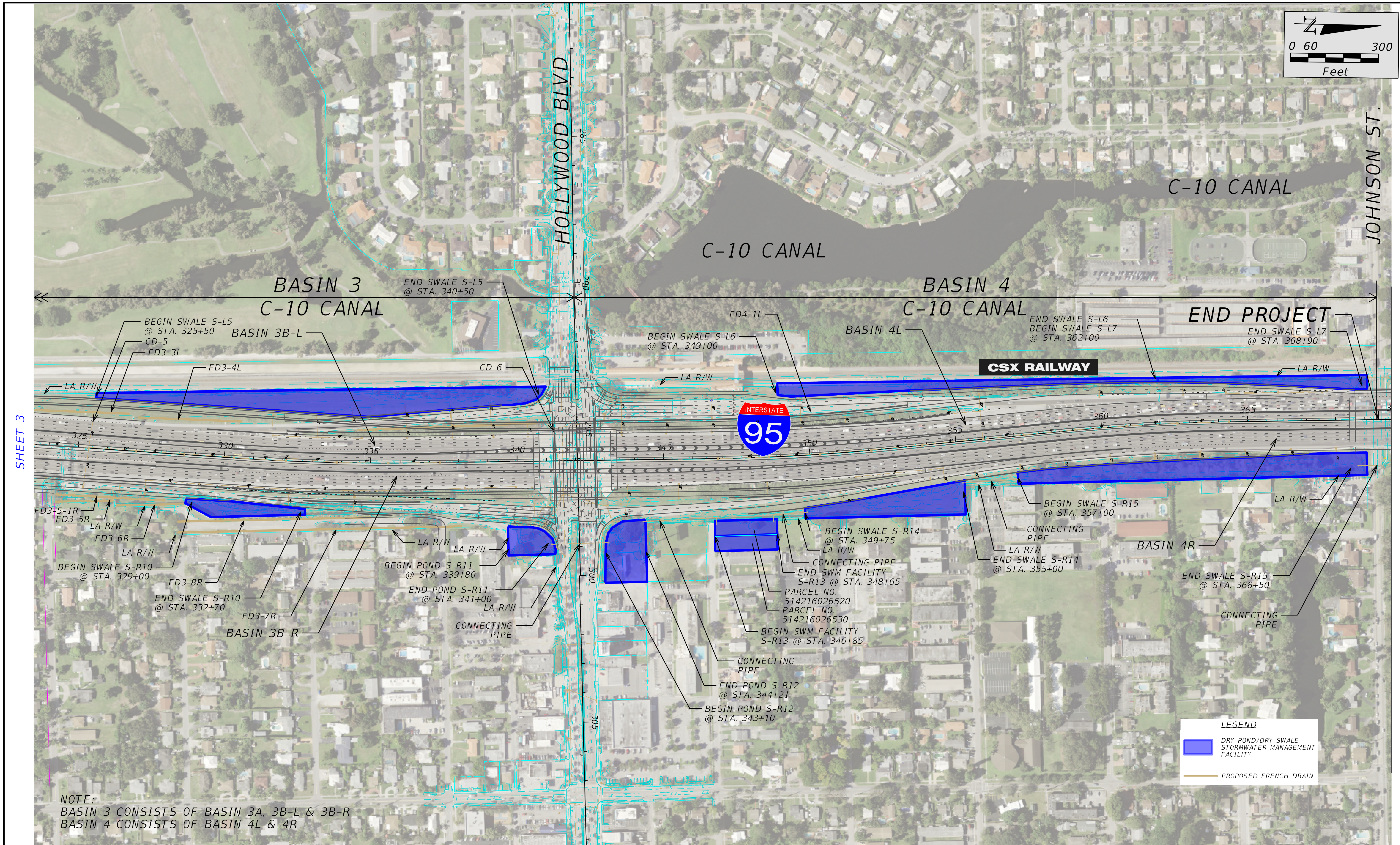
I-95 (SR 9)
CONCEPTUAL DRAINAGE MAP

FIGURE
6.15



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ETDM No.: 14254

I-95 (SR 9)
CONCEPTUAL DRAINAGE MAP

FIGURE 6.15

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DISTRICT FOUR
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

JUNE 2021

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ETDM No.: 14254

I-95 (SR 9)
CONCEPTUAL DRAINAGE MAP

FIGURE
6.15

6-54A

The proposed drainage systems are described below:

Basin 1 – This drainage basin encompasses I-95 between station limits 206+50 and 247+38 between the limits of the Miami Dade/Broward County Line and Hallandale Beach Boulevard. The basin is subdivided into 1-L and 1-R. Runoff from I-95 sheet flows into roadside swales and French drains located along both sides of I-95. These roadside swales will provide water quality treatment and stormwater attenuation using ditch block weirs. Basin 1L and 1R are comprised of swales S-L1, S-R1, S-R2, S-R3 and S-R4. Dry detention pond S-L2 is in a new parcel. This system consists of dry swales with a bottom elevation of 2.0 feet NAVD 88. Weir control elevation is raised to 4.7 feet NAVD 88 to accommodate the required treatment and attenuation volume for this basin. The excess stormwater runoff overflows these weirs and discharges into infield ponds at the I-95 and Ives Dairy Road interchange, which ultimately discharges to the C-9/Snake Creek Canal. This basin is located within the SFWMD's C-9 East Basin.

Basin 2 – This drainage basin encompasses I-95 between station limits 247+38 and 287+92 between Hallandale Beach Boulevard and Pembroke Road. The basin is subdivided into 2A-L, 2A-R, 2B-L and 2B-R. Runoff from this segment of I-95 sheet flows into the remaining roadside swales, ponds and French drains located along both sides of I-95 identified as S-L3, SL-4, S-R5, S-R6, S-R7 and SR-8. Among those, S-L3, SL-4, S-R7 and SR-8 are in eight new parcels. These roadside swales will provide water quality treatment and stormwater attenuation using ditch block weirs. This system consists of dry swales with a bottom elevation of 1.5 feet NAVD 88 to provide partial treatment and attenuation for this basin and a weir control elevation raised to 4.0 feet NAVD 88. This basin is located within the SFWMD's C-10 Basin. The remaining required storage volume will be compensated in proposed exfiltration trench.

Basin 3 – This drainage basin encompasses I-95 between station limits 287+92 and 341+98, between Pembroke Road and Hollywood Boulevard. The basin is subdivided into 3A, 3B-L and 3B-R. Runoff from this segment of I-95 sheet flows into remaining roadside swales and French drains located along both sides of I-95 identified as SR-9. Modified roadside swales provide partial water quality treatment and stormwater attenuation using ditch block weirs. This system consists of dry detention swales with a bottom elevation of 1.5 feet NAVD 88 and a weir control elevation raised to 3.5 feet NAVD 88. The rest of the storage for treatment and attenuation will be discharged to Basin 4 and routed to the proposed stormwater pond within the Sunset Golf Course on the east side of the I-95 corridor and ultimately will be discharged to the SFWMD' C-10 Canal. This basin is located within the SFWMD's C-10 Basin.

Basin 4 – This drainage basin encompasses I-95 between station limits 341+98 and 369+46, between Hollywood Boulevard and Johnson Street. The basin is subdivided into 4-L and 4-R. Runoff from this segment of I-95 sheet flows into the remaining roadside swales located along both sides of I-95 identified as SL6, S-L7, S-R12, S-R13, S-R14 and S-R15. Among those, swale S-R13 is in two new parcels. This system consists of dry swales with a bottom elevation of 1.5 feet NAVD 88 and a weir control elevation raised to 3.5 feet NAVD 88. These modified roadside swales provide water quality treatment and stormwater attenuation using ditch block weirs. The excess stormwater runoff will be discharged to the stormwater pond within the Sunset Golf Course on the east side of the I-95 corridor and ultimately discharged into the C-10 Canal just north of Johnson Street. This basin is located within the SFWMD's C-10 Basin.

Side Street/Arterial Street Drainage – There are three arterial streets within the project limits of the I-95 corridor: Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard. Each of those side streets, beyond the interchanges, has its own drainage system. Exfiltration trenches will be provided as necessary to accommodate the improvements within the interchange areas.

6.1.13 Floodplain Analysis

The project corridor lies within Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) panel numbers 12011C0568H and 12011C731H in Broward County. The project is predominantly located within the 100-year floodplain, within flood zones AE, AH, and X. Zone AE designates flood hazard areas inundated by 100-year flood; Zone AH designates shallow flooding areas where average depths are between 1 and 3 feet for the 100-year flood; and Zone X designates flood hazard areas outside the 100-year flood zone but within the 500-year flood zone.

In accordance with Executive Order 11988 "Floodplain Management", USDOT Order 5650.2, "Floodplain Management Protection", and Federal-Aid Policy

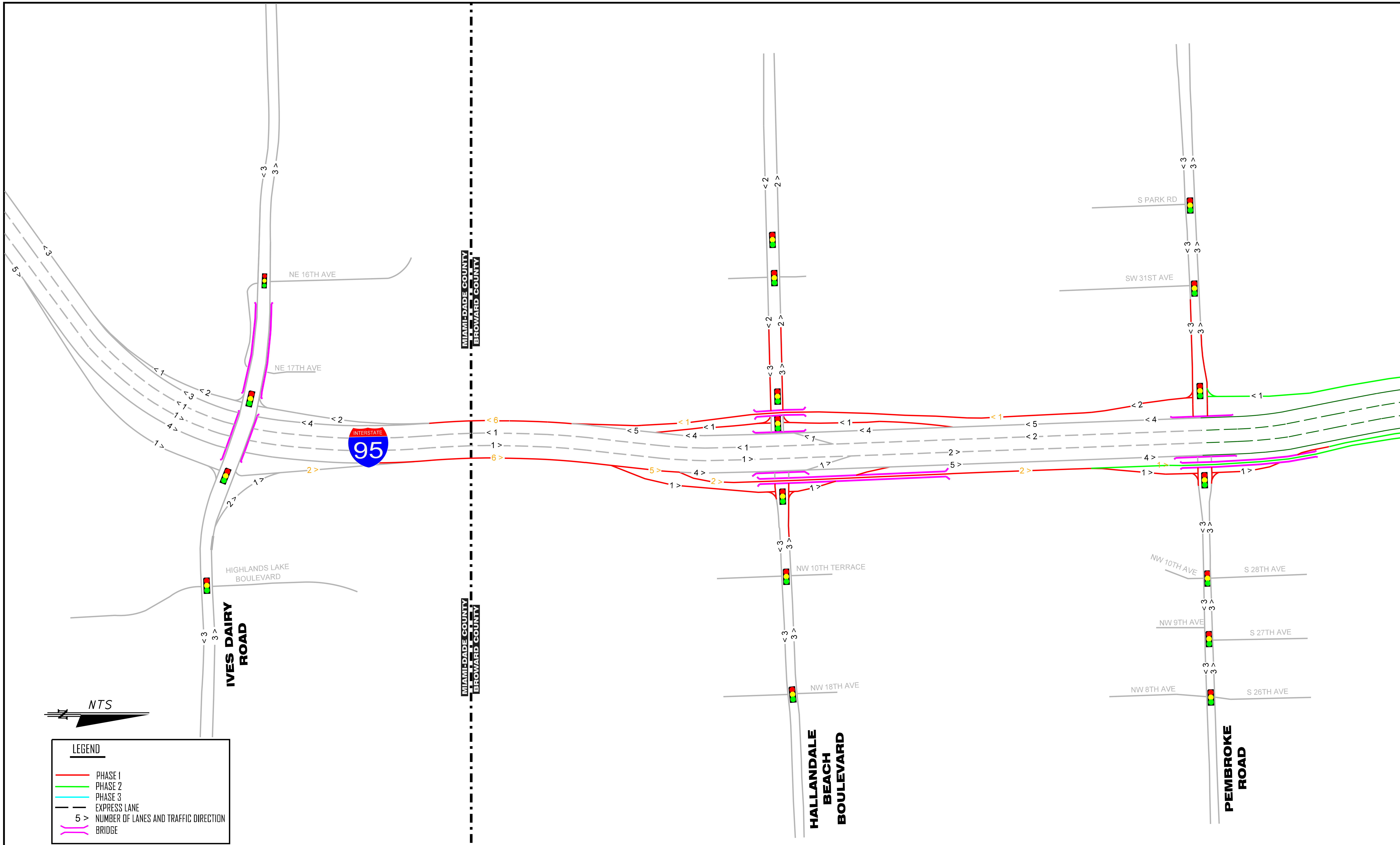
Guide 23 CFR 650A, floodplains must be protected. The intent of these regulations is to avoid or minimize highway encroachments within the base floodplains, and to avoid supporting land use development incompatible with floodplain values.

Detailed floodplain encroachment calculations will be completed when roadway geometry and cross sections are developed further during the Design phase. Given the increase in storage within the corridor for stormwater management, there is no change in flood "risk" or adverse floodplain impacts associated with this project. Our preliminary evaluation indicates that the volume of excavation proposed by the ponds will mitigate the expected encroachment. The modifications to drainage structures included in this project will result in an insignificant change in their capacity to carry floodwater. This change will cause minimal increases in flood heights and flood limits. These minimal increases will not result in any significant change in flood risks or damage. There will not be a significant change in the potential for interruption or termination of emergency services or emergency evacuation routes. Therefore, it has been determined that the proposed encroachment is not significant.

6.1.14 Transportation Management Plan

A conceptual Transportation Management Plan was developed as part of this PD&E Study to determine constructability and the ability to maintain traffic for the 2030 preferred alternative. Many of the components required to develop a plan will be developed in accordance with FDOT standards during the subsequent phases of the project. The plan proposes to keep all travel lanes open at all times during construction. Short lane closures may be necessary during off-peak periods to change construction phases. Advance notice of any lane closure will be given to minimize disruption to roadway users.

Figure 6.16 shows the 2030 proposed construction phases within the project limits. The proposed improvements can be constructed in four northbound phases and three southbound phases.



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JUNE 2021

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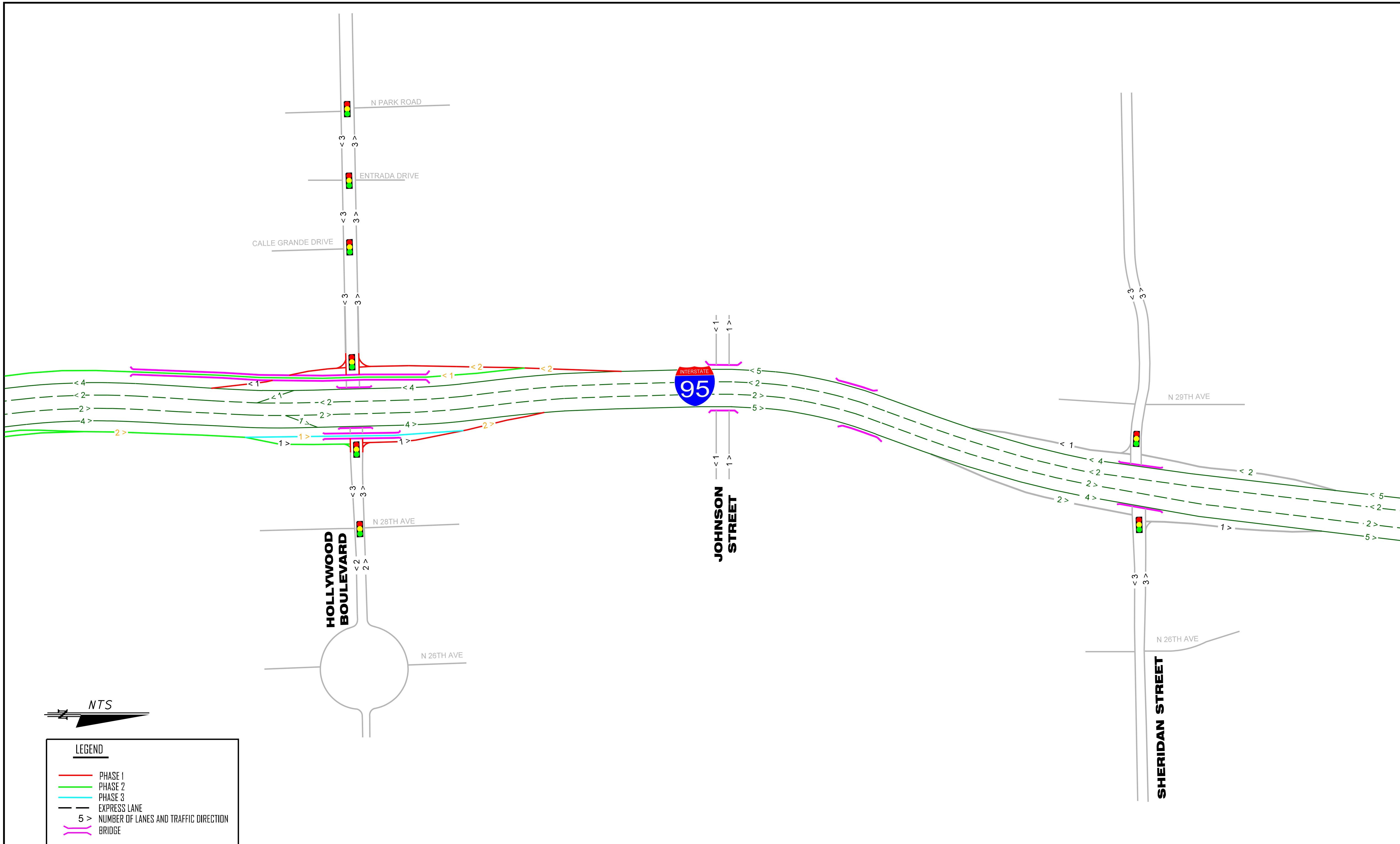
SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
2030 CONCEPT TRAFFIC CONTROL PLAN

FIGURE 6.16



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ETDM No.: 14254

SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
2030 CONCEPT TRAFFIC CONTROL PLAN

FIGURE
6.16

Phase 1 – Northbound

a. Construct the additional auxiliary lane between Ives Dairy Road and Hallandale Beach Boulevard.
b. Partially construct all the at-grade northbound off- and on-ramp improvements. Temporary pavement will be necessary at some locations.
c. Construct the collector distributor roadway system between south Hallandale Beach Boulevard and Pembroke Road.
d. Construct the bridge widening over Johnson Street.
e. Construct all the arterial improvements.
f. Maintain all the existing off- and on-ramps in-place.

