STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

OFFICE OF PLANNING AND ENVIRONMENTAL MANAGEMENT

SR 9 (I-95) & SW 10th Street (SR 869)
SYSTEMS INTERCHANGE MODIFICATION REPORT
Sample Road to Hillsboro Boulevard

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT 4
3400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

September 2021

System Interchange Modification Report(SIMR)

Interstate 95 and SW 10th Street (S.R. 869)

Sample Road to Hillsboro Boulevard

FPID: 436964-1-22-02

Florida Department of Transportation

Determination of Safety, Operational and Engineering Acceptability

Acceptance of this document indicates successful completion of the review and determination of 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.

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QUALITY CONTROL CERTIFICATION FOR INTERCHANGE ACCESS REQUEST SUBMITTAL

Submittal Date: September 9, 2021

FM Number: 436964-1-22-02

Project Title: SR 9 (I-95) Systems Interchange Modification Report – Sample Road to Hillsboro Boulevard

District: Four

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Document Type: ☐ MLOU ☐ IJR ☐ IMR ☐ IOAR ☑OTHER SIMR

Status of Document (Only complete documents will be submitted for review; however, depending on the complexity of the project, interim reviews may be submitted as agreed upon in the MLOU)

Draft Submittal

Quality Control (QC) Statement

This document has been prepared following FDOT Procedure Topic 525-030-160 (New or Modified Interchanges) and complies with the FHWA's two policy requirements. Appropriate District-level quality control reviews have been conducted, and all comments and issues have been resolved to their satisfaction. A record of all comments and responses provided during QC review is available in the project file or Electronic Review Comments (ERC) system.

Requestor: DocuSigned by: Robert Bostian 012207GDFB0B4BA... Date: 9/10/2021 | 12:51 PM EDT

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Engineer's Certification

I, Shitao(Kevin) Gu, PE number 66612, certify that I currently hold an active Professional Engineer's License in the State of Florida and I am competent through education or experience to provide engineering services in the civil and traffic engineering disciplines contained in this report. I further certify that this report was prepared by me or under my responsible charge as defined in Chapter 61G15-18.001 F.A.C. and that all statements, conclusions and recommendations made herein are true and correct to the best of my knowledge and ability.

Project Description: SR 9 (I-95) Systems Interchange Modification Report – Sample Road to Hillsboro Boulevard

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EXECUTIVE SUMMARY

The primary purpose of the I-95 Systems Interchange Modification Report (SIMR) project is to identify the long-term needs of I-95 interchange at SW 10th Street (SR 869) and the adjacent interchange at Hillsboro Boulevard (SR 810) through 2040, to develop design concepts to address traffic spillbacks onto I-95, improve interchange operations, reduce congestion, and enhance safety, and to obtain the determination of safety, operational and engineering(SO&E) acceptability of the preferred alternative, Build 2. This SIMR evaluates the traffic operations of the No-Build, Build 1, and Build 2 alternatives and also presents the performance of Build 2 with the presence of the SW 10th Street Connector Lane PD&E Study preferred alternative as Build 2 sub-scenario.

The information and analyses indicate that several of the merge, diverge and weaving areas have been designated as High Crash Locations at some point within the last three years of analysis (2013-2015). Similarly, the No-Build Alternative is projected to experience operational failures at multiple merge, diverge and weave locations along I-95 within the study interchanges. It is important to note that both Build alternatives have similar modifications to SW 10th Street and differ only in their forecast traffic volumes depending on provisions of direct-connect ramps between I-95 Express Lanes (ELs) and SW 10th Street connector lanes. Build 1 has no direct-connect ramps and Build 2 has direct-connect ramps terminating west of Military Trail. For Build 2, a sub scenario with higher traffic demand was also evaluated. The sub scenario of Build 2 has direct-connect ramps connecting to Sawgrass Expressway (refer to Conceptual Plans in Appendix J). The following modifications are proposed to the SW 10th Street interchange configuration for Build alternatives:

Southbound Ramp Terminal at SW 10th Street:

- The traffic signal for the westbound left-turn from SW 10th Street traffic to southbound I-95 will be eliminated and combined with the I-95 southbound off-ramp signal.
- The existing single westbound left turn lane will be converted into dual westbound left-turn lanes and the storage will be extended approximately 250 feet east of the northbound off-ramp signal.
- A barrier separation will be provided between the eastbound through lanes and the eastbound to northbound right turn movement to eliminate weaving and allow for concurrent movement of the southbound left turn and eastbound right turn movement. The single lane eastbound to northbound loop ramp will be widened to provide for two lanes.
- The existing single free-flow southbound right turn lane has been widened to provide for signal controlled dual right-turn lanes to improve operations and safety in the westbound direction. In addition, a signal will provide adequate gaps for pedestrians to cross the SB off-ramp safely to address the safety concern for

pedestrians in the cross-walk. Also, due to the proximity of the signalized intersection at Newport Center Drive, the free-flow right turn induces weaving with the westbound traffic. This condition is likely to become worse with the introduction of the access to the westbound connector lanes immediately west of the Newport Center Drive.

Northbound Ramp Terminal at SW 10th Street:

- The westbound to northbound left-turn movement will be converted to a free-flow westbound to northbound right turn movement. This eliminates the westbound left turn phase and provides more green time to the eastbound movement.
- The northbound off-ramp will be widened to provide for triple left turn and triple right turn lanes.
- The eastbound to northbound loop ramp and the westbound to northbound on-ramp will merge together before merging with the I-95 mainline traffic.

Proposed modifications to the interchange are recommended to address projected deficiencies in the future. Listed below are specific modifications and projected benefits:

- The proposed Build 1 and 2 alternatives with a 7,900 foot SB auxiliary lane on I-95 between the SB entrance ramp from SW 10th Street and the SB exit ramp to Sample Road creates a 4-lane mainline segment on SB I-95 and is projected to significantly improve the operations in the SB direction.
- The proposed NB braided ramps at the SW 10th Street interchange and the SB braided ramps at Hillsboro Boulevard not only reduce the number of merge and diverge points along I-95 but also provides for longer off-ramp storage lengths. Freeway analysis projects significant improvements over the No-Build conditions in the merge, diverge and mainline operations in both directions.
- As discussed above, the SW 10th Street interchange ramp terminal improvements proposed under the Build 1 and 2 alternatives are projected to significantly improve the operations at the ramp terminals and potentially eliminate the possibility of off-ramp queues spilling on to the mainline.
- The proposed elimination of the SB on-ramp signal at SW 10th Street and the proposed improvements along SW 10th Street are expected to significantly improve the flow of traffic along the arterial, particularly at the interchange. The improved operations are projected to improve the safety along the corridor.
- For Build 2 alternative, a new I-95 NB on-ramp is introduced from WB SW 10 Street as a free-flow right turn on the NE quadrant of the interchange. The new I-95 NB on-ramp connects with EB on-ramp and the EB SW 10 Street Connector carrying traffic destined to the I-95 general-purpose lanes(GPLs). A combination of these on-ramps forms a NB CD

road. The NB CD road braids over the NB Hillsboro Boulevard off-ramp, continues northward, and connects with Hillsboro Blvd. EB and WB on-ramps. Then the NB CD road merges with the I-95 mainline north of Hillsboro Blvd. The proposed NB CD road is anticipated to shift a portion of I-95 mainline traffic between SW 10th Street and Hillsboro Boulevard, thereby relieving the mainline congestion.

These improvements are anticipated to address the traffic operation deficiencies by eliminating or improving the failing conditions within the interchange influence area and improving safety along SW 10th Street and Hillsboro Boulevard. A traditional crash reduction analysis shows that the proposed improvements are likely to reduce approximately 42 crashes per year resulting in an annual safety benefit of more than six (6) million dollars.

Considering the overall operations along I-95, ramp terminals, and along Hillsboro Boulevard and SW 10th Street, Build 2 Alternative is projected to provide better operating conditions than Build 1 and No-Build alternatives. Similar VISSIM analysis conducted under the SW 10th Street Connector PD&E Study, FM 439891-1, confirms that a sub scenario of Build 2 Alternative with higher traffic demand is expected to provide better operations than the No-Build alternative in 2040 and the proposed interchange modifications under Build 2 Alternative can handle the additional traffic demand with the planned SW 10th Connector Lanes (FM 439891-1)

Access Management Plan and the typical section package were prepared and are contained in Appendix R.

The Federal Highway Administration's (FHWA's) adopted policy on *Access to the Interstate System* became effective on May 22, 2017 and replaced the policy of August 27, 2009 on *Access to the Interstate System*, published at 74 Federal Register 43743. The changes in this policy were made to ensure this policy focuses on safety, operational, and engineering issues. The consideration of social, economic, and environmental impacts discussed in the 2009 policy are removed from this policy. However, the removal from this policy does not eliminate the need to consider those matters. Those issues will be addressed under the National Environmental Policy Act and other statutes and regulations applicable to the approval process.

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 level of service 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, the Federal Highway Administration's (FHWA) 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, and ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis should, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (Title 23, Code of Federal Regulations (CFR), paragraphs 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, should 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 should 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 should 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 SIMR confirmed that the proposed interchange modifications are not expected to have any adverse impacts on safety and operations on the interstate facility (I-95). The proposed elimination of the loop ramp in the northeast quadrant of the Hillsboro Boulevard interchange will remove the weaving movement between the ramp terminals and thereby improve the safety and flow of traffic along Hillsboro Boulevard. The proposed improvements along SW 10th Street under the Build 2 alternative is expected to significantly improve the operations at the NB off-ramp terminal intersection from LOS E and F to LOS C and B. According to the VISSIM analysis, the queue length at the NB and SB off-ramp at SW 10th Street is anticipated to exceed the off-ramp length for the 2040 No-Build conditions and it could adversely impact the flow of traffic along I-95. The proposed improvements under the 2040 Build conditions are projected to significantly reduce the queue length for this ramp and should prevent the queue from adversely affecting the operations along I-95. In terms of average travel speeds along the I-95 mainline derived from the HCS freeway segment analysis, the Build Alternative 2 is expected to increase travel speed from 58 MPH to 66 MPH during the AM peak hour and from 59 MPH to 67 MPH during the PM peak hour.

The projected failing conditions, where demand exceeds capacity extensively, under the No-Build Alternative are expected to increase future crash risk within the project corridor. This

potential for increased crash risk is alleviated by the capacity improvements proposed in the Build 2 Alternative.

Many of the improvements proposed for this project such as adding a collector-distributor (C-D) road, express lane direct connection, and braided ramps are not supported by the procedures in the Highway Safety Manual (HSM). The limitations in the HSM analysis methodology does not capture the benefits of the proposed operational and capacity improvements proposed under the Build 2 alternative and consequently does not quantify the crash reduction in a meaningful way for this project.

I-95 EL lanes are proposed to directly connect with ramps to and from west along SW 10th Street. I-95 EL lanes are proposed to braid over GP lanes to connect to off-ramps, and thus eliminate the need for two-sided weaving. The proposed C-D road between Hillsboro Blvd. and SW 10th Street eliminates the existing weaving section between these interchanges , thereby reducing I-95 merge and diverge conflict points from five(5) in the southbound direction to four(4) conflict points, and from six(6) in the northbound direction to four(4) conflict points. A traditional crash reduction analysis was conducted to quantify the potential safety benefits of the proposed freeway, interchange, and arterial improvements. The analysis shows that the proposed improvements are likely to reduce approximately 42 crashes per year resulting in an annual safety benefit of more than six (6) million dollars.

The comparison between No-Build and Build Alternative 2 Sub Scenario for year 2040 conditions shows greater benefits of the Build 2 alternative in terms of annual travel time saving, network-wide delay and speed, and queue lengths on the SW 10th Street off-ramps. Build Alternative 2 Sub Scenario incorporates the approved SW 10th Connector, thereby inducing additional traffic demand.

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.*

This SIMR does not propose any new interchanges along I-95. These existing interchanges provide access to public roads only. The improvements proposed at the interchanges will maintain full access to the existing cross streets and accommodate all movements

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1 PROJECT OVERVIEW

1.1 Introduction

At the request of the Department and as part of Financial Project ID 436964-1, a traffic analysis was undertaken to identify the long-term needs of the project area through 2040 and to develop design concepts to address traffic spillbacks onto I-95, improve interchange operations, reduce congestion, and enhance safety at the study interchange of I-95 at SW 10th Street (SR 869) and adjacent interchanges at Hillsboro Boulevard (SR 810) and Sample Road (SR 834). The study area is located within the City of Deerfield Beach in northeast Broward County, Florida. The project area includes I-95 (SR 9) from south of Sample Road (SR 834) (MP 21.601) to north of Hillsboro Boulevard (SR 810) (MP 24.641). **Figure 1.1** provides a Project Location Map. This System Interchange Modification Report (SIMR) provides the justification documentation for the proposed interchange access modifications to the SW 10th Street and Hillsboro Boulevard interchanges along I-95.

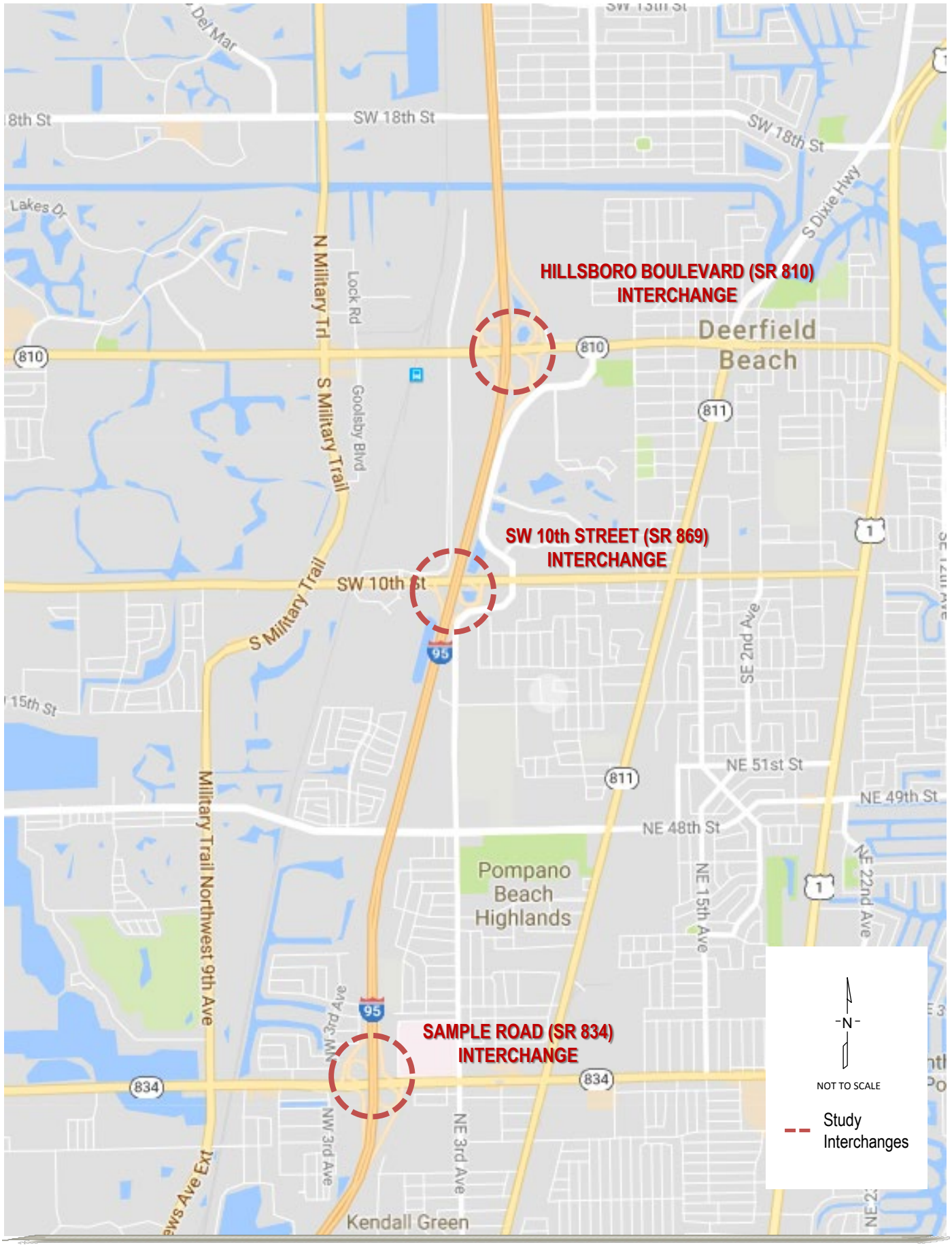
1.2 Purpose and Need for Project

The purpose of this project is to eliminate various existing operational and safety deficiencies along I-95 between and including the interchanges at SW 10th Street and Hillsboro Boulevard, and also on SW 10th Street and Hillsboro Boulevard in the vicinity of I-95. The primary need for the project is based on capacity/operational and safety issues, with secondary considerations for the needs of evacuation and emergency services, transportation demand, system linkage, modal interrelationships, and social demands and economic development.

1.3 Planned and Programmed Transportation Projects

Applicable Master Plans, Strategic Intermodal System (SIS) Plans, Florida Department of Transportation's (FDOT's) Five (5) Year Work Program, interchange planning and safety studies performed by FDOT District Four and future projects identified in the Palm Beach Metropolitan Planning Organization (MPO) Transportation Improvement Program (TIP), Palm Beach MPO 2040 Long Range Transportation Plan (LRTP), local government comprehensive plans, and active Development of Regional Impact (DRI) applications were reviewed to identify any planned and programmed improvements within the study limits of the SIMR. Additionally, the I-95 Express Lanes Phase 3 Design was also reviewed to identify programmed improvements within the SIMR limits. The proposed improvements within the SIMR limits were developed to be consistent with these plans.

Figure 1.1: Project Location Map



1.3.1 FDOT Plans and Projects

The I-95 Express Phase 3B-2 project from Stirling Road to Linton Boulevard is currently under preliminary design and was let in FY 2019 as a Design-Build project. This project will introduce 2 tolled express lanes in place of the existing High Occupancy Vehicle Lane. The I-95 Corridor Design Consultant (CDC) is analyzing this project to ensure its compatibility with the I-95 SIMR. This SIMR supersedes the Corridor Traffic Analysis Report (CTAR) and subsequent amendments within this I-95 interchange project.

In addition, there is an ongoing SW 10th Street Connector PD&E Study (FPID 439891-1) which is studying the feasibility of connecting the existing Sawgrass Expressway from Florida's Turnpike to I-95 through managed lanes. Also, three Interchange Access Requests (IARs) previously approved with the AOI are listed below and reflected in the No-Build Alternative:

I-95 at Hillsboro Boulevard Interchange Operational Analysis Report (IOAR), September 2015 (constructed)
SR 9/I-95 at SW 10th Street Interchange Modification Report (IMR), August 2013 (constructed)
Sample Road (SR834)/Copans Road/Atlantic Boulevard (SR814) Interchange SR 9(I-95) System Interchange Modification Report (SIMR), November 2014 (under construction with I-95 Express Phase 3B-1)

Every effort has been taken to maintain consistency between this SIMR and the approved SW 10th Street Connector PD&E Study, FM 439891-1.

Additional details on the constructed FDOT projects within the SIMR study limits are as follows:

I-95 Express Phase 3B-1

Financial Number: 433108-6-52-01 & 433109-4-52-01
Project Limits: I-95 from south of SW 10th Street to south of Glades Road in Broward and Palm Beach counties.
Start Date: July 10, 2017
Completed: Spring 2022
Estimated Construction Cost: $102 million
Scope of Work:

Widen and convert the existing I-95 HOV Lanes to Managed Lanes which will result in two tolled Express Lanes in each direction.
Other activities include construction of I-95 northbound and southbound auxiliary lanes between Hillsborough Boulevard and Palmetto Park Road and construction of a northbound auxiliary lane between the SW 10th Street entrance ramp and the Hillsborough Boulevard exit ramp.

I-95 Interchange Improvements from Hillsboro Boulevard to SW 10th Street

Financial Number: 430932-1-52-01
Project Length: 1.5 miles
Project Limits: I-95 from the Hillsboro Boulevard entrance ramp to SW 10th Street
Start Date: January 5, 2015
Completed: Spring 2018
Contractor: Community Asphalt Corp.
Estimated Construction Cost: $4.5 million
Scope of Work:

This is one (1) of five (5) interchange improvements throughout Broward and Palm Beach Counties. Work at this location included the following:

Added SB auxiliary lane on I-95 from eastbound Hillsboro Boulevard to I-95 southbound entrance ramp to the SW 10th Street exit ramp.
Widened the SB I-95 exit-ramp to provide a two-lane exit from I-95 with free-flow southbound right turn and two exclusive southbound left turn lanes at the SW 10th Street SB off-ramp terminal.
The free-flow southbound right turn lane was extended to the Newport Center Drive intersection as an exclusive westbound right turn lane.
Utility relocation, milling and resurfacing of existing pavement, bridge widening, and installation of barrier walls, curbs, sidewalks, guardrail, drainage, overhead signs, signing and pavement marking, signals, lighting and retaining walls.

Hillsboro Boulevard Improvements Project in Deerfield Beach

Financial Number: 430602-1-52-01
Project Length: 2.32 miles
Project Limits: Hillsboro Boulevard from Military Trail to US 1 in Deerfield Beach
Start Date: January 3, 2017
Completion Date: Early 2018
Contractor: General Asphalt Co.
Estimated Construction Cost: $9.4 million
Scope of Work:

The improvements under this project consisted of the following:

Improved the off-ramp from NB I-95 to EB Hillsboro Boulevard including the addition of a new signalized intersection and second lane to increase capacity.
Relocated and upgraded drainage structures, upgraded crosswalk ramps to meet ADA requirements, constructed new stamped asphalt crosswalks from east of Natura Boulevard to US 1.
Upgraded existing pedestrian signals to countdown timers, upgraded signalized intersections to

mast arms, and installed new decorative lighting.
Constructed new medians east of SE 2nd Avenue, removed old asphalt and resurfaced the roadway, upgraded signs and pavement markings to reflect the new roadway configuration as follows: (1) Military Trail to Dixie Highway - three 11-foot lanes in each direction (2) NE / SE 2nd Avenue to US 1 - two 11-foot lanes in each direction with a bike lane or sharrows in each direction as follows: (i) Military Trail to NW/SW 2nd Terrace - 4-foot bike lane (ii) NW / SW 2nd Terrace to NE / SE 2nd Avenue - Sharrow symbols to designate that the outside travel lane will be shared with vehicles (iii) NE / SE 2nd Avenue to US 1 - 7-foot bike lane.

Sample Road Interchange Ramp Improvements:

Financial Number: 436958-1-52-01
Project Length: 1.12 miles
Project Limits: I-95/SR-9 at Sample Road Interchange

The improvements under this project consisted of the following:

Combine the WB to SB loop on-ramp from Sample Road with the EB to SB slip on-ramp from Sample Road to create a single on-ramp merge on the mainline.
Combine the EB to NB loop on-ramp from Sample Road with the WB to NB slip on-ramp from Sample Road to create a single on-ramp merge on the mainline.

1.4 Requestor Information

This I-95 Systems Interchange Modification Report (SIMR) has been prepared for the Florida Department of Transportation, District Four. For information on the SIMR, please contact the Department's Project Manager at the following address:

Robert E. Bostian, Jr., PE, Project Manager FDOT- District 4

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2 METHODOLOGY

The methodology applied for the I-95 SIMR is documented in the Methodology Letter of Understanding (MLOU) dated November 2019 which includes Amendments #1 and #2 to the original MLOU signed in May 2017. The MLOU was approved by FDOT District 4, Systems Implementation Office of FDOT Central Office, and Federal Highway Administration (FHWA). The MLOU outlines the criteria, assumptions, processes, analyses and documentation requirements for the project. The project has changed from being a programmatic project to a non-programmatic project due to the system-to-system connection between I-95 and Sawgrass Expressway. The approved MLOU is included in **Appendix A** for ease of reference. The following summarizes some of the more prominent topics covered under the MLOU.

2.1 Area of InfluenceI-95 Mainline

The Area of Influence (AOI) along I-95 (SR 9) will include the freeway merge/diverge ramps at the adjacent interchanges to the south and north of SW 10th Street including ingress/egress ramps to/from I-95 Express lanes. The adjacent interchange south of SW 10th Street is Sample Road (SR 834) and the adjacent interchange north of SW 10th Street is Hillsboro Boulevard (SR 810). **Figure 2.1** provides a graphical representation of the AOI.

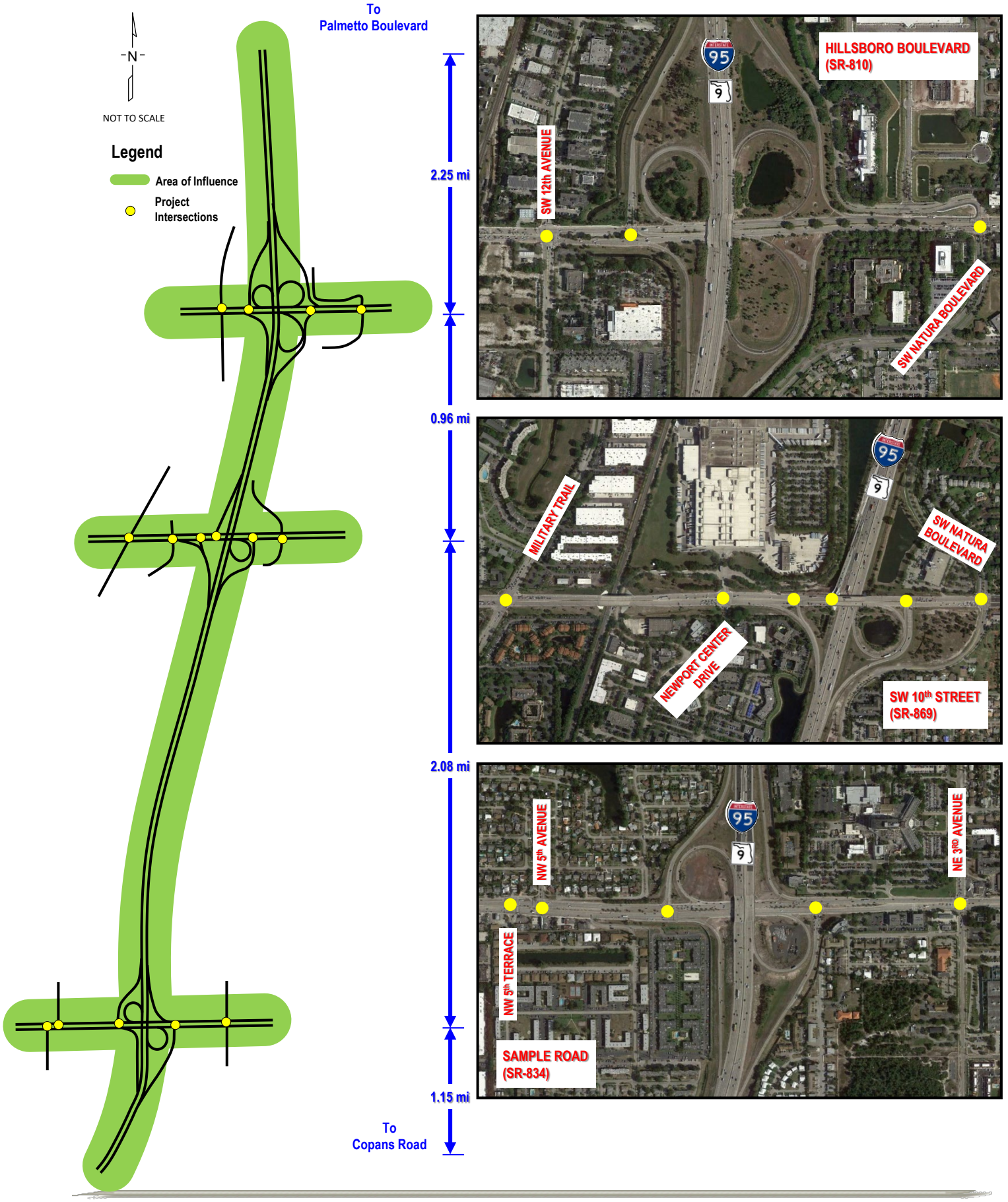
2.1.1 Along Crossroads

The AOI will include the intersections identified in **Table 2.1** below.

Table 2.1: Proposed Study Intersections

Interchange	List of Intersections
Sample Road (SR 834)	• I-95 NB off ramp at Sample Road • I-95 SB off ramp at Sample Road • Sample Road at NW 5th Terrace • Sample Road at NW 5th Avenue • Sample Road at NE 3rd Avenue
SW 10th Street (SR 869)	• I-95 NB ramps terminal at SW 10th Street • I-95 SB on ramp at SW 10th Street • I-95 SB off ramp at SW 10th Street • SW 10th Street at S. Military Trail • SW 10th Street at Newport Center Drive • SW 10th Street at Natura Boulevard
Hillsboro Boulevard (SR 810)	• I-95 NB off ramp at Hillsboro Boulevard • I-95 SB off ramp at Hillsboro Boulevard • Hillsboro Boulevard at SW 12th Avenue • Hillsboro Boulevard at Natura Boulevard/Fairway Drive

Figure 2.1: Area of Influence



2.2 Analysis Years

The analysis years for the project were determined as follows:

For Traffic Forecasting:

- Base year 2005
- Horizon year 2035

For Traffic Operational Analysis:

- Existing year 2016
- Opening year 2020
- Design year 2040

2.3 Travel Demand Forecasting

2.3.1 Selected Travel Model

The modeling effort was coordinated between FDOT District 4 and Florida's Turnpike to produce consistent traffic forecasts for various traffic studies on major corridors - I-95, SW 10th Street Connector, Sawgrass Expressway Widening, and Florida's Turnpike Widening. The travel demand forecasts for the SW 10th Street SIMR were prepared by Florida's Turnpike in conjunction with the SW 10th Street PD&E and Sawgrass Widening PD&E studies. At the beginning of the forecast effort in late-2016, the Florida's Turnpike developed the project-level SERPM 6.54 FTE for use in this study. The SERPM 6.54 FTE included network and socioeconomic data updates consistent with SERPM 7. District 4 approved the use of the SERPM 6.54 model at the onset of the project since the effort was being conducted by the Florida's Turnpike. Additionally, District 4 conducted a reasonability test comparing SERPM 7 with SERPM 6.54 in anticipation of future questions. As documented in the SW 10th Street Subarea Model validation dated December 2017, the comparative analysis found the models to be relatively similar indicating reliability of forecasted volume along the corridor.

The project traffic forecasts for this study were developed through a multi-step process. With the need to estimate dynamically tolled express lane traffic along I-95 for the Build alternatives, the methodology used two modeling tools:

- SERPM Travel demand model
- Express Lanes Time-of-Day Model (ELToD)

Forecasted AADT and EL hourly traffic were derived from these two models. This information was used to derive future year directional design hour traffic (DDHV). Model-generated origin-destination trip matrices also provided inputs to operational simulation models for the No-Build and Build alternatives.

As mentioned above, the study used the FTE version of the Southeast Regional Planning Model (SERPM-FTE) 6.5.4, which has been used for various studies, including the I-95 Express Lanes Traffic and Revenue study and the Sawgrass Expressway Widening PD&E study. The SERPM covers a three-county region in Southeast Florida: Palm Beach, Broward, and Miami-Dade. SERPM-FTE includes model network enhancements such as the recoding of interchange configurations along the major freeway networks in Southeast Florida and updates to the future land use data to reflect the best-known information at the time. The SERPM produces travel demand forecasts at a daily level and by three time periods: AM Peak (6:30 AM – 9:30 AM), PM Peak (3:30 PM – 6:30 PM), and off-peak (remainder of the day).

The Express Lane Time of day (ELToD) model works in conjunction with the SERPM and is designed to take daily and peak period subarea trip tables and produce traffic estimates by hour, by direction, for both the general purpose lanes (GPLs) and ELs for each roadway segment. The model is considered state-of-the-practice for forecasting travel demand on Express Toll lanes in Florida.

2.3.2 Model Validation Methodology

The model development for this project consisted of enhancing the local subarea by recoding intersection configurations, splitting Traffic Analysis Zones (TAZs), and adding local streets important to local circulation around the study corridor. Within the subarea, the highway network coding was reviewed and corrected as needed using aerial imagery. The SERPM was validated to 2010 traffic conditions in an iterative fashion by first adjusting link speeds at the regional level and using the CUBE Analyst process at the subarea level.

A CUBE Analyst process was used at the subarea level to adjust the origin-destination matrices to obtain a better correlation between observed counts and model estimates. The CUBE Analyst process is a matrix estimator that uses a seed origin-destination matrix along with link level traffic counts to develop an origin-destination matrix in an iterative fashion that corresponds to model-estimated volumes which closely match the provided link counts.

The adjustments to origin-destination tables by the CUBE Analyst process were calculated by subtracting the original subarea origin-destination table from the adjusted origin-destination table by time period. This adjustment (also known as validation Delta) was applied to the future year model estimated origin-destination tables.

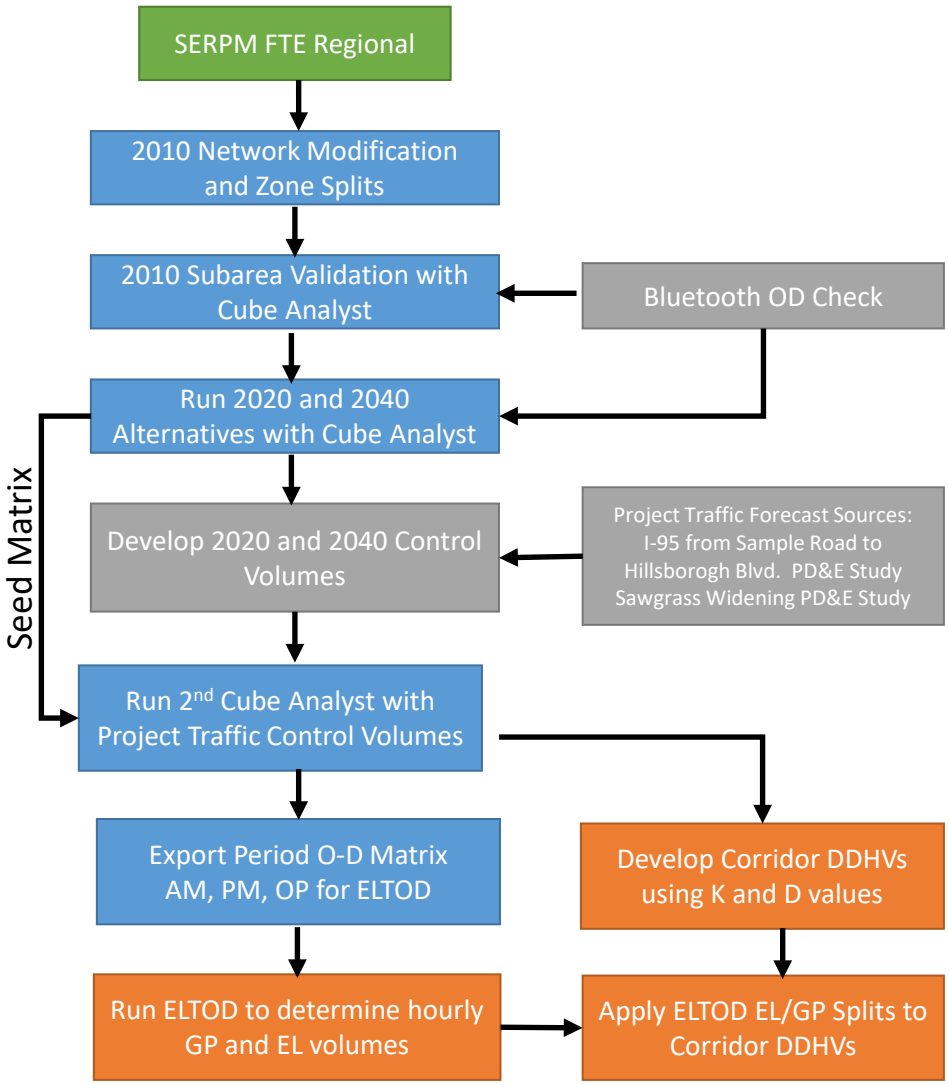
2.3.3 Project Traffic Forecast Development Methodology

The development of the project traffic forecast was a multi-step effort involving a combination of internal modeling procedures and post-model evaluation. **Figure 2.2** illustrates the process beginning with the regional model. After the SERPM-FTE project model was validated against the 2010 traffic conditions, the future year model runs were conducted for the 2020 and 2040

No-Build and Build alternatives. The results of the future year Build alternatives were checked against the Bluetooth Origin-Destination data to see if the traffic between the Turnpike and I-95 Corridors that diverted to the SW 10th Street from the other interchanges was reasonable.

The traffic forecasting methodology used for each approach of each intersection was based on the 2016 AADT (from the field), and 2010 and 2040 SERPM model volumes. The recommended 2040 AADTs were calculated by applying the model growth rate to the 2016 AADT. For all the roadway links, the 2016 and 2040 AADT have been compared, and a minimum compound growth rate of 0.5% has been adopted. Then the 2020 and 2030 volumes were interpolated using 2016 AADT and recommended 2040 volumes.

Figure 2.2: Project Traffic Forecast Development Process



Once the No-Build forecast was determined for 2040, the Build project forecast was determined by applying the model differences to the No-Build project forecast. For example, 2040 Build 2 project traffic forecasts = 2040 No-Build project traffic + (2040 Build 2 Model – 2040 No-Build Model).

Once project traffic forecast volumes were established as control values, a second CUBE Analyst step was implemented to adjust the initial trip tables to match with the forecast values at selected links in the subarea. The final adjusted trip tables were assigned to the subarea networks for each scenario to produce the 2020 and 2040 forecasts on all links with and without control totals. Finally, the second CUBE Analyst assignment results were checked, smoothed, and rounded to produce the project forecast AADTs.

The final forecasted AADTs from the subarea model, along with K-factors and D-factors, were used to develop corridor-level directional design hour volume (DDHV). For express lane locations, the Subarea model peak period trip tables were then exported to ELToD to determine hourly traffic for the general purpose and express toll lanes.

2.3.4 Adjustment Procedures

If the model growth rate was less than the recommended 0.5% growth rate, a 0.5% growth rate was utilized. Otherwise, the growth factor calculated based on the model volumes was used. Then the 2020 and 2030 volumes were interpolated using 2016 AADT and recommended 2040 volumes. For the roadway segments where the 2040 model volumes are lower than the 2010 model volumes, or are not included in the model network, the future 2020, 2030, and 2040 AADTs were calculated using 2016 AADT and a compound growth factor of 0.5%.

The No-Build Alternative for the I-95 PD&E study and the SW 10th Street PD&E study is the same. Hence, there is a need to achieve a consistent project forecast between the two projects. The forecast approach discussed with FDOT District 4 and Turnpike staff was to determine a project forecast for the No-Build Alternative consistent with the I-95 PD&E study and pivot from these forecasts using the impacts identified from the SW 10th Street PD&E model. The methodology outlined in the Traffic Data Collection and Traffic Projections Report for the I-95 PD&E study was to apply a growth rate of 0.5 percent or model growth (whichever is greater) to the 2016 traffic volumes. Since the SW 10th Street Study I-95 study limits extend beyond the I-95 PD&E study limits (from Sample Road to Hillsboro Boulevard), a 0.5 percent growth rate was applied for the interchanges south of Sample Road, and the raw subarea SW 10th Street model results were used north of Hillsboro.

2.4 Traffic Factors

The directional design hour volumes (DDHV) development process for the I-95 SIMR involved the application of the standard procedure of adjusting the Annual Average Daily Traffic (AADT) volumes with the Standard K and D30 traffic factors. However, it was adjusted to produce AM and PM peak hour volumes along the different corridors as follows:

Standard K was applied to the highest peak hour period between AM or PM; the other period K factor was determined as a ratio based on existing counts.
I-95 mainline Calculated K = 7.0% was proposed
Standard K = 8.0 was applied to I-95 ramps and along the crossing corridors between the I-95 Ramps. Other K factors were based on existing and historical counts. D factors were calculated by link for each peak period based on existing and historical data.
Daily truck percentages(24T) and design hour truck percentages (DHTf) were calculated for each intersection or link based on existing and historical data. A minimum DHTf factor of 2.0% was used.
PHF for Existing Year Analysis was based on existing counts. PHF for Future Year Analyses: PHF=0.95 for I-95 Mainline and ramp movements, and PHF=0.92 for cross streets.
TMTool, rounding and balancing were conducted; therefore, the final K and D may not match the initial values.

The proposed traffic factors for this SIMR are summarized on **Table 2.2**

Table 2.2: Existing Traffic Factor Values

Roadway	K%	D%	24T%	DHTf(1)%	PHF(2)
I-95 Mainline	7.0	50.5 to 56.7	4.0 to 6.0	2.0 to 3.0	0.95
I-95 Ramps	8.0	100	4.0 to 6.0	2.0 to 3.0	0.95
SW 10th Street	5.7 to 12.8	50.0 to 83.4	3.0 to 8.0	2.0 to 3.0	0.92
Hillsboro Boulevard	3.6 to 9.0	50.0 to 93.3	3.0 to 9.0	2.0	0.92
Sample Road	3.9 to 9.5	50.7 to 71.2	3.0 to 7.0	2.0 to 3.0	0.92

Source: AECOM preliminary calculations based on existing and historical volume data.

(1) A minimum DHT_f factor of 2.0% will be used.

(2) PHF for Future Year Analyses: PHF=0.95 for I-95 Mainline and ramps; PHF=0.92 for cross streets.

2.5 Traffic Operational Analysis

Traffic operational analyses were performed for the Existing Conditions and future No-Build and Build alternatives. Analyses were performed using the Highway Capacity Software (HCS2010), Version 6.9 and Synchro Version 9. In order to maintain consistency between the three projects, namely SW 10th Street Connector PD&E (439891-1), I-95/SW 10th Street SIMR (436964-1) and Sawgrass Expressway PD&E, within the study area, Synchro 9 was used for all three projects. HCS2010 was used for operational analyses of freeway segments - mainline, ramps, merge,

diverge and weaving segments. Synchro analyses were performed for adjacent signalized intersections and interchange ramp terminal intersections. Synchro software results were reported utilizing the HCM 2000 module outputs. It is important to note that HCM2000 delays can be reported for signal timings not in compliance with NEMA(National Electrical Manufacturers Association) standards. HCM 2010 fails to provide this information. In order to maintain consistency between the SW 10th Street Connector PD&E Study, I-95/SW 10th Street SIMR and Sawgrass Expressway PD&E Study, HCM 2000 was reported for all intersections.

The HCS and Synchro operations analyses were performed for the following conditions:

- Existing year 2016 conditions, AM and PM peak hours
- Year 2020 conditions for No-Build, Build 1, and Build 2 alternatives, AM and PM peak hours
- Year 2040 conditions for No-Build, Build 1, and Build 2 alternatives, AM and PM peak hours
- Existing year Synchro analysis was conducted using the existing signal timing data
- All future year Synchro analysis for both the No-Build and Build conditions included signal optimization.

2.5.1 Measures of Effectiveness (MOEs)

Analyses of the interchange ramp terminals and adjacent intersections were conducted using Synchro 9 software and results were reported utilizing the HCM 2000 output. Since HCM methodology does not report queues, 95th percentile queues were obtained from Synchro report.

FDOT Topic No. 000-525-006-c provides Level of Service (LOS) Targets for the State Highway System (SHS). The following LOS criteria are considered acceptable for the SIMR. The following LOS criteria were considered for the I-95 SIMR analysis since the study area is considered to be an “Urbanized Areas over 500,000”.

- SIS Facilities – LOS D
- Other State Roads – LOS D

In addition to the signalized intersection LOS criteria stated above, operational analysis criteria also included the following:

- Density (passenger cars/mile/lane) for HCS analysis
- Delay (seconds per vehicle)
- Maximum volume-to-capacity (v/c) ratio: A v/c ratio of 1.0 or less.
- Interchange off-ramp queue lengths: The 95th percentile queue was utilized to examine whether the queue would exceed the length of interchange off-ramps and spill over to the I-95 mainline. Since HCM methodology does not report queues, 95th percentile queues were obtained from Synchro report.

3 EXISTING CONDITIONS

3.1 Existing Road Characteristics

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), Broward County MPO, Broward County Traffic and Engineering Division and field reviews. The existing roadway and intersection lane configurations are depicted in **Figure 3.1**. Aerial views of the interchanges are presented in **Figures 3.2 through 3.4**.

