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Decision Making
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June, 2021

Final Interchange Modification Report (IMR)

SW 8th Street / SW 7th Street PD&E Study from SR 9/SW 27th Avenue to SR 5/US-1/Brickell Avenue



**SR 90 / SW 8th Street & SW 7th Street
PROJECT DEVELOPMENT & ENVIRONMENT STUDY
INTERCHANGE MODIFICATION REPORT (IMR)**

Financial Project ID: 432639-6-22-01
FAP No.: 0202054P / ETDM No.: 14230
Miami-Dade County



Prepared For:
FDOT District Six
1000 NW 111 Street
Miami, FL 33172





June, 2021

Interchange Modification Report (IMR) - Final

**SR 90/SW 8th Street and SW 7th Street
Project Development and Environment Study
Interchange Modification Report**
FM #: 432639-6-22-01; FAP #: 0202054P; ETDM #: 14230

**Florida Department of Transportation
Determination of Safety, Operational and Engineering Acceptability**

Acceptance of this document indicates successful completion of the review and determination of the safety, operational and engineering acceptability of the Interchange Access Request. Approval of the access request is contingent upon compliance with applicable Federal requirements, specifically the National Environmental Policy Act (NEPA) or Department's Project Development and Environment (PD&E) Procedures. Completion of the NEPA/PD&E process is considered approval of the project location design concept described in the environmental document.

Requestor	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <small>DocuSigned by:</small>  <small>D4FBA6C83AE8432...</small> </div>	7/9/2021 10:46 AM EDT
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District Interchange Review Coordinator	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <small>DocuSigned by:</small>  <small>705CB16FD3D5405...</small> </div>	7/9/2021 10:47 AM EDT
	Kenneth Jeffries District 6, Transportation Planning Manager	Date
Systems Management Administrator	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <small>DocuSigned by:</small>  <small>4AD03E6A337F4C1...</small> </div>	7/20/2021 1:41 PM EDT
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	Will Watts, PE Chief Engineer – FDOT, Central Office	Date

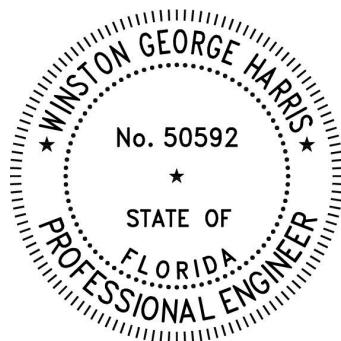


PROFESSIONAL ENGINEER CERTIFICATE

I hereby certify that I am a registered professional engineer in the State of Florida practicing with RS&H, Inc., authorized under Section 471.023, Florida Statutes, to offer engineering services to the public through a Professional Engineer, duly licensed under Chapter 471, Florida Statutes, Certificate of Authorization (CA) No. 2294, by the State of Florida Department of Professional Regulation, Board of Professional Engineers, and that I prepared or approved the evaluation, findings, opinions, conclusions, or technical advice hereby reported for:

Financial Project ID:	432639-6-22-01
Federal Aid Project No.:	0202054P
ETDM No.:	14230
Project:	SR 90/SW 8 th Street and SW 7 th Street Project Development and Environment (PD&E) Study from SR 9/SW 27 th Avenue to SR 5/US 1/Brickell Avenue Interchange Modification Report (IMR)
County:	Miami-Dade County
FDOT Project Manager:	Bao-Ying Wang, P.E.

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

**SIGNATURE:**

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Executive Summary

INTRODUCTION

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) Study for SR 90/US 41/SW 8th Street/SW 7th Street, located in Miami-Dade County, Florida. The limits of the PD&E Study extend along the one-way pair of SW 8th Street and SW 7th Street from SR 9/SW 27th Avenue (western limit) to SR 5/US 1/Brickell Avenue (eastern limit). The limits of the project incorporate the existing interchange at I-95 and SW 8th Street and SW 7th Street. As part of the PD&E Study, the FDOT proposes to implement improvements at the I-95 interchange to increase capacity and enhance safety conditions. The proposed improvements result from a FDOT Planning Study for SW 8th Street/SW 7th Street, which examined conceptual improvements for the one-way pair arterials and corresponding improvements to the I-95 Interchange. **Figure 1.1** depicts the project location.

This Interchange Modification Report (IMR) has been prepared in accordance with the criteria specified in the FDOT's Interchange Access Request User's Guide. The IMR will be processed through the expedited programmatic approval process, as agreed upon in the Programmatic Agreement between the Federal Highway Administration (FHWA), Florida Division and FDOT, dated April 24, 2020. The IMR provides the necessary documentation for review and determination of the safety, operational and engineering acceptability of the I-95 at SW 8th Street/SW 7th Street Interchange Modification. It will serve as the traffic operations analysis document for the related National Environmental Policy Act (NEPA) study encompassing the interchange and the arterial improvements.

PURPOSE AND NEED FOR PROJECT

The interchange at I-95 and SR 90/SW 8th Street and SW 7th Street experiences substantial operational deficiencies with extensive queueing and delays at the terminal intersections and neighboring intersections. Currently this terminal intersection operates at level of service (LOS) F during the PM peak with extensive delays and long queues which spillback onto the I-95 mainline. The population growth



within the City of Miami, along with new developments in the downtown Miami and Brickell areas, will result in a significant increase in surface transportation demand and will worsen operating conditions at the already congested I-95/SW 8th Street/SW 7th Street Interchange. In addition, the subject interchange and neighboring intersections along SW 8th Street and SW 7th Street have historically experienced abnormally high crash rates. FDOT's crash records indicate that the I-95 terminal intersections have consistently experienced abnormal high crash rates in every year from 2011 through 2015. Queue spillback onto the mainline is a major safety and operational concern. Many fatal crashes have occurred within the project limits, and several of these crashes have involved pedestrians. If no action is taken, these safety and operational concerns will continue.

The purpose of this project is to develop recommendations for the proposed modifications to the SR 9 / I-95 and SR 90 /SW 8th Street and SW 7th Street interchange, as well as along the one-way pair arterials. The proposed project will improve traffic operations at the interchange and study area roadways / intersections by implementing operational and capacity improvements to meet the future travel demand projected as a result of Miami-Dade County population and employment growth. The project will further enhance safety conditions at the interchange, improve multimodal interrelationships, promote economic development by improving connectivity between I-95 and the service arterials, and enhance accommodations for bicycle and pedestrian activities.

METHODOLOGY

The methodology applied for the I-95 at SR 90/US 41/SW 8th Street and SW 7th Street IMR is documented in the Methodology Letter of Understanding (MLOU), dated April 9, 2020. The MLOU was approved by FDOT District Six and FDOT Central Office, Systems Implementation Office. The MLOU outlines the criteria, assumptions, processes, analyses and documentation requirements for the project. The MLOU was prepared in accordance with the FDOT's Interchange Access Users' Guide. The IMR evaluates operating conditions for an anticipated opening year of 2025 and design year 2045. Estimated future traffic volumes are based on travel demand forecast resulting from the Southeast Florida Regional Planning Model (SERPM) v7. Assessment of traffic operating conditions are based on the HCM 2010 procedures and microsimulation analyses using Vissim models.



EXISTING (2015) CONDITIONS

The existing I-95 corridor is a limited access highway and a designated Strategic Intermodal System (SIS) facility. The existing typical section, within the project limits, consists of two to five general use (GU) lanes in the northbound direction and two to four GU lanes in the southbound direction.

SR 90/SW 8th Street/SW 7th Street is an urban principal arterial, one-way pair. The existing typical section consists of three eastbound lanes (SW 8th Street) and three westbound lanes (SW 7th Street).

Existing traffic operations at the I-95/SW 8th Street/SW 7th Street are substandard. The I-95 southbound terminal intersection at SW 7th Street and SW 4th Avenue is most critical. This intersection operates at LOS F during the PM peak and queues and delays experienced at this intersection spillback to impact traffic operations along I-95 mainline. Safety is a primary concern at the interchange as several intersections in the vicinity have been identified as high crash locations. These include:

- SW 8th Street at SW 4th Avenue (I-95 SB Terminal) - listed high crash location in 2011 through 2015
- SW 8th Street at SW 3rd Avenue (I-95 NB Terminal) - listed high crash location in 2011, 2012, 2014 and 2015
- SW 8th Street at SW 2nd Avenue - listed high crash location in 2011 through 2015
- SW 7th Street at SW 2nd Avenue - listed high crash location in 2011 through 2015
- SW 7th Street at SW 3rd Avenue - listed high crash location in 2011 through 2015
- SW 7th Street at SW 4th Avenue - listed high crash location in 2011 through 2015

Traffic congestion is currently experienced along the mainline segments of I-95, particularly in the NB direction. However, this congestion results from the spillback effect of downstream congestion that occurs outside the project study limits.

NO BUILD ALTERNATIVE

The future year No Build Alternative network includes the existing (2015) roadway conditions plus all funded and committed projects within the study corridor per the FDOT 5-Year Work Program. It also incorporates all Cost Feasible Plan projects contained in the Metropolitan Planning Organization's (MPO's) Long Range Transportation Plan (LRTP) that are located outside the immediate project limits. The roadway geometry for the No Build Alternative was determined to be consistent with the geometry for the existing 2015 road network within the project limits.

Travel demand forecast indicate that traffic growth will continue through the design year at a rate of approximately 0.5% along I-95 and approximately 0.80% to 1.35% along SW 8th Street and SW 7th Street. Based on this anticipated traffic growth, congestion will continue to increase at the interchange. By the design year 2045 it is anticipated that the northbound segment of I-95 Mainline (north of SW 8th Street on-ramp) will operate at LOS F conditions. In addition, several intersections are expected to operate at LOS F. These include:

- SW 7th Street at SW 4th Avenue/I-95 SB Off-Ramp (LOS F/F – AM/PM)
- SW 8th Street at SW 2nd Avenue (LOS F/F – AM/PM peak)
- SW 7th Street at SW 2nd Avenue (LOS F – PM peak)

Given these forecasted future traffic operating conditions, it was determined that the No Build Alternative will be inadequate to accommodate the future travel demand at the interchange.

SR 90/SW 8th STREET/SW 7th STREET BUILD ALTERNATIVES

The SR 90/SW 8th Street/SW 7th Street PD&E Study examined two tiers of build alternatives covering the limits of the study network. Alternatives were first considered for the configuration of SW 8th Street and SW 7th Street. Secondly, alternative configurations were considered for the I-95/SR 90 Interchange that would be consistent with the recommended configuration for SW 8th Street and SW 7th Street.



The alternatives analysis for SW 8th Street and SW 7th Street is documented in the associated Preliminary Engineering Report (PER). The alternatives analysis examined multiple configurations and traffic flow patterns for SW 8th Street and SW 7th Street. These are illustrated in **Figures 6.1** through **6.7** in the IMR. They include the following:

- Alternative 1: Two Lanes, Two-Way Alternative (**Figure 6.1**)
- Alternative 2: Two Lanes, Two-Way + Transit Lane (**Figure 6.2**)
- Alternative 2A: Two Lanes, Two-Way + Bicycle Lane (**Figure 6.3**)
- Alternative 3: Two Lane, One-Way (**Figure 6.4**)
- Alternative 3A: Three (3) Lanes - One (1) Way + Shared Parking and Travel Lane (**Figure 6.5**)
- Alternative 4: Three Lane, One-Way (**Figure 6.6**)
- Alternative 5: Reverse Flow (**Figure 6.7**)
- Alternative 6: Shared Parking and Travel Lane and Bike Lanes (**Figure 6.8**)

SR 90/SW 8th Street/SW 7th Street Recommended Alternative

Following extensive analyses and coordination with stakeholder agencies and local communities, it was determined that Alternative 4 was the Recommended Alternative for SW 8th Street and SW 7th Street. This alternative retains the existing configuration and one-way traffic flow along SW 8th Street and SW 7th Street. The roadway geometry is similar to existing except for modifications at the I-95 Interchange. The typical section on each facility consists of the following:

- SW 8th Street: three eastbound lanes. The typical section on SW 8th Street also includes on-street parking on both sides of the roadway.
- SW 7th Street: three westbound lanes

I-95 at SR 90/SW 8th STREET/SW 7th STREET INTERCHANGE BUILD ALTERNATIVES

Various potential design modifications were considered for the I-95/SR 90 Interchange. The design modifications considered included the following:



- Interchange Alternative B-1 (**Figure 7.1**): New flyover from SB I-95 to EB SW 8th Street and new flyover for WB SW 7th Street to NB I-95. This alternative was discarded due to inability to meet the minimum vertical alignment criteria for the proposed SB I-95 to EB SW 8th Street flyover.
- Interchange Alternative B-2 (**Figure 7.2**): New flyover from WB SW 7th Street to NB I-95.
- Interchange Alternative B-3 (**Figure 7.3**): New flyover from SB I-95 to EB SW 8th Street. This alternative was discarded due to inability to meet the minimum vertical alignment criteria for the proposed SB I-95 to EB SW 8th Street flyover.
- Interchange Alternative B-4 (**Figure 7.4**): Segment of SW 3rd Avenue between SW 8th Street and SW 7th Street is modified to include three lanes, one-way southbound.
- Interchange Alternative B-5 (**Figure 7.5**): New flyover from WB SW 7th Street to NB I-95. In addition, a new at grade turbo lane is provided for movements from I-95 SB Off-Ramp to EB SW 8th Street. This turbo lane allows traffic from SB I-95 to bypass the signals at SW 8th Street and SW 4th Avenue.
- Interchange Alternative B-6 (**Figure 7.6**): Segment of SW 3rd Avenue between SW 8th Street and SW 7th Street is modified to include three lanes, one-way southbound. In addition, a new at grade turbo lane is provided for movements from I-95 SB Off-Ramp to EB SW 8th Street. This turbo lane allows traffic from SB I-95 to bypass the signals at SW 8th Street and SW 4th Avenue.
- Interchange Alternative B-7 (**Figure 7.7**): New flyover from WB SW 7th Street to NB I-95. In addition, SW 4th Avenue is closed just north of SW 7th Street. This street closure allows for modifying the signal timings at the I-95 SB Terminal intersection from 3-phase operation (No Build) to more efficient 2-phase operation (Recommended Alternative).

I-95/SW 8th Street/SW 7th Street Interchange Recommended Alternative

The I-95 interchange alternatives were screened in an evaluation matrix considering several performance criteria including: safety, traffic operations, environmental impacts, social impacts, right of way, and construction cost. Based on this evaluation, Alternative B-7 was determined to be the Recommended Alternative. The proposed I-95 Interchange Alternative B-7 incorporates the following.

- New flyover ramp for accommodating movements from westbound SW 7th Street to NB I-95. The proposed WB to NB ramp elevates above SW 7th Street/SW 3rd Avenue Intersection and it introduces a new connection (on-ramp) to NB I-95.

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- Close SW 4th Avenue at its intersection with SW 7th Street and I-95 Southbound Off-Ramp. The proposed road closure will prohibit all vehicular traffic movements from SW 4th Avenue, at the intersection.
- Convert the segment of SW 4th Avenue between SW 7th Street and SW 6th Street from one-way southbound to two-way traffic flow. A turn-around facility is also proposed to facilitate traffic circulation and access within this segment of SW 4th Avenue.
- Widen I-95 SB Off-Ramp to provide one additional southbound through lane at the intersection with SW 7th Street. This additional through lane will further increase the capacity of the terminal intersection.
- Convert the segment of SW 3rd Avenue between SW 7th Street and SW 6th Street from one-way northbound to two-way traffic flow. This modification will create one northbound through lane and one new southbound through lane within the segment. This traffic flow modification will facilitate the rerouting of traffic for accessing EB SW 8th Street and the I-95 NB and SB ramps.
- Modification of signal timings to accommodate changes in intersection geometry and traffic volumes due to rerouting of traffic. Notably, signal operation plans at the following intersections will be modified:
 - SW 4th Avenue at Southwest 7th Street and I-95 SB Off-Ramp: Signal operation plan will be changed from 3-phase operation to 2-phase operation (serving SW 7th Street and I-95 SB Off-Ramp).
 - SW 3rd Avenue at SW 7th Street: Signal operation plan will be changed from 2-phase operation to 3-phase operation (serving NB SW 3rd Avenue, SB SW 3rd Avenue and WB SW 7th Street).

The proposed closure of SW 4th Avenue at SW 7th Street is being coordinated with the City of Miami and Miami-Dade County, Department of Transportation and Public Works (DTPW). In accordance with the County's procedures, FDOT District Six submitted a request for the street closure along with a supporting traffic study. At the time of this writing, both the County and City of Miami have indicated their support for the proposed street closure. Other key stakeholders have also offered no objections to the proposed street closure – these include the City's Police, Fire Rescue and Solid Waste departments.



Notwithstanding, per the City of Miami Policy, a formal resolution the street closure will not be issued until the project advances to design and construction is forthcoming.

ASSESSMENT OF RECOMMENDED ALTERNATIVE AND NO BUILD – HCM Analysis

A comparative assessment was performed for the Recommended Alternative and the No Build Alternative, for future year conditions, based on HCM 2010 analytical procedures. The results from the assessment indicated that the Recommended Alternative performs substantially better than the No Build Alternative for all future year scenarios (2025, 2035 and 2045). Based on the HCM 2010 analysis, under the Recommended Alternative by year 2045, all segments of I-95 will operate at LOS E or better in the NB and SB directions. In comparison, the No Build Alternative will experience LOS F along segments of NB I-95 by year 2045. Furthermore, in the Recommended Alternative, the critical intersection at I-95 SB Off-Ramp and SW 7th Street/SW 4th Avenue is expected to operate at LOS C (delay 24.2 sec/veh) in the AM and LOS D in PM (delay 47.9 seconds/vehicle). In comparison, under the No Build Alternative, this critical intersection is expected to operate at LOS F (delay 99.0 sec/veh) in the AM peak and LOS F (delay 198.1 sec/veh) in the PM peak.

ASSESSMENT OF RECOMMENDED ALTERNATIVE AND NO BUILD – Microsimulation Analysis

A detailed assessment of operating conditions for the Build and No Build Alternatives was performed using Vissim microsimulation models. Vissim models were developed for the AM peak period (4 hours) and PM peak period (4 hours) in the design year 2045. The results from the microsimulation analyses indicate that the Recommended Alternative generates overall better operating conditions for all considered MOEs in both the AM and PM peak periods along SR 90 and on I-95. Results for key matrices are as follows:

- **I-95 Travel Times:** The Recommended Alternative improves travel times/operating speeds along SB I-95 by approximately 57% during the AM peak and 14% in the PM peak. Correspondingly, along NB I-95 operating speeds improve by approximately 21% in the AM peak and are similar to No Build during the PM peak.
- **I-95 Throughput Traffic:** In the AM peak period, the Recommended Alternative increases throughput traffic on I-95 mainline by approximately 5% in the NB direction and 54% in the SB direction. In the PM peak period, throughput traffic is increased by approximately 3% in the northbound direction and 10% in the southbound direction.

- SW 8th Street and SW 7th Street Travel times:** The Recommended Alternative improves travel times along WB SW 7th Street by approximately 41% during the AM peak and 38% in the PM peak. Correspondingly along eastbound SW 8th Street, travel times are improved by approximately 24% in the AM peak. In the PM peak, travel times increase slightly along SW 8th Street by approximately 8%. This is due to more traffic being processed in the Recommended Alternative, specifically at the SW 7th Street & SW 4th Avenue/SB Ramp Terminal which results in more vehicles arriving at downstream intersections along SW 8th Street.
- I-95 Off-Ramp Queue Lengths:** Queue lengths on the SB off-ramps are substantially reduced with the Recommended Alternative – reduction in queue length ranges from approximately 7,275 feet (PM peak) to 7,590 feet (AM peak). Queues on the NB Off-Ramp are reduced by approximately 1,515 feet (AM) to 1,750 feet (PM) in comparing the recommended Alternative to the No Build.

Queueing along the I-95 off-ramps is of critical importance to traffic operations and safety along the mainline. Under the No Build Alternative, queue lengths exceed the available storage and impact I-95 mainline throughout the AM and PM peak periods. This condition is alleviated with the Recommended Alternative in the AM peak and PM peak periods.

- Network-wide MOEs:** The Recommended Alternative consistently performs better than the No Build Alternative for all network-wide performance measures – average speed, total delay, latent delay, latent demand, total travel time, vehicle miles traveled and total stops.

ENVIRONMENTAL CONSIDERATIONS

This IMR is being performed in coordination with a related National Environmental Policy Act (NEPA) study, encompassing the I-95 interchange and SR 90/SW 8th Street/SW 7th Street Improvements. Results from the NEPA study will be documented in other project related reports. To date, no adverse environmental issues have been identified that would prevent the advancement of the proposed improvements.

ANTICIPATED DESIGN VARIATIONS AND EXCEPTIONS

No design exceptions or variations are anticipated at this time for implementation of the Recommended Alternative. As the project moves forward through final design and construction, any design variations or exceptions that should arise will be processed through the FDOT and the FHWA for approval.



SAFETY

Several intersections within the vicinity of the interchange have historically experienced abnormally high crash rates. These include the existing I-95 ramp terminal intersections at SW 8th Street and 3rd Avenue, the ramp terminal intersection at SW 7th Street and SW 4th Avenue and the adjacent intersections. The extensive weaving activities at these locations, together with the excessive traffic flows have been identified as contributing factors to the abnormally high crash rates at these locations. The Recommended Alternative offers the following improvements to address safety concerns at the interchange:

- The proposed new on-ramp from SW 7th Street to NB I-95 will substantially reduce weaving activity within the vicinity of the interchange. In the existing condition, access to NB I-95 from SW 7th Street involves travelling a circuitous route – WB along SW 7th Street, SB along SW 4th Avenue and EB along SW 8th Street to the I-95 NB-On-Ramps. These maneuvers are accomplished across multiple lanes within very short city blocks and this creates a high crash risk condition. The proposed new on-ramp from SW 7th Street will alleviate this condition by providing a direct access to NB I-95 for approximately 940/1040 vehicles that make this movement during the AM/PM peak hours (2045 estimates).
- The proposed new I-95 NB on-ramp will reduce conflicting movements at four high crash intersections: SW 8th Street at 4th Avenue; SW 8th Street at 3rd Avenue SW 7th Street at 3rd Avenue and SW 7th Street at SW 4th Avenue. This reduction in conflicting traffic will correspondingly reduce crashes and in particular right-angle crashes at these intersections.
- The proposed improvements will reduce the risk for queue spillback onto I-95 mainline. Vissim microsimulation analysis demonstrates that with the existing interchange configuration, queues at the I-95 SB off-ramp will exceed the available storage resulting in queue spillbacks onto I-95 mainline during AM and PM peak periods. This condition creates a major safety concern with standing queues on I-95 mainline adjacent to high-speed traffic. This safety concern is mitigated by the Recommended Alternative due to the substantial reduction in the generated queue lengths.

It is estimated that the Recommended Alternative will generate crash reductions of approximately 919 crashes at the arterial intersections, over the design life of the project. The crash reduction translates to crash savings of approximately \$133,586,000 (919 crashes reduced @ \$123,589 per crash) based on FDOT's average crash cost for similar facilities .

ACCESS MANAGEMENT

The proposed improvements will not adversely impact access to any property within the study area. Accordingly, an access management plan is not required for the proposed improvements.

MULTIMODAL ACCOMODATIONS

the proposed interchange improvements will enhance safety for pedestrian and bicyclists. Much of the safety enhancements for pedestrians and bicyclists will be realized through their reduced exposure to conflicting automobile and truck traffic, which will result from the proposed new I-95 on-ramp from NW 7th Street. This new on-ramp will reduce traffic exposure at four critical intersections:

- SW 8th Street at SW 4th Avenue
- SW 8th Street at SW 3rd Avenue
- SW 7th Street at SW 4th Avenue
- SW 7th Street at SW 4th Avenue

In addition to the reduced traffic exposure, pedestrians and bicyclists will benefit from upgraded roadway and traffic control facilities such as, updated signing and markings for pedestrians, signal system upgrades, and rehabilitation of facilities for ADA compliance

JUSTIFICATION FOR PROJECT

The FHWA's Policy on Access to the Interstate System provides the requirements for the justification and documentation necessary to substantiate any proposed changes in access to the Interstate System. The policy is published under the Federal Register, Volume 74, Number 165, which was updated on May 22, 2017. The responses provided in the IMR for both of the policy statements demonstrate compliance with these requirements and justification for the proposed interchange modifications at I-95 and SR 90/SW 8th Street/SW 7th Street in Miami-Dade County, Florida.

Policy Requirement No. 1: An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or



on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

Response to Policy Requirement #1: The operational analysis conducted for the IMR confirmed that the proposed interchange modifications are not expected to have any significant adverse impacts on safety and operations on the interstate facility (I-95). Analyses performed using both the HCM procedure and microsimulation techniques confirm that the Recommended Alternative will improve traffic operations along NB and SB I-95 within the area of influence of the interchange. In addition, traffic operations at the I-95 terminal intersections and adjacent intersections will be improved. The analyses indicate the following operational improvements in the design year (2045) along various segments of the study network:

NB I-95: The Recommended Alternative will improve travel times along NB I-95 by approximately 21% in the AM peak hour when compared to the No Build Alternative. In the PM peak hour travel times are approximately the same along NB I-95 in both the No Build and Recommended Alternative. The Recommended Alternative increases throughput traffic along NB I-95 by approximately 5% in the AM peak and 3% in the PM peak. It is noted that considerable traffic congestion occurs downstream along NB I-95, outside the project study area. This congestion, outside the study area, results in substandard operating conditions throughout NB I-95 in both the No Build and Recommended Alternative. The FDOT plans to address this congestion along I-95 in future projects.

SB I-95: The Recommended Alternative will improve travel times along SB I-95 by approximately 57% in the AM peak hour and 15% in the PM peak hour, when compared to the No Build Alternative. Furthermore, the Recommended Alternative increases throughput traffic along SB I-95 by approximately 54% in the AM peak and 10% in the PM peak. This dramatic improvement in operations in the southbound direction results from benefits generated by the Recommended Alternative in

alleviating queue spillback from the off-ramp onto the mainline which occurs under the No Build Alternative. This is also a significant safety benefit resulting from the Recommended Alternative.

SW 8th Street Traffic Operations: The Recommended Alternative will improve travel times along SW 8th Street by approximately 24% during the AM peak with a minor increase of 8% during the PM peak period. The proposed new NB on-ramp will substantially reduce conflicting traffic at critical intersections - SW 8th Street at SW 4th Avenue; and SW 8th Street at 3rd Avenue (northbound ramp terminal). This reduction in traffic improves safety and operations at the intersections.

SW 7th Street Traffic Operations: The Recommended Alternative will improve travel times along SW 7th Street by approximately 41% during the AM peak period and 38% during the PM peak period. The proposed new NB on-ramp will substantially reduce conflicting traffic at critical intersections - SW 7th Street at SW 3rd Avenue; and SW 7th Street at 4th Avenue (southbound ramp terminal). This reduction in traffic improves safety and operations at the intersections.

Network-wide Performance Measures: The Recommended Alternative generates significant improvements across all network-wide performance measures. These include: average speed (70%/38% increase in AM/PM peaks); total delay (69%/51% decrease in AM/PM peaks); latent demand (78%/41% decrease in AM/PM peaks); total travel time (35%/24% decrease in AM/PM peak); and total stops (73%/62% decrease in AM/PM peaks).

Safety Enhancements: The I-95 ramp terminal intersections at SW 8th Street and SW 7th Street and the adjacent intersections are high crash locations. The existing circuitous routes, extensive weaving maneuvers and excessive traffic volumes are all contributing causes to the abnormally high crash rates experienced at these intersections. In addition, the I-95 SB Off-ramp experiences extensive queueing during peak periods which often spills-back onto the mainline and creates a high crash risk condition. The No Build Alternative offers no improvements to address these contributing causes, hence the high crash rates will continue if no corrective measures are implemented. The Recommended Alternative addresses these contributing causes by:

- Providing direct access to NB I-95 from SW 7th Street (new on-ramp)
- Providing improved access to EB SW 8th Street from SB I-95 (simple and more efficient 2-phase signal at terminal intersection)

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- Reducing conflicting traffic at critical intersections
- Mitigating risk of queue spillback onto I-95 mainline by increasing capacity and efficiency of the I-95 SB Off-ramp Terminal Intersection.

The above improvements will substantially improve safety conditions at the arterial intersections. It is estimated that the Recommended Alternative will generate crash reductions of approximately 919 crashes at the arterial intersections, over the design life of the project. This crash reduction translates to crash savings of approximately \$133,586,000 over the design life of the improvements.

The proposed interchange modifications will modify access to/from I-95 and necessitate changes to the current signing at the I-95/SR 90 Interchange. A conceptual signing plan for the interchange modifications is included under **Appendix K**. The signing plan will be fully coordinated with FHWA in advance of construction.

Policy Requirement No. 2: The proposed access connects to a public road only and will provide for all traffic movements. Less than “full interchanges” may be considered on a case-by-case basis for applications requiring special access, such as managed lanes (e.g., transit or high occupancy vehicle and high occupancy toll lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)). In rare instances where all basic movements are not provided by the proposed design, the report should include a full-interchange option with a comparison of the operational and safety analyses to the partial interchange option. The report should also include the mitigation proposed to compensate for the missing movements, including wayfinding signage, impacts on local intersections, mitigation of driver expectation leading to wrong-way movements on ramps, etc. The report should describe whether future provision of a full interchange is precluded by the proposed design.

Response to Policy Requirement #2: The IMR proposes no new interchanges along I-95. The existing interchange provides access to public roads only. The improvements proposed at the interchange will maintain full access to SR 90/SW 8th Street/SW 7th Street and accommodate all movements.

The proposed improvements include a new northbound on-ramp from SW 7th Street to NB I-95. As discussed under response to Policy Point No. 1, the proposed new on-ramp will have no adverse impacts to traffic operations nor safety along I-95 mainline segments or the arterial segments of the study network.



CONCEPTUAL FUNDING PLAN

Construction cost for the proposed improvements is estimated at \$19.7M. According to the FDOT current Five-Year Work Program schedule, the project is a candidate for funding with final design allocations in 2024 and construction funding in 2029. These dates are subject to change as the Work Program is frequently updated and modified as project priorities change.

RECOMMENDATION

The information presented in the preceding sections of the IMR demonstrate that the proposed modifications for the interchange of I-95 and SW 8th Street/SW 7th Street satisfy the requirements for safety, operational and engineering (SO&E) acceptability. The proposed modifications satisfy the FHWA's Policy Points and the improvements will fulfil the purpose and need for the project. Based on these findings, it is recommended that the proposed improvements be advanced for formal approval and implementation.

Interchange Justification Report
SR 90/ SW 8th Street and SW 7th Street PD&E Study

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- Appendix E: LOS Analysis – Existing Conditions
- Appendix F: Safety Analysis Technical Memorandum
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- Appendix I: Vissim Outputs (2045 No Build and Recommended Alternative)
- Appendix J: Predictive Crash Analysis
- Appendix K: Recommended Alternative Concept Signing Plan

COMPANION DOCUMENTS

- Existing Year (2015) Traffic Analysis, SW 8th Street/SW 7th Street PD&E Study, December 12, 2016.
- Design Traffic Technical Memorandum, SW 8 Street / SW 7 Street PD&E Study from SR 9/SW 27 Avenue to SR 5/US-1/Brickell Avenue, March 8, 2018
- SR 90/SW 7th Street/SW 8th Street Corridor Study, from Brickell Avenue to SR 9/SW 27th Avenue, Data Collection Memorandum, February 2016



1.0 INTRODUCTION

1.1 Project Description

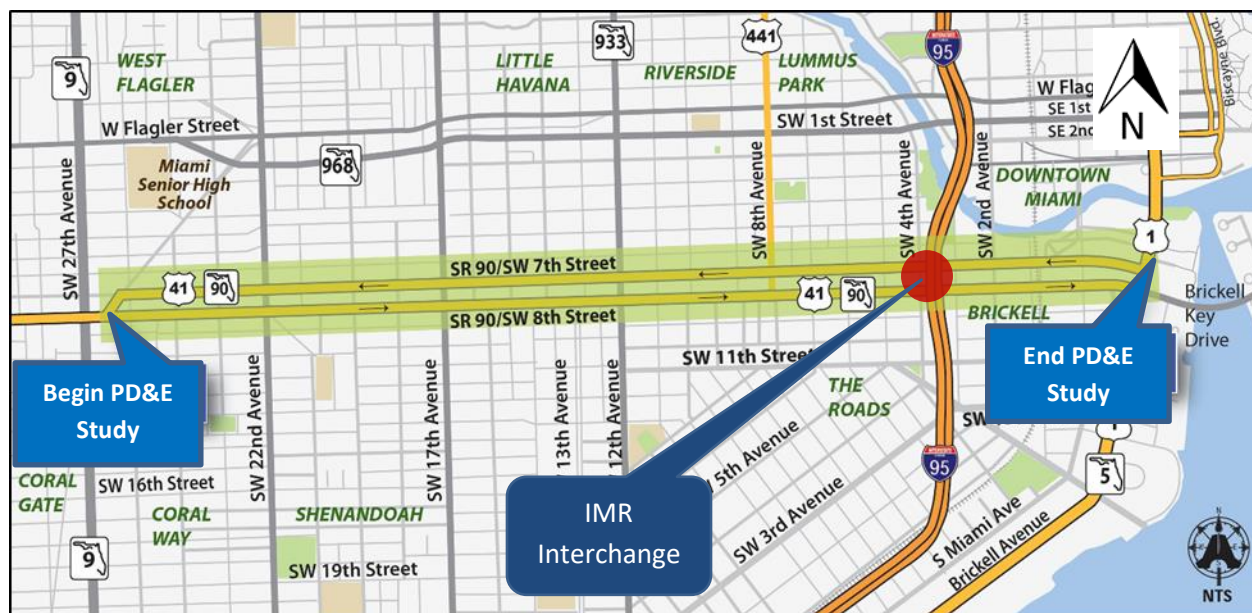
The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) Study for SR 90/US 41/SW 8th Street/SW 7th Street, located in Miami-Dade County, Florida. The limits of the PD&E Study extend along the one-way pair of SW 8th Street and SW 7th Street from SR 9/SW 27th Avenue (western limit) to SR 5/US 1/Brickell Avenue (eastern limit). The limits of the project incorporate the existing interchange at I-95 and SW 8th Street and SW 7th Street. As part of the PD&E Study, the FDOT proposes to implement improvements at the I-95 interchange to increase capacity and enhance safety conditions. The proposed improvements result from a FDOT Planning Study for SW 8th Street/SW 7th Street, which examined conceptual improvements for the one-way pair arterials and corresponding improvements to the I-95 Interchange. **Figure 1.1** depicts the project location.

This proposed interchange modification project will improve traffic operations to address traffic spillback onto SR 9 / I-95, reduce congestion, and improve safety. The overall objectives of this project include the following elements:

- Address physical, operational and safety deficiencies existing at the interchange.
- Enhance mobility and traffic circulation consistent with the long term vision for improvements to SR 90/SW 7th Street and SR 90/SW 8th Street.
- Minimize environmental and social impacts.

The FDOT determined that the proposed interchange improvements warrant preparation of an Interchange Modification Report (IMR), in accordance with the criteria specified in the Interchange Access Request User's Guide. This IMR will be processed through the expedited programmatic approval process, as agreed upon in the Programmatic Agreement between the Federal Highway Administration (FHWA), Florida Division and FDOT. The IMR provides the necessary documentation for review and determination of the safety, operational and engineering acceptability of the I-95 at SW 8th Street/SW 7th Street Interchange Modification. It will serve as the traffic operations analysis document for the related National Environmental Policy Act (NEPA) study encompassing the interchange and the arterial improvements.

Figure 1.1: Project Location Map



1.2 Purpose and Need for Project

The interchange at I-95 and SR 90/SW 8th Street and SW 7th Street experiences substantial operational deficiencies with extensive queueing and delays at the terminal intersections and neighboring intersections. The southbound terminal intersection is most critical. Currently this terminal intersection operates at level of service (LOS) F during the PM peak with extensive delays and long queues which spillback onto the I-95 mainline. This causes congestion on the mainline and is also a safety concern. The population growth within the City of Miami, along with new developments in the downtown Miami and Brickell areas, will result in a significant increase in surface transportation demand and will worsen operating conditions at the already congested I-95/SW 8th Street/SW 7th Street Interchange. In addition, the subject interchange and neighboring intersections along SW 8th Street and SW 7th Street have historically experienced abnormally high crash rates. FDOT's crash records indicate that the I-95 terminal intersections have consistently experienced abnormal high crash rates in every year from 2011 through 2015. Many fatal crashes have occurred within the project limits, and several of these crashes have involved pedestrians. If no action is taken, these safety and operational concerns will continue.

The purpose of this project is to develop recommendations for the proposed modifications to the SR 9 / I-95 and SR 90 /SW 8th Street and SW 7th Street interchange, as well as along the one-way pair arterials. The proposed project will improve traffic operations at the interchange and study area roadways / intersections by implementing operational and capacity improvements to meet the future travel demand projected as a result of Miami-Dade County population and employment growth. The project will further enhance safety conditions at the interchange, improve multimodal interrelationships, promote economic development by improving connectivity between I-95 and the service arterials, and enhance accommodations for bicycle and pedestrian activities. An expanded discussion of the Need for the project is included under Section 4.0 of this report.

1.3 Related Projects within the Study Area

The 2045 Long Range Transportation Plan (LRTP) Plan includes the following projects:



- I-95 (SR 9) from US 1/South Dixie Hwy/SR 5 to Broward County Line, Ultimate Plan Study (Managed Lanes/Capacity/Operations) (Priority IV)
- SR 9A (I-95) from SR 5 (US 1/South Dixie Hwy) to South of NW 62 St (Dr Martin Luther King Jr. Blvd), Project Development & Environmental (Partially funded)
- I-95 (SR-9) Corridor from SR 5 (US 1/Dixie Hwy) to South of I-395 (SR 836), Planning study Segment 1 (Priority IV)

A review of the FDOT Five-Year Work Program (updated July 19, 2019) identified the following projects within the project vicinity:

- 414964-1 SR 9A/I-95 (from NW 151 Street to Broward County Line) Project Development and Environment Study (2021 - 2024)
- 414964-8 SR 9A/I-95 (from NW 62nd Street to NW 151 Street) – Project Development and Environment Study (2024)
- 414964-7 SR 9A/I-95 (from US-1/South Dixie Hwy to south of NW 62nd Street) Project Development and Environment Study (2024)
- 445763-1 SR 9A/I-95 Audible Pavement Markings from MP 0.00 to 11.31 (2022)
- 443905-1 SR 90/US 41/SW 7 Street from Brickell Avenue to West of SW 2 Avenue – Resurfacing (2023 – 2026)
- 446000-1 SR 90/Tamiami Trail/SW 8 Street from Beacom Blvd to SW 4 Ave – Resurfacing (2022-2025)
- 447808-1 SR 90/US-41 SW 7th St From East of SW 27th Ave to West of SW 2nd Ave – Resurfacing (2023-2026)
- 443894-1 SR 9A/I-95 Ramps at SR 90/SW 8 Street and SW 7 Street – Rigid Pavement Rehab (2021-2025)
- 443942-1 SR 9A/I-95 (Shoulders only) from South Dixie Highway to SW 8th Street – Rigid Pavement Rehab (2021-2025)

2.0 METHODOLOGY

The methodology applied for the I-95 at SR 90/US 41/SW 8th Street and SW 7th Street IMR is documented in the Methodology Letter of Understanding (MLOU), dated April 6, 2020. The MLOU was approved by FDOT District Six and FDOT Central Office, Systems Implementation Office. The MLOU outlines the criteria, assumptions, processes, analyses and documentation requirements for the project. This approved MLOU is included with the IMR under **Appendix A**. The following summarizes some of the more prominent issues covered under the MLOU.

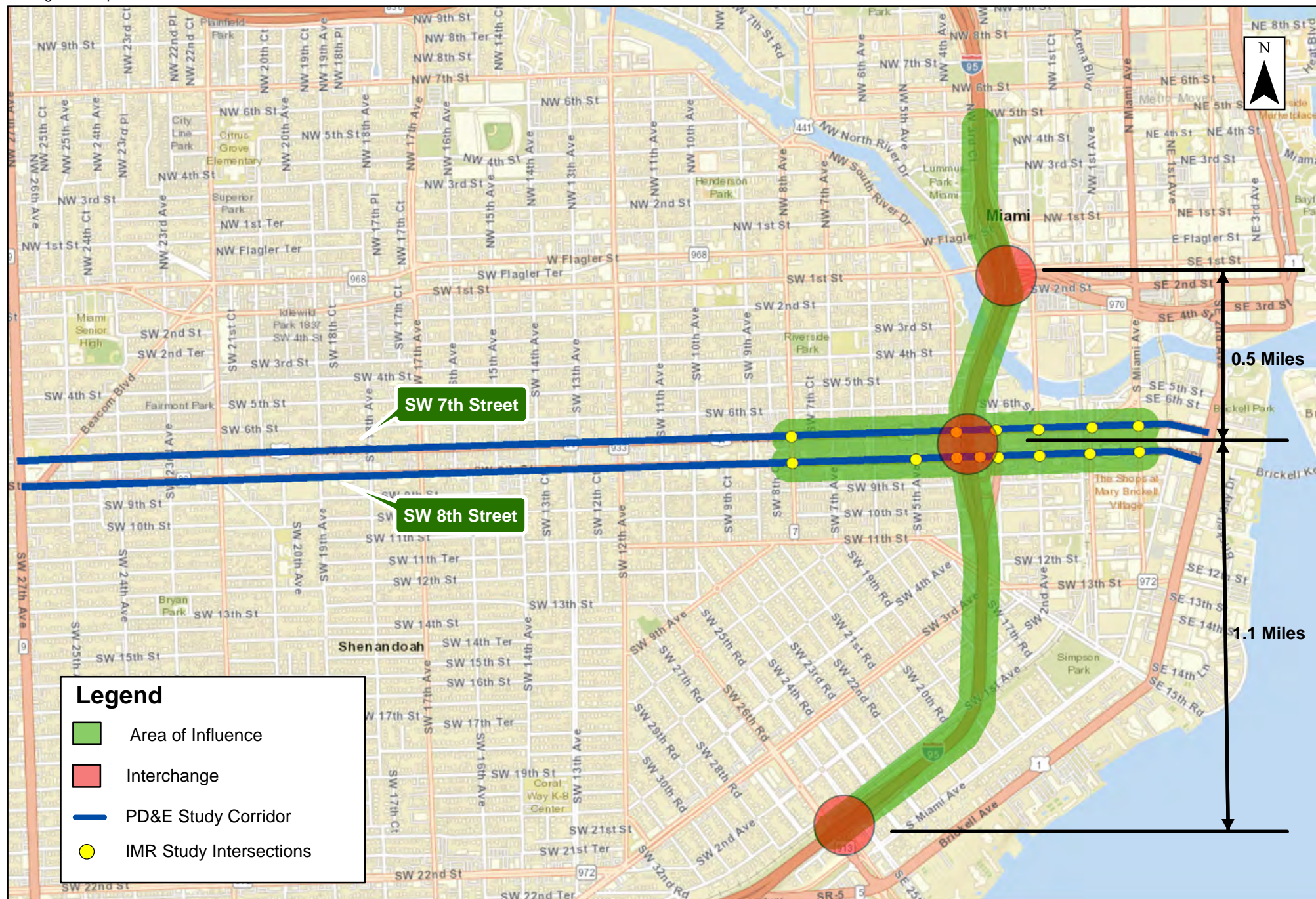
2.1 Area of Influence

The anticipated area of influence for the project is depicted in **Figure 2.1**. It incorporates the following road segments:

- I-95 from south Rickenbacker Causeway to north of NW 2nd Street. This incorporates the mainline and ramp systems connecting to SW 25th Street, Rickenbacker Causeway, Biscayne Boulevard, Miami Avenue, NW 2nd Street, SW 7th Street and SW 8th Street.
- SW 7th Street from SW 8th Avenue to South Miami Avenue. This incorporates the following intersections:
 - SW 7th Street at SW 8th Avenue
 - SW 7th Street at SW 7th Court
 - SW 7th Street at SW 6th Avenue
 - SW 7th Street at SW 5th Avenue
 - SW 7th Street at SW 4th Avenue and I-95 Southbound Off-Ramp.
 - SW 7th Street at SW 3rd Avenue
 - SW 7th Street at SW 2nd Avenue
 - SW 7th Street at SW 1st Court
 - SW 7th Street at SW 1st Avenue
 - SW 7th Street at South Miami Avenue

- SW 8th Street from SW 8th Avenue to South Miami Avenue. This incorporates the following intersections:
 - SW 8th Street at SW 8th Avenue
 - SW 8th Street at SW 7th Avenue
 - SW 8th Street at SW 6th Avenue
 - SW 8th Street at SW 5th Avenue
 - SW 8th Street at SW 4th Avenue and I-95 Southbound On-Ramp.
 - SW 8th Street at SW 3rd Avenue and I-95 Northbound On-Ramp
 - SW 8th Street at SW 2nd Avenue
 - SW 8th Street at SW 1st Court
 - SW 8th Street at SW 1st Avenue
 - SW 8th Street at South Miami Avenue

While the anticipated area of influence includes the ramps systems connecting to I-95 at adjacent interchanges, it does not include the terminal intersections at the service roads, namely: SW 25 Street, Rickenbacker Causeway, Biscayne Boulevard, Miami Avenue and NW 2nd Street.



**SR 90/SW 8th Street and
SW 7th Street PD&E Study**

Area of Influence Map

Figure 2.1

2.2 Analysis Years

The analysis years for the project were determined as follows:

- Existing year: 2015
- Opening year: 2025 (No Build + Recommended Build Alternative)
- Interim year: 2035 (No Build + Recommended Build Alternative)
- Design year: 2045 (No Build + All Build Alternatives)

2.3 Travel Demand Forecast

This study utilizes Southeast Florida Regional Planning Model (SERPM) v7. The SERPM is a regional Activity Based Model (ABM) developed and maintained by the FDOT. The SERPM is a Time of Day Model capable of producing forecasts for multiple peak and off-peak periods as well as a daily 24-hour period. The SERPM includes a 2010 Base Year and a 2040 Forecast Year. It is the adopted travel demand forecasting tool for FDOT and regional MPOs.

The travel demand forecasting process covers the area of influence for the IMR as well as the limits of the related PD&E Study along SW 7th Street and SW 8th Street. In order to maintain consistency with traffic development guidelines set forth in the FDOT PD&E Manual and the FDOT Project Traffic Forecasting Handbook, the SERPM was used to forecast future AADTs which were then converted to design traffic. The travel demand forecasting process proceed as follows:

1. **Existing Year (2015) AADT, AM and PM Peak Hour Volumes:** Existing year AADTs and peak hour volumes (AM and PM) were developed directly from 2015 field counts. The 2015 field counts were supplemented by data gathered from the prior FDOT Planning Study (2013 counts) and other traffic sources listed under Section 4 of the attached MLOU. All supplemental counts were adjusted to 2015 based on traffic growth trends analyses. Traffic volumes were checked for reasonableness, adjusted and balanced across the network.

2. **Design Year (2045) AADTs:** SERPM v7 was used to generate initial estimates of 2040 AADTs for the No Build and Build Alternatives. The AADTs generated by SERPM were checked for reasonableness and adjusted accordingly. Checks for reasonableness included comparison of SERPM forecasted volumes against existing (2015) volumes and other traffic forecasts/growth rate estimates. These include: historical growth trends, traffic forecast from prior projects/travel demand models, and population and employment growth estimates. Population and employment estimates were gathered from review of the socio-economic data in the SERPM models. Based on the reasonableness checks, recommended growth rates were developed for the study corridor. Year 2045 AADTs were then computed by applying the recommended growth rates to the 2015 AADTs with adjustments, as necessary, for balanced flow.

3. **Design Year (2045) AM and PM Hour Volumes:** Design Year (2045) AM and PM peak hour volumes were developed based on growth rate techniques. Applicable growth rates were developed for the study corridor based on a comparison of the existing year (2015) AADT and the 2040 AADT forecast and applying adjustments consistent with reasonableness checks. The resulting growth rates were applied to the 2015 AM and PM peak hour volumes that were previously developed for intersection turning movements, I-95 mainline segments and ramp roadways within the study area. Peak hour volumes were then adjusted for balanced flow throughout the study network. Peak hour volumes for alternative design concepts were subsequently developed by reassignment of traffic volumes based on change in interchange configuration and traffic flow patterns.

Peak period volumes were developed for Vissim microsimulation analysis covering 4 hours in the AM peak period and 4 hours in the PM peak period. Volumes for the peak periods were developed in 15-minute increments by factoring peak hour volumes in accordance with the flow profile from traffic counts along I-95.

4. **Opening Year (2025) and Interim Year (2035) AADT, AM and PM Peak Hour Volumes:** Opening Year (2025) and Interim Year (2035) AADTs, AM and PM peak hour volumes were interpolated from the 2015 and 2045 traffic volumes.

2.4 Traffic Factors

Table 2.1 contains the traffic factors used for travel demand forecasting and operations analyses.

Table 2.1: Traffic Factors

Roadway	K ⁽¹⁾	D ⁽²⁾	T ⁽³⁾	T _f ⁽⁴⁾	PHF ⁽⁵⁾
I-95	8.00%	50.9%	4.5%	2.0%	0.95
SW 8 th Street	9.00%	100%	7.5%	3.5%	0.95
SW 7 th Street	9.00%	100%	7.5%	3.5%	0.95
Other Streets	9.00%	varies	7.5%	3.5%	0.95

Notes:

- (1) K-factors based on standard K, per FDOT Traffic Online
- (2) D-factors based on measured 2015 peak hour traffic distribution, subject to FDOT's recommended maximum and minimums for facility type.
- (3) T-factor (T₂₄) based on assessment of 5-year historical classification counts
- (4) T_f (Design Hour Truck, DHT) estimated at approximately 50% of T-factor;
- (5) PHF: Existing year per measured 2015 counts; Future years = 0.95.

2.5 Operations Analysis

Traffic operations analyses were performed based on procedures specified in the Highway Capacity Manual (HCM) 2010. Calculations were performed using the Highway Capacity Software (HCS) for freeway segments - including basic freeway segments, merge areas, diverge areas and weaving segments. The HCM 2010 module in Synchro (version 10) was used for intersection LOS analysis. Freeway free flow speeds used for the analyses were estimated at 5 mph above the posted speed limit (HCM recommended default). Note that this free flow speed this is reported as "measured" in HCM output sheets due to

limitations in providing input data in the HCS software. Synchro models were calibrated in accordance with guidelines provided in the FDOT's Traffic Analysis Handbook. Specifically, the calibration process involved the following:

- Lost time adjustment factor was adjusted to replicate field observed queue lengths.
- In order to calculate reasonable queuing in the model, all link terminals extended at least 1,000 feet from the last node.
- 95th percentile queue lengths that are tagged with “#” or “m” were examined for the extent of queuing problems.

The calibration process was supported by observations and data gathered during field reviews. These include: typical queue lengths, delays, operating speeds, right turns on red, signal timings and pedestrian/bicycle activity.

Vissim microsimulation models were developed for 2015 existing year (for model calibration) and for comparing the 2045 No Build and Recommended Alternative. Vissim version 9-10 were used for the analyses. The Vissim models were developed in accordance with guidelines contained in the FDOT's Traffic Analysis Handbook. Temporal limits for traffic simulation models covered 4 hours during the AM peak period and 4 hours during the PM peak period with traffic flow rates in 15-minute increments. Vissim model calibration included comparison of traffic volumes, speeds, queue lengths and visual audits. Traffic volume data, travel time data, and field observations were used in the calibration process. Data gathered for the calibration is documented in the Data Collection Report – included under **Appendix B**. A detailed calibration report for the Vissim models is included under **Appendix C** of the IMR. Link specific traffic flow targets used for the calibration process included the following:

- Simulated volumes within 15% of field traffic flows for more than 85% of cases where flows range from 700 veh/hr. to 2,700 veh/hr.
- Simulated volumes within 100 veh/hr. for more than 85% of cases where flows are less than 700 veh/hr.
- Simulated volumes within 400 veh/hr. for more than 85% of cases where flows are greater than 2,700 veh/hr.