Phase 2 Northbound

a. Close the existing Pembroke Road off-ramp.
b. Traffic exiting I-95 northbound to Pembroke Road will be shifted to the collector distributor roadway system constructed in Phase 1c.
c. Construct the collector distributor roadway system from south of Pembroke Road to Hollywood Boulevard.
d. Construct the remaining Hallandale Beach Boulevard at-grade northbound off-ramp improvements. Temporary pavement will be necessary at some locations.

Phase 3 Northbound

a. Close the existing Hollywood Boulevard off-ramp.
b. Traffic exiting I-95 northbound to go to Hollywood Boulevard will be shifted to the collector distributor roadway system constructed in Phases 1c and 2c.
c. Construct the collector distributor roadway system from south of Hollywood Boulevard to north of Hollywood Boulevard.
d. Construct the remaining Hallandale Beach Boulevard northbound on-ramp improvements. Temporary pavement will be necessary at some locations.
e. Construct the remaining Pembroke Road northbound on-ramp improvements. Temporary pavement will be necessary at some locations.

Phase 4 Northbound

a. Close the existing Pembroke Road on-ramp to I-95.
b. Traffic entering I-95 northbound from Pembroke Road will be shifted to the collector distributor roadway system constructed in Phase 3c.

Phase 1 Southbound

a. Partially construct all the at-grade southbound off- and on-ramp improvements. Temporary pavement will be necessary at some locations.
b. Construct the Pembroke Road on-ramp from Pembroke Road to south of Hallandale Beach Boulevard.
c. Construct the additional auxiliary lane between Hallandale Beach Boulevard and Ives Dairy Road.
d. Construct all the arterial improvements.
e. Maintain all the existing off- and on-ramps in-place.

Phase 2 Southbound

a. Construct the collector distributor roadway system from north of Hollywood Boulevard to Pembroke Road.
b. Construct the remaining Hollywood Boulevard southbound off- and on-ramp improvements. Temporary pavement will be necessary at some locations.
c. Construct the remaining Hallandale Beach Boulevard southbound off- and on-ramp improvements. Temporary pavement will be necessary at some locations.

Phase 3 Southbound

a. Close the existing Pembroke Road off- and on-ramps to I-95.
b. Traffic entering I-95 southbound from Pembroke Road will be shifted to the collector distributor roadway system constructed in Phase 1b.
c. Traffic exiting I-95 southbound to Pembroke Road will be shifted to the collector distributor roadway system constructed in Phase 2a.

6.1.15 Special Features

The corridor currently has noise walls. These noise walls have been evaluated as part of a Noise Study Analysis and is summarized under ***Section 6.2.7***.

Retaining earth support systems to retain earth at bridge ends in the structures within the project corridor, are slope systems or mechanically stabilized earth (MSE) walls. For the proposed structures, we anticipate that all new bridges, Bridges 1 through 6, will use MSE walls at both of their ends, front and sides. For Bridge 5, the existing Bridge over Hollywood will require to cut its slope at the northwest corner and install MSE wall in order to create the room to fit Bridge 5 end bent and side wall. For Bridge 6, I-95 over Hollywood, the slopes of the existing Bridge will require to cut the slope at the southeast and northeast end and install MSE wall, in order to create the room to fit Bridge 6 end bents and side walls.

The widening of the I-95 bridge over Johnson Street (Bridge 860599) will require MSE wall at both southeast and northeast bridge ends, parallel to the existing walls installed in a recent DB project.

As to aesthetics, the proposed walls will match the theme and features of the existing walls along the project corridor.

6.1.16 Design Variation and Design Exceptions

The PD&E Study limits overlap with the I-95 Express Phase 2 and Phase 3C projects. The I-95 Express Phase 2 opened to traffic in 2016. I-95 Express Phase 3C is currently under construction. Both projects documented Design Exceptions and Variations along the I-95 mainline, which includes the limits of this PD&E Study. The focus of this PD&E Study was to evaluate and propose interchange improvements only. Therefore, the study did not propose geometric improvements along the I-95 mainline.

Design controls and criteria that will need a Design Variation or Design Exception due to the PD&E Study preferred alternative improvements are summarized in ***Table 6.7***.

Design Variations and Design Exceptions that currently exist along the corridor that may need to be updated are summarized in ***Table 6.8***.

Table 6.7 – Preferred Alternative Design Variations and Design Exceptions

Description	Begin	End	Length	Proposed/ Required	Explanations/Comments
Design Speed Variation					
Collector Distributor Roadway	Hallandale Beach Boulevard	Hollywood Boulevard	-	45 MPH 55 MPH	FDM Requires 55 MPH - 10 MPH less than the mainline design speed The 45 MPH design speed is dictated by the vertical geometry of the collector distributor systems. Substandard Interchange spacing along with right of way constraints and limitations prohibit a vertical geometry that meets the 55 MPH standard.
Border Width Design Variation					
Border Width (throughout the project)	Miami-Dade/Broward County Line	Johnson Street	16,340'	Varies	Existing and proposed condition. Necessary to avoid significant right of way impacts along both sides of the corridor and interchanges.
Bicycle Lane Width Variation					
Westbound Pembroke Road	West of I-95	I-95	540'	4'-7' 7'	Necessary to avoid impacting the Orangebrook Golf Course, which is a Section 4(f) Site
Eastbound Pembroke Road	East of I-95	South 28th Avenue	400'	4' 7'	Necessary to avoid right of way impacts and potential relocations
Westbound Hollywood Boulevard	Tri-Rail Station	West of Tri-Rail Station	320'	4' 7'	Necessary to avoid impact adjacent park and canal

Table 6.8 – Existing Design Variations and Design Exceptions

Description	Begin	End	Length	Proposed/ Required
Shoulder Width Design Variation				
Northbound I-95 Express Lanes	Just north of the Miami-Dade/Broward County Line (208+82)	South of Hallandale Beach Boulevard (225+13)	1,631'	10'-12' 12'
Northbound I-95 Express Lanes	North of Pembroke Road (310+39)	South of Hollywood Boulevard (321+96)	1,157'	10'-12' 12'
Southbound I-95 Express Lanes	South of Hollywood Boulevard (323+74)	North of Pembroke Road (295+49)	2,825'	10'-12' 12'
Southbound I-95 Express Lanes	South of Hallandale Beach Boulevard (217+86)	Just north of the Miami-Dade/Broward County Line (212+66)	520'	10'-12' 12'
Shoulder Width Design Exception				
Northbound I-95 Express Lanes	South of Hallandale Beach Boulevard (225+13)	North of Pembroke Road (310+39)	8,526'	5'-10' 10'
Northbound I-95 Express Lanes	South of Hollywood Boulevard (321+96)	Johnson Street (370+14)	4,818'	5'-10' 10'
Southbound I-95 Express Lanes	Johnson Street (370+14)	South of Hollywood Boulevard (323+74)	4,640'	5'-10' 10'
Southbound I-95 Express Lanes	North of Pembroke Road (295+49)	South of Hallandale Beach Boulevard (217+86)	7,763'	5'-10' 10'
Lane Width Design Exception				
Northbound I-95 Express Lanes and Two Inside General Use Lanes	Miami-Dade/Broward County Line	Johnson Street	16,340'	11' 12'
Southbound I-95 Express Lanes and Two Inside General Use Lanes	Johnson Street	Miami-Dade/Broward County Line	16,340'	11' 12'
Buffer Width Design Variation				
Northbound I-95	Miami-Dade/Broward County Line	Johnson Street	16,340'	3' 4'
Southbound I-95	Johnson Street	Miami-Dade/Broward County Line	16,340'	3' 4'

Table 6.8 – Existing Design Variations and Design Exceptions (Continued)

Description	Begin	End	Length	Proposed/ Required
Length of Horizontal Curve Design Exception				
I-95 South of Hallandale Beach Boulevard (Northbound & Southbound)	PC 234+30	PT 243+03	873'	873' 975'
I-95 North of Pembroke Road (Northbound & Southbound)	PC 291+90	PT 297+11	521'	521' 975'
I-95 South of Hollywood Boulevard (Northbound & Southbound)	PC 330+33	PT 336+61	628'	628' 975'
I-95 North of Hollywood Boulevard (Northbound & Southbound)	PC 346+72	PT 352+41	569'	569' 975'
I-95 South of Johnson Street (Northbound & Southbound)	PC 358+78	PT 364+39	561'	561' 975'
Length of Vertical Curve Design Variation				
I-95 (Crest Vertical Curve)	South of Hallandale Beach Boulevard	North of Hallandale Beach Boulevard	1,650'	1,650' 1,800'
I-95 (Crest Vertical Curve)	South of Pembroke Road	North of Pembroke Road	1,750'	1,750' 1,800'
I-95 (Crest Vertical Curve)	South of Hollywood Boulevard	North of Hollywood Boulevard	1,700'	1,700' 1,800'
Vertical Curve K-Value Design Variation				
I-95 (Crest Vertical Curve)	South of Hallandale Beach Boulevard	North of Hallandale Beach Boulevard	-	307 401
I-95 (Crest Vertical Curve)	South of Pembroke Road	North of Pembroke Road	-	304 401
I-95 (Crest Vertical Curve)	South of Hollywood Boulevard	North of Hollywood Boulevard	-	306 401
I-95 (Crest Vertical Curve)	South of Johnson Street	North of Johnson Street	-	306 401
I-95 (Sag Vertical Curve)	North of Hollywood Boulevard	North of Hollywood Boulevard	-	164 181

Table 6.8 – Existing Design Variations and Design Exceptions (Continued)

Description	Begin	End	Length	Proposed/ Required
Stopping Sight Distance Design Variation				
Northbound I-95 Inside Express Lane	North of Pembroke Road (291+90)	North of Pembroke Road (297+11)	521'	658' 730'
Potential Stopping Sight Distance Design Exception (Due to Express Lane markers)				
Northbound I-95 Inside General Use Lane	Just north of Pembroke Road	North of Pembroke Road	526'	423' 645'
Northbound I-95 Outside Express Lane	North of Hollywood Boulevard	South of Johnson Street	560'	608' 645'
Southbound I-95 Inside General Use Lane	South of Johnson Street	North of Hollywood Boulevard	564'	611' 645'
Southbound I-95 Outside Express Lane	North of Pembroke Road	Just north of Pembroke Road	516'	419' 645'
Potential Superelevation Variation				
I-95	Just north of the Miami-Dade/Broward County Line	South of Hallandale Beach Boulevard	-	0.023 0.025
I-95	South of Hallandale Beach Boulevard	Just south of Hallandale Beach Boulevard	-	0.030 0.033
I-95	Just north of Pembroke Road	North of Pembroke Road	-	0.050 0.056

Note: These Design Exceptions and Variations are existing conditions and are already documented as part of the I-95 Express Phase 2 and Phase 3C projects. This PD&E Study is not proposing geometric improvements along the I-95 mainline.

6.1.17 Cost Estimate

The total cost estimate for the preferred alternative is approximately $218.7 million (see **Table 6.9**).

Table 6.9 – Total Cost Estimate

Category	Cost
Construction Cost	$141.2 million
Maintenance of Traffic (10%)	$14.1 million
Mobilization (8%)	$12.5 million
Project Unknown (15%)	$21.2 million
Utilities	$4.3 million
Design (8%)	$11.3 million
Right of Way	Underway by FDOT
Construction Engineering and Inspection (10%)	$14.1 million
Total Cost Estimate	$ 218.7 million

6.2 Summary of Environmental Impacts of the Preferred Alternative

6.2.1 Future Land Use

Land Use and cover was classified using the South Florida Water Management District (SFWMD) Land Use and Cover nomenclature (see ***Figure 6.17***). ***Table 6.10*** summarizes the existing land use and cover within the study area.

The land use and cover within the right of way (ROW) is transportation (road and highway) with supporting features such as drainage swales.

Table 6.10 – Existing Land Use and Cover within the Study Area

Land Use and Cover
Channelized Waterways, Canals
Commercial and Services
Educational Facilities
Golf Course
Fixed Single Family Units
Mobile Home Units
Multiple Dwelling Units: Low and High Rise
Open Land
Other Light Industry
Parks/Recreation
Reservoirs
Retail Sales and Services
Roads and Highways

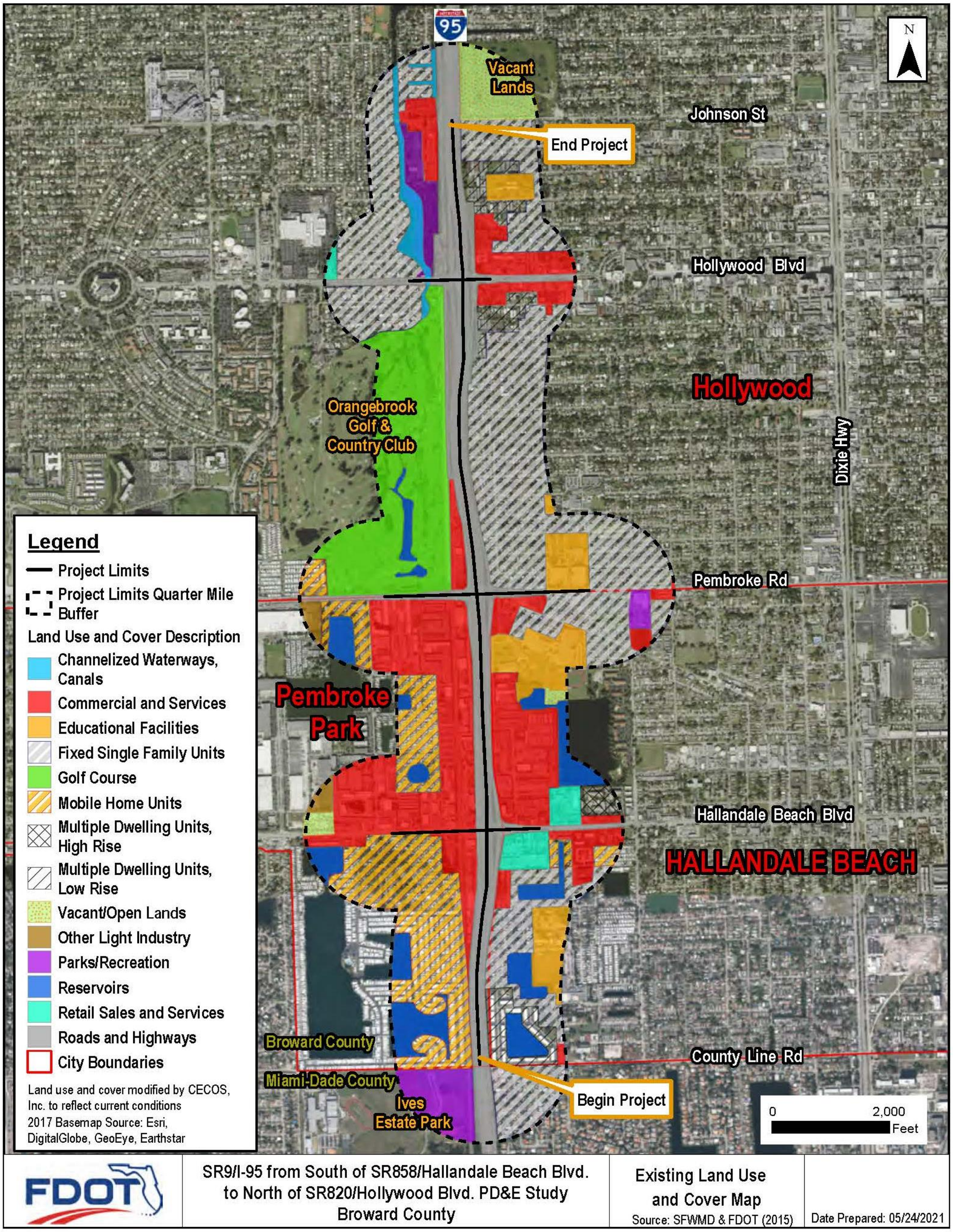


Figure 6.17 – Existing Project Corridor Land Use/Land Cover Map

The Town of Pembroke Park and the Cities of Hallandale Beach and Hollywood, as well as Broward County, adopted comprehensive plans to establish goals, objectives and policies for future growth pursuant to *Chapter 163, Florida Statutes*. These plans include Future Land Use Elements as well as Transportation Elements. ***Figure 6.18*** depicts each municipality and Broward County's future land use maps.

This I-95 project is included in the Broward County Metropolitan Planning Organization (MPO) Transportation Improvement Plan (TIP), the FDOT Work Program, the FDOT STIP, and the FDOT SIS Five Year Work Program. The Broward County MPO 2045 Long Range Transportation Plan included improvements to all I-95 interchanges in Broward County. As the existing corridor is developed, the future land use associated with it is anticipated to be very similar to the existing land use. The proposed improvements may result in redevelopment within the proposed study area, but this re-development will occur on land previously developed.

As depicted on the City of Hallandale Beach's Future Land Use Map, (completed as part of the city's comprehensive plan), the existing and future land uses area are similar in that both identify residential, commercial, and educational uses adjacent to I-95.

The Town of Pembroke Park's existing land use in the project area is typically residential and commercial uses. As depicted on the Town of Pembroke Park's Future Land Use Map, (completed as part of the city's comprehensive plan), the eastern side of the Town's limits (adjacent to I-95) are predominately residential, commercial, and industrial uses. The west side of the Town's future land use consists primarily of residential, commercial, educational/community facilities and recreational. This portion of the Town is outside the proposed study area.