3.1.1 SR 9/I-95 from north of Palmetto Park Road to south of Yamato Road (SR 794)

Facility Type: Freeway, Limited Access, SIS Facility
Functional Classification: Urban Principal Arterial - Interstate
Access Management Classification (FDOT): Class 1
Typical Section:

North of Sample Road to North of Hillsboro Boulevard Interchange:
Northbound and Southbound: 3 GP, 1 HOV / BW
South of Sample Road Interchange:
Northbound and Southbound: 1 AUX, 3 GP, 1 HOV / BW

Note: AUX-Auxiliary Lane/GP-General Purpose Lane/HOV-High Occupancy Vehicle Lane/BW-Barrier Wall Median

Posted Speed Limit: 65 mph

3.1.2 Sample Road, SW 10th Street, and Hillsboro Boulevard

Facility Type: Arterial
Functional Classification: Urban Principal Arterial - Other
Access Management Classification (FDOT): Class 5
Typical Section: EB & WB: 3 Lanes/ Raised Median
Posted Speed Limit: 45 mph

Figure 3.1: 2016 Existing Roadway and Intersection Lane Configurations

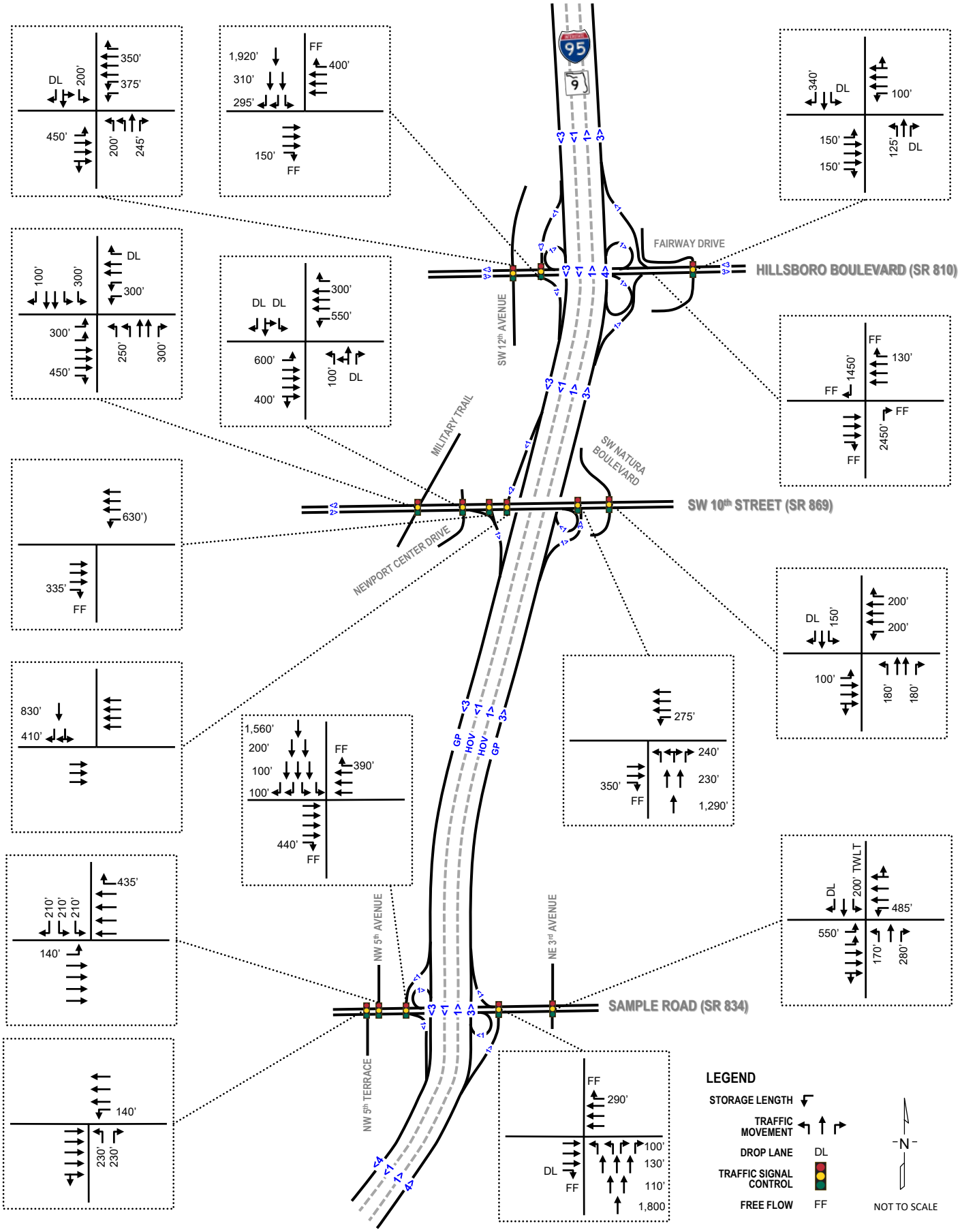


Figure 3.2: Aerial View - Hillsboro Boulevard (SR 810)

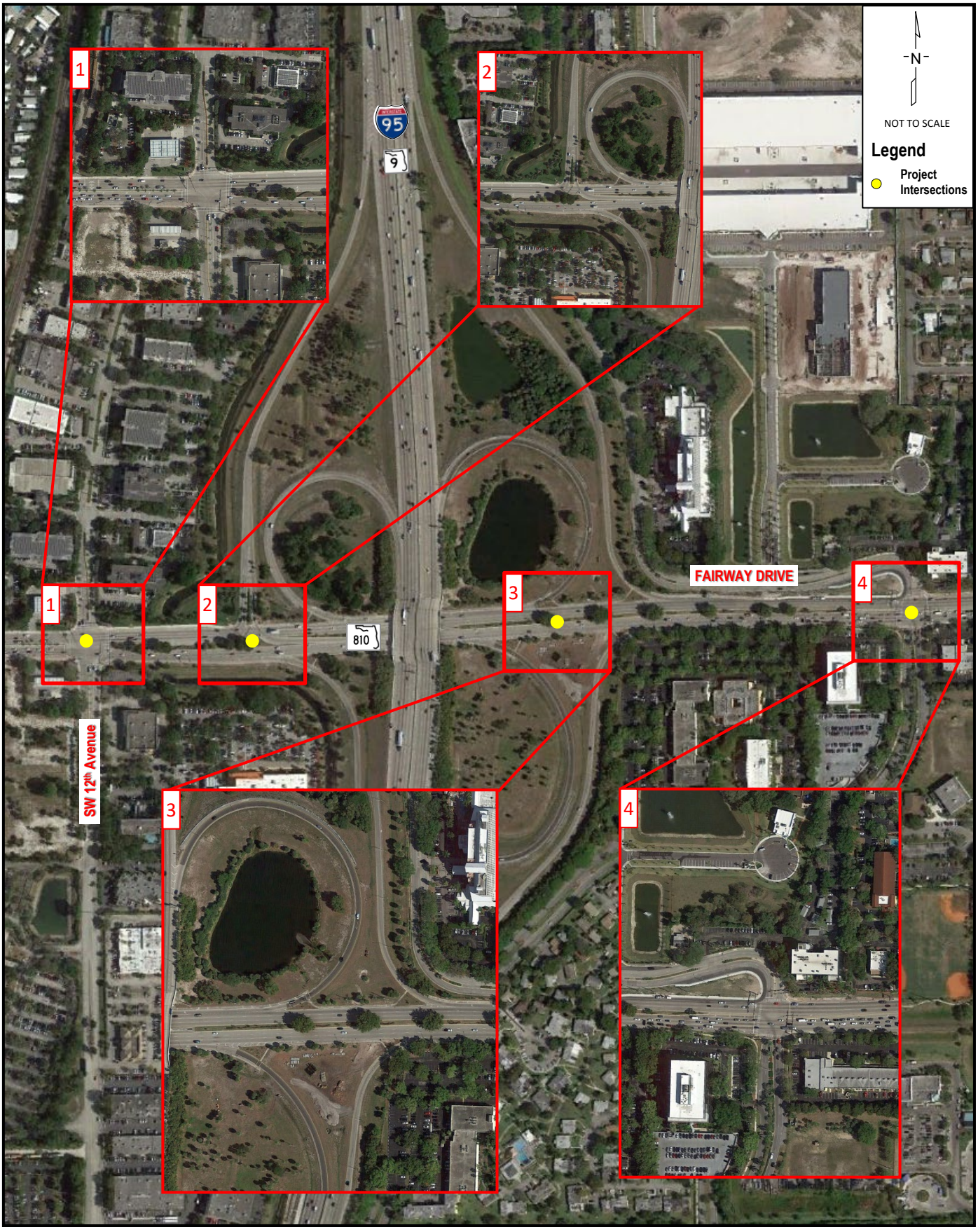


Figure 3.3: Aerial View - SW 10th Street (SR 869)

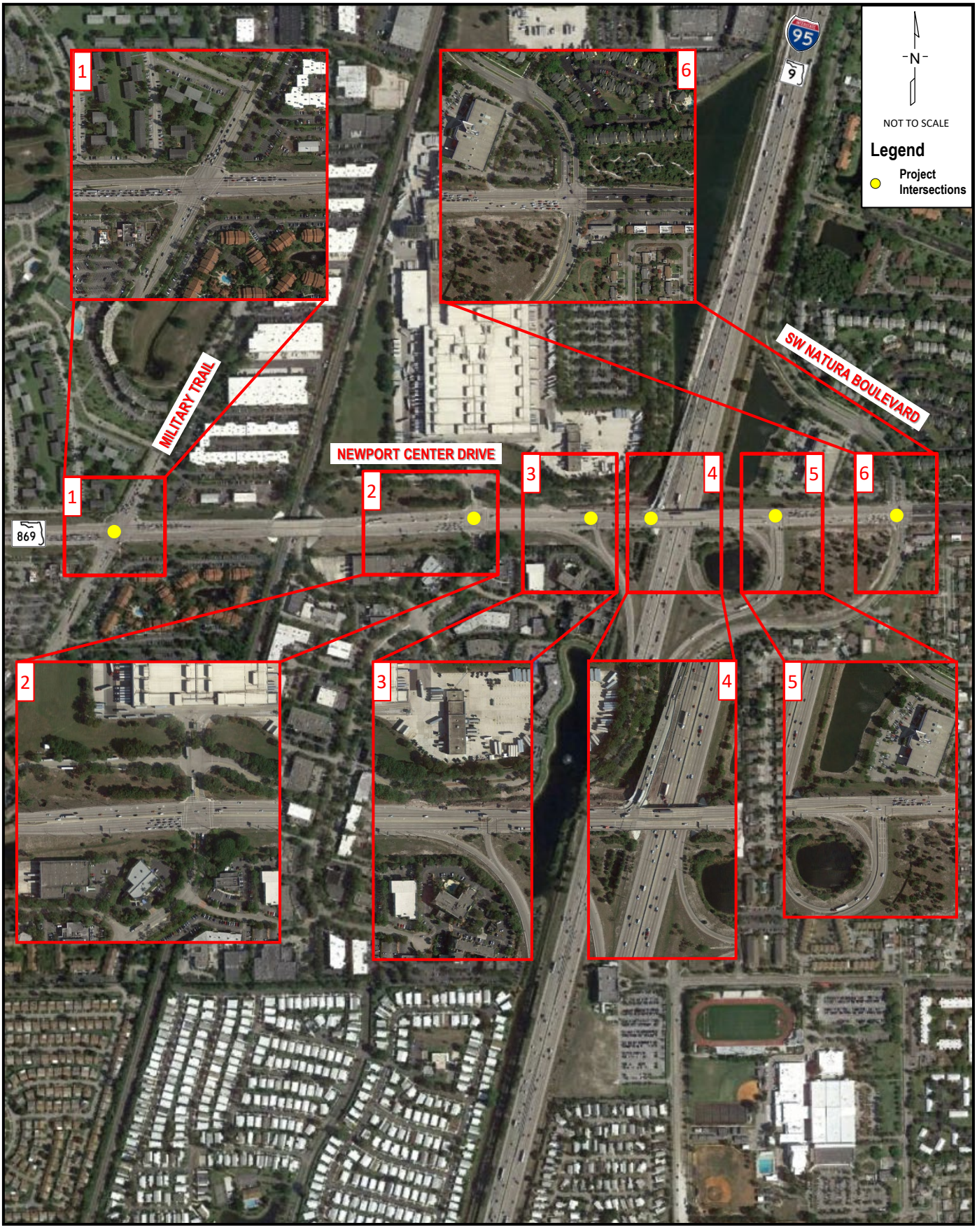


Figure 3.4: Aerial View – Sample Road (SR 834)

3.2 Existing Traffic Data

FDOT District 4 provided existing 2016 volumes that had been summarized in the *Traffic Data Collection & Traffic Projections for I-95 PD&E Study from SW 10th Street to Hillsboro Boulevard,* dated May 19, 2016. The data collection effort was completed March 8 through March 10, 2016.

As part of the SW 10th Street Connector PD&E Study (FPID 439891-1), a comparison of these volumes with volumes from previous studies revealed significant differences. In most cases, the District's March 2016 data showed lower volumes. In order to address the discrepancies and to supplement existing data, additional 4-hour turning movement counts were conducted at 16 locations and 2-day to 7-day directional machine counts were collected at 3 locations. These additional counts were collected by Florida's Turnpike Enterprise (FTE) between October 18 and October 25, 2016. The locations and summaries are documented in the *SW 10th Street PD&E Project Traffic Forecast Memorandum dated January 2019* prepared by FTE and included in Appendix F.

The additional counts verified that the March 2016 data presented lower volumes. Therefore, adjustments were made to develop balanced existing 2016 traffic volumes throughout the study area. I-95 ramp volumes were adjusted to volumes obtained as part of the Broward County Interchange Master Plan reports.

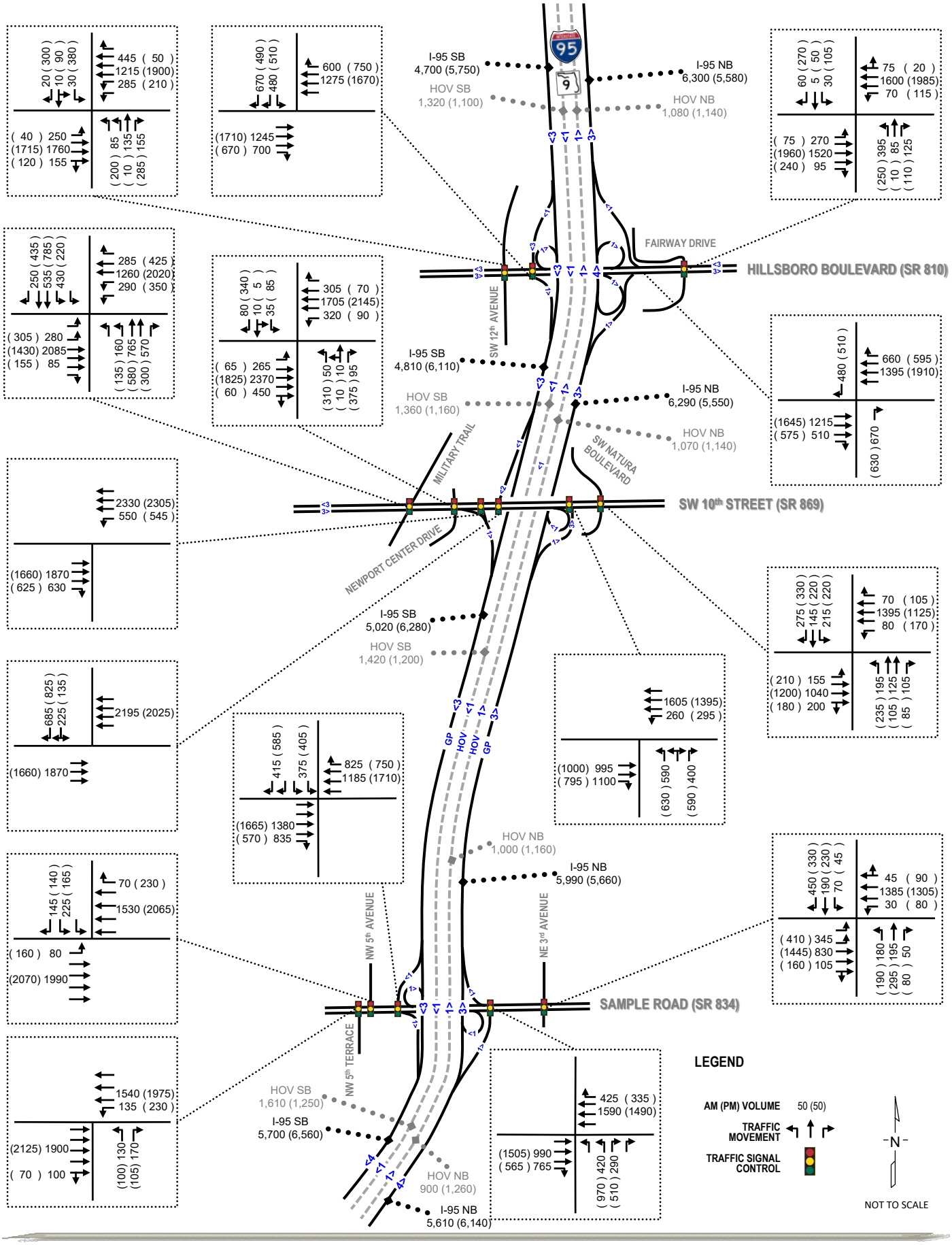
3.2.1 Existing Traffic Volumes

Figure 3.5 presents a summary of the balanced 2016 existing traffic volumes. The raw traffic counts and the existing signal timing are provided in **Appendix B**. These volumes are consistent with the ongoing SW 10th Street Connector PD&E Study.

3.3 Existing Traffic Operational Analysis

A traffic operational analysis was conducted to evaluate the existing conditions in the study area. Major analysis parameters include volume, design hour truck percentage, peak hour factor (PHF) and roadway geometry. The existing intersection PHFs were used for the intersection analysis. Design Hour Truck (DHT) values were calculated based on historical data from the FDOT count sites within the study area, mechanical classification counts and turning movement counts conducted as part of the I-95 PD&E Study data collection efforts. Peak hour values from mechanical counts were calculated as half the daily value in accordance with the FDOT Project Traffic Forecasting Handbook. The calculated DHT used for the I-95 mainline was 3.0%. The calculated DHT used was 2.0% for the ramps and for the interchange cross-streets.

Figure 3.5: 2016 Existing Volumes



3.3.1 Existing Traffic Freeway Operational Analysis – I-95

The measures of effectiveness used to estimate the LOS were density and volume to capacity ratios. The LOS for each freeway segment was determined using the corresponding HCS Freeways, Weaving or Ramps modules when applicable.

The HOV lane and corresponding volumes were excluded for the HCS analysis in order to be able to analyze the operating conditions of the general-purpose lanes. The HOV lane demand was based on the data collection and analysis documented in the 2010 I-95 High-Occupancy Vehicle Lane Monitoring Report, dated May 2011. The report documents that the HOV northbound lane demand is approximately 16% of the total traffic for the AM and PM peak hours and the HOV southbound lane demand is approximately 16% and 18% for AM and PM peak hours, respectively. The percentile demand was applied to the provided existing volumes.

The mainline/basic, weaving, and ramp merge/diverge analysis results are summarized on **Figures 3.6** and **3.7** for Northbound and Southbound directions, respectively. Documentation of the existing traffic freeway operational analysis is provided in **Appendix C**. The results indicate that eight (8) of the sixteen (16) northbound freeway segments in the study area operate at LOS E or F during one or both of the peak hours and three (3) of the fifteen (15) southbound freeway segments in the study area operate at LOS E only during the PM peak hour.

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Figure 3.6: 2016 Existing Year Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	6,300 (5,580)	E (39.1)	D (30.4)
Merge from Hillsboro Boulevard WB	6,310 (5,580)	E (35.9)	D (30.8)
Basic Freeway	5,650 (4,985)	D (32.3)	C (25.7)
Weave - Entry Hillsboro Blvd EB to Exit Hillsboro Blvd WB	6,130 (5,495)	D (30.6)	C (27.1)
Basic Freeway	5,620 (4,920)	D (32.0)	C (25.3)
Diverge to Hillsboro Boulevard EB	6,290 (5,550)	E (37.6)	D (33.7)
Basic Freeway	6,290 (5,550)	E (39.0)	D (29.9)
Merge from SW 10th Street EB & WB	6,360 (5,530)	D (31.4)	C (25.8)
Basic Freeway	5,000 (4,440)	D (27.0)	C (22.3)
Diverge to SW 10th Street EB & WB	5,990 (5,660)	E (36.4)	E (35.7)
Basic Freeway	5,990 (5,660)	E (35.6)	D (32.4)
Merge from Sample Road WB	6,090 (5,560)	F (36.6)	D (30.4)
Basic Freeway	5,665 (5,225)	E (39.5)	D (29.1)
Merge from Sample Road EB	5,665 (5,225)	D (33.3)	C (27.5)
Basic Freeway	4,900 (4,660)	D (30.7)	C (24.9)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	5,610 (6,140)	C (27.4)	D (32.5)

GPL: General Purpose Lane

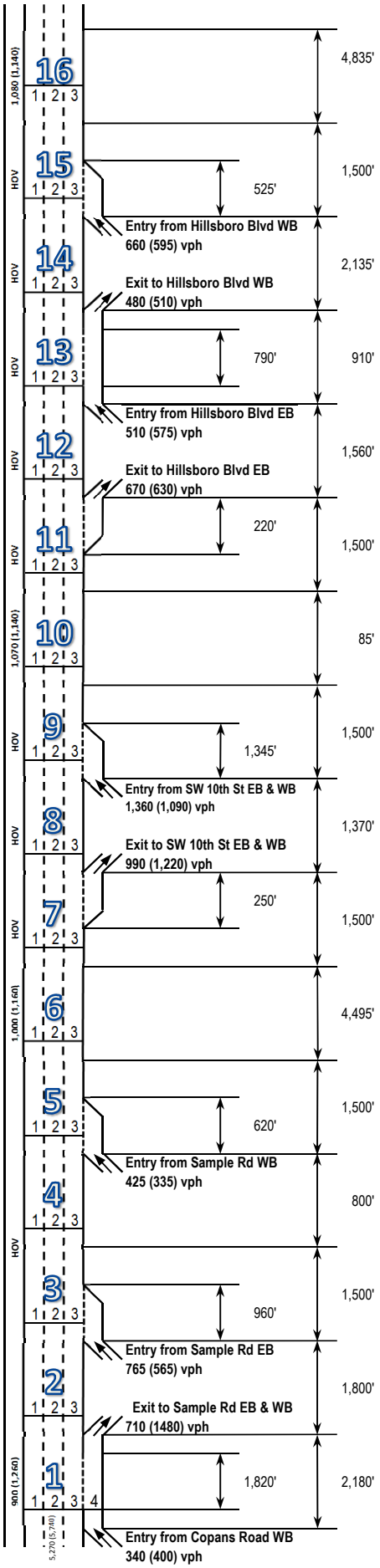
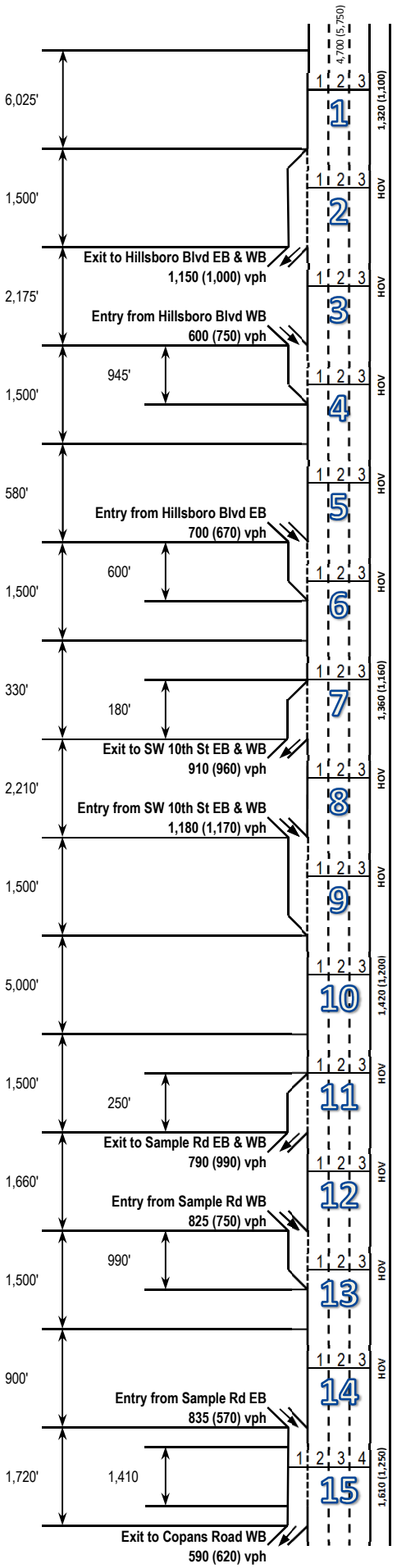


Figure 3.7: 2016 Existing Year Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,700 (5,750)	C (24.5)	D (32.6)
Diverge to Hillsboro Boulevard EB & WB	4,700 (5,750)	C (20.0)	C (24.0)
Basic Freeway	3,550 (4,750)	B (17.9)	C (24.8)
Merge from Hillsboro Boulevard WB	4,150 (5,500)	C (22.3)	D (29.5)
Basic Freeway	4,150 (5,500)	C (21.1)	D (30.4)
Merge from Hillsboro Boulevard EB	4,850 (6,170)	D (28.3)	D (34.0)
Diverge to SW 10th Street EB & WB	4,810 (6,110)	D (31.9)	E (37.4)
Basic Freeway	3,900 (5,150)	C (19.7)	D (27.7)
Merge from SW 10th Street EB & WB	5,080 (6,320)	C (24.9)	D (34.1)
Basic Freeway	5,020 (6,280)	D (27.1)	E (38.9)
Diverge to Sample Road EB & WB	5,020 (6,280)	D (31.8)	E (36.6)
Basic Freeway	4,230 (5,290)	C (21.6)	D (27.5)
Merge from Sample Road WB	5,055 (6,040)	C (27.7)	D (31.1)
Basic Freeway	5,055 (6,040)	D (27.0)	D (33.6)
Weave - Entry Sample Road EB to Exit Copans Road WB	5,700 (6,560)	D (30.0)	D (33.8)

GPL: General Purpose Lane

3.3.2 Existing Traffic Intersection Operational Analysis

Intersection analysis for ramp-terminals and adjacent intersections was performed using existing turning movement volumes, existing lane geometry, and signal timing observations and information obtained from Broward County. Analyses of the interchange ramp terminals and adjacent intersections were conducted using Synchro 9 software and results were reported utilizing the HCM 2000 output. The intersection analyses are presented in **Appendix D**.

Tables 3.1 through **3.3** provide a detailed summary of the results of the signalized intersection analyses for the AM and PM peak hours for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. The results include delays (in seconds per vehicle) and Level of Service (LOS) by movement, approach, and the overall intersection. The volume to capacity (v/c) ratios and 95th percentile queue lengths have also been summarized by movement. The intersection analysis results indicate the following:

Hillsboro Boulevard: One of the three signalized intersections operates at LOS E during the AM peak hour. The I-95 southbound off-ramp approach operates at LOS E during both peak hours.
SW 10th Street: Two of the six signalized intersections operate at LOS F during one or both peak hours. The I-95 northbound and southbound off-ramp approaches operate at LOS F during both peak hours.
Sample Road: All five signalized intersections operate at LOS D or better during both peak hours. The I-95 northbound and southbound off-ramp approaches operate at LOS D or better during both peak hours.

Table 3.4 summarizes the results of the off-ramp signals back of queue analyses for the AM and PM peak hours. HCM methodology does not provide queue lengths, therefore, the 95th percentile queues were obtained from Synchro reports. Available storage lengths on the off-ramps were calculated by deducting deceleration lengths from the total off-ramp lengths measured from stop bars to gore points. According to *Table 3-22, Minimum Deceleration Lengths for Exit Terminals* in *Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways, 2016*, the deceleration length on I-95 off-ramps with a design speed of 70 MPH is 615 feet.

Table 3.1: 2016 Existing – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (128.2)	C (23.2)		F (80.8)	B (14.4)	A (7.6)	E (66.2)	F (81.7)	D (51.8)	E (74.4)	E (74.4)	D (53.8)	C (32.8)
			Approach	D (35.3)			C (22.5)			E (65.8)			E (67.7)			
		Volume to Capacity ratio	Movement	1.02	0.67		0.70	0.44	0.39	0.25	0.74	0.22	0.27	0.28	0.01	
		Queue Length 95th (ft)	Movement	#479	665		m198	305	m159	72	218	101	55	57	0	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.8)		B (14.3)					F (80.4)		E (59.4)	C (22.2)
			Approach	A (0.3)			B (14.3)						E (68.2)			
		Volume to Capacity ratio	Movement		0.26	0.47		0.41					0.95		0.84	
		Queue Length 95th (ft)	Movement		0	71		m262					#733		480	
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (144.2)	B (18.5)	B (13.3)	E (72.8)	C (21.1)		F (518.7)	E (70.9)	E (66.8)	E (69.7)	E (74.0)	E (73.8)	E (77.4)
			Approach	D (36.3)			C (23.2)			F (362.5)			E (72.5)			
		Volume to Capacity ratio	Movement	1.10	0.48	0.06	0.53	0.59		1.97	0.53	0.08	0.27	0.07	0.07	
		Queue Length 95th (ft)	Movement	m#505	455	m21	130	494		#784	152	68	60	20	4	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (71.1)	C (34.6)		F (89.3)	B (19.9)	A (1.7)	E (76.2)	E (66.8)	F (87.2)	F (84.2)	F (84.7)	E (63.1)	D (42.0)
			Approach	D (35.4)			C (26.2)			F (82.4)			E (76.1)			
		Volume to Capacity ratio	Movement	0.34	0.77		0.62	0.74	0.03	0.70	0.07	0.87	0.85	0.86	0.73	
		Queue Length 95th (ft)	Movement	86	772		173	838	m3	156	32	339	361	371	244	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.6)		B (18.8)					E (71.1)		D (44.3)	B (17.8)
			Approach	A (0.3)			B (18.8)						E (58.0)			
		Volume to Capacity ratio	Movement		0.36	0.45		0.57					0.92		0.56	
		Queue Length 95th (ft)	Movement		0	0		500					#738		312	
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	E (75.3)	C (22.7)	B (13.0)	F (81.2)	C (24.0)		E (74.6)	E (63.4)	E (63.6)	E (62.2)	E (72.0)	E (77.2)	C (32.4)
			Approach	C (23.4)			C (27.1)			E (71.0)			E (72.9)			
		Volume to Capacity ratio	Movement	0.54	0.70	0.23	0.71	0.70		0.85	0.05	0.07	0.46	0.41	0.59	
		Queue Length 95th (ft)	Movement	m126	667	m115	197	730		#333	31	61	145	97	155	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 3.2: 2016 Existing – SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (94.3)	D (55.0)	C (27.4)	F (176.5)	D (52.5)	C (34.3)	F (81.3)	F (88.0)	F (235.0)	F (150.0)	E (57.3)	D (52.6)	F (84.8)
			Approach	E (58.6)			E (69.2)			F (143.3)			F (89.2)			
		Volume to Capacity ratio	Movement	0.83	0.94	0.06	1.13	0.86	0.30	0.58	0.95	1.33	1.09	0.58	0.32	
		Queue Length 95th (ft)	Movement	#248	952	23	#318	837	182	140	#625	#1012	#426	380	188	
	East Newport Center Drive	LOS (Delay)	Movement	E (70.1)	C (23.5)		F (172.5)	B (10.9)	B (14.3)	E (75.0)	E (74.9)	E (72.8)	E (75.2)	E (74.5)	E (72.6)	C (32.2)
			Approach	C (27.5)			C (33.5)			E (73.6)			E (73.4)			
		Volume to Capacity ratio	Movement	0.95	0.75		1.17	0.51	0.21	0.39	0.38	0.06	0.38	0.33	0.06	
		Queue Length 95th (ft)	Movement	#361	707		#618	328	41	73	72	9	58	58	0	
	I-95 Southbound On-ramp	LOS (Delay)	Movement		D (35.1)	A (0.6)	E (65.9)	A (0.2)								B (19.1)
			Approach	C (26.4)			B (12.8)									
		Volume to Capacity ratio	Movement		0.71	0.42	0.88	0.48								
		Queue Length 95th (ft)	Movement		554	0	m470	m0								
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (4.1)			A (5.4)					F (156.9)		F (191.3)	D (35.7)
			Approach	A (4.1)			A (5.4)						F (173.8)			
		Volume to Capacity ratio	Movement		0.61			0.57					1.17		1.25	
		Queue Length 95th (ft)	Movement		5			m75					#795		#846	
	I-95 Northbound Ramps	LOS (Delay)	Movement		C (25.3)	A (2.5)	F (221.0)	C (24.8)		F (104.7)		F (143.2)				D (48.6)
			Approach	B (13.4)			D (52.2)			F (116.7)						
		Volume to Capacity ratio	Movement		0.54	0.75	1.30	0.70		1.03		1.10				
		Queue Length 95th (ft)	Movement		m348	m1066	m#547	m300		#551		#653				
	FAU Research Park Boulevard	LOS (Delay)	Movement	B (15.7)	B (17.7)		B (10.5)	B (18.1)	B (12.8)	F (160.8)	E (64.6)	E (62.6)	F (99.8)	E (75.7)	F (86.0)	D (38.4)
			Approach	B (17.5)			B (17.5)			F (108.3)			F (88.3)			
		Volume to Capacity ratio	Movement	0.56	0.41		0.30	0.49	0.05	1.11	0.32	0.07	0.92	0.70	0.78	
		Queue Length 95th (ft)	Movement	m143	m353		50	402	13	#350	98	58	#298	229	245	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (178.1)	D (44.3)	C (31.6)	E (67.1)	F (169.1)	D (53.6)	F (100.6)	E (68.2)	E (59.8)	F (81.2)	E (67.2)	E (67.6)	F (95.4)
			Approach	E (64.9)			F (138.7)			E (70.0)			E (69.4)			
		Volume to Capacity ratio	Movement	1.14	0.69	0.10	0.77	1.24	0.47	0.77	0.74	0.41	0.66	0.83	0.77	
		Queue Length 95th (ft)	Movement	#332	615	24	m267	m#1715	m407	#142	434	223	181	555	492	
	East Newport Center Drive	LOS (Delay)	Movement	E (62.9)	B (15.4)		F (94.2)	B (19.0)	A (4.7)	E (73.4)	E (73.7)	F (108.9)	E (70.7)	E (70.6)	F (195.3)	D (40.9)
			Approach	B (17.0)			C (21.5)			F (92.7)			F (169.1)			
		Volume to Capacity ratio	Movement	0.62	0.60		0.61	0.80	0.05	0.62	0.62	0.92	0.24	0.24	1.17	
		Queue Length 95th (ft)	Movement	m87	158		175	560	6	278	284	#443	102	102	#548	
	I-95 Southbound On-ramp	LOS (Delay)	Movement		C (33.5)	A (0.6)	D (40.4)	A (0.2)								B (15.3)
			Approach	C (24.5)			A (7.9)									
		Volume to Capacity ratio	Movement		0.78	0.42	0.67	0.48								
		Queue Length 95th (ft)	Movement		301	m51	m416	m0								
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (5.0)			A (8.9)					F (183.6)		F (209.5)	D (46.2)
			Approach	A (5.0)			A (8.9)						F (196.3)			
		Volume to Capacity ratio	Movement		0.55			0.53					1.22		1.28	
		Queue Length 95th (ft)	Movement		23			m86					#958		#1001	
	I-95 Northbound Ramps	LOS (Delay)	Movement		D (40.6)	A (1.1)	E (70.4)	C (30.1)		F (272.2)		F (326.4)				F (97.2)
			Approach	C (23.1)			D (37.2)			F (289.3)						
		Volume to Capacity ratio	Movement		0.63	0.53	0.75	0.57		1.42		1.52				
		Queue Length 95th (ft)	Movement		m508	m467	472	479		#863		#984				
	FAU Research Park Boulevard	LOS (Delay)	Movement	B (14.2)	B (19.4)		B (18.7)	B (19.4)	B (15.3)	F (317.2)	E (60.1)	E (58.7)	E (73.4)	F (87.7)	F (86.0)	D (49.2)
			Approach	B (18.7)			B (19.0)			F (202.0)			F (82.9)			
		Volume to Capacity ratio	Movement	0.62	0.49		0.66	0.41	0.07	1.51	0.21	0.06	0.81	0.85	0.83	
		Queue Length 95th (ft)	Movement	119	387		117	301	31	#454	85	38	301	#338	#338	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 3.3: 2016 Existing – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (15.0)		E (74.2)	A (1.6)		E (79.8)		E (64.4)				B (16.1)
			Approach		B (15.0)			A (7.5)			E (71.1)					
		Volume to Capacity ratio	Movement		0.45		0.66	0.41		0.73		0.12				
		Queue Length 95th (ft)	Movement		329		191	33		213		74				
	NW 5th Avenue	LOS (Delay)	Movement	E (59.1)	A (1.7)			B (18.6)	C (32.8)				E (71.4)		E (64.3)	B (15.9)
			Approach		A (4.0)			B (19.2)						E (68.6)		
		Volume to Capacity ratio	Movement	0.56	0.42			0.39	0.05				0.65		0.10	
		Queue Length 95th (ft)	Movement	155	46			362	43				169		68	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (9.4)	A (1.3)		A (9.6)					C (26.2)		C (29.1)	B (11.3)
			Approach		A (6.3)			A (9.6)						C (27.7)		
		Volume to Capacity ratio	Movement		0.37	0.56		0.40					0.48		0.65	
		Queue Length 95th (ft)	Movement		198	366		225					118		151	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (8.7)			A (6.1)	A (0.3)	C (29.4)		C (28.2)				B (10.5)
			Approach		A (8.7)			A (4.9)			C (28.9)					
		Volume to Capacity ratio	Movement		0.32			0.51	0.28	0.60		0.51				
		Queue Length 95th (ft)	Movement		191			100	m0	137		109				
	NE 3rd Avenue	LOS (Delay)	Movement	E (61.9)	B (19.7)		E (74.4)	D (36.9)		D (48.3)	E (56.3)	D (49.7)	D (51.6)	E (68.5)	F (95.8)	D (45.6)
			Approach		C (31.0)			D (37.7)			D (52.2)			F (84.1)		
		Volume to Capacity ratio	Movement	0.75	0.37		0.36	0.68		0.66	0.53	0.03	0.28	0.69	0.90	
		Queue Length 95th (ft)	Movement	256	308		70	621		211	268	0	91	277	#365	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (17.2)		F (80.8)	A (0.8)		F (80.0)		E (67.2)				B (15.9)
			Approach		B (17.2)			A (9.1)			E (73.4)					
		Volume to Capacity ratio	Movement		0.50		0.81	0.49		0.68		0.07				
		Queue Length 95th (ft)	Movement		369		#369	26		171		60				
	NW 5th Avenue	LOS (Delay)	Movement	E (67.7)	A (1.4)			B (10.6)	C (20.4)				E (71.9)		E (67.4)	B (12.8)
			Approach		A (6.1)			B (11.6)						E (69.8)		
		Volume to Capacity ratio	Movement	0.80	0.41			0.51	0.15				0.58		0.09	
		Queue Length 95th (ft)	Movement	#296	34			264	m50				127		69	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (18.8)	A (0.6)		B (15.3)					C (24.7)		C (33.9)	B (17.8)
			Approach		B (14.2)			B (15.3)						C (30.1)		
		Volume to Capacity ratio	Movement		0.46	0.38		0.59					0.46		0.81	
		Queue Length 95th (ft)	Movement		404	34		m306					129		#228	
	I-95 Northbound Ramps	LOS (Delay)	Movement		C (22.6)			B (13.1)	A (0.2)	D (50.8)		C (25.3)				C (24.1)
			Approach		C (22.6)			B (10.7)			D (42.0)					
		Volume to Capacity ratio	Movement		0.57			0.56	0.22	0.98		0.64				
		Queue Length 95th (ft)	Movement		467			171	0	#392		189				
	NE 3rd Avenue	LOS (Delay)	Movement	E (66.1)	D (39.7)		E (73.3)	D (38.7)		D (52.0)	E (60.0)	D (47.1)	D (52.5)	E (75.0)	E (59.5)	D (47.5)
			Approach		D (45.1)			D (40.6)			E (55.5)			E (64.9)		
		Volume to Capacity ratio	Movement	0.79	0.67		0.56	0.68		0.72	0.70	0.05	0.25	0.78	0.37	
		Queue Length 95th (ft)	Movement	291	629		143	582		219	396	0	63	331	150	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 3.4: 2016 Existing – Off-Ramp Signals Queuing Analysis Results

Intersection	Approach	Movement	Turn Lane Storage (ft)	Available Off-Ramp Length (ft)(1)	Queue (ft)	
					AM	PM
Hillsboro Boulevard at I-95 SB Off-Ramp	Southbound	L (EB)	295	1,910	#733	#738
		R (WB)	295	1,910	480	312
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	410	625	#795	#958
		R (WB)	410	625	#846	#1001
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	240	1,145	#551	#863
		R (EB)	240	1,145	#653	#984
Sample Road at I-95 SB Off-Ramp	Southbound	L (EB)	200	1,345	118	129
		R (WB)	200	1,345	151	#228
Sample Road at I-95 NB Off-Ramp	Northbound	L (WB)	230	1,525	137	#392
		R (EB)	230	1,525	109	189

(1) Available off-ramp lengths were calculated by deducting the deceleration length of 615 feet from total off-ramp lengths
#: 95th percentile volume exceeds capacity

3.4 Existing Crash Data

Crash data was collected from the FDOT Crash Analysis Reporting System (CARS) for the three years (from January 2013 to December 2015) according to the MLOU. Crash data along I-95 was collected between MP 21.000 and MP 25.317 including ramp segments and terminals. It was further segregated by interchange: Sample Road (SR 834) from MP 21.000 – MP 22.623; SW 10th Street (SR 869) from MP 22.623 – MP 24.150; and Hillsboro Boulevard (SR 810) from MP 24.150 – MP 25.317. Crash data for Sample Road (between NW 5th Terrace and NE 3rd Avenue), SW 10th Street (between Military Trail and SW Natura Boulevard), and Hillsboro Boulevard (between SW 12th Avenue and SW Natura Boulevard) was also obtained from the FDOT CARS. Historical Crash Maps and statistical summaries are included in **Appendix E**. **Table 3.5** presents the aggregated summary for I-95.

Table 3.5: Crash Data Summary – 2013-2015

Crash Type	Hillsboro Blvd Interchange			SW 10th Street Interchange			Sample Road Interchange		
	Crashes	Annual Avg	Percent	Crashes	Annual Avg	Percent	Crashes	Annual Avg	Percent
Rear End	393	131	63.2%	269	90	53.6%	308	103	53.8%
Head On	2	1	0.3%	2	1	0.4%	6	2	1.0%
Angle/Left/Right Turns	17	6	2.7%	23	8	4.6%	21	7	3.7%
Sideswipe	71	24	11.4%	79	26	15.7%	94	31	16.4%
Peds & Bicycle	1	0	0.2%	2	1	0.4%	0	0	0.0%
Fixed Object	69	23	11.1%	74	25	14.7%	64	21	11.2%
Others	69	23	11.1%	53	18	10.6%	79	26	13.8%
Total Crashes	622	207	100.0%	502	167	100.0%	572	191	100.0%
PDO Crashes	386	129	62.1%	317	106	63.1%	366	122	64.0%
Injury Crashes	234	78	37.6%	184	61	36.7%	205	68	35.8%
Fatal Crashes	2	1	0.3%	1	0	0.2%	1	0	0.2%
Daylight	445	148	71.5%	324	108	64.5%	396	132	69.2%
Dark	152	51	24.4%	153	51	30.5%	148	49	25.9%
Dawn/Dusk	25	8	4.0%	24	8	4.8%	28	9	4.9%
Unknown	0	0	0.0%	1	0	0.2%	0	0	0.0%
Dry	457	152	73.5%	365	122	72.7%	426	142	74.5%
Wet	165	55	26.5%	136	45	27.1%	146	49	25.5%
Others	0	0	0.0%	1	0	0.2%	0	0	0.0%
Contributing Causes	Hillsboro Blvd Interchange			SW 10th Street Interchange			Sample Road Interchange		
	Crashes	Annual Avg	Percent	Crashes	Annual Avg	Percent	Crashes	Annual Avg	Percent
No Contributing Action	64	21	10.3%	69	23	13.7%	90	30	15.7%
Careless Driving	319	106	51.3%	226	75	45.0%	249	83	43.5%
Failed to Yield ROW	5	2	0.8%	4	1	0.8%	5	2	0.9%
Improper Turn	1	0	0.2%	1	0	0.2%	0	0	0.0%
Drove Too Fast for Conditions	32	11	5.1%	16	5	3.2%	18	6	3.1%
Others	201	67	32.3%	186	62	37.1%	210	70	36.7%

Of the 1,696 reported crashes from 2013 through 2015, 970 (57%) were rear end crashes followed by 244 (14%) side-swipe crashes and 207 (12%) crashes involving fixed objects. Based on crash severity, of the 1,696 reported crashes, 1,069 (63%) were property damage only crashes, 623 (37%) were injury type crashes, and 4 (0%) were fatal crashes. There were a total of 530 (31%) night/dusk/dawn crashes reported, which is lower than the statewide average for all roadways of 34 percent; and 447 (26%) of the total crashes occurred under wet/slippery pavement conditions, which is higher than the statewide average for all roadways of 13 percent. Among the contributing causes documented in the crash data, Careless Driving (794 - 49%) and All Other (597 – 35%) were among the highest. 3 crashes involving pedestrians and bicycles occurred at ramp terminals. It is important to note that the percentages for the major crash types and the contributing factors are almost similar across the three interchanges.