Target GEH statistic were established at less than 5 for more than 85% of the links. Travel time targets within 15% (or 1 minute if higher) of the filed measured travel times for more than 85% of cases. Visual audits of the simulation were performed to confirm that the model speed-flow relationships were similar to observed conditions. In addition to average travel speeds, individual link speeds and speed-flow diagrams were used to evaluate the performance of the freeway segments.

2.6 Level of Service Targets

The project is entirely located within the Miami-Dade County Transportation Concurrency Management Area. As such, the applicable LOS targets per Miami-Dade County Comprehensive Development Master Plan are:

- I-95: LOS D for conditions without express lanes; LOS E for conditions with express lanes.
- SW 7th Street, SW 8th Street and all other roads within project limits: LOS E

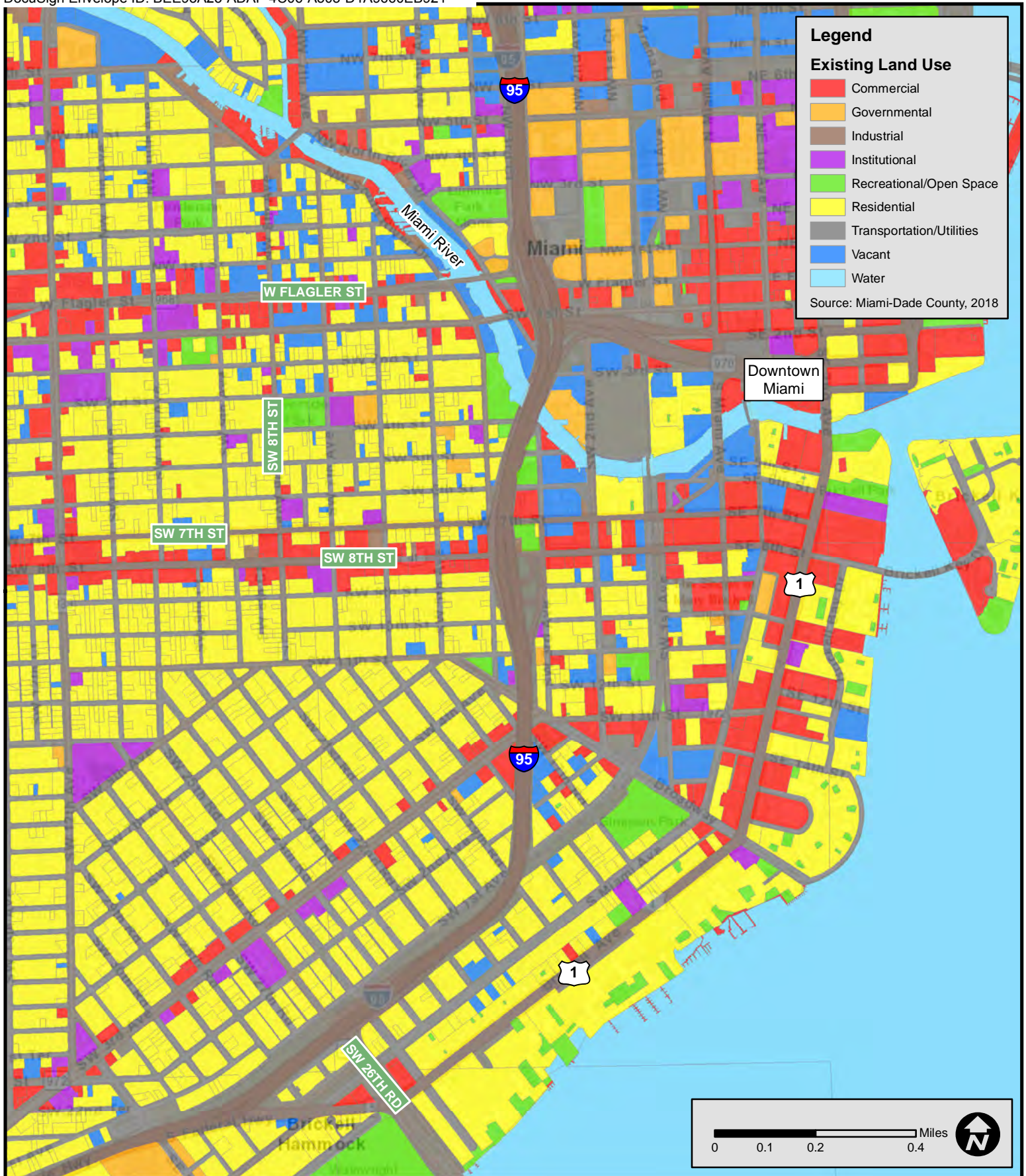
It is noted that the FDOT recommended target for roadways in urban areas is LOS D per the FDOT Quality Level of Service Handbook, 2020.

3.0 EXISTING CONDITIONS

The following sections describe conditions within the study area for the existing year 2015.

3.1 Existing Land Use

The existing land uses adjacent to the project corridor are predominantly multi-family residential and commercial (**Figure 3.1**). The land use along SW 8th Street consists of commercial uses, while SW 7th Street consists of residential areas west of I-95 and commercial use with scattered residential areas east of I-95. The residential areas within the study area are composed predominantly of multi-family buildings, with high-rise establishments located east of I-95 in the Brickell area. The commercial uses vary and include shopping plazas, food and entertainment establishments, supermarkets, pharmacies, gas stations, and car dealerships.



SR 90/SW 8th Street and
SW 7th Street PD&E Study

Existing Land Use Map

Figure 3.1

3.2 Existing Road Network

The general characteristics of the roadway facilities located within the project limits are described in the sections below. The data below is based on information gathered from the FDOT's Roadway Characteristics Inventory, Straight Line Diagrams (SLDs) and field reviews conducted for the PD&E Study.

Facility: SR 9/I-95 from south Rickenbacker Causeway to north of NW 2nd Street

Facility Type: Freeway, Limited Access, Strategic Intermodal System (SIS) Facility, designated evacuation route.

Functional Classification: Urban Principal Arterial – Interstate

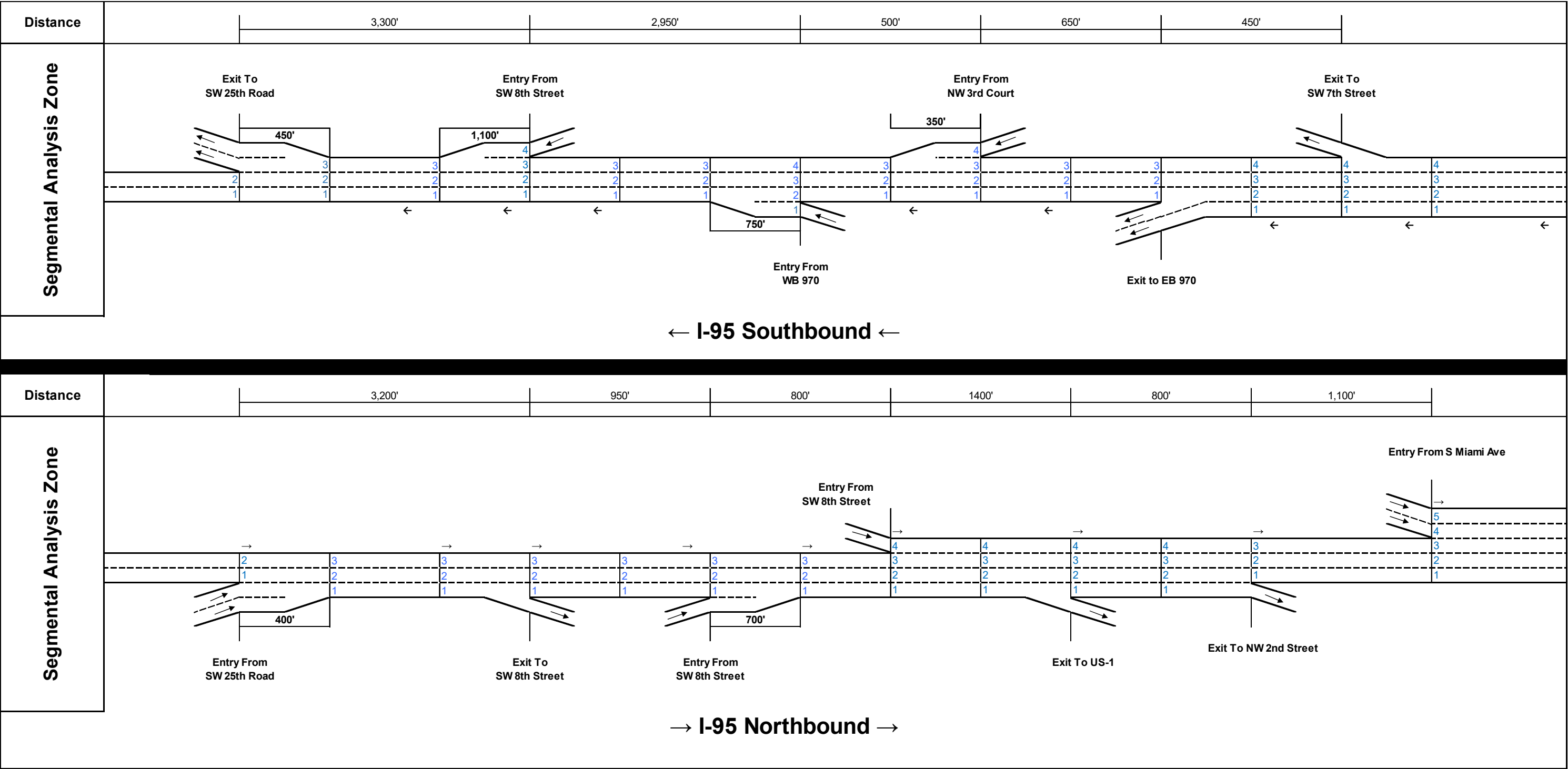
Access Management Classification (FDOT): Class 1

Typical Section (see lane schematic in **Figure 3.2**):

- Northbound I-95 typical section varies as follows:
 - South of Rickenbacker Causeway: 2 General Use (GU) lanes
 - North of Rickenbacker Causeway: 3 GU lanes
 - North of SW 8th Street: 4 GU lanes
 - North of NW 2nd Avenue: 3 GU lanes
 - North of South Miami Avenue: 5 GU lanes
- Southbound I-95 typical section varies as follows:
 - North of South Miami Avenue: 4 GU lanes
 - North of Rickenbacker Causeway: 3 GU lanes
 - South of Rickenbacker Causeway: 2 GU lanes

Median Type: Barrier wall.

Posted Speed Limit: 55 mph



Facility: SR 90/SW 8th Street and SW 7th Street

Facility Type: Arterial

Functional Classification: Urban Principal Arterial- Other

Access Management Classification (FDOT): Class 7

Posted Speed Limit: 30 mph

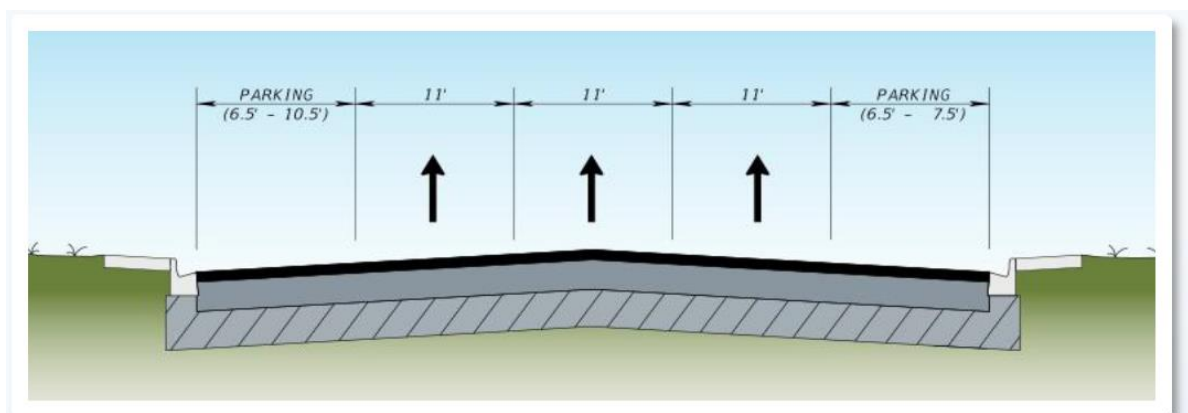
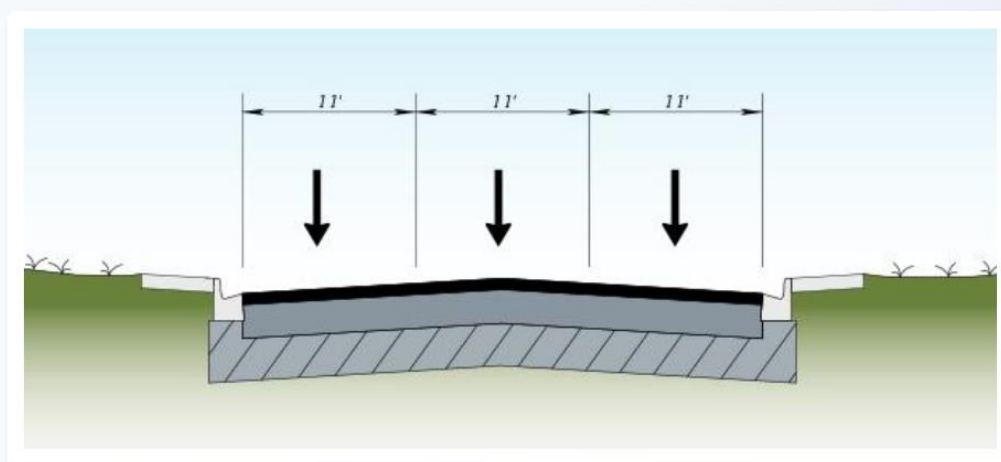
Typical Section (see **Figure 3.3**):

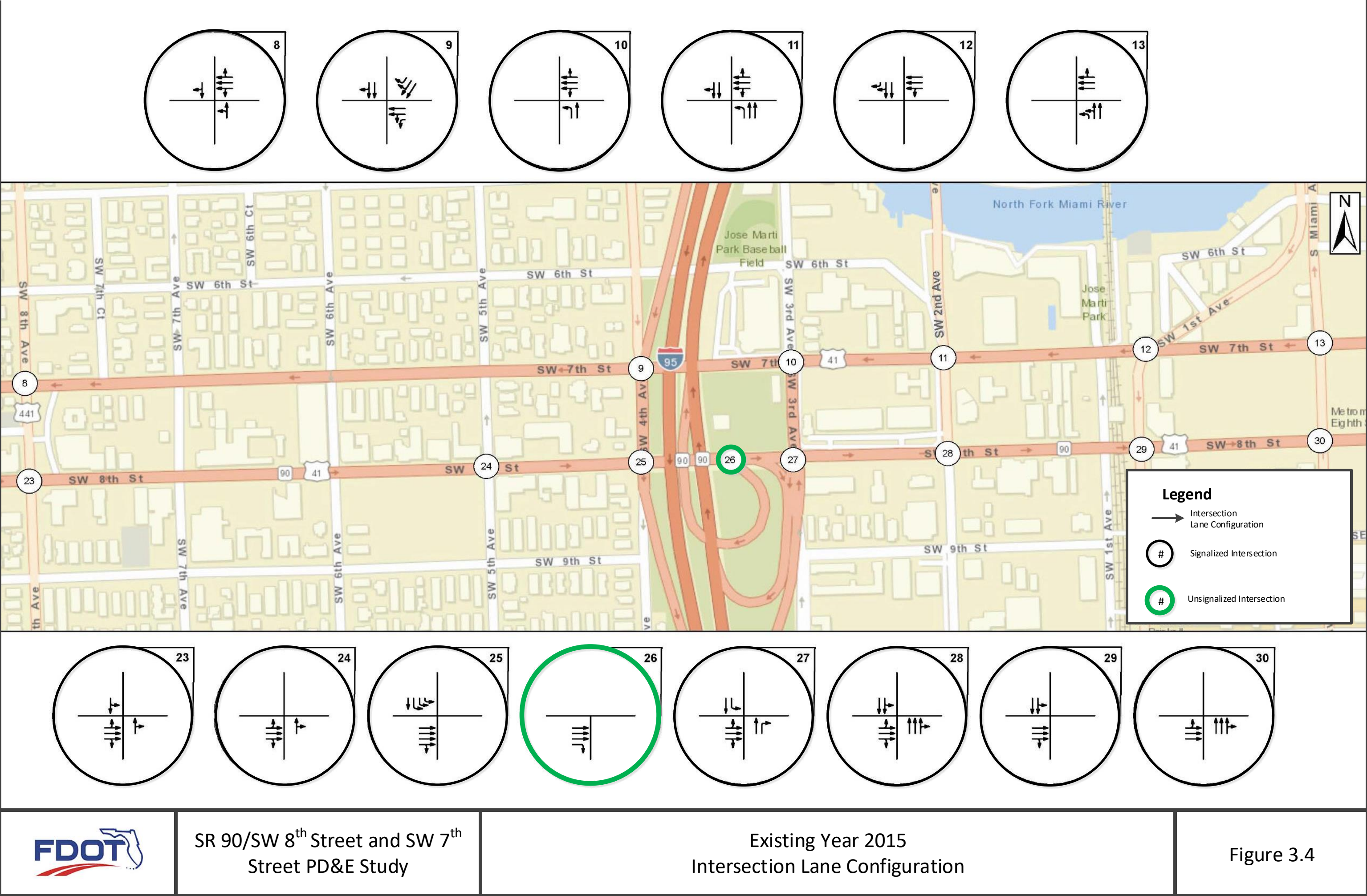
- Eastbound (SW 8th Street): 3 lanes, one-way. Typical section also includes on-street parking and sidewalks.
- Westbound (SW 7th Street): 3 lanes, one-way. Typical section also includes sidewalks.

Intersection Lane configuration

- Existing intersection lane configuration is depicted in **Figure 3.4**

Figure 3.3: SR 90 Existing Typical Section

SW 8th StreetSW 7th Street

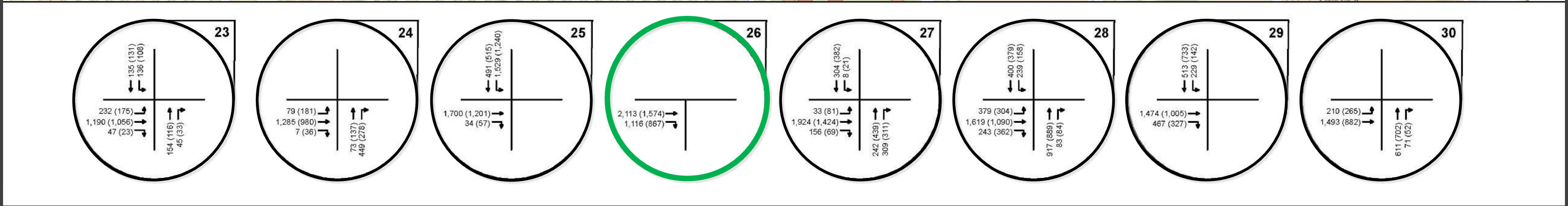


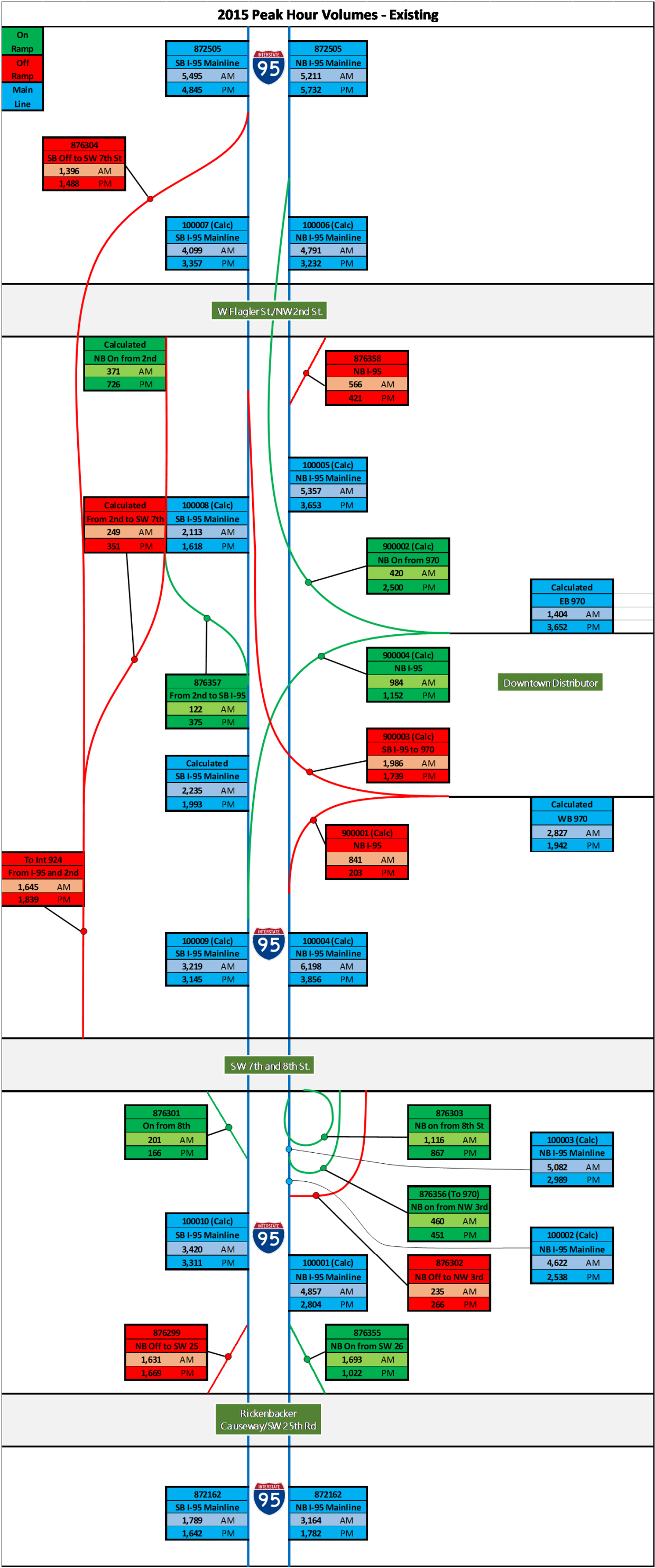
3.3 Existing Traffic Volumes

The IMR utilizes traffic volumes that were developed and approved for the SR 90/SW 8th Street/SW 7th Street PD&E Study. The development of the existing year (2015) traffic volumes is documented in detail in FDOT Technical Memorandum: *Existing Year (2015) Traffic Analysis, SW 8th Street/SW 7th Street PD&E Study, December 12, 2016 9 (IMR Companion Document)*. Traffic data was gathered from multiple sources for development of the existing year traffic volumes. The data sources included:

1. *SR 90/SW 7th Street/SW 8th Street Corridor Study, Data Collection Memorandum, FDOT, February 2016.*
2. *SR 90/SW 7th Street/SW 8th Street from US 1 to SW 27th Avenue, Data Collection Supplement Traffic Data from Traffic Impact Studies, June 2016.*
3. *SR 90/SW 7th Street/SW 8th Street Corridor Study, Technical Memorandum No. 1, Existing Conditions, June 2015.*
4. *SR 90/SW 7th Street/SW 8th Street Corridor Study, Technical Memorandum No. 2, Preliminary Project Traffic Report, April 2015.*
5. *I-95 Corridor Planning for Operational Deficiencies: US 1/SR 5 to Broward Boulevard, Design Traffic Technical Memorandum, FDOT, April 2016.*
6. *Florida Transportation Information DVD, 2015.*

The data gathered from the above sources was processed, checked and adjusted, as necessary, to developed 2015 annual average daily traffic (AADT) and the typical weekday AM (8:00 AM to 9:00 PM) and PM (4:45 PM to 5:45 PM) peak hour volumes for the study network. The resulting hour traffic flows for the IMR study network are depicted in **Figure 3.5** and **Figure 3.6**.





3.4 Existing Traffic Operations

LOS analyses were conducted for the existing (2015) conditions for the roadway segments and intersections in the study network. The analyses were conducted in accordance with procedures of the HCM, 2010 Edition. HCS was used for performing calculations for freeway segments (mainline, merge, diverge and weaving segments). Synchro models were developed for performing the LOS analyses at the terminal intersections and other project intersections. The road network geometry and peak hour traffic volumes used in the analyses were maintained consistent with the information presented in previous sections of this report (Sections 3.2 and 3.3). Signal timings used in the analysis were obtained from Miami-Dade County. These signal timing sheets are contained under **Appendix D**. Peak hour factors and the percent trucks during peak hours were maintained consistent with information presented under Section 2 (Methodology) of the IMR.

The study corridor along I-95 was subdivided into freeway segments (basic, merge, diverge, and weaving) consistent with the HCM procedures. It is recognized that the northbound segment of I-95 between SW 8th Street and NW 2nd Avenue consists of two overlapping weaving segments (see **Figure 3.6**). The analysis of this complex weaving segment is not explicitly covered in the HCM 2010 procedures. Hence, for the HCM analyses, a simplified geometry was assumed within the complex weaving segment to be consistent with the HCM 2010 analytical procedures. In the analysis of the two-sided-weave segment between SW 8th Street on-ramp (left hand entry) and the off-ramp to off-ramp to NW 2nd Street (right hand exit), the simplified geometry assumed that the intermediate off-ramp (exit to US 1) was removed and the associated off-ramp traffic was added to the freeway through traffic. No geometric assumptions were necessary for the weaving segment between SW 8th Street on-ramp (left hand entry) and the off-ramp to US 1 (right hand exit) as the conditions fall within the parameters covered by HCM 2010 procedures.

Analyses for weaving segments also required applying assumptions for traffic movements between upstream ramps/freeway segments and downstream ramps/freeway segments. A conservative approach was applied for the ramp-to-ramp volumes for the two-sided weaving segments. The ramp-to-ramp volumes were assumed to be 5% of the off-ramp volume. This was considered to be a conservative estimate as traffic entering I-95 and exiting at US 1 or NW 2nd Avenue would typically use the right hand

on-ramp from SW 8th Street and avoid the need for weaving when entering from the SW 8th Street left hand on-ramp. It should further be noted that the HCM procedures do not account for the impact of downstream congestion in LOS calculations. Hence, the HCM results may not accurately reflect traffic operations under congested conditions. Microsimulation analyses (discussed under Section 9 of the IMR) provides a more robust analysis for congested conditions.

The HCS output sheets for the existing conditions analysis are contained under **Appendix E** and results are summarized in lane schematics shown in **Figure 3.7**. The intersection analyses are summarized in **Table 3.1** and the associated Synchro output files are contained under **Appendix E**.

Results from the freeway LOS analysis depict generally good operating conditions along northbound I-95 and southbound I-95 in the AM and PM peak periods. In both peak periods, the analysis indicates that all I-95 freeway segments within the project limits operate at LOS D or better.

Results from the intersection LOS analysis indicate that all project intersections operate at LOS D or better during the AM and PM peak periods except for the following:

- SW 8th Street at SW 3rd Avenue: LOS E in AM peak
- SW 8th Street at SW 2nd Avenue: LOS E in AM peak
- SW 8th Street at SW 1st Avenue: LOS E in AM peak
- SW 7th Street at SW 2nd Avenue: LOS E in PM peak
- SW 7th Street at SW 4th Avenue: LOS F in PM peak. This is one of the most critical intersections within the study network as it serves traffic exiting SB I-95 (to EB SW 8th Street and WB SW 7th Street) as well as traffic circulating from WB SW 7th Street to access NB I-95.

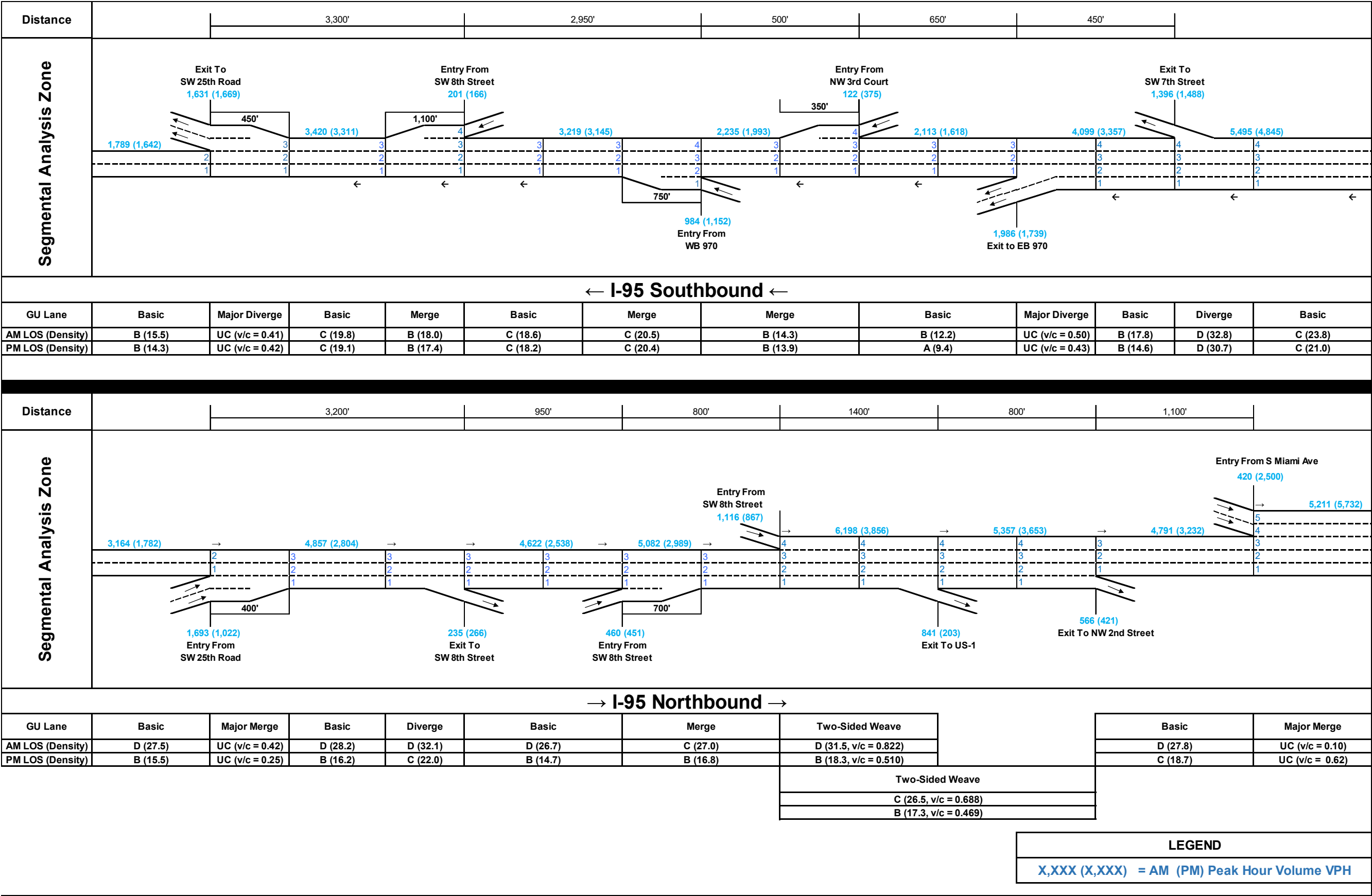


Table 3.1: Existing (2015) Intersection Level of Service Analysis

Intersections	AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SW 8 th Street & SW 8 th Ave*	25.7	C	21.8	C
SW 8 th Street & SW 5 th Ave	39.1	D	29.1	C
SW 8 th Street & SW 4 th Ave	50.5	D	45.3	D
SW 8 th Street & SW 3 rd Ave	65.1	E	43.0	D
SW 8 th Street & SW 2 nd Ave*	67.6	E	32.7	C
SW 8 th Street & SW 1 st Ave	72.8	E	50.8	D
SW 8 th Street & S Miami Ave	38.7	D	38.7	D
SW 7 th Street & S Miami Ave*	12.2	B	35.8	D
SW 7 th Street & SW 1 st Ave*	20.3	C	26.0	C
SW 7 th Street & SW 2 nd Ave	49.3	D	61.9	E
SW 7 th Street & SW 3 rd Ave	28.7	C	42.1	D
SW 7 th Street & SW 4 th Ave/I-95 SB Off-Ramp*	46.5	D	104.3	F
SW 7 th Street & SW 8 th Ave	16.9	B	25.3	C

*LOS was calculated using the HCM 2000 methodology

3.5 Corridor Crash Analysis

FDOT's Crash Analysis Reporting System (CARS) Online was used to gather historical crash records for the I-95 and the SR 90/SW 8th Street/SW 7th Street corridors. CARS Online is a database maintained annually by the FDOT for crashes reported along state highway facilities. The database provides information on various characteristics associated with each crash including: collision type, severity, weather conditions, road surface conditions and date/time information. The CARS Online database was researched to identify and extract crashes reported along the study corridor during the period from January 2011 through December 2015. The crashes were analyzed to make an assessment of safety conditions within the study network.

A detailed analysis of the crash data collected for the PD&E Study is documented in the related ***Safety Analysis Technical Memorandum*** – included under **Appendix F**. The following provides a summary of the findings from the Safety Study.

Safety Analysis for SR 90/SW 8th Street and SW 7th Street

Table 3.2 and **Table 3.3** depict a summary of the crash analysis for SW 8th Street and SW 7th Street respectively, within the PD&E limits (from Brickell Avenue to SW 27th Avenue). The analysis shows a total of 2,593 crashes experienced along SW 8th Street and a total of 1,659 crashes experienced along SW 7th Street over the five-year study period. The predominant crash types along SW 8th Street were rear-end crashes (29%); sideswipe crashes (23.6%) and angle crashes (22.4%). Similarly, the predominant crash types along SW 7th Street were angle crashes (35.1%); rear end crashes (24.1%); and sideswipe crashes (22.7%). Six fatal crashes were experienced along SW 8th Street and one along SW 7th Street.

Analysis of the traffic crash data identified several locations within the influence area of the I-95/SR 90 Interchange with a history of abnormally high crash rates (classified as high cash locations per FDOT's analytical procedures with confidence level of 99.99%). These high crash locations (within the IMR limits) include the following intersections:

- SW 8th Street at SW 4th Avenue and I-95 SB On-Ramp - listed high crash location in 2011 through 2015

- SW 8th Street at SW 3rd Avenue, I-95 NB Off-Ramp and I-95 NB On-Ramps - listed high crash location in 2011, 2012, 2014 and 2015
- SW 8th Street at SW 2nd Avenue - listed high crash location in 2011 through 2015
- SW 8th Street at SW 1st Avenue - listed high crash location in 2011, 2012 and 2015
- SW 7th Street at SW 2nd Avenue - listed high crash location in 2011 through 2015
- SW 7th Street at SW 3rd Avenue - listed high crash location in 2011 through 2015
- SW 7th Street at SW 4th Avenue and I-95 SB Off-Ramp - listed high crash location in 2011 through 2015
- SW 7th Street at South Miami Avenue - listed high crash location in 2012 and 2014
- SW 7th Street at SW 1st Avenue - listed high crash location in 2011, 2012, 2014 and 2015

The high crash locations noted above include the I-95 ramp terminal intersections which are of particular interest for the IMR. Crash summary tables for the I-95 terminal intersections are depicted in **Tables 3.4**, **3.5** and **3.6**. The probable causal factors for the crashes experienced at the I-95 terminal intersections and other intersections within the interchange influence area are: excessive congestion; conflicting weaving maneuvers; parking activities; narrow lanes and aggressive driver behavior.

Conflicting weaving maneuvers were identified as one of the primary contributing cause for crashes experienced within the immediate vicinity of the interchange ramp terminal intersections. The graphic in **Figure 3.8** illustrates the weaving conflicts experienced in the vicinity of the terminal intersections. The traffic flow pattern in the vicinity of the ramp terminals involves a heavy southbound left turn movement (triple left turn lanes) at the intersection of SW 8th Street and SW 4th Avenue. This is followed immediately downstream by a right turn movement from SW 8th Street to access the I-95 NB on-ramps. This creates an area with numerous conflicting movements - illustrated by the dotted red line representing the weaving movement and the solid green line representing the conflicting through movement.

Figure 3.9 illustrates other operational issues that impact safety in the immediate vicinity of the ramp terminals. These include queue spillback onto SW 3rd Avenue and SW 7th Avenue from the NB terminal intersection (SW 8th Street and SW 3rd Avenue intersection). In addition, conflicts frequently occur involving traffic exiting the Publix Driveway and weaving across traffic on SW 7th Street to get

appropriately aligned for maneuvering onto SB 4th Avenue and EB 8th Street, as well as accessing NB I-95 ramps (illustrated by dotted red line and solid green line in **Figure 3.9**). Addressing these safety and operational issues within the vicinity of the interchange is a primary concern for the proposed design modifications presented in the IMR.

Table 3.2: Five-Year Crash Summary SW 8th Street

SR 90/US 41/SW 8 th St. from SW 27 th Avenue to Brickell Avenue		Number of Crashes					5 Year Total Crashes	Mean Crashes	%
		Year							
		2011	2012	2013	2014	2015			
CRASH TYPE	Rear End	107	153	160	156	176	752	150	29.0%
	Head On	1	2	0	1	2	6	1	0.2%
	Angle	79	120	117	133	131	580	116	22.4%
	Left Turn	10	10	13	9	13	55	11	2.1%
	Right Turn	1	7	2	4	2	16	3	0.6%
	Sideswipe	88	103	131	122	167	611	122	23.6%
	Backed Into	5	1	4	7	6	23	5	0.9%
	Pedestrian	9	15	20	10	11	65	13	2.5%
	Bicycle	6	5	7	6	7	31	6	1.2%
	<i>Fixed Object</i>	8	7	9	2	4	30	6	1.2%
	<i>Other Non Fixed Object Collisions</i>	14	21	23	17	7	82	16	3.2%
	Parked Motor Vehicle	11	20	18	16	7	72	14	2.8%
	<i>Non-Collisions</i>	0	5	2	2	0	9	2	0.3%
	<i>Others</i>	66	58	63	66	80	333	67	12.8%
	Total Crashes	394	507	551	535	606	2593	519	100.0%
SEVERITY	PDO Crashes	329	422	466	459	536	2212	442	85.3%
	Fatal Crashes	2	1	1	1	1	6	1	0.2%
	Injury Crashes	63	84	84	75	69	375	75	14.5%
LIGHTING CONDITIONS	Daylight	256	350	375	368	437	1786	357	68.9%
	Dusk	12	10	15	14	8	59	12	2.3%
	Dawn	4	5	8	7	3	27	5	1.0%
	Dark	121	142	152	145	156	716	143	27.6%
	Unknown	1	0	1	1	2	5	1	0.2%
SURFACE CONDITIONS	Dry	352	447	486	489	555	2329	466	89.8%
	Wet	38	59	64	46	51	258	52	9.9%
	Others	4	1	1	0	0	6	1	0.2%
HOUR OF DAY	00:00-06:00	56	74	50	47	50	277	55	10.7%
	06:00-09:00	50	66	66	57	69	308	62	11.9%
	09:00-11:00	47	57	48	52	81	285	57	11.0%
	11:00-13:00	48	69	66	65	74	322	64	12.4%
	13:00-15:00	51	49	81	72	84	337	67	13.0%
	15:00-18:00	51	81	112	111	107	462	92	17.8%
	18:00-24:00	91	111	128	131	141	602	120	23.2%

Table 3.3: Five-Year Crash Summary at SW 7th Street

SW 7 th St. from Brickell Ave. to SW 27 th Avenue		Number of Crashes					5 Year Total Crashes	Mean Crashes	%
		Year							
		2011	2012	2013	2014	2015			
CRASH TYPE	Rear End	53	73	92	88	94	400	80	24.1%
	Head On	0	0	0	0	0	0	0	0.0%
	Angle	85	150	121	111	115	582	116	35.1%
	Left Turn	2	2	7	11	4	26	5	1.6%
	Right Turn	0	2	1	1	1	5	1	0.3%
	Sideswipe	47	81	72	91	86	377	75	22.7%
	Backed Into	3	5	1	6	0	15	3	0.9%
	Pedestrian	8	4	6	4	8	30	6	1.8%
	Bicycle	0	1	3	1	5	10	2	0.6%
	<i>Fixed Object</i>	3	6	3	6	5	23	5	1.4%
	<i>Other Non-Fixed Object Collisions</i>	3	1	3	6	3	16	3	1.0%
	Parked Motor Vehicle	3	1	3	4	3	14	3	0.8%
	<i>Non-Collisions</i>	5	2	0	2	1	10	2	0.6%
	<i>Others</i>	23	39	35	40	28	165	33	9.9%
	Total Crashes	232	366	344	367	350	1659	332	100.0%
SEVERITY	PDO Crashes	186	298	271	323	298	1376	275	82.9%
	Fatal Crashes	1	0	0	0	0	1	0	0.1%
	Injury Crashes	45	68	73	44	52	282	56	17.0%
LIGHTING CONDITIONS	Daylight	148	210	207	255	271	1091	218	65.8%
	Dusk	6	9	9	7	7	38	8	2.3%
	Dawn	1	5	5	1	1	13	3	0.8%
	Dark	77	141	123	103	71	515	103	31.0%
	Unknown	0	1	0	1	0	2	0	0.1%
SURFACE CONDITIONS	Dry	212	308	293	334	316	1463	293	88.2%
	Wet	20	56	50	33	34	193	39	11.6%
	Others	0	2	1	0	0	3	1	0.2%
HOUR OF DAY	00:00-06:00	48	90	62	45	32	277	55	16.7%
	06:00-09:00	17	22	32	28	32	131	26	7.9%
	09:00-11:00	25	33	33	50	42	183	37	11.0%
	11:00-13:00	28	29	30	40	34	161	32	9.7%
	13:00-15:00	22	45	39	47	56	209	42	12.6%
	15:00-18:00	48	73	70	89	91	371	74	22.4%
	18:00-24:00	44	74	78	68	63	327	65	19.7%

Table 3.4: Crash Summary SW 8th Street at SW 3rd Avenue and I-95 NB On-Ramp

SW 8 th St. at SW 3 rd Avenue I-95 NB Off-Ramp and NB On-Ramps		Number of Crashes					5 Year Total Crashes	Mean Crashes	%
		Year							
		2011	2012	2013	2014	2015			
CRASH TYPE	Rear End	7	8	8	10	12	45	9	32.1%
	Head On	0	0	0	0	0	0	0	0.0%
	Angle	8	9	5	14	13	49	10	35.0%
	Left Turn	1	0	0	1	0	2	0	1.4%
	Right Turn	0	0	0	0	0	0	0	0.0%
	Sideswipe	0	7	2	6	7	22	4	15.7%
	Backed Into	0	0	0	0	0	0	0	0.0%
	Pedestrian	0	2	0	2	1	5	1	3.6%
	Bicycle	0	0	0	0	0	0	0	0.0%
	<i>Fixed Object</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>0.7%</i>
	<i>Other Non-Fixed Object Collisions</i>	<i>0</i>	<i>0</i>	<i>4</i>	<i>1</i>	<i>0</i>	<i>5</i>	<i>1</i>	<i>3.6%</i>
	<i>Non-Collisions</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0.0%</i>
	Others	1	1	5	1	3	11	2	7.9%
	Total Crashes	17	27	25	35	36	140	28	100.0%

Table 3.5: Crash Summary SW 7th Street at SW 4th Avenue and I-95 SB Off-Ramp

SW 7 th St. at SW 4 th Avenue and I-95 SB-Off Ramp		Number of Crashes					5 Year Total Crashes	Mean Crashes	%
		Year							
		2011	2012	2013	2014	2015			
CRASH TYPE	Rear End	8	7	9	8	14	46	9	25.6%
	Head On	0	0	0	0	0	0	0	0.0%
	Angle	4	5	2	8	6	25	5	13.9%
	Left Turn	0	0	0	0	0	0	0	0.0%
	Right Turn	0	0	0	0	0	0	0	0.0%
	Sideswipe	9	18	12	23	16	78	16	43.3%
	Backed Into	0	0	0	0	0	0	0	0.0%
	Pedestrian	0	0	0	0	0	0	0	0.0%
	Bicycle	0	0	0	0	0	0	0	0.0%
	<i>Fixed Object</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>3</i>	<i>1</i>	<i>1.7%</i>
	<i>Other Non-Fixed Object Collisions</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0.0%</i>
	<i>Non-Collisions</i>	<i>2</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>0</i>	<i>1.1%</i>
	Others	6	6	5	5	4	26	5	14.4%
	Total Crashes	30	37	29	44	40	180	36	100.0%

Table 3.6: Crash Summary SW 8th Street at SW 4th Avenue and I-95 SB On-Ramp

SW 8 th St. at SW 4 th Avenue and I-95 SB On-Ramp		Number of Crashes					5 Year Total Crashes	Mean Crashes	%
		Year							
		2011	2012	2013	2014	2015			
CRASH TYPE	Rear End	9	15	20	19	16	79	16	16.9%
	Head On	0	0	0	0	0	0	0	0.0%
	Angle	19	19	27	25	26	116	23	24.8%
	Left Turn	0	0	0	0	1	1	0	0.2%
	Right Turn	0	3	0	0	0	3	1	0.6%
	Sideswipe	34	27	35	50	40	186	37	39.7%
	Backed Into	1	0	0	0	0	1	0	0.2%
	Pedestrian	0	0	1	0	0	1	0	0.2%
	Bicycle	0	0	0	0	0	0	0	0.0%
	<i>Fixed Object</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>0.2%</i>
	<i>Other Non-Fixed Object Collisions</i>	<i>1</i>	<i>0</i>	<i>1</i>	<i>1</i>	<i>0</i>	<i>3</i>	<i>1</i>	<i>0.6%</i>
	<i>Non-Collisions</i>	<i>0</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>0</i>	<i>3</i>	<i>1</i>	<i>0.6%</i>
	Others	20	11	14	11	18	74	15	15.8%
	Total Crashes	85	76	99	107	101	468	94	100.0%

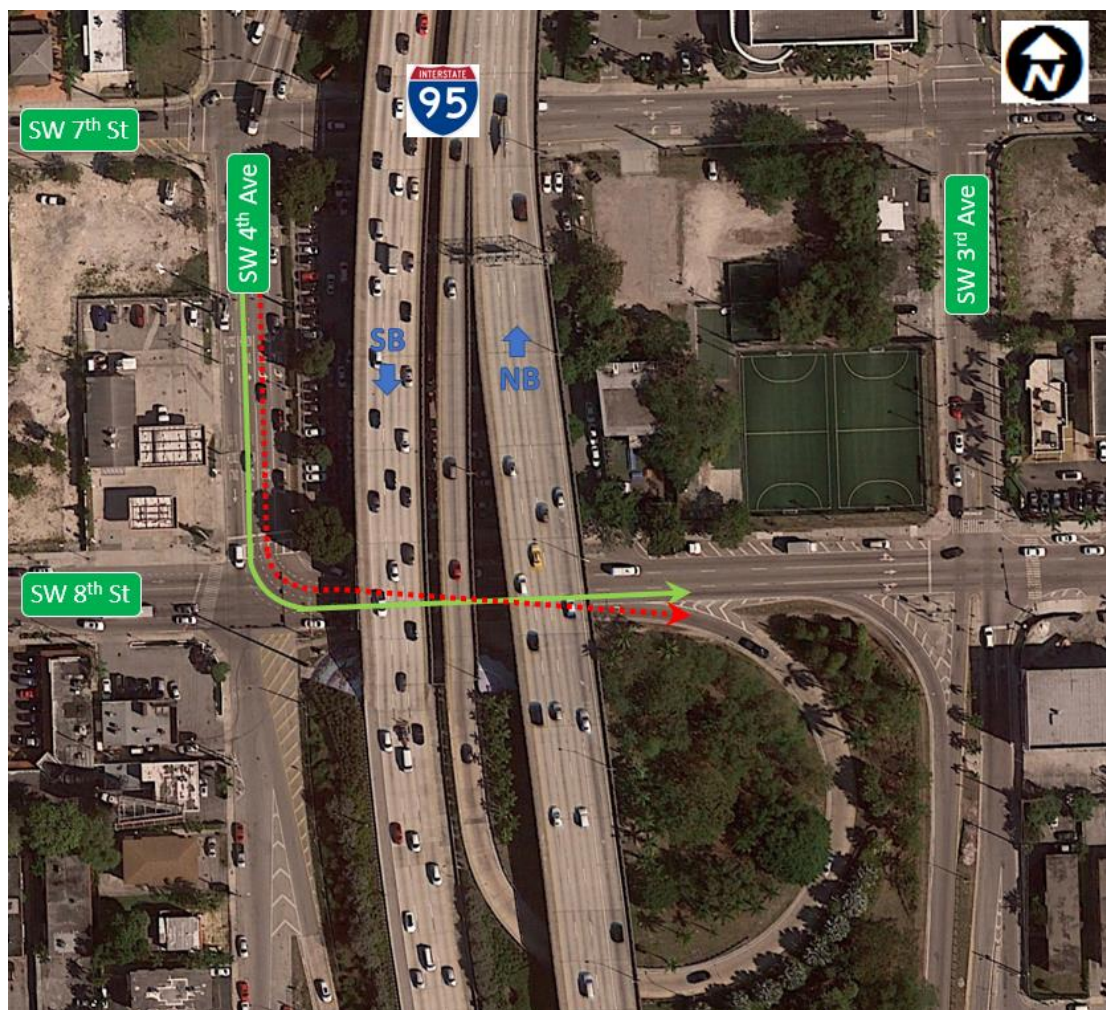
Figure 3.8: Weaving Maneuvers in the Vicinity of SW 8th Street and SW 4th Avenue

Figure 3.9: Operational issues at NB I-95 Terminal and along SW 7th Street

Safety Analysis for the I-95 Corridor

The safety analysis for I-95 included crashes from the Rickenbacker Causeway (MP 0.420) to just north of NW 2nd Street (MP 2.460). A total of 491 crashes were reported along this section of I-95 with 80 crashes in 2011, 96 crashes in 2012, 97 crashes in 2013, 102 crashes in 2014 and 118 crashes in 2015. These results indicate a progressive increase in crashes (approximately 10% per year) along the subject I-95 corridor from 2011 through 2015.

Consistent with the information contained in the crash reports, the crash analysis for the I-95 corridor was subdivided into two segments per traffic breaks (based on AADTs) on the corridor (see ***Safety Analysis Technical Memorandum***). The traffic break was based on the variation in AADT north and south of SR 90 and is consistent with the traffic break applied by FDOT for reporting traffic data on I-95. The segmentation along I-95 was as follows:

- Southern segment from Rickenbacker Causeway (MP 0.420) to SR 90 Interchange (MP 1.547)
- Northern segment from SR 90 interchange (MP 1.547) to NW 2nd Street (MP 2.460).

The following sections summarize the safety analysis for the two segments of I-95.

Table 3.7 and **Table 3.8** depict a summary of the crash analysis for the I-95 segments south of SR 90 and north of SR 90, respectively. The analysis shows that over the 5-year period a total of 309 crashes were experienced along the I-95 segment south of SR 90 and 182 crashes along I-95 north of SR 90. The predominant crash types along the I-95 southern segment were rear-end crashes (46.3%); fixed object crashes (21.4%) and sideswipes crashes (19.4%). Similarly, the predominant crash types along the I-95 northern segment were rear end crashes (40.7%); fixed object crashes (23.6%); and sideswipe crashes (23.1%). Two fatal crashes were experienced along the I-95 northern segment while no fatalities were reported on the I-95 southern segment.

The crashes experienced along the I-95 southern segment and the I-95 northern segment were determined to be not abnormally high when compared to similar locations within the state – no spots or segments along the I-95 corridor were identified on the FDOT's High Crash List between 2011 and 2015. This suggests that safety on the I-95 mainline is not a significant concern at this time. This is an important finding as it suggests that the current operating conditions along I-95 mainline (merge, diverge and

weaving maneuvers) do not adversely impact the safety of the facility. However, inspection of the crash data indicates that the proportion of crashes experienced during dark conditions (approximately 41%) along both I-95 segments is higher than the state average of 33%. This suggest that lighting conditions may be inadequate along the corridor. No other significant safety-related concerns were identified from the I-95 crash data.