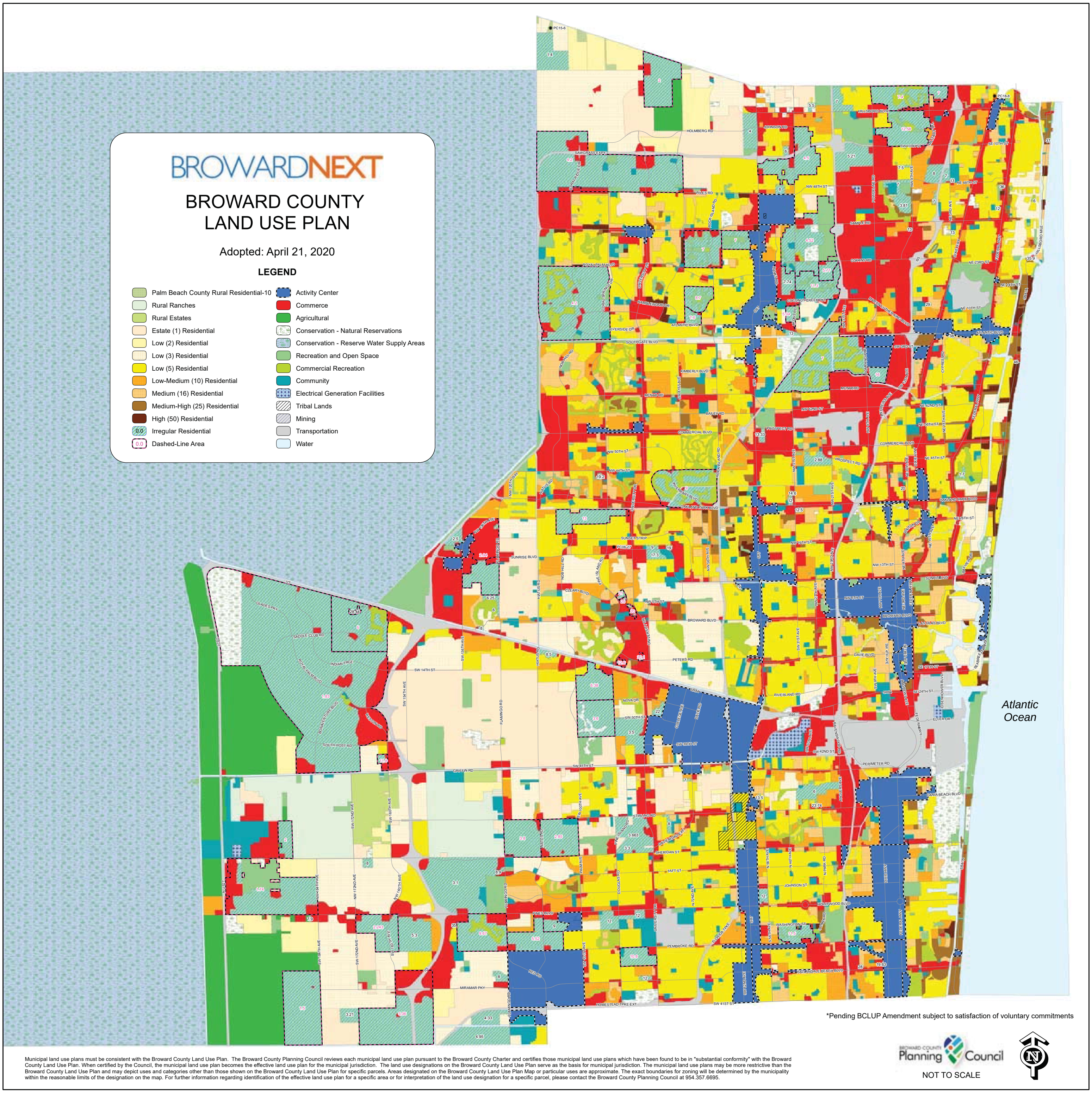


Figure 6.18 - Broward County Future land Use Maps

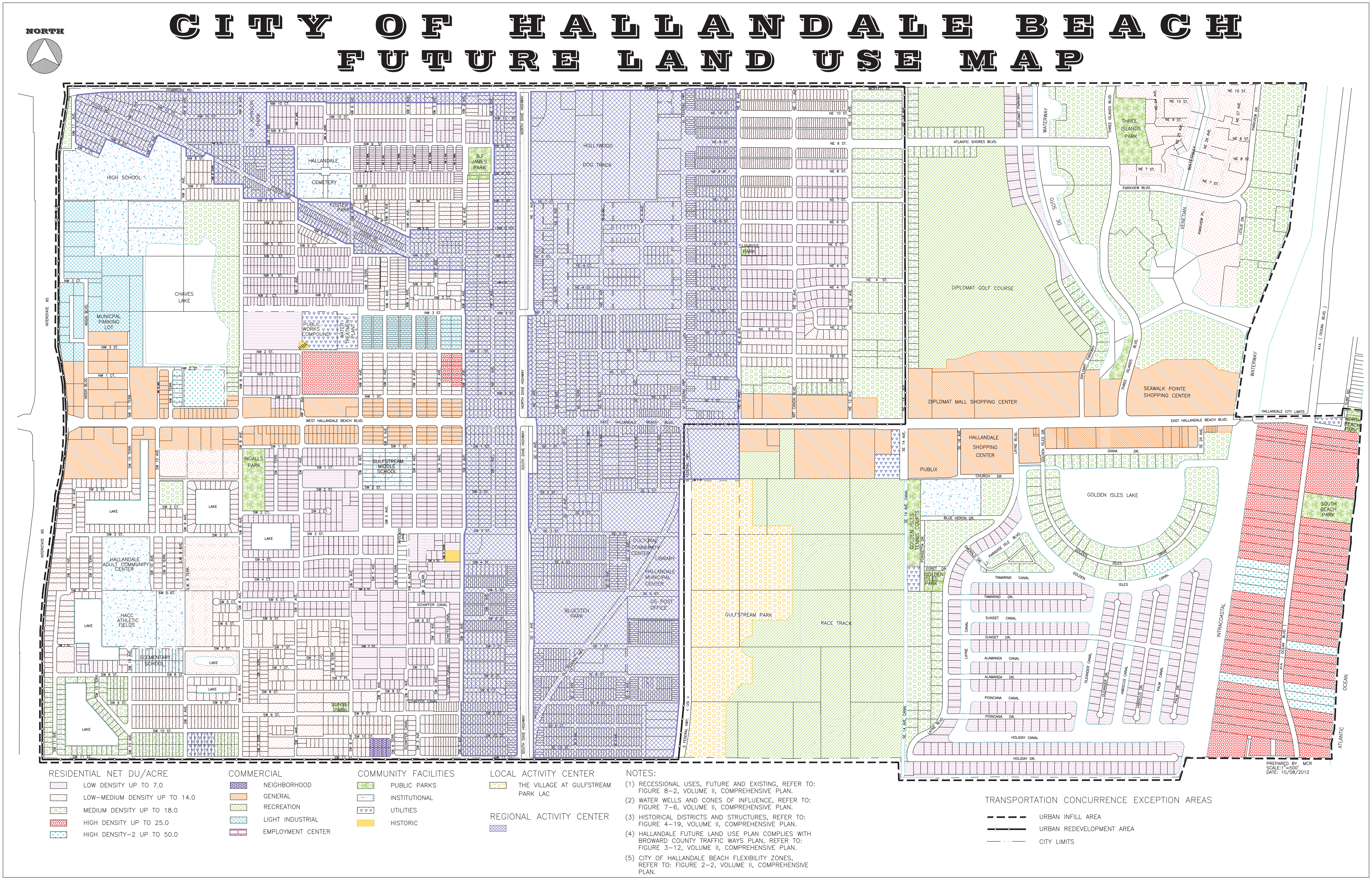


Figure 6.18 - Broward County Future land Use Maps (Continued)

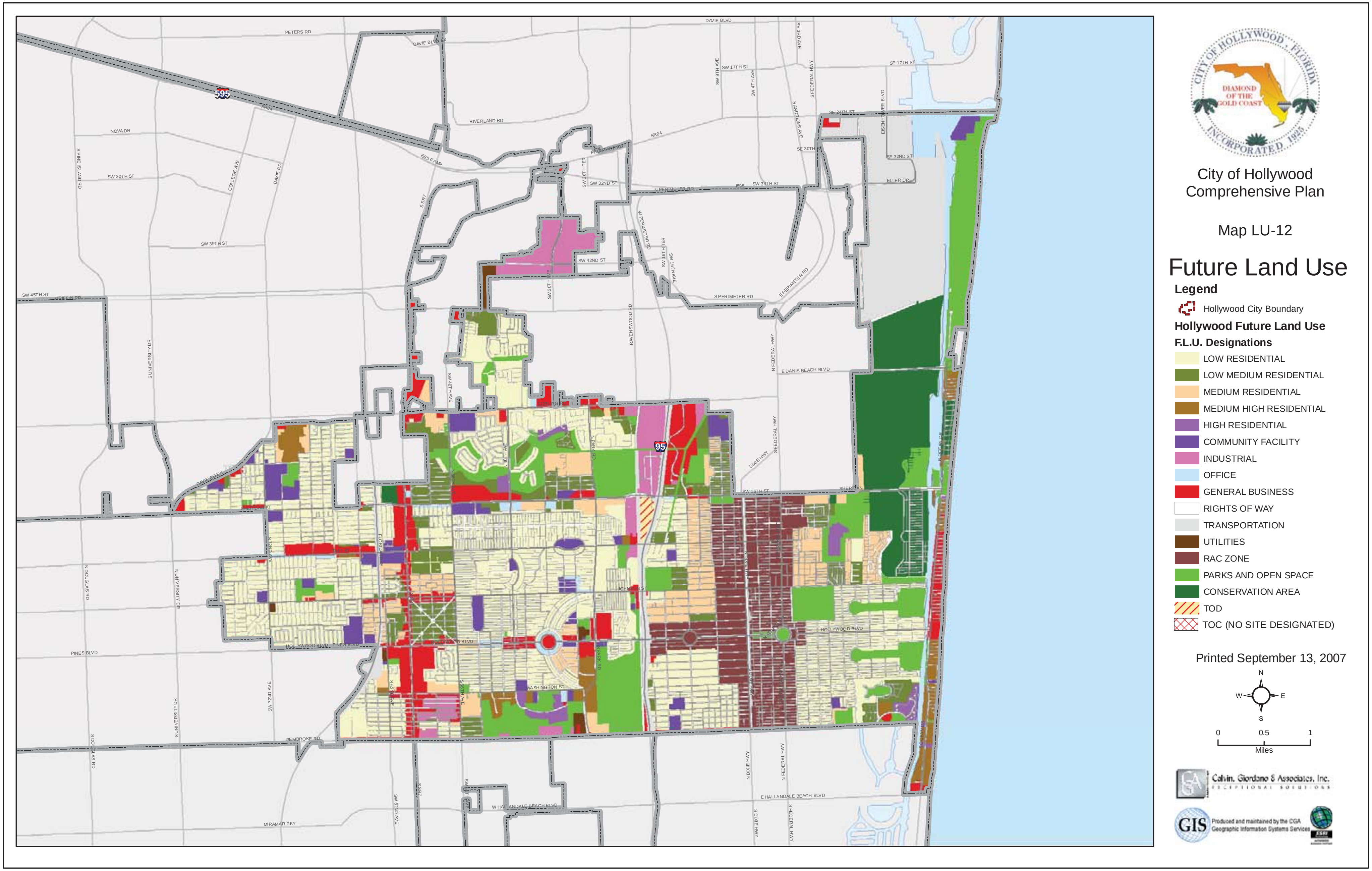


Figure 6.18 - Broward County Future land Use Maps (Continued)

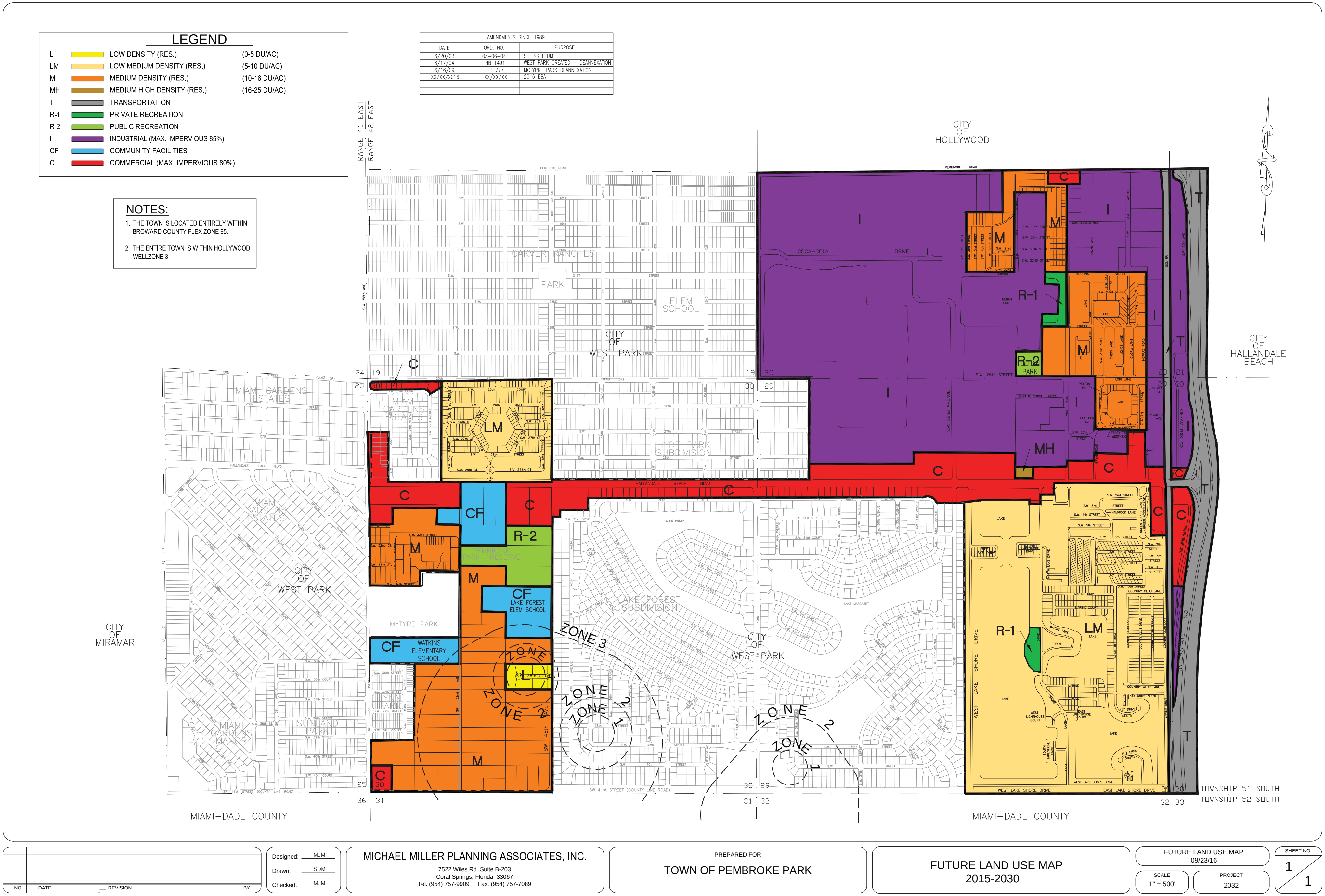


Figure 6.18 - Broward County Future land Use Maps (Continued)

The City of Hollywood's existing land use consists of residential, golf course, educational facilities, and commercial/services. As depicted on the City of Hollywood's Future Land Use Map, (completed as part of the city's comprehensive plan), both sides of the project corridor consist of residential, commercial, parks and open space, educational facilities, and a Regional Activity Center (RAC). A future RAC is proposed along Hollywood Boulevard, east of I-95 within the study limits. A RAC is a high intensity, high density multi-use area designed as appropriate for growth by the local government or jurisdiction. A RAC is intended to encourage attractive and functional mixed living, working, shopping, education, and recreation centers and also encourages mass transit and reduction in auto travel. The existing land use and future land use are similar except for the RAC. Incorporating a potential regional bus service and maintaining the existing shuttle service is consistent with the goals of the City of Hollywood's RAC.

The Broward County Land Use Plan was included to show surrounding future land use outside the project area.

Overall, the existing and future land use maps of the municipalities are similar, as they both show residential, commercial, and activity centers adjacent to the project boundaries. While the project may result in redevelopment of parcels, this redevelopment would occur over previously developed land. Therefore, based on the above, adverse effects (direct/indirect) to land use are not anticipated as a result of this project.

6.2.2 Section 4(f)

In accordance with *FDOT PD&E Manual, Part 2, Chapter 7, Section 4(f) Evaluations, dated July, 1, 2020*, this project was evaluated for potential Section 4(f) involvement. Section 4(f) resources can be divided into three categories: historic/archaeological sites, publicly-owned parks and recreation areas, wildlife and waterfowl refuges. A field review was conducted on July 8, July 28, August 4, 2016, and December 10, 2020 to confirm the findings of the ETDM related to parks and to determine if additional park sites were present adjacent to the corridor. The potential Section 4(f) park resources adjacent to the corridor and evaluated as part of this PD&E Study are shown in ***Table 6.11*** and ***Figure 6.19***. No effect is anticipated to these potential Section 4(f) resources.