A High Crash Location List review was also conducted. The high crash location lists were obtained from FDOT District 4 Traffic Operations. The data was extracted from CARS, which uses crash coefficient levels over 99.95 % and crash rates over 1.00 to establish and rank high crash locations. The high crash locations within the 3-year analysis period for I-95 and Arterials based on the lists provided by FDOT are depicted on **Figure 3.8**. These locations are listed below and the years are identified within the parentheses.

High Crash Spots along I-95 from Sample Road to Hillsboro Boulevard (2013-2015)

MP 21.280 – NB I-95 Off-Ramp to EB & WB Sample Road (2014)
MP 21.330 - SB I-95 On-Ramp from EB Sample Road (2013, 2014)
MP 21.522 – NB I-95 On-Ramp from EB Sample Road (2014)
MP 21.910 – NB I-95 On-Ramp from WB Sample Road (2014, 2015)
MP 24.400 – SB I-95 On-Ramp from EB Hillsboro Boulevard (2013, 2014, 2015)
MP 24.711 – SB I-95 On-Ramp from WB Hillsboro Boulevard (2013, 2014, 2015)
MP 24.732 – NB I-95 Off-Ramp to WB Hillsboro Boulevard (2013, 2015)

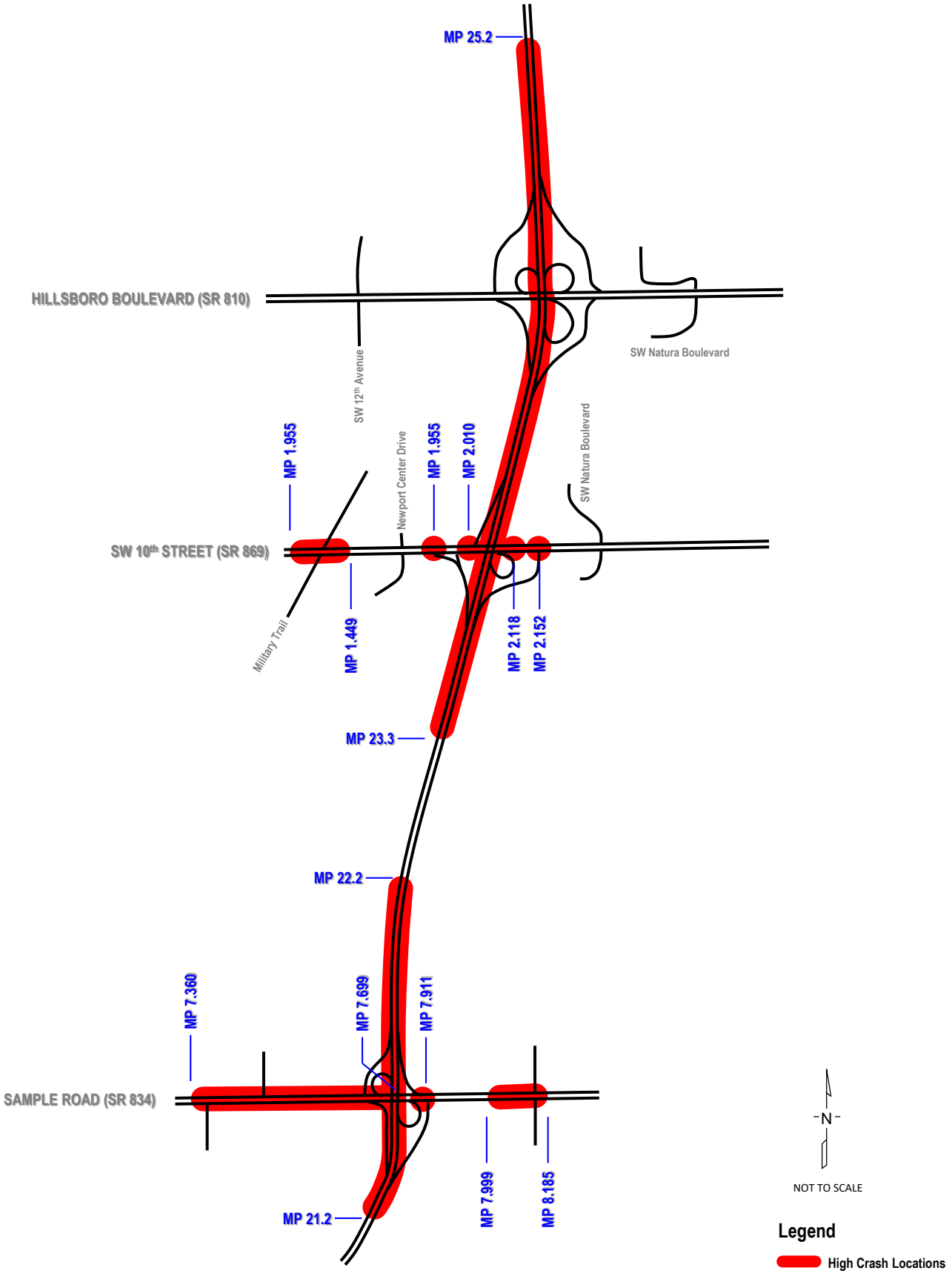
High Crash Spots along SW 10th Street from Military Trail to Natura Boulevard (2013-2015)

MP 1.427 – at Military Trail (2013, 2014, 2015)
MP 1.955 – at WB exit to SB I-95 (2013)
MP 2.01 – at Natura Boulevard (2013, 2015)

High Crash Spots along Sample Road from NW 5th Terrace to NE 3rd Avenue (2013-2015)

MP 7.410 – at NW 5th Terrace (2013, 2014, 2015)
MP 7.443 – at the Driveway between NW 5th Terrace and NW 5th Avenue (2013, 2014)
MP 7.459 – at NW 5th Avenue (2013, 2014)
MP 7.659 – at SB I-95 Off-Ramp terminal (2015)
MP 7.911 – east of NB I-95 Off-Ramp terminal (2015)
MP 8.135 – at NE 3rd Avenue (2013, 2014)

Figure 3.8: FDOT CARS High Crash Locations 2013 – 2015



Safety can be assessed by tracking either the raw frequency of crashes or by calculating crash rates, which are normalized by exposure. Using both crash frequencies and crash rates in analysis provides a more comprehensive assessment of a roadway. Crash frequencies are able to convey the magnitude of the crash problem. While the crash rates are better for identifying crash risk, average crash rates can be calculated for a large subset of roadways (i.e. all 4-lane divided urban arterials within the State or District), The average crash rate is used to calculate the critical crash rate, which establishes a threshold for comparison.

The safety ratio is based on the crash rate (based on total number of crashes). A safety ratio equal to or greater than one is considered high crash locations. The level of statistical significance indicates the confidence level at which the study intersection can be considered as a High Crash Location when compared to similar locations. The level of statistical significance is calculated using the formula below. The threshold value for an abnormally high crash location in an urban area is 99.95%.

$$Level\ of\ Statistical\ Significance = \frac{ACR - A + \frac{1}{2M}}{\sqrt{\frac{A}{M}}}$$

Where:

ACR = Actual crash rate for the study location (crashes per million entering vehicles)

A = Districtwide average crash rate for highway category being tested (crashes per million entering vehicles)

M = Average vehicle exposure (million entering vehicles) = [(ADT * 365 * L) / 1,000,000]

L = Length of the Segment for Segment Analysis, 1 for Spot Analysis

Table 3.6 provides a comparison of the crash rates at the I-95 interchanges and along the cross-streets within the Area of Influence. It can be observed that all three interchanges within the Area of Influence have a crash ratio of more than 1.0 indicating higher than average crash rate for similar facilities. The crash ratio for the cross-streets (Hillsboro Boulevard, SW 10th Street and Sample Road) is below 1.0 indicating lower than average crash rate for similar facilities. The proposed interchange improvements are expected to significantly improve the safety and operations at the interchanges.

Section 5.7 of this report documents the safety analyses that were conducted using the Highway Safety Manual (HSM) methodology and the traditional Crash Reduction Analysis to determine the benefits of the proposed improvements under the Build alternatives.

Table 3.6: Crash Rate Comparison – 2013-2015

Crast Rate	I-95 & Hillsboro Blvd Interchange			I-95 & SW 10th Street Interchange			I-95 & Sample Road Interchange		
	2013	2014	2015	2013	2014	2015	2013	2014	2015
Number of Crashes	190	188	244	148	187	167	178	183	211
Average Daily Traffic (ADT)	200,000	200,000	200,000	202,024	204,186	209,176	196,757	198,248	204,150
Actual Crash Rate (ACR)	2.230	2.207	2.864	1.314	1.643	1.432	1.527	1.558	1.745
District 4 Average Crash Rate (A)	0.934	0.942	0.934	0.934	0.942	0.934	0.934	0.942	0.934
Average Vehicle Exposure (M)	85.191	85.191	85.191	112.599	113.804	116.585	116.558	117.441	120.937
Critical Crash Rate (CCR)	1.272	1.282	1.273	1.229	1.236	1.225	1.224	1.232	1.219
Safety Ratio	1.753	1.722	2.250	1.070	1.329	1.170	1.248	1.265	1.431
Statistical Significance	12.440	12.091	18.483	4.229	7.762	5.612	6.678	6.935	9.267
Confidence Level	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
Statewide Averge Crash Rate	0.887	0.908	0.992	0.887	0.908	0.992	0.887	0.908	0.992

Crast Rate	Hillsboro Blvd from SW 12th Ave to SW Natura Blvd			SW 10th Street from Military Trail to SW Natura Blvd			Sample Road from NW 5th Terr to NE 3rd Ave		
	2013	2014	2015	2013	2014	2015	2013	2014	2015
Number of Crashes	25	39	38	57	72	88	71	92	88
Average Daily Traffic (ADT)	52,520	48,228	47,944	46,125	50,280	49,701	51,778	56,287	55,727
Actual Crash Rate (ACR)	1.876	3.188	3.124	4.369	5.062	6.259	4.554	5.428	5.244
District 4 Average Crash Rate (A)	3.751	4.195	4.827	3.751	4.195	4.827	3.751	4.195	4.827
Average Vehicle Exposure (M)	13.323	12.234	12.162	13.048	14.223	14.059	15.592	16.949	16.781
Critical Crash Rate (CCR)	5.460	6.082	6.859	5.478	5.947	6.720	5.334	5.803	6.562
Safety Ratio	0.344	0.524	0.456	0.798	0.851	0.931	0.854	0.935	0.799
Statistical Significance	-3.463	-1.651	-2.637	1.223	1.661	2.505	1.701	2.537	0.833
Confidence Level	50.00%	50.00%	50.00%	85.00%	95.00%	99.00%	95.00%	99.00%	75.00%
Statewide Averge Crash Rate	4.089	4.538	4.869	4.089	4.538	4.869	4.089	4.538	4.869

ADT – Average Daily Traffic

ACR – Actual Crash Rate = No. of crashes in a year / Average Vehicle Exposure (M)

M – Average Vehicle Exposure (million vehicles or million vehicles miles) = [(ADT * 365 * L) / 1,000,000]

L = Length of the Segment for Segment Analysis, 1 for Spot Analysis

A – Average Crash Rate

CCR – Critical Crash Rate = A + K * (SQRT[A/M]) - (1/[2 * M])

(Ref: FDOT Highway Safety Improvement Program Guidelines)

K = 3.291 for Urban, 1.960 for Suburban, 1.645 for Rural

Safety Ratio = ACR/CCR

Level of statistical significance = (ACR - A + (1/2M))/SQRT(A/M)

Confidence Level = Percent probability that the crash rate is abnormally high for the location under study, using the district-wide average as a bas

CL Threshold = 99.95%

4 FUTURE NO-BUILD CONDITIONS

4.1 Future Land Use

As previously stated, the three interchanges are located within the City of Deerfield Beach and the City of Pompano Beach. **Figure 4.1** presents the City of Deerfield Beach Future Land Use Map. The City of Pompano Beach Future Land Use Map is presented in **Figure 4.2**. The zoning maps show the following zone classifications for each interchange:

4.1.1 Hillsboro Boulevard Interchange

The City of Deerfield Beach Future Land Use Map shows the northwest quadrant of the Hillsboro Boulevard Interchange as Industrial and Commercial while the northeast quadrant is shown as Industrial, Commercial, Recreation Open Space and Employment Center. The southeast quadrant shows as Commercial, Residential Moderate (10 DU/AC) and Recreation Open Space. The southwest quadrant shows as Commercial, Industrial and the York Residential Transit Oriented Development.

4.1.2 SW 10th Street Interchange

The City of Deerfield Beach Future Land Use Map shows the area west of the SW 10th Street interchange as Industrial. The northeast quadrant of the interchange is shown as Residential Moderate (10 DU/AC), Commercial and Conservation. The southeast quadrant shows as Community Facility, Recreation Open Space, Residential Low (5 DU/AC), Residential Moderate (10 DU/AC), and Residential Medium (15 DU/AC).

4.1.3 Sample Road Interchange

The City of Deerfield Beach Future Land Use Map shows the northwest quadrant of the interchange as Low Density Residential Low (5 DU/AC) and the northeast quadrant as Community Facility, Office Park and Commercial. The City of Pompano Boulevard Future Land Use Map shows the Southeast quadrant as Commercial, Community Facilities and Residential – Low (1-5 DU/AC), Low-Medium (5-10 DU/AC) and Medium (10-16 DU/AC). The Southeast quadrant shows as Commercial and Residential – Medium (10-16 DU/AC) and Medium High (16-25 DU/AC).

Figure 4.1: Zoning Map – City of Deerfield Beach Future Land Use Map

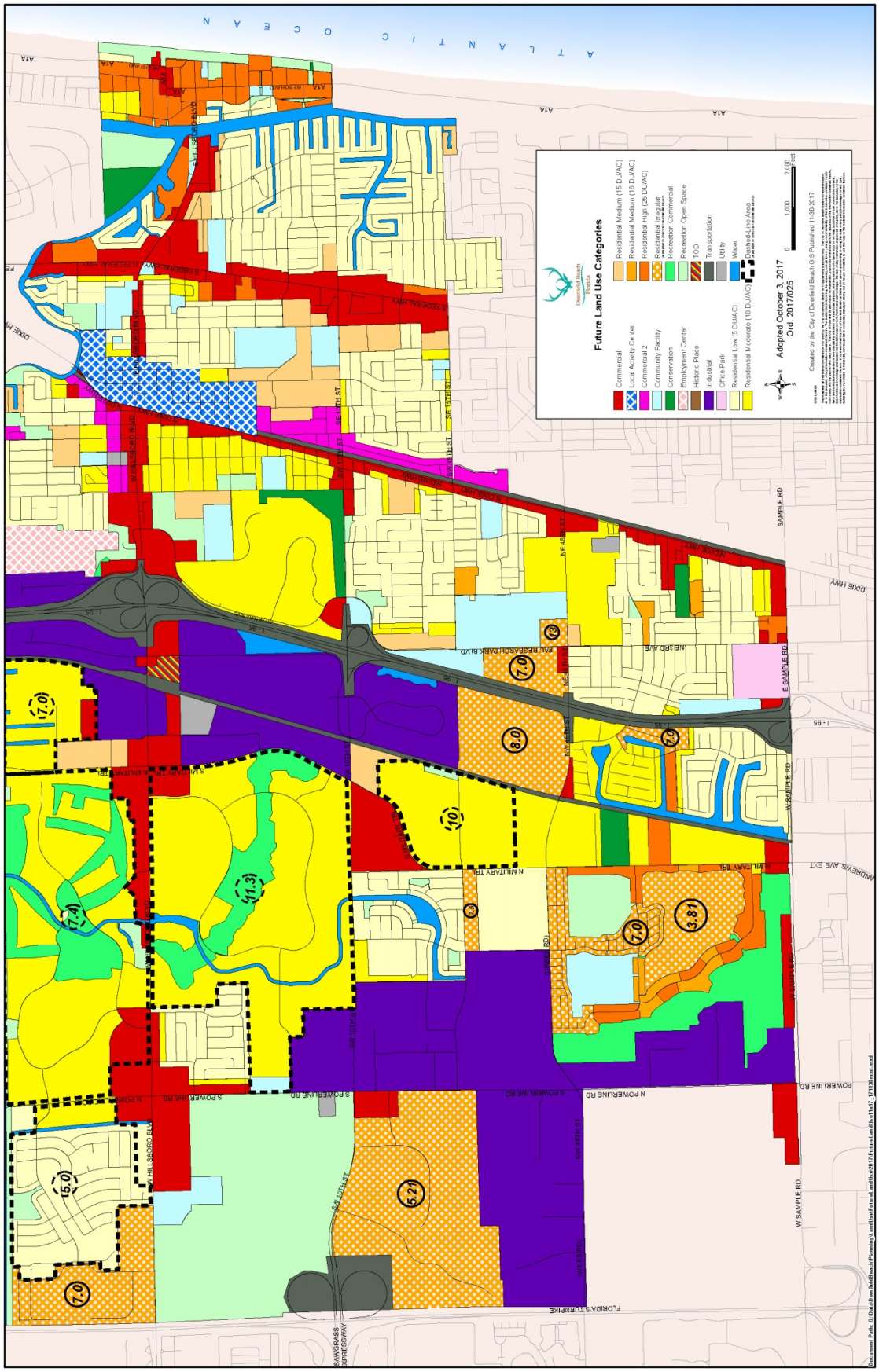
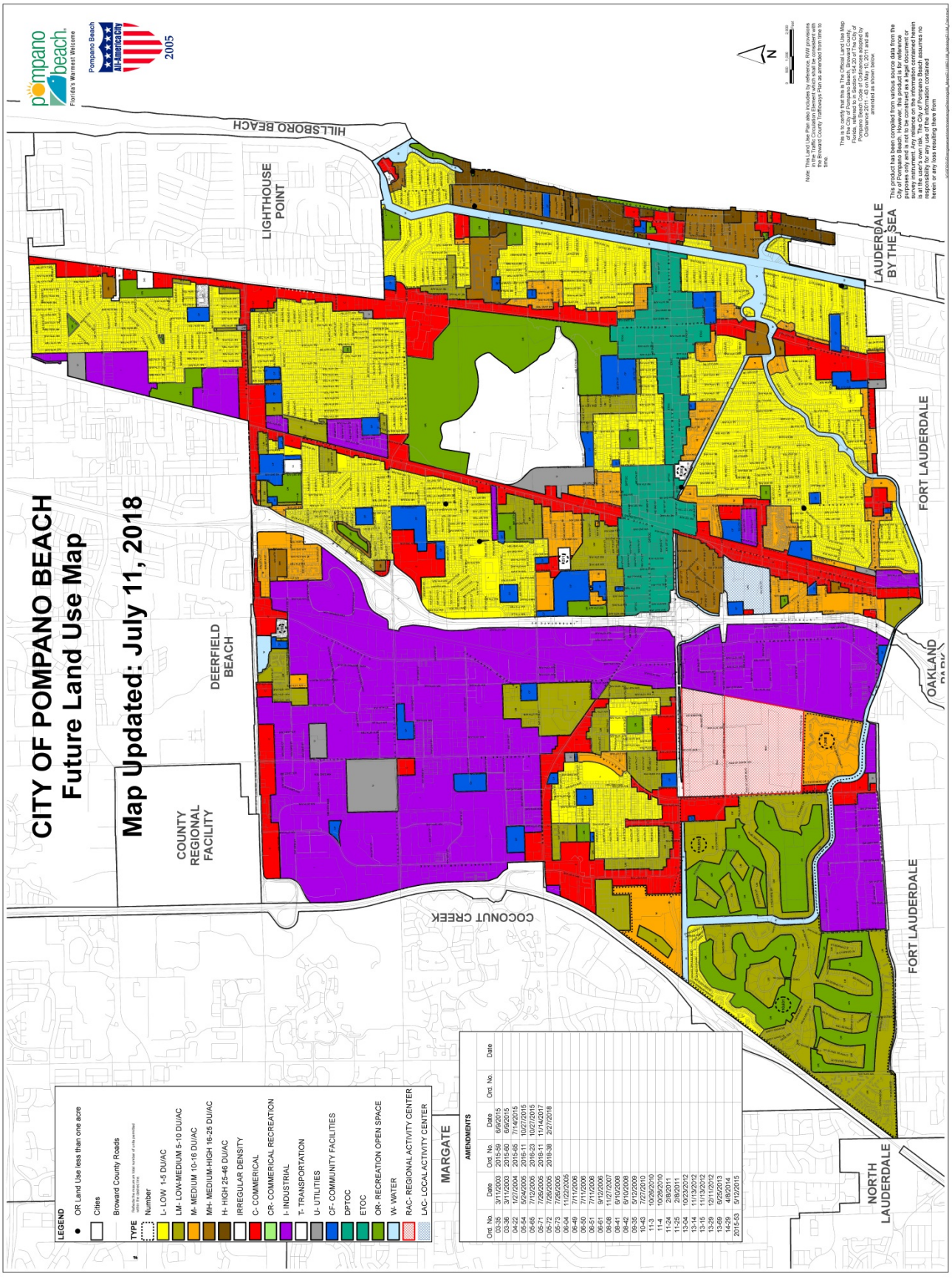


Figure 4.2: Zoning Map – City of Pompano Beach Future Land Use Map



4.2 Land Use Change

No significant future land use changes were identified in the project area. For traffic projection purposes, the base SERPM Version 6.5 model utilizes MPO developed 2005 base year and 2035 LRTP horizon year data; therefore, TAZ data for the 2010 and 2040 analysis years were interpolated/extrapolated from the available 2005 and 2035 data. The interpolated 2010 and extrapolated 2040 TAZ data developed for the I-95 PD&E Study (Stirling Road to Linton Boulevard) was used for this project. The 2040 TAZ data was developed by extrapolation of the MPO-approved 2035 TAZ data, via benchmarking the County Control totals to Bureau of Economic and Business Research (BEBR) projections, consistent with previous revisions of the I-95 Corridor Planning Study (CPS) Model.

4.3 No-Build Alternative – Transportation Network

The future year No-Build Alternative network includes the existing (2015/2016) roadway conditions plus all funded and committed projects within the study corridor as described in Section 1.3-Planned and Programmed Transportation Projects of this SIMR. **Figure 4.3** presents the Future No-Build Alternative Lane Configuration.

4.4 Future Traffic Forecast

As mentioned previously, traffic forecasting was a coordinated effort between FDOT District 4 and the Turnpike. In order to maintain consistency with the on-going SW 10th Street Connector PD&E Study, traffic projections for both the No-Build and Build conditions were obtained from the recently published *SW 10th Street Connector PD&E Study Project Traffic Forecast Memorandum (PTFM)* dated January 2019 (FPID 439891-1). Section 4 of the PTFM provides a detailed description of the modeling methodology and the development of the Directional Design Hour volumes (DDHVs). The complete document is included in **Appendix F**. **Figure 4.4** depicts the Opening Year 2020 and Design Year 2040 No-Build AADTs. **Figures 4.5** and **4.6** present the No-Build Peak Hour Volumes for Opening Year 2020 and Design Year 2040, respectively.

Figure 4.3: No-Build Roadway and Intersection Lane Configurations

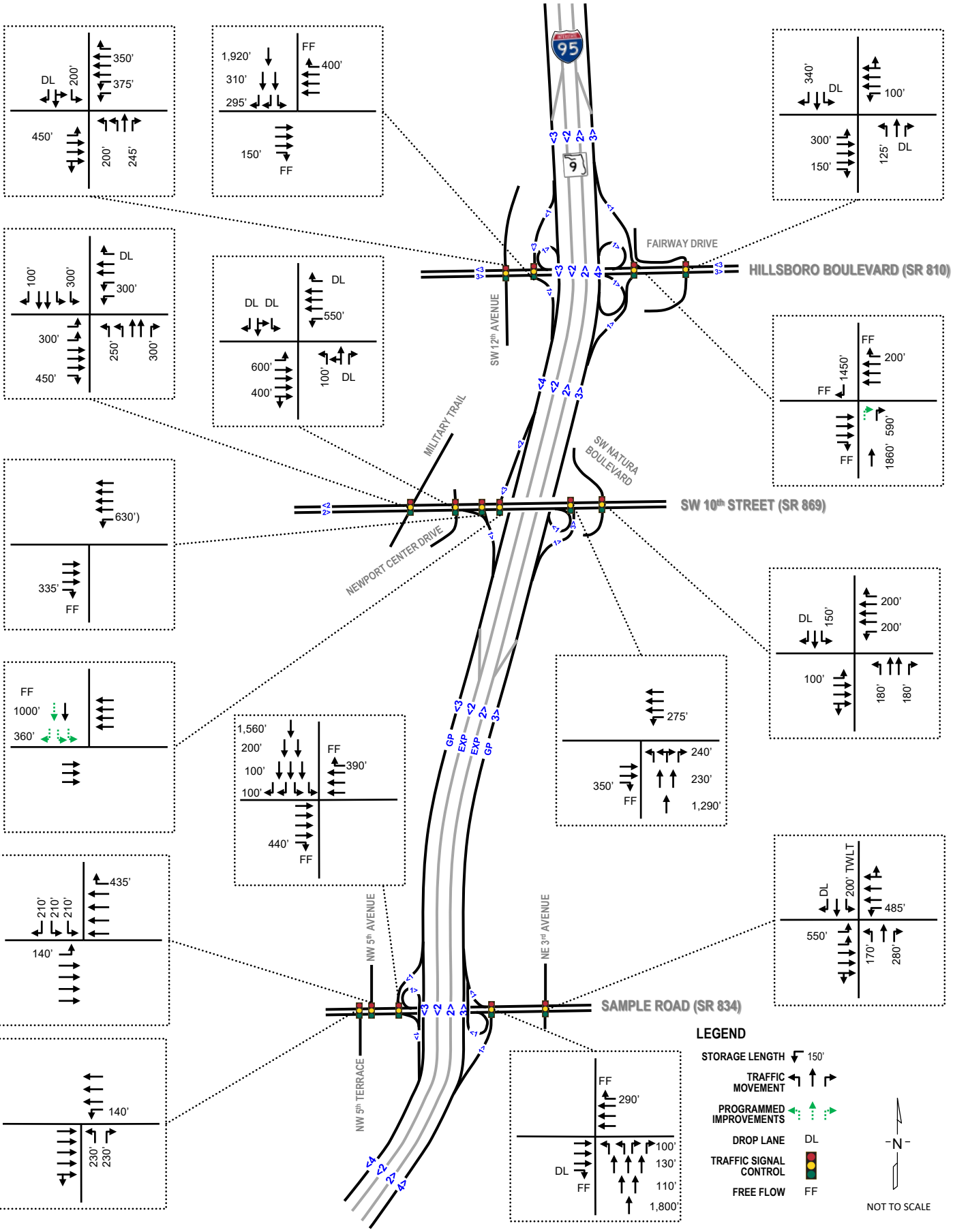


Figure 4.4: 2020 & 2040 No-Build AADT Volumes

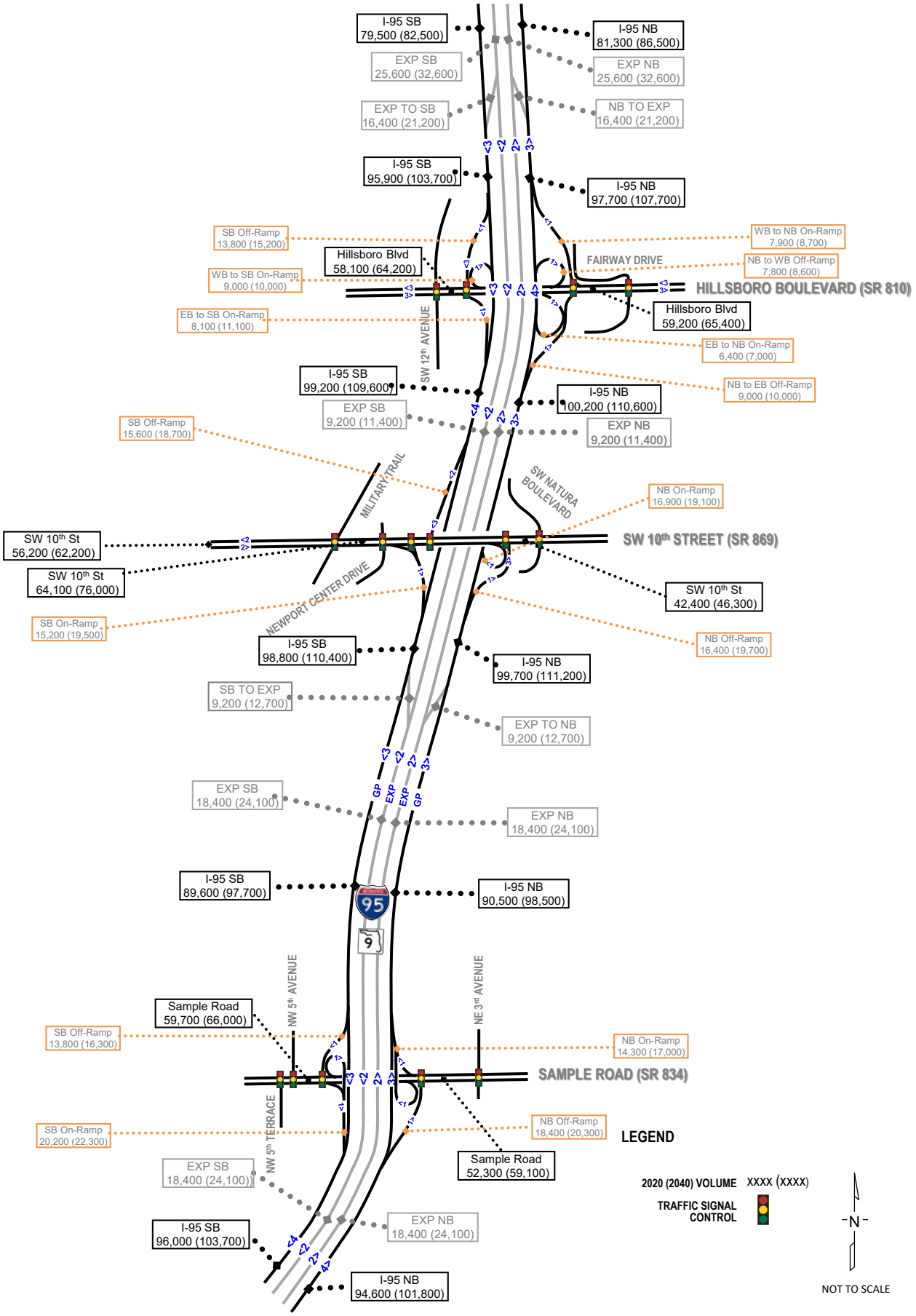


Figure 4.5: 2020 No-Build Peak Hour Volumes

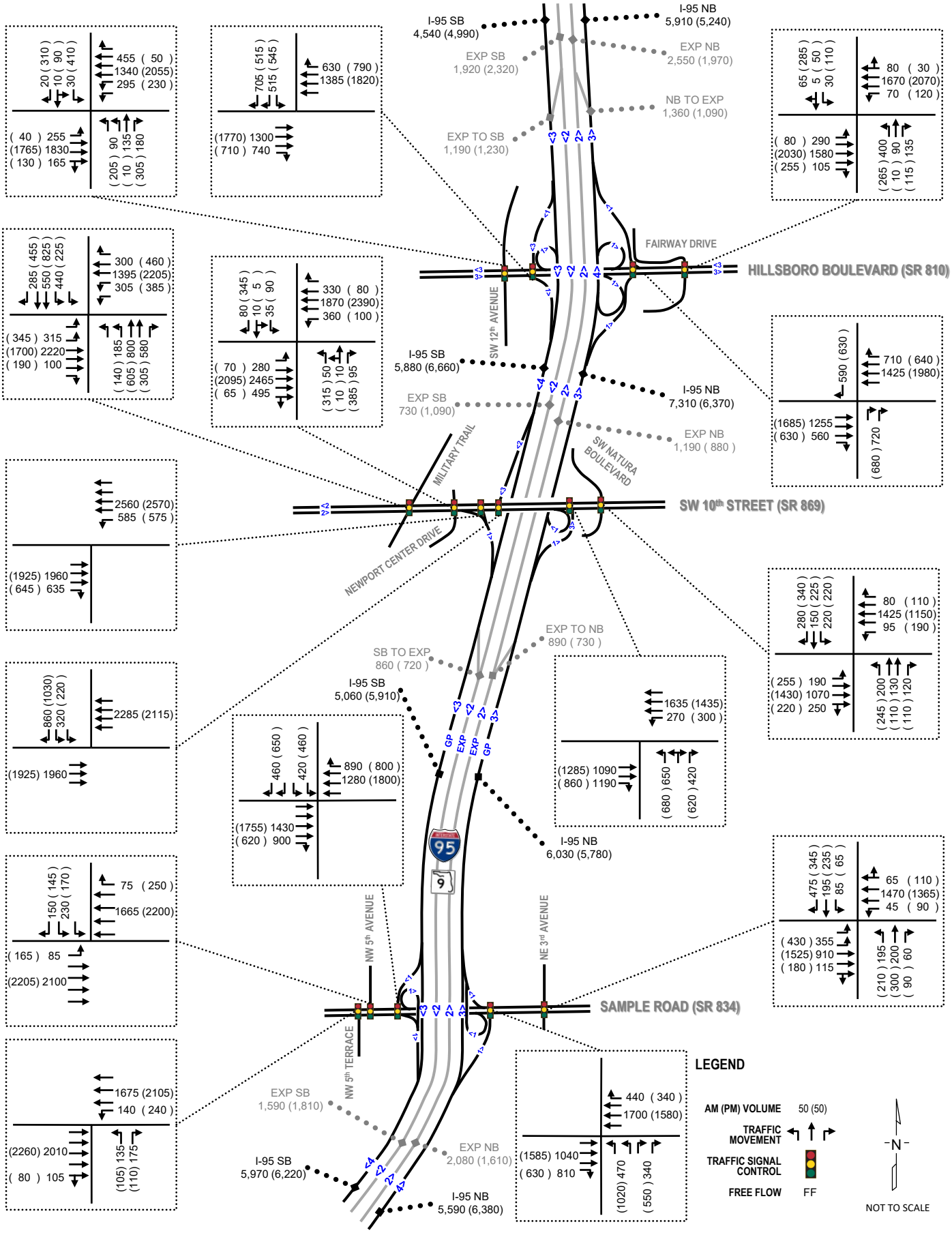
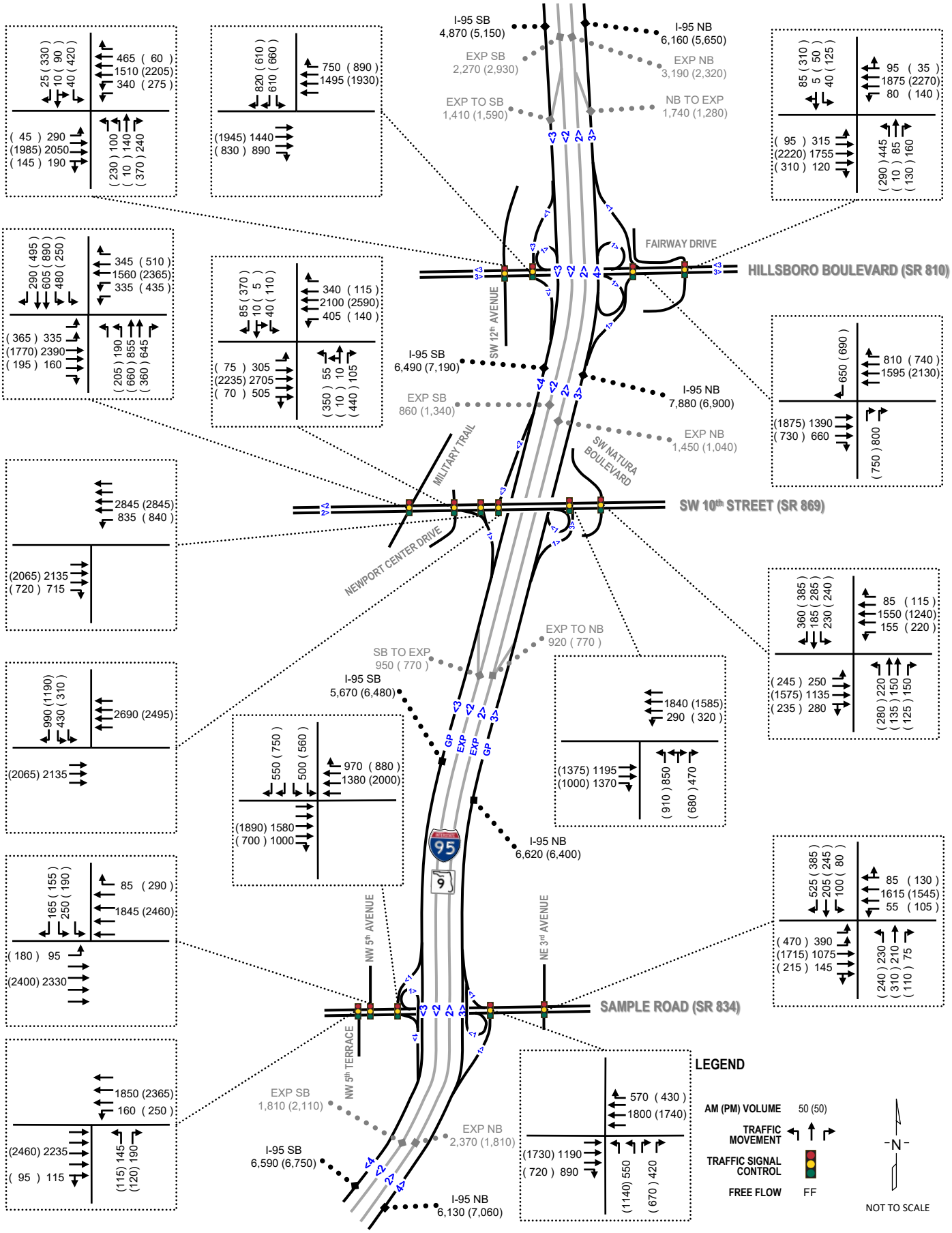


Figure 4.6: 2040 No-Build Peak Hour Volumes



4.4.1 2020 & 2040 No-Build – Freeway Analysis – I-95

The No-Build analysis includes the implementation of I-95 Express Lanes. The mainline/basic, weaving, and ramp merge/diverge analysis results for Opening Year 2020 are summarized and depicted on **Figures 4.7** and **4.8** for the NB and SB directions, respectively. The Design Year 2040 analysis results are summarized and depicted on **Figures** in **4.9** and **4.10** for the NB and SB directions, respectively. Documentation of the 2020 and 2040 No-Build Alternative traffic freeway operational analysis is provided in **Appendix G**. The Design Year 2040 No-Build Alternative analysis indicates that 15 of the 16 freeway segments in the NB direction are projected to operate at LOS E or F during one or both peak hours. Similarly, 9 of the 14 freeway segments in the SB direction are projected to operate at LOS E or F during one or both peak hours.

4.4.2 2020 & 2040 No-Build - Intersection Analysis

Intersection analysis for ramp-terminals and adjacent intersections was performed in a similar manner as for the existing conditions. The No-Build Alternative includes the existing intersection control and lane geometry. **Figure 4.3**, previously presented, presents the No-Build Alternative Lane Configuration and **Figures 4.5** and **4.6**, previously presented, show the AM and PM intersection volumes for 2020 and 2040 conditions, respectively. Signal timing was optimized to reflect routine maintenance operations. **Appendix H** presents the intersection analysis worksheets.

Tables 4.1 through **4.3** summarize the results of the 2020 No-Build signalized intersection analyses for the AM and PM peak hours for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. **Tables 4.4** through **4.6** summarize the results of the 2040 No-Build signalized intersection analyses for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. The results include delays (in seconds per vehicle) and Level of Service (LOS) by movement, approach, and the overall intersection. The volume to capacity (v/c) ratios and 95th percentile queue lengths have also been summarized by movement. The intersection analysis results indicate the following for the 2040 Design Year:

Hillsboro Boulevard: Two of the three signalized intersections are expected to operate at LOS E during the AM or PM peak hours. The I-95 northbound and southbound off-ramp intersections are expected to operate at LOS C or better during both the AM and PM peak hours.
SW 10th Street: Three of the six signalized intersections are expected to operate at LOS E or F during one or both peak hours. The I-95 northbound off-ramp approach is expected to operate at LOS F during both peak hours. The I-95 southbound off-ramp approach is expected to operate at LOS C or better during both peak hours.