Table 3.7: Five-Year Crash Summary – I-95 Segment South of SR 90

I-95 from Rickenbacker Cswy. to the SW 8 th /7 th St. Interchange		Number of Crashes					5 Year Total Crashes	Mean Crashes	%
		Year							
		2011	2012	2013	2014	2015			
CRASH TYPE	Rear End	31	30	30	24	28	143	29	46.3%
	Head On	0	0	0	0	0	0	0	0.0%
	Angle	5	6	4	2	4	21	4	6.8%
	Left Turn	0	0	0	0	0	0	0	0.0%
	Right Turn	0	0	0	0	0	0	0	0.0%
	Sideswipe	9	10	13	15	13	60	12	19.4%
	Backed Into	0	0	0	0	0	0	0	0.0%
	Pedestrian	0	0	0	1	0	1	0	0.3%
	Bicycle	0	0	0	0	0	0	0	0.0%
	Fixed Object	13	14	10	15	14	66	13	21.4%
	Other Non-Fixed Object Collisions	1	0	0	2	0	3	1	1.0%
	Non-Collisions	1	1	1	0	4	7	1	2.3%
	Others	1	5	0	0	2	8	2	2.6%
	Total Crashes	61	66	58	59	65	309	62	100.0%
SEVERITY	PDO Crashes	37	40	33	39	49	198	40	64.1%
	Fatal Crashes	0	0	0	0	0	0	0	0.0%
	Injury Crashes	24	26	25	20	16	111	22	35.9%
LIGHTING CONDITIONS	Daylight	29	40	37	36	38	180	36	58.3%
	Dusk	1	3	2	3	1	10	2	3.2%
	Dawn	1	0	1	2	0	4	1	1.3%
	Dark	30	23	18	18	26	115	23	37.2%
	Unknown	0	0	0	0	0	0	0	0.0%
SURFACE CONDITIONS	Dry	57	53	45	55	51	261	52	84.5%
	Wet	4	13	13	4	14	48	10	15.5%
	Others	0	0	0	0	0	0	0	0.0%
HOUR OF DAY	00:00-06:00	14	10	9	9	14	56	11	18.1%
	06:00-09:00	5	8	5	6	7	31	6	10.0%
	09:00-11:00	4	4	4	6	4	22	4	7.1%
	11:00-13:00	4	6	5	1	2	18	4	5.8%
	13:00-15:00	5	3	6	6	4	24	5	7.8%
	15:00-18:00	8	17	13	16	18	72	14	23.3%
	18:00-24:00	21	18	16	15	16	86	17	27.8%

Table 3.8: Five-Year Crash Summary – I-95 Segment North of SR 90

I-95 from the SW 8 th /7 th St. Interchange to north of NW 2 nd St.		Number of Crashes					5 Year Total Crashes	Mean Crashes	%
		Year							
		2011	2012	2013	2014	2015			
CRASH TYPE	Rear End	4	11	15	20	24	74	15	40.7%
	Head On	0	1	0	0	0	1	0	0.5%
	Angle	0	1	1	2	3	7	1	3.8%
	Left Turn	0	0	0	0	0	0	0	0.0%
	Right Turn	0	0	0	1	0	1	0	0.5%
	Sideswipe	4	6	10	8	14	42	8	23.1%
	Backed Into	0	0	0	0	0	0	0	0.0%
	Pedestrian	0	0	1	0	0	1	0	0.5%
	Bicycle	0	0	0	0	0	0	0	0.0%
	<i>Fixed Object</i>	8	8	8	9	10	43	9	23.6%
	<i>Other Non-Fixed Object Collisions</i>	0	1	1	0	1	3	1	1.6%
	<i>Non-Collisions</i>	0	0	2	3	0	5	1	2.7%
	Others	3	1	1	0	0	5	1	2.7%
	Total Crashes	19	29	39	43	52	182	36	100.0%
SEVERITY	PDO Crashes	13	22	27	28	36	126	25	69.2%
	Fatal Crashes	0	0	0	1	1	2	0	1.1%
	Injury Crashes	6	7	12	14	15	54	11	29.7%
LIGHTING CONDITIONS	Daylight	6	20	28	24	31	109	22	59.9%
	Dusk	0	0	0	3	2	5	1	2.7%
	Dawn	0	2	0	0	1	3	1	1.6%
	Dark	13	7	11	16	18	65	13	35.7%
	Unknown	0	0	0	0	0	0	0	0.0%
SURFACE CONDITIONS	Dry	15	27	35	33	40	150	30	82.4%
	Wet	4	2	4	10	12	32	6	17.6%
	Others	0	0	0	0	0	0	0	0.0%
HOUR OF DAY	00:00-06:00	7	3	4	8	10	32	6	17.6%
	06:00-09:00	1	3	7	4	4	19	4	10.4%
	09:00-11:00	0	4	6	2	2	14	3	7.7%
	11:00-13:00	0	3	2	3	5	13	3	7.1%
	13:00-15:00	0	4	1	3	5	13	3	7.1%
	15:00-18:00	2	5	6	9	9	31	6	17.0%
	18:00-24:00	9	7	13	14	17	60	12	33.0%

3.6 Multi-Modal Facilities

Pedestrian Accommodations

SW 8th Street has existing sidewalks on both sides of the roadway from SW 27th Avenue to Brickell Avenue. The sidewalk width varies from ten (10)-feet to fifteen (15)-feet on the north side of the roadway and from five (5)-feet to ten (10)-feet on the south side of the roadway. SW 7th Street along the project corridor has a continuous six and a half (6.5)-feet sidewalk on both sides of the roadway. FDOT recently implemented two construction projects (Project numbers: 437471-1-52-01 and 437792-1-52-01) which provide American with Disabilities Act (ADA) curb cut ramps and pedestrian mid-block crossings along the SW 8th Street and SW 7th Street.

Bicycle Facilities

There are no existing bicycle facilities or shared bicycle and travel lanes or “sharrows” within the project corridor on either SW 8th Street or SW 7th Street. However, the City of Miami’s Bicycle Master Plan has included designated bicycle routes on these facilities in the future. In addition, several cross-streets in the study area, including SW 2nd Avenue, SW 1st Avenue and South Miami Avenue, currently have designated or planned bicycle lanes. The M-Path Trail is a paved multi-use trail in Miami-Dade County that begins at SW 3rd Street near the Miami River and crosses the SW 7th Street and SW 8th Street corridors.

Transit Service and Facilities

Several transit services and facilities exist within or near the study location including Metrobus, Metrorail (Heavy Rail), Metromover (Automated People Mover), City’s Trolley service and demand-response services (the County’s Special Transportation Service (STS) and City On-Demand). Metrobus and City of Miami Trolley directly serve the study corridor. The Metromover provides free service around the Downtown Miami area and to the Government Center Metrorail Station with a station located at 59 SW 8th Street (Brickell City Center Station). The Brickell Metrorail Station located near the SW 8th Street corridor offers service south to Dadeland Mall (Kendall area), north to Palmetto Station (City of Doral) and to Miami International Airport (MIA).

The Metrobus routes directly serving the corridor include Routes 8, 207, and 208 operated by the Miami-Dade Department of Transportation and Public Works (DTPW), and the Little Havana Trolley Route operated by the City of Miami (**Figure 3.10** and **Figure 3.11**).

Route 8 runs between Florida International University (FIU) and the Brickell area along SW 8th Street and SW 7th Street. This bus route services the project limits between SW 27th Avenue and SW 1st Avenue.

Route 207 runs between the MDC Interamerican Campus and the Brickell area along SW 7th Street and SW 1st Street. This bus route services the project limits between Beacom Boulevard and SW 1st Avenue.

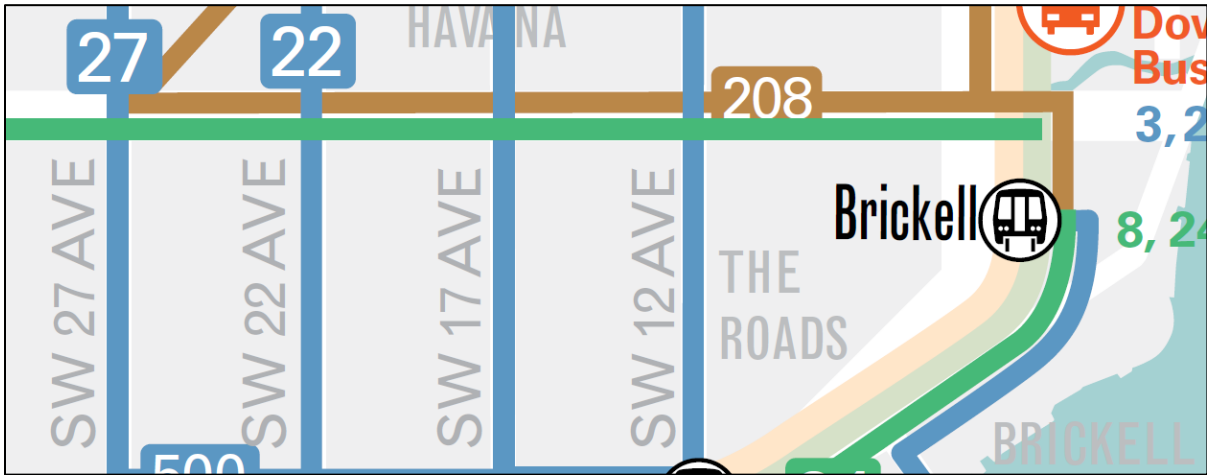
Route 208 runs between the MDC Interamerican Campus and the Brickell area along SW 8th Street and West Flagler Street. This bus route services the project limits between Beacom Boulevard and SW 1st Avenue.

The City of Miami's **Little Havana Trolley Route** runs between SW 37th Avenue and the Brickell area along SW 8th Street and West Flagler Street. This trolley route services the project limits between Beacom Boulevard and SW 2nd Avenue.

Freight and Intermodal Centers

The SW 8th Street Metromover Station is located along the SW 8th Street project corridor and connects to the Brickell Metromover Station and Brickell Metrorail Station. The Metromover provides free service around the Downtown Miami area and to the Government Center Metrorail Station. The Brickell Metrorail Station offers service to the Palmetto Expressway, south to Dadeland Mall and to Miami International Airport via the Miami Intermodal Center (MIC). Interstate 95 is an SIS facility, freight corridor and part of the National Highway Freight network. No freight centers exist within the project study area.

Figure 3.10: Existing Bus Transit Service



Source: Miami-Dade County Department of Transportation and Public Works

Figure 3.11: Existing Trolley Service – Little Havana



Source: City of Miami

4.0 NEED

4.1 Congestion Relief and Transportation Demand

CAPACITY/TRANSPORTATION DEMAND (Improve Traffic Operations and Level of Service). A 2013 traffic analysis performed as part of the Planning Study indicates that very few intersections were operating at a LOS that meets the City of Miami requirements for this type of facility. Results from this planning study indicate that by year 2040 traffic operations at the intersections and segments along the corridor will further degrade and continue to experience heavy delays during peak hours if no improvements are made. While this project will not focus on widening the existing roadways, it will evaluate operational alternatives to address the 2045 transportation demands by improving all modes of transportation.

Miami-Dade County is the fastest growing county in Florida. According to the US Census, the County experienced a population growth from 2,496,435 in 2010 to 2,617,176 in 2013, representing an increase of 4.8%. The City of Miami has grown from a population of 399,457 in 2010 to 417,650 in 2013, representing an increase of 4.5%. The population growth within the City of Miami, along with new developments in the downtown Miami and Brickell areas, will result in a significant increase in surface transportation demand and will worsen the already congested SR 90/SW 7th Street and SR 90/SW 8th Street corridors. Additionally, the Brickell area has seen significant growth in the last decade with the addition of high density, high-rise developments, which will increase traffic along the corridor and further degrade the LOS. Based on the Southeast Florida Regional Planning Model (SERPM), a 0.89% to 1.90% annual growth rate for the study area roadways has been identified. The PD&E Study will evaluate alternatives to accommodate the anticipated transportation demand.

SAFETY (Improve Safety): Crash data for SR 90/SW 7th Street and SR 90/SW 8th Street from SR 9/SW 27th Avenue to SR 5/US 1/Brickell Avenue has been evaluated for the five-year period between 2011-2015. This data indicates that a total of 4,252 crashes occurred on the project corridor (2,593 along SW 8th Street and 1,659 along SW 7th Street). The predominant types of crashes on SR 90/SW 7th Street (westbound) were, angle (35.1%), rear-end crashes (24.1%) and sideswipe crashes (22.7%). Similarly, the most prevalent crashes along SR 90/SW 8th Street (eastbound) included rear-end (29%), sideswipe crashes

(23.6%) and angle crashes (22.4 %). Crashes of this type are typically attributed to the congested conditions during peak periods.

In analyzing the severity of these crashes, it was determined that seven (7) fatal crashes occurred on the study corridor during the 5-year period. Six (6) of these fatal crashes occurred on SR 90/SW 8th Street. Furthermore, there were 657 collisions involving injuries between 2011 and 2015. This high incidence of severe crashes underscores the need for an in-depth or formal safety review of the corridor. The PD&E study will develop alternatives that will help address safety concerns by minimizing pedestrian and vehicular conflicts, providing bicycle amenities, and ensuring that the project corridor meets FDOT's safety and mobility goals as travel demand continues to grow.

SOCIAL DEMANDS AND ECONOMIC DEVELOPMENT (Improve Access to Urban Central Business Districts). Currently, the existing land use adjacent to the project corridor is predominantly multi-family residential and commercial. The land use along SR 90/SW 8th Street consists of commercial uses, while SR 90/SW 7th Street consists of residential areas west of I-95 and commercial use with scattered residential areas east of I-95. The residential areas within the study area are composed predominantly of multi-family buildings, with high-rise establishments located east of I-95 in the Brickell area. The commercial uses vary and include various shopping plazas, food and entertainment establishments, supermarkets, pharmacies, gas stations, and car dealerships.

According to the City of Miami 2020 Future Land Use Map, the areas east of I-95 are designated as the Little Havana and Brickell Urban Central Business Districts (UCBD) and Residential Density Increase Areas (RDIA). These districts include restricted commercial, allowing residential uses to a maximum density equivalent to 'High Density Multifamily Residential' with small sections of general commercial and public facilities/recreation. West of I-95 is predominantly planned to be restricted commercial uses, with medium density multi-family and single-family residential use as the project corridor approaches SR 9/SW 27th Avenue.

The Brickell UCBD is home to one of South Florida's major financial districts with one of the largest concentrations of international banks located along Brickell Avenue. Various consulates and foreign trade

offices are located in Brickell, as well. The Little Havana UCBD will house the Brickell City Centre, a 5.4-million square foot mixed-use urban development. East of SR 5/US 1/Brickell Avenue, the project corridor continues as SE 8th Street (Brickell Key Drive) which connects to Brickell Key, a gated island of upscale high-rise developments and hotel towers. The project improvements will support the City of Miami's plans for future development and economic growth by improving access to these areas

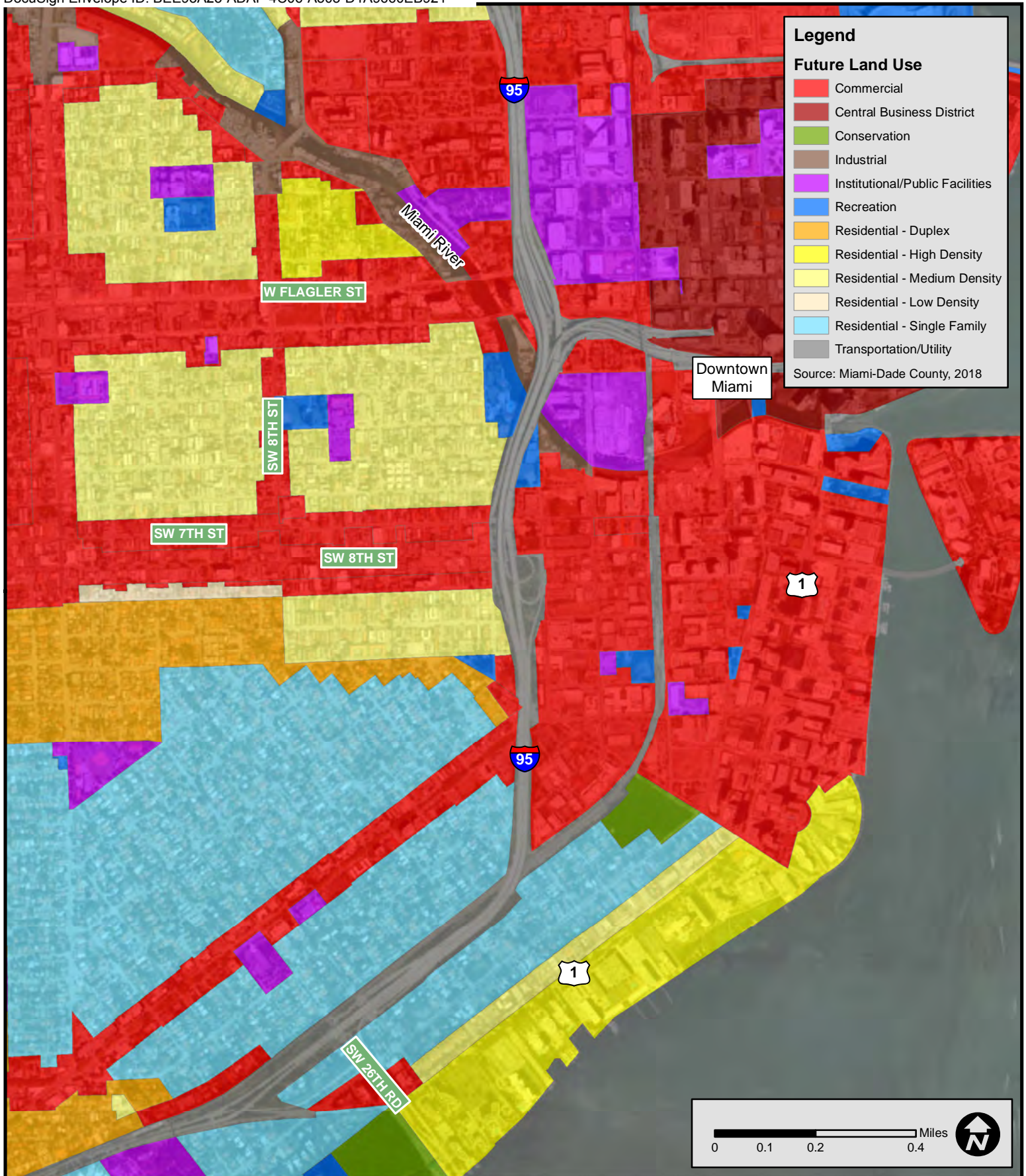
MODAL INTERRELATIONSHIPS (Improve Multimodal Connectivity)

Currently, there are sidewalks along both sides of SR 90/SW 7th Street and SR 90/SW 8th Street. There are no bicycle accommodations present; however, the 2015 Bicycle Master Plan has designated bicycle routes on these facilities. In addition, several cross-streets in the study area including SW 2nd Avenue, SW 1st Avenue and South Miami Avenue currently have designated or planned bicycle lanes. The M-Path Trail is a paved multi-use trail in Miami-Dade County that begins at SW 1st Avenue near the Miami River and crosses the SR 90/SW 7th Street and SW 8th Street corridor. There are several mass transit facilities serving the corridor, such as the Miami-Dade Transit bus routes 8, 6, 24, 48, 95, 207, and 208, and the Eighth Street Metromover Station. The Eighth Street Metromover Station connects to the Brickell Metromover Station and Brickell Metrorail Station. The Metromover provides free service around the downtown Miami area and to the Government Center Metrorail Station. The Brickell Metrorail Station offers service to the Palmetto Expressway, south to Dadeland Mall and to Miami International Airport via the Miami Intermodal Center (MIC). The project will improve intermodal connectivity by providing enhanced pedestrian/bicycle and transit accommodations.

5.0 FUTURE NO BUILD CONDITIONS

5.1 Future Land Use

Figure 5.1 depicts future land uses within the project vicinity per information gathered from the City of Miami. Per the city's plans, the areas east of I-95 including the Little Havana Residential Density Increase Area (RDIA) and Brickell Urban Central Business District (UCBD) are planned to continue to be restricted commercial. It permits residential uses up to a maximum density equivalent to that of high density multi-family residential with smaller sections of general commercial and public facilities/recreation. West of I-95, restricted commercial uses including medium density multi-family and single-family residential uses will continue as well.



SR 90/SW 8th Street and
SW 7th Street PD&E Study

Future Land Use Map

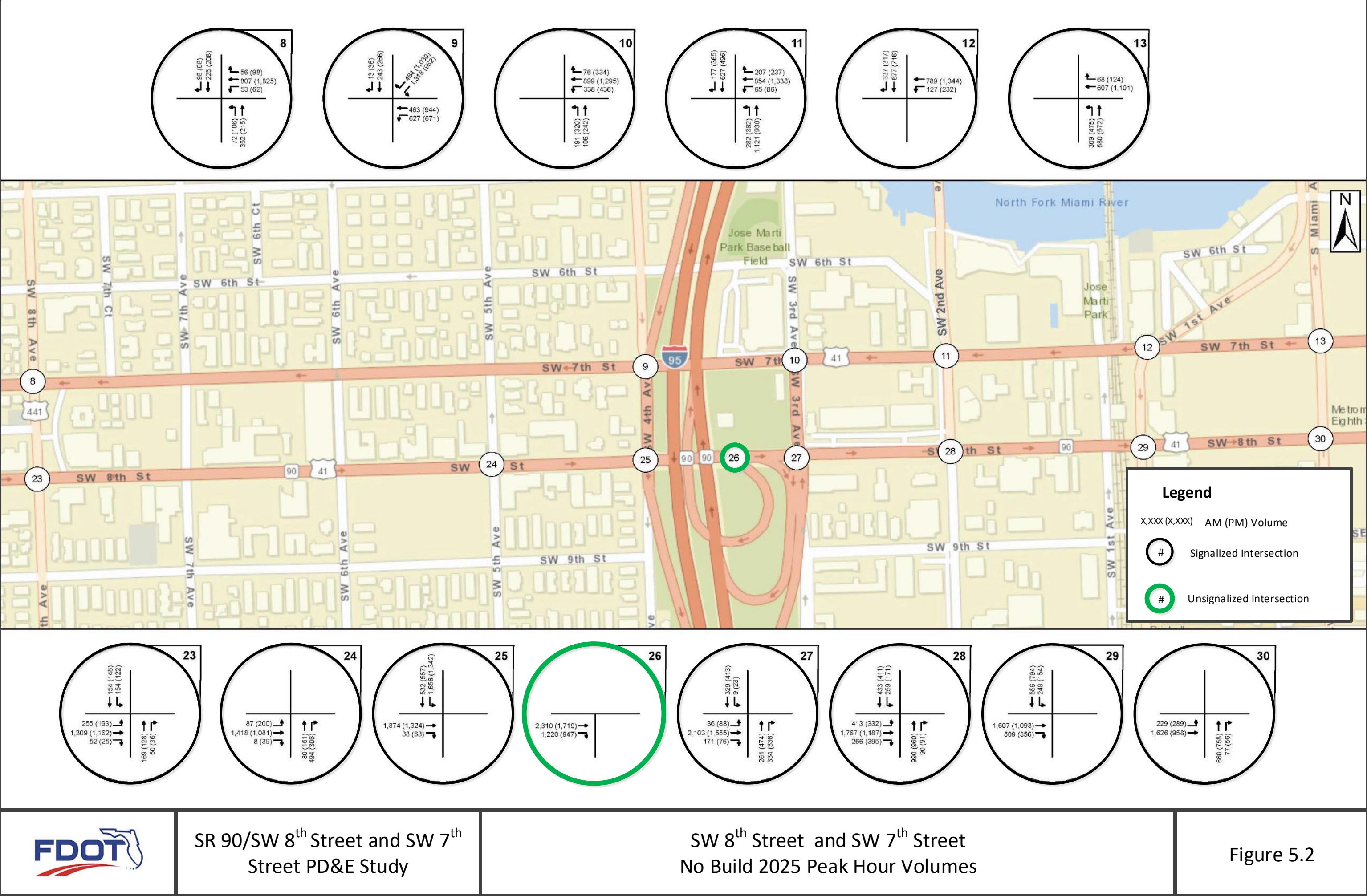
Figure 5.1

5.2 No Build Alternative – Transportation Network

The future year No Build Alternative network includes the existing (2015) roadway conditions plus all funded and committed projects within the study corridor per the FDOT 5-Year Work Program. It also incorporates all Cost Feasible Plan projects contained in the Metropolitan Planning Organization's (MPO's) Long Range Transportation Plan (LRTP) that are located outside the immediate project limits. The roadway geometry for the No Build Alternative was determined to be consistent with the geometry for the existing 2015 road network within the project limits. This road network is described in detail under Section 3.2 of the IMR.

5.3 No Build Alternative – Future Traffic Forecast

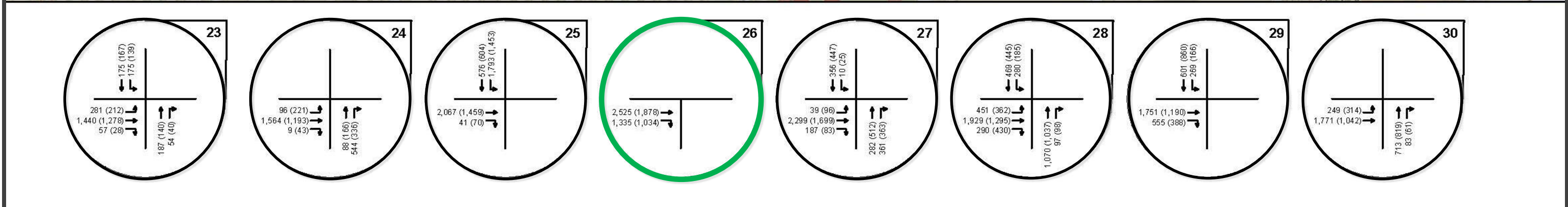
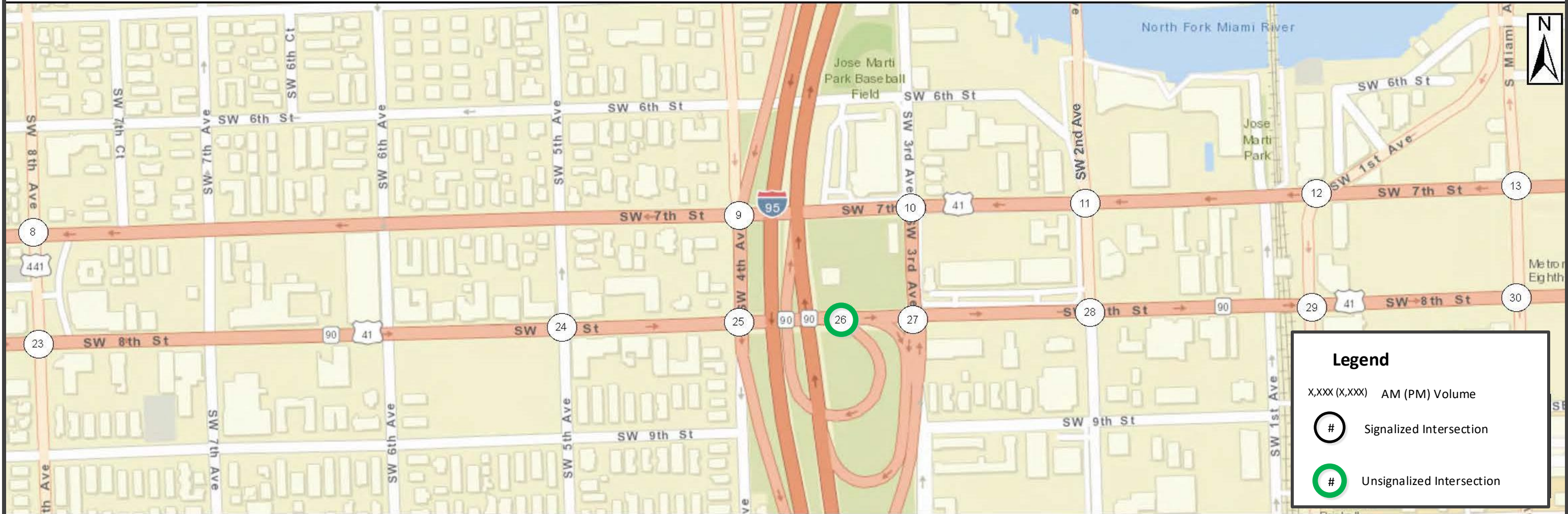
The development of the travel demand forecast for the No Build Alternative is documented in detail in the ***Design Traffic Technical Memorandum, SW 8th Street / SW 7th Street PD&E Study from SR 9/SW 27th Avenue to SR 5/US-1/Brickell Avenue, March 8, 2018, 2017***. This Technical Memorandum is attached as a companion reference document for the IMR. The memorandum contains details of the analytical procedures followed in developing AADTs and peak hour volumes for the existing year 2015, opening year 2025, 2035 and design year 2045. The memorandum was processed through the FDOT's document review procedures and the information contained therein was found to be acceptable by the FDOT for the purposes of this study. **Figures 5-2 through 5-7** show the 2025, 2035 and 2045 peak hour traffic forecasts for the No Build Alternative.

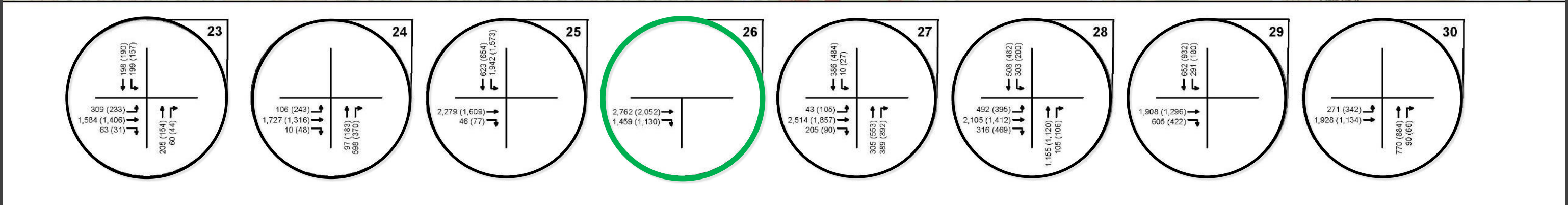
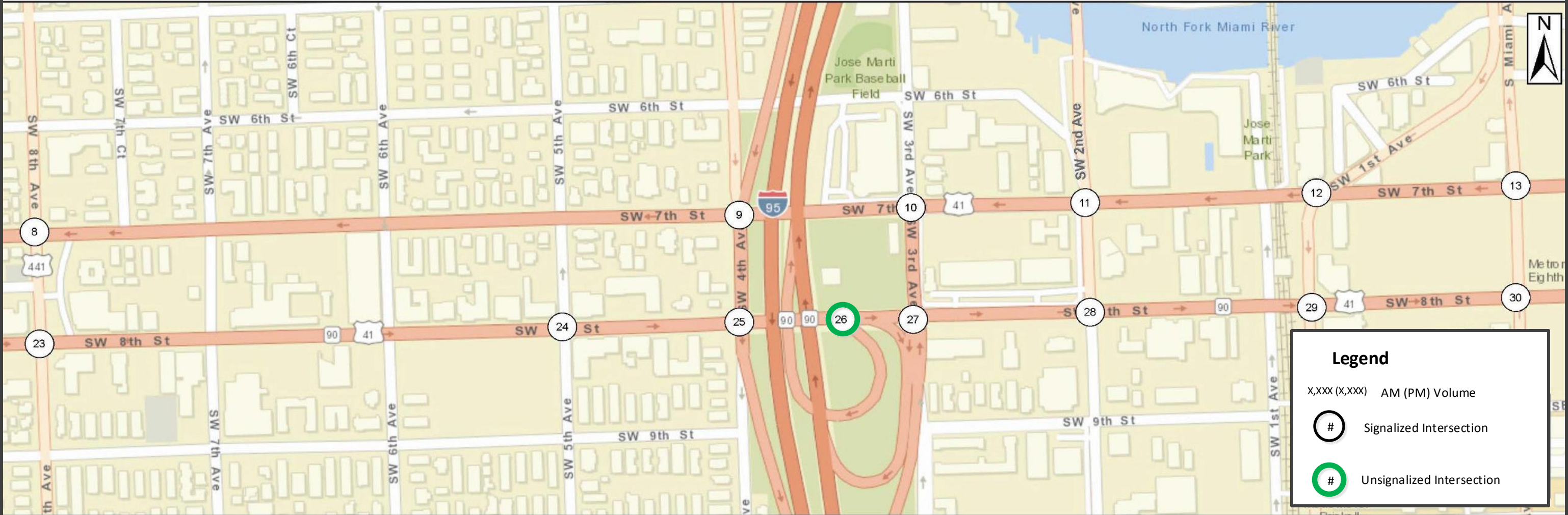


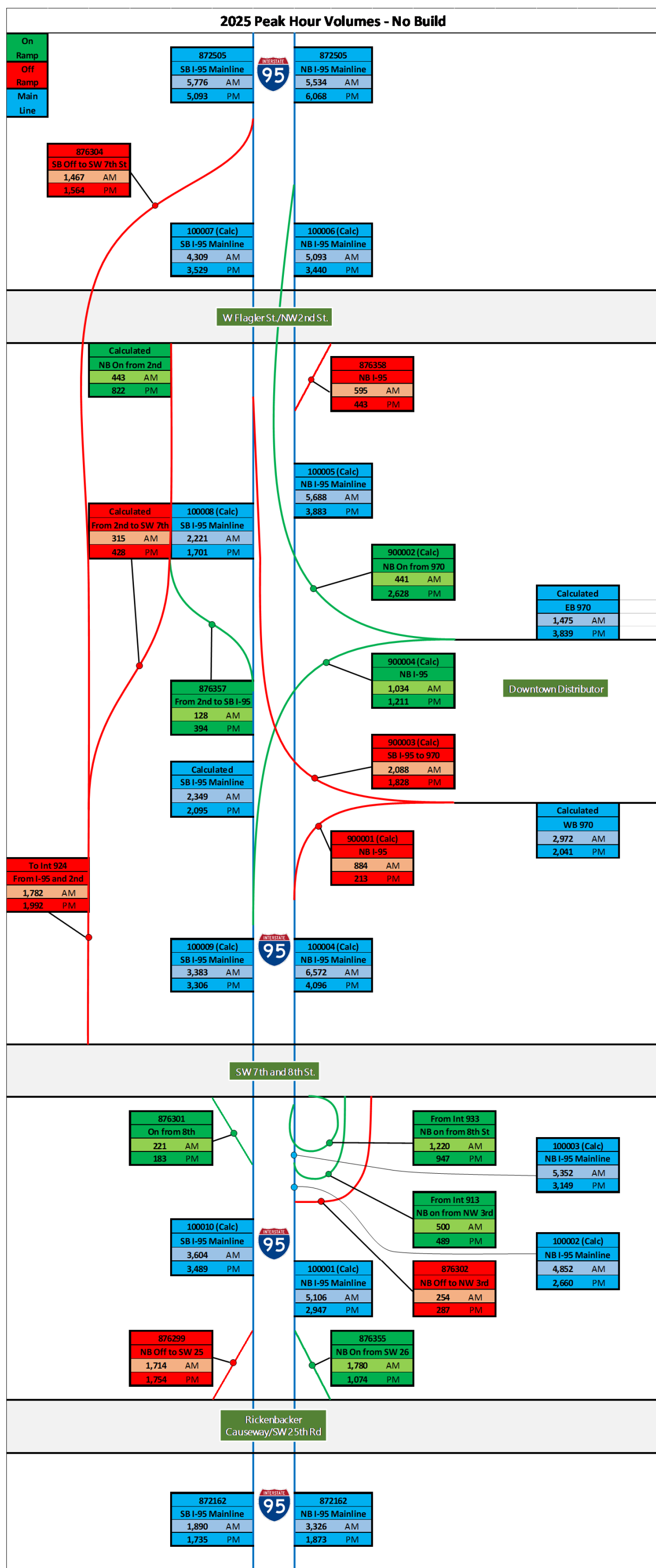
SR 90/SW 8th Street and SW 7th Street PD&E Study

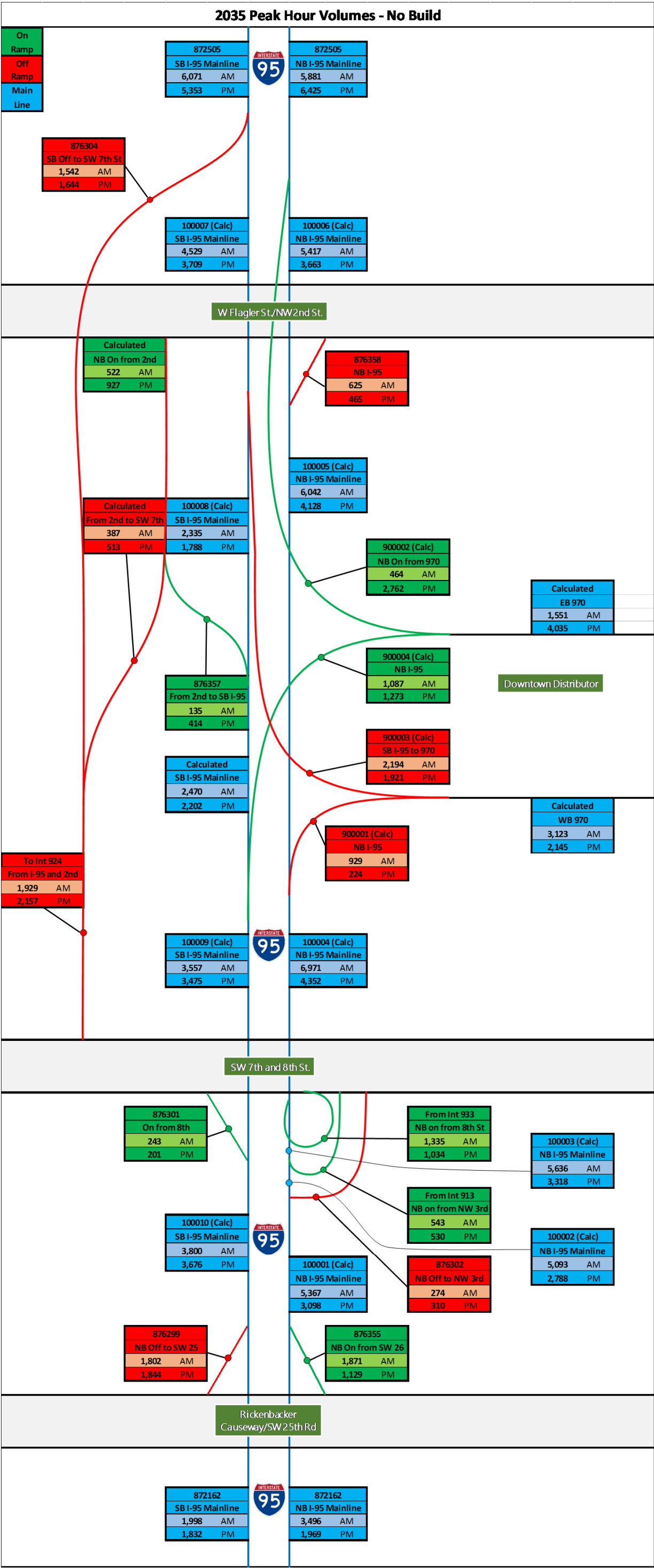
SW 8th Street and SW 7th Street No Build 2025 Peak Hour Volumes

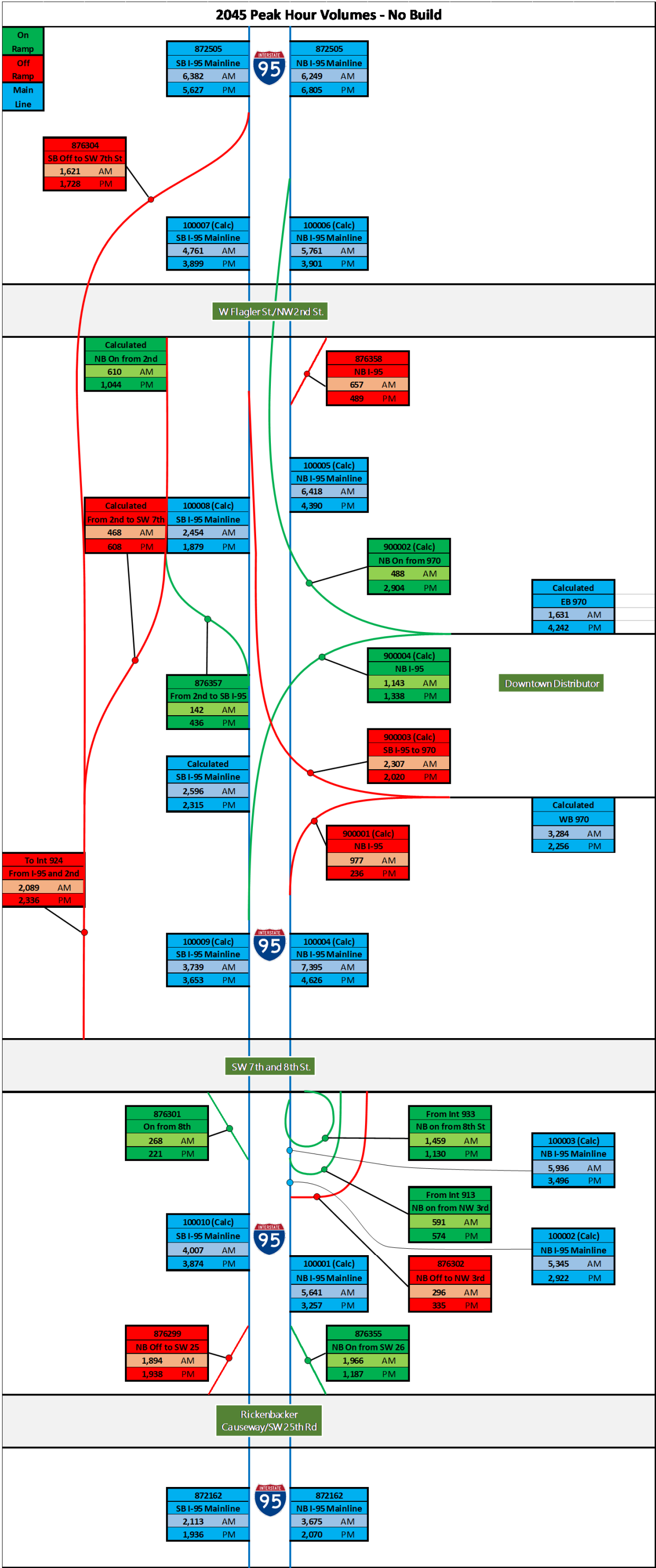
Figure 5.2











5.4 No Build Alternative – Level of Service Analysis

Traffic operations analyses were conducted for the No Build Alternative for opening year (2025), interim year (2035) and design year (2045) conditions. The road network used for the No Build analysis was maintained consistent with the geometry presented under Section 3.2 for existing year (2015) conditions. Traffic volumes used for the analyses were consistent with the forecasted 2025, 2035 and 2045 peak hour volumes, per Section 5.3 of the IMR.

LOS analyses were conducted in accordance with procedures of the HCM, 2010 Edition. The Highway Capacity Software (HCS) was used for performing calculations for freeway segments (mainline, merge and diverge segments). Synchro models were developed for performing the LOS analyses at the terminal intersections and other project intersections. Signal timings were optimized, as necessary, to improve operating LOS of service and a peak hour factor of 0.95 was used throughout for the analyses. Detailed output sheets from the LOS analyses are located in **Appendix G**. The results for I-95 freeway segments are summarized in **Figure 5.8** through **Figure 5.10** while results for the signalized intersections are summarized in **Table 5.1** through **Table 5.3**. Findings from the LOS of service analyses are discussed below.

No Build Alternative, Opening Year (2025) Analysis: The following operating conditions are expected for the No Build Alternative in Year 2025.

- **Freeway Segments:** The LOS analyses for Year 2025 indicate all I-95 freeway segments (merge, diverge, weaving, basic) within the project limits, will operate at LOS D or better, during the AM and PM peak periods. This indicates that no adverse traffic operating conditions are expected along I-95 mainline - operating conditions will to be acceptable in the AM and PM peaks.
- **Intersections:** The LOS analyses for Year 2025 indicate that adverse traffic operating conditions (LOS E/F) are expected at the following intersections during the AM and/or PM peak periods:
 - SW 8th Street at SW 2nd Avenue (LOS F – AM peak)
 - SW 7th Street at SW 2nd Avenue (LOS E – PM peak)

- SW 7th Street at SW 4th Avenue/I-95 SB Off-Ramp (LOS F – PM peak). It is also notable that all approaches to this intersection will operate at LOS F in the PM peak.

No Build Alternative, Interim Year 2035 Analysis: The following operating conditions are expected for the No Build Alternative in Year 2045.

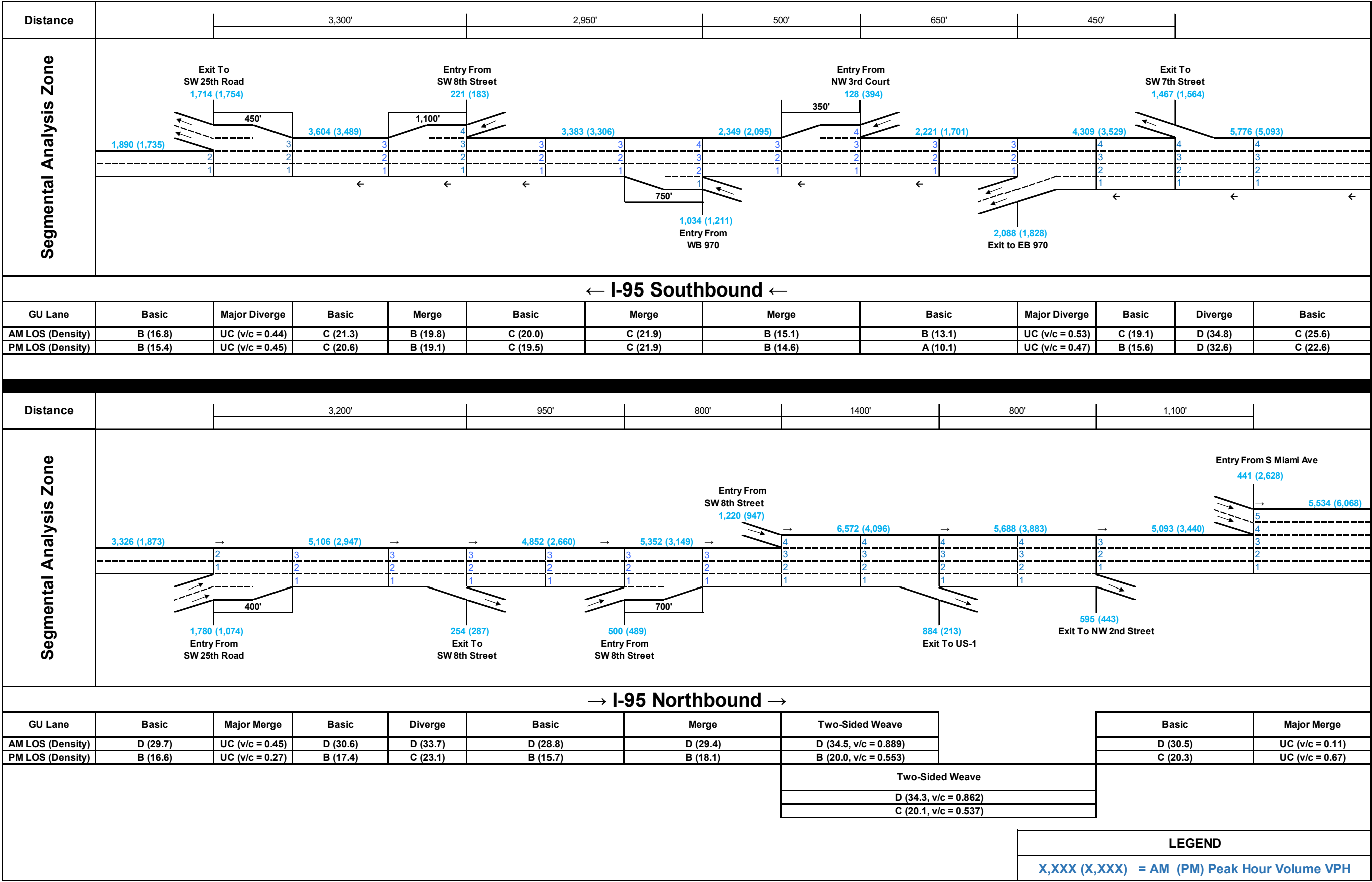
- **Freeway Segments:** The LOS analyses for Year 2035 indicate that the following freeway segments will operate below the desired LOS D target:
 - NB I-95 north of on-ramp from SW 8th Street – weaving segment (LOS E – AM peak)
 - SB I-95 at off-ramp to SW 7th Street (LOS E – AM peak)
- **Intersections:** The LOS analyses for Year 2035 indicate that adverse traffic operating conditions (LOS E/F) are expected at the following intersections during the AM and/or PM peak periods:
 - SW 8th Street at SW 2nd Avenue (LOS F/E – AM/PM peak)
 - SW 8th Street at SW 1st Avenue (LOS E – AM peak)
 - SW 7th Street at SW 2nd Avenue (LOS F – PM peak)
 - SW 7th Street at SW 4th Avenue/I-95 SB Off-Ramp (LOS E/F – AM/PM peak). All approaches to this intersection will operate at LOS F in the PM peak.

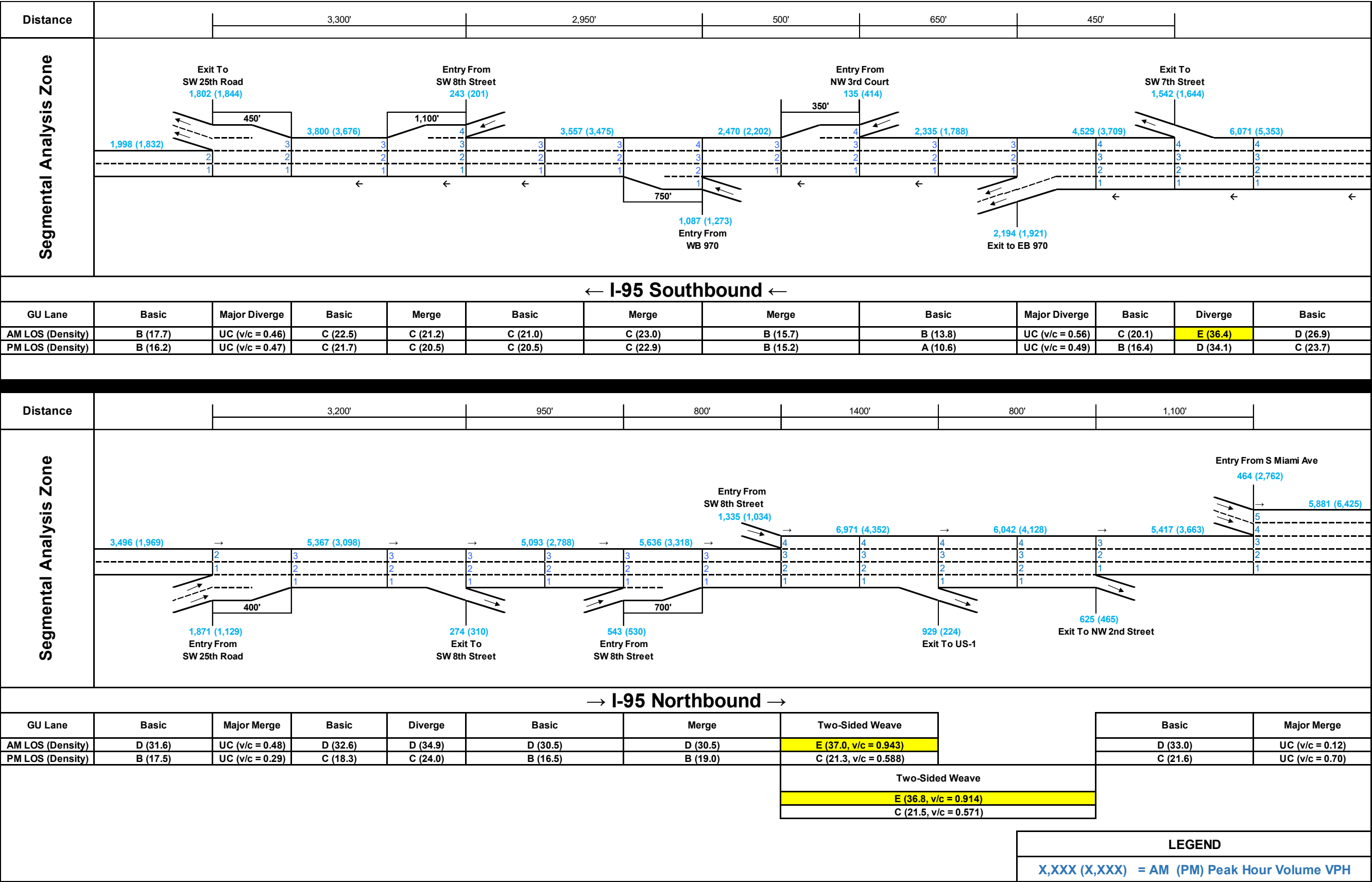
No Build Alternative, Design Year 2045 Analysis: The following operating conditions are expected for the No Build Alternative in Year 2045.