Table 6.11 – Potential Section 4(f) Resources

Map No.	Park Name	Address	Official with Jurisdiction (OWJ)
1	Ives Estate Park	20901 NE 16th Ave	Miami-Dade County
10	Oreste Blake (OB) Johnson Park	1000 NW 8th Avenue	City of Hallandale Beach
12	McNicol Community Center	1411 S 28th Avenue	City of Hollywood
16	Orangebrook Golf Course and Country Club	400 Entrada Drive	City of Hollywood
24	Lions Park	3003 Hollywood Boulevard	City of Hollywood
29	Stanley Goldman Memorial Park	800 Knights Road	City of Hollywood

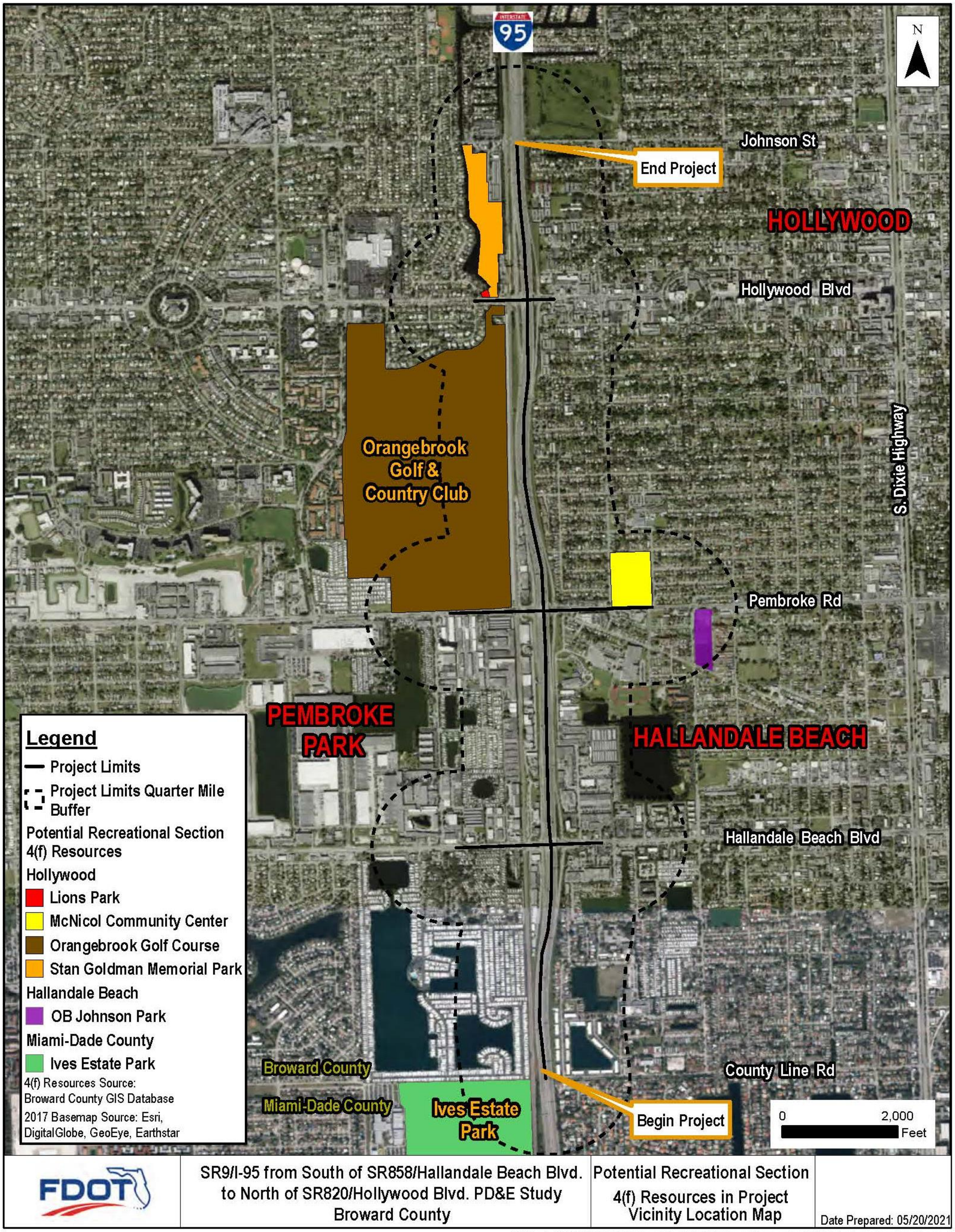


Figure 6.19 – Section 4(f) Resources Location Map

The six park/recreational areas adjacent to the study limits are briefly described below.

Ives Estate Park (#1) – This 94.5- acre park is located in the City of Miami and offers synthetic turf field lighted for football/soccer, baseball/softball fields, fitness zones, playground, and recreation center. This facility is located west of the railroad tracks, on the west side of I-95, south of the Miami-Dade/Broward County Line. It is not adjacent to Hallandale Beach Boulevard, Pembroke Road, or Hollywood Boulevard, but a portion is contained within the 0.25-mile buffer.

Oreste Blake (OB) Johnson Park (#11) – This Park is located in the City of Hallandale Beach and encompasses 6.17-acres. It offers public access/use of a gymnasium, computer lab, fitness center, playground, tennis, turf surfacing, multi-purpose athletic field, afterschool programming, and pathways. City sports leagues also use the facilities at this park. This facility is located adjacent to Pembroke Road, outside the project limits but within the 0.25-mile buffer.

McNicol Community Center (#12) – This 0.14-acre recreational center is located in the City of Hollywood on property owned by the School Board of Broward County. The center provides aftercare, camps, programs, community meeting areas and playgrounds open to the public. This center is located within the 0.25-mile buffer.

Orangebrook Golf Course and Country Club (#16) – This golf course encompasses 255 acres and is located within the City of Hollywood. The facility offers, golf, disc golf, banquet hall, and restaurant; all of which are open to the public. The golf course is located between Hollywood Boulevard and Pembroke Road, and within the 0.25-mile buffer.

Lions Park (#24) – This small park consists of a 0.36-acre passive recreation area located west of I-95 and west of the CSX railroad tracks in the City of Hollywood. The park provides walkways and benches to the public. It is located adjacent to Hollywood Boulevard and within the 0.25-mile buffer.

Stan Goldman Memorial Park (#29) – This Park is 11.8-acre and located west of I-95 and west of the CSX railroad tracks in the City of Hollywood. This resource provides walkways, dog park, skate park, and pickleball courts for public use. It is located in the vicinity of Hollywood Boulevard and within the 0.25-mile buffer.

The City of Hollywood recently purchased the former Sunset Golf Course from a private owner. This city-owned, vacant parcel is located within the project buffer but not open to the public; therefore, Section 4(f) protection does not apply. The FDOT evaluated the preferred alternative in relation to the other Section 4(f) resources (Lions Park, Stan Goldman Memorial Park, Orangebrook Golf Course and Country Club, McNicol Community Center, and OB Johnson Community Center) and "No Use" Determinations were made. The FDOT evaluated the preferred alternative in relation to Ives Estates Park and determined there would be no Section 4(f) involvement with that resource.

Short-term impacts caused by construction activities, such as traffic congestion/delays, noise from construction equipment, and dust from roadway construction may occur temporarily during construction. Once construction is complete, these will no longer be present. No other direct or indirect effects to recreational areas are anticipated as a result of the preferred alternative.

A copy of the Official with Jurisdiction (OWJ) responses (City of Hollywood and the City of Hallandale Beach) are included in the project file and uploaded to the project file in the Statewide Environmental Project Tracker (SWEPT).

6.2.3 Cultural Resources

A Section 106 Evaluation and Determination of Effects Case Study Report for the I-95 (SR 9) PD&E Study from south of Hallandale Beach Boulevard (SR 858) to north of Hollywood Boulevard (SR 820) was undertaken by Janus Research at the request of the FDOT, District 4. The project was conducted in accordance with Stipulation VII of the *Programmatic Agreement (PA) among the Federal Highway Administration (FHWA), the Advisory Council on Historic Preservation (ACHP), the Florida Division of Historical Resources (FDHR), the State Historic Preservation Officer (SHPO), and the FDOT Regarding Implementation of the Federal-Aid Highway Program in Florida* (Section 106 Programmatic Agreement, effective March 2016, amended June 7, 2017), Section 106 of the National Historic Preservation Act (NHPA) of 1966 (Public Law 89-655, as amended), as implemented by 36 CFR 800 -- Protection of Historic Properties (incorporating amendments effective August 5, 2004), and the revised Chapter 267, *Florida Statutes (F.S.)*. This Case Study Report documents the potential effects of the proposed improvements to the National Register of Historic Places (National Register)–eligible resources identified during the Cultural Resource Assessment Survey (CRAS), dated August 2018. The PD&E Study evaluated the improvements to I-95 from south of Hallandale Beach Boulevard to north of Hollywood Boulevard.

In 2019, a Section 106 Evaluation and Determination of Effects Case Study Report was prepared for FDOT. This report documented the potential effects of the improvements to the National Register–eligible historic resources within the project Area of Potential Effect (APE). The Criteria of Effect, as defined in *36 Code of Federal Regulations (CFR) Part 800.5*, were applied to these resources: Hollywood Seaboard Air Line Railway Station (8BD163), Seaboard Air Line (CSX) Railroad (8BD4649), and Stratford's (8BD6648). The Hollywood Seaboard Air Line Railway Station (8BD163) was determined National Register–eligible by the State Historic Preservation Office (SHPO) in 1999, and the Seaboard Air Line (CSX) Railroad (8BD4649) and Stratford's (8BD6648) were recently determined National Register–eligible by the SHPO in August 2018. The SHPO concurred that the proposed project improvements will have no adverse effect on the Hollywood Seaboard Air Line Railway Station, Seaboard Air Line (CSX) Railroad, and Stratford's. Although there are three intersections of the railroad where the roadways will be widened, the railroad materials that will be removed will be replaced in-kind. The improvements will not result in effects that will deter the continued use as a railroad corridor and will also not substantially change the visual relationship between the trackbed and the surrounding environment and landscape.

In 2020, an addendum to the original 2018 Cultural Resources Assessment Survey (CRAS) was prepared. No archaeological resources were identified within the current archaeological APE as a result of the subsurface testing and pedestrian survey conducted for the current survey. The historic resources survey resulted in the identification of ten previously recorded (8BD4649/8DA10753, 8BD6496, 8BD6524-8BD6527, 8BD6633, 8BD6647, 8BD6671, 8BD6672) and eight newly recorded historic resources (8BD7709- 8BD7715, 8BD7738) within the current project APE. Among the ten previously recorded resources, only the Seaboard Air Line (CSX) Railroad (8BD4649/8DA10753), which was recorded as part of the 2018

CRAS, was determined eligible for listing in the National Register. The eight newly recorded resources included six standing structures and two resource groups (building complexes). These buildings and resource groups all exhibited alterations that compromised their historic integrity. While some had historical associations, none rose to a level of significance that would make them eligible for listing in the National Register. Due to the overall lack of integrity among the buildings within and immediately surrounding the APE, it appears there are no National Register–eligible historic districts that would encompass any portion of the APE. No adverse effects to the previously identified significant resources should result from the improvements proposed as part of the most recent changes to the improvements.

Therefore, in consideration of available project information, the proposed project improvements will have no adverse effect on the Hollywood Seaboard Air Line Railway Station, Seaboard Air Line (CSX) Railroad, and Stratford's. Although there are three railroad intersections where the roadways will be widened, the railroad materials that will be removed will be replaced in-kind. Additionally, the improvements at the railroad crossings appears to meet the recently issued Advisory Council on Historic Preservation (ACHP) Program Comment to exempt further Section 106 consideration of effects to rail properties within railroad ROW. Regardless, the improvements will not result in effects that will deter the continued use as a railroad corridor and will also not substantially change the visual relationship between the trackbed and the surrounding environment and landscape.

6.2.4 Wetlands and Other Surface Waters

In accordance with the FDOT PD&E Manual, Chapter 9 (July 1, 2020), Executive Order 11990, Protection of Wetlands as well as applicable federal and state regulatory requirements (Section 404 of the Clean Water Act and Chapter 373, Florida Statute, respectively) a wetland and other surface waters (OSW) evaluation was conducted for the project. The objectives of this evaluation were to identify existing wetlands and OSW's, evaluate potential impacts to them, and assess the function and value of wetlands potentially impacted by the project.

Road improvements associated with the preferred alternative are primarily contained within the existing ROW's of I-95, Hollywood Boulevard, Pembroke

Road, and Hallandale Beach Boulevard. Additional ROW is being acquired primarily for drainage purposes/ponds. Existing condition field reviews were conducted on February 24 and 27, 2017, within 500 feet from both sides of the road centerlines. A field conditions verification survey was conducted to ensure and update any previously identified wetlands, swales or OSW's conditions. These field verifications were conducted on September 22, 2020 and November 18, 2020, within 500 feet from both sides of the road centerlines. All previously identified features were still existing within project buffer, with new features identified. The wetland and surface water locations are shown on ***Figure 6.20.***

One mangrove fringe wetland, adjacent to the C-10 Canal, is present with hydrophytic vegetation, hydric soils, and hydrology. This wetland is considered jurisdictional to regulatory agencies and the hydrology of this area is dependent upon the C-10 Canal. In addition, four, man-made, wet stormwater swales with hydrophytic vegetation were also observed within the study area. Hydric soils are not present and their hydrology appeared dependent on rainfall, stormwater runoff, and groundwater. These swales were considered jurisdictional as surface waters as they are part of an existing stormwater drainage system. Twelve other man-made surface waters were observed within the project area, including retention ponds associated with developments. The majority of these retention ponds do not contain littoral vegetation although some contained tapegrass (Vallasnaria americana), duck potato (Sagittaria latifolia), spike rush (Eleocharis spp.), water hyssop (Bacopa spp.) and bald cypress (Taxodium distichum) at the time of the field reviews.

Figure 6.20 illustrates the location of wetlands, stormwater swales and OSW sites and ***Table 6.12*** summarizes those areas found within 500 feet of the project corridor. The size, hydrologic contiguity and vegetative structural diversity are described in this table.

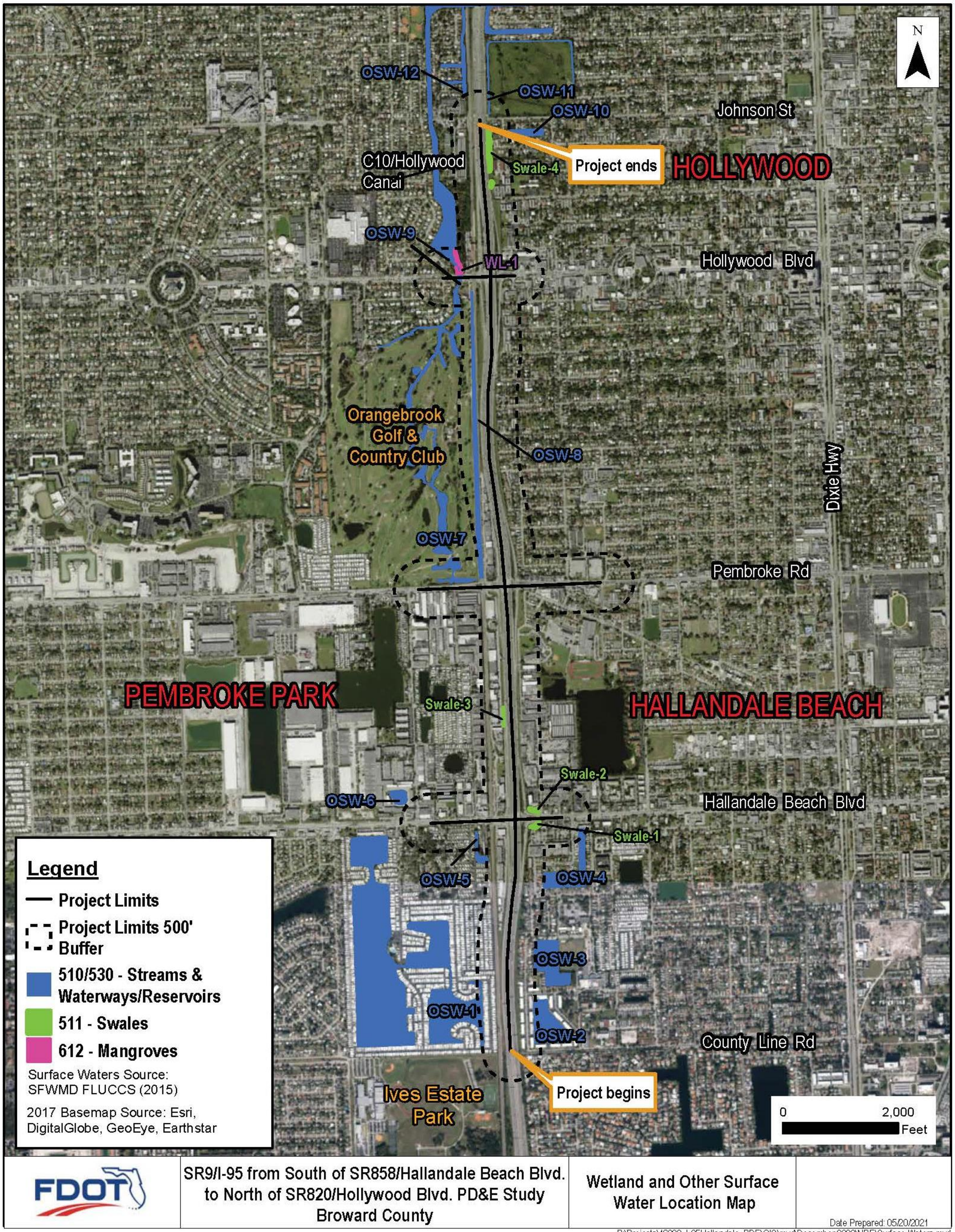


Figure 6.20 – Wetland and Surface Water Location Map

Table 6.12 – Wetland and Surface Water Locations

ID	FLUCCC ode	NWI Code	Approx. Area Within 500' Buffer (AC)	Description	Dominant Wetland Vegetation	Hydric Soils (Historic)	Hydrologic Connection to Waters of the US
WL-1	612	E1UBLx	0.43	Mangrove fringe west of I-95 bordering brackish C-10 Canal. The wetland is within the canal adjacent to Stan Goldman Park and Lions Park, just north of Hollywood Boulevard.	White mangrove (*Laguncularia racemose*) fringe, co-mingled with melaleuca, bald cypress, leather fern (*Acrostichum danaefolium*), and pond apple	Yes (Ok)	Yes
Swale-1	511	PEM1Cx	0.17	Wet drainage swale located to the east of I-95 just south of Hallandale Beach Boulevard.	Water hyssop (*Bacopa monieri*) and primrose willow *(Ludwigia spp.)*	No (Ur)	No
Swale-2	511	PEM1Cx	0.27	Wet drainage swale located to the east of I-95 just north of Hallandale Beach Boulevard.	Water hyssop, bald cypress Pennywort (*Hydrocotyle spp.)*, and primrose willow	No (Ur)	No
Swale-3	511	PEM1Cx	0.04	Wet stormwater swale located on the west side of I-95 between Pembroke Road and Hallandale Beach Boulevard.	Duck potato, spike rush, and primrose willow	No (US)	Yes
Swale-4	511	PFOCx	0.87	Wet stormwater swale located at the northern project limits, on the east side of I-95.	Bald cypress appears as part of existing landscaping adjacent to a motel	No (US)	Yes
OSW-1	530	L1UBHx	1.15	Large stormwater retention pond located within Park Lake Estates residential community, west of I-95, south of Hallandale Beach Boulevard. Between Marine Drive and Lake Shore Drive.	Not present	No (Ur)	No

Table 6.12 – Wetland and Surface Water Locations (Continued)