Figure 4.7: 2020 No-Build Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	5,910 (5,240)	E (35.1)	D (28.8)
Weave - Hillsboro Boulevard WB to I-95 Express Lanes	7,270 (6,330)	F (N/A)	E (39.4)
Basic Freeway	6,560 (5,690)	E (42.4)	D (32.6)
Weave - Entry Hillsboro Blvd EB to Exit Hillsboro Blvd WB	7,150 (6,320)	E (37.3)	D (32.9)
Basic Freeway	6,590 (5,690)	E (42.9)	D (32.6)
Diverge to Hillsboro Boulevard EB	7,310 (6,370)	F (46.2)	E (37.6)
Basic Freeway	7,310 (6,370)	F (55.2)	E (40.0)
Merge from SW 10th Street EB & WB	7,310 (6,370)	F (36.7)	D (31.2)
Basic Freeway	5,850 (5,210)	D (34.2)	D (28.5)
Diverge to SW 10th Street EB & WB	6,920 (6,510)	F (42.4)	E (39.0)
Basic Freeway	6,920 (6,510)	F (47.9)	E (41.8)
Merge from I-95 Express Lanes	6,920 (6,510)	F (42.9)	E (40.8)
Basic Freeway	6,030 (5,780)	E (36.1)	D (33.5)
Merge from Sample Road WB	6,030 (5,780)	E (36.0)	D (33.9)
Basic Freeway	4,780 (4,810)	C (25.4)	C (25.6)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	5,590 (6,380)	C (27.7)	E (35.5)

GPL: General Purpose Lane

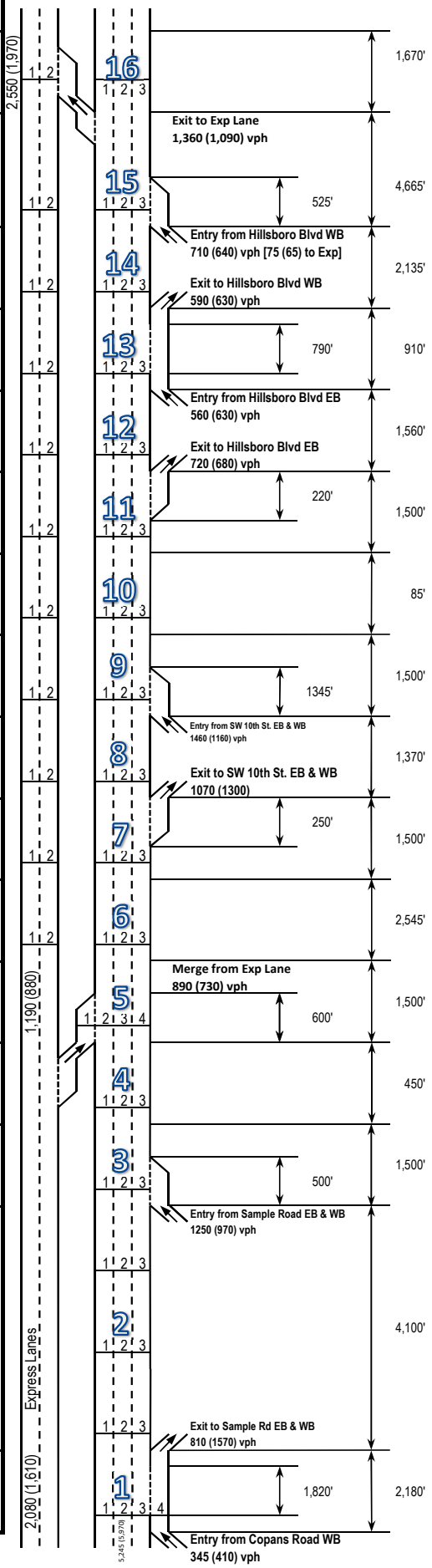
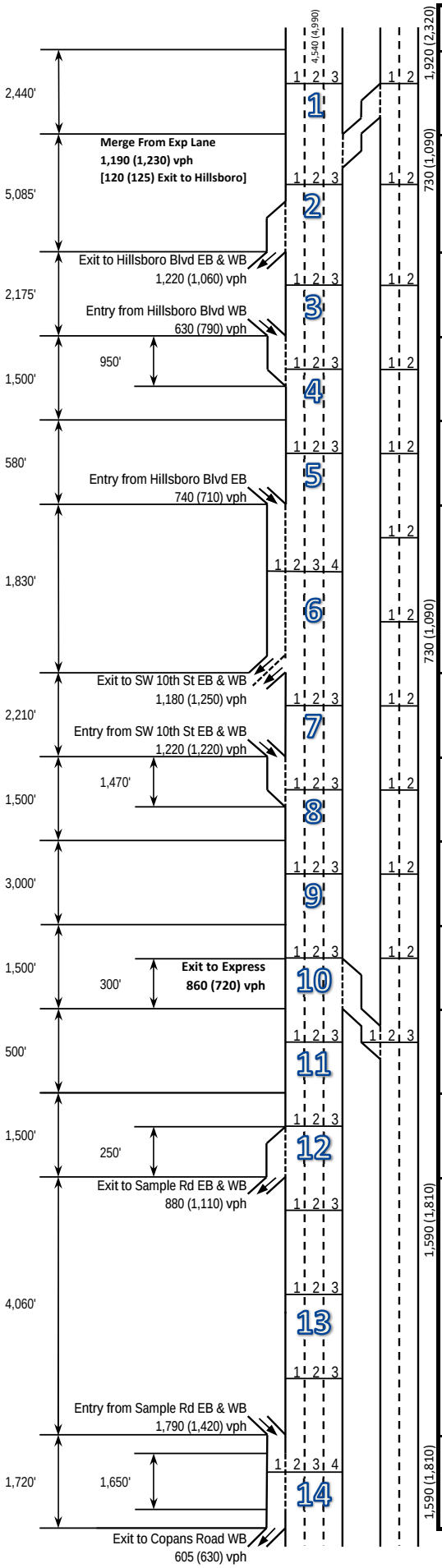


Figure 4.8: 2020 No-Build Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,540 (4,990)	C (23.8)	D (26.9)
Weave I-95 Express Lanes to Hillsboro Boulevard EB & WB	5,730 (6,220)	D (33.7)	E (39.6)
Basic Freeway	4,510 (5,160)	C (23.6)	D (28.2)
Merge from Hillsboro Boulevard WB	5,140 (5,950)	C (27.3)	D (31.9)
Basic Freeway	5,140 (5,950)	D (28.0)	E (35.2)
Weave - Entry Hillsboro Blvd EB to Exit SW 10th Street EB & WB	5,880 (6,660)	C (27.7)	D (31.8)
Basic Freeway	4,700 (5,410)	D (24.8)	D (30.2)
Merge from SW 10th Street EB & WB	5,920 (6,630)	D (30.3)	D (33.5)
Basic Freeway	5,920 (6,630)	D (34.9)	E (43.4)
Diverge to I-95 Express Lanes	5,920 (6,630)	E (37.2)	E (41.1)
Basic Freeway	5,060 (5,910)	D (27.4)	D (34.8)
Diverge to Sample Road EB & WB	5,060 (5,910)	D (34.0)	E (38.1)
Basic Freeway	4,180 (4,800)	C (21.6)	C (25.5)
Weave - Entry Sample Road EB to Exit Copans Road WB	5,970 (6,220)	F (N/A)	D (34.8)

GPL: General Purpose Lane

Figure 4.9: 2040 No-Build Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	6,160 (5,650)	E (37.8)	D (32.3)
Weave - Hillsboro Boulevard WB to I-95 Express Lanes	7,900 (6,930)	F (N/A)	F (N/A)
Basic Freeway	7,090 (6,190)	F (50.9)	E (37.8)
Weave - Entry Hillsboro Blvd EB to Exit Hillsboro Blvd WB	7,740 (6,880)	E (41.9)	E (37.1)
Basic Freeway	7,080 (6,150)	F (50.7)	E (37.4)
Diverge to Hillsboro Boulevard EB	7,880 (6,900)	F (51.5)	F (42.5)
Basic Freeway	7,880 (6,900)	F (70.0)	F (47.6)
Merge from SW 10th Street EB & WB	7,880 (6,900)	F (41.2)	F (34.2)
Basic Freeway	6,220 (5,580)	E (38.2)	D (31.6)
Diverge to SW 10th Street EB & WB	7,540 (7,170)	F (48.1)	F (44.7)
Basic Freeway	7,540 (7,170)	F (60.4)	F (52.4)
Merge from I-95 Express Lanes	7,540 (7,170)	F (47.3)	F (45.6)
Basic Freeway	6,620 (6,400)	E (43.3)	E (40.3)
Merge from Sample Road WB	6,620 (6,400)	E (39.5)	E (37.5)
Basic Freeway	5,160 (5,250)	D (28.2)	D (28.9)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	6,130 (7,060)	D (31.6)	F (N/A)

GPL: General Purpose Lane

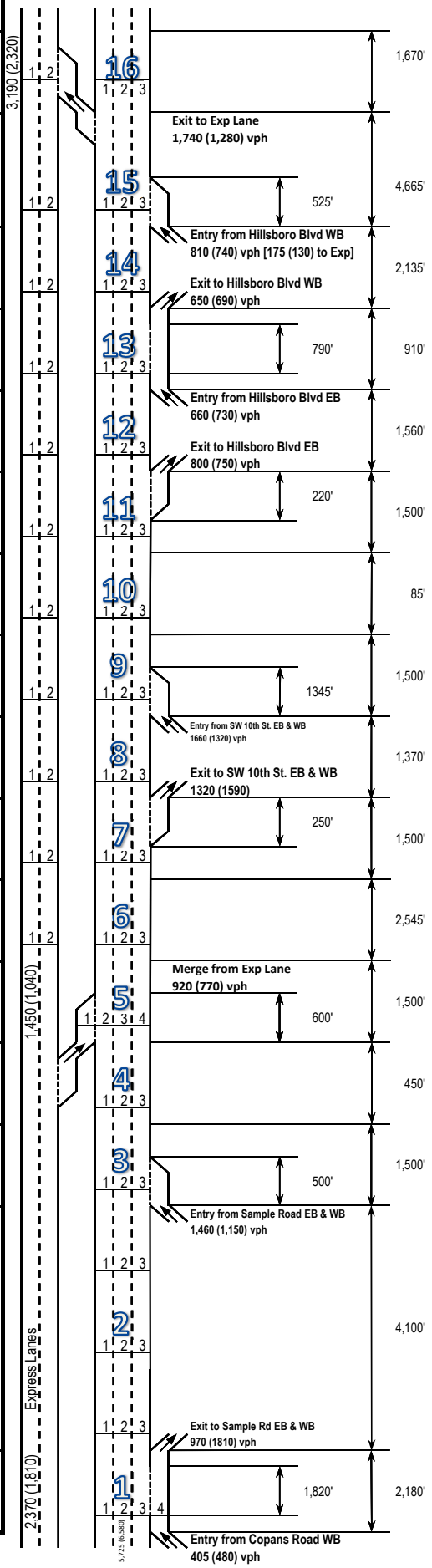
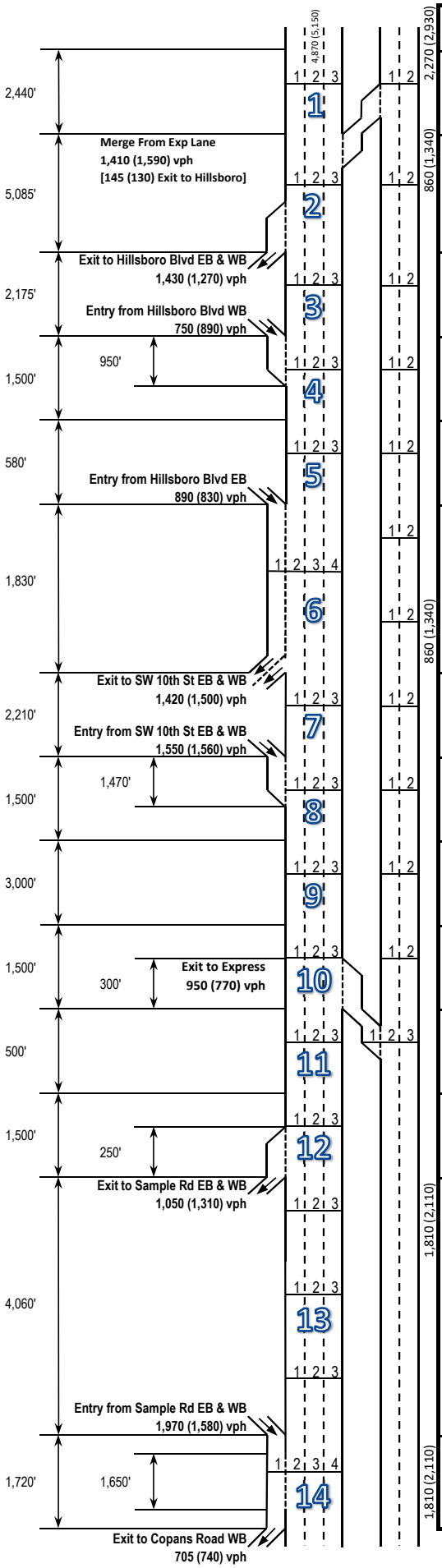


Figure 4.10: 2040 No-Build Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,870 (5,150)	D (26.0)	D (28.1)
Weave I-95 Express Lanes to Hillsboro Boulevard EB & WB	6,280 (6,740)	E (40.5)	F (N/A)
Basic Freeway	4,850 (5,470)	C (25.9)	D (30.7)
Merge from Hillsboro Boulevard WB	5,600 (6,360)	D (30.0)	D (34.2)
Basic Freeway	5,600 (6,360)	D (31.8)	E (39.8)
Weave - Entry Hillsboro Blvd EB to Exit SW 10th Street EB & WB	6,490 (7,190)	F (N/A)	F (N/A)
Basic Freeway	5,070 (5,690)	D (27.5)	D (32.6)
Merge from SW 10th Street EB & WB	6,620 (7,250)	D (34.4)	F (37.2)
Basic Freeway	6,620 (7,250)	E (43.3)	F (54.0)
Diverge to I-95 Express Lanes	5,670 (6,480)	E (41.0)	F (47.1)
Basic Freeway	5,670 (6,480)	D (32.4)	E (41.4)
Diverge to Sample Road EB & WB	5,670 (6,480)	E (37.0)	E (40.8)
Basic Freeway	4,620 (5,170)	C (24.3)	D (28.2)
Weave - Entry Sample Road EB to Exit Copans Road WB	6,590 (6,750)	F (N/A)	F (N/A)

GPL: General Purpose Lane

Table 4.1: 2020 No-Build – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (98.6)	C (22.5)		F (106.1)	B (18.2)	A (5.0)	E (74.6)	F (93.6)	E (59.7)	F (84.5)	F (84.4)	E (56.8)	C (33.8)
			Approach	C (31.1)			C (27.7)			E (74.3)			E (75.2)			
		Volume to Capacity ratio	Movement	0.90	0.68		0.90	0.51	0.40	0.28	0.77	0.12	0.31	0.30	0.01	
		Queue Length 95th (ft)	Movement	#473	723		#290	443	102	85	247	67	63	63	0	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.8)		B (16.7)					E (59.7)		D (50.9)	B (19.3)
			Approach	A (0.4)			B (16.7)						D (54.6)			
		Volume to Capacity ratio	Movement		0.28	0.49		0.51					0.83		0.72	
		Queue Length 95th (ft)	Movement		0	62		515					653		448	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (18.2)			A (0.1)				B (18.5)				B (10.6)
			Approach	B (18.2)			A (0.1)			B (18.5)						
		Volume to Capacity ratio	Movement		0.61			0.30				0.58				
		Queue Length 95th (ft)	Movement		280			m0				230				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (98.1)	B (12.9)	A (8.0)	F (86.8)	C (31.2)		F (414.1)	E (71.7)	E (68.5)	F (82.6)	F (83.3)	F (83.2)	E (66.4)
			Approach	C (25.2)			C (33.3)			F (290.0)			F (83.0)			
		Volume to Capacity ratio	Movement	0.96	0.51	0.07	0.61	0.69		1.73	0.40	0.09	0.40	0.07	0.05	
		Queue Length 95th (ft)	Movement	#570	386	9	150	630		#924	177	72	70	22	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (55.5)	C (32.4)		F (212.0)	C (25.8)	A (0.0)	D (54.6)	D (48.8)	F (155.2)	E (63.2)	E (63.9)	D (40.9)	D (48.0)
			Approach	C (32.9)			D (43.6)			F (113.5)			D (54.9)			
		Volume to Capacity ratio	Movement	0.42	0.86		1.25	0.93	0.03	0.64	0.06	1.14	0.84	0.84	0.52	
		Queue Length 95th (ft)	Movement	72	#701		m#213	#784	m0	124	26	#324	306	313	146	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.5)		B (16.3)					D (43.4)		C (28.7)	B (12.7)
			Approach	A (0.2)			B (16.3)						D (36.2)			
		Volume to Capacity ratio	Movement		0.38	0.47		0.72					0.85		0.51	
		Queue Length 95th (ft)	Movement		0	m0		402					499		213	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (16.0)			A (0.2)				B (17.5)				A (9.0)
			Approach	B (16.0)			A (0.2)			B (17.5)						
		Volume to Capacity ratio	Movement		0.76			0.42				0.68				
		Queue Length 95th (ft)	Movement		275			m0				177				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (84.3)	B (16.8)	B (10.2)	F (136.9)	C (21.5)		F (149.6)	D (44.2)	D (44.5)	D (42.5)	D (44.5)	E (62.2)	C (32.2)
			Approach	B (18.4)			C (27.7)			F (115.9)			E (55.3)			
		Volume to Capacity ratio	Movement	0.81	0.77	0.24	1.01	0.78		1.14	0.04	0.08	0.44	0.19	0.78	
		Queue Length 95th (ft)	Movement	m#103	540	m120	#234	660		#294	23	36	116	68	215	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 4.2: 2020 No-Build - SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (179.1)	F (99.2)	C (25.5)	F (171.3)	D (52.7)	C (26.1)	E (71.0)	E (74.7)	F (166.2)	F (237.6)	D (48.8)	D (44.9)	F (97.1)
			Approach	F (106.0)			E (66.8)			F (108.1)			F (113.0)			
		Volume to Capacity ratio	Movement	1.18	1.11	0.07	1.20	1.01	0.33	0.67	0.96	1.20	1.34	0.62	0.39	
		Queue Length 95th (ft)	Movement	#310	#1069	0	#301	#934	138	144	#578	#819	#429	339	197	
	East Newport Center Drive	LOS (Delay)	Movement	D (54.9)	B (11.8)		F (95.7)	B (14.2)	A (6.2)	E (72.4)	E (72.5)	E (69.5)	E (71.7)	E (71.4)	E (69.4)	C (21.9)
			Approach	B (15.5)			C (24.6)			E (70.6)			E (70.2)			
		Volume to Capacity ratio	Movement	0.82	0.95		0.91	0.67	0.27	0.48	0.49	0.07	0.40	0.38	0.08	
		Queue Length 95th (ft)	Movement	m195	m285		#548	635	21	#77	#78	54	60	62	31	
	I-95 Southbound On-ramp	LOS (Delay)	Movement		B (15.5)	A (0.3)	E (60.5)	A (0.2)								B (11.6)
			Approach	B (11.8)			B (11.4)									
		Volume to Capacity ratio	Movement		0.76	0.44	1.00	0.43								
		Queue Length 95th (ft)	Movement		m335	m0	#675	0								
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (12.4)			C (20.3)					E (55.2)		A (1.6)	B (16.6)
			Approach	B (12.4)			C (20.3)						B (16.2)			
		Volume to Capacity ratio	Movement		0.63			0.58					0.53		0.58	
		Queue Length 95th (ft)	Movement		179			289					159		0	
	I-95 Northbound Ramps	LOS (Delay)	Movement		D (41.3)	A (3.9)	D (44.9)	B (18.0)		E (59.0)		E (76.0)				C (30.5)
			Approach	C (21.8)			C (21.8)			E (64.3)						
		Volume to Capacity ratio	Movement		0.94	0.82	0.66	0.63		0.85		0.90				
		Queue Length 95th (ft)	Movement		686	1090	m377	410		468		#586				
	FAU Research Park Boulevard	LOS (Delay)	Movement	C (26.8)	C (22.4)		B (12.6)	C (22.2)	B (14.0)	D (35.6)	C (31.9)	C (30.7)	C (27.8)	D (36.2)	C (31.4)	C (24.7)
			Approach	C (22.9)			C (21.2)			C (33.3)			C (31.3)			
		Volume to Capacity ratio	Movement	0.74	0.66		0.44	0.76	0.05	0.74	0.40	0.08	0.68	0.67	0.52	
		Queue Length 95th (ft)	Movement	m98	440		44	285	0	#157	59	4	147	131	#136	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (182.9)	C (34.3)	C (21.4)	D (53.7)	F (174.3)	C (25.9)	E (74.4)	F (95.2)	D (48.1)	F (143.1)	F (216.0)	F (119.5)	F (113.5)
			Approach	E (56.2)			F (136.7)			E (78.7)			F (175.9)			
		Volume to Capacity ratio	Movement	1.22	0.81	0.13	0.79	1.32	0.48	0.76	1.02	0.42	1.08	1.34	1.05	
		Queue Length 95th (ft)	Movement	#302	542	47	m177	m#1421	m137	#119	#433	160	#206	#650	#505	
	East Newport Center Drive	LOS (Delay)	Movement	D (46.8)	B (10.8)		E (75.7)	D (35.6)	A (6.6)	E (61.8)	E (60.2)	F (154.0)	D (50.6)	D (50.6)	F (163.6)	D (43.7)
			Approach	B (11.9)			D (36.3)			F (111.4)			F (139.3)			
		Volume to Capacity ratio	Movement	0.63	0.80		0.60	0.98	0.06	0.73	0.71	1.13	0.23	0.23	1.14	
		Queue Length 95th (ft)	Movement	m38	m211		159	#919	1	#260	#253	#461	85	85	#408	
	I-95 Southbound On-ramp	LOS (Delay)	Movement		B (13.8)	A (0.5)	F (97.6)	A (0.2)								B (14.6)
			Approach	B (10.5)			B (18.0)									
		Volume to Capacity ratio	Movement		0.71	0.44	1.10	0.44								
		Queue Length 95th (ft)	Movement		m181	m11	#615	0								
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (9.4)			C (29.5)					D (43.5)		A (2.7)	B (17.6)
			Approach	A (9.4)			C (29.5)						A (9.9)			
		Volume to Capacity ratio	Movement		0.66			0.58					0.33		0.71	
		Queue Length 95th (ft)	Movement		144			m374					66		0	
	I-95 Northbound Ramps	LOS (Delay)	Movement		E (76.0)	A (1.3)	E (68.3)	B (13.8)		E (61.1)		F (92.3)				D (44.6)
			Approach	D (46.0)			C (23.2)			E (70.9)						
		Volume to Capacity ratio	Movement		1.08	0.59	0.94	0.61		0.95		1.02				
		Queue Length 95th (ft)	Movement		#791	110	m#442	157		#542		#664				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (41.5)	B (10.6)		D (55.0)	C (30.9)	C (23.3)	E (67.9)	D (46.7)	D (45.7)	D (42.3)	E (73.5)	E (55.9)	C (32.2)
			Approach	B (14.7)			C (33.4)			E (57.6)			E (57.1)			
		Volume to Capacity ratio	Movement	0.76	0.78		0.84	0.59	0.08	0.90	0.20	0.08	0.60	0.85	0.64	
		Queue Length 95th (ft)	Movement	m145	m287		#249	375	9	#306	75	7	230	#319	#223	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 4.3: 2020 No-Build – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.2)		D (53.4)	A (1.2)		E (56.6)		D (46.9)				B (14.0)
			Approach		B (16.2)			A (5.2)			D (51.1)					
		Volume to Capacity ratio	Movement		0.54		0.64	0.48		0.67		0.12				
		Queue Length 95th (ft)	Movement		325		#155	27		170		64				
	NW 5th Avenue	LOS (Delay)	Movement	D (49.6)	A (2.0)			A (9.3)	A (5.8)				D (51.2)		D (47.0)	A (10.0)
			Approach		A (3.8)			A (9.1)						D (49.6)		
		Volume to Capacity ratio	Movement	0.70	0.47			0.45	0.05				0.59		0.13	
		Queue Length 95th (ft)	Movement	#153	43			250	m6				130		64	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (5.2)	A (1.5)		A (7.6)					B (20.0)		C (23.7)	A (8.4)
			Approach		A (3.8)			A (7.6)						C (21.9)		
		Volume to Capacity ratio	Movement		0.43	0.60		0.48					0.52		0.70	
		Queue Length 95th (ft)	Movement		124	360		156					108		138	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (5.1)			A (4.8)	A (0.2)	C (22.1)		C (21.3)				A (7.8)
			Approach		A (5.1)			A (3.9)			C (21.8)					
		Volume to Capacity ratio	Movement		0.38			0.62	0.29	0.63		0.56				
		Queue Length 95th (ft)	Movement		56			141	m0	124		104				
	NE 3rd Avenue	LOS (Delay)	Movement	E (58.0)	B (18.6)		E (56.3)	D (38.8)		D (38.8)	D (37.7)	C (33.4)	C (32.9)	D (39.3)	E (70.7)	D (39.1)
			Approach		C (28.7)			D (39.3)			D (37.6)			E (58.4)		
		Volume to Capacity ratio	Movement	0.85	0.48		0.49	0.85		0.66	0.45	0.04	0.29	0.47	0.92	
		Queue Length 95th (ft)	Movement	#229	279		79	#558		177	208	0	83	208	#438	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (18.4)		E (72.6)	A (1.3)		E (62.8)		D (53.2)				B (15.4)
			Approach		B (18.4)			A (8.6)			E (57.9)					
		Volume to Capacity ratio	Movement		0.60		0.87	0.57		0.65		0.08				
		Queue Length 95th (ft)	Movement		395		#360	27		152		57				
	NW 5th Avenue	LOS (Delay)	Movement	E (55.4)	A (1.6)			B (11.9)	A (10.0)				E (56.7)		D (53.4)	B (11.4)
			Approach		A (5.3)			B (11.7)						E (55.2)		
		Volume to Capacity ratio	Movement	0.82	0.48			0.61	0.17				0.54		0.10	
		Queue Length 95th (ft)	Movement	#278	35			336	m34				112		64	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (13.3)	A (0.7)		B (14.7)					B (18.5)		C (26.3)	B (14.4)
			Approach		B (10.1)			B (14.7)						C (23.1)		
		Volume to Capacity ratio	Movement		0.57	0.41		0.73					0.46		0.81	
		Queue Length 95th (ft)	Movement		357	18		330					116		#211	
	I-95 Northbound Ramps	LOS (Delay)	Movement		B (12.5)			B (13.3)	A (0.2)	D (39.5)		C (31.4)				B (19.3)
			Approach		B (12.5)			B (11.0)			D (36.7)					
		Volume to Capacity ratio	Movement		0.64			0.64	0.23	0.81		0.54				
		Queue Length 95th (ft)	Movement		239			m194	m0	451		248				
	NE 3rd Avenue	LOS (Delay)	Movement	E (73.7)	C (23.3)		E (76.7)	D (35.9)		F (81.4)	D (53.4)	D (39.0)	D (43.3)	E (57.5)	D (52.2)	D (40.9)
			Approach		C (33.4)			D (38.2)			E (61.4)			D (53.2)		
		Volume to Capacity ratio	Movement	0.86	0.75		0.74	0.77		0.94	0.76	0.06	0.43	0.74	0.63	
		Queue Length 95th (ft)	Movement	#288	390		#171	#542		#210	342	0	74	279	223	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 4.4: 2040 No-Build – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (113.9)	C (26.3)		F (128.0)	C (21.7)	B (15.0)	E (74.4)	F (93.9)	E (61.4)	F (84.5)	F (84.4)	E (55.3)	D (40.0)
			Approach	D (36.3)			D (36.0)			E (73.6)			E (74.7)			
		Volume to Capacity ratio	Movement	0.97	0.77		1.02	0.59	0.42	0.30	0.77	0.30	0.36	0.35	0.02	
		Queue Length 95th (ft)	Movement	#583	914		#356	325	95	93	255	140	72	72	1	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (1.1)		C (26.1)					D (52.9)		D (43.6)	C (20.4)
			Approach	A (0.5)			C (26.1)						D (47.6)			
		Volume to Capacity ratio	Movement		0.31	0.59		0.62					0.84		0.71	
		Queue Length 95th (ft)	Movement		0	197		534					719		473	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (13.1)			A (0.1)				C (27.4)				B (10.5)
			Approach	B (13.1)			A (0.1)			C (27.4)						
		Volume to Capacity ratio	Movement		0.58			0.34				0.77				
		Queue Length 95th (ft)	Movement		319			m0				268				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (136.8)	B (14.1)	A (4.2)	F (88.4)	C (32.7)		F (532.4)	E (72.4)	E (69.5)	F (84.2)	F (83.3)	F (83.3)	F (80.0)
			Approach	C (31.2)			C (34.9)			F (368.6)			F (83.6)			
		Volume to Capacity ratio	Movement	1.07	0.57	0.08	0.64	0.76		1.99	0.39	0.11	0.52	0.07	0.06	
		Queue Length 95th (ft)	Movement	#653	449	8	167	739		#1063	169	79	85	22	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (69.3)	D (39.8)		F (228.0)	C (22.0)	A (0.3)	E (65.3)	E (56.5)	F (246.5)	F (84.7)	F (85.6)	E (65.3)	E (60.2)
			Approach	D (40.4)			D (43.8)			F (175.0)			E (77.4)			
		Volume to Capacity ratio	Movement	0.56	0.92		1.29	0.91	0.04	0.70	0.06	1.36	0.91	0.91	0.81	
		Queue Length 95th (ft)	Movement	#98	#897		m#254	#900	m0	157	29	#516	#415	#425	#333	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.5)		C (25.0)					D (50.4)		C (29.3)	B (16.7)
			Approach	A (0.2)			C (25.0)						D (40.3)			
		Volume to Capacity ratio	Movement		0.42	0.55		0.83					0.90		0.53	
		Queue Length 95th (ft)	Movement		m0	m0		586					733		286	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (15.2)			A (0.1)				C (24.1)				A (9.8)
			Approach	B (15.2)			A (0.1)			C (24.1)						
		Volume to Capacity ratio	Movement		0.73			0.46				0.78				
		Queue Length 95th (ft)	Movement		273			m0				228				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (115.6)	C (23.0)	B (11.9)	F (136.9)	C (28.7)		F (131.4)	D (48.5)	D (49.1)	D (46.9)	D (48.9)	E (73.9)	D (38.0)
			Approach	C (25.0)			C (34.9)			F (104.6)			E (64.4)			
		Volume to Capacity ratio	Movement	0.92	0.86	0.32	1.00	0.86		1.08	0.03	0.10	0.43	0.16	0.84	
		Queue Length 95th (ft)	Movement	m#160	#919	200	#290	#954		#351	25	56	144	75	291	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 4.5: 2040 No-Build - SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (326.4)	F (148.6)	C (25.4)	F (294.3)	F (112.6)	D (48.0)	E (64.9)	E (68.2)	F (187.4)	F (332.8)	D (46.3)	D (41.1)	F (140.5)
			Approach	F (162.4)			F (129.8)			F (113.3)			F (145.2)			
		Volume to Capacity ratio	Movement	1.54	1.23	0.11	1.47	1.15	0.39	0.65	0.95	1.27	1.57	0.66	0.38	
		Queue Length 95th (ft)	Movement	#342	#1151	37	#337	#1071	213	138	#574	#877	#462	352	178	
	East Newport Center Drive	LOS (Delay)	Movement	E (60.2)	C (32.8)		F (114.4)	B (18.1)	A (6.5)	E (67.4)	E (67.4)	E (64.5)	E (66.8)	E (66.4)	E (64.4)	C (34.5)
			Approach	D (35.2)			C (30.4)			E (65.6)			E (65.2)			
		Volume to Capacity ratio	Movement	0.90	1.05		1.04	0.77	0.28	0.49	0.49	0.07	0.42	0.39	0.08	
		Queue Length 95th (ft)	Movement	m191	m222		#639	666	11	#80	#80	11	61	61	0	
	I-95 Southbound On-ramp	LOS (Delay)	Movement		B (14.6)	A (0.1)	F (156.0)	A (0.2)								C (24.8)
			Approach	B (11.0)			D (35.6)									
		Volume to Capacity ratio	Movement		0.91	0.49	1.26	0.48								
		Queue Length 95th (ft)	Movement		m345	m0	#1253	0								
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (16.0)			B (17.1)					E (68.2)		A (2.4)	B (17.9)
			Approach	B (16.0)			B (17.1)						C (22.3)			
		Volume to Capacity ratio	Movement		0.67			0.67					0.85		0.68	
		Queue Length 95th (ft)	Movement		256			m311					#241		0	
	I-95 Northbound Ramps	LOS (Delay)	Movement		F (129.3)	A (9.6)	D (35.4)	B (18.3)		F (94.3)		F (132.9)				E (58.5)
			Approach	E (65.4)			C (20.6)			F (106.3)						
		Volume to Capacity ratio	Movement		1.18	0.94	0.61	0.72		1.05		1.12				
		Queue Length 95th (ft)	Movement		#850	#1270	m239	458		#638		#748				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (46.8)	C (26.7)		B (14.9)	C (22.7)	B (13.0)	E (57.5)	C (29.2)	C (28.1)	C (34.7)	D (41.2)	D (50.1)	C (30.1)
			Approach	C (29.8)			C (21.6)			D (40.8)			D (43.4)			
		Volume to Capacity ratio	Movement	1.00	0.75		0.62	0.83	0.06	0.90	0.41	0.10	0.78	0.77	0.83	
		Queue Length 95th (ft)	Movement	m118	m351		#90	293	0	#200	62	16	#144	#178	#217	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (210.5)	D (38.7)	C (21.7)	D (43.0)	F (236.6)	B (13.3)	F (124.7)	F (124.7)	D (45.7)	F (144.3)	F (260.4)	F (152.3)	F (141.4)
			Approach	E (64.2)			F (176.8)			F (101.5)			F (209.9)			
		Volume to Capacity ratio	Movement	1.30	0.90	0.13	0.84	1.46	0.54	1.03	1.13	0.50	1.11	1.45	1.16	
		Queue Length 95th (ft)	Movement	#304	574	42	m165	m#1381	m124	#177	#461	178	#212	#668	#534	
	East Newport Center Drive	LOS (Delay)	Movement	E (55.7)	B (12.6)		F (80.9)	E (58.3)	A (5.2)	E (61.0)	E (61.9)	F (214.6)	D (49.7)	D (49.7)	F (273.9)	E (64.5)
			Approach	B (13.9)			E (57.3)			F (145.7)			F (220.7)			
		Volume to Capacity ratio	Movement	0.62	0.86		0.78	1.06	0.09	0.77	0.78	1.30	0.34	0.34	1.42	
		Queue Length 95th (ft)	Movement	m30	m406		#222	#979	2	#272	#278	#517	94	96	#430	
	I-95 Southbound On-ramp	LOS (Delay)	Movement		B (14.7)	A (0.5)	F (237.2)	A (0.2)								D (35.6)
			Approach	B (11.0)			D (54.2)									
		Volume to Capacity ratio	Movement		0.83	0.49	1.45	0.48								
		Queue Length 95th (ft)	Movement		m256	m17	#1169	0								
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (9.1)			C (20.2)					D (48.0)		A (4.8)	B (14.8)
			Approach	A (9.1)			C (20.2)						B (13.7)			
		Volume to Capacity ratio	Movement		0.67			0.65					0.61		0.82	
		Queue Length 95th (ft)	Movement		173			m283					133		0	
	I-95 Northbound Ramps	LOS (Delay)	Movement		F (174.6)	A (1.9)	D (50.4)	B (16.5)		F (109.1)		F (148.9)				F (81.3)
			Approach	F (101.9)			C (22.2)			F (121.5)						
		Volume to Capacity ratio	Movement		1.32	0.69	0.89	0.71		1.12		1.20				
		Queue Length 95th (ft)	Movement		#864	150	M#371	m208		#681		#792				
	FAU Research Park Boulevard	LOS (Delay)	Movement	D (45.6)	B (10.5)		F (82.3)	C (32.8)	C (23.6)	F (105.6)	D (41.8)	D (40.7)	D (36.6)	F (84.4)	F (88.4)	D (38.8)
			Approach	B (14.7)			D (39.0)			E (74.6)			E (71.8)			
		Volume to Capacity ratio	Movement	0.83	0.92		0.97	0.69	0.08	1.06	0.23	0.09	0.61	0.95	0.93	
		Queue Length 95th (ft)	Movement	m110	m167		#303	379	34	#392	83	51	230	#414	#390	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 4.6: 2040 No-Build – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.9)		E (70.6)	A (1.5)		E (57.1)		D (46.4)				B (15.1)
			Approach		B (16.9)			A (7.0)			D (51.0)					
		Volume to Capacity ratio	Movement		0.60		0.79	0.53		0.69		0.13				
		Queue Length 95th (ft)	Movement		377		#237	32		181		65				
	NW 5th Avenue	LOS (Delay)	Movement	E (58.5)	A (2.2)			B (10.3)	A (4.9)				D (51.2)		D (47.0)	B (10.6)
			Approach		A (4.4)			B (10.1)						D (49.5)		
		Volume to Capacity ratio	Movement	0.78	0.53			0.50	0.06				0.61		0.22	
		Queue Length 95th (ft)	Movement	m#174	46			298	m6				140		82	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (6.2)	A (2.0)		A (7.9)					C (20.2)		C (26.7)	A (9.4)
			Approach		A (4.6)			A (7.9)						C (23.6)		
		Volume to Capacity ratio	Movement		0.48	0.67		0.53					0.59		0.80	
		Queue Length 95th (ft)	Movement		159	486		168					127		#189	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (6.7)			A (7.1)	A (0.2)	C (22.6)		C (22.1)				A (9.3)
			Approach		A (6.7)			A (5.5)			C (22.4)					
		Volume to Capacity ratio	Movement		0.45			0.68	0.38	0.68		0.64				
		Queue Length 95th (ft)	Movement		97			m160	m0	143		126				
	NE 3rd Avenue	LOS (Delay)	Movement	F (86.0)	C (21.2)		E (58.0)	E (60.4)		D (42.9)	D (36.1)	C (31.9)	C (29.6)	D (36.1)	F (101.3)	D (52.8)
			Approach		D (36.9)			E (60.3)			D (38.5)			E (76.5)		
		Volume to Capacity ratio	Movement	0.85	0.48		0.49	0.85		0.66	0.45	0.04	0.29	0.47	0.92	
		Queue Length 95th (ft)	Movement	#281	307		91	#645		#224	225	0	98	219	#604	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.7)		F (161.1)	A (1.6)		E (57.4)		D (48.2)				B (18.3)
			Approach		B (16.7)			B (16.8)			D (52.7)					
		Volume to Capacity ratio	Movement		0.63		1.15	0.66		0.65		0.08				
		Queue Length 95th (ft)	Movement		405		#413	33		152		56				
	NW 5th Avenue	LOS (Delay)	Movement	F (129.6)	A (1.8)			B (12.7)	B (15.3)				D (51.8)		D (48.4)	B (14.2)
			Approach		B (10.7)			B (13.0)						D (50.3)		
		Volume to Capacity ratio	Movement	1.11	0.53			0.68	0.20				0.56		0.11	
		Queue Length 95th (ft)	Movement	#326	38			393	m44				113		63	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (11.1)	A (0.9)		C (21.3)					C (31.6)		D (42.2)	B (19.2)
			Approach		A (8.4)			C (21.3)						D (37.7)		
		Volume to Capacity ratio	Movement		0.57	0.47		0.75					0.50		0.83	
		Queue Length 95th (ft)	Movement		173	53		549					226		382	
	I-95 Northbound Ramps	LOS (Delay)	Movement		B (17.0)			C (23.2)	A (0.2)	D (36.1)		C (28.2)				C (22.7)
			Approach		B (17.0)			B (18.7)			C (33.2)					
		Volume to Capacity ratio	Movement		0.75			0.76	0.29	0.84		0.61				
		Queue Length 95th (ft)	Movement		339			m343	m0	488		292				
	NE 3rd Avenue	LOS (Delay)	Movement	F (92.8)	C (22.1)		F (127.1)	D (40.3)		F (136.4)	E (58.6)	D (37.5)	D (36.9)	D (48.5)	D (53.3)	D (46.4)
			Approach		D (36.0)			D (45.4)			F (83.4)			D (49.8)		
		Volume to Capacity ratio	Movement	0.99	0.86		0.97	0.90		1.12	0.84	0.08	0.50	0.69	0.75	
		Queue Length 95th (ft)	Movement	#329	#685		#210	#662		#314	336	0	81	265	267	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Sample Road: All five signalized intersections are expected to operate at LOS D or better during both peak hours. The I-95 northbound and southbound off-ramp approaches are expected to operate at LOS D or better during both peak hours.

Table 4.7 summarizes the results of the off-ramp signals back of queue analyses for the AM and PM peak hours for 2040 No-Build conditions. HCM methodology does not provide queue lengths. The 95th percentile queues were obtained from Synchro reports. Available storage lengths on the off-ramps were calculated by deducting deceleration lengths from the total off-ramp lengths measured from stop bars to gore points. According to *Table 3-22, Minimum Deceleration Lengths for Exit Terminals* in *Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways, 2016*, the deceleration length on I-95 off-ramps with a design speed of 70 MPH is 615 feet.

Table 4.7: 2040 No-Build – Off-Ramp Signals Queuing Analysis Results

Intersection	Approach	Movement	Turn Lane Storage (ft)	Available Off-Ramp Length (ft)(1)	Queue (ft)	
					AM	PM
2040 No-Build						
Hillsboro Boulevard at I-95 SB Off-Ramp	Southbound	L (EB)	295	1,910	719	733
		R (WB)	295	1,910	473	286
Hillsboro Boulevard at I-95 NB Off-Ramp	Northbound	R (EB)	590	1,835	268	228
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	360	745	#241	133
		R (WB)	360	745	0	0
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	240	1,145	#638	#681
		R (EB)	240	1,145	#748	#792
Sample Road at I-95 SB Off-Ramp	Southbound	L (EB)	200	1,345	127	226
		R (WB)	200	1,345	#189	382
Sample Road at I-95 NB Off-Ramp	Northbound	L (WB)	230	1,525	143	488
		R (EB)	230	1,525	126	292

(1) Available off-ramp lengths were calculated by deducting the deceleration length of 615 feet from total off-ramp lengths

#: 95th percentile volume exceeds capacity

5 FUTURE BUILD CONDITIONS

5.1 Build Alternatives – Transportation Network

The future Build alternatives network incorporates all the roadway improvements described under Section 4.3 and depicted in Figure 4.3 for the No-Build Alternative plus the proposed improvements to mitigate deficiencies identified in the No-Build Alternative, when feasible. The Build alternative maintain the typical section from the No-Build Alternative along I-95 between interchanges (i.e., no through lanes along I-95 are added.)

5.2 Future Build Alternatives Traffic Forecast

Traffic projections were obtained from the *Project Traffic Forecast Memorandum (PTFM)* dated January 2019 for the SW 10th Street Connector PD&E Study (FPID 439891-1) and from the Memorandum dated May 26, 2020 for the SW 10th Street Connector & I-95 Interchange Supplemental Traffic Forecast Scenarios.

5.3 Development and Screening of Build Alternatives

Based on the evaluation of the No-Build conditions, various Build alternatives were developed and analyzed for the I-95 and SW 10th Street SIMR (FPID 436964-1) and the SW 10th Street Connector PD&E Study (FPID 439891-1). Traffic evaluations were conducted for two different Build alternatives (a Center Alignment and a Northern Alignment for the proposed managed lanes), with six different managed lane ingress and egress configurations resulting in a total of twelve (12) Build alternatives.

The fifteen scenarios (existing 2016 conditions, 2040 No-Build conditions, and twelve 2040 Build conditions) were first analyzed by conducting a Tier 1 volume to capacity ratio analysis of the SW 10th Street general use lanes and proposed managed lanes. In addition, the vehicle-miles traveled in the managed lanes during the peak hours for each of the twelve Build alternatives were calculated and compared. Subsequently, a Tier 2 intersection operations analysis was completed for the signalized intersections along SW 10th Street. A Tier 2 freeway analysis of the proposed managed lanes connecting the Sawgrass Expressway, Florida's Turnpike and I-95 was also completed. The peak hour traffic operations analysis results were reviewed to screen the twelve (12) Build alternatives for any operational fatal flaws where demand exceeded capacity extensively, and a comparison of results was used to identify the most advantageous Build alternatives to be considered further.

Overall, Tier 1 and Tier 2 analyses resulted in the selection of the North Build Alternative 3D-1.3 and the Center Build Alternative 3D-1.3 as the top ranked alternatives. VISSIM microsimulation was conducted to further evaluate these two shortlisted alternatives. The North Build Alternative 3D-1.3 was projected to provide better operating conditions than the Center

Build Alternative. Hence, the PTFM identified the North Build Alternative 3D-1.3 as the best Build Alternative based on projected traffic operations and was further refined to improve the overall operations. An *Alternatives Analysis Memorandum* documenting the development and screening of various alternatives for SW 10th Street and I-95 was submitted to FDOT District 4 on June 29, 2018 and is included in **Appendix I**. Subsequently, at the request of FDOT District 4, Florida's Turnpike Enterprise (FTE) staff was tasked with evaluating additional forecast scenarios addressing potential modifications to the SW 10th Street Connector ramps to and from I-95. The new forecast has been documented in a Memorandum dated July 20, 2020 and is also included in Appendix I. Based on the conclusions of the PTFM, Alternatives Analysis Memorandum, July 20, 2020 Memorandum, and directions received from the Department, the following three Build Alternatives were considered for this SIMR.

Build 1 Alternative: This Build alternative has been identified as an alternative without the direct-connect ramps to and from I-95 but includes all other freeway and arterial improvements proposed under Build 2 alternatives below. The traffic forecast for this alternative is similar to the No-Build forecast.

Build 2 Alternative: This Build alternative has been identified as the Partial Build alternative in the PTFM dated January 2019 and in the *Alternatives Analysis Memorandum* dated June 2018. The Partial-Build/Build 2 alternative provides for grade-separated managed lanes to and from I-95 extending just west of Military Trail. Also, there are no entry or exits ramps on the direct-connect ramps between Military Trail and I-95. The SW 10th Street connector connects to and from I-95 General Use Lanes (GULs) as well as the I-95 Express Lanes (Els).

For Build 2, a sub scenario with higher traffic demand was also evaluated. The sub scenario of Build 2 has I-95 direct-connect ramps connecting to the SW 10th Street Connector Lanes which continue to the Sawgrass Expressway. The SW 10th Street Connector Lanes include an EB exit ramp and a WB entrance ramp between Military Trail and I-95. This alternative has been identified as Build C2 in the May 26, 2020 Memorandum which was prepared by Florida's Turnpike Enterprise for evaluating additional forecast scenarios addressing potential modifications to the SW 10th Street Connector ramps to and from I-95. The memorandum included in Appendix I provides supplemental traffic forecast scenarios to the Project Traffic Forecast Memorandum (PTFM) dated January 2019.

It is important to note that except for the direct-connect ramps , connections to I-95 General Use Lanes and Express Lanes, and the I-95 NB CD road between SW 10th Street and Hillsboro Boulevard, the geometric configuration along the interchange cross-streets for Build 1and Build 2 alternatives are similar within the SIMR study limits and the area of influence. Traffic projections for Build 1 are the same as the No-Build but less than Build 2. This is primarily due to the connector lanes under Build 2 connecting with I-95 Express Lanes.

The conceptual plans for Build 1, Build 2, and its sub scenario with higher traffic demand and the signing plan for Build 2 are included in **Appendix J**.

Figure 5.1 shows the roadway and intersection lane configuration for Build 1 and **Figure 5.2** shows it for Build 2 Alternative and includes the following improvements in addition to the No-Build improvements:

I-95 Improvements:

I-95 southbound auxiliary lane between SB entrance ramp from SW 10th Street and the SB exit ramp to Sample Road. This creates a 4-lane mainline segment on SB I-95. (FPID 433108-5-52-01)

Eliminate the SB auxiliary lane between Hillsboro Boulevard and SW 10th Street. The proposed braided ramps in the southwest quadrant of interchange as discussed below eliminate the need for this auxiliary lane.

For Build 2 Alternative, a new I-95 NB on-ramp is introduced from WB SW 10 Street as a free-flow right turn on the NE quadrant of the interchange. The new I-95 NB on-ramp connects with EB on-ramp and the EB SW 10 Street Connector carrying traffic destined to the I-95 general-purpose lanes. A combination of these on-ramps forms a NB CD road. The NB CD road braids over the NB Hillsboro Boulevard off-ramp, continues northward, and connects with Hillsboro Blvd. EB and WB on-ramps. Then the NB CD road merges with the I-95 mainline north of Hillsboro Blvd.

SW 10th Street Interchange Ramp Improvements:

Provide an on-ramp for WB SW 10th Street to I-95 NB. Combine the EB to NB loop on-ramp from SW 10th Street with the new WB to NB on-ramp from SW 10th Street to create a single on-ramp merge on the mainline.