- **Freeway Segments:** The LOS analyses for Year 2045 indicate that the following freeway segments will operate below the desired LOS D target:
 - NB I-95, north of on-ramp from SW 25th Road (LOS E – AM peak)
 - NB I-95 at off-ramp to SW 8th Street (LOS E – AM peak)
 - NB I-95 north of on-ramp from SW 8th Street – weaving segment (LOS F – AM peak)
 - NB I-95 north of off-ramp to NW 2nd Street (LOS E – AM peak)
 - SB I-95 at off-ramp to SW 7th Street (LOS E/E – AM/PM peak)
- **Intersections:** The LOS analyses for Year 2045 indicate that adverse traffic operating conditions (LOS E/F) are expected at the following intersections during the AM and/or PM peak periods:

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- SW 8th Street at SW 2nd Avenue (LOS F/F – AM/PM peak).
- SW 8th Street at SW 1st Avenue (LOS E/E – AM/PM)
- SW 7th Street at SW 2nd Avenue (LOS F – PM peak)
- SW 7th Street at SW 4th Avenue/I-95 SB Off-Ramp (LOS F/F – AM/PM). All approaches to this intersection will operate at LOS F in the AM and PM peaks.





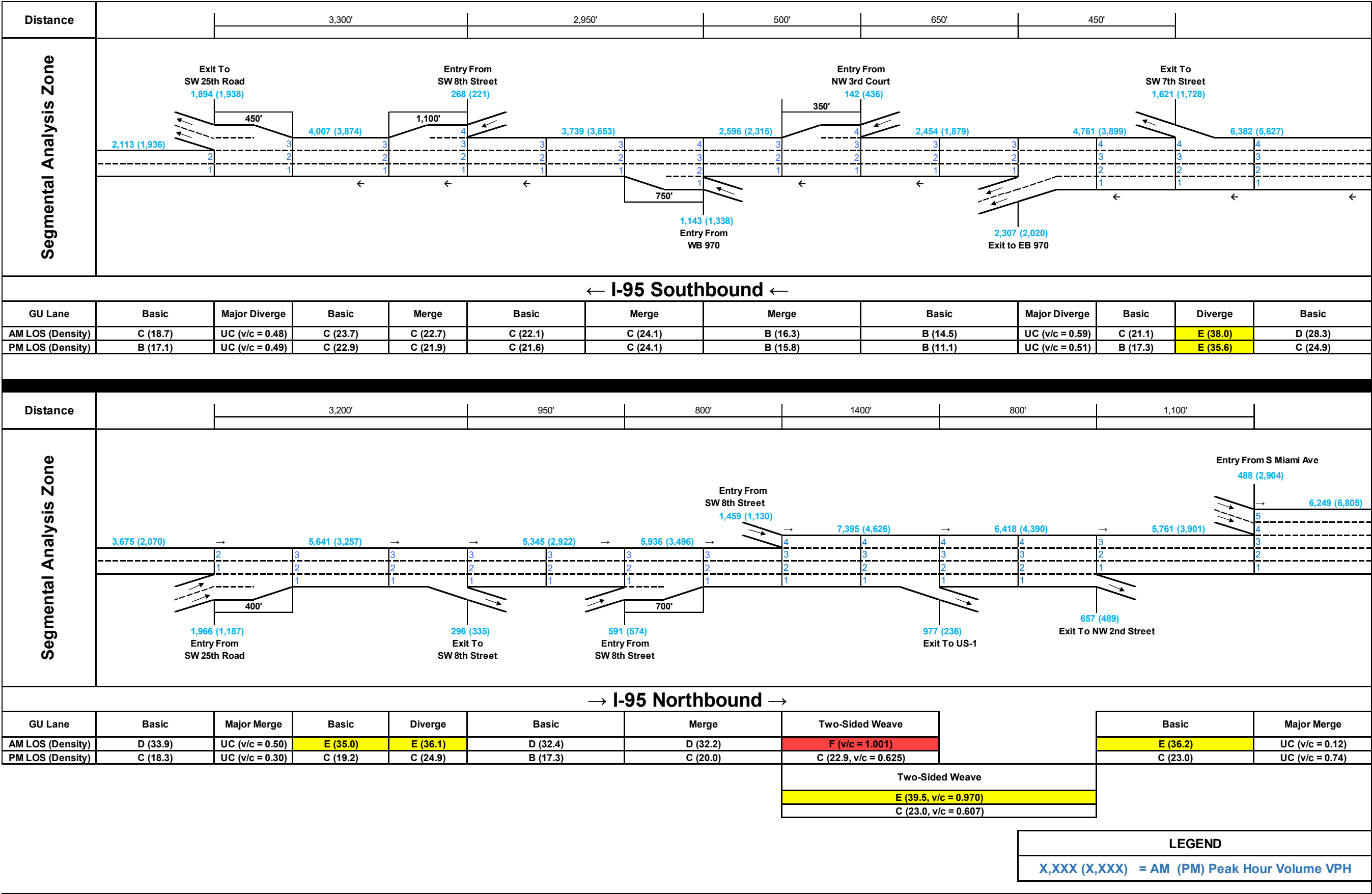


Table 5.1: No Build - Opening Year (2025) Intersection Level of Service Analysis

Intersection	Appr.	Mvmt.	AM						Overall Intersection		PM						Overall Intersection	
			Approach				Delay (sec/veh)	LOS	Approach				Overall Intersection					
			Volume	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)			Approach LOS	Volume	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Delay (sec/veh)	LOS		
SW 8 th Street & SW 8 th Ave*	EB	LT	255	-	-	28.2	C	28.3	C	193	-	-	27.8	C	26.1	C		
		TH	1309	28.2	C					1162	27.8	C						
		RT	52	-	-					25	-	-						
	NB	LT	0	-	-	32.9	C			128	32.4	C	32.4	C				
		TH	169	32.9	C					36	-	-						
		RT	50	-	-					122	-	-						
	SB	LT	154	-	-	25.3	C			148	13.2	B	13.2	B				
		TH	154	25.3	C					0	-	-						
		RT	0	-	-					200	34.1	C						
SW 8 th Street & SW 5 th Ave	EB	LT	87	34.4	C	35.2	D	39.3	D	1081	34.4	C	34.2	C	39.0	D		
		TH	1418	35.8	D					39	34.1	C						
		RT	8	35.4	D					0	0.0	-						
	NB	LT	0	0.0	-	50.1	D			151	0.0	-	52.8	D				
		TH	80	0.0	-					306	52.8	D						
		RT	494	50.1	D					0	0.0	-						
SW 8 th Street & SW 4 th Ave	EB	LT	0	0.0	-	50.4	D	48.3	D	1324	51.5	D	52.4	D	46.2	D		
		TH	1874	49.3	D					63	54.7	D						
		RT	38	53.4	D					1342	41.1	D						
	SB	LT	1656	47.1	D	46.5	D			557	43.4	D	41.7	D				
		TH	532	44.7	D					0	0.0	-						
		RT	0	0.0	-					88	34.8	C						
SW 8 th Street & SW 3 rd Ave	EB	LT	36	28.0	C	23.4	C	30.5	C	1555	28.5	C	30.9	C	29.9	C		
		TH	2103	20.6	C					76	0.0	-						
		RT	171	0.0	-					0	0.0	-						
	NB	LT	0	0.0	-	52.3	D			474	40.1	D	38.2	D				
		TH	261	41.1	D					336	35.6	D						
		RT	334	61.1	E					23	23.9	C						
	SB	LT	9	38.7	D	37.6	D			413	10.4	B	11.1	B				
		TH	329	37.6	D					0	0.0	-						
		RT	0	0.0	-					332	-	-						
SW 8 th Street & SW 2 nd Ave*	EB	TH	1767	108.6	F	108.6	F	84.7	F	1187	39.4	D	39.4	D	45.4	D		
		RT	266	-	-					395	-	-						
		LT	0	-	-					0	-	-						
	NB	TH	990	70.3	E	70.3	E			960	47.1	D	47.1	D				
		RT	90	-	-					91	-	-						
		LT	259	-	-					171	-	-						
	SB	TH	433	22.5	C	22.5	C			411	61.6	E	61.6	E				
		RT	0	-	-					0	-	-						
		LT	0	0.0	-					0	0.0	-						
SW 8 th Street & SW 1 st Ave	EB	TH	1607	42.5	D	43.0	D	54.4	D	1093	47.6	D	47.7	D	50.7	D		
		RT	509	44.0	D					356	48.0	D						
		LT	248	80.8	F					154	54.7	D						
	SB	TH	556	88.0	F	84.3	F			794	55.8	E	55.2	E				
		RT	0	0.0	-					0	0.0	-						
		LT	229	41.8	D					289	42.3	D						
SW 8 th Street & S Miami Ave	EB	TH	1626	40.3	D	40.8	D	40.9	D	958	40.7	D	41.2	D	38.7	D		
		RT	0	0.0	-					0	0.0	-						
		LT	0	0.0	-					0	0.0	-						
	NB	TH	660	40.2	D	41.3	D			758	34.3	C	34.9	C				
		RT	77	43.3	D					56	36.0	D						
		LT	0	-	-					0	-	-						
SW 7 th Street & S Miami Ave*	WB	TH	607	28.6	C	28.6	C	16.9	B	1101	28.9	C	28.9	C	24.2	C		
		RT	68	-	-					124	-	-						
		LT	309	5.8	A					475	19.2	B						
	NB	TH	580	9.0	A	8.0	A			572	18.5	B	18.7	B				
		RT	0	-	-					0	-	-						
		LT	127	-	-					232	-	-						
SW 7 th Street & SW 1 st Ave*	WB	TH	789	11.6	B	11.6	B	16.3	B	1344	31.5	C	31.5	C	33.1	C		
		RT	0	-	-					0	-	-						
		LT	0	-	-					0	-	-						
	SB	TH	677	20.5	C	20.7	C			716	35.7	D	35.7	D				
		RT	337	21.0	C					317	35.6	D						
		LT	65	60.7	E					58.2	E	86					84.1	F
NB	TH	854	56.6	E	1338	68.3	E											
	RT	207	56.7	E	237	68.5	E											
	SW 7 th Street & SW 2 nd Ave	WB	LT	282	34.1	C	7.0	A	34.2	C	362	80.6	F	23.2	C			
TH			1121	0.2	A	930					0.9	A						
RT			0	0.0	-	0					0.0	-						
SB		LT	0	0.0	-	48.0	D	0			0.0	-	109.2	F				
		TH	627	47.8	D			496			108.1	F						
		RT	177	48.2	D			365			110.3	F						
SW 7 th Street & SW 3 rd Ave	WB	LT	338	25.3	C	24.9	C	30.6	C	436	43.3	D	42.2	D	41.7	D		
		TH	899	24.7	C					1295	41.2	D						
		RT	76	24.6	C					334	41.8	D						
	NB	LT	191	57.3	E	55.7	E			320	42.6	D	40.1	D				
		TH	106	52.9	D					242	36.7	D						
		RT	0	0.0	-					0	0.0	-						
SW 7 th Street & SW 4 th Ave/I-95 SB Off-Ramp*	WB	LT	627	58.2	E	59.3	E	54.7	D	671	91.9	F	104.5	F	114.1	F		
		TH	463	59.9	E					944	110.5	F						
		RT	0	-	-					0	-	-						
	SB	LT	0	-	-	126.2	F			0	-	-	188.5	F				
		TH	243	126.2	F					266	188.5	F						
		RT	13	-	-					36	-	-						
	SWB	LT	1318	45.9	D	41.6	D			962	98.3	F	110.7	F				
		TH	-	-	-					-	-	-						
		RT	464	27.5	C					1030	137.6	F						
SW 7 th Street & SW 8 th Ave	WB	LT	53	33.5	C	32.7	C	20.7	C	62	35.3	D	32.5	C	29.7	C		
		TH	807	32.2	C					1825	31.0	C						
		RT	56	32.1	C					98	30.8	C						
	NB	LT	72	1.4	A	1.4	A			106	15.0	B	15.0	B				
		TH	352	0.0	-					215	0.0	-						
		RT	0	0.0	-					0	0.0	-						
	SB	LT	0	0.0	-	12.3	B			0	0.0	-	26.5	C				
		TH	225	0.0	-					208	0.0	-						
		RT	98	12.3	B					68	26.5	C						

Table 5.2: No Build - Interim Year (2035) Intersection Level of Service Analysis

Intersection	Appr.	Mvmt.	AM						Overall Intersection		PM						Overall Intersection				
			Approach				Approach				Approach										
			Volume	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Delay (sec/veh)	LOS	Volume	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Delay (sec/veh)	LOS					
SW 8 th Street & SW 8 th Ave*	EB	LT	281	-	-	33.2	C	33.6	C	212	-	-	29.8	C	27.8	C					
		TH	1440	33.2	C					1278	29.8	C									
		RT	57	-	-					28	-	-									
	NB	LT	0	-	-	34.1	C			0	-	-	33.0	C							
		TH	187	34.1	C					140	33.0	C									
		RT	54	-	-					40	-	-									
	SB	LT	175	-	-	35.1	D			139	-	-	14.6	B							
		TH	175	35.1	D					167	14.6	B									
		RT	0	-	-					0	-	-									
SW 8 th Street & SW 5 th Ave	EB	LT	96	36.2	D	37.2	D	41.1	D	221	36.0	D	36.3	D	40.6	D					
		TH	1564	37.9	D					1193	36.6	D									
		RT	9	37.5	D					43	36.2	D									
	NB	LT	0	0.0	-	51.4	D			0	0.0	-	53.1	D							
		TH	88	0.0	-					166	0.0	-									
		RT	544	51.4	D					336	53.1	D									
	SW 8 th Street & SW 4 th Ave	EB	LT	0	0.0	-	53.7			D	50.8	D	0	0.0			-	54.7	D	48.2	D
			TH	2067	52.3	D							1459	53.6			D				
			RT	41	57.5	E							70	57.6			E				
SB		LT	1793	48.8	D	48.1	D	1453	42.5	D			43.3	D							
		TH	576	45.9	D			604	45.3	D											
		RT	0	0.0	-			0	0.0	-											
SW 8 th Street & SW 3 rd Ave		EB	LT	39	36.8	D	28.7	C	35.9	D			96	40.7	D	34.7	C	33.2	C		
			TH	2299	23.9	C							1699	31.1	C						
			RT	187	0.0	-							83	0.0	-						
	NB	LT	0	0.0	-	59.0	E	0			0.0	-	41.2	D							
		TH	282	42.6	D			512			43.8	D									
		RT	361	71.8	E			363			37.6	D									
	SB	LT	10	40.3	D	41.2	D	25			27.6	C	12.5	B							
		TH	356	41.3	D			447			11.7	B									
		RT	0	0.0	-			0			0.0	-									
SW 8 th Street & SW 2 nd Ave*	EB	LT	451	-	-	155.6	F	119.8	F	362	-	-	68.5	E	62.7	E					
		TH	1929	155.6	F					1295	68.5	E									
		RT	290	-	-					430	-	-									
	NB	LT	0	-	-	94.0	F			0	-	-	51.1	D							
		TH	1070	94.0	F					1037	51.1	D									
		RT	97	-	-					98	-	-									
	SB	LT	280	-	-	32.7	C			185	-	-	64.2	E							
		TH	469	32.7	C					445	64.2	E									
		RT	0	-	-					0	-	-									
SW 8 th Street & SW 1 st Ave	EB	LT	0	0.0	-	46.3	D	61.9	E	0	0.0	-	49.6	D	53.1	D					
		TH	1751	45.1	D					1190	49.4	D									
		RT	555	48.6	D					388	49.9	D									
	SB	LT	269	97.4	F	103.2	F			166	57.7	E	58.5	E							
		TH	601	109.2	F					860	59.2	E									
		RT	0	0.0	-					0	0.0	-									
	SW 8 th Street & S Miami Ave	EB	LT	249	44.1	D	42.9			D	42.9	D	314	43.9			D	42.8	D	40.1	D
			TH	1771	42.3	D							1042	42.3			D				
			RT	0	0.0	-							0	0.0			-				
NB		LT	0	0.0	-	42.8	D	0	0.0	-			35.9	D							
		TH	713	41.5	D			819	35.3	D											
		RT	83	45.1	D			61	37.2	D											
SW 7 th Street & S Miami Ave*		WB	LT	0	-	-	29.2	C	17.9	B			0	-	-	30.2	C	25.6	C		
			TH	656	29.2	C							1193	30.2	C						
			RT	74	-	-							134	-	-						
	NB	LT	335	8.0	A	9.3	A	514			21.2	C	20.2	C							
		TH	627	9.8	A			619			19.7	B									
		RT	0	-	-			0			-	-									
	SW 7 th Street & SW 1 st Ave*	WB	LT	137	-	-	12.5	B			17.3	B	251	-	-	32.3	C			34.4	C
			TH	854	12.5	B							1456	32.3	C						
			RT	0	-	-							0	-	-						
SB		LT	0	-	-	21.5	C	0	-	-			37.6	D							
		TH	733	21.3	C			775	37.6	D											
		RT	365	22.1	C			344	37.5	D											
SW 7 th Street & SW 2 nd Ave		WB	LT	70	66.8	E	62.7	E	37.6	D			93	107.3	F	90.4	F	81.7	F		
			TH	925	60.2	E							1450	79.7	E						
			RT	224	60.4	E							257	81.0	F						
	NB	LT	306	37.6	D	7.8	A	392			110.5	F	31.6	C							
		TH	1215	0.2	A			1007			0.8	A									
		RT	0	0.0	-			0			0.0	-									
	SB	LT	0	0.0	-	54.4	D	0			0.0	-	140.0	F							
		TH	679	54.2	D			537			139.2	F									
		RT	191	54.6	D			395			141.0	F									
SW 7 th Street & SW 3 rd Ave	WB	LT	366	27.1	C	26.7	C	32.0	C	472	48.4	D	46.6	D	44.8	D					
		TH	974	26.5	C					1403	45.0	D									
		RT	82	26.4	C					362	46.2	D									
	NB	LT	206	57.0	E	55.3	E			261	41.1	D	38.4	D							
		TH	115	52.3	D					347	34.7	C									
		RT	0	0.0	-					0	0.0	-									
	SW 7 th Street & SW 4 th Ave/I-95 SB Off-Ramp*	WB	LT	679	70.2	E	75.6			E	72.5	E	727	128.3			F	144.9	F	154.4	F
			TH	501	78.2	E							1023	152.9			F				
			RT	0	-	-							0	-			-				
SB		LT	0	-	-	154.6	F	0	-	-			229.3	F							
		TH	263	154.6	F			288	229.3	F											
		RT	14	-	-			39	-	-											
SWB		LT	1432	67.6	E	58.9	E	1044	137.1	F			150.8	F							
		TH	-	-	-			-	-	-											
		RT	503	30.2	C			1119	180.4	F											
SW 7 th Street & SW 8 th Ave	WB	LT	58	35.3	D	34.2	C	21.7	C	68	43.2	D	38.2	D	34.8	C					
		TH	880	33.7	C					1986	35.3	D									
		RT	61	33.5	C					106	35.4	D									
	NB	LT	88	2.6	A	2.6	A			117	20.6	C	20.6	C							
		TH	388	0.0	-					235	0.0	-									
		RT	0	0.0	-					0	0.0	-									
	SB	LT	0	0.0	-	13.3	B			0	0.0	-	27.6	C							
		TH	292	0.0	-					238	0.0	-									
		RT	112	13.3	B					77	27.6	C									

Table 5.3: No Build – Design Year (2045) Intersection Level of Service Analysis

Intersection	Appr.	Mvmt.	AM						Overall Intersection		PM					Overall Intersection			
			Approach				Approach				Approach		Approach						
			Volume	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Delay (sec/veh)	LOS	Volume	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Delay (sec/veh)	LOS			
SW 8 th Street & SW 8 th Ave*	EB	LT	309	-	-	47.6	D	48.6	D	233	-	-	32.8	C	30.5	C			
		TH	1584	47.6	D					1406	32.8	C							
		RT	63	-	-					31	-	-							
	NB	LT	0	-	-	35.4	D			0	-	-	33.6	C			17.6	B	
		TH	205	35.4	D					154	33.6	C							
		RT	60	-	-					44	-	-							
	SB	LT	199	-	-	62.7	E			157	-	-	17.6	B			190	17.6	B
		TH	198	62.7	E					0	-	-							
		RT	0	-	-					0	-	-							
SW 8 th Street & SW 5 th Ave	EB	LT	106	37.5	D	38.9	D	43.1	D	243	38.4	D	38.8	D	42.5	D			
		TH	1727	39.8	D					1316	39.2	D							
		RT	10	39.5	D					48	38.8	D							
	NB	LT	0	0.0	-	54.5	D			0	0.0	-	53.3	D			370	53.3	D
		TH	97	0.0	-					183	0.0	-							
		RT	598	54.5	D					0	0.0	-							
SW 8 th Street & SW 4 th Ave	EB	LT	0	0.0	-	59.4	E	54.7	D	1609	56.1	E	57.5	E	50.5	D			
		TH	2279	57.6	E					77	61.2	E							
		RT	46	64.0	E					1573	44.2	D							
	SB	LT	1942	51.3	D	50.5	D			654	47.3	D	45.1	D			0	0.0	-
		TH	623	48.0	D					0	0.0	-							
		RT	0	0.0	-					0	0.0	-							
SW 8 th Street & SW 3 rd Ave	EB	LT	43	55.7	F	39.8	D	46.1	D	105	52.3	D	41.7	D	38.8	D			
		TH	2514	30.2	C					1857	35.4	D							
		RT	205	0.0	-					90	0.0	-							
	NB	LT	0	0.0	-	68.9	E			0	0.0	-	45.7	D			553	49.6	D
		TH	305	44.7	D					392	40.2	D							
		RT	389	87.9	F					27	32.7	C							
	SB	LT	10	41.9	D	47.1	D			484	13.7	B	14.7	B			0	0.0	-
		TH	386	47.2	D					0	0.0	-							
		RT	0	0.0	-					0	0.0	-							
SW 8 th Street & SW 2 nd Ave*	EB	LT	492	-	-	207.8	F	162.3	F	395	-	-	111.5	F	89.0	F			
		TH	2105	207.8	F					1412	111.5	F							
		RT	316	-	-					469	-	-							
	NB	LT	0	-	-	128.1	F			0	-	-	59.1	E			1120	59.1	E
		TH	1155	128.1	F					106	-	-							
		RT	105	-	-					200	-	-							
	SB	LT	303	-	-	52.3	D			482	67.4	E	67.4	E			0	-	-
		TH	508	52.3	D					0	-	-							
		RT	0	-	-					0	-	-							
SW 8 th Street & SW 1 st Ave	EB	LT	0	0.0	-	56.2	E	76.4	E	0	0.0	-	52.0	D	56.3	E			
		TH	1908	49.0	D					1296	51.6	D							
		RT	605	69.9	F					422	52.6	D							
	SB	LT	291	122.2	F	130.3	F			180	61.8	E	63.0	E			932	64.3	E
		TH	652	138.7	F					0	0.0	-							
		RT	0	0.0	-					0	0.0	-							
SW 8 th Street & S Miami Ave	EB	LT	271	46.2	D	44.8	D	44.8	D	342	45.6	D	44.5	D	41.6	D			
		TH	1928	44.1	D					1134	43.9	D							
		RT	0	0.0	-					0	0.0	-							
	NB	LT	0	0.0	-	44.8	D			0	0.0	-	37.1	D			66	38.6	D
		TH	770	43.2	D					0	-	-							
		RT	90	47.7	D					0	-	-							
SW 7 th Street & S Miami Ave*	WB	LT	0	-	-	29.9	C	19.1	B	0	-	-	32.0	C	27.2	C			
		TH	712	29.9	C					1290	32.0	C							
		RT	80	-	-					145	-	-							
	NB	LT	362	10.5	B	11.0	B			556	22.6	C	21.5	C			670	21.0	C
		TH	679	11.2	B					0	-	-							
		RT	0	-	-					0	-	-							
SW 7 th Street & SW 1 st Ave*	WB	LT	149	-	-	13.7	B	18.4	B	272	-	-	34.0	C	36.4	D			
		TH	925	13.7	B					1574	34.0	C							
		RT	0	-	-					0	-	-							
	SB	LT	0	-	-	22.6	C			0	-	-	40.1	D			840	40.2	D
		TH	794	22.2	C					372	39.9	D							
		RT	395	23.5	C					0	0.0	-							
SW 7 th Street & SW 2 nd Ave	WB	LT	76	23.8	C	23.0	C	27.1	C	100	139.2	F	115.3	F	104.7	F			
		TH	1001	22.5	C					1568	99.1	F							
		RT	243	22.5	C					278	103.3	F							
	NB	LT	331	41.6	D	8.6	A			425	147.0	F	41.7	D			1090	0.6	A
		TH	1316	0.3	A					0	0.0	-							
		RT	0	0.0	-					0	0.0	-							
	SB	LT	0	0.0	-	65.3	E			0	0.0	-	178.5	F			582	177.5	F
		TH	735	65.0	E					428	179.6	F							
		RT	207	65.5	E					511	57.9	E							
SW 7 th Street & SW 3 rd Ave	WB	LT	396	29.2	C	28.6	C	33.5	C	1518	49.5	D	53.6	D	49.9	D			
		TH	1054	28.4	C					392	52.7	D							
		RT	89	28.3	C					375	39.1	D							
	NB	LT	223	56.6	E	54.8	D			283	32.7	C	36.4	D			0	0.0	-
		TH	125	51.7	D					0	0.0	-							
		RT	0	0.0	-					0	0.0	-							
SW 7 th Street & SW 4 th Ave/I-95 SB Off-Ramp*	WB	LT	735	89.9	F	102.4	F	99.0	F	787	171.3	F	189.7	F	198.1	F			
		TH	542	108.5	F					1106	198.6	F							
		RT	0	-	-					0	-	-							
	SB	LT	0	-	-	191.3	F			0	-	-	275.2	F			42	-	-
		TH	285	191.3	F					312	275.2	F							
		RT	15	-	-					42	-	-							
	SWB	LT	1545	98.5	F	83.6	F			1128	178.9	F	193.2	F			1208	224.2	F
		TH	-	-	-					-	-	-							
		RT	544	34.8	C					-	-	-							
SW 7 th Street & SW 8 th Ave	WB	LT	63	37.9	D	36.4	D	23.3	C	74	58.9	E	48.8	D	45.4	D			
		TH	960	35.7	D					2160	42.6	D							
		RT	67	35.4	D					116	43.4	D							
	NB	LT	88	3.8	A	3.8	A			128	39.8	D	39.8	D			259	0.0	-
		TH	426	0.0	-					0	0.0	-							
		RT	0	0.0	-					0	0.0	-							
	SB	LT	0	0.0	-	14.2	B			273	0.0	-	29.0	C			88	29.0	C
		TH	334	0.0	-					-	-	-							
		RT	129	14.2	B					-	-	-							

6.0 SR 90/SW 8th STREET/SW 7th STREET BUILD ALTERNATIVES

The SR 90/SW 8th Street/SW 7th Street PD&E Study examined two tiers of build alternatives covering the limits of the study network. Alternatives were first considered for the configuration of SW 8th Street and SW 7th Street. Secondly, alternative configurations were considered for the I-95/SR 90 Interchange that would be consistent with the recommended configuration for SW 8th Street and SW 7th Street.

The Alternatives analysis for SW 8th Street and SW 7th Street is document in the associated Preliminary Engineering Report (PER). The alternatives analysis examined multiple configurations and traffic flow patterns for SW 8th Street and SW 7th Street. The alternatives are described below and illustrated in **Figures 6.1** through **6.7** included:

Alternative 1: Two Lanes, Two-Way Alternative (Figure 6.1): This alternative reconfigures SW 8th Street and SW 7th Street for two-way traffic flow. Two (2) through lanes (one eastbound and one westbound) are provided on SW 8th Street and SW 7th Street. The typical sections consist of the following:

- SW 8th Street: one eastbound lane + one westbound lane + center two-way left turn lane. The typical section on SW 8th Street also accommodates on-street parking on both sides of the roadway.
- SW 7th Street: one eastbound lane + one westbound lane + center two-way left turn lane.

Alternative 2: Two Lanes, Two-Way + Transit Lane (Figure 6.2): This alternative reconfigures SW 8th Street and SW 7th Street for two-way traffic flow. In addition, one lane is repurposed for transit operations. The typical sections consist of the following:

- SW 8th Street: one eastbound lane + one westbound lane + one eastbound transit lane. The typical section on SW 8th Street also accommodates on-street parking on both sides of the roadway.
- SW 7th Street: one eastbound lane + one westbound lane + one westbound transit lane.

Alternative 2A: Two Lanes, Two-Way + Bicycle Lane (Figure 6.3): This alternative reconfigures SW 8th Street and SW 7th Street for two-way traffic flow. In addition, one lane is repurposed to accommodate a bicycle lane. The difference in width between the repurposed travel lane (11 feet) and the proposed

bicycle lane (7 feet) allows for wider sidewalks (+ 4 feet) on SW 8th Street and SW 7th Street. The typical sections consist of the following:

- SW 8th Street: one eastbound lane + one westbound lane + one bicycle lane. The typical section on SW 8th Street also accommodates on-street parking on both sides of the roadway.
- SW 7th Street: one eastbound lane + one westbound lane + one bicycle lane.

Alternative 3: Two Lane, One-Way (Figure 6.4): This alternative maintains one-way traffic flow on SW 8th Street and SW 7th Street. Two (2) eastbound lanes are provided on SW 8th Street and two (2) westbound lanes are provided on SW 7th Street. One lane is repurposed on SW 8th Street and on SW 7th Street to accommodate a bicycle lane. The difference in width between the repurposed travel lane (11 feet) and the proposed bicycle lane (7 feet) allows for wider sidewalks (+ 4 feet) on SW 8th Street and SW 7th Street. The typical sections consist of the following:

- SW 8th Street: two eastbound lanes + one bicycle lane. The typical section on SW 8th Street also includes on-street parking on both sides of the roadway.
- SW 7th Street: two westbound lanes + one bicycle lane.

Alternative 3A: Three (3) Lanes - One (1) Way + Shared Parking and Travel Lane (Figure 6.5): This alternative maintains one-way traffic flow on SW 8th Street and SW 7th Street. One eastbound lane on SW 8th Street is repurposed as a shared lane that serves through traffic during peak periods while also providing on-street parking during off-peak periods. Three (3) westbound lanes are provided on SW 7th Street. The typical sections consist of the following:

- SW 8th Street: Two eastbound through lanes + one shared eastbound through lane/parking lane (shared lane used for on-street parking during off-peak periods). Typical section on SW 8th Street also accommodates parking on the north side, a bicycle lane, and sidewalks on both sides of the street.
- SW 7th Street: Three (3) lanes one-way eastbound. Typical section on SW 7th Street also accommodates sidewalks on both sides of the street.

Alternative 4: Three Lane, One-Way (Figure 6.6): This alternative retains the existing configuration and one-way traffic flow along SW 8th Street and SW 7th Street. The roadway geometry is similar to existing

except for modifications at the I-95 Interchange. The typical section on each facility consists of the following:

- SW 8th Street: three eastbound lanes. The typical section on SW 8th Street also includes on-street parking on both sides of the roadway.
- SW 7th Street: three westbound lanes

Alternative 5 (Figure 6.7):

This alternative reverses the directional traffic flow on SW 8th Street and SW 7th Street. In Alternative 5, SW 8th Street is modified for westbound traffic flow, while SW 7th Street is modified for eastbound traffic flow. The typical section on SW 8th Street and SW 7th Street are as follows:

- SW 8th Street: Three (3) lanes one-way westbound with on-street parking on both sides of the street.
- SW 7th Street: Three (3) lanes one-way eastbound. No on-street parking is provided on SW 7th Street, similar to existing conditions.

Alternative 6 (Figure 6.8):

In Alternative 6, directional traffic flow along SW 8th Street (one-way eastbound) and SW 7th Street (one-way westbound) is maintained per existing conditions. One eastbound lane on SW 8th Street is repurposed as a shared lane that serves through traffic during peak periods while also providing on-street parking during off-peak periods. Alternative 6 also reduces the through lanes on SW 7th Street from three lanes (existing) to two lanes (proposed). This reduction in travel lanes along SW 7th Street allows for construction of a buffer separated bicycle lane. The typical section on SW 8th Street and SW 7th Street are as follows:

- SW 8th Street: Two eastbound through lanes + one shared eastbound through lane/parking lane (shared lane used for on-street parking during off-peak periods). Typical section on SW 8th Street also accommodates parking on the north side, a bicycle lane, and sidewalks on both sides of the street.
- SW 7th Street: Two (2) lanes one-way eastbound. Typical section on SW 7th Street also accommodates a bicycle lane and sidewalks on both sides of the street.

SR 90/SW 8th Street/SW 7th Street Recommended Alternative

Following extensive analyses and coordination with stakeholder agencies and local communities, it was determined that Alternative 4 was the Recommended Alternative for SW 8th Street and SW 7th Street (details contained in the Preliminary Engineering Report). This alternative maintains the existing configuration and traffic flow pattern for SR 90 - 3 lanes eastbound on SW 8th Street and 3 lanes westbound on SW 7th Street. Alternative interchange concepts were considered for the I-95/SR 90 Interchange that would complement the recommended configuration for SW 8th Street/SW 7th Street while proposing modifications that would address safety and operational issues within the influence area of the interchange. These interchange alternatives are discussed following section of the IMR.

Figure 6.1: SR 90 Alternative 1: -Two Lanes, Two-Way Traffic

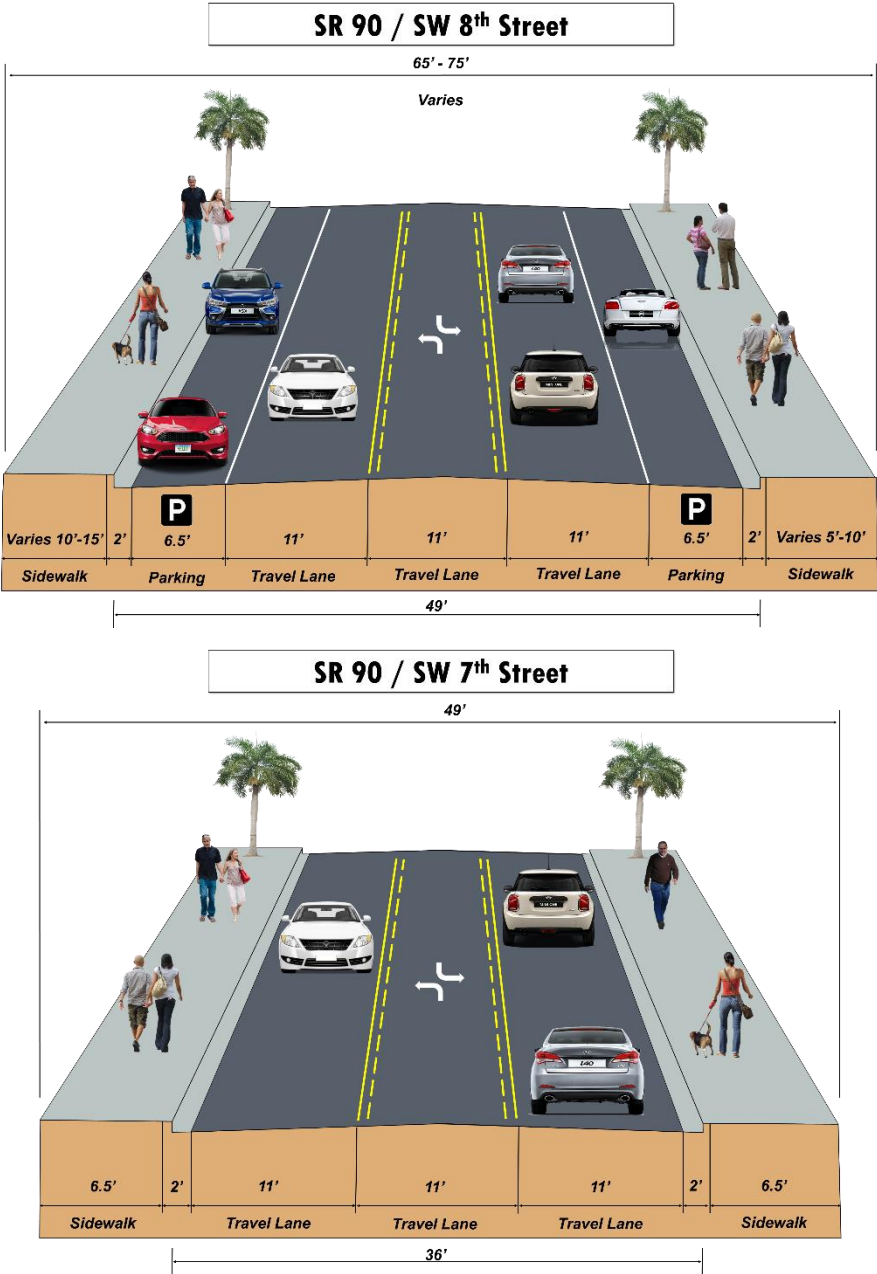


Figure 6.2: SR 90 Alternative 2 – Two-Way with Transit

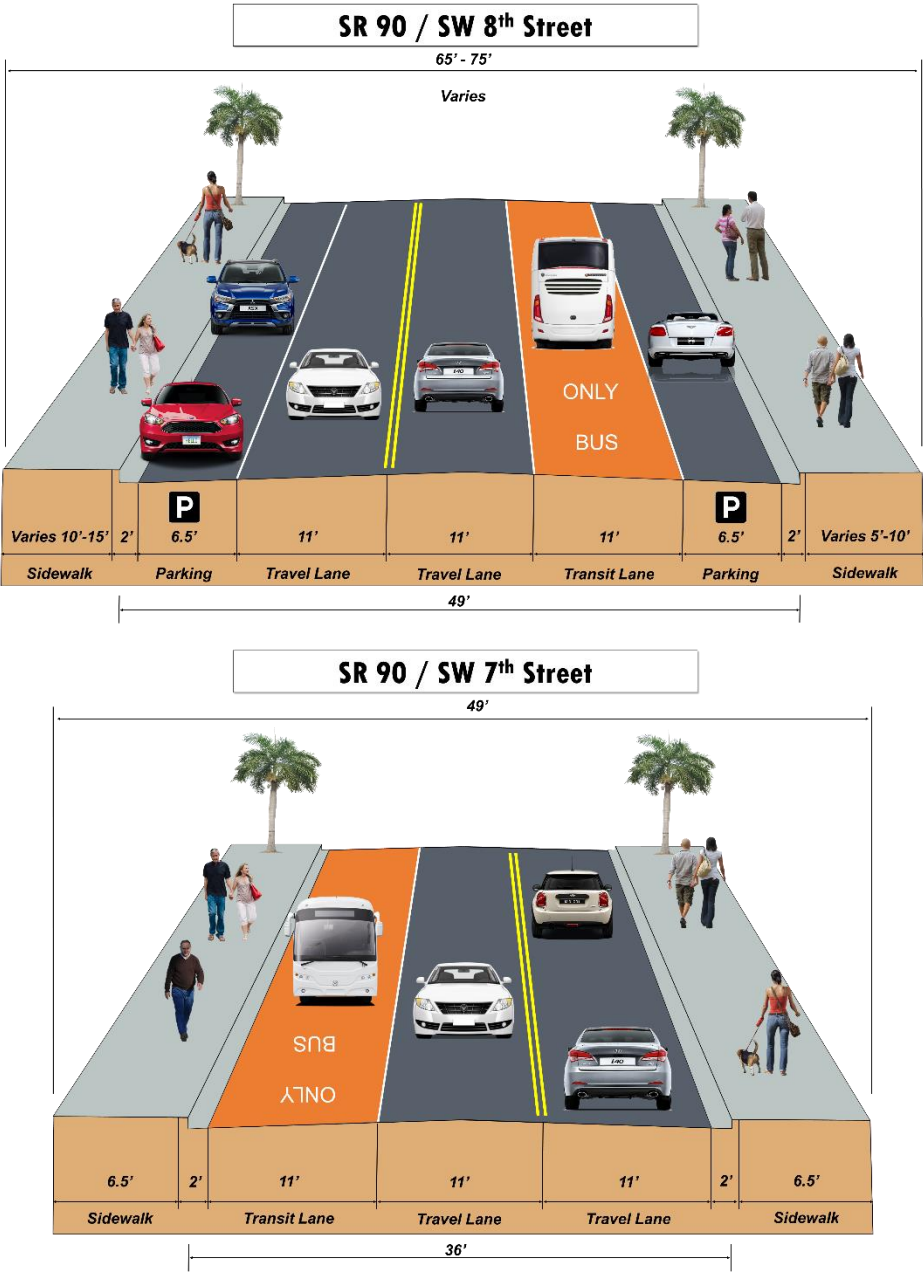


Figure 6.3: SR 90 Alternative 2A – Two-Way with Bicycle Lane

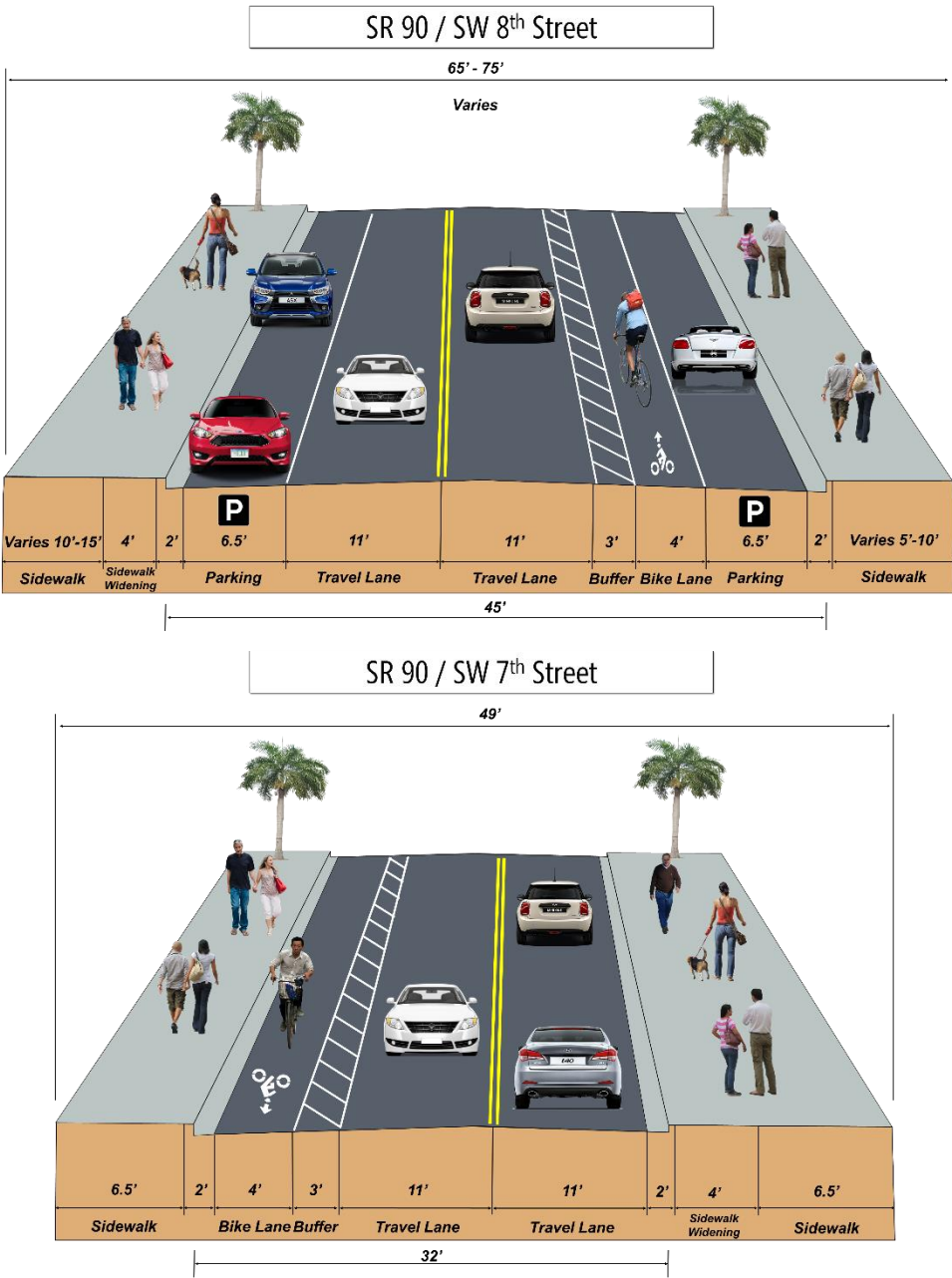


Figure 6.4: SR 90 Alternative 3 – Two Lanes, One-Way with Bicycle Lane

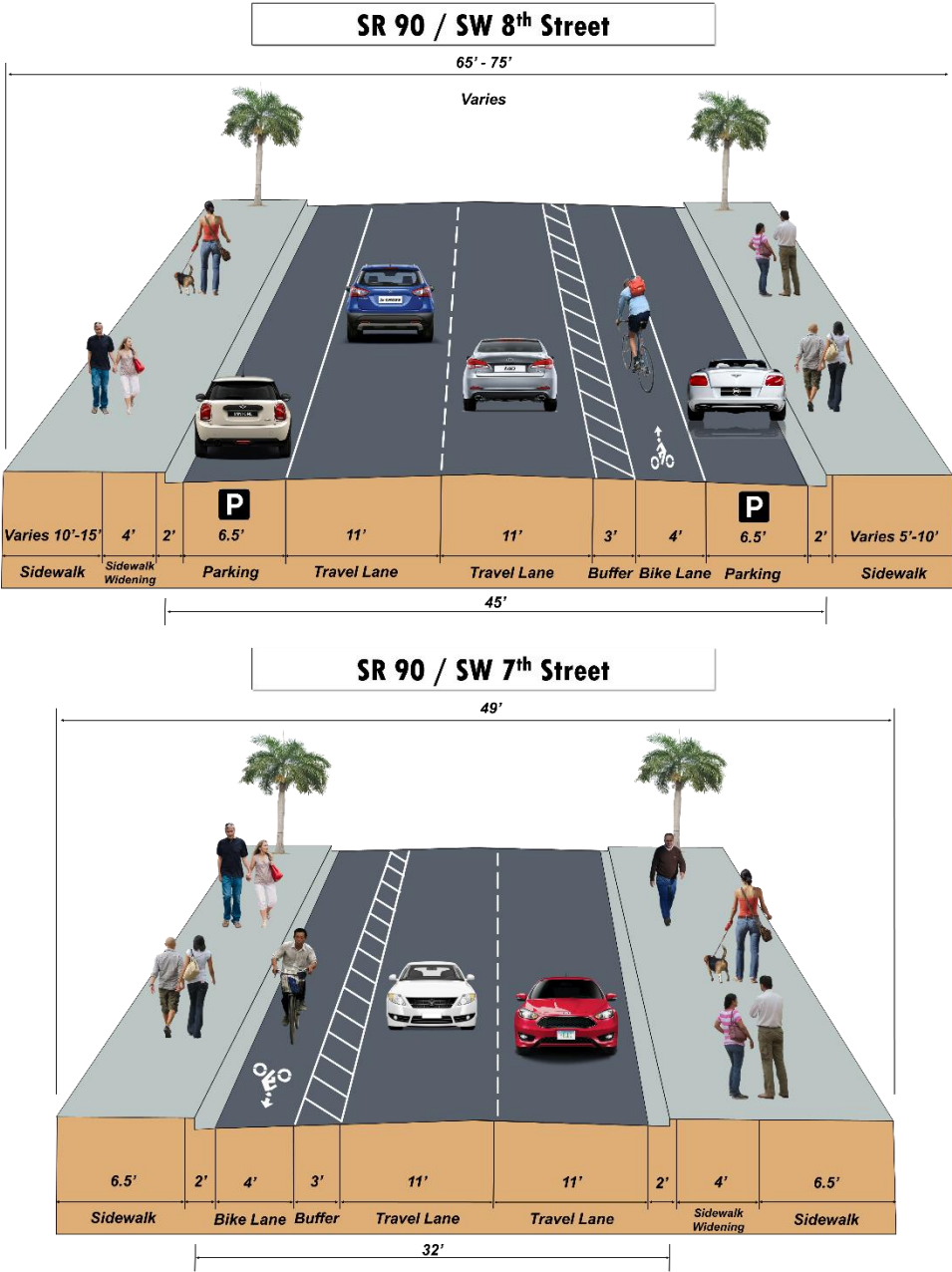


Figure 6.5: SR 90 Alternative 3A – Three Lanes, One-Way + Shared Parking Travel Lane