ID	FLUCCC ode	NWI Code	Approx. Area Within 500' Buffer (AC)	Description	Dominant Wetland Vegetation	Hydric Soils (Historic)	Hydrologic Connection to Waters of the US
OSW-2	530	PUBHx	1.14	Stormwater retention pond within Ro-Len Lakes Gardens residential community, east of I-95 between SW 10th Avenue and 11th Avenue.	Not present	No (AU)	No
OSW-3	530	PUBHx	0.42	Stormwater retention pond within residential community and Hallandale Elementary School, east of I-95 and just north of SW 8th Street.	Not present	Yes (DU)	No
OSW-4	530	PUBHx	0.62	Stormwater retention pond within single-family residential community and commercial facilities east of I-95, between Hallandale Beach Boulevard and SW 3rd Street.	SAV: Tapegrass	No (AU)	No
OSW-5	530	PUBHx	0.39	Stormwater retention pond within Green Acres Village residential community and commercial facilities. The pond is located west of I-95 between Green Acres Road and Country Club Lane.	Bald cypress and marsh fern (*Thelypteris palustris*)	No (Ur)	No
OSW-6	530	PUBHx	0.01	Stormwater retention pond located within Lakeside Business Park, west of I-95 and north of Hallandale Beach Boulevard.	Water hyssop and melaleuca	No (Ud)	No
OSW-7	530	PUBHx/ PEM1Fx	1.49	Stormwater retention pond within the Orangebrook Golf and Country Club. Multiple culverts surround and discharge to this drainage feature, which flows connects to other ponds within the country club.	Torpedo grass (*Panicum repens*), water hyssop , spike rush, and primrose willow	No (Ar); Yes (Da)	Yes

Table 6.12 – Wetland and Surface Water Locations (Continued)

ID	FLUCCC ode	NWI Code	Approx. Area Within 500' Buffer (AC)	Description	Dominant Wetland Vegetation	Hydric Soils (Historic)	Hydrologic Connection to Waters of the US
OSW-8	530	PUBHx	7.60	Large stormwater retention ditch, concrete-lined that temporarily stores water to the west of I-95, in between Orangebrook golf and country club and railroad tracks. No vegetation observed	Not present	Yes (Du)	Yes
OSW-9	510	E1UBLx/ R5UBH	2.61	This waterbody is part of the C-10 Canal. Multiple culverts surround and discharge to this drainage feature, which flows under Hollywood Boulevard and connects to the Orangebrook Golf & Country Club.	Not Present, No SAV Associated with WL-1	No (Ar); Yes (Ok)	Yes
OSW-10	530	PUBHx	0.05	Stormwater retention area within single-family residential homes, located east of I-95 between Johnson and Lincoln Streets. Multiple culverts surround and discharge to this drainage feature.	Not present	No (Ar)	Yes
OSW-11	530	R5UBH	0.19	Stormwater retention area within Sunset Golf Club. Dominated by open water; multiple culverts surround and discharge to this drainage feature.	Australian pine, Brazilian pepper, swamp fern (*Blechnum serrulatum*)	Yes (Ok)	Yes
OSW-12	510	E1UBLx	<0.01	This waterbody is part of the C-10 Canal.	Cocoplum (*Chrysobalanus icaco) and* pond apple on bank	No (Ar)	Yes

FLUCCS: 510 – Streams and Waterways; 511/600 – Swale/Wetland; 530 – Reservoirs/Retention Ponds; 612 – Mangroves
NWI: L1UBHx = Lacustrine, limnetic, unconsolidated bottom, excavated; PUBHx = Palustrine, unconsolidated bottom, excavated; PEM1Fx = Palustrine, emergent, persistent, semipermanently flooded, excavated; E1UBLx = Estuarine, subtidal, unconsolidated bottom, subtidal, excavated; R5UBH = Riverine, unknown perennial, unconsolidated bottom, permanently flooded; PEM1Cx = Palustrine, eme2rgent, persistent, seasonally flooded, excavated; PFOCx = Palustrine, forested, seasonally flooded, excavated.
Soils: Ar = Arents, organic substratum-Urban land complex; Ok = Okeelanta muck, drained, 0 to 1 percent slopes; Da = Dade fine sand; Ud = Udorthents; AU = Arents-Urban land complex; DU = Dade-Urban land complex; US = Udorthents, shaped; Ur = Urban land; W = Water

6.2.4.1 Direct and Secondary Impacts

Direct impacts include placement of fill for roadway construction and fill/excavation of stormwater swales. For the purposes of this wetland impact assessment, impacts to wet swales and other surface waters were calculated based on the preferred alternative. No natural wetland systems will be impacted by the project. Direct impacts to stormwater swales within the existing I-95 ROW are anticipated due to construction activities. It is estimated that a total of 1.35 acres of other surface waters (stormwater features) will be impacted. **Table 6.13** summarizes the direct impacts to stormwater swales (acreage) for the preferred alternative.

Table 6.13 – Summary of Potential Direct Wetland and Surface Water Impacts

ID	FLUCCS Code	Size (Ac)	Preferred Alternative Direct Impact (Ac)
WL-1	612	0.43	0.00
Swale-1	511	0.17	0.17
Swale-2	511	0.27	0.27
Swale-3	511	0.044	0.04
Swale-4	511	0.87	0.87
OSW-1	530	1.15	0.00
OSW-2	530	1.14	0.00
OSW-3	530	0.42	0.00
OSW-4	530	0.62	0.00
OSW-5	530	0.39	0.00
OSW-6	530	0.01	0.00
OSW-7	530	1.49	0.00
OSW-8	530	7.60	0.00
OSW-9	510	2.61	0.00
OSW-10	530	0.05	0.00
OSW-11	530	0.19	0.00
OSW-12	510	0.002	0.00
Total Direct Impacts			**1.35**

In accordance with State criteria, water quality will be treated prior to discharge to receiving waters. Therefore, secondary impacts are not anticipated as a result of this project.

6.2.4.2 Avoidance and Minimization

One fringe mangrove wetland is located within the C-10 Canal, just north of Hollywood Boulevard and west of I-95. Man-made stormwater swales and surface water littoral shelves are located immediately adjacent to the existing roadway. Therefore, complete avoidance and minimization of impacts to these swales and surface waters is not possible nor practicable and still meet the purpose and need of the project. However, impacts to Wetland 1 (mangrove wetland) have been avoided. Avoidance and minimization will continue to be incorporated as practical throughout the PD&E and Design processes.

The proposed roadway improvements' stormwater management facilities for the preferred alternative will meet FDOT drainage criteria, SFWMD permit criteria, and use best management practices (BMPs) in accordance with the current *FDOT's Standard Specifications for Road and Bridge Construction*.

6.2.4.3 Wetland Functional Assessment and Mitigation

Impacts to Wetland 1 are not anticipated. Therefore, a UMAM evaluation was not prepared. Impacts to surface waters do not require a functional assessment as mitigation for these impacts is typically not required.

6.2.5 Protected Species and Habitat

This project was evaluated for impacts to wildlife and habitat resources, including protected species in accordance with *50 Code of Federal Regulations (CFR) Part 402 of the Endangered Species Act (ESA) of 1973, as amended, and Part 2, Chapter 16 (July 1, 2020) of the FDOT PD&E Manual.* Wildlife species are protected under the ESA, the *Migratory Bird Treaty Act (MBTA*), and the State of Florida, pursuant to *Florida Statute 379.411*.

Both wetland and upland habitats, as well as surface waters, exist within the project corridor, providing potential nesting and foraging habitat for federal and state-listed species. The C-10 Canal is accessible to the West Indian (Florida) manatee and American crocodile, and brackish mangrove wetlands in this canal provide suitable foraging habitat for listed wading birds. Other surface waters are adjacent to the project area, including retention ponds that also contain some foraging habitat for wading birds. Upland drainage swales, four wet swales, and other maintained grassed areas are located within the project's ROW. These areas provide marginal habitat for the eastern indigo snake, burrowing owl, gopher tortoise, and associated commensal species.

The project study area was evaluated for potential occurrences of federally listed and state listed plant and animal species. Throughout the urban, developed corridor, a combination of windshield surveys and pedestrian transects were used to conduct the field reviews. Existing conditions field reviews were initially conducted on February 24 and 27, 2017 during daylight hours, within 500 feet from both sides of the road centerlines within the proposed study area. Additional field reviews were conducted to update previously identified resources. These field verification reviews were conducted on September 22, 2020 and November 18, 2020 during daylight hours between 9:00 am and 5:00 pm, within 500 feet from both sides of the road centerlines. All previously identified features were still existing within project buffer. Benthic surveys were conducted in the C-10 Canal on August 23, 2017 and September 16, 2020. The benthic surveys involved transects within the canal, extending 100 feet from the northern and southern end of the Hollywood Boulevard Bridge. In accordance with the results of the United States Fish and Wildlife Service (USFWS) coordination, acoustical surveys are required due to the number of tall palm trees that meet the FWS criteria for roosting habitat (minimum 25' in height and 8" DBH) adjacent to the project corridor. These tall palms may be used for nesting by the Florida bonneted bat. The FDOT is currently coordinating with the USFWS.

The project is located within the USFWS Consultation Areas for the Everglade snail kite (Rostrhamus sociabilis plumbeus), American Crocodile (Crocodylus acutus), and the Florida bonneted bat (Eumops floridanus).

The project was screened through the ETDM Process (ETDM Project #14254) in 2016. The USFWS, FWC and Federal Highway Administration (FHWA) commented the project will have "Minimal" effect on wildlife and habitat. The FWS further indicated that the following federally listed species have potential to occur in or near the project site: American crocodile, eastern indigo snake, and the West Indian manatee.

6.2.5.1 Species Occurrence and Effect Determinations

Based on the results of the combined desktop and on-site reviews, the federally-listed species with potential to exist within or adjacent to the project corridor are presented in ***Table 6.14.*** Each species was assigned as no, low, moderate, or high likelihood of occurrence within the study area based on the following definitions:

- **No** – The corridor is outside the species' known range or the corridor is within the species' range but no suitable habitat for, or previous documentation of this species occurs, within the corridor, and it was not observed during field reviews.
- **Low** – The corridor is located within the species' known range and minimal or marginal quality habitat is present within or adjacent to the corridor. However, there are no documented occurrences of the species in the vicinity and it was not observed during field reviews.
- **Moderate** – The corridor is within the species' range and suitable habitat exists; but there are no known occurrences of the species and it was not observed during field reviews.
- **High** – The project is within the species' known range, suitable habitat exists within the corridor, there is a minimum of one documented occurrence of the species within the corridor and/or the species was observed during field reviews.

Note that species listed as federally endangered or threatened are also listed by the State of Florida as endangered or threatened.

Table 6.14 – Federally Listed Species with the Potential to Occur in the Project Area

Scientific Name	Common Name	Listing Status	Probability of Occurrence
REPTILES			
Drymarchon corais couperi	Eastern Indigo Snake	FT	Low
Crocodylus acutus	American Crocodile	FT	Low
BIRDS			
Mycteria americana	Wood Stork	FT	Moderate
Rostrhamus sociabilis plumbeus	Everglade Snail Kite	FE	Low
MAMMALS			
Trichechus manatus latirostris	West Indian (Florida) Manatee	FT	Moderate
Eumops floridanus	Florida Bonneted Bat	FE	Moderate
PLANTS			
Halophila johnsonii	Johnson's Seagrass	FT	No

Note: FT = Federally-designated Threatened; FE = Federally-designated Endangered

Sources: *FWC. May 2017. Florida's Endangered Species, Threatened Species and Species of Special Concern. Official Lists; FNAI. 2017. Biodiversity Matrix; USFWS. 2017. ECOS; USFWS. September 2006. Central and Southern Florida Project Manatee Accessibility. SFWMD Fort Lauderdale Field Station. 2019 Florida Bonneted Bat Consultation Key.*

The *ETDM Summary Report #14254* indicated minimal involvement with state-listed species. Based on our field reviews, some state–listed species could be present within the study area. These species are listed in ***Table 6.15***.

Table 6.15 – State-Listed Species with the Potential to Occur in the Project Area

Scientific Name	Common Name	Listing Status	Probability of Occurrence
REPTILES			
Gopherus polyphemus	Gopher Tortoise	ST	Low
BIRDS			
Athene cunicularia floridana	Florida Burrowing Owl	ST	Moderate
Egretta caerulea	Little Blue Heron	ST	High
Egretta tricolor	Tricolored Heron	ST	High

Note: ST = State-designated Threatened, **Sources**: FWC. January 2017. Florida's Endangered Species, Threatened Species and Species of Special Concern. Official Lists; FNAI. 2017. Biodiversity Matrix

Potential habitat within the corridor is moderate for the American crocodile, West Indian manatee, Florida bonneted bat, wood stork and burrowing owl, and high for the little blue heron, and tricolored heron. Impacts to listed species are not anticipated with the preferred alternative.

Direct impacts are caused by an action/project and occur at the same time and place as that action/project. Fill placement in wading bird nesting or foraging habitat is one example of a direct impact. The potential effect of the preferred alternative on each federally-listed and state-listed species is summarized in ***Tables 6.16*** and ***Table 6.17***, respectively.

Table 6.16 – Federally Listed Species Determination of Effect

Scientific Name	Common Name	Listing Status	Determination of Effect - Preferred Alternative**
REPTILES			
Drymarchon corais couperi	Eastern Indigo Snake	FT	MANLAA
Crocodylus acutus	American Crocodile	FT	NE
BIRDS			
Mycteria americana	Wood Stork	FT	MANLAA
Rostrhamus sociabilis plumbeus	Everglade Snail Kite	FE	NE
MAMMALS			
Trichechus manatus	West Indian Manatee	FT	NE
Eumops floridanus	Florida Bonneted Bat	FE	TBD***
PLANTS			
Halophila johnsonii	Johnson's Seagrass	FT	NE

Note: FT = Federally-designated Threatened; FE = Federally-designated Endangered
** NE = No Effect; MANLAA = May Affect, Not Likely to Adversely Affect, TBD = To Be Determined
*** Per USFWS acoustical survey required. FDOT coordinating with FWS on appropriate determination of effect.

Table 6.17 – State Listed Species Determination of Effect

Scientific Name	Common Name	Listing Status	Determination of Effect - Preferred Alternative
REPTILES			
Gopherus polyphemus	Gopher Tortoise	ST	No Adverse Effect
BIRDS			
Athene cunicularia floridana	Florida Burrowing Owl	ST	No Adverse Effect
Egretta caerulea	Little Blue Heron	ST	No Adverse Effect
Egretta tricolor	Tricolored Heron	ST	No Adverse Effect

Note: ST = State Threatened

A discussion of potential impacts to each of the species listed in the above tables is included in the *Natural Resources Evaluation (NRE),* a companion document to this PD&E Study. During construction of this project, the FDOT's contractor will adhere to the most recent version of the U.S. Fish and Wildlife Service's Standard Protection Measures for the Eastern Indigo Snake to minimize the potential for adverse effects. A copy of the NRE has been appended to the environmental document and uploaded to the project file in SWEPT.

6.2.5.2 Critical Habitats

Critical habitat is a specific, federally-designated, geographic area that is essential for the conservation of a threatened or endangered species that may require special management and protection. In accordance with the USFWS IPaC database, there are no critical habitats in this area.

6.2.5.3 Concurrence

FDOT is currently coordinating with USFWS to obtain concurrence on the determination of effects to federally listed species. USFWS concurrence is pending.

6.2.6 Essential Fish Habitat

This project was evaluated for impacts to Essential Fish Habitat (EFH) in accordance with *16 U.S.C 1801 of January 12, 2007, as amended, Magnuson-Stevens Fishery Conservation and Management Act,* and *Part 2, Chapter 17 (July 1, 2020) of the FDOT PD&E Manual*. EFH describes all waters and substrate necessary for fish to spawn, breed, feed, or grow to maturity. The National Marine Fisheries Service (NMFS) is the agency with jurisdiction and although the *NMFS EFH Mapper* does not indicate EFH in the project area, the *ETDM Summary Report #14254* references the occurrence of moderate quality estuarine (mangrove) wetlands along the C-10 Canal where it runs adjacent to I-95 and where Hollywood Boulevard crosses the C-10 Canal. Mangrove habitat is designated EFH by the South Atlantic Fishery Management Council (SAFMC), as well as a Habitat Areas of Particular Concern (HAPC). The HAPC's are subsets of EFH that are rare, ecologically important, susceptible to human-induced degradation, or located in an environmentally stressed area. Mangroves provide nursery, foraging, and refuge habitat for federally managed fishery species (e.g. snapper/grouper species), as well as for other commercially and recreationally important fish. Additionally, mangroves control runoff and turbidity by stabilizing sediment, indirectly supporting fishery habitat.

EFH was observed north of the Hollywood Boulevard Bridge and occurs along both the east and west sides of the C-10 Canal and consists of white mangroves. This area may provide foraging, nursery and refuge habitat for the numerous small juvenile fish observed north and south of the Hollywood Boulevard Bridge. No other EFH was observed during the field reviews or two benthic surveys.

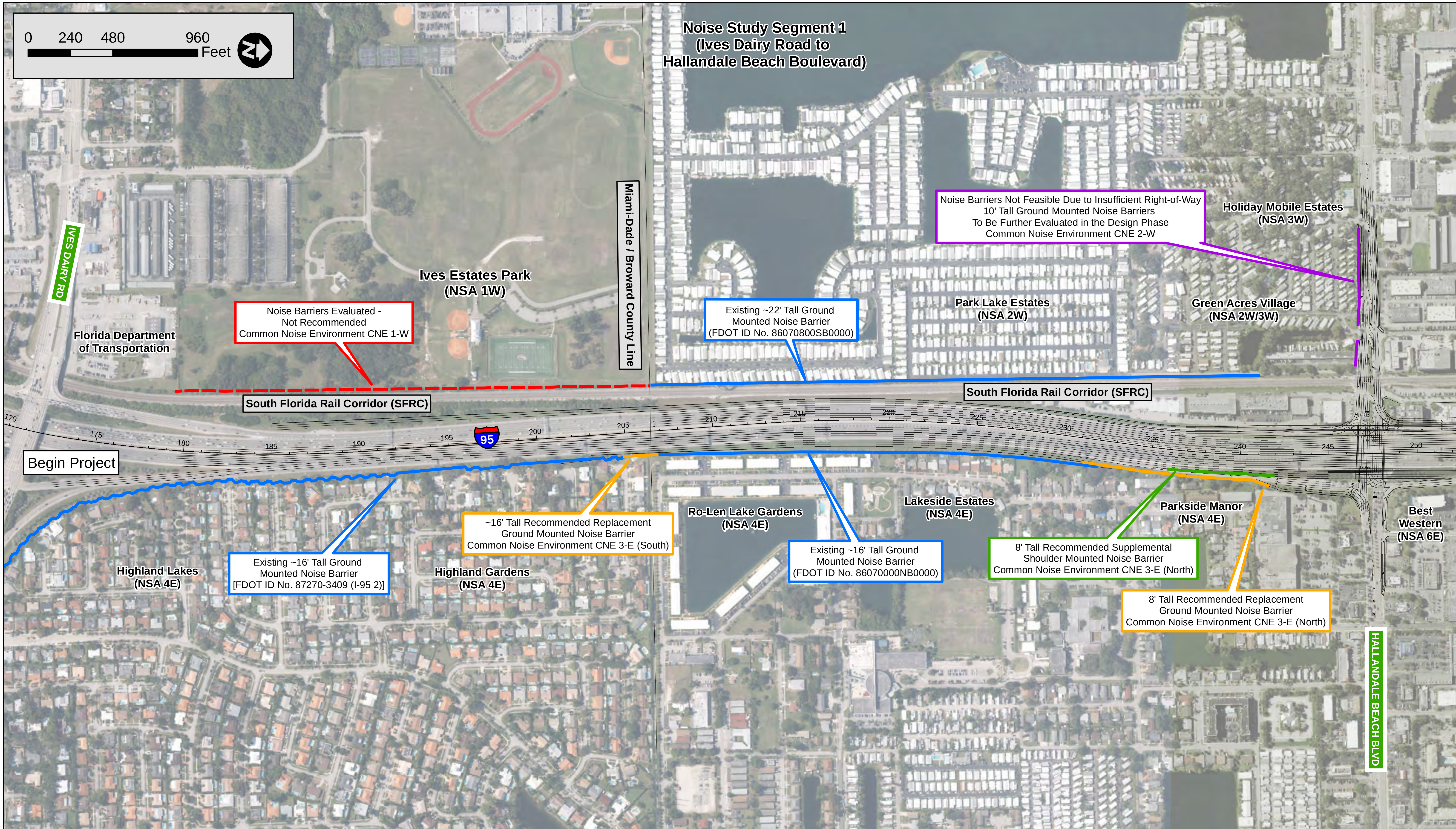
Work on the Hollywood Bridge over the C-10 Canal is no longer proposed, and no other in-water work is proposed within the C-10 Canal. Therefore, no impacts to EFH are anticipated by this project and consultation with NMFS is not required.