Widen the EB to NB loop on-ramp to two lanes.

Provide a braided NB off-ramp for Hillsboro Boulevard upstream of the NB on-ramp merge from SW 10th Street.

Provide a two-lane NB off-ramp exit for SW 10th Street.

Provide for 3 left-turn lanes and 3 right-turn lanes on the NB off-ramp approach.

Provide for 2 left-turn lanes and 2 right-turn lanes on the SB off-ramp approach.

Eliminate the existing WB to SB on-ramp signal on SW 10th Street by aligning it with the SB off-ramp signal. Widen the WB to SB on-ramp to two lanes.

Provide a EB connector ramp to I-95 SB GPL lanes via I-95 SB EL lanes in the proposed SB auxiliary lane between SW 10th Street to Sample Road.

Hillsboro Boulevard Interchange Ramp Improvements:

Combine the WB to SB loop on-ramp from Hillsboro Boulevard with the EB to SB slip on-ramp from Hillsboro Boulevard to create a single on-ramp merge on the mainline.
Provide a braided SB off-ramp for SW 10th Street upstream of the SB on-ramp merge from Hillsboro Boulevard.
SW 10th Street Intersection Improvements:
Various intersection alternatives for Newport Drive intersection were assessed in the *SW 10th Street Eastbound Weave Operations from the Connector Lane Egress, West of Newport Center Drive, to the Newport Center Drive and I-95 Intersections*, as contained in Appendix I and the full intersection opening was selected.
A second dedicated left turn lane is provided along EB and WB approaches at the intersection with Newport Center Drive. A choice through/left-turn lane and dual right-turn lanes are provided for the southbound leg. Provide barrier separated two EB through lanes for EB to NB I-95 traffic from east of Newport Center Drive to west of NB off-ramp intersection. Widen the loop on-ramp in the southeast quadrant to two lanes. At the SB ramp intersection, provide dual WB left turn lanes extending 250 feet east of the NB ramp intersection. Widen the existing single free-flow southbound right turn lane to provide for signal controlled dual right-turn lanes to improve operations and safety in the westbound direction Signalization provides adequate traffic gaps for pedestrians to cross the SB off-ramp. Also, due to the proximity of the signalized intersection at Newport Center Drive, the free-flow right turn traffic from the I-95 SB off-ramp induces weaving with the westbound traffic. This condition is likely to become worse with the introduction of the access to the westbound connector lanes immediately west of the Newport Center Drive. At Natura Boulevard, provide dual EB and WB left turn lanes and an exclusive EB right turn lane. The 2020 and 2040 AADT traffic volumes for Build 1, Build 2, and its sub scenario with higher traffic demand are shown in **Figures 5.3, 5.4** and **5.5**, respectively.
The 2020 and 2040 peak hour traffic volumes for Build 1 Alternative are shown in **Figures 5.6** and **5.7**, respectively. The 2020 and 2040 peak hour traffic volumes for Build 2 Alternative are shown in **Figures 5.8** and **5.9**, respectively. The 2020 and 2040 peak hour traffic volumes for Build 2 sub scenario with higher traffic demand are shown in **Figures 5.10** and **5.11**, respectively.
These improvements address the traffic operation deficiencies by improving or eliminating failing merge, diverge and weaving segments; and may reduce crash rates by implementing these improvements. Improvements at the ramp terminal intersections are projected to eliminate queue spillbacks on to the I-95 mainline. In addition, pedestrian and bicycle mobility is maintained or enhanced through improved design.

Figure 5.1: Build 1 - Roadway and Intersection Lane Configurations

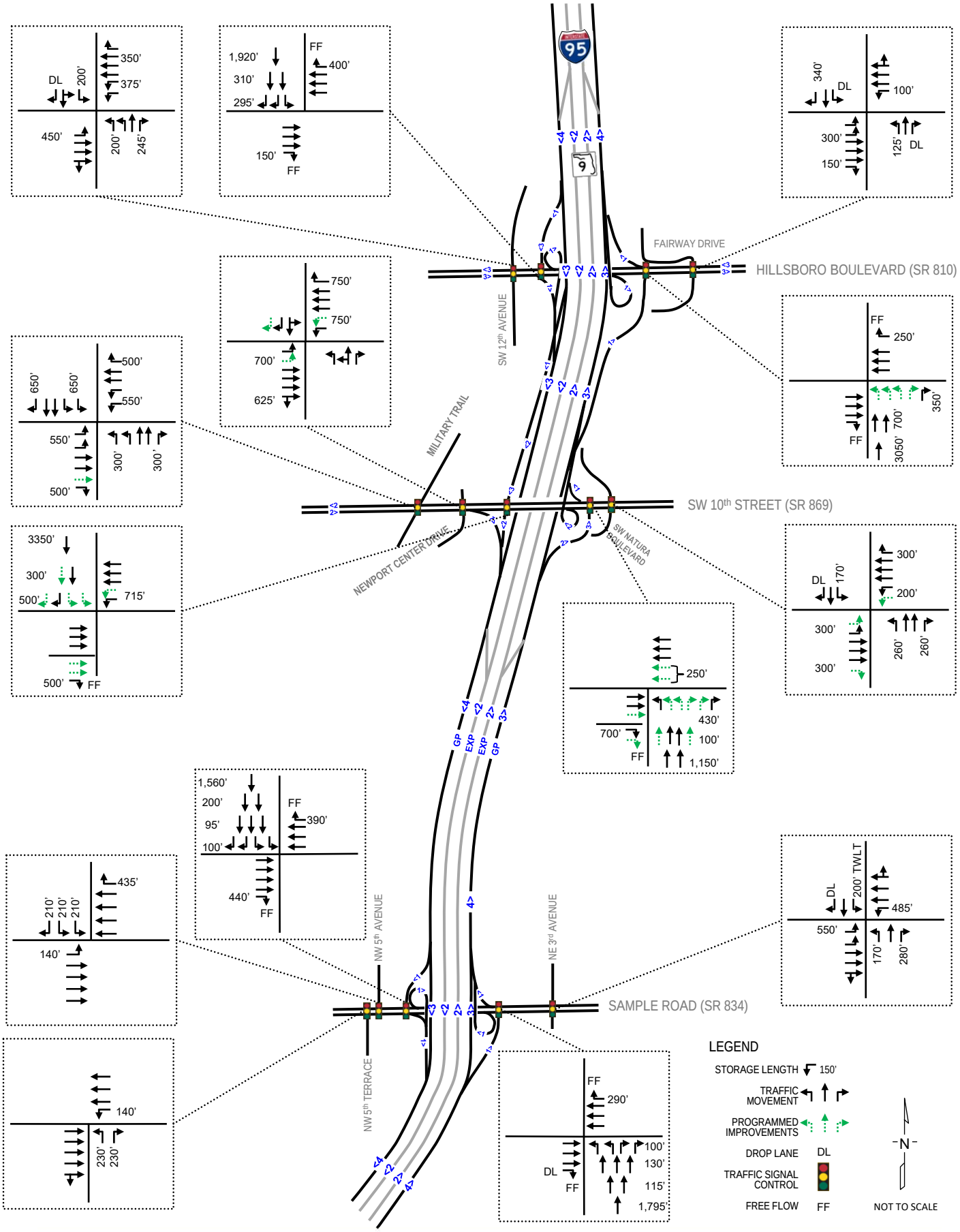


Figure 5.2: Build 2 & Sub Scenario - Roadway and Intersection Lane Configurations

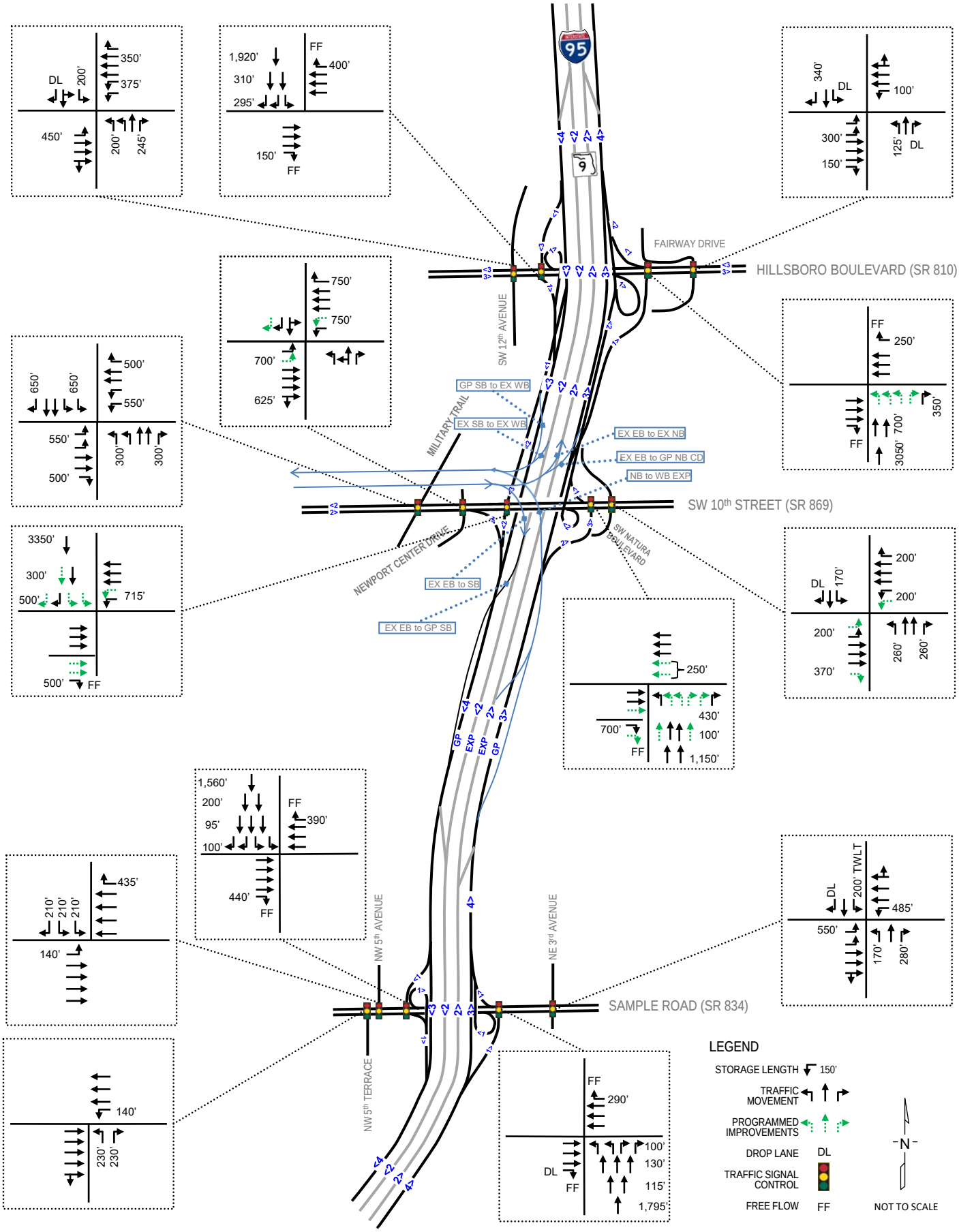


Figure 5.3: 2020 & 2040 Build 1 AADT Volumes

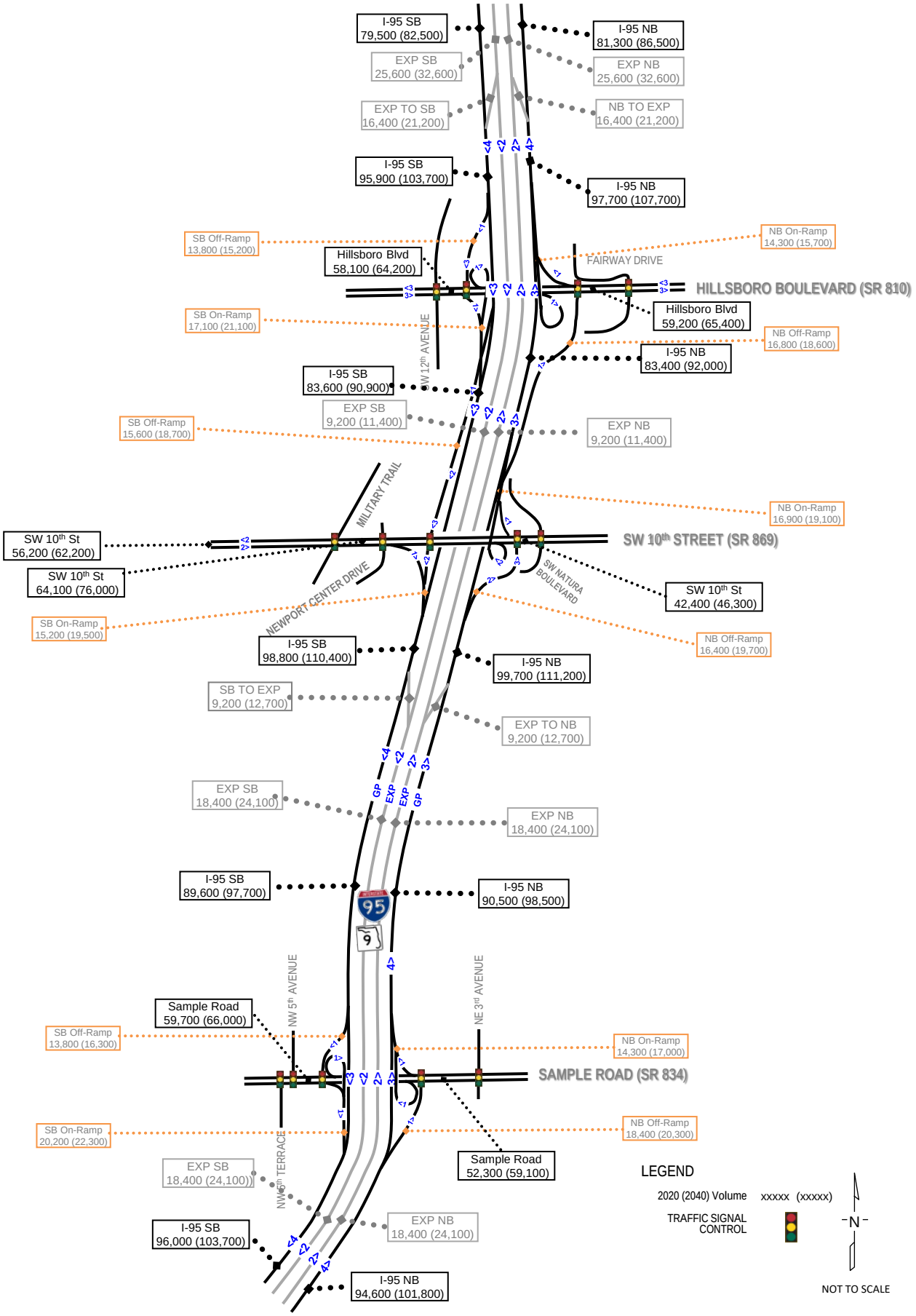


Figure 5.4: 2020 & 2040 Build 2 AADT Volumes

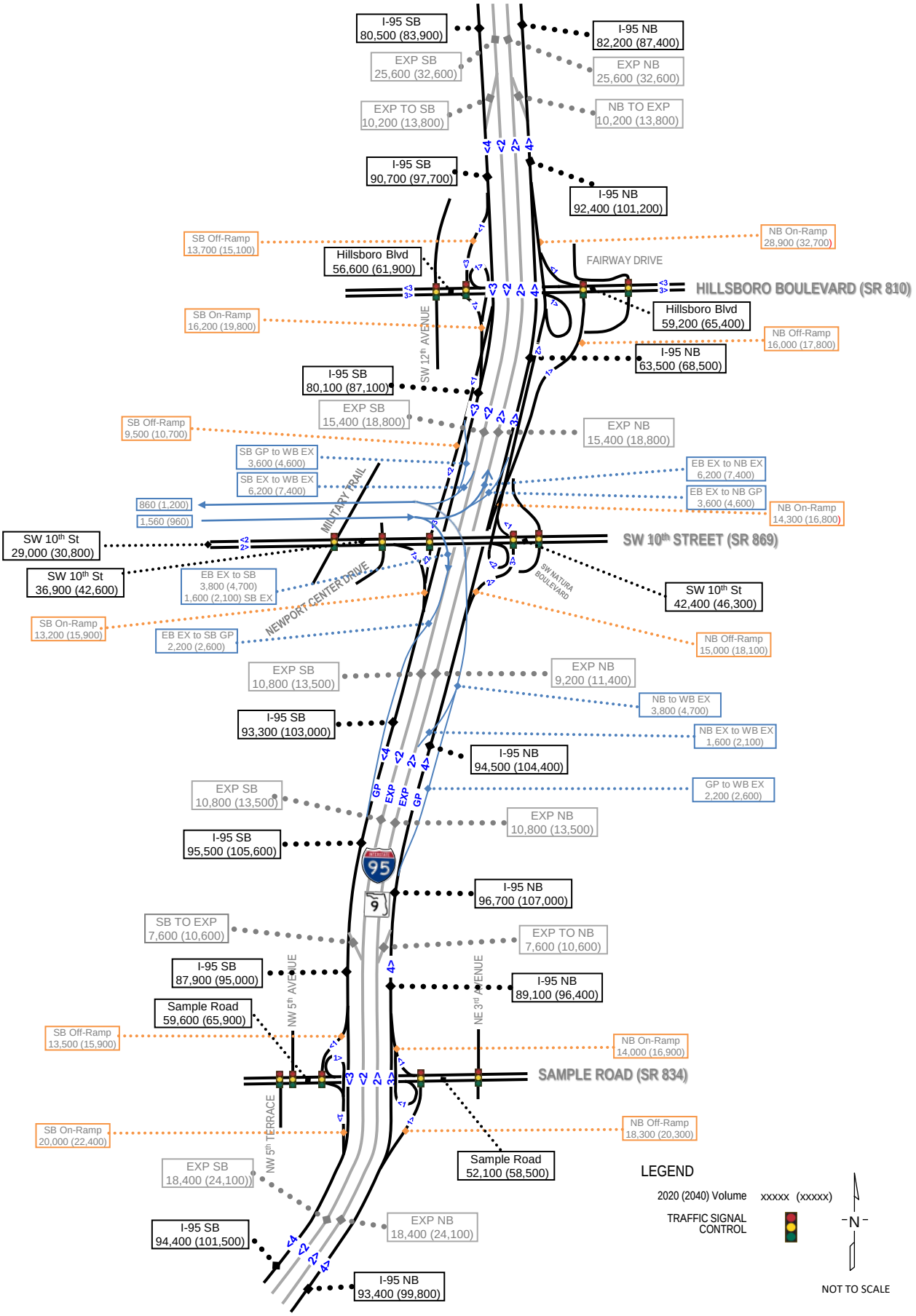


Figure 5.5: 2020 & 2040 Build 2 Sub Scenario AADT Volumes

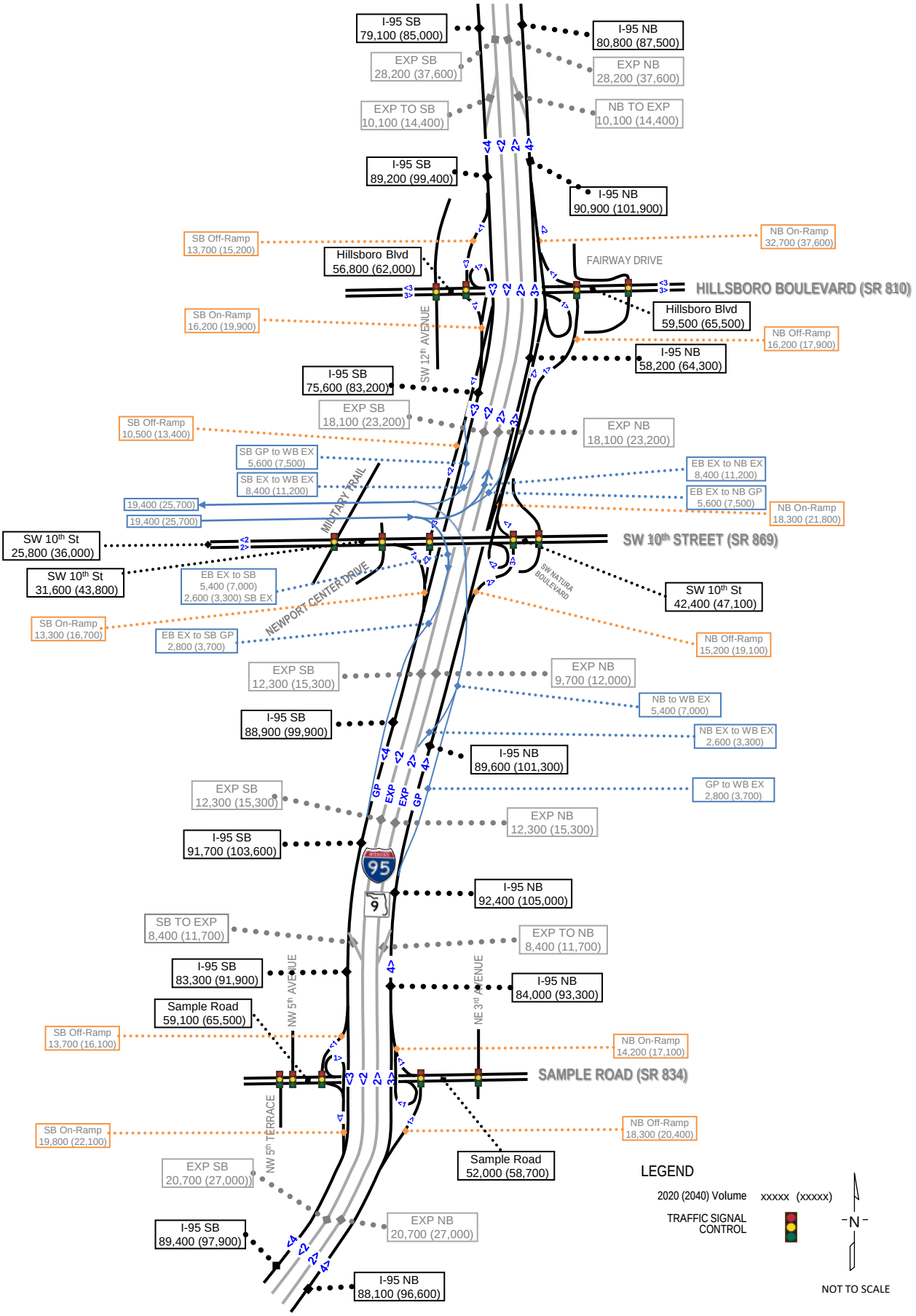


Figure 5.6: 2020 Build 1 Peak Hour Volumes

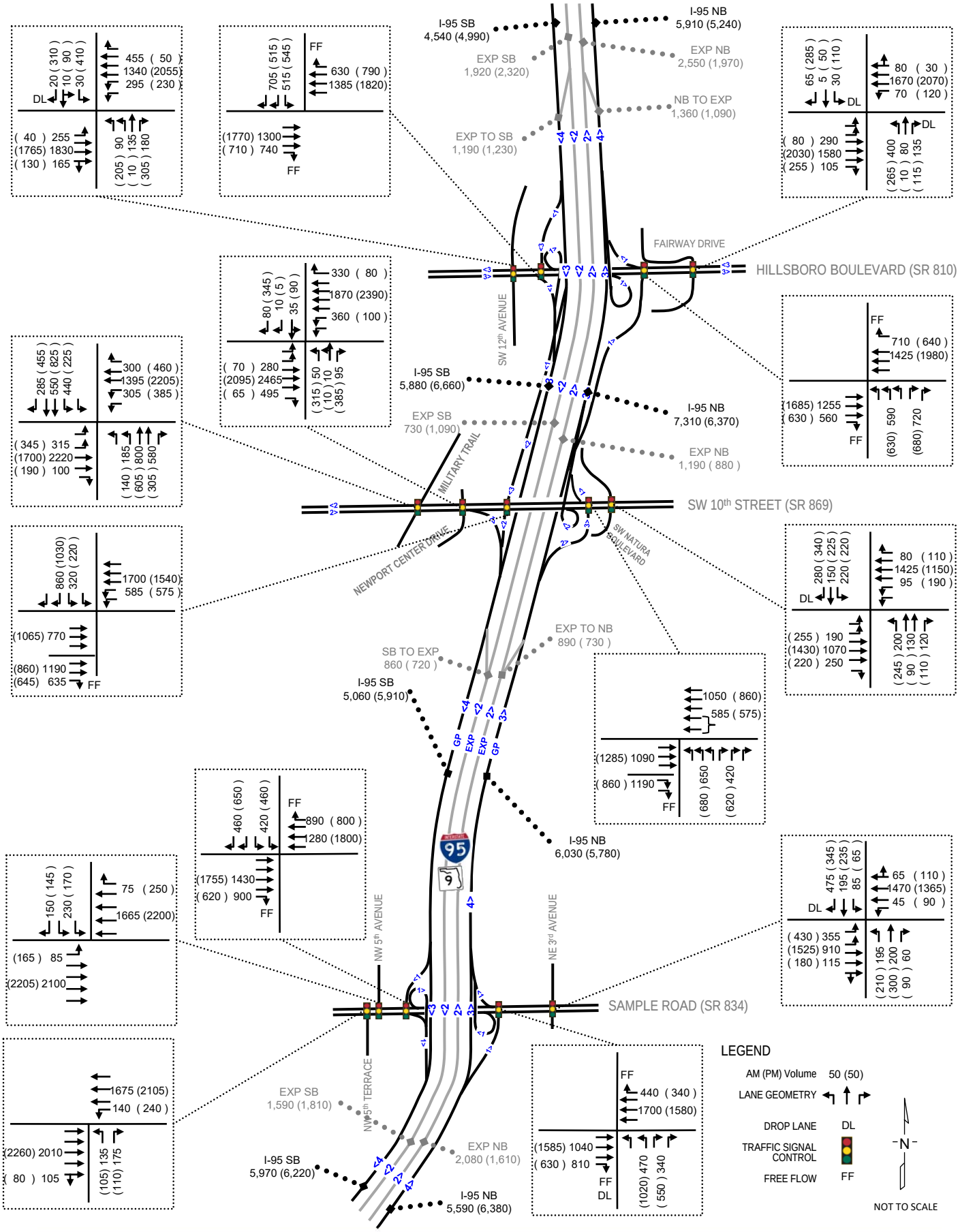


Figure 5.7: 2040 Build 1 Peak Hour Volumes

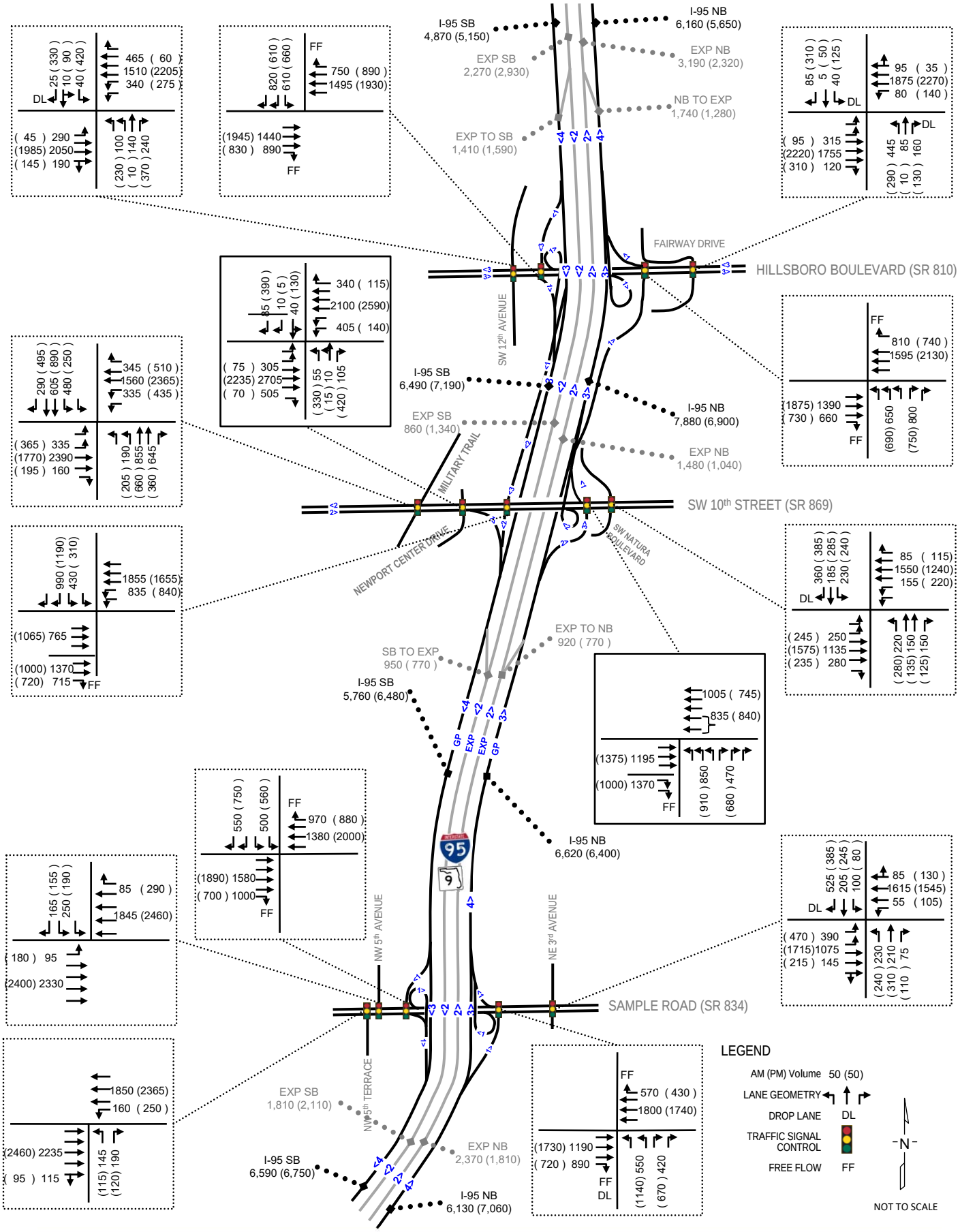


Figure 5.8: 2020 Build 2 Peak Hour Volumes

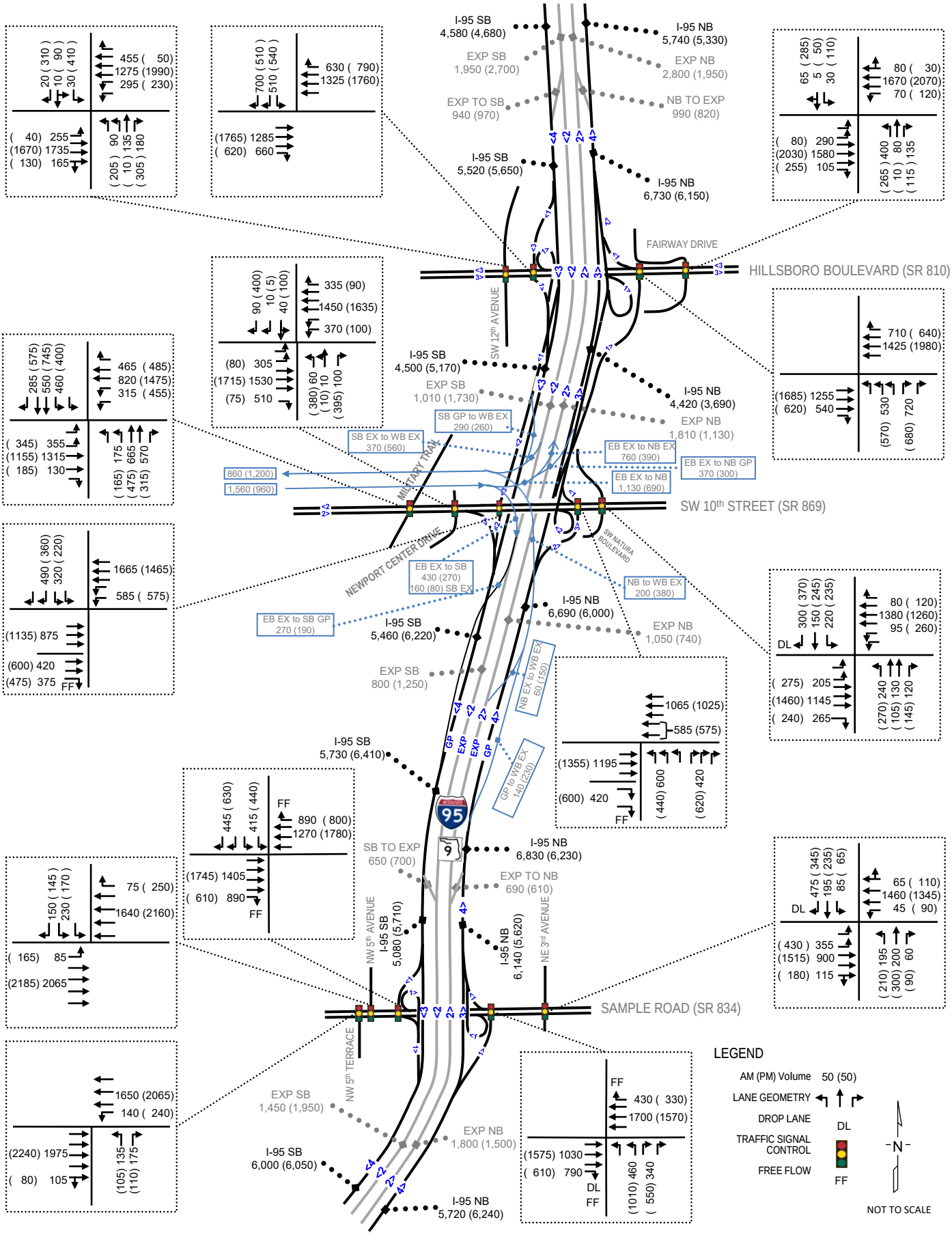


Figure 5.9: 2040 Build 2 Peak Hour Volumes

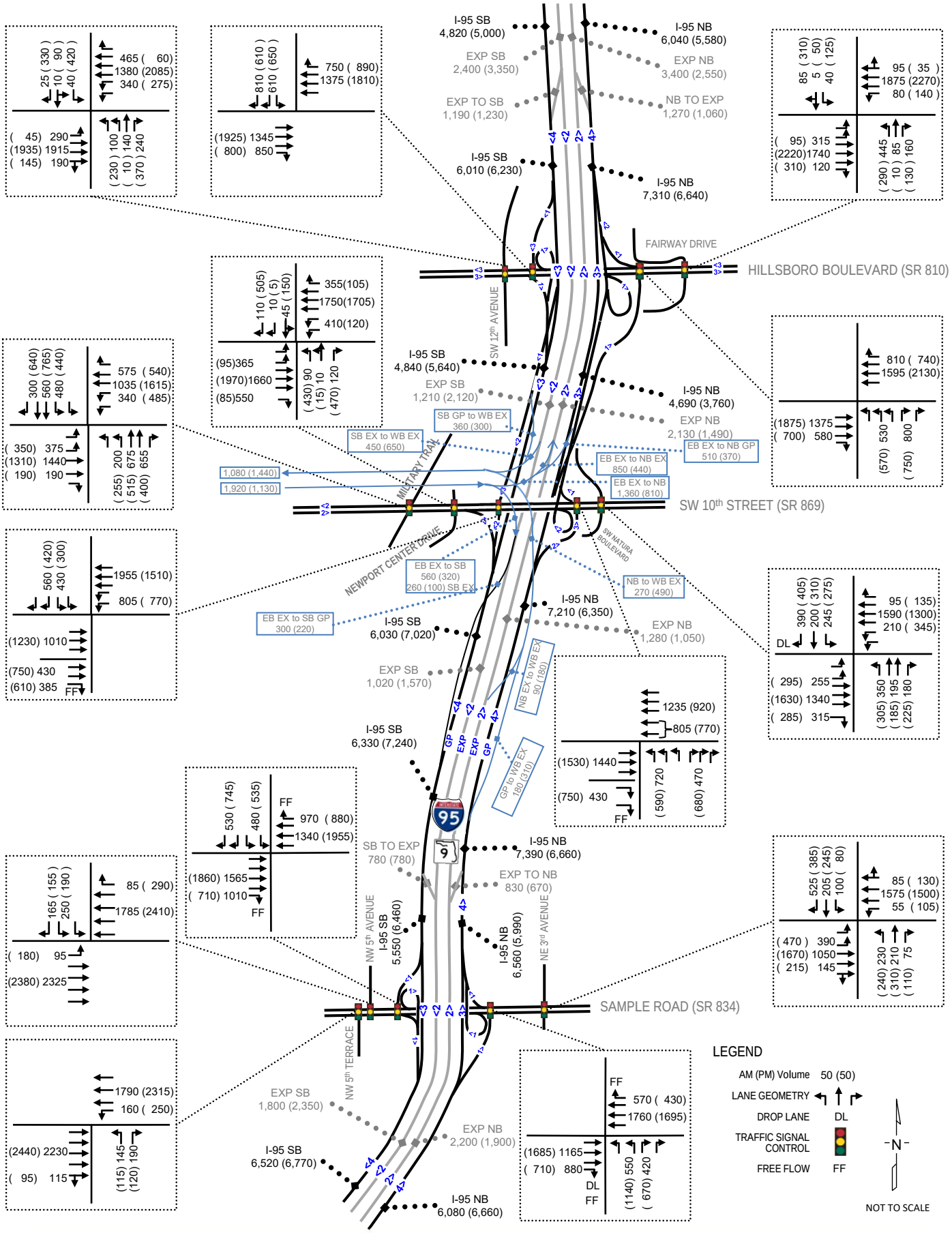


Figure 5.10: 2020 Build 2 Sub Scenario Peak Hour Volumes

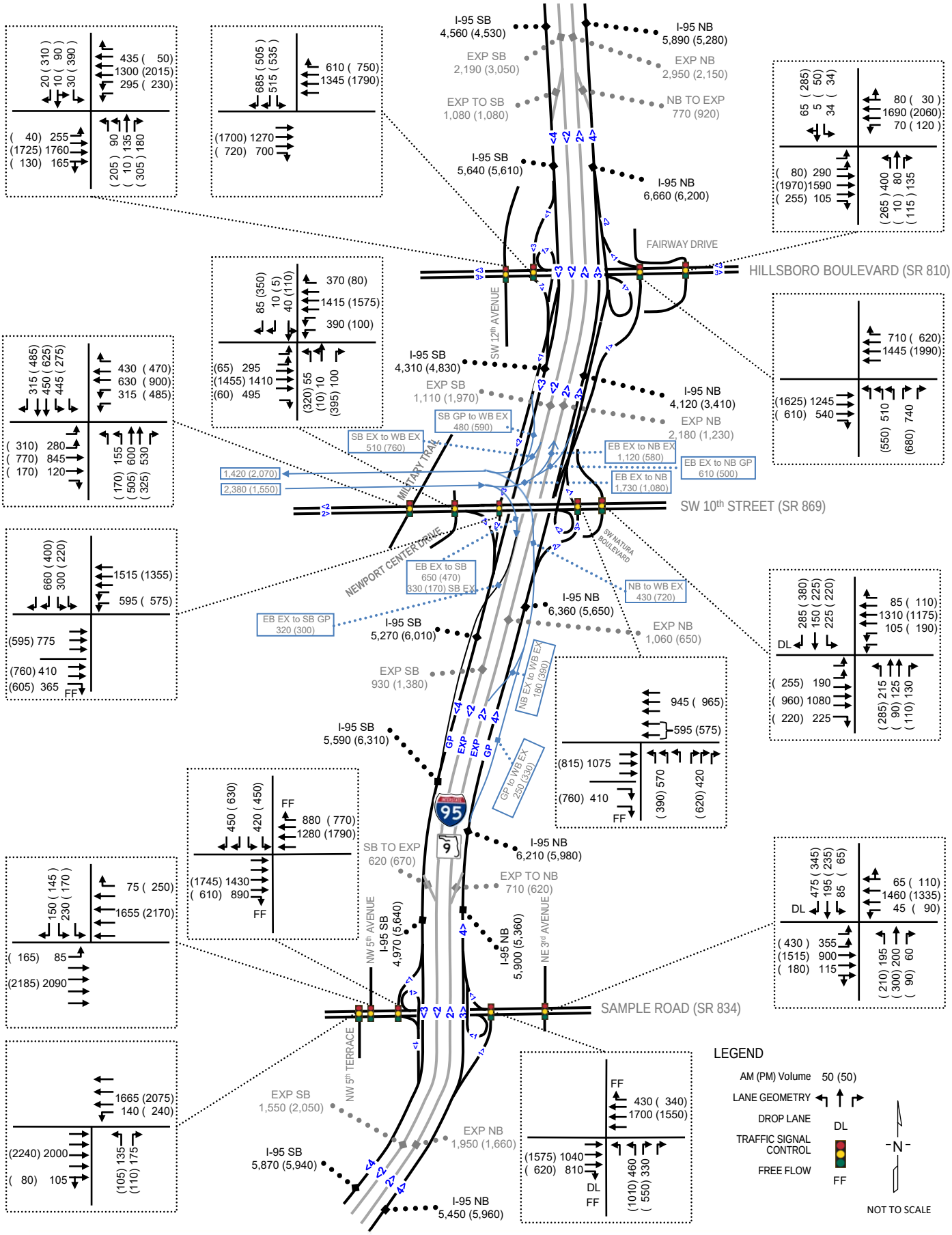
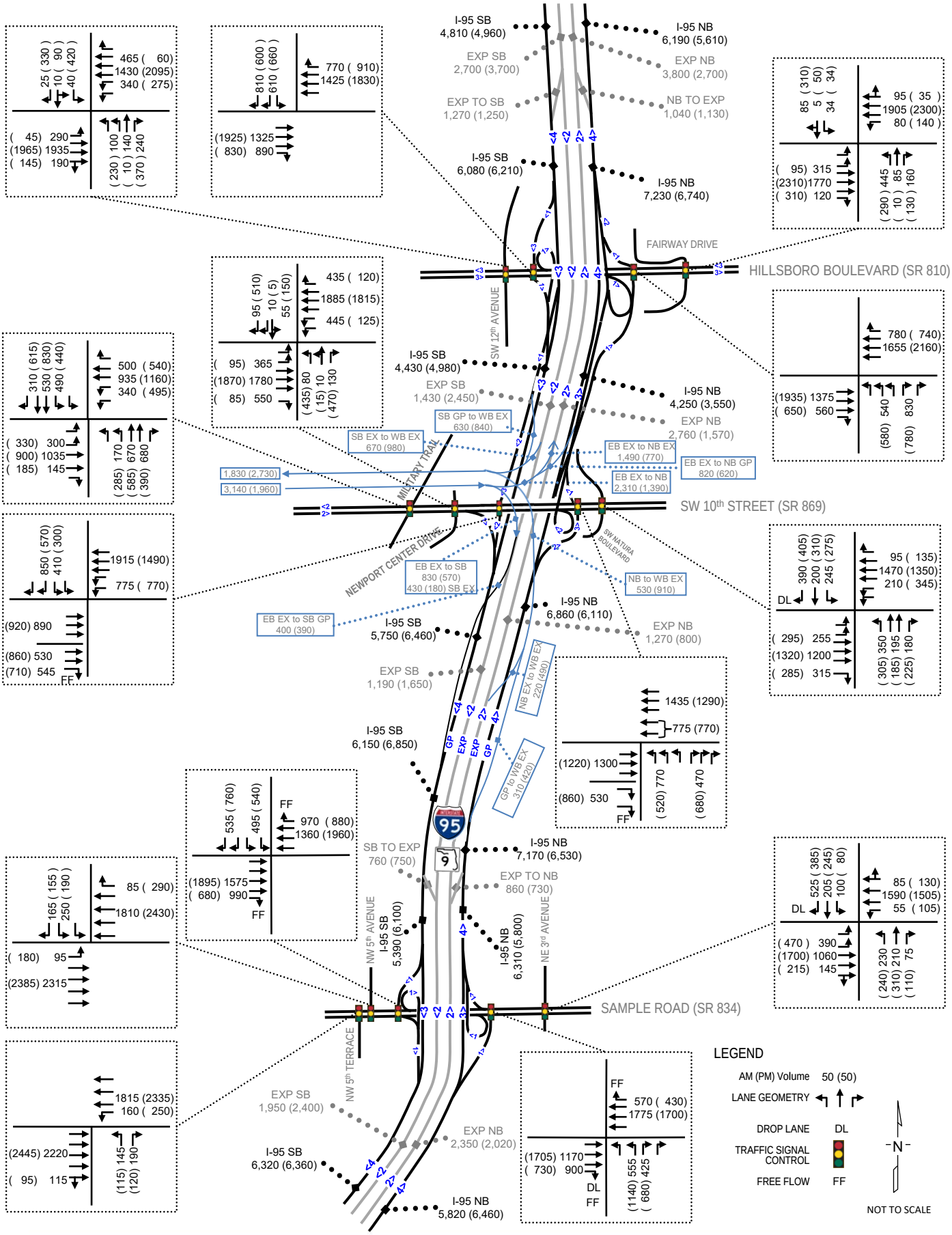


Figure 5.11: 2040 Build 2 Sub Scenario Peak Hour Volumes



5.4 Build 1 Alternative – Traffic Operational Analysis

Build 1 Alternative does not provide the SW 10th Street connector and is not anticipated to improve traffic conditions along SW 10th Street. The proposed improvements are expected to provide better operating conditions than the No-Build conditions along I-95 and prevent any spillbacks from the ramp terminals on to the mainline. These improvements are also likely to improve safety by reducing congestion and the number of conflict points.