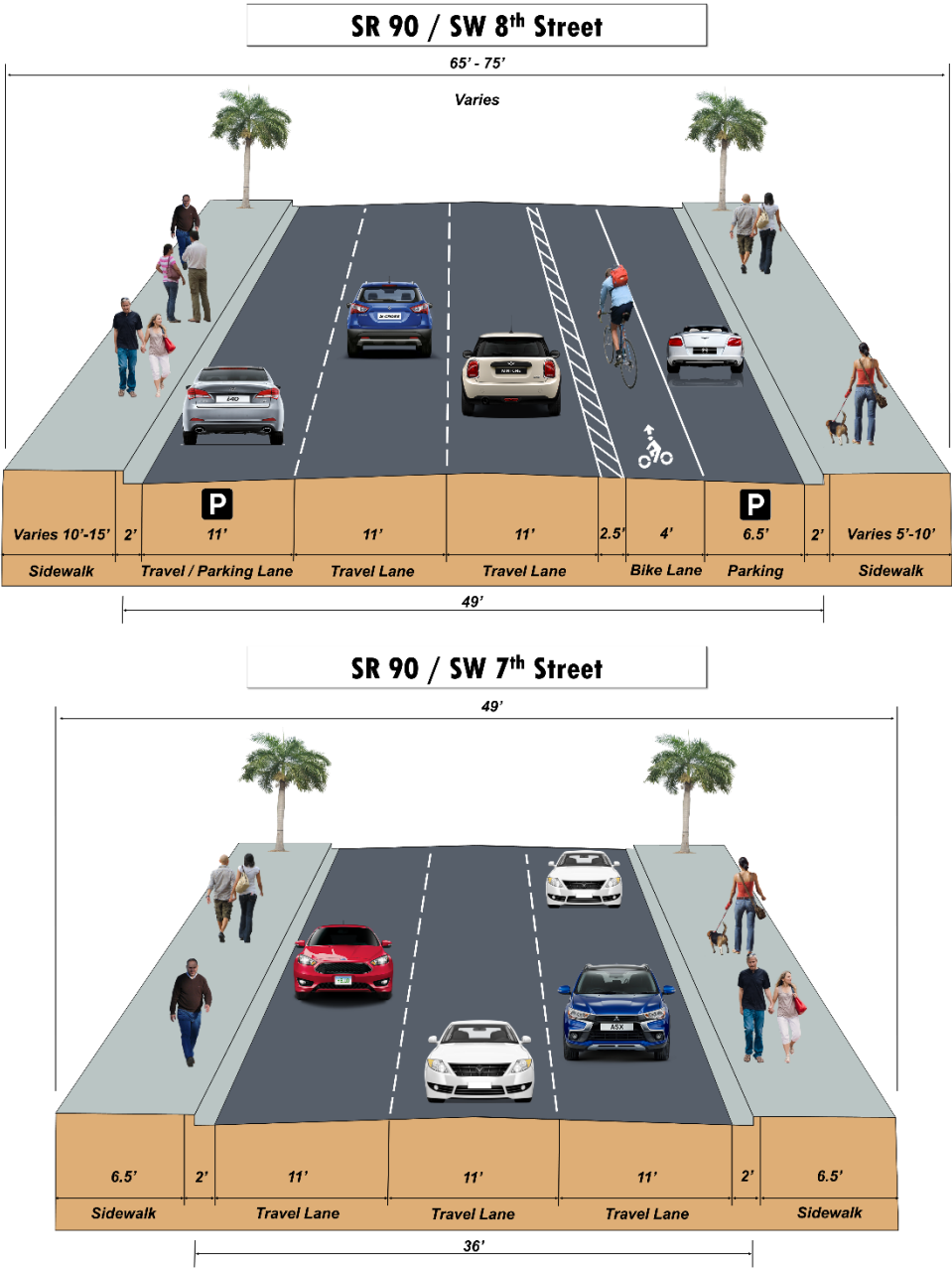


Figure 6.6: SR 90 Alternative 4 – Three Lanes, One-Way

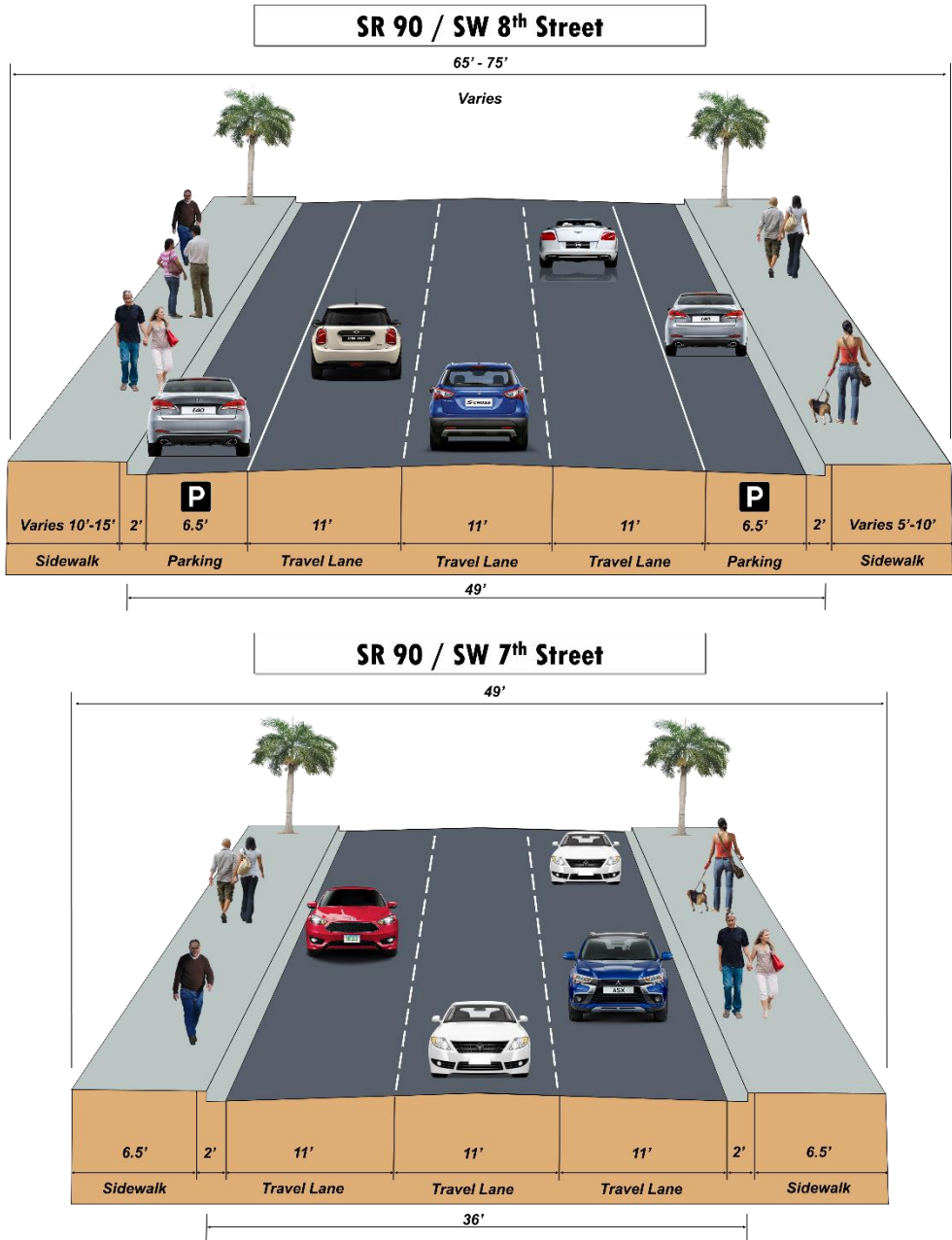


Figure 6.7: SR 90 Alternative 5 – Reverse Flow

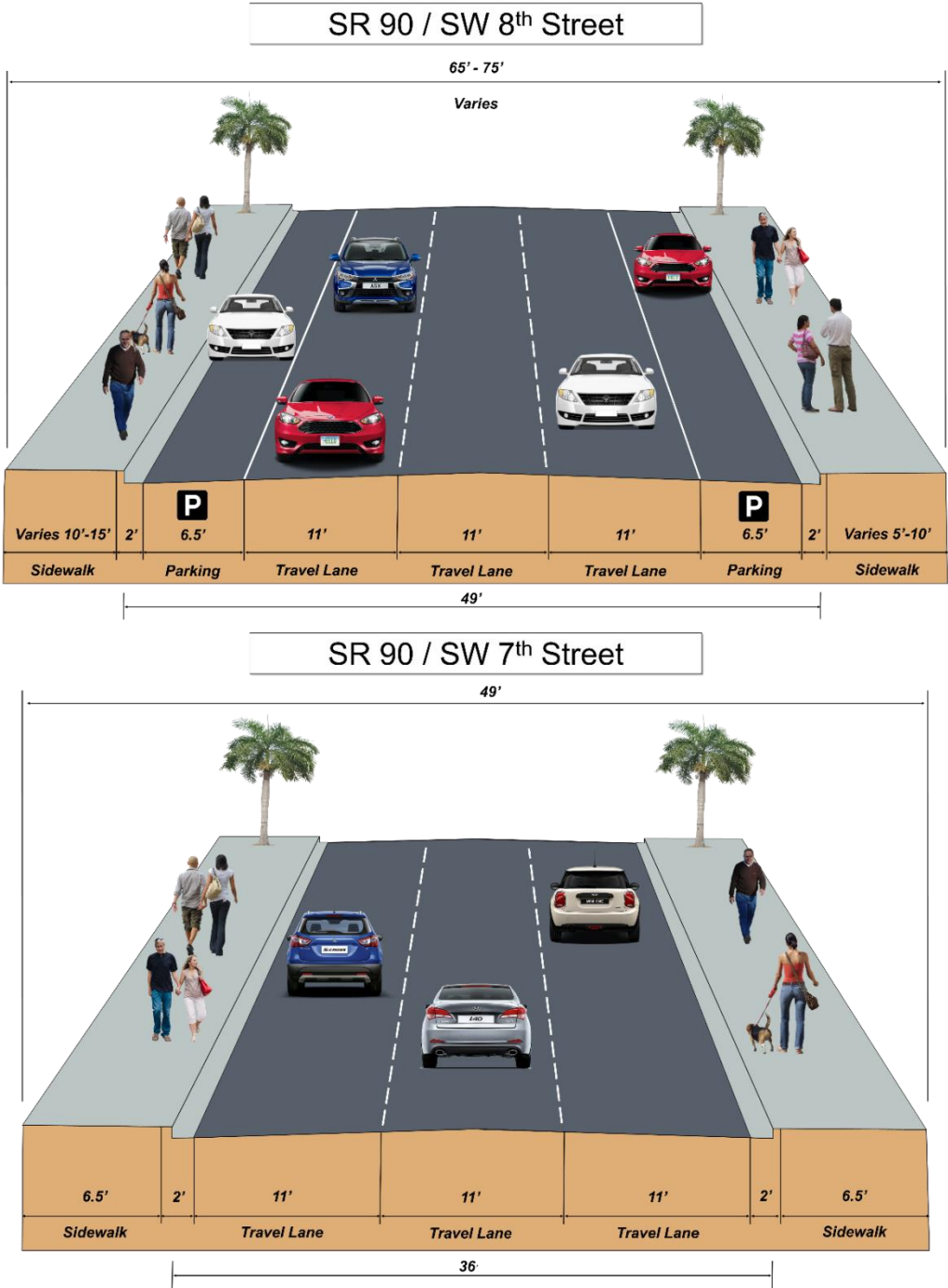
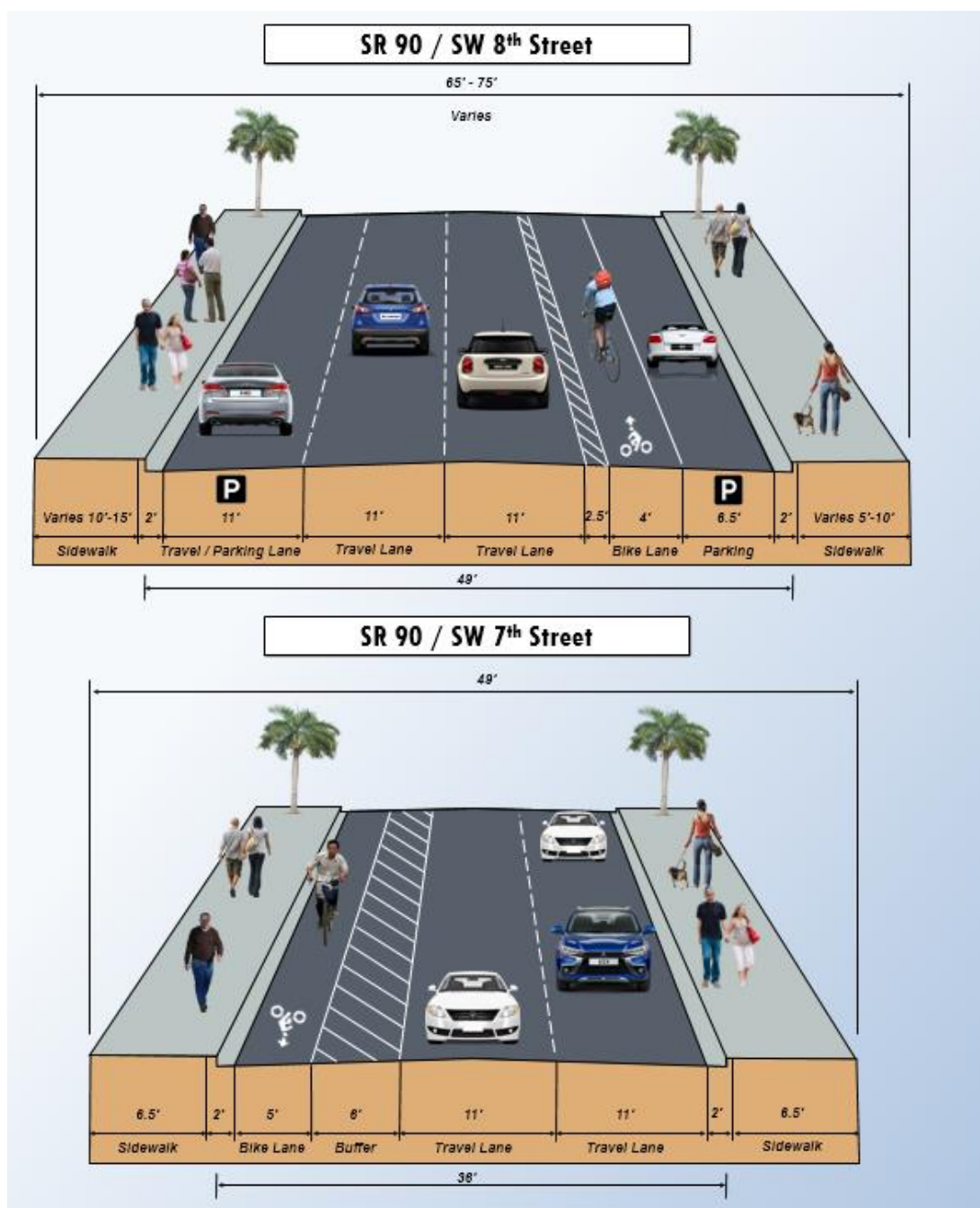


Figure 6.8: SR 90 Alternative 6 – 3 Lanes EB, 2 Lanes WB



7.0 I-95/SR 90 INTERCHANGE BUILD ALTERNATIVES

7.1 Considered Interchange Build Alternatives

Various potential design modifications were considered for the I-95/SR 90 Interchange. The design modifications were developed aimed at addressing the following:

- Consistency with the Recommended Alternative for future configuration and traffic flow pattern on SW 8th Street and SW 7th Street (discussed under Section 6.1 of the IMR)
- Mitigating or minimizing existing traffic safety and operational issues within the influence area of the interchange
- Meeting the long term (year 2045) travel demand needs at the interchange.

The interchange alternatives considered for the project are described below.

Interchange Alternative B-1 (Figure 7.1): This modified I-95 Interchange design concept facilitates eastbound traffic flow on SW 8th Street and westbound traffic flow SW 7th Street (consistent with SR 90/SW 8th Street/SW 7th Street recommended Alternative). The proposed design concept and the associated 2045 traffic flows are depicted in **Figure 7.1** The proposed I-95 Interchange Alternative B-1 incorporates the following.

- New flyover ramp for accommodating movements from SB I-95 to eastbound SW 8th Street. The proposed SB to EB flyover elevates above SW 7th Street/SW 4th Avenue Intersection and SW 8th Street/SW 3rd Avenue Intersection. The proposed new flyover connects to the existing I-95 SB off-ramp to SW 8th Street – it does not introduce a new connection to I-95.
- New flyover ramp for accommodating movements from westbound SW 7th Street to NB I-95. The proposed WB to NB ramp elevates above SW 7th Street/SW 3rd Avenue Intersection and it introduces a new connection (on-ramp) to NB I-95.
- The two existing loop ramps for movements from eastbound SW 8th Street to NB I-95 are modified to prevent direct access to these ramps from SW 3rd Avenue.

- The intersection at SW 8th Street and SW 3rd Avenue is modified to prohibit southbound through (SBT) movements.
- Traffic flows and intersection configurations are not impacted (match existing) for all segments of SR 90/SW 8th Street/SW 7th Street located east of SW 2nd Avenue and west of SW 4th Avenue.

Alternative B-1 was subsequently eliminated following reviews and consultation with FDOT design staff. It was determined that the proposed SB I-95 Ramp to EB SW 8th Street flyover could not be designed without violating FDOT Design Criteria for maximum vertical grade and FDOT Design Criteria for the minimum rate of vertical curvature with the minimum design speed of 30 mph. This is due in large part to the required minimum 16.5-ft vertical clearance over existing I-95. FDOT allowable maximum grade for ramps is 7% whereas, the minimum grade achievable to meet the minimum vertical clearance over I-95 is approximately +12%. In addition, the City of Miami north/south street network is set on a grid spacing of approximately 550-ft, which makes it very challenging to tie down to match existing while meeting minimum design criteria. The achievable vertical grades would satisfy a design speed of only 20 mph which is unacceptable given the safety considerations for having a large speed differential on the I-95 Off-Ramp.

Interchange Alternative B-2 (Figure 7.2): This modified I-95 Interchange design concept facilitates eastbound traffic flow on SW 8th Street and westbound traffic flow SW 7th Street (consistent with SR 90/SW 8th Street/SW 7th Street recommended Alternative). The proposed design concept and the associated 2045 traffic flows are depicted in **Figure 7.2**. The proposed I-95 Interchange Alternative B-2 incorporates the following.

- New flyover ramp for accommodating movements from westbound SW 7th Street to NB I-95. The proposed WB to NB ramp elevates above SW 7th Street/SW 3rd Avenue Intersection and it introduces a new connection (on-ramp) to NB I-95.
- Traffic flows and intersection configurations are not impacted (match existing) for all segments of SR 90/SW 8th Street/SW 7th Street located east of SW 2nd Avenue and west of SW 4th Avenue.

Interchange Alternative B-3 (Figure 7.3): This modified I-95 Interchange design concept facilitates eastbound traffic flow on SW 8th Street and westbound traffic flow SW 7th Street (consistent with SR 90/SW 8th Street/SW 7th Street recommended Alternative). The proposed design concept and the associated 2045 traffic flows are depicted in **Figure 7.3**. The proposed I-95 Interchange Alternative B-3 incorporates the following.

- New flyover ramp for accommodating movements from SB I-95 to eastbound SW 8th Street. The proposed SB to EB flyover elevates above SW 7th Street/SW 4th Avenue Intersection and SW 8th Street/SW 3rd Avenue Intersection. The proposed new flyover connects to the existing I-95 SB off-ramp to SW 7th Street – it does not introduce a new connection to I-95.
- Traffic flows and intersection configurations are not impacted (match existing) for all segments of SR 90/SW 8th Street/SW 7th Street located east of SW 2nd Avenue and west of SW 4th Avenue.

Similar to Alternative B-1, Alternative B-3 was subsequently discarded from consideration due to inability to meet minimum vertical alignment criteria for the proposed SB I-95 to EB SW 8th Street flyover.

Interchange Alternative B-4 (Figure 7.4): This modified I-95 Interchange design concept facilitates eastbound traffic flow on SW 8th Street and westbound traffic flow SW 7th Street (consistent with SR 90/SW 8th Street/SW 7th Street recommended Alternative). The proposed design concept and the associated 2045 traffic flows are depicted in **Figure 7.4**. The proposed I-95 Interchange Alternative B-4 incorporates the following.

- The segment of SW 3rd Avenue between SW 8th Street and SW 7th Street is modified to include three lanes, one-way southbound. This modification is intended to provide the primary access to NB I-95 for traffic coming from WB SW 7th Street.
- The intersection at SW 8th Street and SW 3rd Avenue is modified to allow two through lanes from SB SW 3rd Avenue to NB I-95 ON-Ramp. In addition, the NB approach of SW 3rd Avenue is modified to accommodate two right turn lanes (northbound through is prohibited).
- Intersection at SW 7th Street and SW 3rd Avenue is modified to remove traffic signal – no need for signal control as there are no conflicting movements

- Traffic flows and intersection configurations are not impacted (match existing) for all segments of SR 90/SW 8th Street/SW 7th Street located east of SW 2nd Avenue and west of SW 4th Avenue.
- Traffic flows and lane configurations are not impacted (match existing) along all segments of NB I-95 and SB I-95.

Interchange Alternative B-5 (Figure 7.5): This modified I-95 Interchange design concept facilitates eastbound traffic flow on SW 8th Street and westbound traffic flow SW 7th Street (consistent with SR 90/SW 8th Street/SW 7th Street recommended Alternative). The proposed design concept and the associated 2045 traffic flows are depicted in **Figure 7.5**. The proposed I-95 Interchange Alternative B-5 incorporates the following.

- New flyover ramp for accommodating movements from westbound SW 7th Street to NB I-95. The proposed WB to NB ramp elevates above SW 7th Street/SW 3rd Avenue Intersection and it introduces a new connection (on-ramp) to NB I-95.
- New at grade turbo lane for movements from I-95 SB Off-Ramp to EB SW 8th Street. This turbo lane allows traffic from SB I-95 to bypass the signals at SW 8th Street and SW 4th Avenue. The turbo lane develops as a turn bay providing an additional at-grade SB lane at the intersection of I-95 SB off-ramp and SW 7th Street. It also provides an additional EB lane at the intersection of SW 8th Street and SW 3rd Avenue. Furthermore, eastbound left turns are prohibited at the intersection of SW 8th Street and SW 3rd Avenue due to safety considerations.
- Traffic flows and intersection configurations are not impacted (match existing) for all segments of SR 90/SW 8th Street/SW 7th Street located east of SW 2nd Avenue and west of SW 4th Avenue.

Interchange Alternative B-6 (Figure 7.6): This modified I-95 Interchange design concept facilitates eastbound traffic flow on SW 8th Street and westbound traffic flow SW 7th Street (consistent with SR 90/SW 8th Street/SW 7th Street recommended Alternative). The proposed design concept and the associated 2045 traffic flows are depicted in **Figure 7.6**. The proposed I-95 Interchange Alternative B-6 incorporates the following.

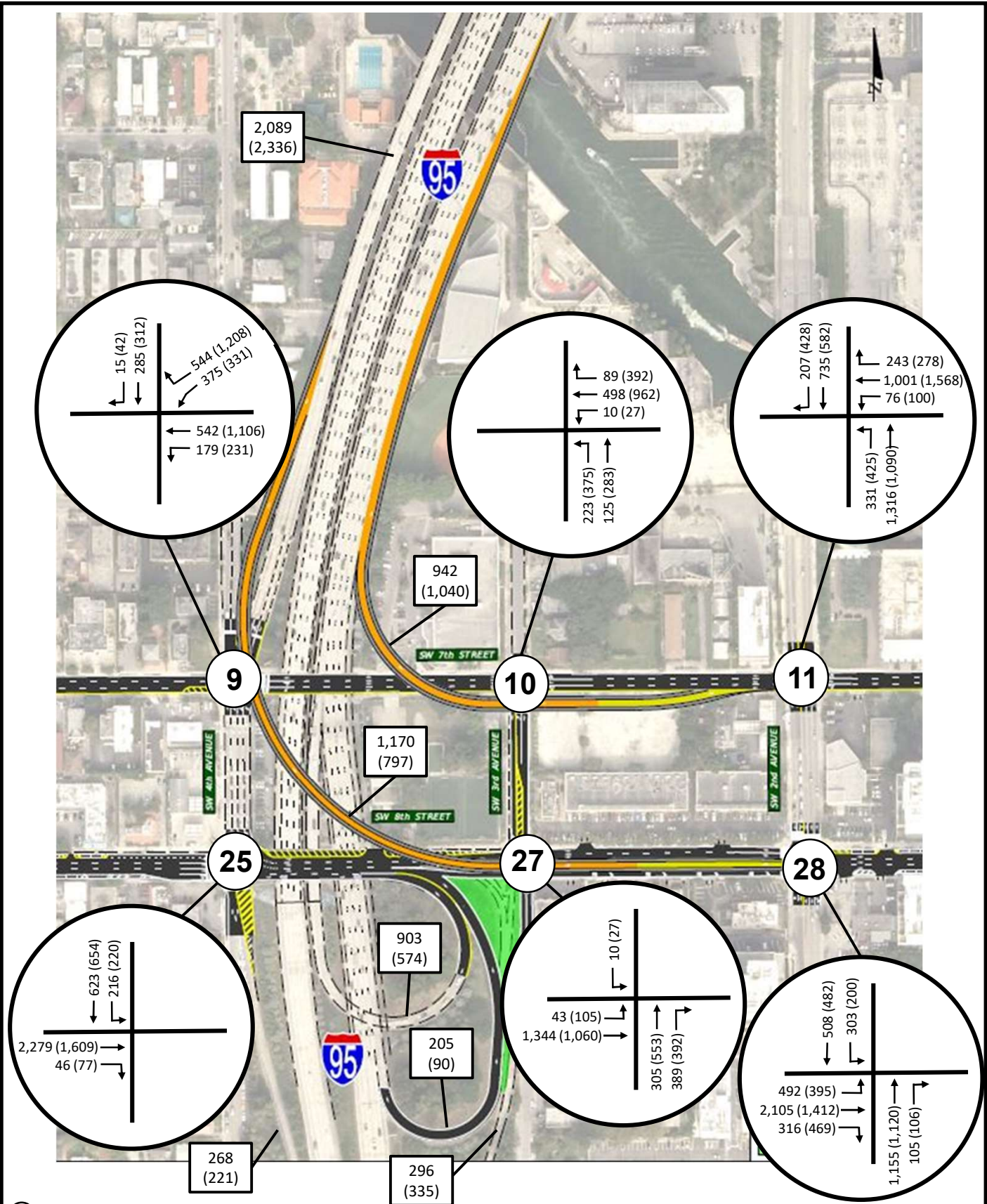
- The segment of SW 3rd Avenue between SW 8th Street and SW 7th Street is modified to include three lanes, one-way southbound. This modification is intended to provide the primary access to NB I-95 for traffic coming from WB SW 7th Street.
- New at grade turbo lane for movements from I-95 SB Off-Ramp to EB SW 8th Street. This turbo lane allows traffic from SB I-95 to bypass the signals at SW 8th Street and SW 4th Avenue. The turbo lane develops as a turn bay providing an additional at-grade SB lane at the intersection of I-95 SB off-ramp and SW 7th Street. It also provides an additional EB lane at the intersection of SW 8th Street and SW 3rd Avenue. Furthermore, eastbound left turns are prohibited at the intersection of SW 8th Street and SW 3rd Avenue due to safety considerations.
- Traffic flows and intersection configurations are not impacted (match existing) for all segments of SR 90/SW 8th Street/SW 7th Street located east of SW 2nd Avenue and west of SW 4th Avenue.

Interchange Alternative B-7 (Figure 7.7): This modified I-95 Interchange design concept facilitates eastbound traffic flow on SW 8th Street and westbound traffic flow SW 7th Street (consistent with SR 90/SW 8th Street/SW 7th Street recommended Alternative). The proposed design concept and the associated 2045 traffic flows are depicted in **Figure 7.7**. The proposed I-95 Interchange Alternative B-7 incorporates the following.

- New flyover ramp for accommodating movements from westbound SW 7th Street to NB I-95. The proposed WB to NB ramp elevates above SW 7th Street/SW 3rd Avenue Intersection and it introduces a new connection (on-ramp) to NB I-95.
- Close SW 4th Avenue at its intersection with SW 7th Street and I-95 Southbound Off-Ramp. The proposed road closure will prohibit all vehicular traffic movements from SW 4th Avenue, at the intersection.
- Convert the segment of SW 4th Avenue between SW 7th Street and SW 6th Street from one-way southbound to two-way traffic flow. A turn-around facility is also proposed to facilitate traffic circulation and access within this segment of SW 4th Avenue.
- Widen I-95 SB Off-Ramp to provide one additional southbound through lane at the intersection with SW 7th Street. This additional through lane will further increase the capacity of the terminal intersection.

- Convert the segment of SW 3rd Avenue between SW 7th Street and SW 6th Street from one-way northbound to two-way traffic flow. This modification will create one northbound through lane and one new southbound through lane within the segment. This traffic flow modification will facilitate the rerouting of traffic for accessing EB SW 8th Street and the I-95 NB and SB ramps.
- Modification of signal timings to accommodate changes in intersection geometry and traffic volumes due to rerouting of traffic. Notably, signal operation plans at the following intersections will be modified:
 - SW 4th Avenue at Southwest 7th Street and I-95 SB Off-Ramp: Signal operation plan will be changed from 3-phase operation to 2-phase operation (serving SW 7th Street and I-95 SB Off-Ramp).
 - SW 3rd Avenue at SW 7th Street: Signal operation plan will be changed from 2-phase operation to 3-phase operation (serving NB SW 3rd Avenue, SB SW 3rd Avenue and WB SW 7th Street).

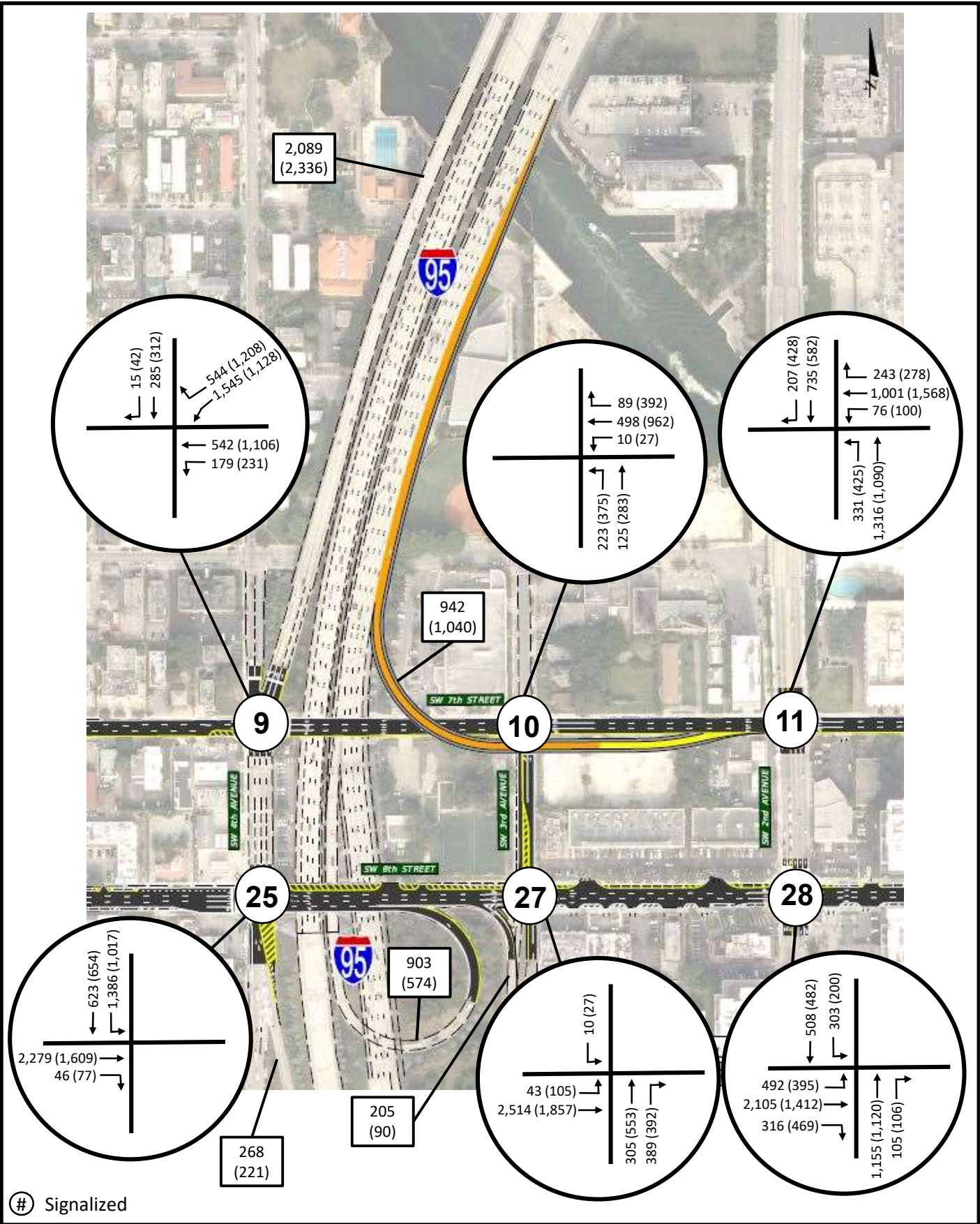
Other Concepts from Value Engineering (VE) Workshop: It should be noted that in addition to the interchange alternatives described herein, a Value Engineering (VE) Workshop conducted by the FDOT identified a potential alternative with access to I-95 via SW 10th Street. This VE alternative was later discarded due to its incompatibility with the residential character of SW 10th Street and planned future land use developments in the area.

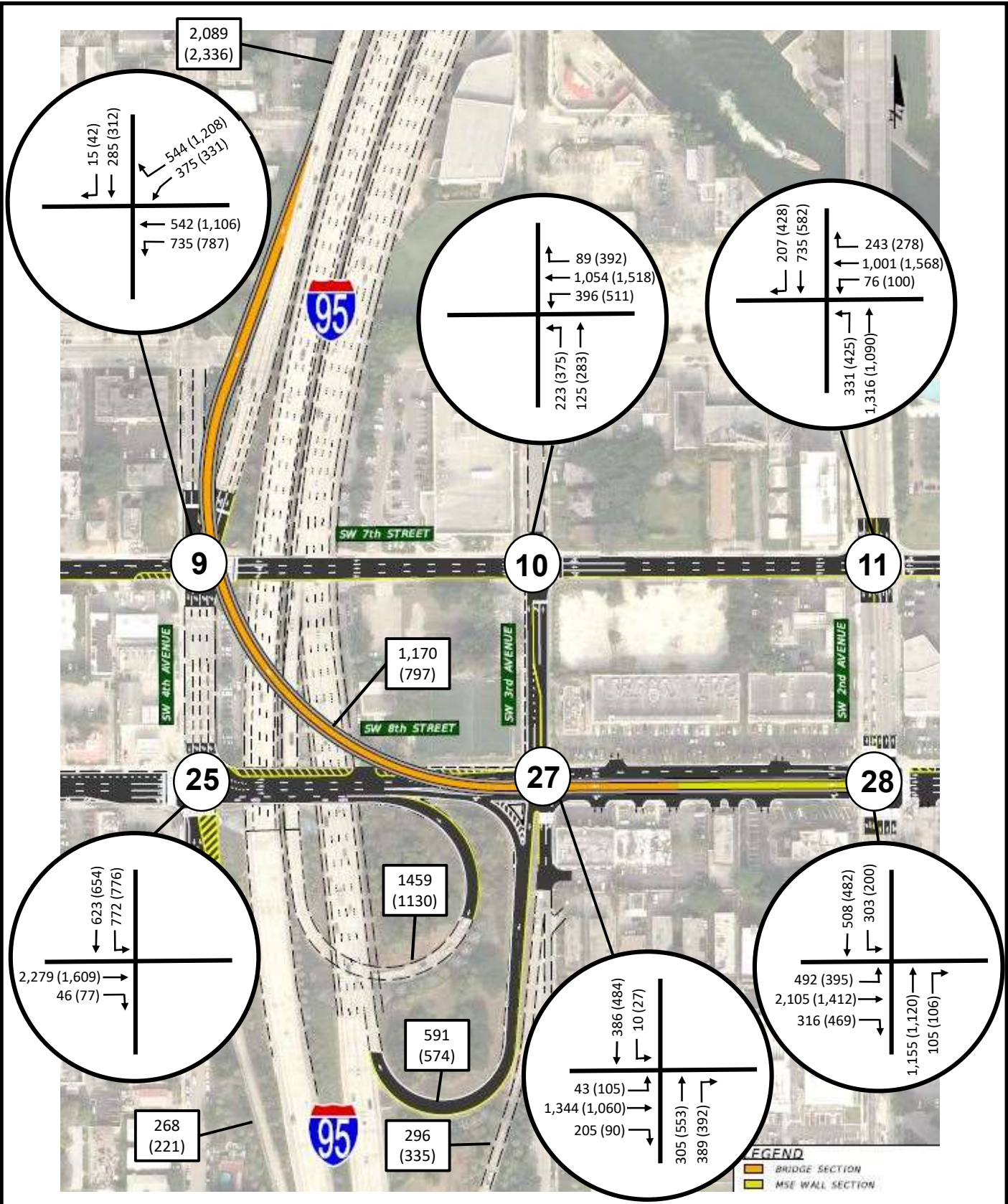


SR 90/SW 8th Street and
SW 7th Street PD&E Study

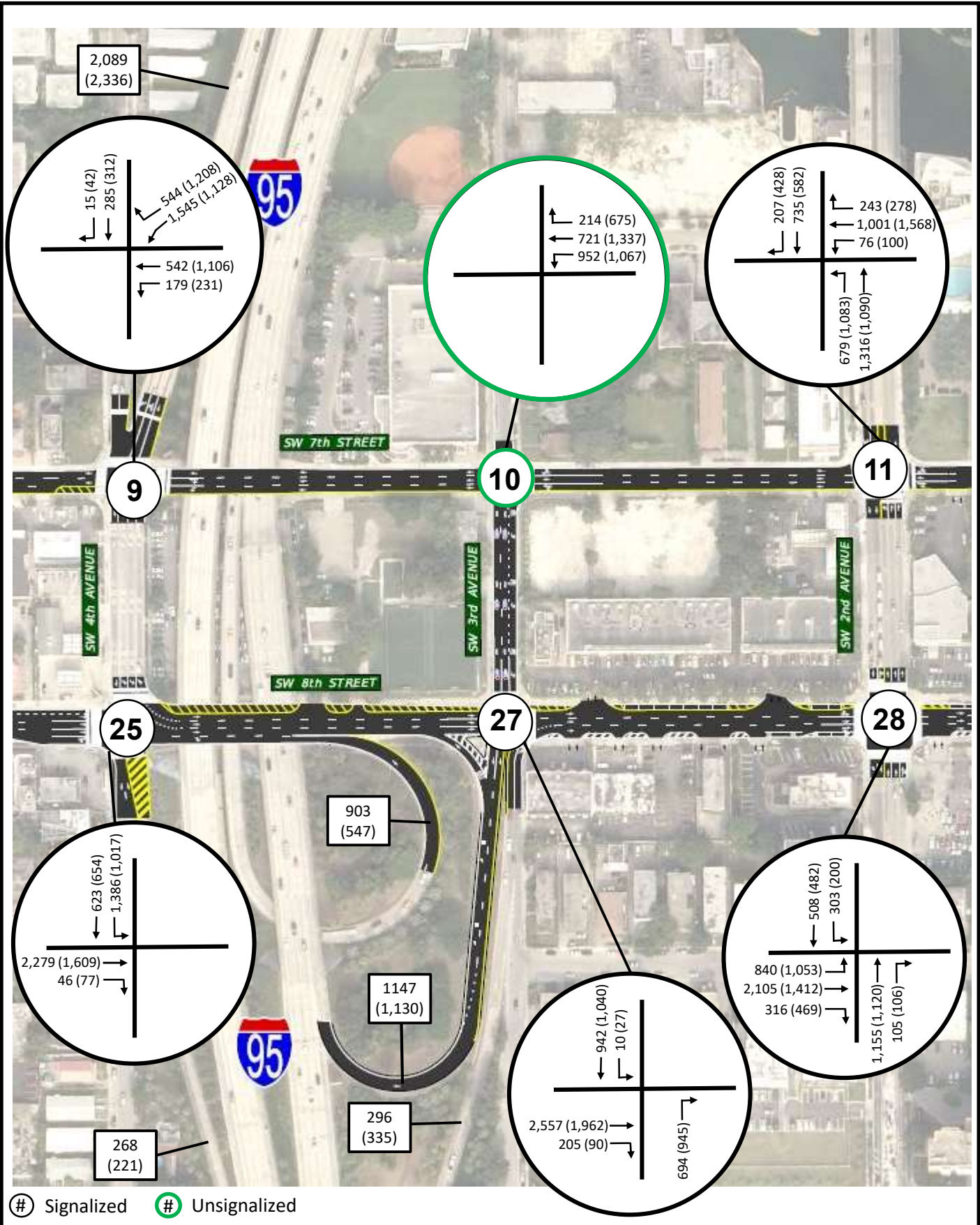
I-95 Interchange Alternative B-1
2045 Peak Hour Volumes

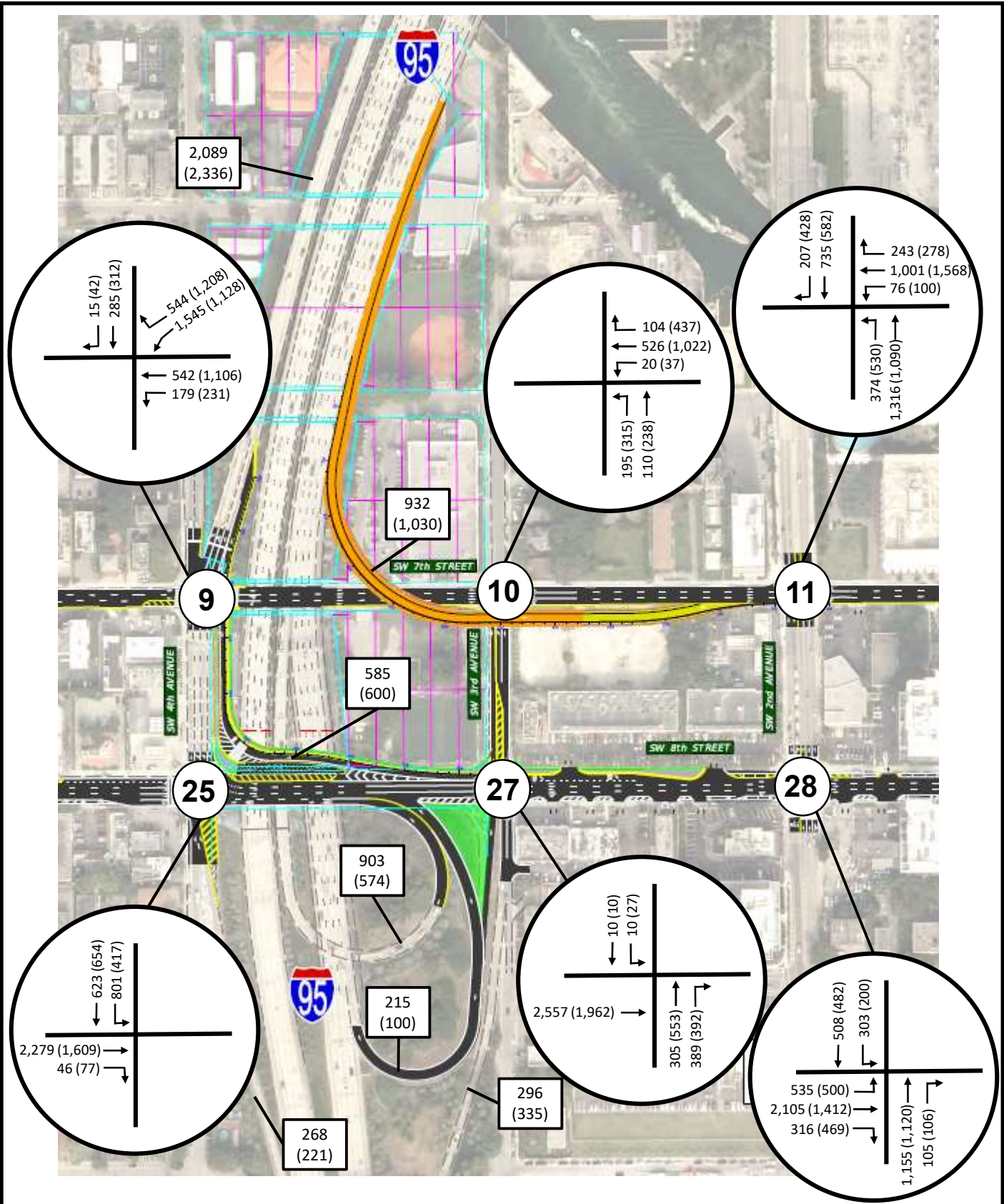
Figure 7.1



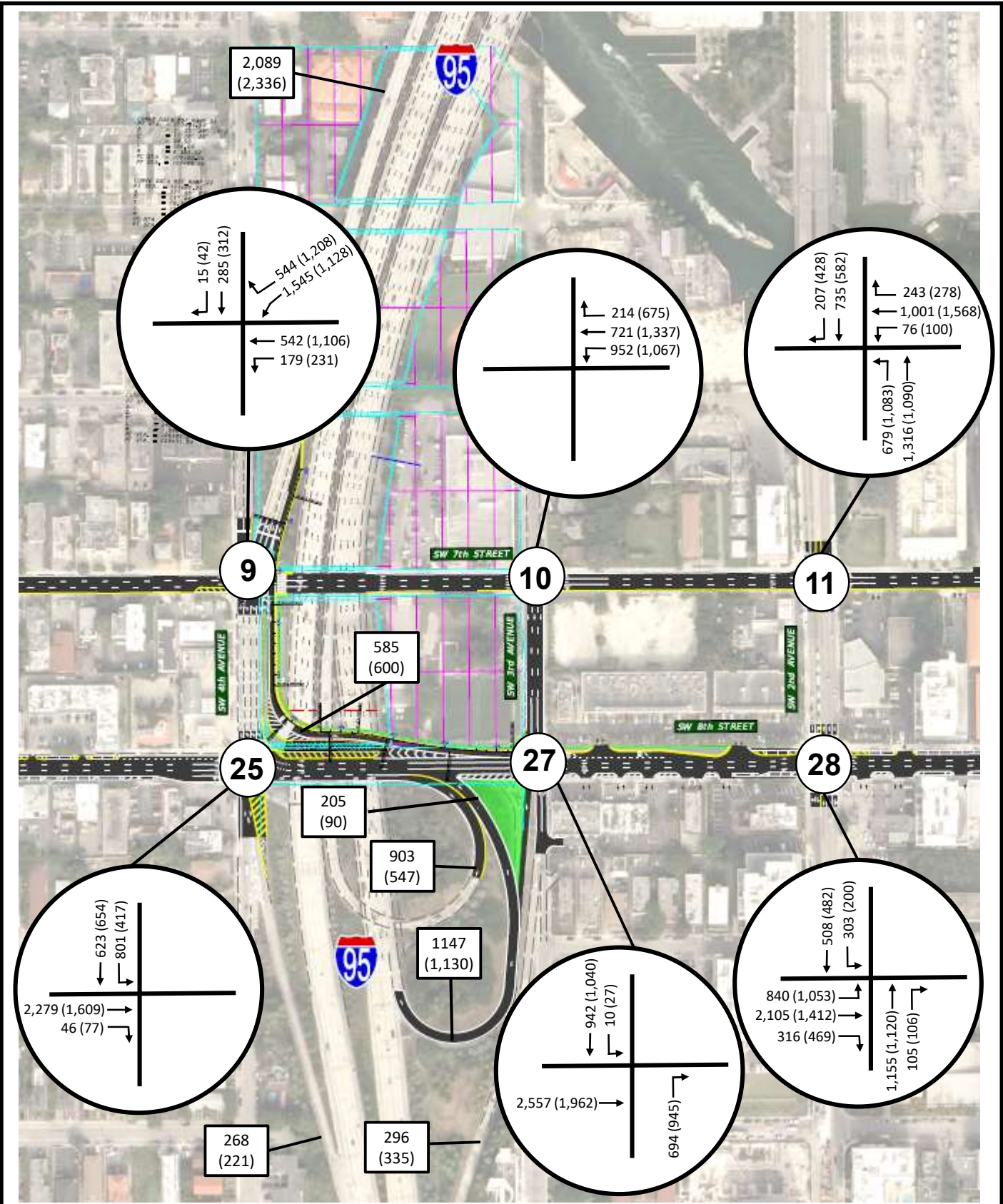


Signalized

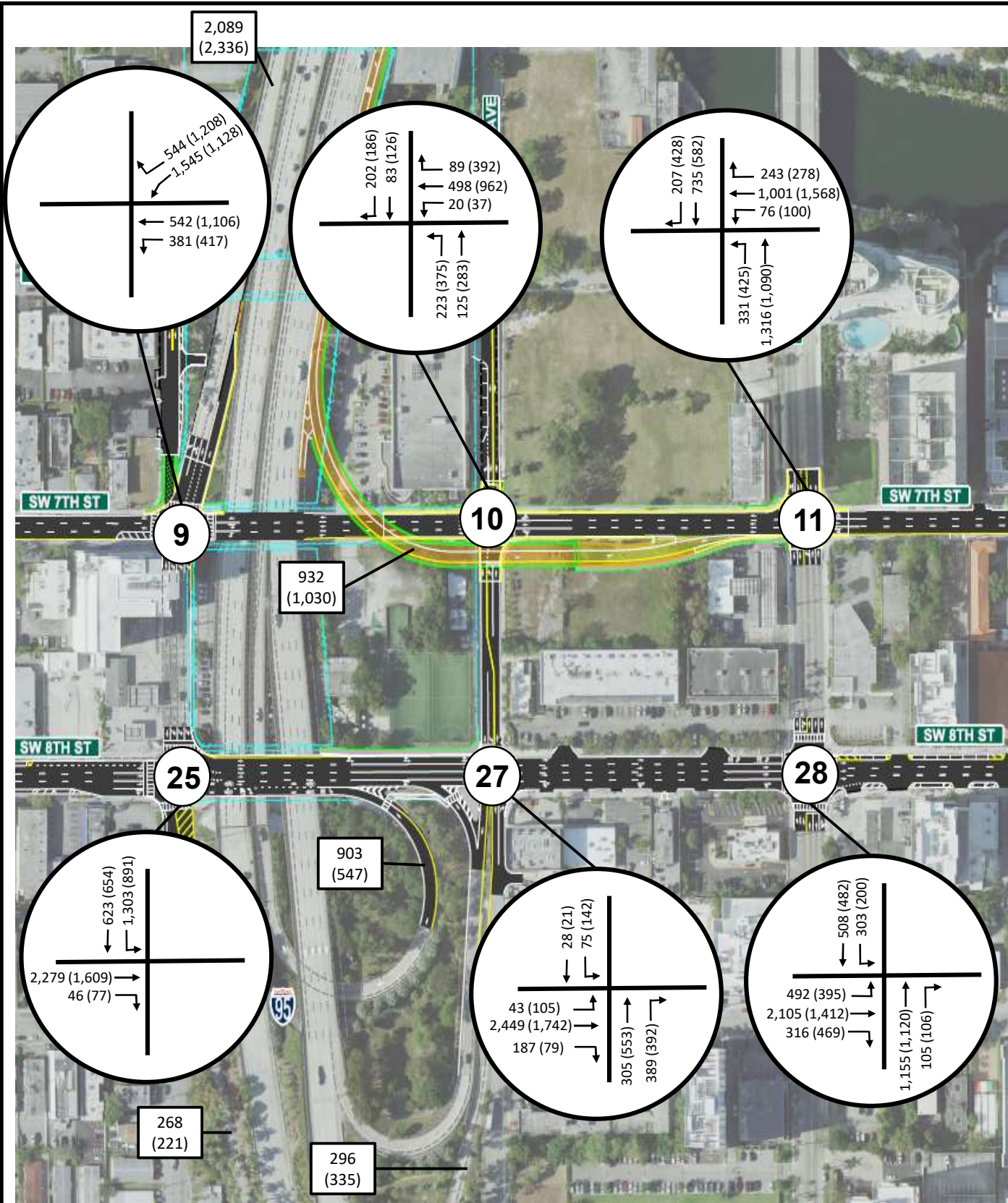




Signalized



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7.2 Level of Service Analysis for I-95 Interchange Alternatives

LOS analyses were conducted for each alternative interchange concept to evaluate and compare the expected traffic operating conditions in the design year 2045. LOS analyses were based on the HCM 2010 procedures consistent with the methodology described under Section 2 of the IMR. Intersections were analyzed using Synchro software and freeway segments were evaluated using HCS software. The scope of the analyses included the I-95 freeway segments (mainline, merge, diverge and weaving segments) and operations at the intersections along SR 90/SW 8th Street/SW 7th Street that would be directly impacted by the proposed design modifications. These intersections include:

- SW 8th Street at SW 4th Avenue
- SW 8th Street at SW 3rd Avenue
- SW 8th Street at SW 2nd Avenue
- SW 7th Street at SW 4th Avenue
- SW 7th Street at SW 3rd Avenue
- SW 7th Street at SW 2nd Avenue

Operations analyses for all build alternatives assumed traffic flows per the No Build traffic forecast with traffic volumes reassigned, as necessary, to match each design concept. The resulting traffic volume assignments are depicted in **Figures 7.1** through **7.6** for each of the build alternatives.

Similar to the analysis performed for the No Build Alternative, the HCM analyses for the Build Alternatives required simplified geometric assumptions along the mainline for the evaluating the complex weaving segment between the NB on-ramp from SW 8th Street and the NB off-ramps to US 1 and NW 2nd Avenue. The simplified geometric assumptions were as follows:

- Two sided weave from SW 8th Street On-Ramp to US 1 Off-Ramp per Alternative B1 and B2. For this analysis, traffic using the SW 7th Street intermediate on-ramp was assumed to enter the I-95 mainline south of SW 8th Street. In this assumption, traffic using SW 7th Street on-ramp is added to the freeway to freeway volume.
- Two sided weave from SW 8th Street On-Ramp to NW 2nd Street Off-Ramp per Alternative B1 and B2. For this analysis, a simplified network is assumed which excludes the intermediate SW 7th

Street On-ramp and US-1 Off-ramp. Traffic that would otherwise use these ramps is assumed to be part of the I-95 mainline freeway to freeway traffic. Following this assumption, traffic volumes associated with the intermediate SW 7th Street On-ramp was assumed to enter the I-95 mainline south of SW 8th Street. Similarly, traffic volumes associated with the intermediate US 1 Off-ramp was assumed to continue north on I-95 mainline, beyond NW 2nd Avenue On-Ramp. These added freeway to freeway volumes are reflected in the simplified network assumed for the analysis.