6.2.7 HIGHWAY TRAFFIC NOISE

The information presented in this section is a summary of the I-95 Noise Study Report (NSR), companion document to this study. A traffic noise study was performed in accordance with 23 CFR 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise (July 13, 2010), the FDOT's PD&E Manual, Part 2, Chapter 18, Highway Traffic Noise (July1, 2020), and FDOT's Traffic Noise Modeling and Analysis Practitioners Handbook (December 31, 2018).

Design year (2045) traffic noise levels for the preferred alternative will approach [i.e., within 1 dB(A)], meet, or exceed the Noise Abatement Criteria (NAC) at 182 residences and seven special land use sites within the project limits within 13 Noise Study Areas (NSAs). In accordance with FHWA and FDOT policies, the feasibility and reasonableness of noise barriers were considered for these impacted noise sensitive sites.

Noise barriers were not considered a feasible abatement at two of the 13 impacted NSAs (i.e., 12W and 18W) since an effective noise barrier at these locations would block direct access to these noise sensitive areas. NSA 12W represents two impacted residences within Central Golf Section of Hollywood subdivision (i.e., NSA 12W) located west of I-95 and south of Hollywood Boulevard. The southern portion of NSA 18W represents the outdoor use areas associated with Lions Park located west of I-95 and north of Hollywood Boulevard. The locations of this subdivision and park are depicted in ***Figure 6.21***.



I-95 (SR 9) PD&E Study from
South of Hallandale Beach Boulevard (SR 858)
to North of Hollywood Boulevard (SR 820)
Broward County, Florida
FPID No. 436903-1-22-02

FDOT

Noise Barriers

- Existing Noise Barrier to Remain
- Replacement of Existing Noise Barrier
- Supplemental Noise Barrier
- Noise Barrier Not Feasible
- Not Recommended Noise Barrier
- Proposed Improvements

July 2021

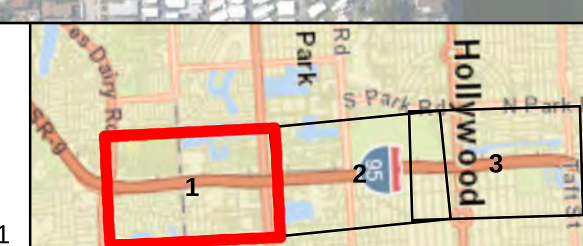


Figure 6.21
Noise Barrier Recommendation Map
Sheet 1 of 3

I-95 (SR 9) PD&E Study from
South of Hallandale Beach Boulevard (SR 858)
to North of Hollywood Boulevard (SR 820)
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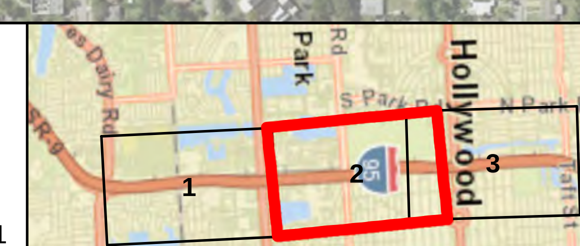
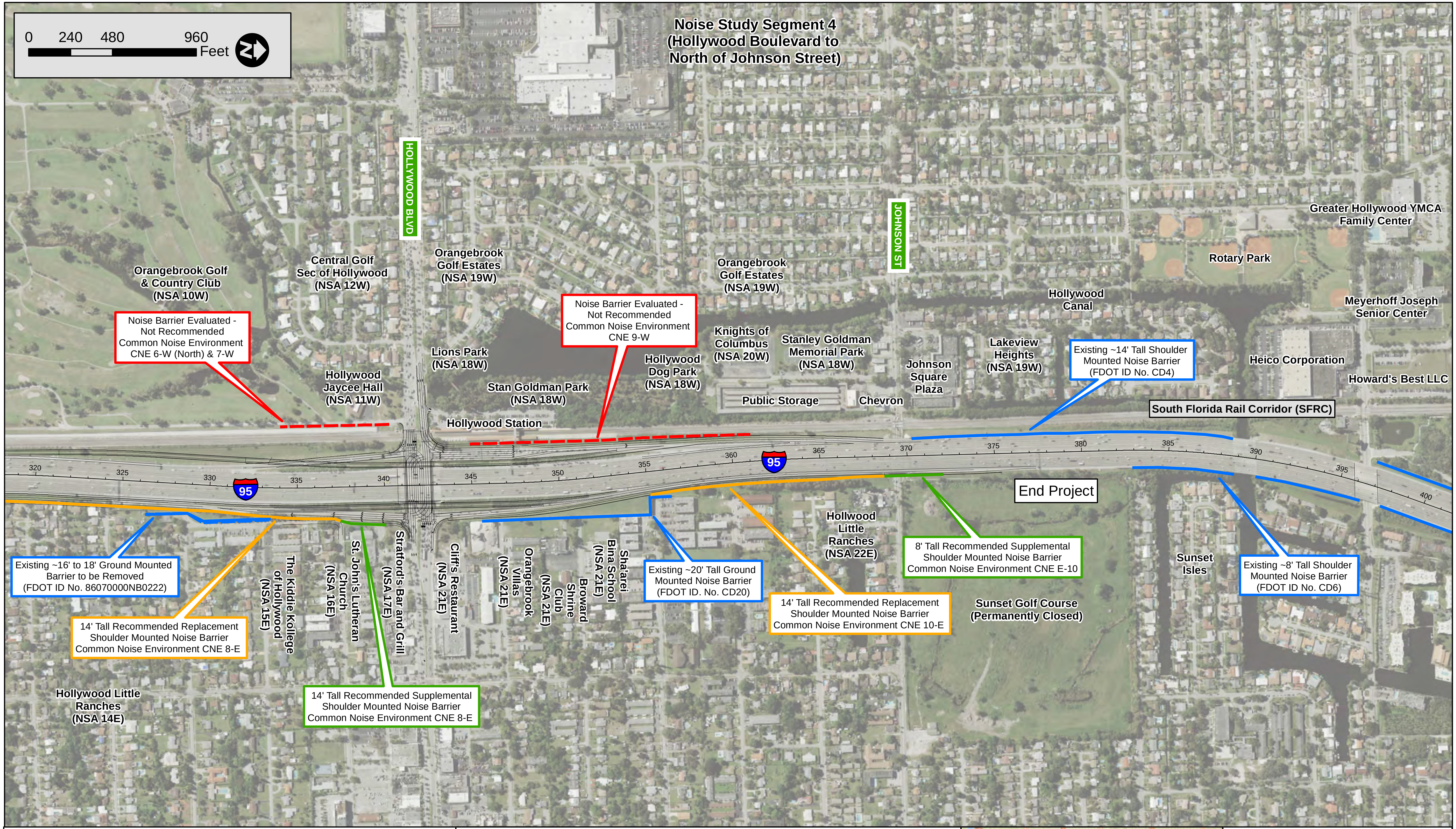


Figure 6.21
Noise Barrier Recommendation Map
Sheet 2 of 3



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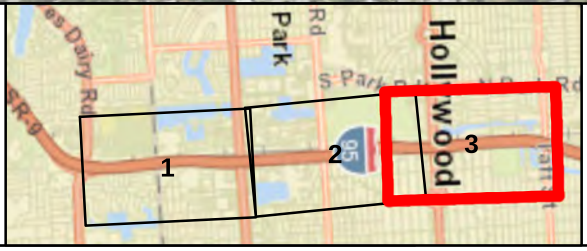

Figure 6.21
Noise Barrier
Recommendation Map
Sheet 3 of 3

Noise barriers were evaluated for 180 of 182 residences and five of the seven special land use sites that approach, meet, or exceed the NAC. Ten separate Common Noise Environments (CNEs) were used to assess noise barriers at these locations (i.e., CNE 1-W through CNE 10-E). The results of the noise barrier analysis for each of these CNEs are summarized in ***Table 6.18***. Of the 10 CNEs presented in ***Table 6.18***, noise barriers are recommended for further consideration during the project's design phase and for public input at four locations (CNEs 2-W, 3-E, 8-E, and 10-E). Noise barriers are not recommended for further consideration at six locations (CNEs 1-W, 4-E, 5-E, 6-W, 7-W, and 9-W). The locations and limits of the noise barriers (both recommended and not recommended) are depicted on ***Figure 6.21*** and presented in ***Table 6.18***.

Noise barriers at one (i.e., CNE 2-W) of the four CNEs where noise barriers have been recommended for further consideration during the project's design phase are not currently considered feasible. The optimal conceptual barrier design at this location meets FDOT's noise barrier cost criteria of equal to or less than $42,000 per benefited receptor site and FDOT's noise reduction reasonableness criteria of 7 dB(A) at one or more impacted sites. However, there does not appear to be sufficient right-of-way to construct a noise barrier at this location along the southside of Hallandale Beach Boulevard in the vicinity of the Green Acres Villages and Holiday Mobile Estates communities. Although noise barriers are not currently considered feasible, they are recommended for further evaluation at this location during the project's design phase when additional design information including topographical survey would be available to confirm the available right-of-way at this location. The recommended noise barrier system at this location is expected to reduce traffic noise by at least 5 dB(A) at 20 residences including the three impacted residences within these residential communities. The estimated cost of the recommended noise barrier system is $228,000.

Table 6.18 - Noise Barrier Evaluation Summary and Recommendations

Noise Sensitive Area Name / Number	Common Noise Environment (CNE) Identification Number/ (Conceptual Noise Barrier Design Number)	Optimized Conceptual Noise Barrier Design					Number of Impacted Receptor Sites	Number of Impacted/ Benefited Receptor Sites	Number of Benefited Receptor Sites/ Not Impacted	Total Number of Benefited Receptor Sites	Average Noise Reduction for all Benefited Receptor Sites dB(A)	Maximum Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Optimal Barrier Design Meet FDOT's Reasonable Noise Abatement Criteria of $42,000 per Benefited Receptor Site and 7.0 dB(A) Noise Reduction Design Goal and Feasible?	Noise Barrier Recommended for Further Consideration and Public Input?	Comments
		Noise Barrier Type (Segment)	Height (feet)	Length (feet)	Begin Station Number	End Station Number											
Ives Estates Park - West of I-95 between Ives Dairy Road and Miami-Dade / Broward County Line / NSA 1 W	CNE 1-W (CD 1W-4)	Ground Mounted	22	2,740	179+20	206+60	Special Land Use	--	--	--	7.8	10.3	$1,808,400	--	NO (Usage of Park Recreational Facilities Less Than Required to be Cost Reasonable)	NO	Represents the optimal conceptual noise barrier design; Does not meet the Reasonableness Cost Criteria for special land uses; Noise barriers are not recommended for further consideration or public input during the project's design phase at this location.
Green Acres Village and Holiday Mobile Estates - South of Hallandale Beach Boulevard and West of I-95 / NSA 3W	CNE 2-W (CD 2W-2)	Ground Mounted (Segment 1 of 2)	10	590	132+00	137+90	3	3	17	20	6.8	8.8	$228,000	$11,400	NO (Not Feasible - Insufficient Right-of-way to Constructed Noise Barrier)	***Yes (See Comments)***	Not considered a feasible abatement measure due to insufficient existing right-of-way to accommodate a noise barrier at this location; Noise barriers are recommended to be further evaluated at this location during the project's design phase when additional design information including topographical survey would be available.
		Ground Mounted (Segment 2 of 2)	10	170	138+30	140+00											
Highland Gardens and Parkside Manor Communities - East of I-95 and between Ives Dairy Road and Hallandale Beach Boulevard / NSA 4E	CNE 3-E (CD 3E-1S and CD 3E-4N)	South Segment - Replacement Ground Mounted Noise Barrier	16	200	204+80	206+80	11	2	0	2	9.6	12.3	$96,000	$48,000	NO (Not Required - In-Kind Replacement Noise Barrier)	***Yes (Replacement Noise Barriers)***	Two segments of the existing ground mounted noise barrier are physically impacted by the widening of I-95 and require replacement; Represents the optimal conceptual replacement noise barrier system design and is recommended for further consideration and public input in the project's design phase.
		North Segment - Replacement Shoulder Mounted Noise Barriers	14	1,080	231+00	241+80	47	43	11	54	8.1	12.1	$597,600	$11,067	YES (Not Required - Replacement Noise Barrier System)		
		North Segment - Supplemental Shoulder Mounted Noise Barrier	8	600	236+00	242+00											
Meekins Addition No.1 Subdivision - East of I-95 and South of Pembroke Road / NSA 8E	CNE 4-E (CD 4E-5)	Shoulder Mounted (Off Ramp)	8	700	274+00	281+00	2	2	0	2	5.2	6.2	$786,600	$393,300	NO	NO	Represents the optimal conceptual noise barrier design; Does not meet the Cost Reasonable Criteria and the minimum noise reduction design goal of 7 dB(A); Noise barriers are not recommended for further consideration or public input during the project's design phase at this location.
		Ground Mounted Noise Barrier (I-95 Eastern Right-of-Way Line)	22	610	281+00	287+00											
		Shoulder Mounted (CD Road)	8	900	278+00	287+00											
Choices Children's Academy - East of I-95 and South of Pembroke Road / NSA 9E	CNE 5-E (CD 5E-4)	Ground Mounted (I-95 Eastern Right-of-Way Line)	22	560	283+00	287+60	Special Land Use	---	---	---	6.7	8.2	$933,600	---	NO (Usage of Park Recreational Facilities Less Than Required to be Cost Reasonable)	NO	Represents the optimal conceptual noise barrier design; Does not meet the Reasonableness Cost Criteria for special land uses; Noise barrier are not recommended for further consideration or public input during the project's design phase at this location.
		Shoulder Mounted (Off Ramp)	8	600	275+00	281+00											
		Shoulder Mounted (Off Ramp)	14	600	281+00	287+00											
		Shoulder Mounted (I-95 Northbound)	8	700	280+00	287+00											
Orangebrook Golf & Country Club - West of I-95 between Pembroke Road and Hollywood Boulevard / NSA 10W	CNE 6-W (CD 6W-4S and CD 6W-1N)	Ground Mounted Noise Barrier (South Segment)	22	260	289+40	292+00	Special Land Use	--	--	--	6.2	7.1	$171,600	--	NO (Usage of Golf Course Less Than Required to be Cost Reasonable)	NO	Represents the optimal conceptual noise barrier design; Does not meet the Reasonableness Cost Criteria for special land uses; Noise barrier are not recommended for further consideration or public input during the project's design phase at this location.
		Ground Mounted Noise Barrier (North Segment)	16	460	334+00	338+60		--	--	--	6.7	7.7	$220,800	--			
Hollywood Jaycee Hall - West of I-95 and South of Hollywood Boulevard / NSA 11W	CNE 7-W (CD 7W-2)	Ground Mounted Noise Barrier	22	280	337+80	340+60	Special Land Use	---	---	---	7.2	7.2	$184,800	---	NO (Usage of Parks and Recreational Facilities Less Than Required to be Cost Reasonable)	NO	Represents the optimal conceptual noise barrier design; Does not meet the Reasonableness Cost Criteria for special land uses; Noise barrier are not recommended for further consideration or public input during the project's design phase at this location.
South Hollywood, Bermack Heights, The Town Colony Condominiums, Jaxon Heights, and Hollywood Little Ranches Communities - East of I-95 between Pembroke Road and Hollywood Boulevard / NSA 14E and St. John's Lutheran Church / NSA 16E	CNE 8-E (CD 8E-3)	Segment 1 of 4 - Replacement Shoulder Mounted Noise Barrier	14	2,900	298+30	327+30	90	74	5	79	7.9	11.1	$1,772,400	$22,435	YES (Not Required - Replacement Noise Barrier System)	***Yes (Replacement Noise Barriers)***	Segments of the existing noise barrier are physically impacted by the widening of I-95 and require replacement; Represents the optimal conceptual replacement noise barrier system design and is recommended for further consideration and public input in the project's design phase; St. John's Lutheran Church playground would receive incidental benefit from this conceptual noise barrier design.
		Segment 2 of 4 - Replacement Shoulder Mounted Noise Barrier	14	570	327+30	333+00											
		Segment 3 of 4 - Replacement Shoulder Mounted Noise Barrier	14	440	333+00	337+40											
		Segment 4 of 4 - Supplemental Shoulder Mounted Noise Barrier	14	310	337+40	340+50											
Stan Goldman Park and Hollywood Dog Park - West of I-95 and North of Hollywood Boulevard / NSA 18W	CNE 9-W (CD 9W-3)	Ground Mounted Noise Barrier (I-95 Western Right-of-Way Line)	20	1,600	345+00	361+00	Special Land Use	---	---	---	6.1	7.3	$960,000	---	NO (Usage of Parks and Recreational Facilities Less Than Required to be Cost Reasonable)	NO	Represents the lowest cost conceptual noise barrier design; The conceptual design meets FDOT's 7.0 dB(A) Noise Reduction Design Goal, but does not meet the Reasonableness Cost Criteria; A noise barrier is not recommended for further consideration or public input during the project's design phase at this location.
Hollywood Little Ranches - East of I-95 and North of Hollywood Boulevard / NSA 22E	CNE 10-E (CD 10E-4)	Segment 1 of 2 - Replacement Shoulder Mounted Noise Barrier	14	1,350	355+20	368+70	27	27	1	28	8.6	12.9	$646,200	$23,079	YES (Not Required - Replacement Noise Barrier System)	***Yes (Replacement Noise Barriers)***	Represents the optimal conceptual replacement noise barrier system design and is recommended for further consideration and public input in the project's design phase; Segments of the existing noise barrier are physically impacted by the widening of I-95 and require replacement; 14-foot tall shoulder mounted noise barrier will require a design variation since it will be on an MSE wall.
		Segment 2 of 2 - Supplemental Shoulder Mounted Noise Barrier	8	330	368+70	372+00											

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Noise barriers at three of the four CNEs where noise barriers have been recommended for further consideration represent replacement noise barrier systems (i.e., CNEs 3-E, 8-E, and 10-E). At these three locations, the existing noise barriers or segments of the existing noise barriers, would be physically impacted by the proposed improvements and be required to be removed and replaced. The conceptual designs of these replacement noise barriers would be, at a minimum, an in-kind replacement or optimized with supplemental noise barriers to maximize the amount of noise reduction at the impacted noise sensitive receptors. In addition, the recommended conceptual noise barrier designs will meet the minimum noise reduction design goal of 7 dB(A) for at least one impacted residence. Since these are replacement noise barriers, the reasonable cost criteria of equal to or less than $42,000 per benefited receptor site is not applicable in accordance with FDOT's noise policy. The recommended replacement noise barriers at these three CNEs are expected to reduce traffic noise by at least 5 dB(A) at 163 residences including 146 of the 175 impacted residences within these areas. In addition, the recommended noise barrier system for CNE 8-E would provide incidental benefit to one of the impacted special land uses (i.e., NSA 16E representing a playground associated with St. John's Lutheran Church). The estimated cost of the recommended noise barriers is $3,112,200.