5.4.1 2020 & 2040 – Freeway Analysis – I-95

The mainline/basic, weaving, and ramp merge/diverge analysis results for Opening Year 2020 are summarized and depicted on **Figures 5.12** and **5.13** for the NB and SB directions, respectively. The Design Year 2040 analysis results are summarized and depicted on **Figures 5.14** and **5.15** for the NB and SB directions, respectively. Documentation of the 2020 and 2040 Build 1 Alternative traffic freeway operational analysis is provided in **Appendix K**. The Design Year 2040 Build 1 Alternative analysis indicates that 7 of the 14 freeway segments in the NB direction are projected to operate at LOS E or F during one or both peak hours. In the SB direction, 3 of the 14 freeway segments are projected to operate at LOS E or F during one or both peak hours.

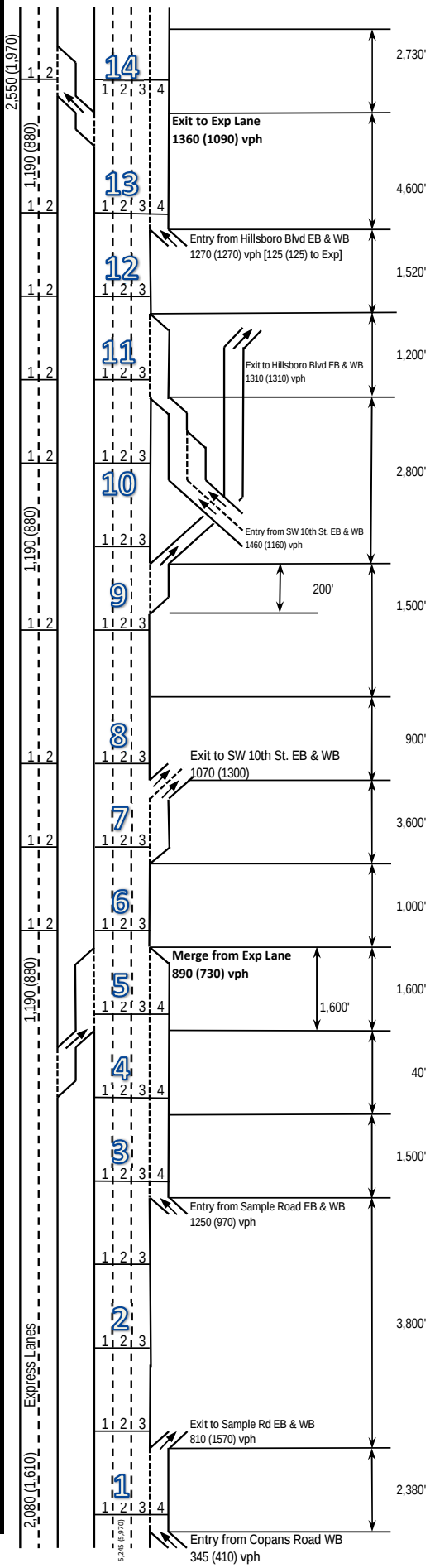
5.4.2 2020 & 2040 - Intersection Analysis

A barrier separation will be provided between the eastbound through lanes and the eastbound to northbound right turn movement to eliminate weaving and allow for concurrent movement of the southbound left turn and eastbound right turn movement for all Build alternatives. In the Synchro analysis, the I-95 southbound off-ramp terminal intersection was analyzed using the conservative assumption that the eastbound through traffic would stop during the southbound off-ramp phase. Therefore, it will only operate even better with the true phasing in place. In the parallel SW 10th Street Connector PD&E Study dated May 2021, a VISSIM model was coded to replicate the exact signal timing. VISSIM analysis results derived from the PD&E study will be referenced in following sections.

Tables 5.1 through **5.3** summarize the results of the 2020 Build 1 signalized intersection analyses for the AM and PM peak hours for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. **Tables 5.4** through **5.6** summarize the results of the 2040 Build 1 signalized intersection analyses for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. Signal timing was optimized for all intersections. The results include delays (in seconds per vehicle) and LOS by movement, approach, and the overall intersection. The volume to capacity (v/c) ratios and 95th percentile queue lengths have also been summarized by movement. **Appendix L** presents the intersection analysis worksheets.

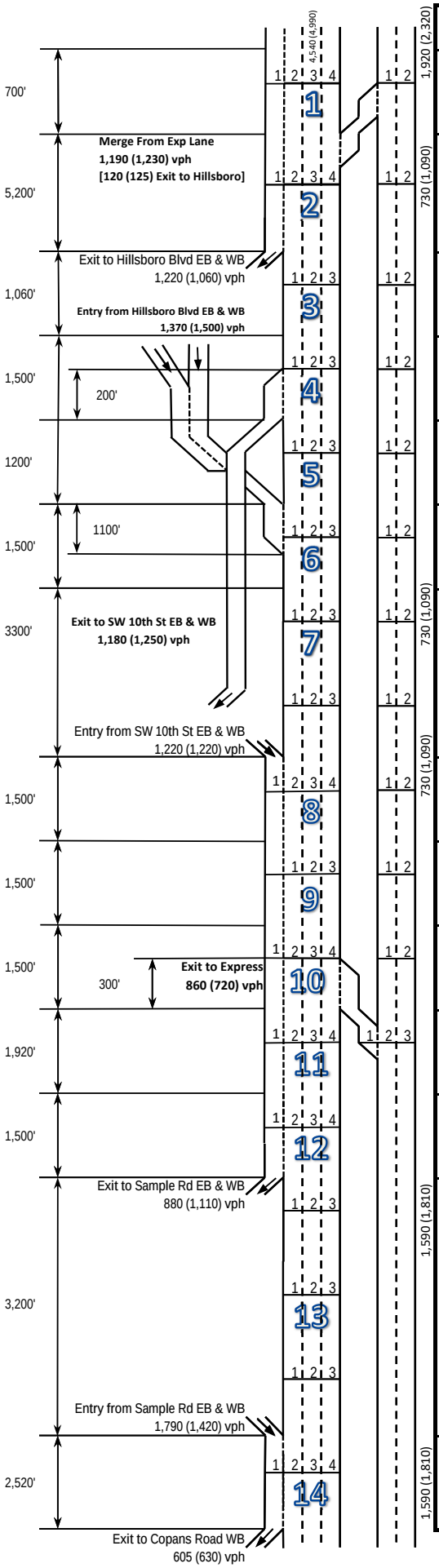
Figure 5.12: 2020 Build 1 Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	5,910 (5,240)	C (23.2)	C (20.2)
Weave - Hillsboro Boulevard EB & WB to I-95 Express Lanes	7,270 (6,330)	D (34.0)	D (29.0)
Basic Freeway	6,000 (5,060)	E (35.7)	D (27.4)
Merge from SW 10th St EB & WB	6,000 (5,060)	D (32.8)	C (27.2)
Basic Freeway	4,540 (3,900)	C (23.8)	C (20.0)
Diverge to Hillsboro Blvd EB & WB	5,850 (5,210)	E (37.1)	D (34.5)
Basic Freeway	5,850 (5,210)	D (34.2)	D (28.5)
Major Diverge to SW 10th Street EB & WB	6,920 (6,510)	D (32.3)	D (30.4)
Basic Freeway	6,920 (6,510)	F (47.9)	E (41.8)
Merge from I-95 Express Lanes	6,920 (6,510)	C (27.4)	C (25.1)
Basic Freeway	6,030 (5,780)	C (23.7)	C (22.5)
Lane Add from Sample Road WB*	6,030 (5,780)	Under Capacity v/c: u/s, Ramp, d/s 0.71, 0.63, 0.67	Under Capacity v/c: u/s, Ramp, d/s 0.71, 0.49, 0.64
Basic Freeway	4,780 (4,810)	C (25.4)	C (25.6)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	5,590 (6,380)	C (27.6)	E (35.2)



GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

Figure 5.13: 2020 Build 1 Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,540 (4,990)	B (17.3)	C (19.1)
Weave - I-95 Express Lanes to Hillsboro Boulevard EB & WB	5,730 (6,220)	C (25.9)	D (28.4)
Basic Freeway	4,510 (5,160)	C (23.6)	D (28.2)
Diverge to SW 10th St EB & WB	4,510 (5,160)	D (31.2)	D (34.2)
Basic Freeway	3,330 (3,910)	B (16.8)	C (20.0)
Merge from Hillsboro Blvd EB & WB	4,700 (5,410)	C (25.3)	D (29.3)
Basic Freeway	4,700 (5,410)	C (24.8)	D (30.2)
Lane Add Merge from SW 10th Street EB & WB*	5,920 (6,630)	Under Capacity v/c: u/s, Ramp, d/s 0.70, 0.62, 0.66	Under Capacity v/c: u/s, Ramp, d/s 0.80, 0.62, 0.74
Basic Freeway	5,920 (6,630)	C (23.1)	D (26.7)
Diverge to I-95 Express Lanes	5,920 (6,630)	D (32.7)	D (35.0)
Basic Freeway	5,060 (5,910)	C (19.4)	C (23.1)
Diverge - Lane Drop to Sample Road EB & WB	5,060 (5,910)	C (23.7)	D (27.6)
Basic Freeway	4,180 (4,800)	C (21.6)	C (25.5)
Weave - Entry Sample Road EB to Exit Copans Road WB	5,970 (6,220)	F (N/A)	D (34.4)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

Figure 5.14: 2040 Build 1 Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	6,160 (5,650)	C (24.4)	C (22.0)
Weave - Hillsboro Boulevard EB & WB to I-95 Express Lanes	7,900 (6,930)	E (40.6)	D (34.0)
Basic Freeway	6,430 (5,460)	E (40.7)	D (30.6)
Merge from SW 10th St EB & WB	6,430 (5,460)	E (35.6)	D (29.7)
Basic Freeway	4,770 (4,140)	C (25.3)	C (21.3)
Diverge to Hillsboro Blvd EB & WB	6,220 (5,580)	E (38.8)	E (36.3)
Basic Freeway	6,220 (5,580)	E (38.2)	D (31.6)
Major Diverge to SW 10th Street EB & WB	7,540 (7,170)	E (35.2)	D (33.5)
Basic Freeway	7,540 (7,170)	F (60.4)	F (52.4)
Merge from I-95 Express Lanes	7,540 (7,170)	D (30.0)	C (27.9)
Basic Freeway	6,620 (6,400)	D (26.7)	C (25.5)
Lane Add from Sample Road WB*	6,620 (6,400)	Under Capacity v/c: u/s, Ramp, d/s 0.77, 0.74, 0.74	Under Capacity v/c: u/s, Ramp, d/s 0.78, 0.58, 0.71
Basic Freeway	5,160 (5,250)	D (28.2)	D (28.9)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	6,130 (7,060)	D (31.4)	F (N/A)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

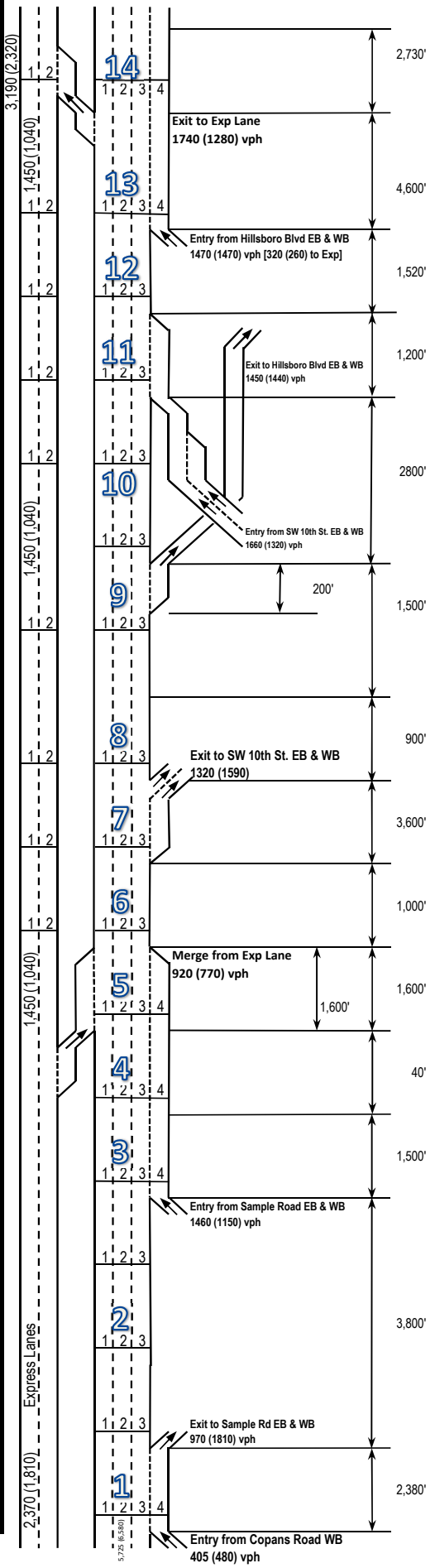
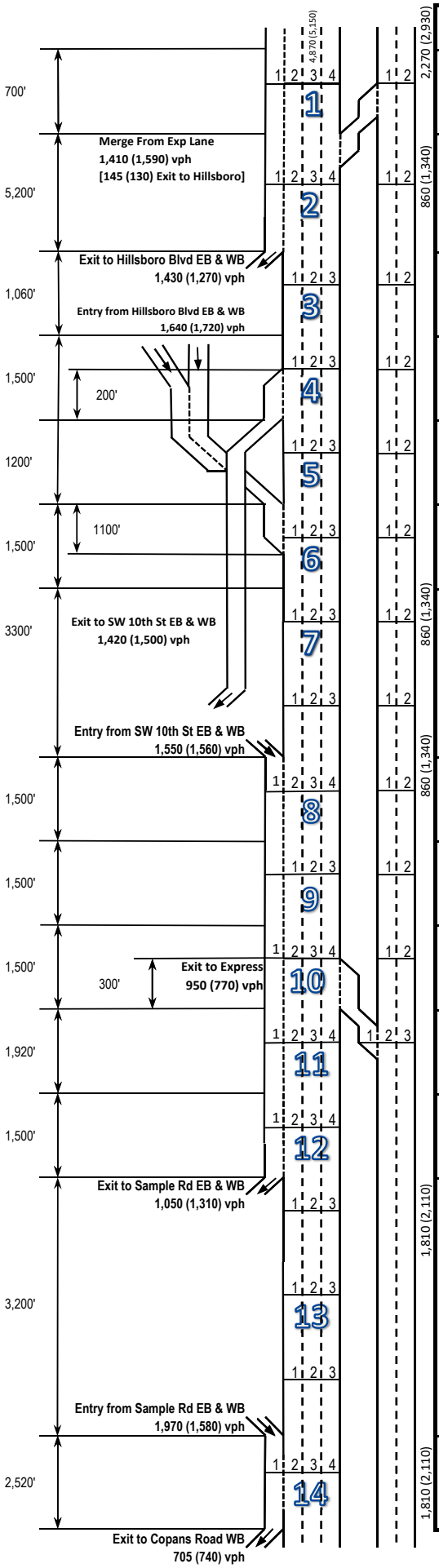


Figure 5.15: 2040 Build 1 Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,870 (5,150)	C (18.6)	C (19.8)
Weave - I-95 Express Lanes to Hillsboro Boulevard EB & WB	6,280 (6,740)	D (29.0)	D (41.3)
Basic Freeway	4,850 (5,470)	C (25.9)	D (30.7)
Diverge to SW 10th St EB & WB	4,850 (5,470)	D (33.3)	E (36.0)
Basic Freeway	3,430 (3,970)	B (17.5)	C (20.4)
Merge from Hillsboro Blvd EB & WB	5,070 (5,690)	D (28.1)	D (31.3)
Basic Freeway	5,070 (5,690)	D (27.5)	D (32.6)
Lane Add Merge from SW 10th Street EB & WB*	6,620 (7,250)	Under Capacity v/c: u/s, Ramp, d/s 0.75, 0.78, 0.74	Under Capacity v/c: u/s, Ramp, d/s 0.84, 0.79, 0.81
Basic Freeway	6,620 (7,250)	D (26.7)	D (30.4)
Diverge to I-95 Express Lanes	6,620 (7,250)	E (36.3)	E (38.0)
Basic Freeway	5,670 (6,480)	C (22.0)	D (25.9)
Diverge - Lane Drop to Sample Road EB & WB	5,670 (6,480)	C (26.5)	D (30.3)
Basic Freeway	4,620 (5,170)	C (24.3)	D (28.2)
Weave - Entry Sample Road EB to Exit Copans Road WB	6,590 (6,750)	F (N/A)	F (N/A)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

Table 5.1: 2020 Build 1 – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (98.6)	C (22.5)		F (101.2)	B (19.9)	A (8.3)	E (74.6)	F (93.6)	E (59.7)	F (84.5)	F (84.4)	E (56.8)	C (34.3)
			Approach	C (31.1)			C (28.9)			E (74.3)			E (75.2)			
		Volume to Capacity ratio	Movement	0.90	0.68		0.90	0.51	0.40	0.28	0.77	0.12	0.31	0.30	0.01	
		Queue Length 95th (ft)	Movement	#473	723		#295	496	133	85	247	67	63	63	0	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.8)		B (15.0)					E (59.7)		D (50.9)	B (18.8)
			Approach	A (0.4)			B (15.0)						D (54.6)			
		Volume to Capacity ratio	Movement		0.28	0.49		0.51					0.83		0.72	
		Queue Length 95th (ft)	Movement		0	62		435					653		448	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		A (8.6)			A (6.9)	A (0.5)	C (21.3)		C (27.5)				B (11.3)
			Approach	A (8.6)			A (4.8)			C (24.7)						
		Volume to Capacity ratio	Movement		0.47			0.54	0.49	0.36		0.72				
		Queue Length 95th (ft)	Movement		243			m163	m0	110		242				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (106.4)	B (14.5)	B (13.9)	F (86.8)	C (31.2)		F (414.1)	E (71.2)	E (68.5)	F (82.6)	F (83.3)	F (83.2)	E (67.6)
			Approach	C (27.9)			C (33.3)			F (293.5)			F (83.0)			
		Volume to Capacity ratio	Movement	0.96	0.51	0.07	0.61	0.69		1.73	0.35	0.09	0.40	0.07	0.05	
		Queue Length 95th (ft)	Movement	#587	368	19	150	360		#924	160	72	70	22	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (55.5)	C (32.4)		F (206.7)	C (23.9)	A (0.1)	D (54.6)	D (48.8)	F (155.2)	E (63.2)	E (63.9)	D (40.9)	D (47.1)
			Approach	C (32.9)			D (41.4)			F (113.5)			D (54.9)			
		Volume to Capacity ratio	Movement	0.42	0.86		1.25	0.93	0.03	0.64	0.06	1.14	0.84	0.84	0.52	
		Queue Length 95th (ft)	Movement	72	#701		m#213	#785	m0	124	26	#324	306	313	146	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.5)		B (18.3)					D (43.4)		C (28.7)	B (13.4)
			Approach	A (0.2)			B (18.3)						D (36.2)			
		Volume to Capacity ratio	Movement		0.38	0.47		0.72					0.85		0.51	
		Queue Length 95th (ft)	Movement		0	m0		550					499		213	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (10.1)			A (9.2)	A (0.5)	B (16.8)		C (23.3)				B (11.0)
			Approach	B (10.1)			A (7.1)			C (20.1)						
		Volume to Capacity ratio	Movement		0.62			0.73	0.44	0.44		0.78				
		Queue Length 95th (ft)	Movement		188			m259	m0	96		#193				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (85.9)	B (15.5)	A (7.6)	F (136.9)	C (21.5)		F (149.6)	D (44.2)	D (44.5)	D (42.5)	D (44.5)	E (62.2)	C (31.7)
			Approach	B (17.3)			C (27.7)			F (115.9)			E (55.3)			
		Volume to Capacity ratio	Movement	0.81	0.77	0.24	1.01	0.78		1.14	0.04	0.08	0.44	0.19	0.78	
		Queue Length 95th (ft)	Movement	m#124	521	m103	#234	660		#294	23	36	116	68	215	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.2: 2020 Build 1 – SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (87.1)	F (205.3)	B (16.5)	F (142.5)	D (44.5)	C (30.6)	F (95.7)	F (254.2)	F (199.1)	F (271.5)	E (76.3)	E (64.1)	F (149.3)
			Approach	F (184.0)			E (57.4)			F (215.1)			F (140.9)			
		Volume to Capacity ratio	Movement	0.81	1.35	0.07	1.00	0.89	0.28	0.79	1.38	1.26	1.39	0.83	0.47	
		Queue Length 95th (ft)	Movement	#298	#2062	21	#324	567	211	#184	#852	#871	#507	437	241	
	East Newport Center Drive	LOS (Delay)	Movement	D (51.3)	B (14.7)	B (14.7)	F (85.0)	C (26.8)	D (49.6)	E (77.9)	E (78.0)	D (51.6)	F (91.1)	F (91.1)	D (50.9)	C (28.4)
			Approach	B (17.8)			D (37.9)			E (61.8)			E (65.4)			
		Volume to Capacity ratio	Movement	0.51	0.85	0.85	0.78	0.69	0.24	0.23	0.23	0.09	0.56	0.56	0.04	
		Queue Length 95th (ft)	Movement	m125	m271	m271	m267	m513	m28	81	82	63	108	108	26	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		E (64.9)	E (64.9)	F (85.9)	A (9.2)					D (46.7)		F (98.6)	D (54.8)
			Approach	E (64.9)			C (28.3)						F (84.5)			
		Volume to Capacity ratio	Movement		1.10	1.10	0.77	0.60					0.31		1.03	
		Queue Length 95th (ft)	Movement		#931	#931	405	197					203		#794	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (0.6)	A (0.2)		A (6.6)		E (79.2)		E (76.0)				B (18.2)
			Approach	A (0.4)			A (6.6)			E (78.0)						
		Volume to Capacity ratio	Movement		0.34	0.45		0.35		0.82		0.74				
		Queue Length 95th (ft)	Movement		m7	m19		87		331		276				
	FAU Research Park Boulevard	LOS (Delay)	Movement	E (67.5)	B (13.1)	C (21.4)	F (82.9)	C (24.8)	B (17.6)	E (73.7)	E (74.5)	E (72.0)	E (65.9)	F (92.2)	E (76.9)	D (37.9)
			Approach	C (21.3)			C (27.8)			E (73.5)			E (76.7)			
		Volume to Capacity ratio	Movement	0.66	0.38	0.17	0.51	0.54	0.05	0.78	0.36	0.08	0.70	0.77	0.53	
		Queue Length 95th (ft)	Movement	173	176	65	97	531	31	285	116	64	315	267	194	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (196.1)	E (68.0)	C (20.1)	F (104.7)	F (153.5)	C (20.3)	F (201.7)	F (128.3)	E (56.2)	F (144.7)	F (187.0)	F (174.1)	F (123.0)
			Approach	F (83.7)			F (127.3)			F (117.1)			F (176.7)			
		Volume to Capacity ratio	Movement	1.19	0.75	0.18	0.80	1.24	0.48	1.13	1.06	0.56	1.01	1.23	1.14	
		Queue Length 95th (ft)	Movement	#387	#1332	119	m#328	#1946	m263	#190	#582	379	#255	#824	#771	
	East Newport Center Drive	LOS (Delay)	Movement	E (73.7)	B (18.5)	B (18.5)	F (88.6)	C (31.7)	B (16.4)	E (70.6)	E (70.1)	E (79.9)	E (78.9)	E (78.9)	F (89.8)	D (37.5)
			Approach	C (20.2)			C (33.4)			E (75.6)			F (87.4)			
		Volume to Capacity ratio	Movement	0.68	0.69	0.69	0.57	0.92	0.06	0.59	0.58	0.86	0.56	0.56	0.85	
		Queue Length 95th (ft)	Movement	m49	m297	m297	m84	m1032	m12	300	295	#579	188	188	#290	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		F (116.0)	F (116.0)	E (79.2)	A (10.0)					D (42.5)		F (141.9)	F (86.4)
			Approach	F (116.0)			C (28.4)						F (124.4)			
		Volume to Capacity ratio	Movement		1.21	1.21	0.73	0.56					0.20		1.16	
		Queue Length 95th (ft)	Movement		#976	#976	286	174					138		#1005	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (6.8)	A (0.0)		A (5.7)		E (77.5)		F (118.3)				C (27.5)
			Approach	A (4.1)			A (5.7)			F (97.0)						
		Volume to Capacity ratio	Movement		0.41	0.32		0.32		0.82		1.03				
		Queue Length 95th (ft)	Movement		m105	m0		59		345		#471				
	FAU Research Park Boulevard	LOS (Delay)	Movement	F (94.1)	C (24.3)	B (14.2)	F (86.0)	C (33.9)	C (26.1)	E (61.9)	E (58.6)	E (57.9)	E (58.2)	F (87.2)	F (83.6)	D (45.3)
			Approach	C (32.5)			D (40.2)			E (60.2)			E (77.5)			
		Volume to Capacity ratio	Movement	0.76	0.62	0.19	0.70	0.52	0.08	0.81	0.14	0.08	0.61	0.81	0.76	
		Queue Length 95th (ft)	Movement	m187	m385	m48	173	488	43	300	73	55	269	365	320	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.3: 2020 Build 1 – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.2)		D (53.6)	A (1.2)		E (56.6)		D (46.9)				B (14.0)
			Approach		B (16.2)			A (5.2)			D (51.1)					
		Volume to Capacity ratio	Movement		0.54		0.64	0.48		0.67		0.12				
		Queue Length 95th (ft)	Movement		325		#155	27		170		64				
	NW 5th Avenue	LOS (Delay)	Movement	D (49.6)	A (2.0)			A (9.1)	A (4.8)				D (51.2)		D (47.0)	A (9.9)
			Approach		A (3.8)			A (8.9)						D (49.6)		
		Volume to Capacity ratio	Movement	0.70	0.47			0.45	0.05				0.59		0.13	
		Queue Length 95th (ft)	Movement	#153	43			251	m5				130		64	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (5.2)	A (1.5)		A (6.9)					B (20.0)		C (23.7)	A (8.2)
			Approach		A (3.8)			A (6.9)						C (21.9)		
		Volume to Capacity ratio	Movement		0.43	0.60		0.48					0.52		0.70	
		Queue Length 95th (ft)	Movement		124	360		144					108		138	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (5.1)			A (4.6)	A (0.2)	C (22.1)		C (21.3)				A (7.7)
			Approach		A (5.1)			A (3.7)			C (21.8)					
		Volume to Capacity ratio	Movement		0.38			0.62	0.29	0.63		0.56				
		Queue Length 95th (ft)	Movement		56			m145	m0	124		104				
	NE 3rd Avenue	LOS (Delay)	Movement	E (66.7)	B (18.0)		E (56.4)	D (39.7)		D (40.0)	D (36.9)	C (32.7)	C (30.7)	D (36.8)	E (78.5)	D (40.7)
			Approach		C (30.6)			D (40.1)			D (37.7)			E (62.4)		
		Volume to Capacity ratio	Movement	0.91	0.49		0.49	0.87		0.65	0.44	0.04	0.29	0.43	0.97	
		Queue Length 95th (ft)	Movement	m243	263		79	505		183	214	0	86	209	#517	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.1)		F (122.2)	A (1.6)		E (56.5)		D (48.8)				B (16.7)
			Approach		B (16.1)			B (14.0)			D (52.6)					
		Volume to Capacity ratio	Movement		0.58		1.04	0.58		0.63		0.08				
		Queue Length 95th (ft)	Movement		355		#380	30		142		54				
	NW 5th Avenue	LOS (Delay)	Movement	F (134.4)	A (1.6)			A (9.9)	A (3.7)				D (51.8)		D (48.9)	B (12.5)
			Approach		B (10.9)			A (9.3)						D (50.5)		
		Volume to Capacity ratio	Movement	1.10	0.48			0.59	0.17				0.53		0.10	
		Queue Length 95th (ft)	Movement	#309	35			382	m6				104		61	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (6.4)	A (0.7)		A (8.7)					B (19.5)		D (41.2)	B (11.8)
			Approach		A (4.9)			A (8.7)						C (32.2)		
		Volume to Capacity ratio	Movement		0.54	0.41		0.69					0.54		0.94	
		Queue Length 95th (ft)	Movement		187	37		167					118		#243	
	I-95 Northbound Ramps	LOS (Delay)	Movement		B (15.8)			B (11.1)	A (0.2)	D (36.1)		C (28.7)				B (18.6)
			Approach		B (15.8)			A (9.2)			C (33.5)					
		Volume to Capacity ratio	Movement		0.65			0.65	0.23	0.80		0.53				
		Queue Length 95th (ft)	Movement		358			m147	m0	416		230				
	NE 3rd Avenue	LOS (Delay)	Movement	E (68.6)	C (25.7)		E (74.6)	C (34.7)		F (87.6)	D (51.1)	D (36.2)	D (37.5)	D (47.9)	D (46.4)	D (40.0)
			Approach		C (34.4)			D (37.0)			E (61.6)			D (46.0)		
		Volume to Capacity ratio	Movement	0.92	0.78		0.76	0.79		0.96	0.77	0.06	0.42	0.68	0.63	
		Queue Length 95th (ft)	Movement	#290	420		#165	#537		#248	321	0	68	254	217	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.4: 2040 Build 1 – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (113.9)	C (26.3)		F (125.2)	C (20.4)	B (12.1)	E (74.4)	F (93.9)	E (61.4)	F (84.5)	F (84.4)	E (55.3)	D (39.3)
			Approach	D (36.3)			C (34.2)			E (73.6)			E (74.7)			
		Volume to Capacity ratio	Movement	0.97	0.77		1.02	0.59	0.42	0.30	0.77	0.30	0.36	0.35	0.02	
		Queue Length 95th (ft)	Movement	#583	914		#353	354	118	93	255	140	72	72	1	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (1.1)		C (27.8)					D (52.9)		D (43.6)	C (20.9)
			Approach	A (0.5)			C (27.8)						D (47.6)			
		Volume to Capacity ratio	Movement		0.31	0.59		0.62					0.84		0.71	
		Queue Length 95th (ft)	Movement		0	239		429					719		473	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (13.9)			A (9.4)	A (0.4)	C (20.1)		C (27.5)				B (13.2)
			Approach	B (13.9)			A (6.4)			C (24.1)						
		Volume to Capacity ratio	Movement		0.55			0.63	0.56	0.37		0.76				
		Queue Length 95th (ft)	Movement		255			m256	m0	121		282				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (137.4)	B (14.6)	A (10.0)	F (88.4)	C (32.7)		F (532.4)	E (72.4)	E (69.5)	F (84.2)	F (83.3)	F (83.3)	F (80.4)
			Approach	C (32.0)			C (34.9)			F (368.6)			F (83.6)			
		Volume to Capacity ratio	Movement	1.07	0.57	0.08	0.64	0.76		1.99	0.39	0.11	0.52	0.07	0.06	
		Queue Length 95th (ft)	Movement	#667	428	m23	167	739		#1063	169	79	85	22	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (69.3)	D (39.8)		F (228.9)	B (19.1)	A (0.3)	E (65.3)	E (56.5)	F (246.5)	F (84.7)	F (85.6)	E (65.3)	E (59.2)
			Approach	D (40.4)			D (41.4)			F (175.0)			E (77.4)			
		Volume to Capacity ratio	Movement	0.56	0.92		1.29	0.91	0.04	0.70	0.06	1.36	0.91	0.91	0.81	
		Queue Length 95th (ft)	Movement	#98	#897		m#253	#900	m0	157	29	#516	#415	#425	#333	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.5)		C (28.8)					D (50.4)		C (29.3)	B (17.9)
			Approach	A (0.2)			C (28.8)						D (40.3)			
		Volume to Capacity ratio	Movement		0.42	0.55		0.83					0.90		0.53	
		Queue Length 95th (ft)	Movement		m0	m0		661					733		286	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (13.3)			B (12.1)	A (0.6)	B (18.4)		C (26.3)				B (13.4)
			Approach	B (13.3)			A (9.1)			C (22.4)						
		Volume to Capacity ratio	Movement		0.70			0.80	0.51	0.45		0.80				
		Queue Length 95th (ft)	Movement		273			m319	m0	118		#240				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (111.6)	C (22.6)	B (12.0)	F (136.9)	C (28.7)		F (131.4)	D (48.5)	D (49.1)	D (46.9)	D (48.9)	E (73.9)	D (37.8)
			Approach	C (24.6)			C (34.9)			F (104.6)			E (64.4)			
		Volume to Capacity ratio	Movement	0.92	0.86	0.32	1.00	0.86		1.08	0.03	0.10	0.43	0.16	0.84	
		Queue Length 95th (ft)	Movement	m#162	#919	m180	#290	#954		#351	25	56	144	75	291	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.5: 2040 Build 1 – SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (127.6)	F (259.0)	B (18.4)	F (148.0)	D (50.1)	C (28.7)	F (120.4)	F (317.0)	F (268.0)	F (290.9)	E (79.5)	E (63.8)	F (180.1)
			Approach	F (230.4)			E (61.4)			F (276.1)			F (150.0)			
		Volume to Capacity ratio	Movement	1.00	1.47	0.13	1.03	0.97	0.32	0.92	1.52	1.42	1.43	0.87	0.51	
		Queue Length 95th (ft)	Movement	#342	#2305	62	#359	#1164	256	#212	#942	#1038	#553	#496	265	
	East Newport Center Drive	LOS (Delay)	Movement	E (55.7)	B (16.0)	B (16.0)	F (87.5)	C (25.0)	C (25.4)	E (78.2)	E (78.2)	D (51.4)	F (111.1)	F (111.1)	E (55.1)	C (27.8)
			Approach	B (19.5)			C (33.9)			E (61.7)			E (75.8)			
		Volume to Capacity ratio	Movement	0.65	0.91	0.91	0.85	0.74	0.24	0.25	0.25	0.11	0.71	0.71	0.05	
		Queue Length 95th (ft)	Movement	m125	m275	m275	m289	m512	m6	86	87	78	#140	#140	30	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		F (105.0)	F (105.0)	F (141.5)	A (8.8)					D (48.8)		F (158.4)	F (87.3)
			Approach	F (105.0)			D (49.1)						F (125.2)			
		Volume to Capacity ratio	Movement		1.23	1.23	1.10	0.65					0.42		1.19	
		Queue Length 95th (ft)	Movement		#1076	#1076	m#640	m219					274		#990	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (0.7)	A (0.1)		A (6.8)		F (129.1)		F (81.6)				C (26.8)
			Approach	A (0.4)			A (6.8)			F (112.2)						
		Volume to Capacity ratio	Movement		0.37	0.52		0.39		1.08		0.82				
		Queue Length 95th (ft)	Movement		m8	m44		100		#509		310				
	FAU Research Park Boulevard	LOS (Delay)	Movement	E (71.0)	B (18.0)	C (24.5)	F (85.5)	C (31.7)	C (21.6)	E (72.1)	E (67.2)	E (65.1)	E (63.9)	F (84.2)	F (90.4)	D (43.8)
			Approach	C (27.0)			D (35.9)			E (68.7)			F (81.1)			
		Volume to Capacity ratio	Movement	0.74	0.44	0.19	0.65	0.64	0.06	0.83	0.29	0.10	0.70	0.75	0.79	
		Queue Length 95th (ft)	Movement	m217	261	m68	145	675	40	291	120	66	303	305	303	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (258.8)	E (75.5)	B (18.1)	F (248.0)	F (192.1)	B (15.3)	F (200.1)	F (128.0)	E (63.3)	F (201.5)	F (244.7)	F (256.0)	F (158.2)
			Approach	F (99.4)			F (172.2)			F (121.1)			F (241.5)			
		Volume to Capacity ratio	Movement	1.35	1.04	0.20	1.34	1.35	0.55	1.16	1.07	0.75	1.18	1.36	1.37	
		Queue Length 95th (ft)	Movement	#431	#1413	115	m#416	m#2171	m189	#256	#627	476	#300	#927	#919	
	East Newport Center Drive	LOS (Delay)	Movement	F (81.6)	C (27.5)	C (27.5)	F (91.1)	C (33.6)	A (7.0)	E (78.8)	E (78.6)	F (101.3)	F (101.0)	F (101.0)	F (122.0)	D (46.2)
			Approach	C (29.2)			D (35.4)			F (91.1)			F (116.7)			
		Volume to Capacity ratio	Movement	0.73	0.73	0.73	0.62	0.96	0.08	0.69	0.69	0.96	0.81	0.81	1.00	
		Queue Length 95th (ft)	Movement	m51	m389	m389	m105	m812	m2	324	325	#692	#298	#298	#372	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		F (154.8)	F (154.8)	F (130.4)	A (9.8)					D (43.8)		F (218.1)	F (121.9)
			Approach	F (154.8)			D (49.5)						F (182.1)			
		Volume to Capacity ratio	Movement		1.35	1.35	1.06	0.60					0.28		1.34	
		Queue Length 95th (ft)	Movement		#1118	#1118	m#492	m175					190		#1240	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (6.7)	A (0.0)		A (5.0)		F (133.4)		F (151.8)				D (40.8)
			Approach	A (4.0)			A (5.0)			F (141.3)						
		Volume to Capacity ratio	Movement		0.44	0.38		0.35		1.09		1.13				
		Queue Length 95th (ft)	Movement		m102	m0		69		#545		#541				
	FAU Research Park Boulevard	LOS (Delay)	Movement	F (93.9)	C (27.2)	B (14.6)	F (91.0)	D (40.1)	C (29.8)	E (77.5)	D (54.0)	D (52.9)	D (54.0)	F (87.5)	F (91.0)	D (49.4)
			Approach	C (33.7)			D (46.5)			E (65.9)			F (80.1)			
		Volume to Capacity ratio	Movement	0.74	0.74	0.22	0.78	0.61	0.08	0.92	0.17	0.09	0.62	0.86	0.86	
		Queue Length 95th (ft)	Movement	m174	m447	m54	#198	549	47	#431	101	57	288	460	421	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.6: 2040 Build 1 – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.9)		E (70.6)	A (1.5)		E (57.1)		D (46.4)				B (15.1)
			Approach		B (16.9)			A (7.0)			D (51.0)					
		Volume to Capacity ratio	Movement		0.60		0.79	0.53		0.69		0.13				
		Queue Length 95th (ft)	Movement		377		#237	32		181		65				
	NW 5th Avenue	LOS (Delay)	Movement	E (58.5)	A (2.2)			B (10.3)	A (4.9)				D (51.2)		D (47.0)	B (10.6)
			Approach		A (4.4)			B (10.1)						D (49.5)		
		Volume to Capacity ratio	Movement	0.78	0.53			0.50	0.06				0.61		0.22	
		Queue Length 95th (ft)	Movement	m#174	46			298	m6				140		82	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (6.2)	A (2.0)		A (7.9)					C (20.2)		C (26.7)	A (9.4)
			Approach		A (4.6)			A (7.9)						C (23.6)		
		Volume to Capacity ratio	Movement		0.48	0.67		0.53					0.59		0.80	
		Queue Length 95th (ft)	Movement		159	456		168					127		#189	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (6.7)			A (7.1)	A (0.2)	C (22.6)		C (22.1)				A (9.3)
			Approach		A (6.7)			A (5.5)			C (22.4)					
		Volume to Capacity ratio	Movement		0.45			0.68	0.38	0.68		0.64				
		Queue Length 95th (ft)	Movement		97			m160	m0	143		126				
	NE 3rd Avenue	LOS (Delay)	Movement	F (86.0)	C (21.2)		E (58.0)	E (60.4)		D (42.9)	D (36.1)	C (31.9)	C (29.6)	D (36.1)	F (101.3)	D (52.8)
			Approach		D (36.9)			E (60.3)			D (38.5)			E (76.5)		
		Volume to Capacity ratio	Movement	1.00	0.62		0.55	1.01		0.73	0.45	0.05	0.32	0.44	1.05	
		Queue Length 95th (ft)	Movement	#281	307		91	#645		#224	225	0	98	219	#604	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (19.2)		F (94.8)	A (2.1)		E (63.3)		D (52.6)				B (16.9)
			Approach		B (19.2)			B (11.0)			E (57.8)					
		Volume to Capacity ratio	Movement		0.65		0.95	0.65		0.67		0.08				
		Queue Length 95th (ft)	Movement		448		#397	45		164		58				
	NW 5th Avenue	LOS (Delay)	Movement	F (105.3)	A (1.8)			B (12.8)	A (6.3)				E (56.7)		D (52.7)	B (13.3)
			Approach		A (9.0)			B (12.1)						D (54.9)		
		Volume to Capacity ratio	Movement	1.03	0.52			0.67	0.20				0.57		0.11	
		Queue Length 95th (ft)	Movement	#335	38			470	m11				122		65	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (10.9)	A (0.9)		B (13.9)					B (18.9)		C (33.8)	B (14.4)
			Approach		A (8.2)			B (13.9)						C (27.5)		
		Volume to Capacity ratio	Movement		0.62	0.47		0.83					0.55		0.90	
		Queue Length 95th (ft)	Movement		304	60		291					143		#279	
	I-95 Northbound Ramps	LOS (Delay)	Movement		B (17.9)			B (14.6)	A (0.2)	D (38.6)		C (30.4)				C (21.0)
			Approach		B (17.9)			B (11.8)			D (35.6)					
		Volume to Capacity ratio	Movement		0.74			0.75	0.29	0.84		0.61				
		Queue Length 95th (ft)	Movement		411			m213	m0	522		311				
	NE 3rd Avenue	LOS (Delay)	Movement	F (82.4)	C (27.7)		F (120.6)	D (40.8)		F (126.7)	E (60.4)	D (40.3)	D (41.9)	E (58.0)	E (67.9)	D (48.7)
			Approach		D (38.4)			D (45.5)			F (81.1)			E (61.5)		
		Volume to Capacity ratio	Movement	0.97	0.84		0.93	0.88		1.09	0.82	0.08	0.51	0.76	0.83	
		Queue Length 95th (ft)	Movement	#343	#602		#217	#690		#280	358	0	87	291	303	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

The intersection analysis results indicate the following for the 2040 Design Year:

- Hillsboro Boulevard: Two of the four signalized intersections are expected to operate at LOS E or worse during the AM or PM peak hours. The I-95 northbound and southbound off-ramp intersections are expected to operate at LOS C or better during both the AM and PM peak hours.
- SW 10th Street: Of the five signalized intersections, intersections at Military Trail and I-95 Southbound off-ramp are expected to operate at LOS F during both peak hours.
- Sample Road: All five signalized intersections including the I-95 NB and SB off-ramp approaches are expected to operate at LOS D or better during both peak hours.

Tables 5.7 summarizes the results of the off-ramp signals back of queue analyses for the AM and PM peak hours for 2040 Build 1 conditions. HCM methodology does not provide queue lengths. The 95th percentile queues were obtained from Synchro reports. The analysis indicates that the queues on the off-ramps are not expected to exceed the length of the off-ramp and are not likely to affect the I-95 mainline operations.

Table 5.7: 2040 Build 1 – Off-Ramp Signals Queuing Analysis Results

Intersection	Approach	Movement	Turn Lane Storage (ft)	Available Off-Ramp Length (ft)(1)	Queue (ft)	
					AM	PM
2040 Build 1						
Hillsboro Boulevard at I-95 SB Off-Ramp	Southbound	L (EB)	295	1,910	719	733
		R (WB)	295	1,910	473	286
Hillsboro Boulevard at I-95 NB Off-Ramp	Northbound	L (WB)	350	3,485	121	118
		R (EB)	350	3,485	282	#240
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	500	3,535	274	190
		R (WB)	500	3,535	#990	#1240
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	530	1,065	#509	#545
		R (EB)	530	1,065	310	#541
Sample Road at I-95 SB Off-Ramp	Southbound	L (EB)	200	1,345	108	118
		R (WB)	200	1,345	138	#243
Sample Road at I-95 NB Off-Ramp	Northbound	L (WB)	230	1,525	124	416
		R (EB)	230	1,525	104	230

(1) Available off-ramp lengths were calculated by deducting the deceleration length of 615 feet from total off-ramp lengths
#: 95th percentile volume exceeds capacity

5.5 Build 2 Alternative – Traffic Operational Analysis

The proposed improvements under Build 2 are expected to provide better operating conditions than the No-Build conditions. They are also likely to prevent any spillbacks from the ramp terminals on to the mainline and improve safety by reducing congestion and the number of conflict points.