The HCS analyses further assumed that for Build Alternatives B-1, B-2, and B-5 (incorporating the proposed new on-ramp from 7th Street) there would be a reduction (approximately 50% assumed) in the two-sided weave movements from SW 8th Street on-ramp to US 1 off-ramp and from SW 8th Street on-ramp to NW 2nd Avenue off-ramp. This reduction in the two sided weave movement is reasonable given that the new NB on-ramp from SW 7th Street would provide an alternative route for accomplishing this movement. Furthermore, with the new on-ramp, none of the traffic originating from SW 7th Street would be required to perform this two-sided weave movement, whereas, in the No Build Alternative the two sided weave movement includes traffic originating from both SW 8th Street and SW 7th Street.

For alternatives B-5 and B-6 it is assumed that traffic using the turbo lane would consist only a portion of the traffic making movement from SB I-95 to EB SW 8th Street. The proportion using the turbo lane was estimated at approximately 50% in the AM peak and 75% in the PM peak. These estimates were developed following an incremental iterative LOS assessment process to minimize queues and delays on the I-95 SB Off-Ramp.

Detailed results from the interchange LOS analyses are presented under **Appendix H**. Results for I-95 segments are summarized in **Figures 7.7** through **7.12** and results for the intersection LOS analyses are summarized in **Tables 7.1** through **7.6**. Findings from the LOS analyses are discussed below.

I-95 Interchange Alternative B1:

- **Freeway Operations (Figure 7.8):** Alternative B1 provides the best operating conditions along NB and SB I-95 (matches Alternative B2). The analyses indicate that the implementation of Alternative B-1 will result in no failing (LOS F) freeway segments along NB or SB I-95. However, some segments of I-95 mainline are expected to operate below the desired LOS D target. These include:
 - NB I-95, north of on-ramp from SW 25th Road (LOSE – AM peak)
 - NB I-95 at off-ramp to SW 8th Street (LOS E – AM peak)
 - NB I-95 north of on-ramp from SW 8th Street – weaving segment (LOS E – AM peak). This weaving segment performs better than the No Build as the new on-ramp from SW 7th Street generates a decrease in the two-sided weave movements (from SW 8th Street on-ramp to US 1 off-ramp and from SW 8th Street on-ramp to NW 2nd Street off-ramp).
 - NB I-95 north of off-ramp to NW 2nd Street (LOS E – AM peak)
 - SB I-95 at off-ramp to SW 7th Street (LOS E/E – AM/PM peak)
- **Intersection Operations (Table 7.1):** Alternative B1 provides substantially better overall operating conditions at the impacted intersections, when compared to No Build, as the proposed flyovers displace traffic from the critical intersections in the network. Nonetheless, some intersections are expected to operate below the desired LOS E target, due to the high traffic demand. The analyses indicate that during the AM and PM peak periods, Alternative B1 will generate operating conditions below LOS E at the following intersections:
 - SW 8th Street at SW 2nd Avenue (LOS F – AM peak)
 - SW 7th Street at SW 2nd Avenue (LOS F – PM peak)
 - SW 7th Street at SW 4th Avenue/I-95 SB Off-Ramp (LOS F – PM peak)

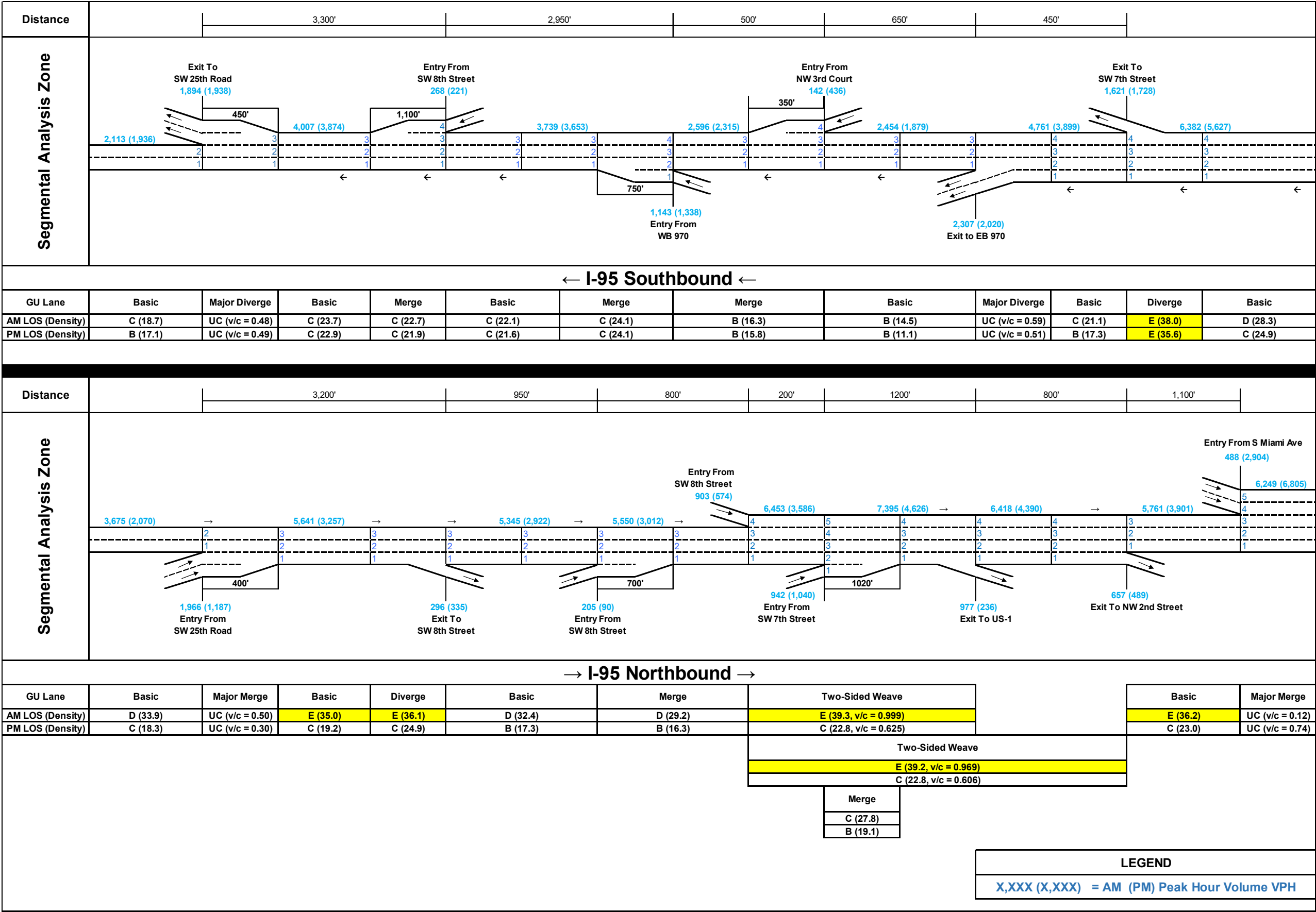


Table 7.1: I-95 Interchange Alternative B-1 - 2045 Intersection LOS Analysis

Intersection	AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SW 8 th Street & SW 4 th Ave	52.2	D	52.1	D
SW 8 th Street & SW 3 rd Ave*	15.3	B	16.0	B
SW 8 th Street & SW 2 nd Ave*	112.3	F	56.5	E
SW 7 th Street & SW 2 nd Ave	28.9	C	105.8	F
SW 7 th Street & SW 3 rd Ave	31.6	C	42.1	D
SW 7 th Street & SW 4 th Ave/I-95 SB Off-Ramp*	35.8	D	100.5	F

*LOS was calculated using the HCM 2000 methodology

I-95 Interchange Alternative B2:

- Freeway Operations (Figure 7.9): Interchange Alternative B-2 matches Interchange Alternative B1 in the configuration and traffic flows along NB and SB I-95. Hence, traffic operations along I-95 under Alternative B2 matches the operations for Alternative B1. Similar to Alternative B1, none of the I-95 freeway segments are expected operate LOS F, however, some segments will operate below the desired LOS D target. These include:
 - NB I-95, north of on-ramp from SW 25th Road (LOS E – AM peak)
 - NB I-95 at off-ramp to SW 8th Street (LOS E – AM peak)
 - NB I-95 north of on-ramp from SW 8th Street – weaving segment (LOS E – AM peak)
 - NB I-95 north of off-ramp to NW 2nd Street (LOS E – AM peak)
 - SB I-95 at off-ramp to SW 7th Street (LOS E/E – AM/PM peak)

- Intersection Operations (Table 7.2): The analyses indicate that Alternative B-2 will generate operating conditions below the desired LOS E target at the following intersections, during the AM and/or PM peak periods:
 - SW 8th Street at SW 2nd Avenue (LOS F/F – AM/PM peak)
 - SW 7th Street at SW 2nd Avenue (LOS F – PM peak)
 - SW 7th Street at SW 4th Avenue/I-95 SB Off-Ramp (LOS F – PM peak)

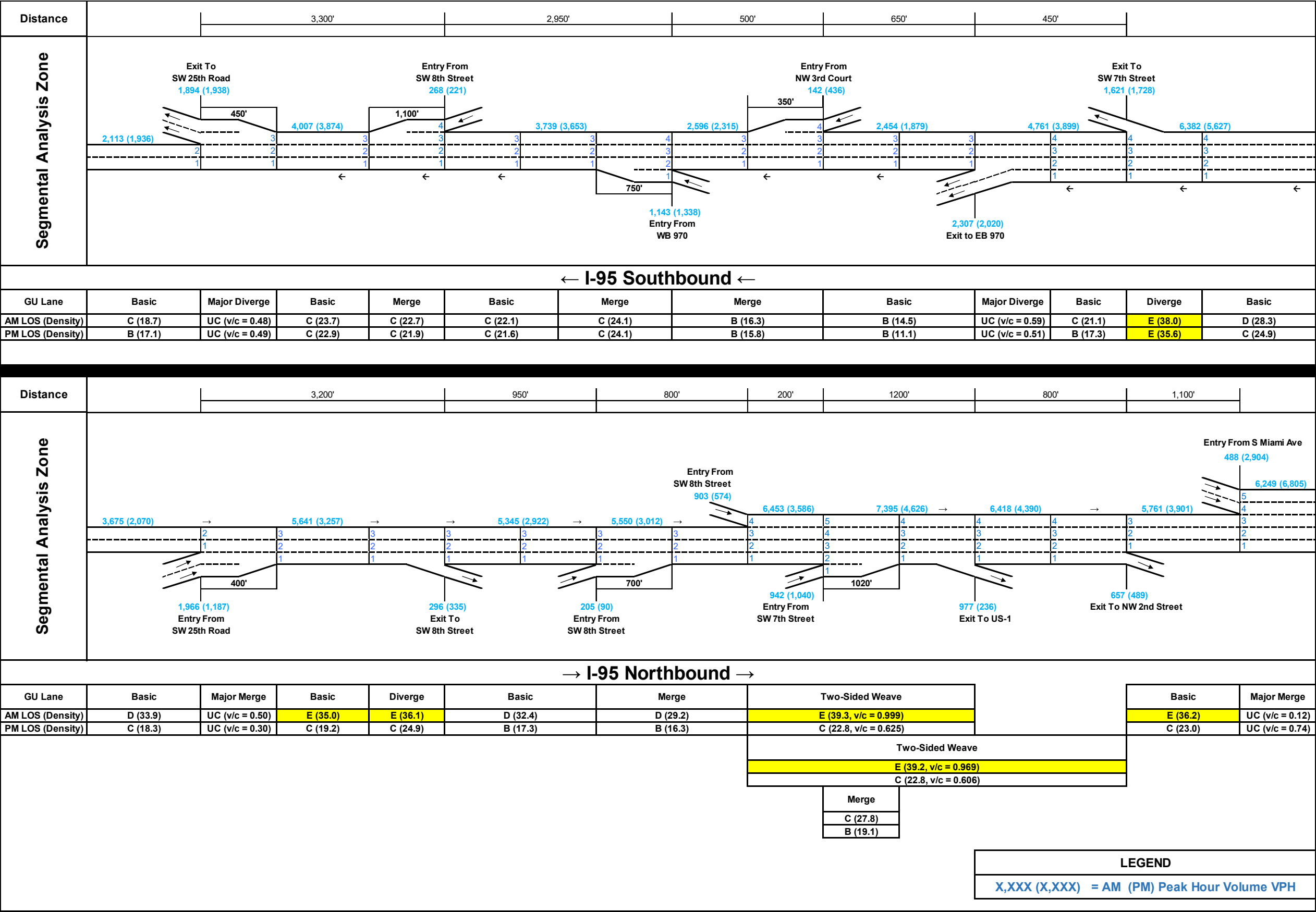


Table 7.2: I-95 Interchange Alternative B-2 - 2045 Intersection LOS Analysis

Intersection	AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SW 8 th Street & SW 4 th Ave	49.7	D	48.6	D
SW 8 th Street & SW 3 rd Ave*	39.8	D	42.1	D
SW 8 th Street & SW 2 nd Ave*	158.6	F	82.0	F
SW 7 th Street & SW 2 nd Ave	27.1	C	104.7	F
SW 7 th Street & SW 3 rd Ave	31.5	C	41.9	D
SW 7 th Street & SW 4 th Ave/I-95 SB Off-Ramp*	59.0	E	171.1	F

*LOS was calculated using the HCM 2000 methodology

I-95 Interchange Alternative B-3:

- Freeway Operations (Figure 7.10): Interchange Alternative B-3 matches the No Build Alternative in the configuration and traffic flows along NB and SB I-95. Hence, traffic operations along I-95 under Alternative B3 matches the operations for the No Build. Similar to the No Build Alternative, the following segments along I-95 will experience operating conditions below the desired LOS D target:
 - NB I-95, north of on-ramp from SW 25th Road (LOS E – AM peak)
 - NB I-95 at off-ramp to SW 8th Street (LOS E – AM peak)
 - NB I-95 north of on-ramp from SW 8th Street – weaving segment (LOS F – AM peak).
 - NB I-95 north of off-ramp to NW 2nd Street (LOS E – AM peak)
 - SB I-95 at off-ramp to SW 7th Street (LOS E/E – AM/PM peak)

- Intersection Operations (Table 7.3): The analyses indicate that Alternative B-3 will generate operating conditions below the desired LOS E target at the following intersections, during the AM and/or PM peak periods:
 - SW 8th Street at SW 2nd Avenue (LOS F – AM peak)
 - SW 7th Street at SW 2nd Avenue (LOS F – PM peak)
 - SW 7th Street at SW 4th Avenue/I-95 SB Off-Ramp (LOS F – PM peak)

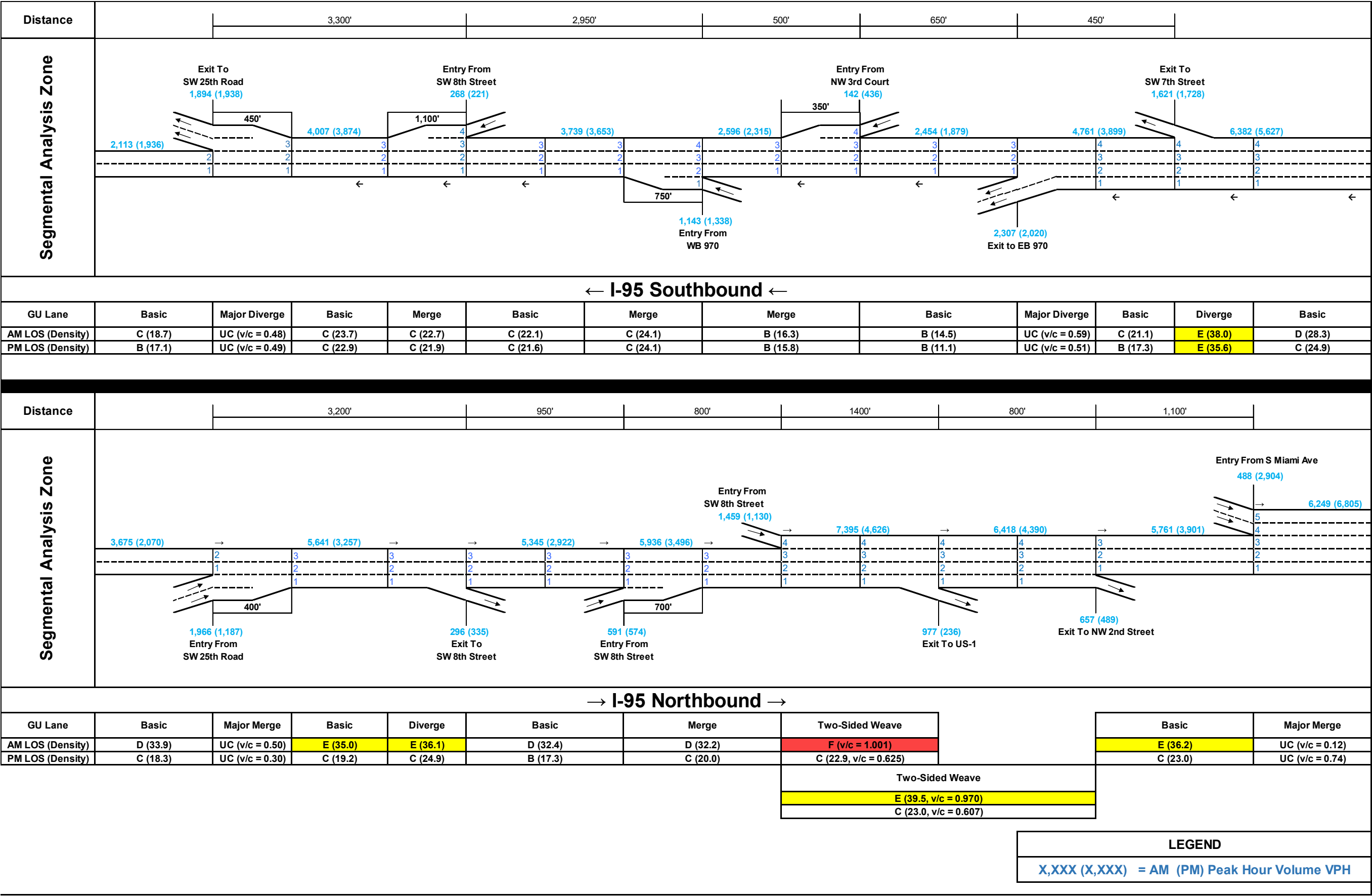


Table 7.3: I-95 Interchange Alternative B-3 - 2045 Intersection LOS Analysis

Intersection	AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SW 8 th Street & SW 4 th Ave	50.2	D	48.9	D
SW 8 th Street & SW 3 rd Ave*	27.0	C	19.9	B
SW 8 th Street & SW 2 nd Ave*	109.1	F	52.3	D
SW 7 th street & SW 2 nd Ave	28.9	C	105.8	F
SW 7 th Street & SW 3 rd Ave	33.5	C	56.2	E
SW 7 th Street & SW 4 th Ave/I-95 SB Off-Ramp*	38.5	D	120.5	F

*LOS was calculated using the HCM 2000 methodology

I-95 Interchange Alternative B-4:

- **Freeway Operations (Figure 7.11):** Interchange Alternative B-4 matches the No Build Alternative in the configuration and traffic flows along SB I-95. Hence, traffic operations along SB I-95 under Alternative B-4 matches the operations for the No Build. In the case of NB I-95, this alternative generates additional traffic on the SW 8th Street on-ramp (right hand). This results in adverse traffic operating conditions at SW 8th Street NB on-ramp, which does not occur in the No Build or other Build Alternatives. The HCS analyses indicate that the following segments of I-95 will experience operating conditions below the desired LOS D target:
 - NB I-95, north of on-ramp from SW 25th Road (LOSE – AM peak)
 - NB I-95 at off-ramp to SW 8th Street (LOS E – AM peak)
 - NB I-95 on-ramp (right hand ramp) from SW 8th Street - (LOS F in AM peak)
 - NB I-95 north of on-ramp from SW 8th Street – weaving segment (LOS F – AM peak).
 - NB I-95 north of off-ramp to NW 2nd Street (LOS E – AM peak)
 - SB I-95 at off-ramp to SW 7th Street (LOS E/E – AM/PM peak)
- **Intersection Operations (Table 7.4):** The analyses indicate that Alternative B-4 will generate operating conditions below the desired LOS E target at the following intersections, during the AM and/or PM peak periods:
 - SW 8th Street at SW 2nd Avenue (LOS F/F – AM/PM peak)
 - SW 7th Street at SW 2nd Avenue (LOS F – PM peak)
 - SW 7th Street at SW 4th Avenue/I-95 SB Off-Ramp (LOS F – PM peak)

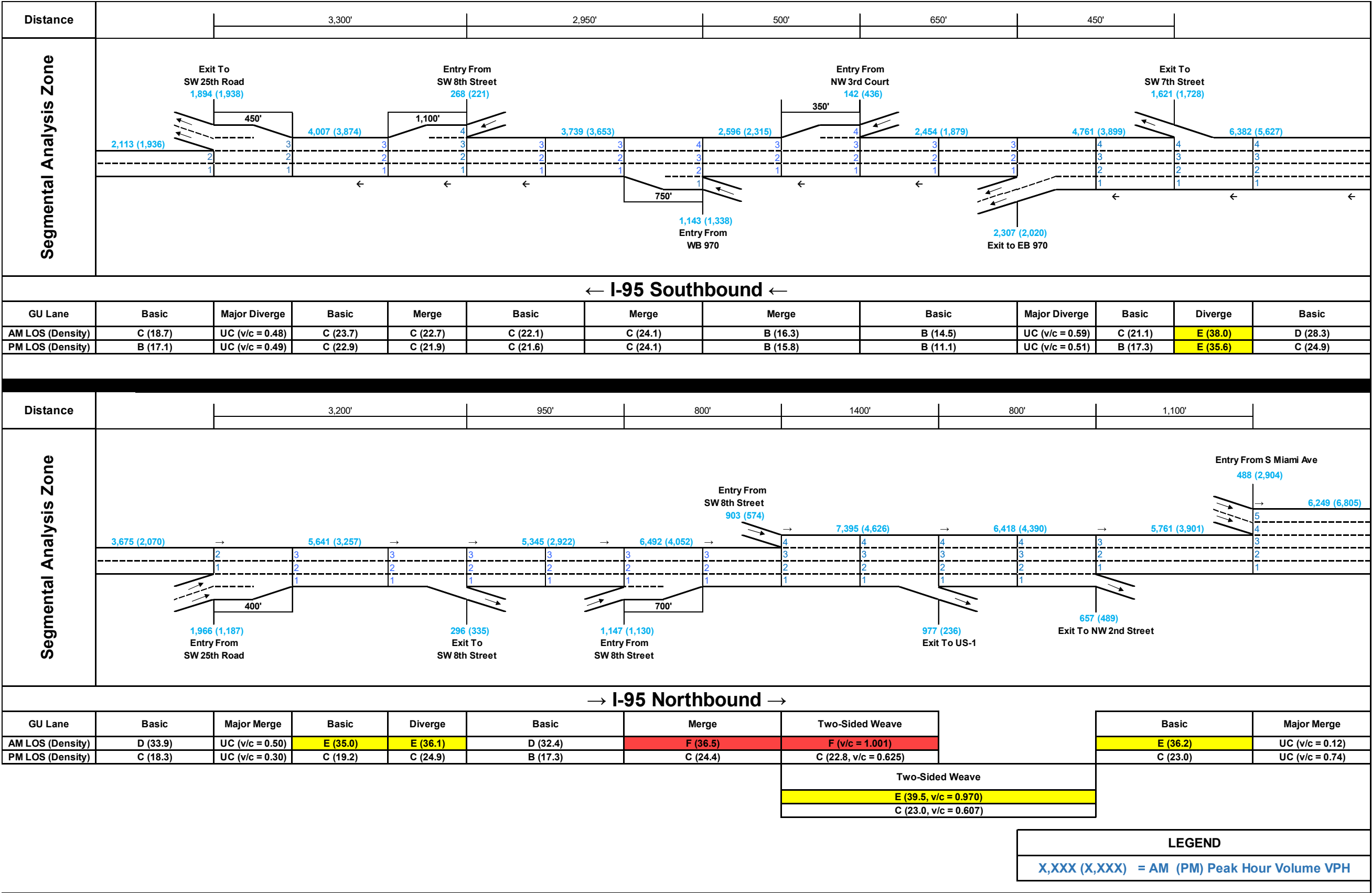


Table 7.4: I-95 Interchange Alternative B-4 - 2045 Intersection LOS Analysis

Intersection	AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SW 8 th Street & SW 4 th Ave	49.7	D	48.6	D
SW 8 th Street & SW 3 rd Ave*	65.0	E	35.6	C
SW 8 th Street & SW 2 nd Ave*	204.8	F	153.8	F
SW 7 th Street & SW 2 nd Ave	62.4	E	170.1	F
SW 7 th Street & SW 3 rd Ave**	-	-	-	-
SW 7 th Street & SW 4 th Ave/I-95 SB Off-Ramp*	55.9	E	169.9	F

*LOS was calculated using the HCM 2000 methodology

**Unsignalized intersection

I-95 Interchange Alternative B-5:

- Freeway Operations (Figure 7.12): Interchange Alternative B-5 matches Interchange Alternative B-2 in the configuration and traffic flows along NB and SB I-95. Hence, traffic operations along I-95 under Alternative B-5 matches the operations for Alternative B-2. Similar to Alternative B2, none of the I-95 freeway segments are expected operate at LOS F, however, some segments will operate below the desired LOS D target. These include:
 - NB I-95, north of on-ramp from SW 25th Road (LOS E – AM peak)
 - NB I-95 at off-ramp to SW 8th Street (LOS E – AM peak)
 - NB I-95 north of on-ramp from SW 8th Street – weaving segment (LOS E – AM peak)
 - NB I-95 north of off-ramp to NW 2nd Street (LOS E – AM peak)
 - SB I-95 at off-ramp to SW 7th Street (LOS E/E – AM/PM peak)

- Intersection Operations (Table 7.5): The analyses indicate that Alternative B-5 will generate operating conditions below the desired LOS E target at the following intersections, during the AM and/or PM peak periods:
 - SW 8th Street at SW 2nd Avenue (LOS F/F – AM/PM peak)
 - SW 7th Street at SW 2nd Avenue (LOS F – PM peak)
 - SW 7th Street at SW 4th Avenue/I-95 SB Off-Ramp (LOS F – PM peak)

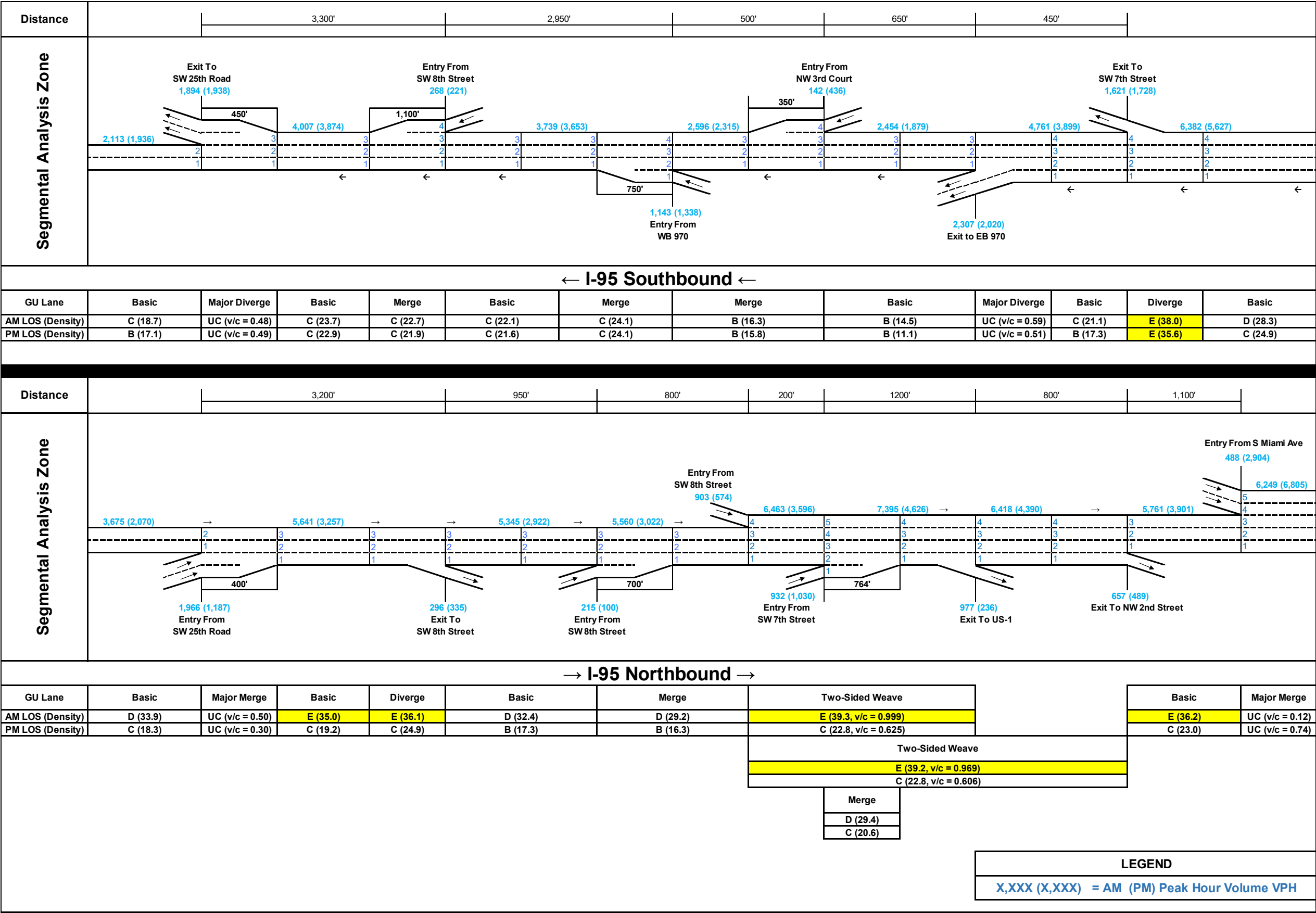


Table 7.5: I-95 Interchange Alternative B-5 - 2045 Intersection LOS Analysis

Intersection	AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SW 8 th Street & SW 4 th Ave	50.0	D	50.2	D
SW 8 th Street & SW 3 rd Ave*	25.8	C	27.1	C
SW 8 th Street & SW 2 nd Ave*	171.5	F	95.6	F
SW 7 th Street & SW 2 nd Ave	31.1	C	128.6	F
SW 7 th Street & SW 3 rd Ave	29.5	C	34.5	C
SW 7 th Street & SW 4 th Ave/I-95 SB Off-Ramp*	36.7	D	102.4	F

*LOS was calculated using the HCM 2000 methodology

I-95 Interchange Alternative B-6:

- Freeway Operations (Figure 7.13): Interchange Alternative B-6 matches Alternative B-4 in the configuration and traffic flows along NB and SB I-95. Hence, traffic operations along I-95 under Alternative B-6 matches the operations for Alternative B-4. Similar to Alternative B-4, this alternative generates adverse traffic operating conditions at SW 8th Street NB I-95 on-ramp, which does not occur in the No Build or other Build Alternatives. The HCS analyses indicate that the following segments of I-95 will experience operating conditions below the desired LOS D target:
 - NB I-95, north of on-ramp from SW 25th Road (LOS E – AM peak)
 - NB I-95 at off-ramp to SW 8th Street (LOS E – AM peak)
 - NB I-95 on-ramp (right hand ramp) from SW 8th Street - (LOS F in AM peak)
 - NB I-95 north of on-ramp from SW 8th Street – weaving segment (LOS F – AM peak).
 - NB I-95 north of off-ramp to NW 2nd Street (LOS E – AM peak)
 - SB I-95 at off-ramp to SW 7th Street (LOS E/E – AM/PM peak)
- Intersection Operations (Table 7.6): The analyses indicate that Alternative B-6 will generate operating conditions below the desired LOS E target at the following intersections, during the AM and/or PM peak periods:
 - SW 8th Street at SW 3rd Avenue (LOS F/F – AM/PM peak)
 - SW 8th Street at SW 2nd Avenue (LOS F/F – AM/PM peak)
 - SW 7th Street at SW 2nd Avenue (LOS F – PM peak)
 - SW 7th Street at SW 4th Avenue/I-95 SB Off-Ramp (LOS F – PM peak)

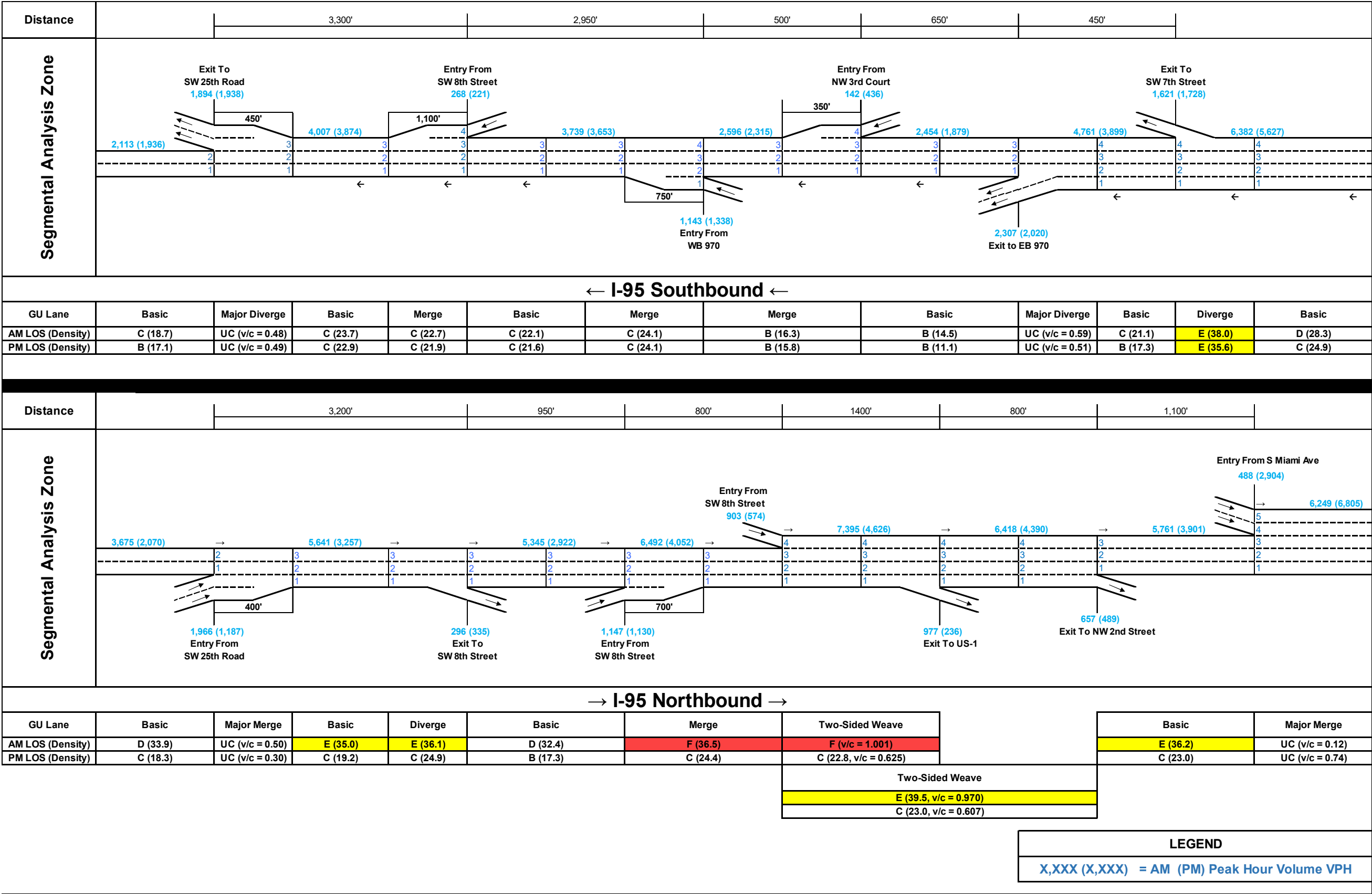


Table 7.6: I-95 Interchange Alternative B-6 - 2045 Intersection LOS Analysis

Intersection	AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SW 8 th Street & SW 4 th Ave	50.0	D	50.2	D
SW 8 th Street & SW 3 rd Ave*	108.7	F	80.0	F
SW 8 th Street & SW 2 nd Ave*	204.3	F	154.7	F
SW 7 th Street & SW 2 nd Ave	62.4	E	251.3	F
SW 7 th Street & SW 3 rd Ave**	-	-	-	-
SW 7 th Street & SW 4 th Ave/I-95 SB Off-Ramp*	35.0	C	101.3	F

*LOS was calculated using the HCM 2000 methodology

**Unsignalized intersection

I-95 Interchange Alternative B-7:

- **Freeway Operations (Figure 7.14):** Interchange Alternative B-7 matches Interchange Alternative B-5 in the configuration and traffic flows along NB and SB I-95. Hence, traffic operations along I-95 under Alternative B-7 matches the operations for Alternative B-5. Similar to Alternative B-5, none of the I-95 freeway segments are expected to operate LOS F, however, some segments will operate below the desired LOS D target. These include:
 - NB I-95, north of on-ramp from SW 25th Road (LOS E – AM peak)
 - NB I-95 at off-ramp to SW 8th Street (LOS E – AM peak)
 - NB I-95 north of on-ramp from SW 8th Street – weaving segment (LOS E – AM peak)
 - NB I-95 north of off-ramp to NW 2nd Street (LOS E – AM peak)
 - SB I-95 at off-ramp to SW 7th Street (LOS E/E – AM/PM peak)
- **Intersection Operations (Table 7.7):** The analyses indicate that Alternative B-7 will generate operating conditions below the desired LOS E target at the following intersections, during the AM and/or PM peak periods:
 - SW 8th Street at SW 2nd Avenue (LOS F AM peak)
 - SW 7th Street at SW 2nd Avenue (LOS F PM peak)

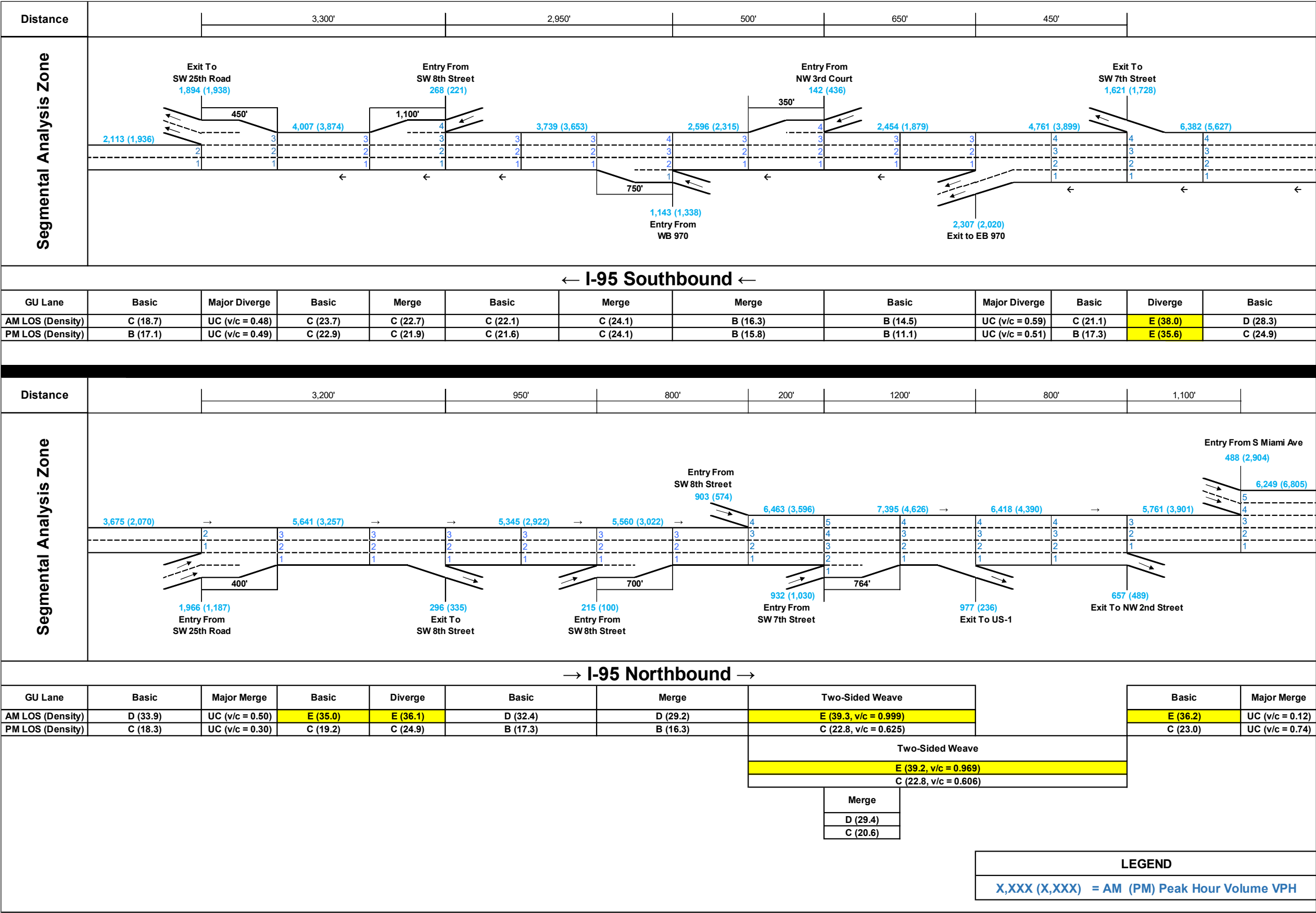


Table 7.7: I-95 Interchange Alternative B-7 - 2045 Intersection LOS Analysis

Intersection	AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SW 8 th Street & SW 4 th Ave	43.6	D	40.8	D
SW 8 th Street & SW 3 rd Ave	34.3	C	40.4	D
SW 8 th Street & SW 2 nd Ave*	101.2	F	50.8	D
SW 7 th Street & SW 2 nd Ave	28.9	C	105.8	F
SW 7 th Street & SW 3 rd Ave	28.0	C	31.0	C
SW 7 th Street & SW 4 th Ave/I-95 SB Off-Ramp*	24.2	C	47.9	D

*LOS was calculated using the HCM 2000 methodology

7.3 Evaluation of I-95 Interchange Alternatives

The I-95 interchange alternatives were screened in an evaluation matrix considering several performance criteria including: safety, traffic operations, environmental impacts, social impacts, right of way, and construction cost. Each alternative was assigned a relative ranking based on the collective assessment of various professionals from the project team and input gained from the public outreach conducted during the PD&E process. The No Build Alternative was used as a benchmark for assessing the positive or negative impacts of each alternative. The ranking assigned to each alternative ranged from a low of -3 to a high of +3. A ranking of -3 was applied to indicate that the alternative performs substantially worse than the No Build Alternative for the specified performance measure. A ranking of +3 was applied to indicate that the alternative performs substantially better than the No Build Alternative for the specified performance measure. A Recommended Alternative was determined based on the assigned rankings across all performance criteria. The resulting evaluation matrix is shown in **Table 7.8**.

As discussed under the section 7.1 of the IMR, in design reviews performed by FDOT and the project team it was determined that the proposed flyover for the SB I-95 to EB SW 8th Street could not meet acceptable design criteria for vertical alignment and design speed. Based on this determination, Alternative B-1 and Alternative B-3 were assessed to be fatally flawed and discarded. Similarly, following discussions with FDOT, Alternative B-5 was discarded because of safety concerns related to the operations of the proposed turbo lane. It was determined that the turbo lane could increase the risk of crashes at the intersection of I-95 Southbound Off-Ramp and SW 7th Street, due to the potential for erratic lane change maneuvers at the entry to the turbo lane. The turbo lane also increases the crash risk at SW 8th Street and SW 3rd Avenue due to potential for erratic lane change maneuvers near the exit to the turbo lane.

Based on the assessment presented in the evaluation matrix (**Table 7.8**), Build Alternative B-7 was determined to be the highest ranked design concept for the study location and the Recommended Alternative for moving forward.

Table 7.8: Alternatives Evaluation Matrix

CATEGORY	CRITERIA	NO BUILD	I-95 INTERCHANGE BUILD ALTERNATIVES				COMMENTS
			B-2	B-4	B-6	B-7	
Safety and Traffic Operations	Fully addresses Project Purpose and Need	0	2	-3	-2	3	B-7 addresses safety and operational concerns. B-4 and B-6 impact I-95 operations.
	Addresses all major traffic movements at interchange	0	2	-3	-2	3	B-7 provides most traffic congestion relief at critical intersections. B-4 and B-6 impact I-95.
	Satisfies the LOS Criteria through the Design Year	0	2	-3	-2	3	B-7 provides most traffic congestion relief at critical intersections. B-4 and B-6 impact I-95
	Improves Roadway / Interchange Operation / Safety	0	2	-3	-2	3	B-7 minimizes conflicts at intersections and reduces queuing on I-95. B-4 and B-6 impact I-95
Environmental and Social	Social and Economic Environment (religious centers, schools, social services, group care facilities)	0	0	0	0	0	Build Alternatives have no anticipated social impacts
	Cultural Environment (Section 4f, historic, archeological, recreational sites)	0	0	0	0	0	Build Alternatives have no anticipated cultural impacts
	Natural Environment (wetlands, protected species and habitat)	0	-1	0	0	-1	WB to NB Flyover in B-2 and B-7 may impact listed species and additional storm water runoff may impact water quality.
	Physical Environment (parking, pedestrians, air/water quality, contamination, utility)	0	-1	0	0	-1	B-2 and B-7 impact parking.
Project Cost	Construction (Cost)	0	-2	0	-1	-3	B-7 most costly with flyover
	Right-of-way Cost	0	-2	0	-1	-3	B-7 and B-2 impact Publix Supermarket on SW 7 th Street
Total All Categories		0	2	-12	-10	4	B-7 highest ranked alternative

Notes:

1. Relative ranking of design alternative ranges from -3 (worst of all alternatives) to +3 (best of all alternatives).
2. Alternatives B-1 and B-3 are excluded from evaluation matrix as they are fatally flawed due to inadequate vertical alignment of proposed SB I-95 to EB SW 8th Street flyover. Alternative B-7 discarded due to increase safety concerns associated with the operations of the proposed turbo lane.

8.0 RECOMMENDED ALTERNATIVE

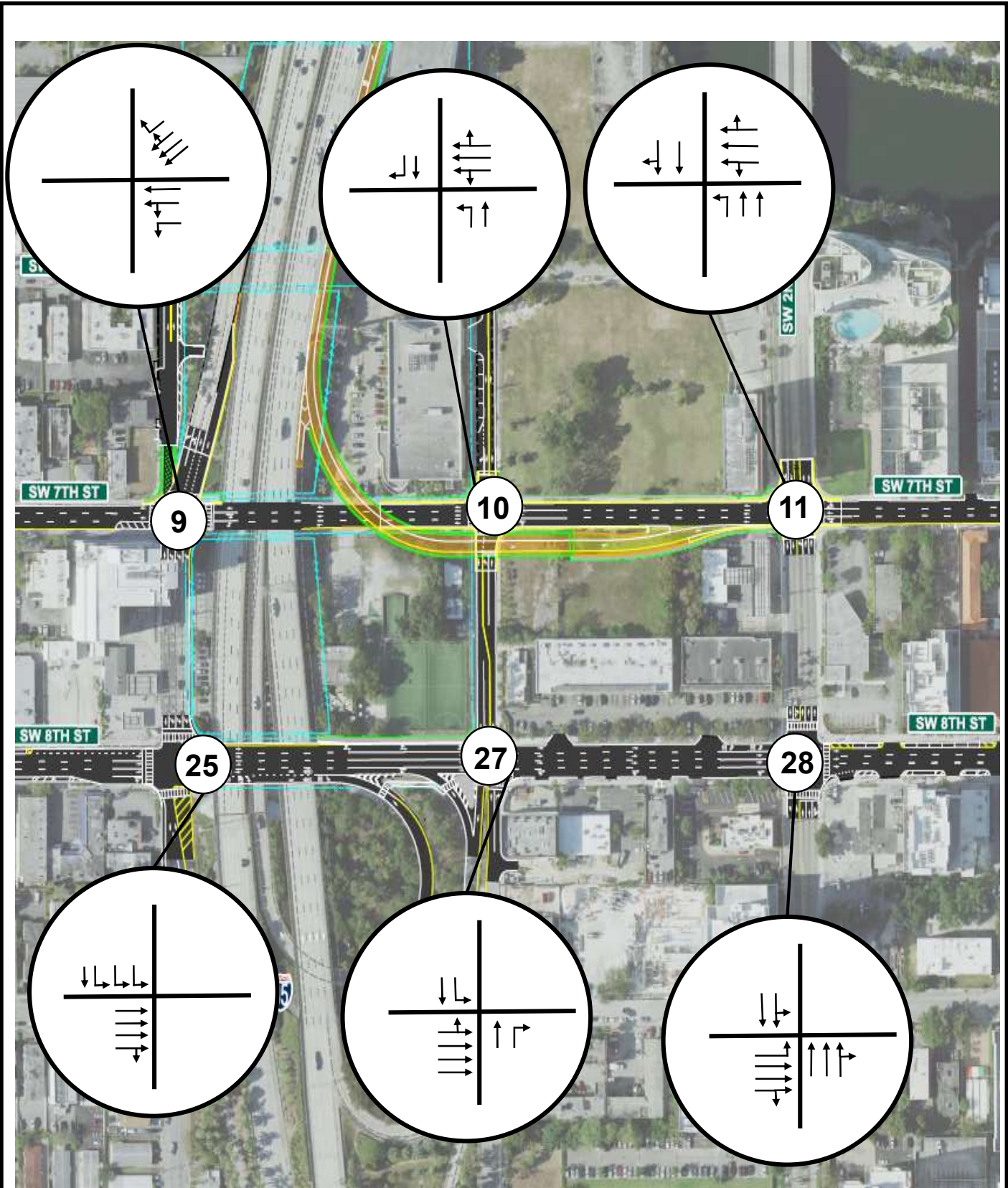
8.1 Recommended Alternative - Road Network

Based on the analyses presented in the preceding sections of the report, Interchange Alternative B-7 was determined to be the Recommended Alternative for the study. The Recommended Alternative incorporates modifications to the I-95 at SR 90/SW 8th Street/SW 7th Street interchange, as well as modifications to adjacent intersections to optimize safety and traffic operations at the interchange. The interchange modifications are also consistent with the recommended future configuration for SW 8th Street and SW 7th Street, as determined from the analyses and public outreach performed during the PD&E Study. SW 4th Avenue is proposed to be closed at its intersection with SW 7th Street and additional traffic flow modifications are recommended to facilitate this street closure. The Recommended Alternative is illustrated in **Figure 8.1** (I-95 Interchange Alternative B-7) under Section 7 of the report. It incorporates the following:

- SW 8th Street is maintained three lanes one-way eastbound per existing condition.
- SW 7th Street is maintained three lanes one-way westbound per existing condition.
- Proposed new flyover ramp for accommodating movements from westbound SW 7th Street to NB I-95. The proposed WB to NB ramp elevates above SW 7th Street/SW 3rd Avenue Intersection and it introduces a new connection (on-ramp) to NB I-95.
- Close SW 4th Avenue at its intersection with SW 7th Street and I-95 Southbound Off-Ramp. The proposed road closure will prohibit all vehicular traffic movements from SW 4th Avenue, at the intersection.
- Convert the segment of SW 4th Avenue between SW 7th Street and SW 6th Street from one-way southbound to two-way traffic flow. A turn-around facility is also proposed to facilitate traffic circulation and access within this segment of SW 4th Avenue.
- Widen I-95 SB Off-Ramp to provide one additional southbound through lane at the intersection with SW 7th Street. This additional through lane will further increase the capacity of the terminal intersection.
- Convert the segment of SW 3rd Avenue between SW 7th Street and SW 6th Street from one-way northbound to two-way traffic flow. This modification will create one northbound through lane and one new southbound through lane within the segment. This traffic flow modification will facilitate the rerouting of traffic for accessing EB SW 8th Street and the I-95 NB and SB ramps.