Additional noise barrier analysis will be performed during the project's design phase when more detailed project design information is available. It is during the project's design phase that final decisions regarding noise barrier length and height are made and an engineering constructability review is conducted to confirm that the noise barrier is feasible and support for noise barriers from the benefited noise sensitive sites is determined. Note that any of the 14-foot tall shoulder mounted noise barriers recommended for construction on a retaining or MSE wall will need approval in writing by the State Structures Design Engineer in accordance with FDOT's noise policy.

Noise barriers were not found to be feasible or cost reasonable at six CNEs. One of the six CNEs represent a residential area (i.e., 4-E). The other five represent non-residential/special land use sites (i.e., CNEs 1-W, 5-E, 6-W, 7-W, and 9-W). The cost of noise barriers at the residential areas would exceed FDOT's reasonable cost criteria of equal to or less than $42,000 per benefited receptor site and the optimal conceptual noise barrier design did not meet the minimum noise reduction design goal of 7 dB(A) for at least one impacted residence. The usages of the special land use sites were less than required to be cost reasonable.

Based on the noise analysis performed to date, there appears to be no apparent solutions available to mitigate the noise impacts at 33 of the 182 impacted residences or at five special land use sites along the project corridor. Therefore, impacts to these and other noise sensitive sites along the project corridor are an unavoidable consequence of the project.

Statement of Likelihood

FDOT is committed to the construction of feasible noise abatement measures (i.e., recommended noise barriers) at the noise impacted locations identified in ***Table 6.18*** and ***Figure 6.21*** upon the following conditions:

- Final recommendations on the construction of abatement measures are determined during the project's design and through the public involvement process;
- Detailed noise analyses during the final design process support the need, feasibility, and reasonableness of providing abatement;
- Cost analysis indicates that the cost of the noise barrier(s) will not exceed the cost reasonable criterion;
- Community input supporting types, heights, and locations of the noise barrier(s) is provided to the District Office; and
- Safety and engineering aspects as related to the roadway user and the adjacent property owner have been reviewed and any conflicts or issues resolved.

It is likely that the noise abatement measures for the identified locations will be constructed if found feasible based on the contingencies listed above. If, during the project's design phase, any of the contingency conditions listed above cause abatement to no longer be considered reasonable or feasible for a given location(s), such determination(s) will be made prior to requesting approval for construction advertisement. Commitments regarding the exact abatement measure locations, heights, and type (or approved alternatives) will be made during project reevaluation and at a time before the construction advertisement is approved.

6.2.8 CONTAMINATION

A Level 1 Contamination Screening Evaluation Report (CSER) was prepared using the *FDOT PD&E Manual, Part 2, Chapter 20* and standard contamination screening evaluation practices such as: reviewing regulatory agency records, site reconnaissance, literature review and when necessary, personal interviews of knowledgeable parties within the limits of the project.

A total of 52 potentially contaminated sites were identified and reviewed for potential impacts to the project corridor. Of these, 11 were ranked "High", 15 were ranked "Medium", 21 were ranked "Low", and five were ranked "No" for potential contamination concerns. See ***Figure 6.22*** and ***Figure 6.23*** for the locations of these sites and see ***Table 6.19*** for site names, descriptions, and risk ratings.

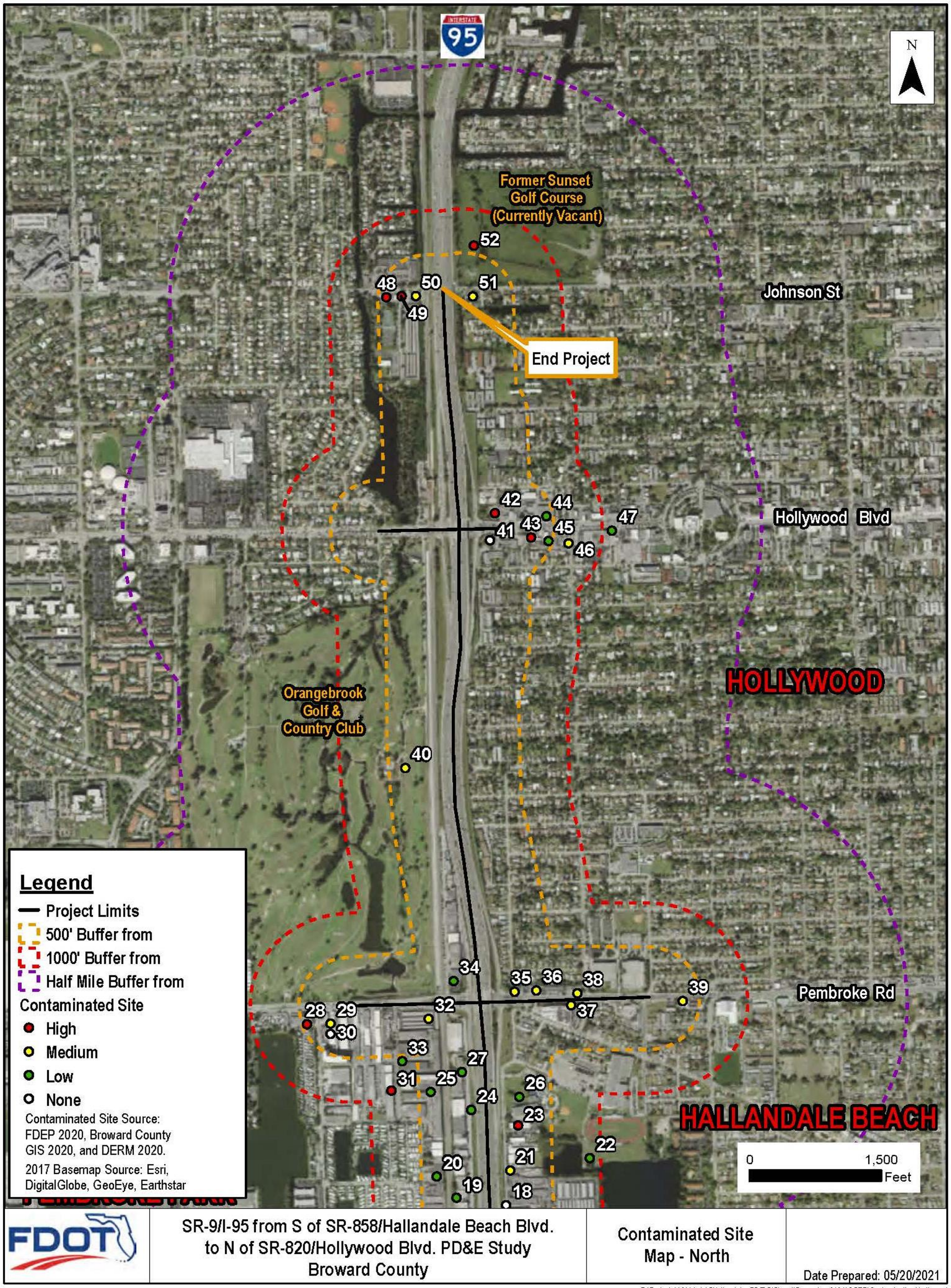

Figure 6.22 – Contamination Site Map (North)

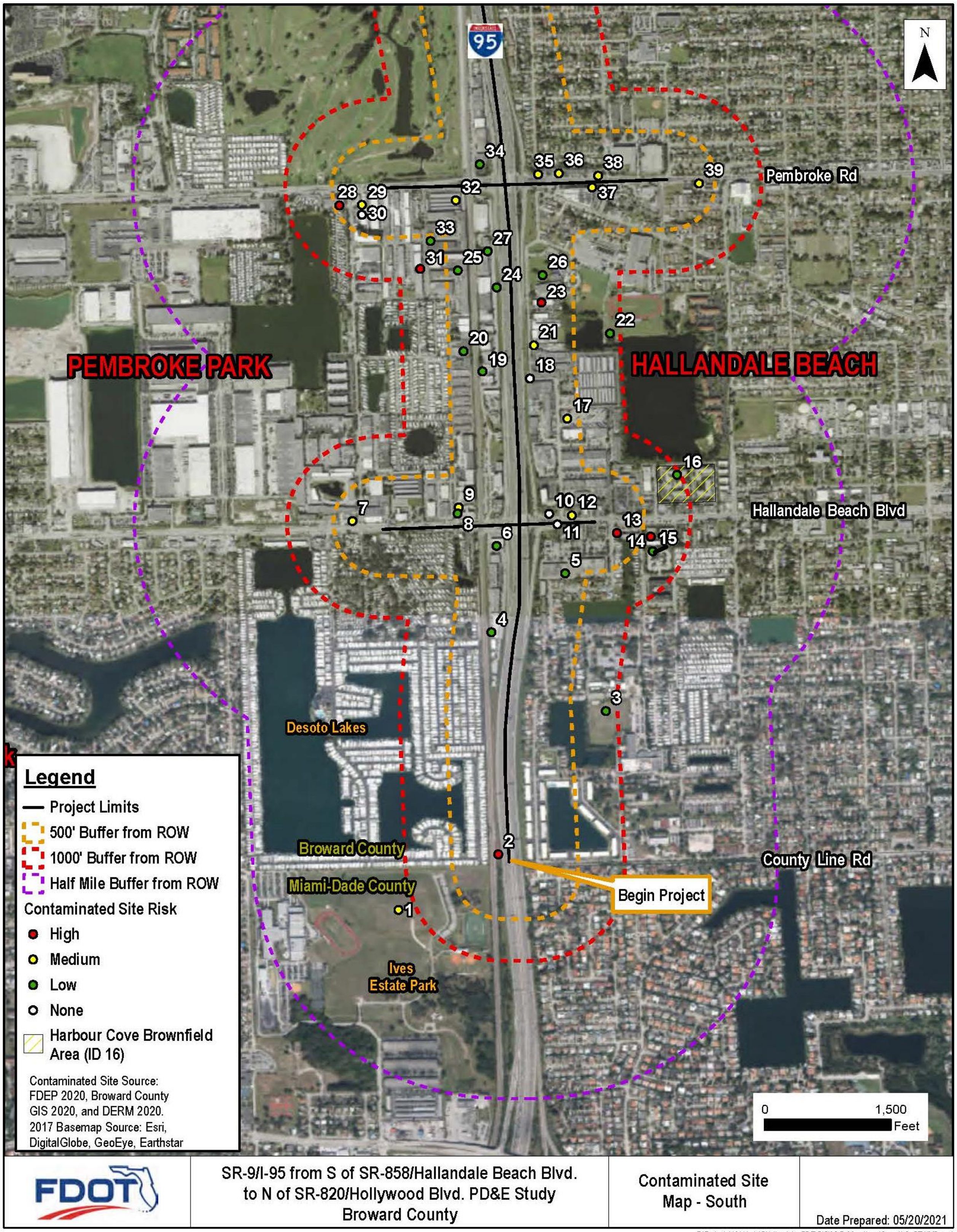

Figure 6.23 – Contamination Site Map (South)

Table 6.19 - Known and Potentially Contaminated Sites List

Site ID	Name	Address	Current / Former Name	County Permit or ID Number	FDEP Facility ID	Type of Contamination	Storage Tanks	Distance (approximate)	Notes	Status	Risk Rating
1	City of North Miami Beach OJUS Landfill	20735 NE 16th Avenue Miami, FL 33139	Ives Estates Park (Current)	SW-1179/File-12839	57134 ERIC_15135	Methane, ammonia	None registered	200 feet west of I-95 ROW	2016 data confirms contaminants above GCTLs. The site is a park.	Ongoing biennial groundwater monitoring for ammonia and annual groundwater monitoring for methane	M
2	Penn Tank Lines Inc. Roadside Spill	Southbound I-95 0.75 miles South of Exit 18 Hallandale Beach, FL 33020	None	None Recovered	9816414	Petroleum	None registered	Southbound on I-95 (on shoulder)	Roadside spill of 2,000 gallons; Source removal of 465 tons of contaminated soil and 12,190 gallons of petroleum contact water. Assessment ongoing.	Assessment Ongoing	H
3	City of Hallandale Beach DDMS #1	Field Behind 1000 SW 3rd Street Hallandale Beach, FL 33009	Gulfstream Academy at Hallandale Beach (Current)	None Identified	99011	None Recorded	None registered	800 feet east of I-95 corridor	Field used as Disaster Debris Management Site. Facility listed on FDEP WACS as NFA. Identied as a field for Gulfstream Academy of Hallandale Beach during site reconnaisance.	NFA	L
4	Dubs and Tires	2952 SW 30th Avenue Pembroke Park, FL 33009	None Identified	No HW permit	None Recorded	None Recorded	None registered	Adjacent to I95, 50 feet west of I-95 ROW	Auto tire and service station, providing AC, alignments, brakes, oil change, new tire and tire repair. Part of strip mall building.	Facility Active	L
5	Coin Laundry Dry Cleaners	1059 W Hallandale Boulevard Hallandale Beach, FL 33009	Laundry VIP	None Recovered	None Recovered	None Recorded	None Registered	230 feet west of I-95 project corridor 494 feet south of West Hallandale Beach Boulevard	Facility operates as a laundry with drycleaning services. Drycleaning services perfomed at offsite location.	Facility Active	L
6	Advanced Auto Parts #9479	3000 W Hallandale Beach Boulevard Pembroke Park, FL 33009	None Identified	HM-00485-19 00485	None Recorded	None Recorded	None	Adjacent to I95, west of ROW	Facility maintains a HAZMAT License as a retail trade with battery exchange or hazardous waste. Hazardous waste maintained at this site includes petroleum products, batteries and fluorescent bulbs.	Facility Active	L
7	Gas Station Services Corp.	3151 W Hallandale Beach Boulevard Pembroke Park, FL 33009	Moil (Current) Mobil Hallandale Amoco-Subco Superstop Hallandale	02181 ST-02181-20	9800048	Petroleum	3 USTs in service	Adjacent to the north side of the Hallandale Beach Boulevard corridor	No visible concern with petroleum/HAZMAT storage or spills during field survey. Minor non-compliance issues listed in 09/19 Facility Annual Compliance Inspection Report. Facility representative responded in May 2020 to provide evidence of a contractor hired to bring the facility in compliance.	Facility Active; Not in Compliance	M
8	Energy Dispatch LLC Tanker Truck Spill	East and West Sides of SW 31st Avenue & Hallandale Boulevard Pembroke Park, FL 33009	None Identified	09884	9803721	Petroleum Hydrocarbons	None Registered	Adjacent to the project corridor, north of ROW	Roadside spill of 2000 gallons East and West sides of SW 31st Street; Source removal of 465 tons of contaminated soil and 12,190 gallons of petroleum contact water. SRCO issued 11/20/2003 for 01/26/2001 discharge.	SRCO Issued	L
9	Racetrac #491	3031 W Hallandale Beach Boulevard Pembroke Park, FL 33009	Chevron	ST-02341-20 02341	9602003 9101088	Petroleum Hydrocarbons	3 USTs in service	Adjacent to the project corridor, north of ROW	SRCO issued 01/29/14 for DRF filed on 05/16/08; Facility in compliance per 11/19 Facility Annual Compliance Inspection Report	In compliance	M
10	Texaco #021-313-FISK'S	1090 W Hallandale Beach Boulevard Hallandale Beach, FL 33009	Swale #2 (Current) Mobil #03	09827 09693	8501967 8502027	Petroleum	6 USTs removed	Adjacent east of I-95 project corridor and adj north of Hallandale Beach Boulevard	Site not found in field. Currently a swale. EDI application filed for the former gasoline station11/88. NFA issues 06/1996.	Facility Closed	N
11	FL Dept. of Transportation	Hwy 858 & I-95 Hallandale Beach, FL 33010	None Identified	None Identified	9102665	None Recorded	None Registered	Along median of Hallandale Beach Boulevard	Facility number appears to be created for reimbursement purposes.	No Action Required	N
12	Exxon	1080 W Hallandale Beach Boulevard Hallandale Beach, FL 33009	SF Service LLC, Shell, Hallandale Beach Club, Five Brothers LLC	ST-04662-20 04662	8502695	Petroleum Hydrocarbons / Historic Release (Closed)	3 USTs in service	Adjacent to project corridor, north of Hallandale Beach Boulevard	SRCO issued 08/03/06 for 12/02/2004 discharge; SRCO issued 11/18/97 for 05/03/1985	Facility Active; In compliance	M
13	HB 1000-18 LLC	1021 W Hallandale Beach Boulevard Hallandale Beach, FL 33009	Strip Mall (Current) Shell, Fina, Citgo, 7-11, Amerika - OJ Gas Corp	04094	8501728	Petroleum Hydrocarbons	6 USTs removed	Adjacent to project corridor, south of Hallandale Beach Boulevard ROW, 830 feet east of I-95	50 feet S of project corridor; 2018 groundwater sampling results above GCTLs within 50 feet of ROW and 2016 soil sample results below SCTLs	Facility Closed; Remedial Action Ongoing	H
14	Hallandale Beach U-Gas	999 W Hallandale Beach Boulevard Hallandale Beach, FL 33009	BP AMOCO	ST-04111-20 04111	8502072	Petroleum Hydrocarbons	4 USTs in service	Adjacent to project corridor, south of Hallandale Beach Boulevard ROW	60 feet S of project corridor; GW direction to the NW and 4 to 5 feet bls; 2018 soil and 2020 groundwater sample results above CTLs	Facility Active; NAM ongoing	H
15	Hallandale Auto Care	99 SW 10th Avenue Hallandale Beach, FL 33009	None Identified	HM-02498-20 02498	None Recovered	None Recorded	None Registered	200 feet southeast of W Hallandale Beach Boulevard project corridor	Facility operates as an auto repair shop. Waste materials includes used oil, solvents, coolants, oily rags and batteries.	Facility Active; In Compliance	L