5.5.1 2020 & 2040 – Freeway Analysis – I-95

The mainline/basic, weaving, and ramp merge/diverge analysis results for Opening Year 2020 are summarized on **Figures 5.16** and **5.17** for general-purpose lanes of NB and SB directions, respectively. **Figures 5.18** and **5.19** summarize the Design Year 2040 analysis results for general-purpose lanes of NB and SB directions, respectively. Documentation of the Build 2 Alternative traffic freeway operational analysis is provided in **Appendix M**. Improvements of the Build 2 Alternative eliminate the weaving sections along General-Use lanes and Express Lanes between Hillsboro Boulevard and SW 10th Street. The proposed NB CD road is anticipated to shift a portion of I-95 mainline traffic between SW 10th Street and Hillsboro Boulevard, thereby relieving the mainline congestion. With proposed improvements, queues on off-ramps to SW 10th Street are not anticipated to spill over and block the mainline. In contrast, for No-Build conditions, queues are anticipated to block the I-95 mainline and cause severe local gridlock.

Levels of Service at or better than the target D were attempted to the degree possible. However, due to ROW and other constraints, it is not cost feasible to achieve desired levels of service for every freeway segment. The design year 2040 Build 2 Alternative analysis indicates that 3 of the 12 freeway segments along the I-95 NB direction are projected to operate at LOS E during the AM peak hour including the basic freeway segment between the SW 10th Street off-ramp and the Hillsboro Boulevard off-ramp, the diverge area to Hillsboro Boulevard, and the weaving segment from Hillsboro Boulevard on-ramps to the Express lanes slip-ramp. During the PM peak hour,2 segments are expected to operate at LOS E/F including the weaving segment from the Copans Road westbound on-ramp to the Sample Road off-ramp and the weaving segment from Hillsboro Boulevard on-ramps to the Express lanes slip-ramp. Along the I-95 SB direction, only 1 of the 14 freeway segments is projected to operate at LOS F during the AM peak hour which is the weaving segment from Sample Road on-ramps to the Copans Road westbound off-ramp. 3 segments are expected to operate at LOS E or F during the PM peak hour including the merge area from Hillsboro Boulevard on-ramps, the diverge area to I-95 Express Lanes, and the weaving segment from Sample Road on-ramps to the Copans Road westbound off-ramp. **Tables 5.8** and **5.9** summarize SW 10th Street Connector merge/diverge analysis results to/from I-95 express lanes.

5.5.2 2020 & 2040 - Intersection Analysis

Tables 5.10 through **5.12** summarize the results of the 2020 Build 2 signalized intersection analyses for the AM and PM peak hours for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. **Tables 5.13** through **5.15** summarize the results of the 2040 Build 2 signalized intersection analyses for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. Signal timing was optimized for vehicles at all intersections. The results include delays (in seconds per vehicle) and LOS by movement, approach, and the overall intersection. The volume to capacity (v/c) ratios and 95th percentile queue lengths have also been summarized by movement. **Appendix N** presents the intersection analysis worksheets. Levels of Service at or better than D were attempted to the degree possible in cooperation with local governments for surface roads. However, due to ROW and other constraints, it is not cost feasible to achieve desired levels of service for every movement or intersection. Therefore, the improvements along the arterials were focused to move traffic away from the interchange as efficiently as possible to improve off-ramp operations. Side streets northbound/southbound movements at nearby intersections were analyzed and improved to some extent within the local jurisdiction acceptance. The overall intersection LOS is being driven by the operations on the side street movements. The intersection analysis results indicate the following for the 2040 Design Year:

Hillsboro Boulevard: Two of the four signalized intersections are expected to operate at LOS E or worse during the AM or PM peak hours. Two signalized intersections are located at SW Natura Boulevard and SW 12th Avenue. The I-95 NB and SB off-ramp intersections are expected to operate at LOS D or better during both peak hours. Eastbound/westbound through movements at Hillsboro/Natura Boulevard are expected to operate at LOS C with eastbound 2040 queues not reaching the northbound off-ramp. Similarly, eastbound/westbound approach movements at Hillsboro Blvd/SW 12th Avenue are expected to operate at LOS C/D. The operations on these 2 intersections are not expected to deteriorate interchange operations.

SW 10th Street: Two of the four signalized intersections are expected to operate at LOS E or worse during the AM or PM peak hours. Two signalized intersections are located at South Military Trail and FAU Research Park Boulevard. The I-95 NB and SB off-ramp approaches are expected to operate at LOS D or better during both peak hours. At the intersection of SW 10th/Military Trail, the westbound year 2040 queues are anticipated to be much less than the available distance to Natura Blvd. At the intersection of SW 10th Street at FAU Research Park Boulevard, eastbound/westbound through movements are anticipated to operate at LOS D with EB 2040 queues less than the available 600 ft to the northbound off-ramp terminal. The operations on these 2 intersections are not expected to deteriorate interchange operations.

Figure 5.16: 2020 Build 2 Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	5,740 (5,330)	C (22.3)	C (20.5)
Weave - Hillsboro Boulevard EB & WB to I-95 Express Lanes	6,730 (6,150)	D (34.1)	D (30.6)
Basic Freeway	4,420 (3,690)	C (23.0)	C (18.8)
Diverge to Hillsboro Blvd EB & WB	5,670 (4,940)	E (36.2)	D (33.2)
Northbound Express to Westbound Express SW 10th Street - 60 (150) vph SW 10th Street Eastbound SW 10th Street Express to Northbound Express - 760 (390) vph			
Basic Freeway	5,670 (4,940)	D (32.4)	D (26.5)
Major Diverge to SW 10th Street EB & WB	6,690 (6,000)	D (31.3)	D (28.0)
Basic Freeway	6,690 (6,000)	D (27.1)	C (23.5)
Diverge from GP Lane to WB 10th St Ex Lane	6,830 (6,230)	D (30.6)	D (28.6)
Merge from I-95 Express Lanes	6,830 (6,230)	C (26.2)	C (23.5)
Lane Add from Sample Road WB*	6,140 (5,620)	Under Capacity v/c: u/s, Ramp, d/s 0.73, 0.62, 0.68	Under Capacity v/c: u/s, Ramp, d/s 0.69, 0.48, 0.63
Basic Freeway	4,920 (4,680)	D (26.4)	C (24.7)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	5,720 (6,240)	D (28.3)	D (34.3)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

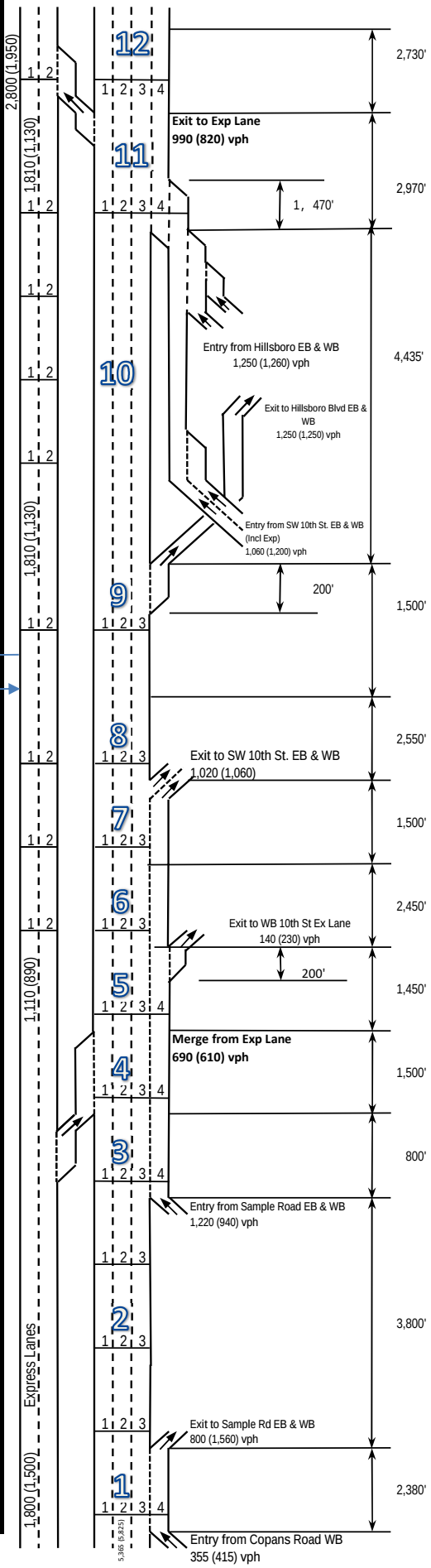
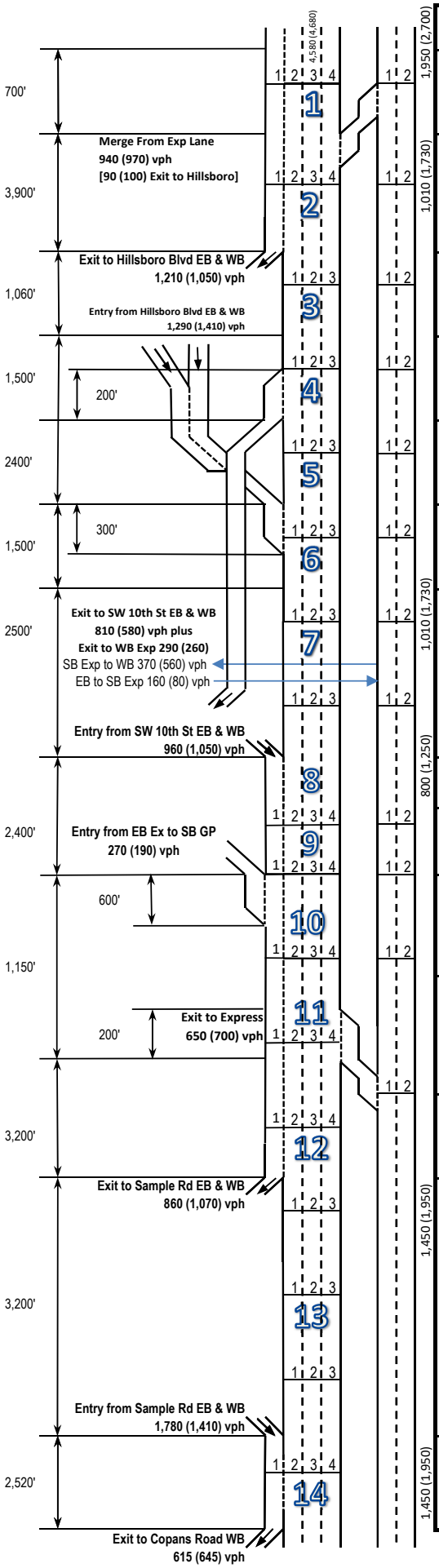


Figure 5.17: 2020 Build 2 Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,580 (4,680)	B (17.5)	B (17.9)
Weave - I-95 Express Lanes to Hillsboro Boulevard EB & WB	5,520 (5,650)	C (24.5)	C (25.3)
Basic Freeway	4,310 (4,600)	C (22.3)	C (24.2)
Diverge to SW 10th St EB & WB	4,310 (4,600)	D (30.1)	D (30.8)
Basic Freeway	3,210 (3,760)	B (16.3)	C (19.2)
Merge from Hillsboro Blvd EB & WB	4,500 (5,170)	D (29.7)	D (33.3)
Basic Freeway	4,500 (5,170)	C (23.5)	D (28.2)
Lane Add Merge from SW 10th St EB & WB*	5,460 (6,220)	Under Capacity v/c: u/s, Ramp, d/s 0.67, 0.49, 0.61	Under Capacity v/c: u/s, Ramp, d/s 0.77, 0.53, 0.69
Basic Freeway	5,460 (6,220)	C (21.1)	C (24.6)
Merge from EB Ex to SB GP Lane	5,730 (6,410)	C (22.1)	C (24.0)
Diverge to I-95 Express Lanes	5,730 (6,410)	D (31.5)	D (34.8)
Diverge - Lane Drop to Sample Road EB & WB	5,080 (5,710)	C (23.7)	C (26.7)
Basic Freeway	4,220 (4,640)	C (21.8)	C (24.4)
Weave - Entry Sample Road EB to Exit Copans Road WB	6,000 (6,050)	F (N/A)	D (33.3)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

Figure 5.18: 2040 Build 2 Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	6,040 (5,580)	C (23.7)	C (21.6)
Weave - Hillsboro Boulevard EB & WB to I-95 Express Lanes	7,310 (6,640)	E (39.5)	E (35.4)
Basic Freeway	4,690 (3,760)	C (24.8)	C (19.2)
Diverge to Hillsboro Blvd EB & WB	6,020 (5,080)	E (37.8)	D (27.5)
Northbound Express to Westbound Express SW 10th Street - 90 (180) vph			
SW 10th Street			
Eastbound SW 10th Street Express to Northbound Express - 850 (440) vph			
Basic Freeway	6,020 (5,080)	E (35.9)	D (27.5)
Major Diverge to SW 10th Street EB & WB	7,210 (6,350)	D (33.7)	D (29.7)
Basic Freeway	7,210 (6,350)	D (30.1)	C (25.3)
Diverge from GP Lane to WB 10th St Ex Lane	7,390 (6,660)	D (33.0)	D (30.8)
Merge from I-95 Express Lanes	7,390 (6,660)	D (29.0)	C (25.4)
Lane Add from Sample Road WB*	6,560 (5,990)	Under Capacity v/c: u/s, Ramp, d/s 0.76, 0.73, 0.73	Under Capacity v/c: u/s, Ramp, d/s 0.72, 0.58, 0.67
Basic Freeway	5,110 (4,850)	D (27.8)	C (25.9)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	6,080 (6,660)	D (31.2)	F (N/A)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

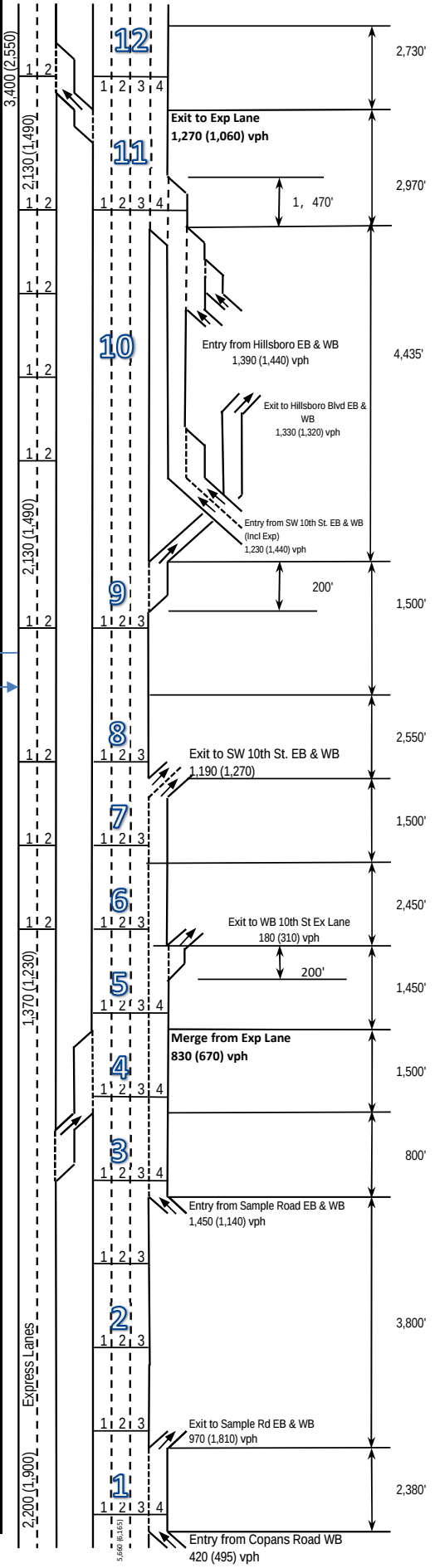
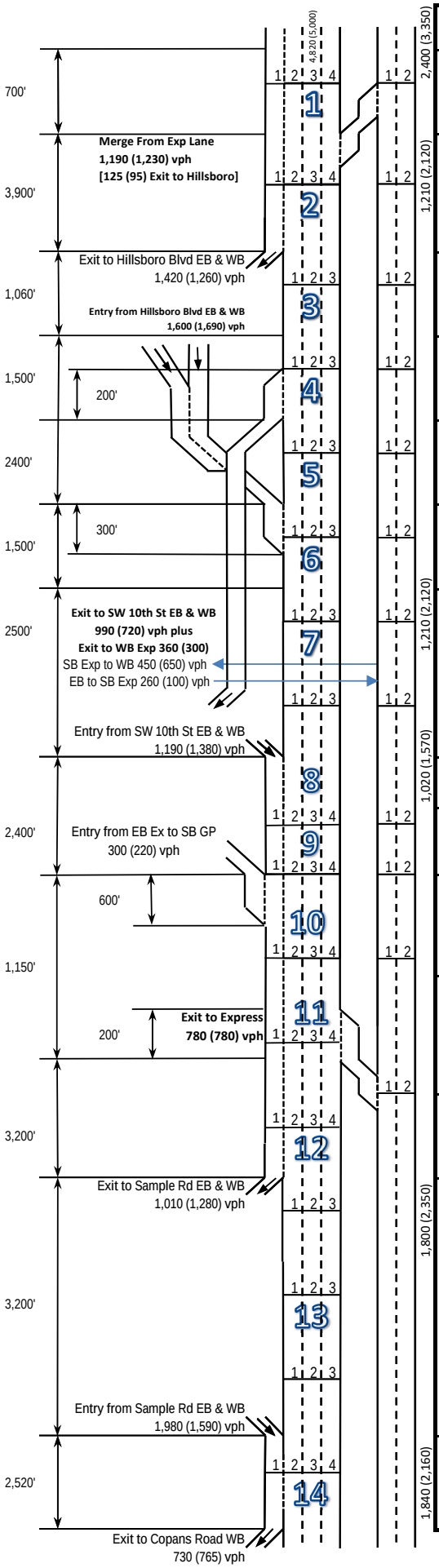


Figure 5.19: 2040 Build 2 Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,820 (5,000)	C (18.4)	C (19.1)
Weave - I-95 Express Lanes to Hillsboro Boulevard EB & WB	6,010 (6,230)	C (27.4)	D (28.2)
Basic Freeway	4,590 (4,970)	C (24.1)	D (26.7)
Diverge to SW 10th St EB & WB	4,590 (4,970)	D (32.0)	D (32.8)
Basic Freeway	3,240 (3,950)	B (16.5)	C (20.2)
Merge from Hillsboro Blvd EB & WB	4,840 (5,640)	D (32.3)	E (36.5)
Basic Freeway	4,840 (5,640)	D (25.8)	D (32.2)
Lane Add Merge from SW 10th St EB & WB*	6,030 (7,020)	Under Capacity v/c: u/s, Ramp, d/s 0.72, 0.60, 0.67	Under Capacity v/c: u/s, Ramp, d/s 0.84, 0.70, 0.78
Basic Freeway	6,030 (7,020)	C (23.7)	D (29.0)
Merge from EB Ex to SB GP Lane	6,330 (7,240)	C (24.2)	C (26.9)
Diverge to I-95 Express Lanes	6,330 (7,240)	D (34.9)	E (38.9)
Diverge - Lane Drop to Sample Road EB & WB	5,550 (6,460)	C (25.9)	D (30.2)
Basic Freeway	4,540 (5,180)	C (23.8)	D (28.3)
Weave - Entry Sample Road EB to Exit Copans Road WB	6,520 (6,770)	F (N/A)	F (N/A)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

Sample Road: All five signalized intersections including the I-95 NB and SB off-ramp approaches are expected to operate at LOS D or better during both peak hours.

Table 5.8 2020 Build 2-SW 10th St. Connector
I-95 Express Lanes Merge/Diverge Analysis Results

Segment	Freeway Volume AM(PM) vph	Ramp Volume AM(PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Merge to I-95 NB	1050(740)	760(390)	B(13.6)	A(8.2)
Diverge from I-95 NB	1110(890)	60(150)	B(11.3)	A(9.3)
Diverge from I-95 SB	1010(1730)	370(560)	B(11.3)	B(17.9)
Merge to I-95 SB	640(1170)	160(80)	A(5.2)	A(9.0)

Table 5.9 2040 Build 2-SW 10th St. Connector
I-95 Express Lanes Merge/Diverge Analysis Results

Segment	Freeway Volume AM(PM) vph	Ramp Volume AM(PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Merge to NB EL	1280(1050)	850(440)	B(16.3)	B(11.1)
Diverge from NB EL	1370(1230)	90(180)	B(13.7)	B(12.4)
Diverge from SB EL	1210(2120)	450(650)	B(13.1)	C(21.5)
Merge to SB EL	760(1470)	260(100)	A(6.9)	B(11.6)

As displayed in Tables 5.8 and 5.9, all the SW 10th Street Connector merge/diverge segments with I-95 express lanes are anticipated to operate at acceptable levels of service for Build 2 Alternative future conditions.

The merge area from the Hillsboro Boulevard WB on-ramp to the I-95 NB CD road was also evaluated. For year 2020 conditions, the LOS is B with the density of 16.1 pc/mile/lane during the AM peak hour and the LOS is B with the density of 17.9 pc/mile/lane during the AM peak hour. For year 2040 conditions, the LOS is B with the density of 17.4 pc/mile/lane during the AM peak hour and the LOS is C with the density of 20.8 pc/mile/lane during the AM peak hour

Table 5.10: 2020 Build 2 – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (97.5)	C (22.5)	C (22.5)	F (93.5)	B (17.8)	A (7.9)	E (74.6)	F (93.6)	E (58.6)	F (84.5)	F (84.4)	E (56.7)	C (33.5)
			Approach	C (31.4)			C (26.6)			E (73.8)			E (75.2)			
		Volume to Capacity ratio	Movement	0.89	0.66	0.66	0.84	0.49	0.40	0.28	0.77	0.12	0.31	0.30	0.01	
		Queue Length 95th (ft)	Movement	#468	685	685	#269	447	138	85	247	66	63	63	0	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.7)		B (15.2)					E (59.8)		D (51.1)	B (19.2)
			Approach	A (0.3)			B (15.2)						D (54.8)			
		Volume to Capacity ratio	Movement		0.27	0.44		0.49					0.82		0.72	
		Queue Length 95th (ft)	Movement		0	5		461					644		445	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		A (9.3)			B (11.4)	A (0.7)	C (21.1)		C (27.8)				B (12.8)
			Approach	A (9.3)			A (7.9)			C (24.9)						
		Volume to Capacity ratio	Movement		0.47			0.53	0.49	0.32		0.73				
		Queue Length 95th (ft)	Movement		238			m245	m2	98		242				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (81.2)	B (17.0)	C (20.7)	F (86.8)	C (26.1)	B (16.8)	F (228.1)	E (64.0)	E (61.9)	F (82.6)	F (83.3)	F (83.2)	D (48.0)
			Approach	C (26.6)			C (28.0)			F (170.2)			F (83.0)			
		Volume to Capacity ratio	Movement	0.83	0.55	0.07	0.61	0.62	0.06	1.31	0.26	0.09	0.40	0.07	0.05	
		Queue Length 95th (ft)	Movement	#263	367	30	150	545	5	#828	151	68	66	22	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (55.5)	C (30.4)	C (30.4)	F (208.0)	C (21.9)	A (0.1)	D (54.6)	D (48.8)	F (155.2)	E (63.2)	E (63.9)	D (40.9)	D (46.3)
			Approach	C (30.9)			D (40.3)			F (113.5)			D (54.9)			
		Volume to Capacity ratio	Movement	0.42	0.82	0.82	1.25	0.90	0.03	0.64	0.06	1.14	0.84	0.84	0.52	
		Queue Length 95th (ft)	Movement	72	#640	#640	#215	#742	m0	124	26	#324	306	313	146	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.4)		B (17.7)					D (42.4)		C (28.5)	B (13.2)
			Approach	A (0.2)			B (17.7)						D (35.6)			
		Volume to Capacity ratio	Movement		0.38	0.41		0.69					0.84		0.50	
		Queue Length 95th (ft)	Movement		0	m0		527					484		207	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (10.4)			A (9.2)	A (0.6)	B (16.5)		B (16.5)				B (11.0)
			Approach	B (10.4)			A (7.1)			C (20.1)						
		Volume to Capacity ratio	Movement		0.62			0.73	0.44	0.40		0.78				
		Queue Length 95th (ft)	Movement		199			m267	m0	87		#193				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	E (56.9)	B (15.7)	A (7.8)	F (136.9)	C (20.8)	B (10.7)	F (149.6)	D (44.2)	D (44.5)	D (42.5)	D (44.5)	E (62.2)	C (31.0)
			Approach	B (16.2)			C (26.9)			F (115.9)			E (55.3)			
		Volume to Capacity ratio	Movement	0.43	0.77	0.24	1.01	0.76	0.02	1.14	0.04	0.08	0.44	0.19	0.78	
		Queue Length 95th (ft)	Movement	m50	513	m101	#234	638	0	#294	23	36	116	68	215	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.11: 2020 Build 2 – SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (82.1)	E (76.6)	C (24.8)	F (104.7)	C (25.1)	B (12.4)	F (84.4)	F (114.4)	F (107.7)	F (121.8)	E (61.4)	D (53.2)	E (73.7)
			Approach	E (73.9)			D (37.1)			F (108.0)			F (81.0)			
		Volume to Capacity ratio	Movement	0.79	1.00	0.10	0.74	0.63	0.55	0.66	1.03	1.03	1.02	0.66	0.24	
		Queue Length 95th (ft)	Movement	288	#1069	49	276	321	198	160	#615	#871	#443	410	117	
	East Newport Center Drive	LOS (Delay)	Movement	D (49.5)	B (16.4)	B (16.4)	F (80.2)	C (31.1)	E (61.7)	E (78.4)	E (78.4)	D (50.6)	F (87.7)	F (87.7)	D (44.8)	C (33.9)
			Approach	C (20.7)			D (44.3)			E (62.0)			E (60.0)			
		Volume to Capacity ratio	Movement	0.46	0.60	0.60	0.76	0.59	0.24	0.27	0.27	0.09	0.54	0.54	0.05	
		Queue Length 95th (ft)	Movement	m176	m338	m338	291	420	68	91	91	64	114	114	26	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		C (32.7)	C (32.7)	D (53.5)	B (11.8)					D (52.5)		E (59.8)	C (31.9)
			Approach	C (32.7)			C (22.4)						E (56.9)			
		Volume to Capacity ratio	Movement		0.72	0.72	0.61	0.53					0.36		0.67	
		Queue Length 95th (ft)	Movement		405	405	189	364					215		387	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (5.9)	A (0.1)		A (6.9)		E (70.2)		E (70.3)				B (19.9)
			Approach	A (4.4)			A (6.9)			E (70.3)						
		Volume to Capacity ratio	Movement		0.42	0.16		0.37		0.68		0.66				
		Queue Length 95th (ft)	Movement		50	0		233		297		269				
	FAU Research Park Boulevard	LOS (Delay)	Movement	E (64.7)	B (13.6)	A (8.2)	F (84.5)	C (27.9)	C (20.1)	E (66.8)	E (68.4)	E (66.5)	E (67.6)	F (91.0)	F (81.9)	D (38.1)
			Approach	B (19.2)			C (31.0)			E (67.1)			E (79.2)			
		Volume to Capacity ratio	Movement	0.68	0.43	0.18	0.54	0.55	0.05	0.80	0.27	0.08	0.71	0.77	0.64	
		Queue Length 95th (ft)	Movement	182	177	14	97	545	10	326	109	60	299	265	226	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (126.6)	E (60.5)	C (29.7)	F (87.6)	F (88.5)	D (37.4)	F (130.0)	E (74.2)	D (47.3)	F (90.2)	E (65.9)	F (127.4)	E (79.3)
			Approach	E (70.7)			E (78.0)			E (75.0)			F (92.1)			
		Volume to Capacity ratio	Movement	1.00	0.90	0.19	0.96	1.04	0.54	0.93	0.77	0.50	0.87	0.82	1.07	
		Queue Length 95th (ft)	Movement	#349	834	107	#420	#1208	608	#192	382	317	#343	559	#868	
	East Newport Center Drive	LOS (Delay)	Movement	E (68.8)	C (21.4)	C (21.4)	F (82.8)	D (42.9)	D (41.1)	E (73.6)	E (73.6)	E (64.7)	E (69.4)	E (69.4)	E (71.4)	D (43.3)
			Approach	C (23.4)			D (45.0)			E (69.1)			E (71.0)			
		Volume to Capacity ratio	Movement	0.52	0.63	0.63	0.58	0.71	0.06	0.67	0.67	0.70	0.45	0.45	0.77	
		Queue Length 95th (ft)	Movement	m67	615	615	m101	718	m45	332	334	400	189	189	291	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		C (25.0)	C (25.0)	E (72.7)	A (4.5)					E (62.2)		E (69.9)	C (29.5)
			Approach	C (25.0)			C (23.3)						E (67.0)			
		Volume to Capacity ratio	Movement		0.84	0.84	0.54	0.43					0.34		0.69	
		Queue Length 95th (ft)	Movement		217	217	315	105					169		308	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (4.6)	A (0.1)		A (8.4)		E (57.2)		E (66.7)				B (17.8)
			Approach	A (3.3)			A (8.4)			E (62.8)						
		Volume to Capacity ratio	Movement		0.50	0.23		0.39		0.38		0.75				
		Queue Length 95th (ft)	Movement		101	0		88		202		380				
	FAU Research Park Boulevard	LOS (Delay)	Movement	F (87.0)	C (31.3)	B (17.3)	F (87.2)	D (38.6)	C (28.7)	E (68.3)	E (56.4)	E (55.8)	E (57.8)	F (87.2)	F (82.7)	D (49.4)
			Approach	D (37.3)			D (45.6)			E (62.4)			E (77.1)			
		Volume to Capacity ratio	Movement	0.76	0.68	0.22	0.77	0.60	0.09	0.87	0.15	0.10	0.64	0.83	0.77	
		Queue Length 95th (ft)	Movement	226	519	98	225	567	54	#368	82	60	283	393	340	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.12: 2020 Build 2 – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.1)		D (53.2)	A (1.1)		E (56.6)		D (46.9)				B (14.0)
			Approach		B (16.1)			A (5.2)			D (51.1)					
		Volume to Capacity ratio	Movement		0.53		0.64	0.47		0.67		0.12				
		Queue Length 95th (ft)	Movement		318		#154	27		170		64				
	NW 5th Avenue	LOS (Delay)	Movement	D (49.7)	A (2.0)			A (9.1)	A (4.4)				D (51.2)		D (47.0)	A (10.0)
			Approach		A (3.8)			A (8.9)						D (49.6)		
		Volume to Capacity ratio	Movement	0.70	0.47			0.44	0.05				0.59		0.13	
		Queue Length 95th (ft)	Movement	#152	42			238	m4				130		64	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (5.2)	A (1.5)		A (6.7)					B (20.0)		C (23.2)	A (8.1)
			Approach		A (3.8)			A (6.7)						C (21.6)		
		Volume to Capacity ratio	Movement		0.42	0.59		0.47					0.52		0.69	
		Queue Length 95th (ft)	Movement		126	363		145					107		134	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (5.0)			A (4.5)	A (0.2)	C (22.0)		C (21.4)				A (7.6)
			Approach		A (5.0)			A (3.7)			C (21.8)					
		Volume to Capacity ratio	Movement		0.37			0.62	0.29	0.62		0.56				
		Queue Length 95th (ft)	Movement		56			m143	m0	121		104				
	NE 3rd Avenue	LOS (Delay)	Movement	E (67.5)	B (18.9)		E (56.4)	D (40.6)		D (37.6)	D (36.3)	C (32.2)	C (30.9)	D (37.0)	F (81.2)	D (41.6)
			Approach		C (31.5)			D (41.1)			D (36.3)			E (64.1)		
		Volume to Capacity ratio	Movement	0.91	0.49		0.49	0.87		0.63	0.43	0.04	0.28	0.44	0.98	
		Queue Length 95th (ft)	Movement	#243	259		79	501		183	214	0	86	212	#526	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (18.2)		E (72.1)	A (1.4)		E (62.8)		D (53.2)				B (15.5)
			Approach		B (18.2)			A (8.8)			E (57.9)					
		Volume to Capacity ratio	Movement		0.59		0.87	0.56		0.65		0.08				
		Queue Length 95th (ft)	Movement		389		#359	30		152		57				
	NW 5th Avenue	LOS (Delay)	Movement	E (55.7)	A (1.6)			B (11.5)	A (5.2)				E (56.7)		D (53.4)	B (11.1)
			Approach		A (5.4)			B (10.8)						E (55.2)		
		Volume to Capacity ratio	Movement	0.82	0.47			0.59	0.17				0.54		0.10	
		Queue Length 95th (ft)	Movement	#277	35			382	m23				112		64	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (10.0)	A (0.7)		B (13.8)					B (18.5)		C (25.4)	B (12.8)
			Approach		A (7.7)			B (13.8)						C (22.5)		
		Volume to Capacity ratio	Movement		0.56	0.41		0.72					0.45		0.79	
		Queue Length 95th (ft)	Movement		290	33		m226					111		#196	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (7.5)			A (9.0)	A (0.2)	D (45.1)		C (20.8)				B (16.3)
			Approach		A (7.5)			A (7.5)			D (36.5)					
		Volume to Capacity ratio	Movement		0.65			0.65	0.22	0.98		0.66				
		Queue Length 95th (ft)	Movement		61			267	m0	#338		167				
	NE 3rd Avenue	LOS (Delay)	Movement	E (64.0)	C (24.2)		E (76.6)	D (37.2)		E (67.9)	D (51.1)	D (38.1)	D (42.9)	E (57.4)	D (51.7)	D (40.0)
			Approach		C (32.3)			D (39.5)			D (55.0)			D (52.9)		
		Volume to Capacity ratio	Movement	0.87	0.76		0.74	0.79		0.89	0.74	0.06	0.40	0.74	0.62	
		Queue Length 95th (ft)	Movement	#282	511		#173	#566		#245	339	0	73	280	219	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.13: 2040 Build 2 – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (96.0)	C (25.2)		F (113.6)	C (20.6)	B (17.9)	E (74.4)	F (93.9)	E (60.6)	F (84.5)	F (84.4)	D (53.5)	D (38.4)
			Approach	C (33.8)			C (34.5)			E (73.2)			E (74.1)			
		Volume to Capacity ratio	Movement	0.91	0.73		0.98	0.55	0.43	0.30	0.77	0.29	0.36	0.35	0.02	
		Queue Length 95th (ft)	Movement	#525	827		#346	303	116	93	255	136	72	72	1	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (1.0)		C (25.6)					D (50.9)		D (42.0)	C (20.2)
			Approach	A (0.5)			C (25.6)						D (45.8)			
		Volume to Capacity ratio	Movement		0.29	0.57		0.58					0.82		0.69	
		Queue Length 95th (ft)	Movement		0	190		529					693		448	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (12.5)			B (12.9)	A (0.8)	B (19.4)		C (27.5)				B (13.8)
			Approach	B (12.5)			A (8.8)			C (24.2)						
		Volume to Capacity ratio	Movement		0.54			0.63	0.56	0.30		0.76				
		Queue Length 95th (ft)	Movement		219			m302	m10	98		282				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (92.9)	B (19.9)	B (16.9)	F (103.8)	C (25.7)	B (15.4)	F (354.6)	E (66.8)	E (64.9)	F (84.2)	F (83.3)	F (83.3)	E (61.2)
			Approach	C (30.3)			C (28.3)			F (252.1)			F (83.6)			
		Volume to Capacity ratio	Movement	0.92	0.58	0.08	0.75	0.76	0.07	1.60	0.31	0.14	0.52	0.07	0.06	
		Queue Length 95th (ft)	Movement	#304	485	m30	#195	614	0	#991	163	87	82	22	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (69.3)	D (39.5)	D (39.5)	F (182.4)	B (19.2)	A (0.1)	E (65.3)	E (56.5)	F (220.1)	F (84.7)	F (85.6)	E (64.7)	E (56.3)
			Approach	D (40.2)			D (37.3)			F (159.0)			E (77.1)			
		Volume to Capacity ratio	Movement	0.56	0.91	0.91	1.16	0.86	0.04	0.70	0.06	1.30	0.91	0.91	0.81	
		Queue Length 95th (ft)	Movement	#98	#873	#873	m#258	536	m0	157	29	#506	#415	#425	#330	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.5)		C (23.5)					D (47.9)		C (29.1)	B (15.8)
			Approach	A (0.2)			C (23.5)						D (38.8)			
		Volume to Capacity ratio	Movement		0.41	0.53		0.78					0.88		0.53	
		Queue Length 95th (ft)	Movement		m0	m0		641					693		277	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (13.0)			B (12.1)	A (0.6)	B (17.9)		C (26.8)				B (13.3)
			Approach	B (13.0)			A (9.1)			C (22.9)						
		Volume to Capacity ratio	Movement		0.70			0.79	0.51	0.37		0.81				
		Queue Length 95th (ft)	Movement		254			m324	m0	97		#240				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	E (69.4)	C (23.1)	B (11.9)	F (136.9)	C (26.0)	B (12.1)	F (131.4)	D (48.5)	D (49.5)	D (46.9)	D (48.9)	E (73.9)	D (36.2)
			Approach	C (23.5)			C (32.1)			F (104.7)			E (64.4)			
		Volume to Capacity ratio	Movement	0.60	0.86	0.32	1.00	0.83	0.02	1.08	0.03	0.14	0.43	0.16	0.84	
		Queue Length 95th (ft)	Movement	m65	#921	m175	#290	#858	0	#351	25	66	144	75	291	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.14: 2040 Build 2 – SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (90.6)	F (106.0)	C (26.2)	F (85.3)	D (37.5)	C (20.4)	F (94.9)	F (164.0)	F (165.2)	F (145.9)	E (66.3)	E (57.4)	F (92.8)
			Approach	F (95.5)			D (40.8)			F (155.5)			F (92.8)			
		Volume to Capacity ratio	Movement	0.86	1.09	0.19	0.68	0.75	0.66	0.79	1.16	1.20	1.09	0.72	0.34	
		Queue Length 95th (ft)	Movement	#324	#1225	105	296	478	245	#193	#674	#1109	#480	428	172	
	East Newport Center Drive	LOS (Delay)	Movement	D (53.7)	B (16.9)	B (16.9)	F (82.8)	C (24.7)	C (27.3)	E (79.8)	E (79.8)	D (49.6)	F (89.1)	F (89.1)	D (48.1)	C (30.7)
			Approach	C (22.1)			C (34.6)			E (63.4)			E (61.8)			
		Volume to Capacity ratio	Movement	0.62	0.67	0.67	0.78	0.68	0.25	0.38	0.39	0.14	0.58	0.58	0.09	
		Queue Length 95th (ft)	Movement	m198	m396	m396	324	511	64	118	122	89	123	123	44	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		D (40.0)	D (40.0)	E (68.8)	C (25.7)					E (55.4)		E (65.8)	D (42.7)
			Approach	D (40.0)			D (38.0)						E (61.3)			
		Volume to Capacity ratio	Movement		0.84	0.84	0.77	0.61					0.49		0.78	
		Queue Length 95th (ft)	Movement		410	410	401	736					293		454	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (8.5)	A (0.1)		B (19.4)		E (75.9)		E (73.3)				C (26.9)
			Approach	A (6.6)			B (19.4)			E (74.9)						
		Volume to Capacity ratio	Movement		0.53	0.16		0.45		0.81		0.74				
		Queue Length 95th (ft)	Movement		114	m0		589		361		303				
	FAU Research Park Boulevard	LOS (Delay)	Movement	E (75.2)	C (26.0)	D (41.8)	F (85.4)	D (44.8)	C (29.3)	E (68.3)	E (56.1)	D (54.3)	E (57.2)	E (74.6)	F (107.6)	D (51.2)
			Approach	D (35.2)			D (48.5)			E (61.5)			F (84.9)			
		Volume to Capacity ratio	Movement	0.81	0.64	0.27	0.71	0.78	0.07	0.91	0.26	0.12	0.67	0.68	0.92	
		Queue Length 95th (ft)	Movement	#230	576	204	186	752	27	#454	142	67	293	328	#446	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (174.5)	F (87.2)	C (28.0)	F (140.9)	F (123.8)	B (18.9)	F (174.0)	E (77.5)	D (54.7)	F (89.0)	E (68.0)	F (209.5)	F (105.3)
			Approach	F (97.6)			F (105.5)			F (90.8)			F (122.1)			
		Volume to Capacity ratio	Movement	1.14	1.03	0.16	1.10	1.14	0.59	1.11	0.82	0.68	0.88	0.84	1.28	
		Queue Length 95th (ft)	Movement	#383	#1082	75	m#473	#1391	m308	#294	416	465	#372	580	#1103	
	East Newport Center Drive	LOS (Delay)	Movement	E (76.5)	D (39.8)	D (39.8)	F (99.3)	D (49.4)	C (30.6)	E (67.0)	E (66.5)	E (76.6)	E (68.5)	E (68.5)	F (81.4)	D (54.1)
			Approach	D (41.4)			D (51.5)			E (71.8)			E (78.4)			
		Volume to Capacity ratio	Movement	0.60	0.83	0.83	0.76	0.86	0.07	0.64	0.63	0.88	0.57	0.57	0.90	
		Queue Length 95th (ft)	Movement	m68	m563	m468	m#123	728	m25	384	380	#653	266	266	#425	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		C (31.2)	C (31.2)	E (71.8)	A (4.4)					E (65.8)		F (82.6)	C (35.0)
			Approach	C (31.2)			C (26.7)						E (75.6)			
		Volume to Capacity ratio	Movement		0.95	0.95	0.74	0.44					0.49		0.85	
		Queue Length 95th (ft)	Movement		538	538	400	113					228		#384	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (5.8)	A (0.1)		A (4.6)		E (62.1)		E (77.7)				B (19.1)
			Approach	A (4.0)			A (4.6)			E (70.4)						
		Volume to Capacity ratio	Movement		0.56	0.28		0.40		0.55		0.88				
		Queue Length 95th (ft)	Movement		m118	m0		m49		278		#434				
	FAU Research Park Boulevard	LOS (Delay)	Movement	F (89.2)	D (50.9)	D (36.2)	F (96.7)	D (46.4)	C (34.1)	F (99.9)	E (55.9)	D (54.7)	D (52.2)	F (100.2)	F (85.0)	E (61.6)
			Approach	D (54.1)			E (55.2)			E (74.3)			F (80.7)			
		Volume to Capacity ratio	Movement	0.77	0.87	0.30	0.89	0.69	0.12	0.98	0.24	0.15	0.66	0.93	0.82	
		Queue Length 95th (ft)	Movement	m232	710	m142	#314	586	74	#552	142	78	342	#567	#455	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.15: 2040 Build 2 – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.9)		E (69.5)	A (1.4)		E (57.1)		D (46.4)				B (15.2)
			Approach		B (16.9)			A (7.0)			D (51.0)					
		Volume to Capacity ratio	Movement		0.60		0.79	0.51		0.69		0.13				
		Queue Length 95th (ft)	Movement		376		#237	32		181		65				
	NW 5th Avenue	LOS (Delay)	Movement	E (58.4)	A (2.2)			A (9.8)	A (4.2)				D (51.2)		D (47.0)	B (10.4)
			Approach		A (4.4)			A (9.5)						D (49.5)		
		Volume to Capacity ratio	Movement	0.78	0.53			0.49	0.06				0.61		0.22	
		Queue Length 95th (ft)	Movement	m#173	46			278	m5				140		81	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (6.0)	A (2.0)		A (7.6)					C (20.4)		C (26.7)	A (9.2)
			Approach		A (4.5)			A (7.6)						C (23.7)		
		Volume to Capacity ratio	Movement		0.47	0.67		0.51					0.58		0.79	
		Queue Length 95th (ft)	Movement		157	466		160					123		#182	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (6.3)			A (7.0)	A (0.2)	C (22.6)		C (22.1)				A (9.2)
			Approach		A (6.3)			A (5.4)			C (22.4)					
		Volume to Capacity ratio	Movement		0.44			0.66	0.38	0.68		0.64				
		Queue Length 95th (ft)	Movement		75			m157	m0	143		126				
	NE 3rd Avenue	LOS (Delay)	Movement	F (86.8)	C (21.0)		E (58.0)	D (54.8)		D (41.3)	D (36.1)	C (31.9)	C (30.3)	D (36.9)	F (111.2)	D (52.0)
			Approach		D (37.2)			D (54.9)			D (37.8)			F (83.1)		
		Volume to Capacity ratio	Movement	1.00	0.61		0.55	0.98		0.72	0.45	0.05	0.32	0.45	1.08	
		Queue Length 95th (ft)	Movement	#280	299		91	#619		#220	225	0	98	222	#611	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (19.1)		F (94.3)	A (2.0)		E (63.3)		D (52.6)				B (16.9)
			Approach		B (19.1)			B (11.0)			E (57.8)					
		Volume to Capacity ratio	Movement		0.64		0.95	0.64		0.67		0.08				
		Queue Length 95th (ft)	Movement		443		#396	42		164		58				
	NW 5th Avenue	LOS (Delay)	Movement	F (105.7)	A (1.8)			B (12.3)	A (5.7)				E (56.7)		D (52.7)	B (13.1)
			Approach		A (9.1)			B (11.6)						D (54.9)		
		Volume to Capacity ratio	Movement	1.03	0.52			0.65	0.20				0.57		0.11	
		Queue Length 95th (ft)	Movement	#334	38			450	m12				122		65	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (10.7)	A (0.9)		B (13.7)					B (18.7)		C (33.1)	B (14.1)
			Approach		A (8.0)			B (13.7)						C (27.0)		
		Volume to Capacity ratio	Movement		0.61	0.47		0.81					0.52		0.90	
		Queue Length 95th (ft)	Movement		295	78		276					136		#276	
	I-95 Northbound Ramps	LOS (Delay)	Movement		B (17.6)			B (15.9)	A (0.2)	D (38.0)		C (30.1)				C (21.3)
			Approach		B (17.6)			B (12.8)			C (35.0)					
		Volume to Capacity ratio	Movement		0.73			0.73	0.29	0.83		0.60				
		Queue Length 95th (ft)	Movement		396			m232	m0	513		307				
	NE 3rd Avenue	LOS (Delay)	Movement	F (84.5)	C (26.7)		F (120.6)	D (39.4)		F (126.7)	E (60.4)	D (40.3)	D (41.9)	E (58.0)	E (67.9)	D (48.4)
			Approach		D (38.2)			D (44.3)			F (81.1)			E (61.5)		
		Volume to Capacity ratio	Movement	0.97	0.82		0.93	0.85		1.09	0.82	0.08	0.51	0.76	0.83	
		Queue Length 95th (ft)	Movement	#343	479		#217	#658		#280	358	0	87	291	303	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Tables 5.16 summarizes the results of the off-ramp signals back of queue analyses for the AM and PM peak hours for 2040 Build 2 conditions. HCM methodology does not provide queue lengths. The 95th percentile queues were obtained from Synchro reports. The analysis indicates that the queues on the off-ramps are not expected to exceed the length of off-ramps and are not likely to affect the I-95 mainline operations.