- Modification of signal timings to accommodate changes in intersection geometry and traffic volumes due to rerouting of traffic. Notably, signal operation plans at the following intersections will be modified:
 - SW 4th Avenue at Southwest 7th Street and I-95 SB Off-Ramp: Signal operation plan will be changed from 3-phase operation to 2-phase operation (serving SW 7th Street and I-95 SB Off-Ramp).
 - SW 3rd Avenue at SW 7th Street: Signal operation plan will be changed from 2-phase operation to 3-phase operation (serving NB SW 3rd Avenue, SB SW 3rd Avenue and WB SW 7th Street).

The proposed closure of SW 4th Avenue at SW 7th Street is being coordinated with the City of Miami and Miami-Dade County, Department of Transportation and Public Works (DTPW). In accordance with the County's procedures, FDOT District Six submitted a request for the street closure along with a supporting traffic study. At the time of this writing, both the County and City of Miami have indicated their support for the proposed street closure. Other key stakeholders have also offered no objections to the proposed street closure – these include the City's Police, Fire Rescue and Solid Waste departments. Notwithstanding, per the City of Miami Policy, a formal resolution approving the street closure will not be issued until the project advances to design and construction is forthcoming.



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8.2 Recommended Alternative – Opening Year (2025) LOS Analysis

LOS analyses were conducted to evaluate the performance of the Recommended Alternative in the anticipated opening year 2025. The analyses were performed consistent with the methodology presented under Section 2 of the IMR. HCM 2010 Edition procedures were used for I-95 freeway segments analyses and Synchro 10 used for intersection analyses. Year 2025 peak hour volumes were estimated by reassigning the 2025 No Build Alternative traffic volumes to be consistent with the proposed I-95 Interchange modifications. **Figure 8.2** shows the Recommended Alternative network along with the estimated 2025 peak hour volumes used for the analyses. As noted under section 8.1, for study intersections located west of SW 4th Avenue and east of SW 2nd Avenue, the traffic flows and intersection geometries are consistent with the 2025 No Build Alternative (presented under Section 5 of the IMR). Results of the 2025 LOS analyses for the Recommended Alternative I-95 freeway segments are summarized in **Figure 8.3** and LOS for the intersections are summarized in **Table 8.1**. Detailed output sheets for the 2025 LOS analysis are contained under **Appendix H** (Build 4-1). Results of the 2025 LOS analyses are discussed below.

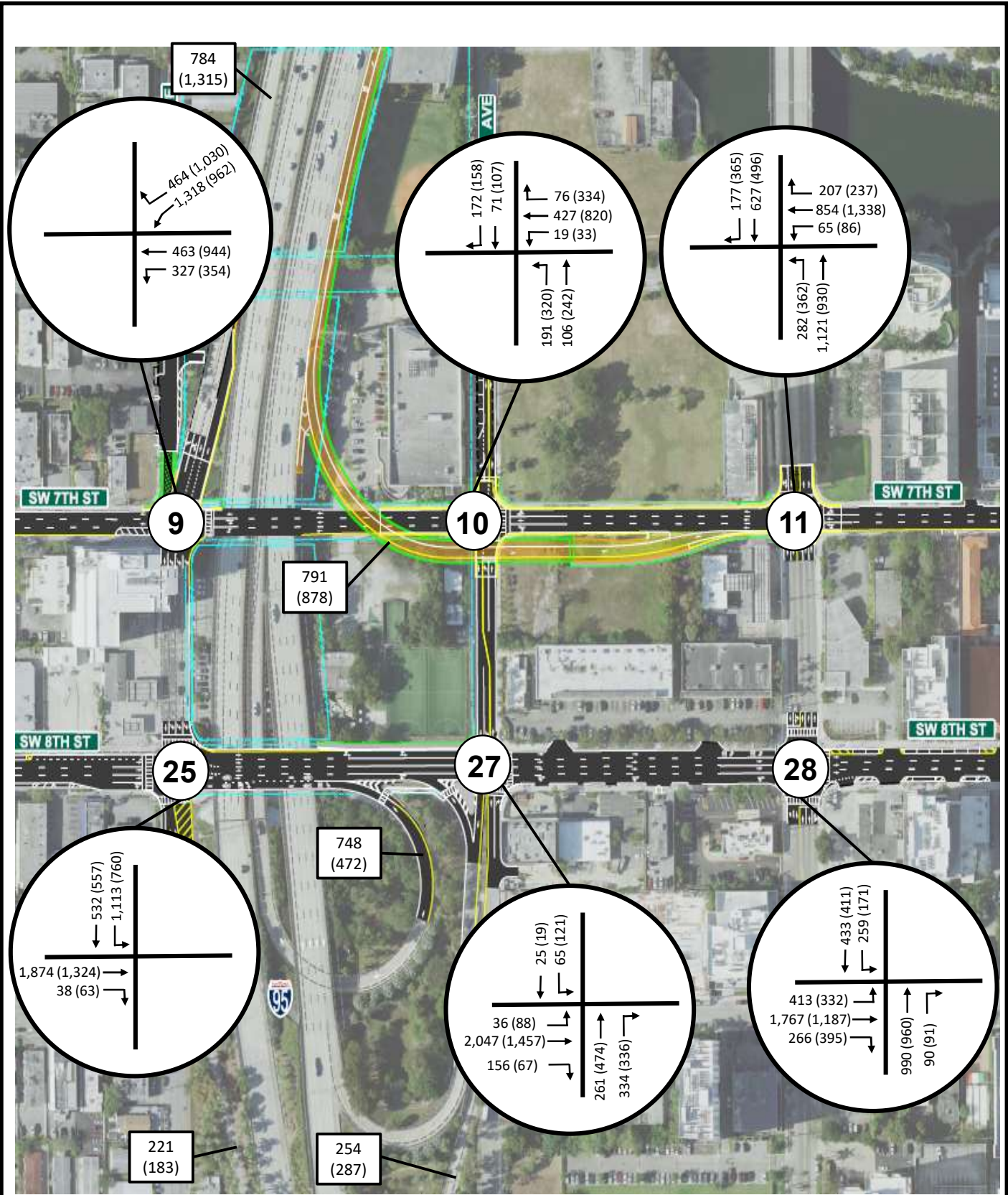
I-95 Traffic Operations: The results of the freeway analyses indicate that all segments of I-95 will operate at LOS D or better during the opening year (2025), AM and PM peak periods. These results are comparable to the 2025 No Build Alternative, 2025 traffic operations (reference **Figure 5.8** in the IMR).

SW 8th Street and SW 7th Street Traffic Operations: As depicted in **Table 8.1**, all intersections within the area of influence are expected to operate within the desired LOS E target or better during the opening year, AM and PM peak periods. This is an improvement over the No Build Alternative in which two intersections experienced failing conditions – SW 8th Street at 2nd Avenue and SW 7th Street at 4th Avenue (refer to **Table 5.1** in the IMR).

At the critical intersection of SW 7th Street at SW 4th Avenue/I-95 SB Off-Ramp, the Recommended Alternative performs at LOS C/LOS C in the AM/PM peaks. This is a substantial improvement when compared to the No Build which operates at LOS F/F in the AM/PM peaks. In addition, in the No Build

Alternative all movements at this intersection operate at LOS F whereas in the Recommended Alternative none of the intersection movements operate at LOS F.

The results of the LOS analysis indicate that the Recommended Alternative will provide overall better traffic operations when compared to the No Build Alternative, during opening year (2025).



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SR 90/SW 8th Street and
SW 7th Street PD&E Study

Recommended Alternative (B-7)
2025 Peak Hour Volumes

Figure 8.2

Table 8.1: Recommended Alternative (B-7) - 2025 Intersection Level of Service Analysis

Intersection	Appr.	Mvmt.	AM						Overall Intersection		PM					
			Approach				Approach				Approach				Overall Intersection	
			Volume	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Delay (sec/veh)	LOS	Volume	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Delay (sec/veh)	LOS
SW 8 th Street & SW 8 th Ave*	EB	LT	255	-	-	28.2	C	28.3	C	193	-	-	27.8	C	26.1	C
		TH	1309	28.2	C					1162	27.8	C				
		RT	52	-	-					25	-	-				
	NB	LT	0	-	-	32.9	C			0	-	-	32.4	C		
		TH	169	32.9	C					128	32.4	C				
		RT	50	-	-					36	-	-				
	SB	LT	154	-	-	25.3	C			122	-	-	13.2	B		
		TH	154	25.3	C					148	13.2	B				
		RT	0	-	-					0	-	-				
SW 8 th Street & SW 5 th Ave	EB	LT	87	34.4	C	35.2	D	39.3	D	200	34.1	C	34.2	C	39.0	D
		TH	1418	35.8	D					1081	34.4	C				
		RT	8	35.4	D					39	34.1	C				
	NB	LT	0	0.0	-	50.1	D			0	0.0	-	52.8	D		
		TH	80	0.0	-					151	0.0	-				
		RT	494	50.1	D					306	52.8	D				
SW 8 th Street & SW 4 th Ave	EB	LT	0	0.0	-	50.4	D	39.0	D	0	0.0	-	53.2	D	37.1	D
		TH	1874	49.3	D					1324	52.3	D				
		RT	38	53.4	D					63	55.8	E				
	SB	LT	1113	23.8	C	25.8	C			760	17.1	B	20.0	C		
		TH	532	29.9	C					557	24.0	C				
		RT	0	0.0	-					0	0.0	-				
SW 8 th Street & SW 3 rd Ave	EB	LT	36	32.9	C	27.9	C	28.8	C	88	39.3	D	35.0	D	32.4	C
		TH	2047	25.7	C					1457	33.2	C				
		RT	156	0.0	-					67	0.0	-				
	NB	LT	0	0.0	-	31.4	C			0	0.0	-	25.7	C		
		TH	261	27.9	C					474	26.6	C				
		RT	334	34.2	C					336	24.4	C				
	SB	LT	65	34.9	C	31.3	C			121	46.7	D	42.6	D		
		TH	25	22.0	C					19	16.5	B				
		RT	0	0.0	-					0	0.0	-				
SW 8 th Street & SW 2 nd Ave*	EB	LT	413	19.5	-	66.2	E	51.3	D	332	26.9	C	39.3	D	39.8	D
		TH	1767	75.7	E					1187	41.9	D				
		RT	266	-	-					395	-	-				
	NB	LT	0	-	-	29.2	C			0	-	-	30.4	C		
		TH	990	29.2	C					960	30.4	C				
		RT	90	-	-					91	-	-				
	SB	LT	259	-	-	33.4	C			171	-	-	58.6	E		
		TH	433	33.4	C					411	58.6	E				
		RT	0	-	-					0	-	-				
SW 8 th Street & SW 1 st Ave	EB	LT	0	0.0	-	19.9	B	37.6	D	0	0.0	-	48.2	D	51.0	D
		TH	1607	19.4	B					1093	47.9	D				
		RT	509	20.7	C					356	48.8	D				
	SB	LT	248	80.8	F	84.3	F			154	54.7	D	55.2	E		
		TH	556	88.0	F					794	55.8	E				
		RT	0	0.0	-					0	0.0	-				
SW 8 th Street & S Miami Ave	EB	LT	229	41.8	D	40.8	D	40.9	D	289	42.3	D	41.2	D	38.7	D
		TH	1626	40.3	D					958	40.7	D				
		RT	0	0.0	-					0	0.0	-				
	NB	LT	0	0.0	-	41.3	D			0	0.0	-	34.9	C		
		TH	660	40.2	D					758	34.3	C				
		RT	77	43.3	D					56	36.0	D				
SW 7 th Street & S Miami Ave*	WB	LT	0	-	-	28.6	C	16.3	B	0	-	-	28.9	C	24.3	C
		TH	607	28.6	C					1101	28.9	C				
		RT	68	-	-					124	-	-				
	NB	LT	309	4.2	A	6.9	A			475	19.4	B	18.9	B		
		TH	580	8.1	A					572	18.7	B				
		RT	0	-	-					0	-	-				
SW 7 th Street & SW 1 st Ave*	WB	LT	127	-	-	11.7	B	16.4	B	232	-	-	27.0	C	30.4	C
		TH	789	11.7	B					1344	27.0	C				
		RT	0	-	-					0	-	-				
	SB	LT	0	-	-	20.7	C			0	-	-	35.7	D		
		TH	677	20.5	C					716	35.7	D				
		RT	337	21.0	C					317	35.6	D				
SW 7 th Street & SW 2 nd Ave	WB	LT	65	63.0	E	60.0	E	42.0	D	86	84.1	F	74.2	E	67.1	E
		TH	854	58.2	E					1338	68.3	E				
		RT	207	58.4	E					237	68.5	E				
	NB	LT	282	46.3	D	24.1	C			362	77.7	F	22.8	C		
		TH	1121	18.5	B					930	1.4	A				
		RT	0	0.0	-					0	0.0	-				
	SB	LT	0	0.0	-	48.0	D			0	0.0	-	120.0	F		
		TH	627	47.8	D					496	118.9	F				
		RT	177	48.2	D					365	121.1	F				
SW 7 th Street & SW 3 rd Ave	WB	LT	19	9.5	A	9.5	A	27.9	C	33	25.8	C	25.2	C	24.6	C
		TH	427	9.4	A					820	24.7	C				
		RT	76	9.5	A					334	24.9	C				
	NB	LT	191	57.4	E	52.6	D			320	29.8	C	23.0	C		
		TH	106	43.9	D					242	14.0	B				
		RT	0	0.0	-					0	0.0	-				
	SB	LT	0	0.0	-	37.1	D			0	0.0	-	25.6	C		
		TH	71	34.2	C					107	24.7	C				
		RT	172	38.3	D					158	26.3	C				
SW 7 th Street & SW 4 th Ave/I-95 SB Off-Ramp*	WB	LT	327	30.2	C	29.6	C	29.9	C	354	23.8	C	28.9	C	31.5	C
		TH	463	29.4	C					944	30.5	C				
		RT	0	-	-					0	-	-				
	SWB	LT	1318	30.2	C	30.0	C			962	28.4	C	33.2	C		
		TH	-	-	-					-	-	-				
		RT	464	29.5	C					1030	47.2	D				
SW 7 th Street & SW 8 th Ave	WB	LT	53	33.5	C	32.7	C	20.7	C	62	35.3	D	32.5	C	29.7	C
		TH	807	32.2	C					1825	31.0	C				
		RT	56	32.1	C					98	30.8	C				
	NB	LT	72	1.4	A	1.4	A			106	15.0	B	15.0	B		
		TH	352	0.0	-					215	0.0	-				
		RT	0	0.0	-					0	0.0	-				
	SB	LT	0	0.0	-	12.3	B			0	0.0	-	26.5	C		
		TH	225	0.0	-					208	0.0	-				
		RT	98	12.3	B					68	26.5	C				

8.3 Recommended Alternative – Interim Year (2035) LOS Analysis

LOS analyses were conducted to evaluate the performance of the Recommended Alternative in the interim year 2035. The analyses were performed consistent with the methodology presented under Section 2 of the IMR. HCM 2010 Edition procedures were used for I-95 freeway segments analyses and Synchro 10 used for intersection analyses. Year 2035 peak hour volumes were estimated by reassigning the 2035 No Build Alternative traffic volumes to be consistent with the proposed I-95 Interchange modifications. **Figure 8.4** shows the Recommended Alternative network along with the estimated 2035 peak hour volumes used for the analyses. As noted under Section 8.1, for study intersections located west of SW 4th Avenue and east of SW 2nd Avenue, the traffic flows and intersection geometries are consistent with the 2035 No Build Alternative (presented under Section 5 of the IMR). Results of the 2035 LOS analyses for the Recommended Alternative I-95 freeway segments are summarized in **Figure 8.5** and LOS for the intersections are summarized in **Table 8.2**. Detailed output sheets for the 2035 LOS analysis are contained under **Appendix H** (Build B-5). Results of the 2035 LOS analyses are discussed below.

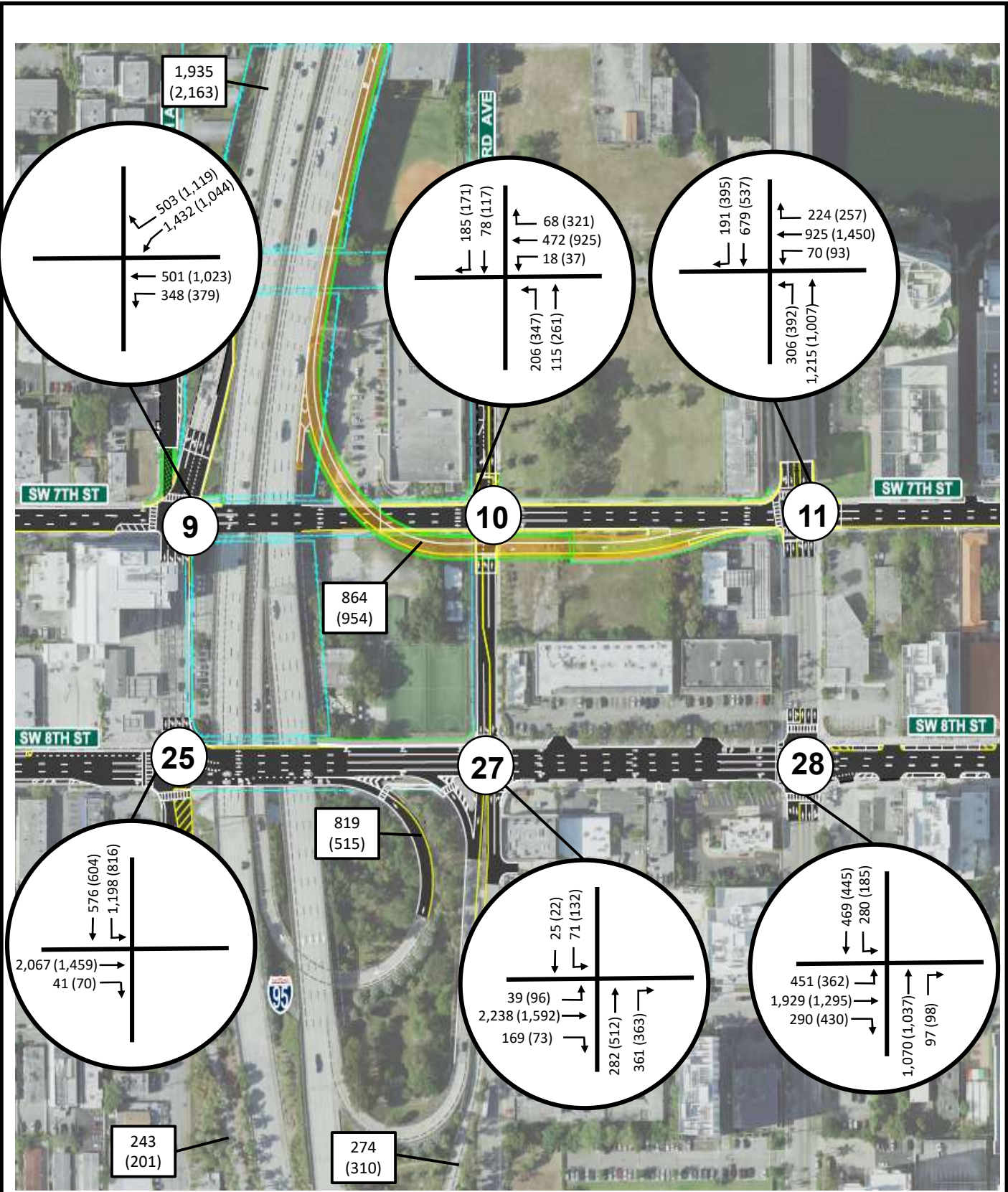
I-95 Traffic Operations: The results of the freeway analyses indicate that all but one segment of I-95 will operate at LOS D or better during the interim year (2035), AM and PM peak periods. During the AM peak period, SB I-95 at the off-ramp to SW 7th Street will operate at LOS E. In the No Build Alternative this segment of SB I-95 also operates at LOS E (see **Figure 5.9** under Section 5 of the IMR). Overall operating conditions along SB I-95 are similar in the Recommended Alternative and the No Build Alternative, as the geometry and volumes are similar. Along NB I-95, all segments of I-95 operate at LOS D or better in the Recommended Alternative, whereas, in the No Build Alternative LOS E is experienced along the weave segment north of SW 8th Street On-Ramp. These results indicate the Recommended Alternative performs overall better along I-95 when compared to the No Build Alternative.

SW 8th Street and SW 7th Street Traffic Operations: As depicted in **Table 8.2**, The Recommended Alternative will generate operating conditions below the desired LOS E target at the following intersections during the interim year (2035), AM and/or PM peak periods:

- SW 8th Street at SW 2nd Avenue (LOS F – AM peak). This result is better than No Build which generates LOS F in AM peak and LOS E in PM peak (see **Table 5.2** in the IMR). In addition, the No Build Alternative generates LOS F on the EB approach and the NB approach whereas in the Recommended Alternative LOS F is only generate on the EB approach.
- SW 7th Street at SW 2nd Avenue (LOS F – PM peak). This result is comparable to the No Build Alternative which also generates LOS F condition in the PM. In addition, the WB approach and the SB approach of the intersection operate at LOS F in both the Recommended Alternative and the No Build.

At the critical intersection of SW 7th Street at SW 4th Avenue/I-95 SB Off-Ramp, the Recommended Alternative performs at LOS C/LOS D in the AM/PM peaks. This is a substantial improvement when compared to the No Build which operates at LOS E/F in the AM/PM peaks. In addition, in the No Build Alternative all movements at the intersection operate at LOS F whereas in the Recommended Alternative none of the intersection movements operate at LOS F.

The results of the LOS analysis indicate that the Recommended Alternative will provide overall better traffic operations when compared to the No Build Alternative, during the interim year (2035).



Signalized

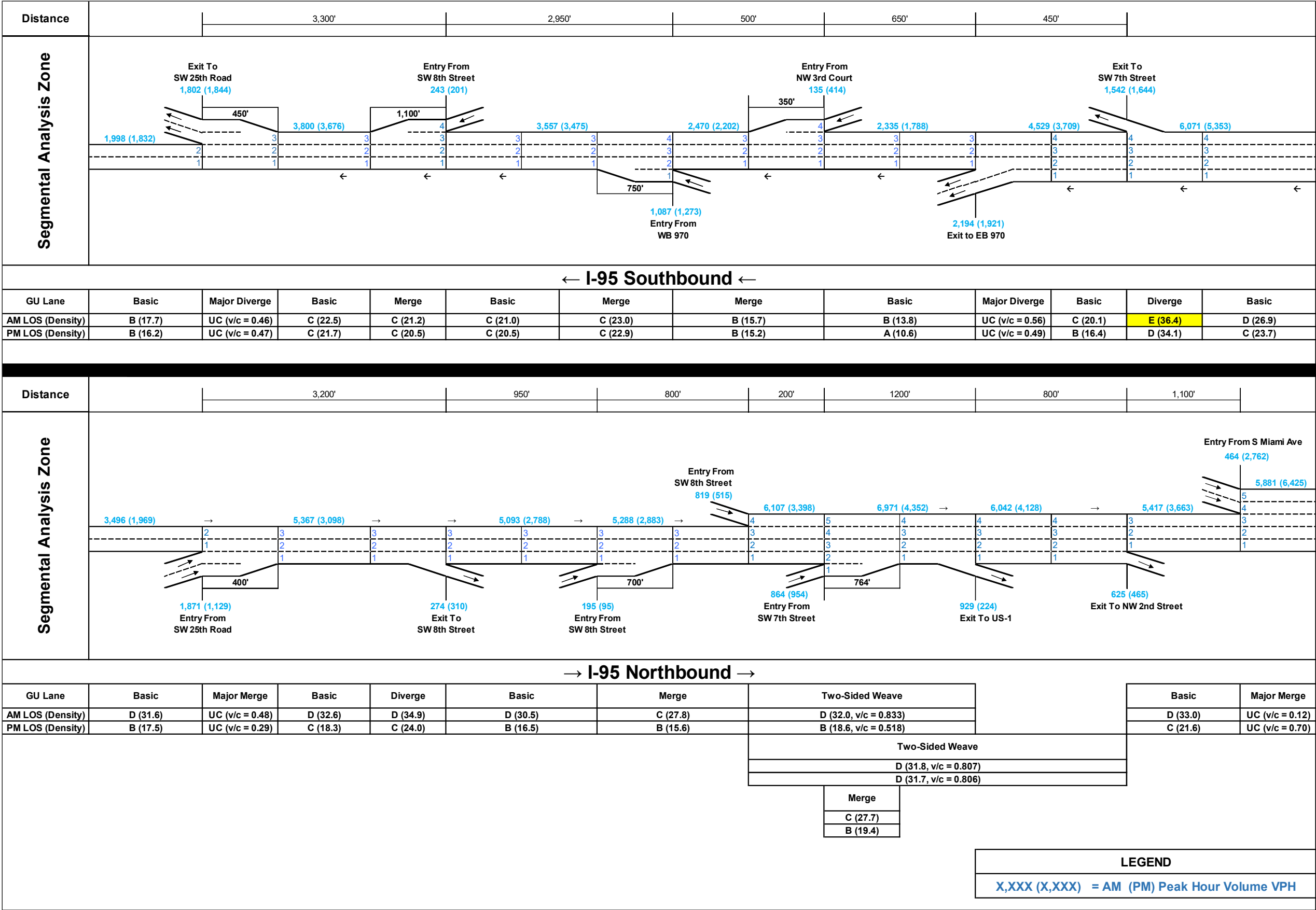


Table 8.2: Recommended Alternative (B-7) - 2035 Intersection Level of Service Analysis

Intersection	Appr.	Mvmt.	AM						Overall Intersection		PM						Overall Intersection				
			Approach				Approach				Approach		Approach								
			Volume	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Delay (sec/veh)	LOS	Volume	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Delay (sec/veh)	LOS					
SW 8 th Street & SW 8 th Ave*	EB	LT	281	-	-	33.2	C	33.6	C	212	-	-	29.8	C	27.8	C					
		TH	1440	33.2	C					1278	29.8	C									
		RT	57	-	-					28	-	-									
	NB	LT	0	-	-	34.1	C			0	-	-	33.0	C			27.8	C			
		TH	187	34.1	C					140	33.0	C									
		RT	54	-	-					40	-	-									
	SB	LT	175	-	-	35.1	D			139	-	-	14.6	B			27.8	C			
		TH	175	35.1	D					167	14.6	B									
		RT	0	-	-					0	-	-									
SW 8 th Street & SW 5 th Ave	EB	LT	96	36.2	D	37.2	D	41.1	D	221	36.0	D	36.3	D	40.6	D					
		TH	1564	37.9	D					1193	36.6	D									
		RT	9	37.5	D					43	36.2	D									
	NB	LT	0	0.0	-	51.4	D			0	0.0	-	53.1	D			40.6	D			
		TH	88	0.0	-					166	0.0	-									
		RT	544	51.4	D					336	53.1	D									
	SW 8 th Street & SW 4 th Ave	EB	LT	0	0.0	-	51.2			D	41.1	D	0	0.0			-	54.7	D	38.7	D
			TH	2067	50.1	D							1459	53.6			D				
			RT	41	54.1	D							70	57.6			E				
SB		LT	1198	26.1	C	29.1	C	816	18.0	B			21.6	C	38.7	D					
		TH	576	35.2	D			604	26.4	C											
		RT	0	0.0	-			0	0.0	-											
SW 8 th Street & SW 3 rd Ave		EB	LT	39	36.8	D	29.9	C	30.9	C			96	49.3	D	41.6	D	36.3	D		
			TH	2238	26.9	C							1592	38.4	D						
			RT	169	0.0	-							73	0.0	-						
	NB	LT	0	0.0	-	34.0	C	0			0.0	-	24.4	C	36.3	D					
		TH	282	29.5	C			512			25.4	C									
		RT	361	37.6	D			363			23.0	C									
	SB	LT	71	37.8	D	33.9	C	132			51.1	D	45.9	D	36.3	D					
		TH	25	22.6	C			22			15.0	B									
		RT	0	0.0	-			0			0.0	-									
SW 8 th Street & SW 2 nd Ave*	EB	LT	451	42.1	-	129.3	F	89.3	F	362	26.3	C	47.9	D	45.8	D					
		TH	1929	147.1	F					1295	52.4	D									
		RT	290	-	-					430	-	-									
	NB	LT	0	-	-	35.6	D			0	-	-	32.4	C			45.8	D			
		TH	1070	35.6	D					1037	32.4	C									
		RT	97	-	-					98	-	-									
	SB	LT	280	-	-	30.0	C			185	-	-	62.9	E			45.8	D			
		TH	469	30.0	C					445	62.9	E									
		RT	0	-	-					0	-	-									
SW 8 th Street & SW 1 st Ave	EB	LT	0	0.0	-	46.3	D	61.9	E	0	0.0	-	49.6	D	53.1	D					
		TH	1751	45.1	D					1190	49.4	D									
		RT	555	48.6	D					388	49.9	D									
	SB	LT	269	97.4	F	103.2	F			166	57.7	E	58.5	E			53.1	D			
		TH	601	109.2	F					860	59.2	E									
		RT	0	0.0	-					0	0.0	-									
	SW 8 th Street & S Miami Ave	EB	LT	249	44.1	D	42.9			D	42.9	D	314	43.9			D	42.8	D	40.1	D
			TH	1771	42.3	D							1042	42.3			D				
			RT	0	0.0	-							0	0.0			-				
NB		LT	0	0.0	-	42.8	D	0	0.0	-			35.9	D	40.1	D					
		TH	713	41.5	D			819	35.3	D											
		RT	83	45.1	D			61	37.2	D											
SW 7 th Street & S Miami Ave*		WB	LT	0	-	-	29.2	C	17.0	B			0	-	-	30.2	C	25.7	C		
			TH	656	29.2	C							1193	30.2	C						
			RT	74	-	-							134	-	-						
	NB	LT	335	6.2	A	7.8	A	514			21.4	C	20.4	C	25.7	C					
		TH	627	8.5	A			619			20.0	B									
		RT	0	-	-			0			-	-									
	SW 7 th Street & SW 1 st Ave*	WB	LT	137	-	-	12.5	B			17.3	B	251	-	-	28.2	C			31.9	C
			TH	854	12.5	B							1456	28.2	C						
			RT	0	-	-							0	-	-						
SB		LT	0	-	-	21.5	C	0	-	-			37.6	D	31.9	C					
		TH	733	21.3	C			775	37.6	D											
		RT	365	22.1	C			344	37.5	D											
SW 7 th Street & SW 2 nd Ave		WB	LT	70	63.9	E	60.5	E	39.4	D			93	124.3	F	103.6	F	85.8	F		
			TH	925	58.3	E							1450	90.6	F						
			RT	224	58.5	E							257	92.2	F						
	NB	LT	306	52.2	D	11.9	B	392			91.2	F	26.6	C	85.8	F					
		TH	1215	1.7	A			1007			1.5	A									
		RT	0	0.0	-			0			0.0	-									
	SB	LT	0	0.0	-	58.1	E	0			0.0	-	140.0	F	85.8	F					
		TH	679	57.9	E			537			139.2	F									
		RT	191	58.3	E			395			141.0	F									
SW 7 th Street & SW 3 rd Ave	WB	LT	18	10.9	B	10.8	B	27.9	C	37	31.9	C	30.8	C	26.8	C					
		TH	472	10.8	B					925	30.1	C									
		RT	68	10.8	B					321	30.2	C									
	NB	LT	206	57.0	E	51.8	D			347	27.6	C	20.3	C			26.8	C			
		TH	115	42.5	D					261	10.6	B									
		RT	0	0.0	-					0	0.0	-									
	SB	LT	0	0.0	-	35.0	D			0	0.0	-	22.8	C			26.8	C			
		TH	78	32.1	C					117	21.9	C									
		RT	185	36.2	D					171	23.4	C									
SW 7 th Street & SW 4 th Ave/I-95 SB Off-Ramp*	WB	LT	348	34.6	C	33.8	C	29.9	C	379	31.0	C	39.8	D	37.5	D					
		TH	501	33.5	C					1023	42.6	D									
		RT	0	-	-					0	-	-									
	SWB	LT	1432	27.9	C	28.2	C			1044	28.8	C	36.1	D			37.5	D			
		TH	-	-	-					-	-	-									
		RT	503	29.5	C					1119	57.0	E									
	SW 7 th Street & SW 8 th Ave	WB	LT	58	35.3	D	34.2			C	21.7	C	68	43.2			D	38.2	D	34.8	C
			TH	880	33.7	C							1986	35.3			D				
			RT	61	33.5	C							106	35.4			D				
NB		LT	80	2.2	A	2.2	A	117	20.6	C			20.6	C	34.8	C					
		TH	388	0.0	-			235	0.0	-											
		RT	0	0.0	-			0	0.0	-											
SB		LT	0	0.0	-	13.3	B	0	0.0	-			27.6	C	34.8	C					
		TH	292	0.0	-			238	0.0	-											
		RT	112	13.3	B			77	27.6	C											

8.4 Recommended Alternative – Design Year (2045) LOS Analysis

LOS analyses were conducted to evaluate the performance of the Recommended Alternative in the anticipated design year 2045. The analyses were performed consistent with the methodology presented under Section 2 of the IMR. HCM 2010 Edition procedures were used for I-95 freeway segments analyses and Synchro 10 used for intersection analyses. Year 2045 peak hour volumes were estimated by reassigning the 2045 No Build Alternative traffic volumes to be consistent with the proposed I-95 Interchange modifications. **Figure 8.6** shows the Recommended Alternative network along with the estimated 2045 peak hour volumes used for the analyses. As noted under section 8.1, for study intersections located west of SW 4th Avenue and east of SW 2nd Avenue, the traffic flows and intersection geometries are consistent with the 2045 No Build Alternative (presented under Section 5 of the IMR). Results of the 2045 LOS analyses for the Recommended Alternative I-95 freeway segments are summarized in **Figure 8.7** and LOS for the intersections are summarized in **Table 8.3**. Detailed output sheets for the 2045 LOS analysis are included under **Appendix H**. Results of the analyses are discussed below.

I-95 Traffic Operations: The results of the freeway analyses indicate that all segments of I-95 will operate at LOS E or better during the design year (2045), AM and PM peak periods. These results are an improvement over the No Build Alternative in which LOS F conditions are generated along NB I-95 within the weaving segment between SW 8th Street on-ramp (left hand entry) and US 1 of-ramp (right hand exit) – see **Figure 5.10** in the IMR. The following segments of the Recommend Alternative will operate below the desired LOS D target:

- NB I-95, north of on-ramp from SW 25th Road (LOS E – AM peak). This matches operations in the No Build Alternative.
- NB I-95 at off-ramp to SW 8th Street (LOS E – AM peak). This matches operations in the No Build Alternative.
- NB I-95 north of on-ramp from SW 8th Street – weaving segment (LOS E – AM peak). This weaving segment performs better than the No Build as the new on-ramp from SW 7th Street generates a

decrease in the two-sided weave movements (from SW 8th Street on-ramp to US 1 off-ramp and from SW 8th Street on-ramp to NW 2nd Street off-ramp).

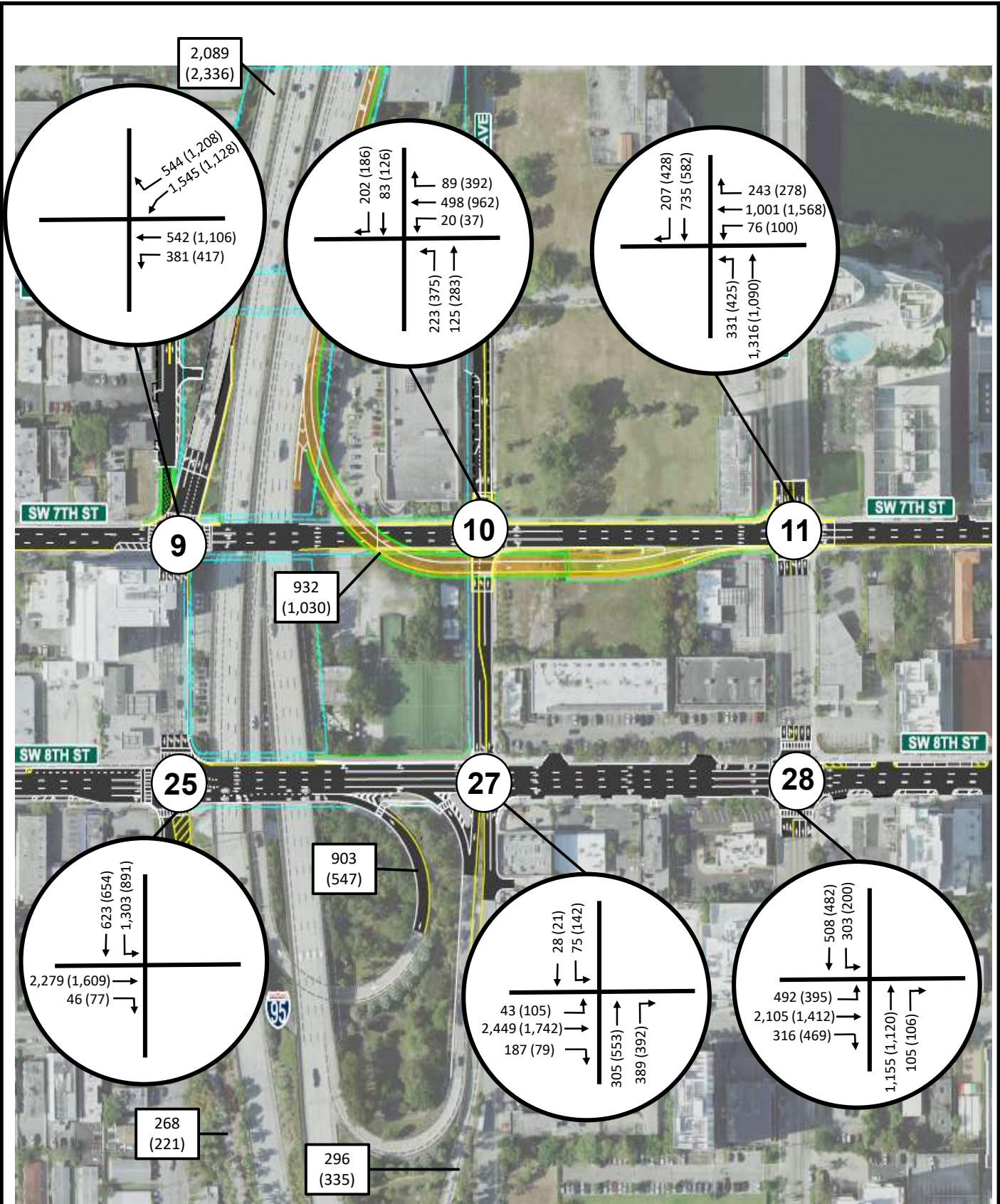
- NB I-95, north of off-ramp to NW 2nd Street (LOS E – AM Peak)
- SB I-95 at off-ramp to SW 7th Street (LOS E/E – AM/PM peak). This matches operations in the No Build Alternative

SW 8th Street and SW 7th Street Traffic Operations: As depicted in **Table 8.3**, The Recommended Alternative will generate operating conditions below the desired LOS E target at the following intersections during the design year (2045), AM and PM peak periods:

- SW 8th Street at SW 2nd Avenue (LOS F/D – AM/PM peaks). This result is better than the No Build Alternative which generates LOS F conditions in the AM and PM peak periods (see **Table 5.3** in the IMR). Further, in the No Build Alternative, the EB approach and the NB approach operate at LOS F, whereas in the Recommended Alternative only the EB approach operates at LOS F.
- SW 7th Street at SW 2nd Avenue (LOS F – PM peak). This result is comparable to the No Build Alternative which also generates LOS F condition in the PM peak. In addition, the WB approach and the SB approach of the intersection operate at LOS F in both the Recommended Alternative and the No Build.

At the critical intersection of SW 7th Street at SW 4th Avenue/I-95 SB Off-Ramp, the Recommended Alternative performs at LOS C/LOS D in the AM/PM peaks. This is a substantial improvement when compared to the No Build which operates at LOS F/F in the AM/PM peaks. In addition, in the No Build Alternative all movements at this intersection operate at LOS F, whereas in the Recommended Alternative none of the intersection movements operate at LOS F.

The results of the LOS analysis indicate that the Recommended Alternative will provide overall better traffic operations when compared to the No Build Alternative, during the design year (2045).



Signalized

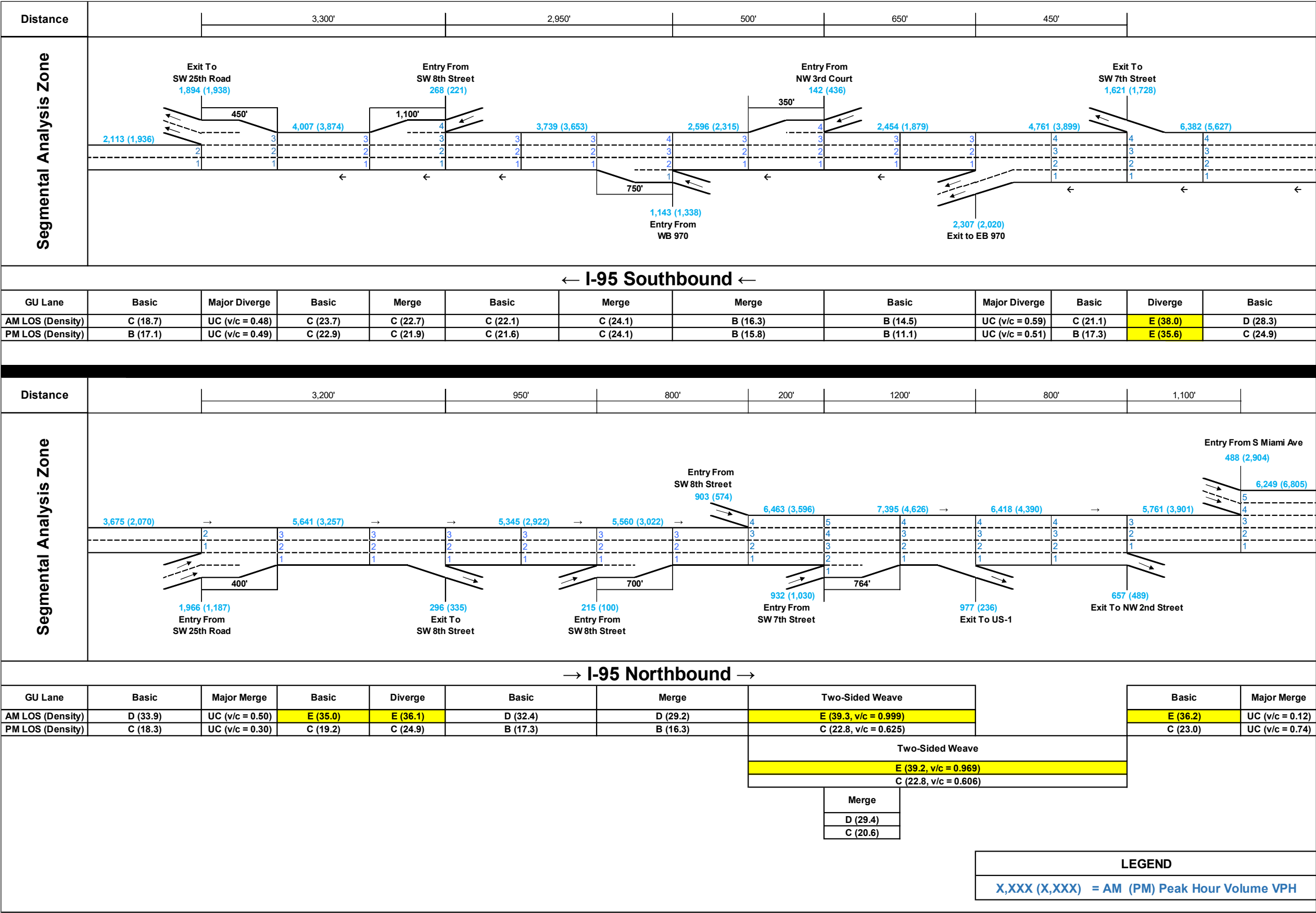


Table 8.3: Recommended Alternative (B-7) - 2045 Intersection Level of Service Analysis

Intersection	Appr.	Mvmt.	AM						Overall Intersection		PM						Overall Intersection	
			Approach					Delay (sec/veh)	LOS	Approach					Overall Intersection			
			Volume	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS			Volume	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Delay (sec/veh)	LOS		
SW 8 th Street & SW 8 th Ave*	EB	LT	309	-	-	47.6	D	48.6	D	233	-	-	32.8	C	30.5	C		
		TH	1584	47.6	D					1406	32.8	C						
		RT	63	-	-					31	-	-						
	NB	LT	0	-	-	35.4	D			0	-	-	33.6	C				
		TH	205	35.4	D					154	33.6	C						
		RT	60	-	-					44	-	-						
	SB	LT	199	-	-	62.7	E			157	-	-	17.6	B				
		TH	198	62.7	E					190	17.6	B						
		RT	0	-	-					0	-	-						
SW 8 th Street & SW 5 th Ave	EB	LT	106	37.5	D	38.9	D	43.1	D	243	38.4	D	38.8	D	42.5	D		
		TH	1727	39.8	D					1316	39.2	D						
		RT	10	39.5	D					48	38.8	D						
	NB	LT	0	0.0	-	54.5	D			0	0.0	-	53.3	D				
		TH	97	0.0	-					183	0.0	-						
		RT	598	54.5	D					370	53.3	D						
SW 8 th Street & SW 4 th Ave	EB	LT	0	0.0	-	52.8	D	43.6	D	0	0.0	-	57.5	E	40.8	D		
		TH	2279	51.7	D					1609	56.1	E						
		RT	46	55.6	E					77	61.2	E						
	SB	LT	1303	28.0	C	32.6	C			891	18.4	B	22.5	C				
		TH	623	42.1	D					654	28.2	C						
		RT	0	0.0	-					0	0.0	-						
SW 8 th Street & SW 3 rd Ave	EB	LT	43	43.9	D	33.3	C	34.3	C	105	55.6	E	44.7	D	40.4	D		
		TH	2449	28.8	C					1742	40.1	D						
		RT	187	0.0	-					79	0.0	-						
	NB	LT	0	0.0	-	37.4	D			0	0.0	-	26.8	C				
		TH	305	31.3	C					553	28.1	C						
		RT	389	42.2	D					392	25.0	C						
	SB	LT	75	41.0	D	36.3	D			142	77.2	E	69.2	E				
		TH	28	23.2	C					21	15.5	B						
		RT	0	0.0	-					0	0.0	-						
SW 8 th Street & SW 2 nd Ave*	EB	LT	492	29.9	-	138.4	F	101.2	F	395	38.8	D	65.9	E	50.8	D		
		TH	2105	160.5	F					1412	71.5	E						
		RT	316	-	-					469	-	-						
	NB	LT	0	-	-	40.8	D			0	-	-	37.0	D				
		TH	1155	40.8	D					1120	37.0	D						
		RT	105	-	-					106	-	-						
	SB	LT	303	-	-	61.5	E			200	-	-	25.5	C				
		TH	508	61.5	E					482	25.5	C						
		RT	0	-	-					0	-	-						
SW 8 th Street & SW 1 st Ave	EB	LT	0	0.0	-	56.2	E	76.4	E	0	0.0	-	52.0	D	56.3	E		
		TH	1908	49.0	D					1296	51.6	D						
		RT	605	69.9	F					422	52.6	D						
	SB	LT	291	122.2	F	130.3	F			180	61.8	E	63.0	E				
		TH	652	138.7	F					932	64.3	E						
		RT	0	0.0	-					0	0.0	-						
SW 8 th Street & S Miami Ave	EB	LT	271	46.2	D	44.8	D	44.8	D	342	45.6	D	44.5	D	41.6	D		
		TH	1928	44.1	D					1134	43.9	D						
		RT	0	0.0	-					0	0.0	-						
	NB	LT	0	0.0	-	44.8	D			0	0.0	-	37.1	D				
		TH	770	43.2	D					884	36.4	D						
		RT	90	47.7	D					66	38.6	D						
SW 7 th Street & S Miami Ave*	WB	LT	0	-	-	29.9	C	18.1	B	0	-	-	32.0	C	27.3	C		
		TH	712	29.9	C					1290	32.0	C						
		RT	80	-	-					145	-	-						
	NB	LT	362	8.4	A	9.2	A			556	22.9	C	21.8	C				
		TH	679	9.5	A					670	21.2	C						
		RT	0	-	-					0	-	-						
SW 7 th Street & SW 1 st Ave*	WB	LT	149	-	-	13.6	B	18.3	B	272	-	-	30.0	C	34.0	C		
		TH	925	13.6	B					1574	30.0	C						
		RT	0	-	-					0	-	-						
	SB	LT	0	-	-	22.6	C			0	-	-	40.1	D				
		TH	794	22.2	C					840	40.2	D						
		RT	395	23.5	C					372	39.9	D						
SW 7 th Street & SW 2 nd Ave	WB	LT	76	23.8	C	23.0	C	28.9	C	100	139.2	F	115.3	F	105.8	F		
		TH	1001	22.5	C					1568	99.1	F						
		RT	243	22.5	C					278	103.3	F						
	NB	LT	331	57.9	E	12.9	B			425	156.2	F	45.1	D				
		TH	1316	1.6	A					1090	1.9	A						
		RT	0	0.0	-					0	0.0	-						
	SB	LT	0	0.0	-	65.3	E			0	0.0	-	178.5	F				
		TH	735	65.0	E					582	177.5	F						
		RT	207	65.5	E					428	179.6	F						
SW 7 th Street & SW 3 rd Ave	WB	LT	20	12.6	B	12.5	B	28.0	C	37	41.9	D	39.8	D	31.0	C		
		TH	498	12.4	B					962	38.2	D						
		RT	89	12.5	B					392	38.6	D						
	NB	LT	223	56.4	E	50.9	D			375	25.2	C	20.0	C				
		TH	125	41.0	D					283	7.4	A						
		RT	0	0.0	-					0	0.0	-						
SB	LT	0	0.0	-	32.9	C	0	0.0	-	29.0	C							
	TH	83	30.0	C			126	19.1	B									
	RT	202	34.1	C			186	20.6	C									
SW 7 th Street & SW 4 th Ave/I-95 SB Off-Ramp*	WB	LT	381	17.5	B	17.0	B	24.2	C	417	33.7	C	57.7	E	47.9	D		
		TH	542	16.7	B					1106	65.6	E						
		RT	0	-	-					0	-	-						
	SWB	LT	1545	26.7	C	27.4	C			1128	30.4	C	41.5	D				
		TH	-	-	-					1208	73.4	E						
		RT	544	29.8	C					0	-	-						
SW 7 th Street & SW 8 th Ave	WB	LT	63	37.9	D	36.4	D	23.3	C	74	58.9	E	48.8	D	45.4	D		
		TH	960	35.7	D					2160	42.6	D						
		RT	67	35.4	D					116	43.4	D						
	NB	LT	88	3.8	A	3.8	A			128	39.8	D	39.8	D				
		TH	426	0.0	-					259	0.0	-						
		RT	0	0.0	-					0	0.0	-						
	SB	LT	0	0.0	-	14.2	B			0	0.0	-	29.0	C				
		TH	334	0.0	-					273	0.0	-						
		RT	129	14.2	B					88	29.0	C						

9.0 TRAFFIC MICROSIMULATION ANALYSIS

The LOS analyses presented in the preceding sections of the IMR provide an assessment of the anticipated traffic operating conditions along I-95 freeway segments and the arterial intersections based on the HCM analytical procedures. It is recognized that the HCM procedures cannot fully address the complex weaving segments present along the I-95 mainline nor the excessive oversaturated conditions along sections of SW 8th Street and SW 7th Street. These conditions are best evaluated using traffic microsimulation techniques. Hence, microsimulation models were developed to provide a more robust assessment and comparison of the anticipated operating conditions in the design year (2045) for the No Build Alternative and Recommended Alternative (B-7). Consistent with the study methodology, Vissim models were used for microsimulation analyses. The following sections describe the development of the microsimulation models and results from the analyses.