Table 6.19 - Known and Potentially Contaminated Sites List (Continued)

Site ID	Name	Address	Current / Former Name	County Permit or ID Number	FDEP Facility ID	Type of Contamination	Storage Tanks	Distance (approximate)	Notes	Status	Risk Rating
16	Harbour Cove Associates (Brownfield)	100 NW 9th Terrace Hallandale Beach, FL 33020	None Identified	BF060401001	ERIC_6725	Petroleum	6 USTs removed	100 feet north of the Hallandale Beach Boulevard. corridor	Facility issued SRCO in 2004 with institutional and engineering controls to restrict groundwater use onsite. SRCO w/ conditions recorded under DRC. Rehabilitated and Developed as multi-family residential apartments.	Facility Closed	L
17	Ansin Boulevard Dump	310 Ansin Boulevard Hallandale Beach, FL 33009	Recycling Center of Florida	None Recovered	53352	None recovered/recorded	None registered	400 feet east of I-95	NFA status per Per FDEP SW Inventory Report. No violation history, 1988 GW sampling clean. Potential ammonia impacts in groundwater from Site 23 . FDEP issued offsite notice for GW impacts from former Hallandale Switch Facility.	Facility Closed	M
18	Wedgewood Holdings, Inc.	400 Ansin Boulevard Hallandale Beach, FL 33009	None Identified		9802375	None Recorded	1 UST removed	250 feet east of I-95	TCAR submitted 02/00 for a 4,000-gallon unleaded gasoline UST. Confirmatory soil and groundwater samples were below CTLs.	Facility Closed	N
19	Messingschlager Properties	2514 SW 30th Avenue Hallandale Beach, FL 33009	Richard Danvers Auto Shop		9401806	Petroleum	1 UST removed	150 feet west of I-95	DRF file 09/94 for unleaded gasoline release. Facility received eligibility for state-funded cleanup under the ATRP. An NFA was issued 06/05. UST removed 12/94.	Facility Active; NFA	L
20	95 Warehouse LTD	2401 SW 31st Avenue Pembroke Park, FL 33009	Warehouse 1800	06862	8942651	Petroleum Hydrocarbons	2 USTs removed	350 feet east of I-95 project corridor	SRCO issued 11/10 for 12/88 discharge	Facility Active; SRCO Issued	L
21	Gallo Marble Enterprises	500 Ansin Boulevard Hallandale Beach, FL 33009	Countertops of Broward (Current)	No HW permit	8627989	Ammonia	None registered	120 feet east of I-95	DRF filed 12/91 for soil contamination discovered during tank closure. SRCO granted in 01/06 for the 12/91 discharge. However, ammonia contamination documented in GW. Site has a Deed Restrictive Covenant to fulfill NFA/C requirements. No groundwater can be used onsite.	Facility Active; In compliance	M
22	Hallandale Beach Dump	700 NW 7 Street Hallandale Beach, FL 33009	Hallandale High School (Current)		99353	Ammonia	None registered	890 feet east of I-95	Old dump listed in the BC Abandoned Dump Inventory. SW facility inventory lists facility class status as NFA. Site is closed and occupied by field behind Hallandale High School. Offsite ammonia impacts from Site 23.	Facility Closed	L
23	Imperial Marine Equipment	600 Ansin Boulevard Hallandale Beach, FL 33009	Hallandale Switch Facility	No HW permit; NF-2701 09924	9700906	Ammonia	Yes	60 feet east of ROW	Not found in field. Former Hallandale Switch facility with reported ammonia contamination in groundwater. FDEP issued notices to nearby properties for offsite contaminant migration.	Facility Closed; Contamination migrated offsite	H
24	Hallandale Beach City I-95 Pump Station	2001 SW 30th Avenue Hallandale Beach, FL 33009	None Identified		9809512	None Recorded	1 UST in service	Adjacent west of I-95	5,000 gallon diesel UST installed 07/07 to fuel generator/pump	Facility Active	L
25	BW Recycling	2035 SW 31st Avenue Pembroke Park, FL 33009	None recovered	None Recovered	None recovered	None Recorded	None registered	350 feet west of I-95 project corridor	Within 1000 feet of the FDOT distance requirement for non-landfill solid waste sites. No activity observed outside facility.	Facility Active	L
26	James Lanier Education Center / Broward County School Board- S Area Education Center	1050 NW 7th Court Hallandale Beach, FL 33009	None Identified	07879	9100221	Petroleum	1 UST removed	Adjacent east of I-95	DRF filed 05/07 during tank closure of 2,500 gallon heating oil UST. NFA issued 07/08.	Facility Active; NFA	L
27	Orkin Extermination Co	1820 SW 30th Avenue Hallandale Beach, FL 33009	None Identified	HM-01149-19 01149	8502427	None Recorded	2 USTs removed	Adjacent west of I-95	Pest Control Facility maintains HM license for pesticides and fluorescent bulbs. Two 4,000 gallon unleaded gasoline USTs removed in 04/87. Facility on septic.	Facility Active	L
28	Flowers Baking Company	3262 Pembroke Road Pembroke Park, FL 33009	Community Center	None Recovered	8622371	Petroleum	1 UST removed	On the south side of the Pembroke Road	Idenitied as a community center in field survey; 2015 groundwater sampling results exceed GCTLs within 150 feet and some soil contamination near 150 feet. Design of RAP modification due to rebound concentrations above GCTLs; PARM following operation of remediation system	Facility Closed; Remdiation Pending	H

Table 6.19 - Known and Potentially Contaminated Sites List (Continued)

Site ID	Name	Address	Current / Former Name	County Permit or ID Number	FDEP Facility ID	Type of Contamination	Storage Tanks	Distance (approximate)	Notes	Status	Risk Rating
29	Giant #177	3250 Pembroke Road Pembroke Park, FL 33009	Mobil (Current) Pembroke Shell	03546 ST-03546-20	9803165	Petroleum	3 USTs in service	On the south side of Pembroke Road	Clean, no auto services; In Compliance	Facility Active; In compliance	M
30	Broward Roofing Supply	1751 S Park Road Hallandale Beach, FL 33009	None Identified	None Recovered	8627995	None Recorded	1 UST removed	300 feet S of Pembroke Road, 1,260 feet west of I-95	2,000 leaded gasoline UST removed	Facility Active	N
31	Petroleum Products Corporation	3130 SW 19th Street Pembroke Park, FL 33009	Petroleum Park Warehouses; International Petroleum Corporation; National Oil Service of Florida	54384655 ERIC_3796 54391722 09535	8732818	Petroleum Hydrocarbons	Bulk Storage Tanks	900 feet west of I-95	Near residential community. Superfund site. Sludge and free product documented in groundwater. Proposed Remedial Action Plan preferred alternative comment period - EPA	Facility Closed; Remediation Pending; Monitoring Ongoing	H
32	A&B Recycling	1708 SW 31st Avenue Pembroke Park, FL 33009	None recovered	03206 HM-03206-20	None Registered	None Recorded	None Registered	Adjacent on the south side of Pembroke Road project corridor	Within 1000 feet of the FDOT distance requirement for non-landfill solid waste sites] Site seemed mismanaged and piles of recyclables/waste. Scrap metal yard with battery recycling.	Facility Active	M
33	Waste Connections - Pembroke Park Transfer Station	1899 SW 31st Avenue Pembroke Park, FL 33009	Choice Recycling Services of Broward; Pembroke Park Recycling and Transfer; Progressive Waste Solutions of FL, Inc.; Glori Allan Inc.	FL0000871996 00014	55464 105719	None Recorded	None registered	700 feet south of Pembroke Road project corridor	Waste processing facility receives construction and demolition debris, commercial waste, household waste, residential bulky waste, vegetative debris and yard trash.	Facility Active	L
34	All Weather Control, Inc.	1505 S 30th Avenue Hollywood, FL 33020	None Identified	None Recovered	8628456	None Recorded	1 UST removed	Adjacent west of I-95 project corridor	2,200 leaded gasoline UST removed	Facility Closed	L
35	Kosher Motors (Current)	2829 Pembroke Road Hollywood, FL 33020	Stevens Auto Service Center	15905 01535	9500022	None Recorded	4 USTs removed	Adjacent to project corridor, south of Hallandale Beach Boulevard.	Dated structure and cluttered property, limited signs of industrial activity. Operates as an auto repair facility. DRF filed for contamination detected near a former waste oil tank. Facility remediated RA activities included soil excavation and three years of NAM. SRCO issued 01/15.	Facility Active; SRCO Issued	M
36	Family Tire Distributors	2817 Pembroke Road Hollywood, FL 33020	None Recovered	15361 HM-15361-20	None Registered	None Recorded	None registered	Adjacent on the north side of the Pembroke Road project corridor	Well managed building and material storage Maintains HM License for auto repair services	Facility Active	M
37	Italian Hoagie	1051 W Pembroke Road Pembroke Park, FL 33010	Texaco Station	04369	8732177	None Recorded	2 USTs abandoned in place	Adj S of Pembroke Road	Facility historically operated as a Texaco gasoline station. Two USTs are suspected to be abandoned in place. No additional information found.	Facility Closed	M
38	Shell FCE #3828	2801 Pembroke Road Pembroke Park, FL 33020	First Coast Energy	03950 ST-03950-20	8502153	Historic Release Closed	2 USTs in service, 4 USTs removed	Adjacent on the north side of the Pembroke Road project corridor; No recorded Restrictive Covenant	Active gasoline operations. SRCO issued 03/17 for 07/98 discharge	Facility Active; In Compliance	M
39	Orion Pembroke	1011 NW 8th Avenue Hallandale Beach, FL 33009	R.U.N LLC BP Amoco #1866	06740 ST-06740-19	9807438 9807672	None Recorded	3 USTs in service	Adjacent on the south side of the Pembroke Road project corridor	Clean, no auto service; In compliance Facility is on septic	Facility Active; In Compliance	M
40	Orangebrook Country Club	4000 Entrada Street Hollywood, FL 33021	None Identified	01360 HM-01360-20	8944879	None Recorded	1 UST in service2 USTs removed	Adjacent to project corridor	Site operated as a golf course since the 1950s. Cirently maintains one 500-gallon UST	Facility Active	L
41	I-95 Express Lanes - Toll Equipment Building #2	500BLK I95, #MM2.23 Hollywood, FL 33021	None Identified	15881	9813994	None Recorded	None Registered	Adjacent to project corridor	Facility Maintains Haz Mat License for 500-gallon diesel AST which fuels Emergency Generator	Facility Active	N
42	Mobil	2911 Hollywood Boulevard Hollywood, FL 33020	Chevron	54401456 09656	8502126	Petroleum	4 USTs removed	Adjacent on the north side of the Hollywood Boulevard project corridor	One SRCO issued 09/92 for 07/88 discharge. 02/95 DRF unresolved. FDOT owns property however, they are not responsible for the cleanup. Facility closed and fenced off.	Facility Closed	H
43	Davo Auto Center	2828 Hollywood Boulevard Hollywood, FL 33020	U-Haul (Current) Dons & Sons Equipment	54397828 0969	8502583	Petroleum Hydrocarbons	6 USTs removed	Adjacent on the south side of the Hollywood Boulevard project corridor; groundwater flow to the north; 2017 groundwater data detected contaminants above GCTLs and some soil contamination 75 feet south of ROW;	2019 GW sample results above GCTLs. RAP approved and remedial activities pending.	Facility Closed; Remediation Pending;	H

Table 6.19 - Known and Potentially Contaminated Sites List (Continued)

Site ID	Name	Address	Current / Former Name	County Permit or ID Number	FDEP Facility ID	Type of Contamination	Storage Tanks	Distance (approximate)	Notes	Status	Risk Rating
44	Goodyear Auto Service	2825 Hollywood Boulevard Hollywood, FL 33020	None Recovered	03426	FLD981758634	None Recorded	None registered	Adjacent on the north side of the Hollywood Boulevard project corridor	Appeared in good condition and well managed. Maintains HAZMAT License for storage and use of materials	Facility Active	L
45	Mike's Great Bear Auto	2804 Hollywood Boulevard Hollywood, FL 33020	None Recovered	No HW permit	None Recovered	None Recorded	None registered	Adjacent on the south side of the Hollywood Boulevard project corridor	Appeared in good condition and well managed Site pending remedial system installation	Facility Active	L
46	Shell-First Coast Energy #3829	2800 Hollywood Boulevard Hollywood, FL 33020	Equiva	13297 HM-13297-20	8502526	Petroleum Hydrocarbons	3 USTs in service	Adjacent on the south side of the Hollywood Boulevard project corridor	Appears to be former auto service bays in back and surface hatches/doors; concrete cuts near hatches/doors; all monitoring wells except compliance wells have been abandoned. SRCO issued 08/11 for 01/86, 09/93 and 07/08 discharges	Facility Active; SRCO Issued	M
47	World Best Cleaners	2654 Hollywood Boulevard Hollywood, FL 33020	World Best Cleaners - 9500235 and Pride French Cleaners -	FLD981028897 19732 HM-19732	9500235	Solvents PCE/TCE	None Registered	Adjacent on the south side of the Hollywood Boulevard project corridor	No visible concern with petroleum/HAZMAT storage or spills; small building with vent on roof in rear	Facility Active	L
48	Sunshine #165	3034 Johnson Street Hallandale Beach, FL 33021	Johnson Street Marathon	None Identified	8502207	Petroleum	4 USTs in service	Adjacent to the south of Johnson Street 500 feet west of I-95 corridor	NAM; Groundwater samples above GCTLs reported in 2020 NAM	Facility Active; NAM Ongoing	H
49	Marvin's Cleaners	3030 Johnson Street Hallandale Beach, FL 33020	Clean Paws, Inc. (current)	ERIC_4112 AIR_0112286 FLD059858167 FLR000031617 01888	9501066	Solvents PCE/TCE	1 AST removed	Adjacent to the south of Johnson Street 300 feet west of I-95 corridor	NAM; Groundwater sampling conducted ever 2 years. SRCO issued 08/11 for 01/86, 09/93 and 07/08 discharges	Facility Closed; NAM Ongoing	H
50	Sunshine #30	3000 Johnson Street Hallandale Beach, FL 33020	Sunset Automotive	None Identified	8502723	Petroleum	2 USTs in service	Adjacent to south of Johnson Street and 150 feet west of I-95 corridor	SRCO; in compliance	Facility Active; In Compliance	M
51	Michel Auto Repairs	2922 Johnson Street Hollywood, FL 33020	Hollywood Tires (Current)	02882 HM-02882-19	None Recovered	None Recorded	None registered	150 feet east of I-95 project corridor	Aveerage condition Facility on septic. Auto repair facility handles petroleum products, coolant, batteries, rags, F-Tubes and solvents	Facility Active	M
52	Former Sunset Golf Club	2727 Johnson Street Hollywood, FL 33020	Hollywood Adventures Park	NF-2088 19544 FLR10TJ71	None Recovered	Arsenic	None Recorded	Adjacent east of I-95 and adjacent north of Johnson Street	2018 sampling detected arsenic in soil and groundwater above CTLs; Facility undergone remedial activities and was issued a NFAC from the BCEPGMD. The site has a DRC restricting groundwater use onsite.	Facility Closed with engineering controls	H

For the sites assigned a risk rating "No", no further action is recommended. These sites have been evaluated and determined not to pose a potential environmental contamination risk to the proposed project, at this time.
For sites ranked "Low", no further action is required at this time. While these sites/facilities have the potential to impact the proposed project at this time, they were determined to have a low risk, based on several factors. Factors that may change the risk rating include a facility's non-compliance to environmental regulations, discharges to the soil or groundwater, and modifications to current permits. If any of these factors change, additional assessment of the facilities may be warranted.

For sites assigned a risk rating of "Medium" or "High", a Level II Assessment is recommended if construction activities are proposed in the site vicinity. These sites have been determined to have known contaminants, which may impact the proposed project. A soil and groundwater sampling plan should be developed for each site, as applicable. Based on the findings of a future review and Level II Assessment, the design engineers may be required to avoid areas of concern or include special provisions with the plans to require that construction activities performed in areas of concern be conducted or supervised by a contamination assessment and remediation contractor specified by the FDOT.

Additional information may become available or site-specific conditions may change from the time this report was prepared and should be considered prior to acquiring ROW and/or proceeding with roadway construction.

If construction dewatering is necessary during construction, a Water Use Permit from SFWMD may be required and a dewatering permit may be required from Broward County if that activity occurs within ¼-mile of a contaminated site. The contractor will be held responsible for ensuring compliance with any necessary dewatering permit(s). The dewatering plan will need to consider the radius of influence of any dewatering activity on nearby contamination plumes to avoid potential contamination plume exacerbation. The status of the sites will be updated accordingly at each future design phase. All permits will be obtained in accordance with Federal, State, and local laws and regulations and in coordination with the District Contamination Impact Coordinator (DCIC). For more information regarding contamination, please refer to the *Contamination Screening Evaluation Report* (CSER), which can be found in the SWEPT database.