9.1 Existing (2015) Conditions VISSIM Model

Traffic microsimulation process begins with the development and calibration of the existing year traffic conditions model. Vissim version 9-10 microsimulation models were developed and calibrated to replicate existing year (2015) traffic conditions, during typical weekdays, AM and PM peak periods. Temporal limits for the models covered 4 hours during the AM peak period and 4 hours during the PM peak period. The simulation period also included an initial 30-minute seed time to load traffic onto the network. Input volumes were assessed in 15-minute increments based on existing traffic flow profiles.

Calibration of the existing year models were based on measured traffic volumes, link speeds and field observations of traffic operating conditions during peak periods. The I-95 Vissim model was calibrated in accordance with the guidelines presented in the *FDOT Traffic Analysis Handbook*. The calibration criteria used are summarized in **Table 9.1**

Table 9.1: Freeway Model Calibration Criteria

Criteria and Measures	Calibration Acceptance Targets
Hourly Flows, Model Versus Observed	
Individual Link Flows	
Within 15%, for 700 veh/h < Flow < 2700 veh/h	> 85% of cases
Within 100 veh/h, for Flow < 700 veh/h	> 85% of cases
Within 400 veh/h, for Flow > 2700 veh/h	> 85% of cases
Sum of All Link Flows	Within 5% of sum of all link counts
GEH Statistic < 5 for Individual Link Flows	> 85% of cases
GEH Statistic for Sum of All Link Flows	GEH < 5 for sum of all link counts
Travel Times, Model Versus Observed	
Journey Times, Network	
Within 15% (or 1 min, if higher)	> 85% of cases
Visual Audits	
Individual Link Speeds	
Visually Acceptable Speed-Flow Relationship	To analyst's satisfaction
Bottlenecks	
Visually Acceptable Queuing	To analyst's satisfaction

Appendix C contains the *VISSIM Existing Conditions Model Development and Calibration Report*. The Vissim Calibration Report details the development of the existing conditions model and input parameters that were adjusted as part of calibration process. These included making incremental adjustments to model parameters that influence “car following” and lane changing behavior. Field reviews and data gathered for the study confirmed that in the existing conditions, during peak periods, traffic operations along I-95 mainline are substantially impacted by congestion occurring outside the project study area. An important component of the Vissim calibration process was to replicate the impacts of this congestion occurring outside the study area. This was achieved by strategically adjusting the desired speed decisions at points along I-95 mainline such that the simulated speeds reasonably matched the field measured speeds. Adjustments made to the desired speed decisions were maintained consistent in the Existing Conditions Models and the Future No Build and Build models.

Model output parameters were computed based on 10 Vissim runs, which was determined to be adequate to generate statistically significant results. Statistical comparisons were made of the model output

parameters and the applied calibration criteria. The information documented in the Vissim Calibration Report demonstrates that the existing conditions models accurately replicate 2015 traffic conditions along I-95, SW 8th Street and SW 7th Street, within the tolerances specified in the FDOT guidelines. In satisfying these calibration criteria, it is concluded that the Existing Conditions models were successfully calibrated and are suitable for analysis of future build alternatives - with appropriate adjustments for changes in design concepts and traffic flow conditions.

9.2 2045 No Build Alternative – Microsimulation Analysis

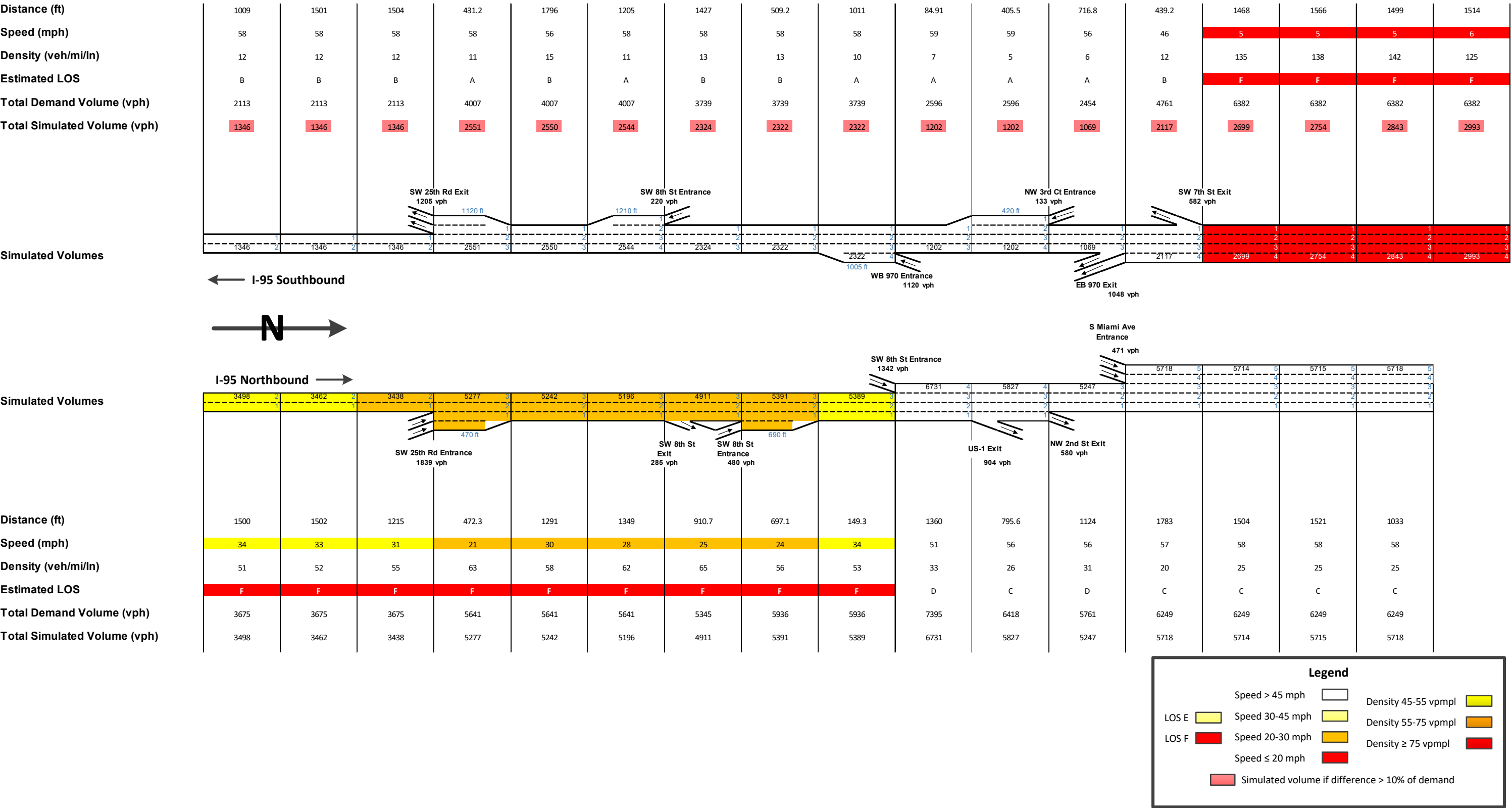
Vissim microsimulation models were developed for the No Build Alternative to assess the anticipated traffic operating conditions in the design year (2045). The design year No Build models were developed using parameters consistent with the calibrated Existing (2015) Conditions Model. Traffic volumes were applied in 15-minute increments covering 4-hours in AM peak period and 4-hours in the PM peak period during the design year. Measures of effectiveness (MOEs) were extracted from the models for the AM and PM peak hours (hour 2 of the analysis period) and these MOEs were used for assessing traffic operating conditions. MOEs were computed based on 10 Vissim runs. Approximate LOS conditions were estimated for freeway segments based on the densities reported by Vissim and comparing these with the HCM LOS thresholds. It should be noted that HCM and Vissim do not apply the same methodologies for computing densities, which are the basis for determining LOS conditions. Hence, the approximate LOS conditions derived from Vissim are not directly comparable to the LOS derived in accordance with HCM. Outputs from the Vissim models are included under **Appendix I**. The results of this analysis are discussed below.

I-95 AM Peak Operations: Figure 9.1 depicts the anticipated I-95 operating conditions for the No-Build Alternative in the AM peak hour, year 2045. The results indicate that during the AM peak hour, traffic congestion will be experienced in both the northbound and southbound directions on I-95, under the No Build Alternative. In the northbound direction, along the mainline segment just south of the SW 8th Street on-ramp (left hand ramp), the peak traffic demand volume (5,936 vph) is marginally below the capacity of the existing 3-lane segment. This condition results in a sharp drop in speeds along the segments and this propagates to upstream locations resulting in low operating speeds (approximately 25 mph to 40

mph) over an extended segment of the freeway (from south of SW 25th Street on-ramp to SW 8th Street on-ramp). The reported densities along this segment translate approximately to LOS F.

In the southbound direction, severe congestion is experienced along the segment of I-95 north of the SW 7th Street off-ramp. Operating speeds within this segment are below 10 mph with LOS F conditions. Visual inspection of the simulation models indicate that this mainline congestion results from queueing at the SB terminal intersection at SW 7th Street.

I-95 PM Peak Operations: Figure 9.2 depicts the anticipated I-95 operating conditions for the No-Build Alternative in the PM peak hour, year 2045. During the PM peak hour, significant traffic congestion is experienced along SB I-95 north of the SW 7th Street off-ramp (similar to AM peak operations). Operating speeds within this segment are below 20 mph with LOS F conditions. Visual inspection of the simulation models indicate that this mainline congestion results from queueing at the SB terminal intersection at SW 7th Street. Low operating speeds, approximately 30 mph, are experienced along SB I-95, south of the SW 8th Street on-ramp, due to the spillback effect of congestion experienced outside of the study area. NB I-95 experiences congestion throughout all segments during the PM peak period. This occurs due to the spillback effect of downstream traffic congestion, outside of the study area. This congestion, outside the study area, was evident in the Existing Conditions model. Resulting from this congestion, operating speeds are less than 20 mph for all NB I-95 segments with densities approximating to LOS F.



SW 25th Rd Entrance
1839 vph

470 ft

SW 8th St Exit
285 vph

SW 8th St Entrance
480 vph

690 ft

US-1 Exit
904 vph

NW 2nd St Exit
580 vph

Legend

Speed > 45 mph

Speed 30-45 mph

Speed 20-30 mph

Speed ≤ 20 mph

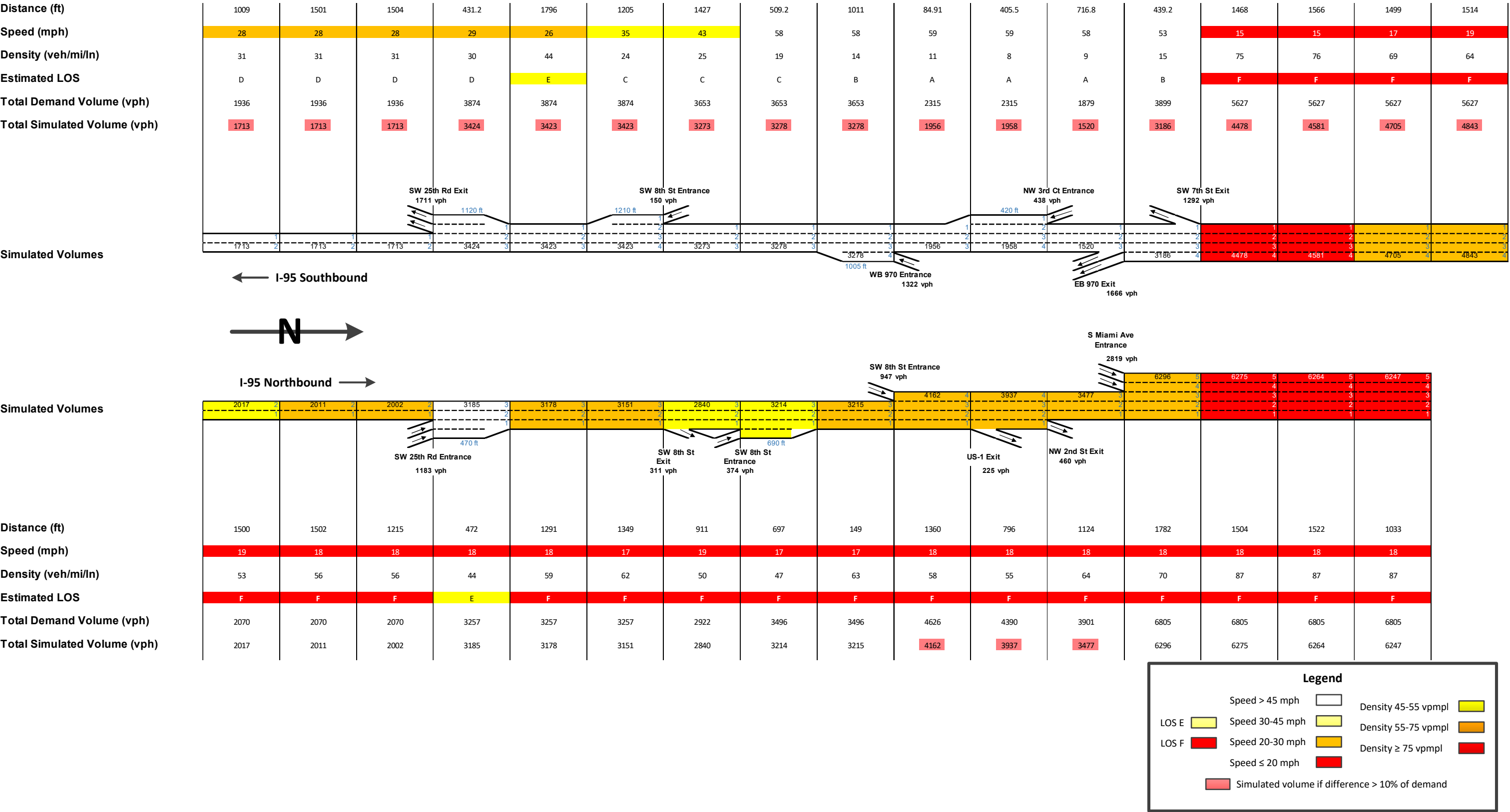
Simulated volume if difference > 10% of demand

Density 45-55 vpmpl

Density 55-75 vpmpl

Density ≥ 75 vpmpl





9.3 2045 Recommended Alternative – Microsimulation Analysis

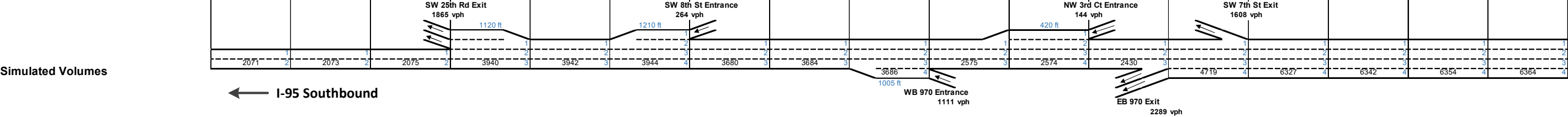
Vissim microsimulation models were developed for the Recommended Alternative to assess the anticipated traffic operating conditions in the design year (2045). The design year Recommended Alternative models were developed using parameters consistent with the calibrated Existing (2015) Conditions Model. Traffic volumes were applied in 15-minute increments covering 4-hours in the AM peak period and 4-hours in the PM peak period during the design year. Measures of effectiveness (MOEs) were extracted from the models for the AM and PM peak hours (hour 2 of the analysis period) and these MOEs were used for assessing traffic operating conditions. MOEs were computed based on 10 Vissim runs. Outputs from the Vissim models are included under **Appendix I**. The results of this analysis are discussed below.

I-95 AM Peak Hour: **Figure 9-3** depicts the anticipated I-95 operating conditions for the Recommended Alternative in the AM peak hour, year 2045. These results indicate a significant improvement when compared to the No Build Alternative. In the northbound direction, operating speeds are above 33 mph with densities at LOS E or better – except for 2 segments. The improved operations in the NB direction results from addition of the proposed new NB on-ramp from SW 7th Street which reduces traffic demand to approximately 5,560 vph in the critical 3-lane segment located just south of SW 8th Street on-ramp. In the southbound direction, operating speeds are 46 mph or higher with densities approximating to LOS D or better. The improved operating conditions in the SB direction result from the additional lane at the SB off-ramp terminal intersection which increases the capacity of the intersection. In addition, the closing of SW 4th Avenue modifies the signal operation from 3-phase operation (No Build) to a more efficient 2-phase operation (Build). These modifications at the terminal intersection result in reduce delays and queuing on the off-ramp and alleviate impacts to the mainline traffic flow.

I-95 PM Peak Hour: **Figure 9.4** depicts the anticipated I-95 operating conditions for the Recommended Alternative in the PM peak hour, year 2045. The results show an improvement in traffic operations along SB I-95, when compared to the No-Build Alternative. The improvements are most significant along the segment of SB I-95 north of SW 7th Street Off-Ramp. Within this segment operating speeds are above 50 mph with densities approximating to LOS D or better. In comparison, under the No Build alternative, this segment of I-95 operates at LOS F with operating speeds below 20 mph. In the NB direction, operations

are similar to the No Build Alternative with traffic congestion experienced throughout all segments of I-95. Operating speeds throughout NB I-95 are below 20 mph with densities approximating to LOS F conditions. These substandard operating conditions results from the spillback effect of downstream congestion experienced outside the study area. This congestion occurring outside the study area was evident in the Existing Conditions model.

Distance (ft)	1009	1501	1504	431	1796	1205	1427	509	1011	85	406	717	439	1468	1566	1499	1514
Speed (mph)	57	57	57	57	53	56	57	57	58	59	59	55	48	45	46	46	46
Density (veh/mi/ln)	18	18	18	17	25	18	22	22	16	15	11	15	25	35	34	35	35
Estimated LOS	B	B	B	B	C	B	C	C	B	B	A	B	C	D	D	D	D
Total Demand Volume (vph)	2113	2113	2113	4007	4007	4007	3739	3739	3739	2596	2596	2454	4761	6382	6382	6382	6382
Total Simulated Volume (vph)	2071	2073	2075	3940	3942	3944	3680	3684	3686	2575	2574	2430	4719	6327	6342	6354	6364



Simulated Volumes	3616	3600	3590	5533	5523	5503	5197	5389	5387	6271	7112	7112	6165	5549	6017	6015	6014	6013
Distance (ft)	1500	1502	1215	472	1291	1349	911	697	149	104	746	505	796	1124	1782	1504	1521	1033
Speed (mph)	51	49	47	39	44	43	37	34	39	42	44	50	55	55	57	58	58	58
Density (veh/mi/ln)	35	37	38	35	42	43	47	40	46	37	32	36	28	34	21	26	26	26
Estimated LOS	D	E	E	D	E	E	F	E	F	E	D	E	D	D	C	C	C	C
Total Demand Volume (vph)	3675	3675	3675	5641	5641	5641	5345	5560	5560	6463	7395	7395	6418	5761	6249	6249	6249	6249
Total Simulated Volume (vph)	3616	3600	3590	5533	5523	5503	5197	5389	5387	6271	7112	7112	6165	5549	6017	6015	6014	6013

Legend

Speed > 45 mph

Speed 30-45 mph

Speed 20-30 mph

Speed ≤ 20 mph

Simulated volume if difference > 10% of demand

Density 45-55 vpmpl

Density 55-75 vpmpl

Density ≥ 75 vpmpl

LOS E

LOS F

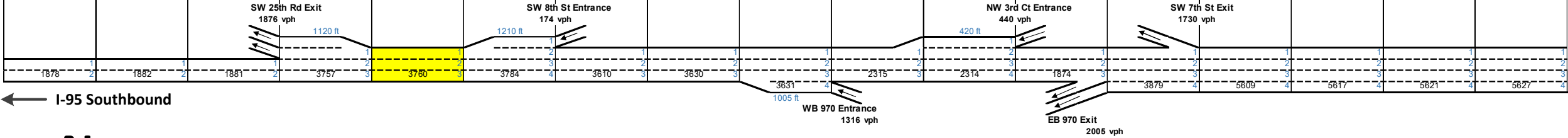


SR 90/SW 8th Street and SW 7th Street PD&E Study

I-95 Microsimulation Analysis
2045 Recommended Alternative (B-7) AM Peak

Figure 9.3

Distance (ft)	1009	1501	1504	431	1796	1205	1427	509	1011	85	406	717	439	1468	1566	1499	1514
Speed (mph)	28	28	28	29	24	23	37	57	58	59	59	59	57	54	56	56	57
Density (veh/mi/ln)	34	34	34	32	52	41	33	21	16	13	10	11	17	26	25	25	25
Estimated LOS	D	D	D	D	F	E	D	C	B	B	A	A	B	C	C	C	C
Total Demand Volume (vph)	1936	1936	1936	3874	3874	3874	3653	3653	3653	2315	2315	1879	3899	5627	5627	5627	5627
Total Simulated Volume (vph)	1878	1882	1881	3757	3760	3784	3610	3630	3631	2315	2314	1874	3879	5609	5617	5621	5627



I-95 Northbound →

Simulated Volumes	2017	2011	2002	3186	3178	3168	2838	2931	2930	3482	4410	4412	4180	3698	6511	6486	6469	6455
Distance (ft)	1500	1502	1215	472	1291	1349	911	697	149	104	746	505	796	1124	1782	1504	1521	1033
Speed (mph)	19	18	18	18	18	18	18	18	17	18	17	18	18	18	18	18	18	18
Density (veh/mi/ln)	53	56	56	44	59	59	53	41	57	48	52	61	58	68	72	90	90	90
Estimated LOS	F	F	F	E	F	F	F	E	F	F	F	F	F	F	F	F	F	F
Total Demand Volume (vph)	2070	2070	2070	3257	3257	3257	2922	3022	3022	3596	4626	4626	4390	3901	6805	6805	6805	6805
Total Simulated Volume (vph)	2017	2011	2002	3186	3178	3168	2838	2931	2930	3482	4410	4412	4180	3698	6511	6486	6469	6455

Legend

Speed > 45 mph

Speed 30-45 mph

Speed 20-30 mph

Speed ≤ 20 mph

Simulated volume if difference > 10% of demand

Density 45-55 vpmpl

Density 55-75 vpmpl

Density ≥ 75 vpmpl

LOS E

LOS F



SR 90/SW 8th Street and SW 7th Street PD&E Study

I-95 Microsimulation Analysis
2045 Recommended Alternative (B-7) PM Peak

Figure 9.4

9.4 Comparison of No Build and Recommended Alternative

Various MOEs generated from the 2045 Vissim microsimulation models were extracted to compare the anticipated future traffic operating for the No Build Alternative and Recommended Alternative. The comparison included:

- Travel times and operating speeds along I-95 mainline
- Throughput (simulated volume) along I-95 mainline
- Travel times along SW 8th Street and SW 7th Street
- Queue lengths at the I-95 Off-Ramp Terminal Intersection
- Network-wide performance measures (average speed, total delay, latent demand, total travel time, vehicle miles traveled and total stops)

Tables 9.2 through 9.6 provide a summary of the above MOEs for the No Build Alternative and the Recommended Alternative for the AM and PM peak periods, in the design year 2045. The results demonstrate that the Recommended Alternative consistently performs better than the No Build Alternative. This conclusion is supported by the findings discussed below.

I-95 Travel Times: **Table 9.2** summarizes the travel times along I-95 mainline during the AM and PM peak periods for the two alternatives. As depicted in the table, travel times and corresponding operating speeds are substantially improved with the Recommended Alternative, particularly in the southbound direction. The Recommended Alternative improves travel times/operating speeds along SB I-95 by approximately 57% during the AM peak and 14% in the PM peak. Correspondingly, along NB I-95 operating speeds improve by approximately 21% in the AM peak and is comparable to No Build during the PM peak.

I-95 Throughput Traffic: **Table 9.3** summarizes the simulated throughput traffic along I-95 mainline during the AM and PM peak periods for the two alternatives. As depicted in the table, I-95 throughput traffic is increased with the Recommended Alternative in both NB and SB directions in the AM and PM peak periods. In the AM peak period, the Recommended Alternative increases throughput traffic on I-95 mainline by approximately 5% in the NB direction and 54% in the SB direction. Similarly, during the PM

peak period, throughput traffic is increased by approximately 3% in the northbound direction and 10% in the southbound direction.

SW 8th Street and SW 7th Street Travel times: Table 9.4 summarizes the travel times along SW 8th Street and SW 7th Street during the AM and PM peak periods for the two alternatives. As depicted in the table, travel times are substantially improved with the Recommended Alternative, particularly along westbound SW 7th Street. The Recommended Alternative improves travel times along WB SW 7th Street by approximately 41% during the AM peak and 38% in the PM peak. Correspondingly along eastbound SW 8th Street, travel times are improved by approximately 24% in the AM peak. In the PM peak, travel times increase slightly along SW 8th Street by approximately 8%. This is due to more traffic being processed under the Recommended Alternative when compared to No Build Alternative - specifically at the SW 7th Street & SW 4th Avenue/SB Ramp Terminal which results in more vehicles arriving at downstream intersections along SW 8th Street.

I-95 Off-Ramp Queue Lengths: Table 9.5 summarizes the queue lengths on the I-95 off ramps to SW 8th Street and SW 7th Street during the AM and PM peak periods for the two alternatives. In Table 9.5 the available storage represents the left or right turn storage bay measured from the stop bar to the taper. The ramp length is measured from the stop bar to the gore point on the freeway and this distance is reduced to account for deceleration along the ramp. The deceleration distance (530 feet) is estimated per 2018 AASHTO Greenbook, Table 10-6. These procedures are consistent with the FDOT's Traffic Analysis Handbook, 2021.

As depicted in Table 9.5, queue lengths on the I-95 off-ramps are substantially reduced with the Recommended Alternative.

- **I-95 SB Off-Ramp Queues:** In the AM peak, queues on I-95 SB Off-ramp are reduced from approximately 9,275 feet (No Build) to approximately 1,685 feet (Recommended Alternative) – a reduction of approximately 7,590 feet. Similarly, in the PM peak, queues on I-95 SB Off-ramp are reduced from approximately 9,260 feet (No Build) to approximately 1,985 feet (Recommended Alternative) – a reduction of approximately 7,275 feet.
- **I-95 NB Off-Ramp Queues:** In the AM peak, queues on I-95 NB Off-Ramp are reduced from approximately 1,945 feet (No Build) to approximately 430 feet (Recommended Alternative) – a

reduction of approximately 1,515 feet. Similarly, in the PM peak, queues on I-95 NB Off-ramp are reduced from approximately 2,380 feet (No Build) to approximately 660 feet (Recommend Alternative) – a reduction of approximately 1,750 feet.

Queueing along the I-95 off-ramps is of critical importance to traffic operations and safety along the mainline. As depicted in **Table 9.5**, queueing occurs along SB I-95 mainline under the No Build Alternative along SB I-95 – queue lengths on the SB off-ramp extend over 9,200 feet (in AM and PM), whereas the ramp length is approximately 2,570 feet. Similarly, on the NB Off-Ramp, queues lengths under the No Build Alternative (1,945 feet in AM peak and 2,380 in PM peak) exceed the length of the ramp (680 feet) and will spill onto I-95 mainline. These safety and operational concerns are alleviated with the Recommended Alternative, as queueing is fully contained on the off-ramps in the AM peak and PM peak periods.

Network-wide MOEs: **Table 9.6** summarizes the network-wide MOEs during the AM and PM peak periods for the two alternatives. As depicted in the table, the Recommended Alternative consistently performs better than the No Build Alternative for all performance measures – average speed, total delay, latent delay, latent demand, total travel time, vehicle miles traveled and total stops. The operational improvements generated by the Recommended Alternative for these network-wide performance measures are very substantial.

Table 9.2: Travel Times - 2045 I-95 Mainline

AM PEAK		No-Build	Recommended	Change
I-95 Northbound	SW 25th Rd Entrance to ~1500 north of US-1 Entrance	3:08 (36 mph)	2:27 (46 mph)	-21%
I-95 Southbound	~1500' north of SW 7th St Exit to SW 25th Rd Exit	4:40 (23 mph)	2:01 (53 mph)	-57%
PM PEAK		No-Build	Recommended	Change
I-95 Northbound	SW 25th Rd Entrance to ~1500 north of US-1 Entrance	6:18 (18 mph)	6:14 (18 mph)	-1%
I-95 Southbound	~1500' north of SW 7th St Exit to SW 25th Rd Exit	3:28 (31 mph)	2:59 (36 mph)	-14%

Note: Percentages indicate comparisons to the No-Build Alternative.

Table 9.3: Throughput Volume - 2045 I-95 Mainline

AM PEAK (vehs)		No-Build	Recommended	Change
I-95 Northbound	North of South Miami Avenue On-Ramp	5718	6013	+5%
I-95 Southbound	South of SW 25 th Road Off-Ramp	1346	2071	+54%
PM PEAK (vehs)		No-Build	Recommended	Change
I-95 Northbound	North of South Miami Avenue On-Ramp	6247	6455	+3%
I-95 Southbound	South of SW 25 th Road Off-Ramp	1713	1878	+10%

Note: Percentages indicate comparisons to the No-Build Alternative.

Table 9.4: Travel Times - 2045 SW 8th Street and SW 7th Street

AM PEAK PERIOD (min:sec)		No-Build	Recommended	Change
SW 8 th Street (Eastbound)	8th Avenue to S Miami Avenue	3:58	3:02	-24%
SW 7 th Street (Westbound)	S Miami Avenue to 8th Avenue	6:18	3:44	-41%
PM PEAK PERIOD (min:sec)		No-Build	Recommended	Change
SW 8 th Street (Eastbound)	8th Avenue to S Miami Avenue	4:09	4:29	+8%
SW 7 th Street (Westbound)	S Miami Avenue to 8th Avenue	8:40	5:22	-38%

Note: Percentages indicate comparisons to the No-Build Alternative.

Table 9.5: 2045 Off-Ramp Queue Length Analysis

Intersection	Direction	Movement Available Storage (feet)		Ramp Length* (feet)	No-Build Max Queue (feet)				Recommended Max Queue (feet)			
					AM	Queue Contained in Ramp?	PM	Queue Contained in Ramp?	AM	Queue Contained in Ramp?	PM	Queue Contained in Ramp?
SW 8 th Street at I-95 off-ramp	NB Off-Ramp	R	300	680	1,945**	No	2,380**	No	430	Yes	660	Yes
	T		150									
SW 7 th Street at I-95 off-ramp	SB Off-Ramp	T	NA	2,570	9,275**	No	9,260**	No	1,685	Yes	1,985	Yes
	R		180									

Ramp length is the distance from stop bar to painted gore on the freeway reduced by deceleration length.

*Deceleration length per 2018 AASHTO Green Book, Table 10-6. Equals 530 feet for 60 mph design speed.

** Queue lengths exceed ramp length and spillback onto I-95 mainline

Table 9.6: 2045 Network-wide Performance

AM PEAK	No Build	Recommended	Change
Average Speed (mph)	20	34	70%
Total Delay (hr)	4,213	1,326	-69%
Latent Delay (hr)	13,910	3,343	-76%
Latent Demand	5,521	1,207	-78%
Total Travel Time (hr)	7,543	4,872	-35%
Total Stops	356,239	95,193	-73%
Vehicle Miles Traveled	154,235	164,487	7%
PM PEAK	No Build	Recommended	Change
Average Speed (mph)	16	22	38%
Total Delay (hr)	4,215	2,062	-51%
Latent Delay (hr)	5,370	1348	-75%
Latent Demand	1,826	1086.4	-41%
Total Travel Time (hr)	8,938	6,804	-24%
Total Stops	300,298	113,987	-62%
Vehicle Miles Traveled	146,284	146,054	0%

Note: Percentages indicate comparisons to the No-Build Alternative.

10.0 SAFETY ASSESSMENT

10.1 Recommended Alternative Safety Enhancements

As discussed under Section 3.5 of the IMR, traffic safety is a concern along the arterial network within the vicinity of the I-95/SR 90 Interchange. Several intersections within the vicinity of the interchange have historically experienced abnormally high crash rates. These include the existing I-95 ramp terminal intersections at SW 8th Street and 3rd Avenue, the ramp terminal intersection at SW 7th Street and SW 4th Avenue and the adjacent intersections. The extensive weaving activities at these locations, together with the excessive traffic flows have been identified as contributing factors to the abnormally high crash rates at these locations. The Recommended Alternative for the I-95/SR 90 Interchange will provide improvements to address these and other safety concerns within the influence area of the interchange. Safety improvements include:

- The proposed new on-ramp from SW 7th Street to NB I-95 will substantially reduce weaving activity within the vicinity of the interchange. In the existing condition, access to NB I-95 from SW 7th Street involves travelling a circuitous route – WB along SW 7th Street, SB along SW 4th Avenue and EB along SW 8th Street to the I-95 NB On-Ramps. These maneuvers are accomplished across multiple lanes within very short city blocks and this creates a high crash risk condition. The proposed new on-ramp from SW 7th Street will alleviate this condition by providing a direct access to NB I-95 for approximately 940/1040 vehicles that make this movement during the AM/PM peak hours (2045 estimates).
- The proposed new I-95 NB on-ramp will reduce conflicting movements at four high crash intersections: SW 8th Street at 4th Avenue; SW 8th Street at 3rd Avenue, SW 7th Street at SW 3rd Avenue and SW 7th Street at SW 4th Avenue. This reduction in conflicting traffic will correspondingly reduce crashes and in particular right angle crashes at these intersections.
- The proposed improvements will reduce the risk for queue spillback onto I-95 mainline. Vissim microsimulation analysis demonstrates that with the existing interchange configuration, queues at the I-95 SB off-ramp will exceed the available storage resulting in queue spillbacks onto I-95 mainline during AM and PM peak periods. This condition creates a major safety concern with

standing queues on I-95 mainline adjacent to high-speed traffic. This safety concern is significantly reduced by the Recommended Alternative due to the substantial reduction in the generated queue lengths and durations.

10.2 Predictive Crash Analysis – SW 8th Street and SW 7th Street

The Highway Safety Manual (HSM) is the premier guide for performing quantitative crash prediction analyses for road facilities. The HSM procedures were reviewed for applicability to the SR 90/SW 8th Street/SW 7th Street IMR. Through this review, it was determined that the current HSM procedures could not be directly applied for crash prediction along SW 7th Street and SW 8th Street due to the unique characteristics of these roadways – one-way facilities, similar to the study roads, are not currently covered by the HSM. Given these limitations, an alternative procedure was used for quantifying the estimated crashes along SW 8th Street and SW 7th Street under the Build and No Build conditions. This procedure is described below.

The safety analysis applied for the study arterials evaluated crash rates at the four intersections that would be primarily impacted by the proposed build improvements. These are:

- SW 8th Street & SW 3rd Avenue
- SW 8th Street & SW 4th Avenue
- SW 7th Street & SW 3rd Avenue
- SW 7th Street & SW 4th Avenue

The above four referenced intersections will experience a reduction in traffic under the Build condition when compared to the No Build Condition. This is due to the proposed new on-ramp for WB SW 7th Street to NB I-95 which removes traffic from the arterial network. This reduction in traffic is a change in exposure which can be used to estimate the change in crashes between Build and No Build. The process involved the following steps:

1. Compute observed intersection crash rates. This is computed from historical crash data collected in 2011 through 2015.

2. Compute No Build traffic exposure. This is computed as the total traffic entering each intersection from opening year (2025) through design year (2045) under No Build Conditions. It is estimated from the project traffic forecast.
3. Compute Build traffic exposure. This is computed as the total traffic entering each intersection from opening year (2025) through design year (2045) under Build Conditions. It is estimated from the project traffic forecast.
4. Compute estimated crashes under No Build Conditions. This is computed as the product from steps 1 and 2 above.
5. Computed estimated crashes under Build Conditions. This is computed as the product from steps 1 and 3 above.
6. Compute crash reduction. The is computed from the difference between results from steps 4 and 5 above.

Detailed calculations for the above procedure are contained under **Appendix J** and summarized in **Table 10.1**. As depicted in **Table 10.1**, the total estimated crashes under the No Build and Build Conditions are approximately 4,077 and 3,158 respectively. This is a reduction of approximately 919 crashes over the design life of the project if the Recommended Build Alternative is implemented. The crash reduction translates to crash savings of approximately \$133,586,000 (919 crashes reduced @ \$123,589 per crash) based on FDOT's average crash cost for similar facilities.

Table 10.1 Intersections Crash Prediction Summary

Intersection	Observed Crash Rate 2011 – 2015 (Crashes per MEV)	No Build Crashes 2025 – 2045	Build Crashes 2025 – 2045	Crash Reduction
SW 8th St. and SW 4th Ave.	6.427	1874	1546	328
SW 8th St. and SW 3rd Ave	2.532	664	463	201
SW 7th St. and SW 4th Ave	2.460	847	713	134
SW 7th St. and SW 3rd Ave	2.456	692	436	256
Total		4077	3158	919

10.3 Predictive Crash Analysis – I-95 Mainline

A quantitative safety analysis was performed for the I-95 Mainline per the HSM predictive crash procedures. Computations were performed using the Enhanced Interchange Safety Analysis Tool (ISATe). This spreadsheet-based tool automates the calculations in Part C of the HSM. The analysis required gathering various input data for I-95 segments, ranging from geometric elements, such as alignment and cross section data, roadside and ramp access data and average annual daily traffic (AADT) data. Additionally, historical crash data for I-95 was gathered for applying the Empirical-Bayes (EB) methodology which combines the HSM's predictive procedures with observed data to compute expected crashes. These procedures were used for comparing expected crashes throughout the design life of the project (2025 through 2045) under No Build and Build Conditions.

Per the HSM procedures, I-95 mainline was segmented into homogenous sections with consistent cross section, traffic volume, and similar geometric features. This segmentation resulted in 11 homogenous sections under the No Build condition and 12 homogenous segments under the proposed Build condition.

Appendix J contains lane schematics illustrating the segmentation of I-95, detailed input data and output

information from the analyses. It must be noted that due to limitations within the ISATe spreadsheet, a 24-year analysis is the maximum duration that can be evaluated. Therefore, ISATe documentation in **Appendix J** reports the analysis years as 2014 through 2034. However, the AADT coded for these horizon years reflect years 2025 through 2045 conditions. Additionally, ramps and ramp termini were not included in the HCM ISATe analysis as the proposed improvements will not significantly modify the existing ramps, except at the ramp terminals and modifications at the ramp terminals are considered in the arterial crash analysis evaluation. The proposed new NB I-95 on-ramp is considered in the safety analysis for I-95, with a new connection to the mainline in the Build Alternative. Results from the analyses are summarized in Table 10.2.

The results from the predictive crash analyses show no significant difference in the expected crashes along I-95 under the Build condition when compared to the No Build Condition. Notwithstanding, it is expected that the Build Condition will result in a reduction of crashes along I-95 mainline given that the proposed improvements will mitigate queue spillback onto I-95 mainline which occurs under the No Build Condition. The HSM procedures cannot explicitly model this queue spillback onto the mainline, hence it is not reflected in the results from the predictive crash analysis.

Table 10.2: I-95 Crash Prediction Summary

Crash Type	Expected Number of Crashes: 2025 - 2045		
	No Build	Build	Crash Difference
Multiple Vehicles	1412	1418	+6
Single Vehicle	601	598	-3
Total Crashes	2013	2016	+3

11.0 OTHER CONSIDERATIONS

11.1 Environmental Considerations

The project evaluation will require the completion of a Natural Resources Evaluation (NRE) in accordance with Chapter 9 (Wetland and Other Surface Waters), Chapter 16 (Protected Species and Habitat) and Chapter 17 (Essential Fish Habitat) of the FDOT PD&E Manual.

During the Efficient Transportation Decision Making (ETDM) screening for this project, the potential presence of wetlands associated with the Miami River was documented within the project area. Seagrass and corals are designated by the South Atlantic Fishery Management Council as Essential Fish Habitat (EFH) and as a Habitat Area of Particular Concern (HAPC). The replacement or expansion of the I-95 Bridge over the Miami River could impact corals and seagrass that may be present within the footprint of the project. The potential presence of and impact to wetlands (i.e. seagrass) will need to be evaluated in accordance with Chapter 9 (Wetland and Other Surface Waters) of the FDOT PD&E Manual. EFH will need to be evaluated in accordance with Chapter 17 (Essential Fish Habitat) of the FDOT PD&E Manual.

Based on the location of the potential bridge widening, an in-water benthic survey was conducted in July 2019 on the southeast quadrant of the bridge. No seagrass was observed and the bottom conditions consisting of rubble riprap, oyster shells and coarse sand are not conducive to seagrass growth. Should the presence of wetlands be identified, avoidance and/or minimization will be required. If avoidance and/or minimization is not practicable, a mitigation plan will be prepared. Best management practices (BMPs) shall be utilized during construction to avoid impacts to surface waters, and, if found to be present, wetlands. In addition, Environmental Resource Permit (ERP) or Right-of-Way (ROW) Permits may be required in accordance with federal, state, and local laws and regulations.

The replacement or expansion of the I-95 Bridge over the Miami River could affect listed species designated under the Endangered Species Act (ESA). Sea turtles and smalltooth sawfish are known to inhabit the area. The Miami River is designated as Critical Habitat for the manatee. An ESA evaluation will be included in the evaluation of protected species and habitat to be conducted per Chapter 16 (Protected

Species and Habitat) of the FDOT PD&E Manual. Avoidance and minimization measures will be required to limit impacts to listed species during construction.

The Miami River is part of the Biscayne Bay Aquatic Preserve [an Outstanding Florida Water (OFW)] and a recharge area of the Biscayne Aquifer (a Sole Source Aquifer)]. Widening the bridge may result in additional impervious surface area, resulting in increased surface and stormwater runoff into the surrounding waters. To address potential water quality impacts, an ERP may be required. Stormwater management measures and BMPs shall be implemented during construction to avoid water quality impacts to this resource

11.2 Anticipated Design Variations and Exceptions

No design exceptions or variations are anticipated at this time for implementation of the Recommended Alternative. As the project moves forward through final design and construction, any design variations or exceptions that should arise will be processed through the FDOT and the FHWA for approval.

11.3 Access Management

The proposed improvements will not adversely impact access to any property within the study area. Accordingly, an access management plan is not required for the proposed improvements.

11.4 Multimodal Accommodations

The associated PD&E Study for the IMR evaluated several alternatives for enhancing the multimodal facilities along SW 8th Street and SW 7th Street. These included improvements such as adding buffered bicycle lanes, widening sidewalks, and repurposing travel lanes to introduce bus lanes (see alternative arterial concepts under Section 6 of the IMR). These potential multimodal improvements were ultimately discarded from consideration consistent with local stakeholder preferences, the historical designation of the corridor and the project transportation needs. Notwithstanding, the proposed interchange

improvements will enhance safety benefits for pedestrian and bicyclists. Much of the safety enhancements for pedestrians and bicyclists will be realized through their reduced exposure to conflicting automobile and truck traffic, which will result from the proposed new I-95 on-ramp from NW 7th Street. This new on-ramp will reduce traffic exposure at four critical intersections:

- SW 8th Street at SW 4th Avenue
- SW 8th Street at SW 3rd Avenue
- SW 7th Street at SW 4th Avenue
- SW 7th Street at SW 4th Avenue

In addition to the reduced traffic exposure, pedestrians and bicyclists will benefit from upgraded roadway and traffic control facilities such as, updated signing and markings for pedestrians, signal system upgrades, and rehabilitation of facilities for ADA compliance.

12.0 JUSTIFICATION FOR PROJECT

The FHWA's Policy on Access to the Interstate System provides the requirements for the justification and documentation necessary to substantiate any proposed changes in access to the Interstate System. The policy is published under the Federal Register, Volume 74, Number 165, which was updated on May 22, 2017. The responses provided herein for both of the policy statements demonstrate compliance with these requirements and justification for the proposed interchange modifications at I-95 and SR 90/SW 8th Street/SW 7th Street in Miami-Dade County, Florida.

Policy:

It is in the national interest to preserve and enhance the Interstate System to meet the needs of the 21st Century by assuring that it provides the highest LOS in terms of safety and mobility. Full control of access along the Interstate mainline and ramps, along with control of access on the crossroad at interchanges, is critical to providing such service. Therefore, FHWA's decision to approve new or revised access points to the Interstate System under Title 23, United States Code (U.S.C.), Section 111, must be supported by substantiated information justifying and documenting that decision. The FHWA's decision to approve a request is dependent on the proposal satisfying and documenting the following requirements.

Considerations and Requirements:

- 1. An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).***

The operational analysis conducted for the IMR confirmed that the proposed interchange modifications are not expected to have any significant adverse impacts on safety and operations on the interstate facility (I-95). Analyses performed using both the HCM procedure and microsimulation techniques confirm that the Recommended Alternative will improve traffic operations along NB and SB I-95 within the area of influence of the interchange. In addition, traffic operations at the I-95 terminal intersections and adjacent intersections will be improved. The analyses indicate the following operational improvements in the design year (2045) along various segments of the study network:

NB I-95: The Recommended Alternative will improve travel times along NB I-95 by approximately 21% in the AM peak hour when compared to the No Build Alternative. In the PM peak hour travel times are approximately the same along NB I-95 in both the No Build and Recommended Alternative. The Recommended Alternative increases throughput traffic along NB I-95 by approximately 5% in the AM peak and 3% in the PM peak. It is noted that considerable traffic congestion occurs downstream along NB I-95, outside the project study area. This congestion, outside the study area, results in substandard operating conditions throughout NB I-95 in both the No Build and Recommended Alternative. The FDOT plans to address this congestion along I-95 in future projects.

SB I-95: The Recommended Alternative will improve travel times along SB I-95 by approximately 57% in the AM peak hour and 15% in the PM peak hour, when compared to the No Build Alternative. Furthermore, the Recommended Alternative increases throughput traffic along SB I-95 by approximately 54% in the AM peak and 10% in the PM peak. This dramatic improvement in operations in the southbound direction results from benefits generated by the Recommended Alternative in alleviating queue spillback from the off-ramp onto the mainline which occurs under the No Build Alternative. This is also a significant safety benefit resulting from the Recommended Alternative.

SW 8th Street Traffic Operations: The Recommended Alternative will improve travel times along SW 8th Street by approximately 24% during the AM peak with a minor increase of 8% during the PM peak period. The proposed new NB on-ramp will substantially reduce conflicting traffic at critical intersections - SW 8th Street at SW 4th Avenue; and SW 8th Street at 3rd Avenue (northbound ramp terminal). This reduction in traffic improves safety and operations at the intersections.

SW 7th Street Traffic Operations: The Recommended Alternative will improve travel times along SW 7th Street by approximately 41% during the AM peak period and 38% during the PM peak period.

The proposed new NB on-ramp will substantially reduce conflicting traffic at critical intersections - SW 7th Street at SW 3rd Avenue; and SW 7th Street at 4th Avenue (southbound ramp terminal). This reduction in traffic improves safety and operations at the intersections.

Network-wide Performance Measures: The Recommended Alternative generates significant improvements across all network-wide performance measures. These include: average speed (70%/38% increase in AM/PM peaks); total delay (69%/51% decrease in AM/PM peaks); latent demand (78%/41% decrease in AM/PM peaks); total travel time (35%/24% decrease in AM/PM peak); and total stops (73%/62% decrease in AM/PM peaks).

Safety Enhancements: The I-95 ramp terminal intersections at SW 8th Street and SW 7th Street and the adjacent intersections are high crash locations. The existing circuitous routes, extensive weaving maneuvers and excessive traffic volumes are all contributing causes to the abnormally high crash rates experienced at these intersections. In addition, the I-95 SB Off-ramp experiences extensive queueing during peak periods which often spills-back onto the mainline and creates a high crash risk condition. The No Build Alternative offers no improvements to address these contributing causes, hence the high crash rates will continue if no corrective measures are implemented. The Recommended Alternative addresses these contributing causes by:

- Providing direct access to NB I-95 from SW 7th Street (new on-ramp)
- Providing improved access to EB SW 8th Street from SB I-95 (simple and more efficient 2-phase signal at terminal intersection)
- Reducing conflicting traffic at critical intersections
- Mitigating risk of queue spillback onto I-95 mainline by increasing capacity and efficiency of the I-95 SB Off-ramp Terminal Intersection.

The above improvements will substantially improve safety conditions at the arterial intersections. It is estimated that the Recommended Alternative will generate crash reductions of approximately 919 crashes at the arterial intersections, over the design life of the project. This crash reduction translates to crash savings of approximately \$133,586,000 over the design life of the improvements.

The proposed interchange modifications will modify access to/from I-95 and necessitate changes to the current signing at the I-95/SR 90 Interchange. A conceptual signing plan for the interchange modifications is included under **Appendix K**. The signing plan will be fully coordinated with FHWA in advance of construction.

2. *The proposed access connects to a public road only and will provide for all traffic movements. Less than “full interchanges” may be considered on a case-by-case basis for applications requiring special access, such as managed lanes (e.g., transit or high occupancy vehicle and high occupancy toll lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)). In rare instances where all basic movements are not provided by the proposed design, the report should include a full-interchange option with a comparison of the operational and safety analyses to the partial interchange option. The report should also include the mitigation proposed to compensate for the missing movements, including wayfinding signage, impacts on local intersections, mitigation of driver expectation leading to wrong-way movements on ramps, etc. The report should describe whether future provision of a full interchange is precluded by the proposed design.*

The IMR proposes no new interchanges along I-95. The existing interchange provides access to public roads only. The improvements proposed at the interchange will maintain full access to SR 90/SW 8th Street/SW 7th Street and accommodate all movements.

The proposed improvements include a new northbound on-ramp from SW 7th Street to NB I-95. As discussed under response to Policy Point No. 1, the proposed new on-ramp will have no adverse impacts to traffic operations nor safety along I-95 mainline segments or the arterial segments of the study network.

13.0 FUNDING PLAN

Construction cost for the proposed improvements is estimated at \$19.7M. According to the FDOT's current Five-Year Work Program schedule, the project is a candidate for funding with final design allocations in 2024 and construction funding in 2029. These dates are subject to change as the Work Program is frequently updated and modified as project priorities change.

14.0 RECOMMENDATION

The information presented in the preceding sections of the IMR demonstrate that the proposed modifications for the interchange of I-95 and SW 8th Street/SW 7th Street satisfy the requirements for safety, operational and engineering (SO&E) acceptability. The proposed modifications satisfy the FHWA's Policy Points and the improvements will fulfil the purpose and need for the project. Based on these findings, it is recommended that the proposed improvements be advanced for formal approval and implementation.

Appendices:

Appendix A: MLOU

Appendix B: Data Collection Report

Appendix C: Vissim Existing Conditions Calibration Report

Appendix D: Traffic Signal Timing Sheets

Appendix E: LOS Analysis – Existing Conditions

- HCS 2015 (freeway segments)
- Synchro 2015 (intersections)

Appendix F: Safety Analysis Technical Memorandum

Appendix G: LOS – No Build

- HCS 2025 (freeway segments)
- HCS 2045 (freeway segments)
- Synchro 2025 (intersections)
- Synchro 2045 (intersections)

Appendix H: LOS Build Alternatives

- HCS 2045 Build B-1
- Synchro 2045 Build B-1
- HCS 2045 Build B-2
- Synchro 2045 Build B-2
- HCS 2045 Build B-3
- Synchro 2045 Build B-3
- HCS 2045 Build 4-4
- Synchro 2045 Build 4-4
- HCS 2045 Build B-5
- Synchro 2045 Build B-5
- HCS 2045 Build B-6
- Synchro 2045 Build B-6
- HCS 2025 Build B-7
- HCS 2035 Build B-7

- HCS 2045 Build B-7
- Synchro 2025 Build B-7
- Synchro 2035 Build B-7
- Synchro 2045 Build B-7

Appendix I: Vissim Outputs (2045 No Build and Recommended Alternative)

Appendix J: Predictive Crash Analysis

Appendix K: Recommended Alternative Concept Signing Plan