Table 5.16: 2040 Build 2 – Off-Ramp Signals Queuing Analysis Results

Intersection	Approach	Movement	Turn Lane Storage (ft)	Available Off-Ramp Length (ft)(1)	Queue (ft)	
					AM	PM
2040 Build 2						
Hillsboro Boulevard at I-95 SB Off-Ramp	Southbound	L (EB)	295	1,910	693	693
		R (WB)	295	1,910	448	277
Hillsboro Boulevard at I-95 NB Off-Ramp	Northbound	L (WB)	350	3,485	98	97
		R (EB)	350	3,485	282	#240
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	500	3,535	293	228
		R (WB)	500	3,535	454	#384
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	530	1,065	361	278
		R (EB)	530	1,065	303	#434
Sample Road at I-95 SB Off-Ramp	Southbound	L (EB)	200	1,345	123	136
		R (WB)	200	1,345	#182	#276
Sample Road at I-95 NB Off-Ramp	Northbound	L (WB)	230	1,525	143	513
		R (EB)	230	1,525	126	307

(1) Available off-ramp lengths were calculated by deducting the deceleration length of 615 feet from total off-ramp lengths

#: 95th percentile volume exceeds capacity

5.6 Build 2 Alternative Sub Scenario – Traffic Operational Analysis

For Build 2, a sub scenario with higher traffic demand was also evaluated. The sub scenario of Build 2 has I-95 direct-connect ramps connecting to the SW 10th Street Connector Lanes which continue to the Sawgrass Expressway. Proposed improvements for Build 2 Sub Scenario are similar to Build 2 within the SIMR study area and are expected to provide better operating conditions than the No-Build conditions. The sub scenario of Build 2 Alternative is anticipated to prevent any spillbacks from the ramp terminals on to the mainline and improve safety by reducing congestion and the number of conflict points.

5.6.1 2020 & 2040 – Freeway Analysis – I-95

The mainline/basic, weaving, and ramp merge/diverge analysis results for Opening Year 2020 are summarized on **Figures 5.20** and **5.21** for the NB and SB directions, respectively. **Figures 5.22** and **5.23** summarize the Design Year 2040 analysis results for NB and SB directions, respectively. Documentation of traffic freeway operational analysis for Build 2 Sub Scenario is provided in **Appendix O**. The Design Year 2040 analysis for Build 2 Sub Scenario indicates that 1 of the 12 freeway segments in the NB direction is projected to operate at LOS E during the AM peak hour and all segments are projected to operate at LOS D or better during the PM peak hour. In the SB direction, 2 of the 14 freeway segments are projected to operate at LOS E or F during one or both peak hours.

Tables 5.17 and **5.18** summarize SW 10th Street Connector merge/diverge analysis results to/from I-95 express lanes.

5.6.2 2020 & 2040 - Intersection Analysis

Tables 5.19 through **5.21** summarize the results of the 2020 signalized intersection analyses for the AM and PM peak hours for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. **Tables 5.22** through **5.24** summarize the results of the 2040 signalized intersection analyses for Hillsboro Boulevard, SW 10th Street, and Sample Road intersections, respectively. Signal timing was optimized for vehicles at all intersections. The results include delays (in seconds per vehicle) and LOS by movement, approach, and the overall intersection. The volume to capacity (v/c) ratios and 95th percentile queue lengths have also been summarized by movement. **Appendix P** presents the intersection analysis worksheets. Levels of Service at or better than D were attempted to the degree possible in cooperation with local governments for surface roads. However, due to ROW and other constraints, it is not cost feasible to achieve desired levels of service for every movement or intersection. Therefore, the improvements along the arterials were focused to move traffic away from the interchange as efficiently as possible to improve off-ramp operations. Side streets northbound/southbound movements at nearby intersections were analyzed and improved to some extent within the local jurisdiction acceptance.

Figure 5.20: 2020 Build 2 Sub Scenario Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	5,890 (5,280)	C (23.0)	C (20.3)
Weave - Hillsboro Boulevard EB & WB to I-95 Express Lanes	6,660 (6,200)	D (33.0)	D (32.0)
Basic Freeway	4,120 (3,410)	C (21.2)	B (17.3)
Diverge to Hillsboro Blvd EB & WB	5,370 (4,640)	E (35.0)	D (31.9)
Northbound Express to Westbound Express SW 10th Street - 180 (390) vph			
SW 10th Street			
Eastbound SW 10th Street Express to Northbound Express - 1,120 (580) vph			
Basic Freeway	5,370 (4,640)	D (29.8)	C (24.4)
Major Diverge to SW 10th Street EB & WB	6,360 (5,650)	D (29.7)	C (26.4)
Basic Freeway	6,360 (5,650)	C (25.3)	C (21.9)
Diverge from GP Lane to WB 10th St Ex Lane	6,610 (5,980)	D (30.3)	D (28.2)
Merge from I-95 Express Lanes	6,610 (5,980)	C (25.4)	C (22.5)
Lane Add from Sample Road WB*	5,900 (5,360)	Under Capacity v/c: u/s, Ramp, d/s 0.69, 0.63, 0.66	Under Capacity v/c: u/s, Ramp, d/s 0.65, 0.49, 0.60
Basic Freeway	4,660 (4,400)	C (24.6)	C (22.9)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	5,450 (5,960)	C (26.8)	D (32.5)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

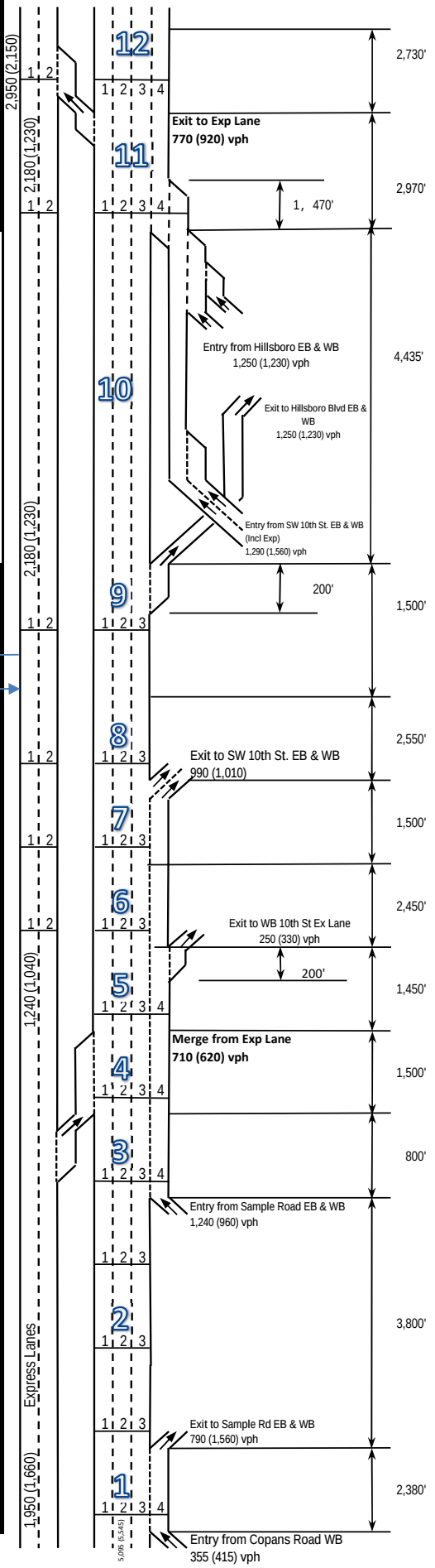
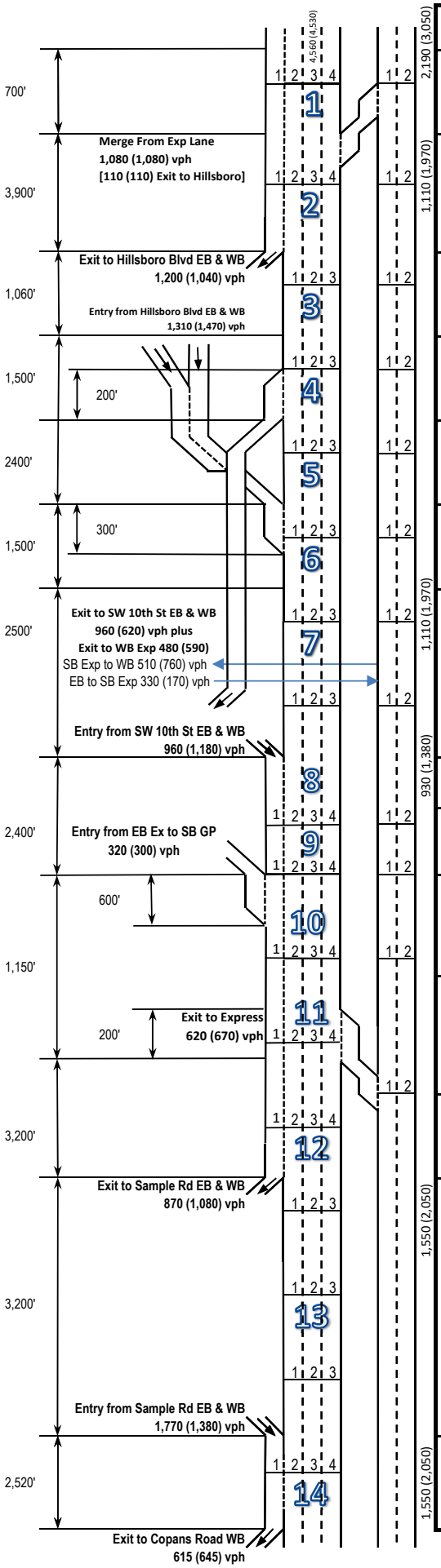


Figure 5.21: 2020 Build 2 Sub Scenario Freeway Analysis Results - Southbound

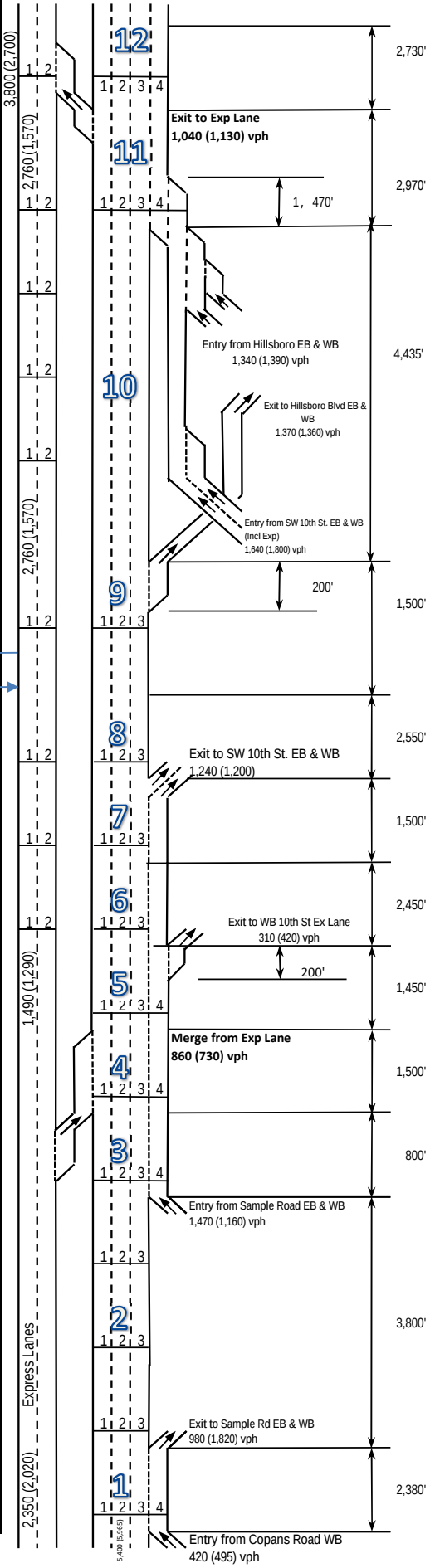


Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,560 (4,530)	B (17.4)	B (17.3)
Weave - I-95 Express Lanes to Hillsboro Boulevard EB & WB	5,640 (5,610)	C (25.3)	C (25.2)
Basic Freeway	4,440 (4,570)	C (23.1)	C (24.0)
Diverge to SW 10th St EB & WB	4,440 (4,570)	D (31.5)	D (31.5)
Basic Freeway	3,000 (3,360)	B (15.3)	B (17.1)
Merge from Hillsboro Blvd EB & WB	4,310 (4,830)	D (28.8)	D (31.8)
Basic Freeway	4,310 (4,830)	C (22.3)	C (25.7)
Lane Add Merge from SW 10th St EB & WB*	5,270 (6,010)	Under Capacity v/c: u/s, Ramp, d/s 0.64, 0.49, 0.59	Under Capacity v/c: u/s, Ramp, d/s 0.72, 0.60, 0.67
Basic Freeway	5,270 (6,010)	C (20.3)	C (23.6)
Merge from EB Ex to SB GP Lane	5,590 (6,310)	C (21.9)	C (24.2)
Diverge to I-95 Express Lanes	5,590 (6,310)	D (30.7)	D (34.2)
Diverge - Lane Drop to Sample Road EB & WB	4,970 (5,640)	C (23.2)	C (26.4)
Basic Freeway	4,100 (4,560)	C (21.1)	C (23.9)
Weave - Entry Sample Road EB to Exit Copans Road WB	5,870 (5,940)	F (N/A)	D (32.5)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

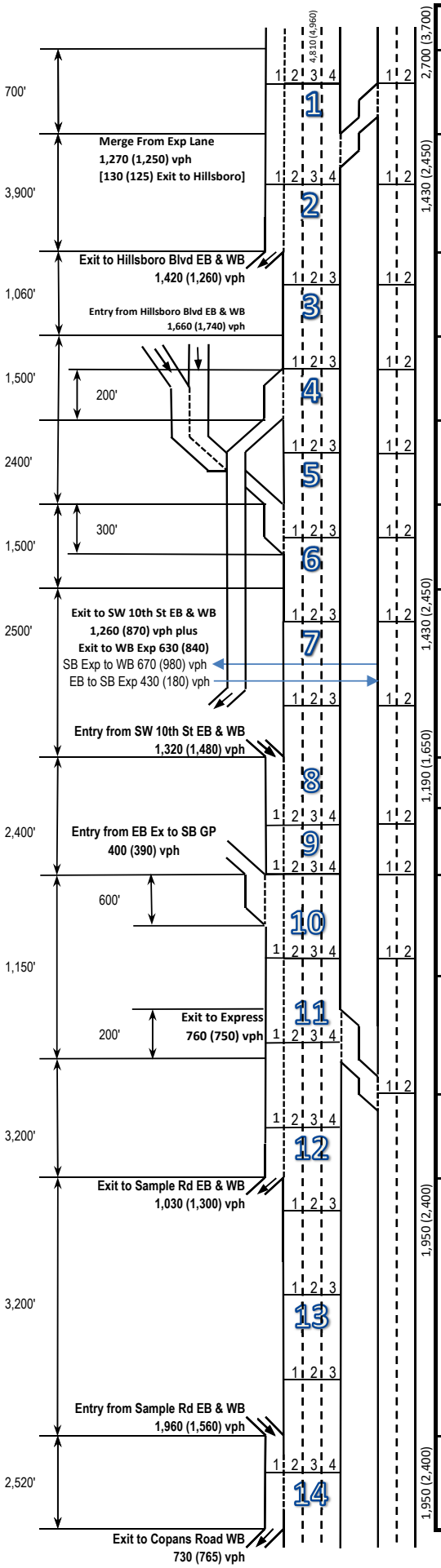
Figure 5.22: 2040 Build 2 Sub Scenario Freeway Analysis Results - Northbound

Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	6,190 (5,610)	C (24.4)	C (21.7)
Weave - Hillsboro Boulevard EB & WB to I-95 Express Lanes	7,230 (6,740)	E (38.6)	E (37.2)
Basic Freeway	4,250 (3,550)	C (22.0)	C (18.1)
Diverge to Hillsboro Blvd EB & WB	5,620 (4,910)	E (36.3)	D (33.4)
Northbound Express to Westbound Express SW 10th Street - 220 (490) vph			
SW 10th Street			
Eastbound SW 10th Street Express to Northbound Express - 1,490 (770) vph			
Basic Freeway	5,620 (4,910)	D (32.0)	D (26.3)
Major Diverge to SW 10th Street EB & WB	6,860 (6,110)	D (32.1)	D (28.6)
Basic Freeway	6,860 (6,110)	D (28.0)	C (24.1)
Diverge from GP Lane to WB 10th St Ex Lane	7,170 (6,530)	D (32.8)	D (30.8)
Merge from I-95 Express Lanes	7,170 (6,530)	D (28.2)	C (25.1)
Lane Add from Sample Road WB*	6,310 (5,800)	Under Capacity v/c: u/s, Ramp, d/s 0.72, 0.74, 0.70	Under Capacity v/c: u/s, Ramp, d/s 0.69, 0.59, 0.65
Basic Freeway	4,840 (4,640)	C (25.8)	C (24.4)
Weave - Entry Copans Road WB to Exit Sample Road EB & WB	5,820 (6,460)	D (29.7)	F (N/A)



GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

Figure 5.23: 2040 Build 2 Sub Scenario Freeway Analysis Results - Southbound



Segment	Freeway GPL Vol AM (PM) vph	AM LOS/Density (PC/MI/LN)	PM LOS/Density (PC/MI/LN)
Basic Freeway	4,810 (4,960)	C (18.4)	C (19.0)
Weave - I-95 Express Lanes to Hillsboro Boulevard EB & WB	6,080 (6,210)	C (27.8)	D (28.4)
Basic Freeway	4,660 (4,950)	C (24.6)	D (26.6)
Diverge to SW 10th St EB & WB	4,660 (4,950)	D (33.8)	D (34.5)
Basic Freeway	2,770 (3,240)	B (14.1)	B (16.5)
Merge from Hillsboro Blvd EB & WB	4,430 (4,980)	D (32.3)	D (33.4)
Basic Freeway	4,430 (4,980)	C (23.1)	D (26.8)
Lane Add Merge from SW 10th St EB & WB*	5,750 (6,460)	Under Capacity v/c: u/s, Ramp, d/s 0.66, 0.67, 0.64	Under Capacity v/c: u/s, Ramp, d/s 0.74, 0.75, 0.72
Basic Freeway	5,750 (6,460)	C (22.4)	C (25.8)
Merge from EB Ex to SB GP Lane	6,150 (6,850)	C (24.1)	C (26.4)
Diverge to I-95 Express Lanes	6,150 (6,850)	D (34.0)	E (37.0)
Diverge - Lane Drop to Sample Road EB & WB	5,390 (6,100)	C (25.2)	D (28.5)
Basic Freeway	4,360 (4,800)	C (22.7)	C (25.5)
Weave - Entry Sample Road EB to Exit Copans Road WB	6,320 (6,360)	F (N/A)	F (N/A)

GPL: General Purpose Lane
* u/s= Up Stream, d/s= Down Stream

The intersection analysis results indicate the following for the 2040 Design Year:

Hillsboro Boulevard: Two of the four signalized intersections are expected to operate at LOS E or worse during the AM or PM peak hours. Two signalized intersections are located at SW Natura Boulevard and SW 12th Avenue. The I-95 NB and SB off-ramp intersections are expected to operate at LOS D or better during both peak hours. Eastbound/westbound through movements at Hillsboro/Natura Boulevard are expected to operate at LOS C or better with eastbound 2040 queues not reaching the northbound off-ramp. Similarly, eastbound/westbound approach movements at Hillsboro Blvd/SW 12th Avenue are expected to operate at LOS C/D. The operations on these 2 intersections are not expected to deteriorate interchange operations.

SW 10th Street: Two of the four signalized intersections are expected to operate at LOS E or worse during the AM or PM peak hours. Two signalized intersections are located at South Military Trail and FAU Research Park Boulevard. The I-95 NB and SB off-ramp approaches are expected to operate at LOS D or better during both peak hours. At the intersection of SW 10th/Military Trail, the westbound year 2040 queues are anticipated to be much less than the available distance to the southbound off-ramp. At the intersection of SW 10th Street at FAU Research Park Boulevard, the eastbound 2040 queues are anticipated to be less than the available 600 ft to the northbound off-ramp terminal. The operations on these 2 intersections are not expected to deteriorate interchange operations.

Sample Road: All five signalized intersections including the I-95 NB and SB off-ramp approaches are expected to operate at LOS D or better during both peak hours.

Table 5.17 2020 Build 2 Sub Scenario-SW 10th St. Connector
I-95 Express Lanes Merge/Diverge Analysis Results

Segment	Freeway Volume	Ramp Volume	AM LOS/Density	PM LOS/Density
	AM(PM) vph	AM(PM) vph	(PC/MI/LN)	(PC/MI/LN)
Merge to I-95 NB	1060(650)	1120(580)	B(16.5)	A(8.9)
Diverge from I-95 NB	1240(1040)	180(390)	B(12.5)	B(10.7)
Diverge from I-95 SB	1110(1970)	510(760)	B(12.2)	C(20.1)
Merge to I-95 SB	600(1210)	330(170)	A(6.2)	A(10.0)

Table 5.18 2040 Build 2 Sub Scenario-SW 10th St. Connector
I-95 Express Lanes Merge/Diverge Analysis Results

Segment	Freeway Volume	Ramp Volume	AM LOS/Density	PM LOS/Density
	AM(PM) vph	AM(PM) vph	(PC/MI/LN)	(PC/MI/LN)
Merge to I-95 NB	1270(800)	1490(770)	C(21.2)	B(11.6)
Diverge from I-95 NB	(1290)1490	(490)220	B(14.8)	B(13.0)
Diverge from I-95 SB	1430(2450)	670(980)	B(15.1)	C(24.5)
Merge to I-95 SB	760(1470)	430(180)	A(8.3)	B(12.2)

As displayed in Tables 5.17 and 5.18, all the SW 10th Street Connector merge/diverge segments with I-95 express lanes are anticipated to operate at acceptable levels of service for Build 2 Sub Scenario future conditions.

The merge area from the Hillsboro Boulevard WB on-ramp to the I-95 NB CD road was also evaluated. For year 2020 conditions, the LOS is B with the density of 16.0 pc/mile/lane during the AM peak hour and the LOS is B with the density of 17.7 pc/mile/lane during the AM peak hour. For year 2040 conditions, the LOS is B with the density of 18.3 pc/mile/lane during the AM peak hour and the LOS is C with the density of 21.3 pc/mile/lane during the AM peak hour

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Table 5.19: 2020 Build 2 Sub Scenario – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (87.5)	C (21.2)	C (21.2)	F (103.5)	B (17.9)	B (15.6)	E (65.9)	F (82.0)	D (53.6)	E (74.4)	E (74.3)	D (49.8)	C (33.0)
			Approach	C (29.0)			C (29.9)			E (65.8)			E (66.2)			
		Volume to Capacity ratio	Movement	0.88	0.67	0.67	0.96	0.52	0.37	0.27	0.75	0.12	0.28	0.28	0.01	
		Queue Length 95th (ft)	Movement	#430	639	639	#278	280	90	77	224	64	57	57	0	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.8)		B (15.2)					D (53.3)		D (44.3)	B (17.3)
			Approach	A (0.3)			B (15.2)						D (48.1)			
		Volume to Capacity ratio	Movement		0.27	0.47		0.50					0.82		0.69	
		Queue Length 95th (ft)	Movement		0	7		294					583		384	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (10.7)			A (9.1)	A (0.7)	B (17.9)		C (24.2)				B (11.6)
			Approach	B (10.7)			A (6.3)			C (21.6)						
		Volume to Capacity ratio	Movement		0.49			0.56	0.49	0.30		0.72				
		Queue Length 95th (ft)	Movement		201			m174	m3	84		224				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	E (78.4)	B (15.1)	C (20.6)	E (76.8)	C (22.1)	B (14.1)	F (317.4)	E (60.9)	E (58.7)	E (72.4)	E (73.3)	E (73.2)	D (52.9)
			Approach	C (24.6)			C (23.9)			F (227.2)			E (73.0)			
		Volume to Capacity ratio	Movement	0.84	0.54	0.07	0.59	0.61	0.06	1.53	0.31	0.09	0.39	0.06	0.04	
		Queue Length 95th (ft)	Movement	#240	360	20	137	476	0	#799	143	68	67	21	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (55.5)	C (30.6)	C (30.6)	F (215.5)	C (22.3)	A (1.4)	D (54.6)	D (48.8)	F (155.2)	E (63.8)	E (62.6)	D (41.6)	D (46.5)
			Approach	C (31.1)			D (41.2)			F (113.5)			D (54.7)			
		Volume to Capacity ratio	Movement	0.42	0.83	0.83	1.25	0.90	0.03	0.64	0.06	1.14	0.84	0.83	0.54	
		Queue Length 95th (ft)	Movement	72	#676	#676	#213	#776	m0	124	26	#324	295	297	146	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.6)		B (16.4)					D (43.3)		C (28.9)	B (12.8)
			Approach	A (0.2)			B (16.4)						D (36.3)			
		Volume to Capacity ratio	Movement		0.36	0.48		0.70					0.84		0.50	
		Queue Length 95th (ft)	Movement		0	m0		418					486		209	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (10.3)			A (9.9)	A (0.5)	B (16.4)		C (23.3)				B (11.2)
			Approach	B (10.3)			A (7.7)			C (20.2)						
		Volume to Capacity ratio	Movement		0.60			0.73	0.43	0.39		0.78				
		Queue Length 95th (ft)	Movement		189			m242	m0	84		#193				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	E (61.0)	B (15.8)	A (7.3)	F (131.4)	C (22.9)	B (11.8)	F (97.4)	D (40.0)	D (40.4)	D (40.0)	D (42.4)	D (52.8)	C (28.5)
			Approach	B (16.4)			C (28.7)			E (79.1)			D (50.2)			
		Volume to Capacity ratio	Movement	0.43	0.77	0.25	0.99	0.79	0.02	0.99	0.03	0.08	0.13	0.17	0.70	
		Queue Length 95th (ft)	Movement	m51	507	m97	#233	633	0	#306	22	36	46	68	215	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.20: 2020 Build 2 Sub Scenario – SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (83.3)	D (51.8)	C (28.9)	F (90.2)	C (23.7)	A (9.8)	F (84.8)	F (82.6)	E (72.5)	F (87.7)	D (52.7)	D (48.9)	E (58.1)
			Approach	E (56.7)			C (34.6)			E (78.7)			E (64.6)			
		Volume to Capacity ratio	Movement	0.75	0.71	0.08	0.68	0.49	0.49	0.64	0.89	0.90	0.88	0.47	0.24	
		Queue Length 95th (ft)	Movement	236	624	18	245	308	4	145	#483	646	#370	309	102	
	East Newport Center Drive	LOS (Delay)	Movement	E (58.8)	C (22.9)	C (22.9)	F (82.9)	B (18.2)	B (18.6)	E (78.2)	E (78.2)	D (49.4)	F (87.0)	F (87.0)	D (46.3)	C (30.9)
			Approach	C (27.7)			C (29.8)			E (60.7)			E (61.3)			
		Volume to Capacity ratio	Movement	0.47	0.57	0.57	0.77	0.56	0.26	0.25	0.25	0.07	0.53	0.53	0.05	
		Queue Length 95th (ft)	Movement	m207	455	455	312	279	11	86	87	50	113	113	26	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		D (42.4)	D (42.4)	E (70.7)	C (21.9)					D (44.4)		E (56.8)	D (41.3)
			Approach	D (42.4)			D (35.4)						D (52.9)			
		Volume to Capacity ratio	Movement		0.77	0.77	0.65	0.54					0.28		0.75	
		Queue Length 95th (ft)	Movement		441	441	428	609					186		506	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (1.1)	A (0.1)		A (4.3)		E (63.9)		E (64.4)				B (16.6)
			Approach	A (0.8)			A (4.3)			E (64.1)						
		Volume to Capacity ratio	Movement		0.35	0.16		0.35		0.56		0.57				
		Queue Length 95th (ft)	Movement		12	0		58		272		260				
	FAU Research Park Boulevard	LOS (Delay)	Movement	F (83.4)	B (18.9)	C (33.5)	F (83.0)	C (25.3)	B (18.7)	E (70.4)	E (72.6)	E (70.5)	E (65.1)	F (92.2)	E (75.4)	D (41.4)
			Approach	C (29.3)			C (28.9)			E (71.0)			E (75.7)			
		Volume to Capacity ratio	Movement	0.65	0.40	0.15	0.53	0.51	0.06	0.78	0.32	0.09	0.68	0.77	0.47	
		Queue Length 95th (ft)	Movement	161	439	112	106	497	37	300	111	67	314	267	176	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (86.7)	D (49.6)	C (29.6)	E (66.5)	D (44.2)	C (32.8)	F (88.2)	E (69.9)	D (40.9)	F (80.1)	E (64.4)	E (70.5)	E (57.9)
			Approach	E (56.1)			D (47.1)			E (63.6)			E (69.7)			
		Volume to Capacity ratio	Movement	0.80	0.64	0.13	0.86	0.65	0.55	0.71	0.73	0.46	0.71	0.74	0.77	
		Queue Length 95th (ft)	Movement	261	560	66	354	680	579	159	385	285	225	437	446	
	East Newport Center Drive	LOS (Delay)	Movement	F (84.2)	C (28.0)	C (28.0)	F (101.4)	B (17.6)	A (5.6)	E (65.7)	E (65.4)	E (65.8)	F (80.8)	F (80.8)	E (74.0)	D (37.4)
			Approach	C (30.3)			C (21.9)			E (65.7)			E (75.7)			
		Volume to Capacity ratio	Movement	0.48	0.51	0.51	0.58	0.66	0.06	0.53	0.52	0.75	0.63	0.63	0.72	
		Queue Length 95th (ft)	Movement	m72	536	536	m102	698	m10	282	275	457	212	212	235	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		C (32.2)	C (32.2)	E (62.1)	B (16.5)					E (59.7)		E (68.5)	D (35.6)
			Approach	C (32.2)			C (29.8)						E (65.4)			
		Volume to Capacity ratio	Movement		1.02	1.02	0.53	0.39					0.32		0.71	
		Queue Length 95th (ft)	Movement		215	215	234	463					164		337	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (7.1)	A (0.2)		B (13.5)		E (55.7)		E (65.4)				C (20.8)
			Approach	A (3.8)			B (13.5)			E (61.6)						
		Volume to Capacity ratio	Movement		0.30	0.29		0.39		0.33		0.73				
		Queue Length 95th (ft)	Movement		68	0		74		178		377				
	FAU Research Park Boulevard	LOS (Delay)	Movement	F (84.2)	C (23.2)	E (60.5)	F (84.6)	D (38.1)	C (29.0)	E (60.3)	D (53.5)	D (53.0)	E (58.8)	F (82.6)	F (91.5)	D (51.0)
			Approach	D (39.8)			D (43.4)			E (57.4)			F (80.4)			
		Volume to Capacity ratio	Movement	0.74	0.44	0.15	0.68	0.57	0.08	0.84	0.12	0.08	0.62	0.78	0.84	
		Queue Length 95th (ft)	Movement	203	487	173	172	541	46	331	68	51	250	354	356	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.21: 2020 Build 2 Sub Scenario – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.2)		D (53.6)	A (1.2)		E (56.6)		D (46.9)				B (14.0)
			Approach		B (16.2)			A (5.2)			D (51.1)					
		Volume to Capacity ratio	Movement		0.54		0.64	0.47		0.67		0.12				
		Queue Length 95th (ft)	Movement		323		#154	27		170		64				
	NW 5th Avenue	LOS (Delay)	Movement	D (49.5)	A (2.0)			A (9.1)	A (4.3)				D (51.2)		D (47.0)	A (9.9)
			Approach		A (3.8)			A (8.9)						D (49.6)		
		Volume to Capacity ratio	Movement	0.70	0.47			0.45	0.05				0.59		0.13	
		Queue Length 95th (ft)	Movement	#152	43			242	m4				130		64	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (5.3)	A (1.5)		A (6.7)					C (20.1)		C (23.5)	A (8.1)
			Approach		A (3.8)			A (6.7)						C (21.8)		
		Volume to Capacity ratio	Movement		0.42	0.59		0.48					0.53		0.70	
		Queue Length 95th (ft)	Movement		131	356		146					108		135	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (5.0)			A (4.5)	A (0.2)	C (22.0)		C (21.2)				A (7.5)
			Approach		A (5.0)			A (3.7)			C (21.7)					
		Volume to Capacity ratio	Movement		0.38			0.62	0.29	0.62		0.55				
		Queue Length 95th (ft)	Movement		56			m143	m0	121		101				
	NE 3rd Avenue	LOS (Delay)	Movement	E (67.5)	B (18.9)		E (56.4)	D (40.6)		D (37.6)	D (36.3)	C (32.2)	C (30.9)	D (37.0)	F (81.2)	D (41.6)
			Approach		C (31.5)			D (41.1)			D (36.3)			E (64.1)		
		Volume to Capacity ratio	Movement	0.91	0.49		0.49	0.87		0.63	0.43	0.04	0.28	0.44	0.98	
		Queue Length 95th (ft)	Movement	#243	260		79	501		183	214	0	86	212	#526	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (18.2)		E (72.7)	A (1.5)		E (62.8)		D (53.2)				B (15.5)
			Approach		B (18.2)			A (8.9)			E (57.9)					
		Volume to Capacity ratio	Movement		0.59		0.87	0.56		0.65		0.08				
		Queue Length 95th (ft)	Movement		389		#359	31		152		57				
	NW 5th Avenue	LOS (Delay)	Movement	E (55.7)	A (1.6)			B (12.1)	A (4.1)				E (56.7)		D (53.4)	B (11.3)
			Approach		A (5.4)			B (11.2)						E (55.2)		
		Volume to Capacity ratio	Movement	0.82	0.47			0.60	0.17				0.54		0.10	
		Queue Length 95th (ft)	Movement	#277	35			406	m15				112		64	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (9.2)	A (0.7)		B (13.6)					B (18.5)		C (25.4)	B (12.4)
			Approach		A (7.1)			B (13.6)						C (22.5)		
		Volume to Capacity ratio	Movement		0.56	0.41		0.73					0.46		0.79	
		Queue Length 95th (ft)	Movement		263	29		m238					114		#196	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (6.8)			A (9.4)	A (0.2)	D (45.1)		C (20.8)				B (16.2)
			Approach		A (6.8)			A (7.8)			D (36.5)					
		Volume to Capacity ratio	Movement		0.65			0.64	0.23	0.98		0.66				
		Queue Length 95th (ft)	Movement		62			m283	m0	#338		167				
	NE 3rd Avenue	LOS (Delay)	Movement	E (60.9)	C (21.1)		E (76.7)	D (35.3)		F (81.4)	D (53.4)	D (39.0)	D (43.3)	E (57.5)	D (52.2)	D (38.9)
			Approach		C (29.2)			D (37.8)			E (61.0)			D (53.2)		
		Volume to Capacity ratio	Movement	0.86	0.74		0.74	0.76		0.94	0.76	0.06	0.43	0.74	0.63	
		Queue Length 95th (ft)	Movement	#284	483		#171	523		#210	342	0	74	279	223	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.22: 2040 Build 2 Sub Scenario – Hillsboro Boulevard Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	F (96.0)	C (25.5)	C (25.5)	F (112.9)	C (22.7)	B (14.1)	E (74.4)	F (93.9)	E (60.6)	F (84.5)	F (84.4)	D (53.5)	D (38.4)
			Approach	C (33.9)			C (34.6)			E (73.2)			E (74.1)			
		Volume to Capacity ratio	Movement	0.91	0.74	0.74	0.98	0.57	0.43	0.30	0.77	0.29	0.36	0.35	0.02	
		Queue Length 95th (ft)	Movement	#526	839	839	#343	404	135	93	255	136	72	72	1	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (1.2)		C (22.9)					D (51.6)		D (42.5)	B (19.5)
			Approach	A (0.5)			C (22.9)						D (46.4)			
		Volume to Capacity ratio	Movement		0.28	0.59		0.60					0.83		0.70	
		Queue Length 95th (ft)	Movement		0	297		462					702		454	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (15.2)			A (9.7)	A (0.7)	B (18.8)		C (27.2)				B (13.5)
			Approach	B (15.2)			A (6.8)			C (23.8)						
		Volume to Capacity ratio	Movement		0.55			0.66	0.54	0.30		0.77				
		Queue Length 95th (ft)	Movement		278			m190	m0	98		292				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	F (104.2)	B (16.5)	B (13.3)	F (103.8)	C (25.3)	B (15.0)	F (379.6)	E (67.8)	E (65.8)	F (83.0)	F (83.3)	F (83.3)	E (62.2)
			Approach	C (28.9)			C (27.9)			F (268.6)			F (83.2)			
		Volume to Capacity ratio	Movement	0.92	0.59	0.08	0.75	0.68	0.07	1.66	0.32	0.14	0.45	0.07	0.06	
		Queue Length 95th (ft)	Movement	#310	409	m23	#195	620	0	#1003	164	89	74	22	0	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Hillsboro Blvd.	SW 12th Avenue	LOS (Delay)	Movement	E (61.8)	D (42.4)	D (42.4)	F (241.0)	C (23.1)	A (0.3)	E (60.0)	D (52.2)	F (236.1)	E (72.3)	E (73.1)	D (52.5)	E (60.1)
			Approach	D (42.8)			D (47.2)			F (166.7)			E (64.7)			
		Volume to Capacity ratio	Movement	0.52	0.95	0.95	1.33	0.91	0.04	0.68	0.06	1.35	0.87	0.88	0.72	
		Queue Length 95th (ft)	Movement	#90	#873	#873	m#248	#822	m0	146	27	#475	#369	#377	249	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (0.1)	A (0.5)		C (23.6)					D (45.2)		C (26.4)	B (15.2)
			Approach	A (0.2)			C (23.6)						D (36.3)			
		Volume to Capacity ratio	Movement		0.41	0.55		0.80					0.89		0.51	
		Queue Length 95th (ft)	Movement		m0	m0		628					669		256	
	I-95 Northbound Off-ramp	LOS (Delay)	Movement		B (13.1)			B (11.8)	A (0.6)	B (16.7)		C (27.2)				B (13.2)
			Approach	B (13.1)			A (9.0)			C (22.7)						
		Volume to Capacity ratio	Movement		0.73			0.81	0.51	0.38		0.84				
		Queue Length 95th (ft)	Movement		236			m320	m0	92		#263				
	SW Natura Blvd/Fairway Drive	LOS (Delay)	Movement	E (64.8)	C (22.5)	B (10.1)	F (195.3)	C (27.3)	B (12.2)	F (114.9)	D (42.9)	D (43.4)	D (41.7)	D (44.7)	E (62.5)	D (35.6)
			Approach	C (22.5)			D (36.6)			F (91.6)			E (58.4)			
		Volume to Capacity ratio	Movement	0.56	0.90	0.32	1.18	0.86	0.02	1.05	0.03	0.09	0.12	0.16	0.78	
		Queue Length 95th (ft)	Movement	m#57	#915	m173	#295	#886	0	#343	23	52	47	70	265	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.23: 2040 Build 2 Sub Scenario – SW 10th Street Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (83.4)	F (80.6)	C (32.8)	E (79.3)	D (53.2)	B (18.5)	F (84.3)	F (112.8)	F (107.7)	F (113.6)	E (57.6)	D (52.0)	E (76.1)
			Approach	E (76.5)			D (48.4)			F (107.3)			E (76.9)			
		Volume to Capacity ratio	Movement	0.76	0.97	0.10	0.54	0.72	0.58	0.66	1.03	1.06	1.00	0.59	0.30	
		Queue Length 95th (ft)	Movement	251	#845	39	295	521	222	157	#615	#1073	#460	384	149	
	East Newport Center Drive	LOS (Delay)	Movement	E (57.2)	B (19.0)	B (19.0)	E (79.6)	C (29.4)	D (40.5)	E (79.4)	E (79.3)	D (49.0)	F (91.7)	F (91.7)	D (49.0)	C (33.9)
			Approach	C (24.1)			D (39.2)			E (61.5)			E (66.4)			
		Volume to Capacity ratio	Movement	0.67	0.73	0.73	0.80	0.72	0.31	0.35	0.35	0.17	0.63	0.63	0.07	
		Queue Length 95th (ft)	Movement	m234	m560	m560	m336	604	m29	110	110	104	143	143	34	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		D (43.2)	D (43.2)	F (90.5)	B (11.5)					D (44.6)		E (73.4)	D (43.3)
			Approach	D (43.2)			C (33.8)						E (64.1)			
		Volume to Capacity ratio	Movement		1.08	1.08	0.92	0.70					0.37		0.94	
		Queue Length 95th (ft)	Movement		#626	#626	m531	317					250		#732	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (1.0)	A (0.1)		A (6.5)		F (88.6)		E (77.3)				C (22.4)
			Approach	A (0.8)			A (6.5)			F (84.3)						
		Volume to Capacity ratio	Movement		0.41	0.20		0.41		0.93		0.78				
		Queue Length 95th (ft)	Movement		m15	m0		120		#417		307				
	FAU Research Park Boulevard	LOS (Delay)	Movement	E (72.0)	C (26.6)	C (21.4)	F (84.9)	D (42.8)	C (29.4)	E (66.9)	E (55.8)	D (54.1)	E (58.1)	E (75.6)	F (104.8)	D (49.9)
			Approach	C (32.2)			D (47.1)			E (60.7)			F (84.1)			
		Volume to Capacity ratio	Movement	0.80	0.58	0.25	0.71	0.72	0.07	0.90	0.25	0.12	0.67	0.69	0.91	
		Queue Length 95th (ft)	Movement	m#217	315	75	186	693	27	#435	138	65	284	323	401	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
SW 10th Street	South Military Trail	LOS (Delay)	Movement	F (117.5)	E (70.2)	C (34.4)	F (83.5)	F (80.7)	D (49.1)	F (128.4)	E (64.7)	D (40.7)	F (87.9)	E (60.6)	F (108.4)	E (76.4)
			Approach	E (76.6)			E (73.6)			E (71.7)			F (82.6)			
		Volume to Capacity ratio	Movement	0.97	0.89	0.16	0.96	0.98	0.67	0.99	0.72	0.55	0.87	0.80	1.03	
		Queue Length 95th (ft)	Movement	#330	677	79	m#408	#938	m510	#301	444	389	#367	604	#899	
	East Newport Center Drive	LOS (Delay)	Movement	E (73.2)	C (30.8)	C (30.8)	F (88.9)	E (57.2)	E (55.1)	E (69.6)	E (69.0)	E (72.5)	E (66.5)	E (66.5)	F (81.2)	D (53.7)
			Approach	C (32.7)			E (59.0)			E (70.9)			E (77.8)			
		Volume to Capacity ratio	Movement	0.69	0.82	0.82	0.61	0.91	0.09	0.68	0.66	0.85	0.54	0.54	0.90	
		Queue Length 95th (ft)	Movement	m79	622	622	m117	858	m45	394	389	#640	266	266	#432	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		E (60.5)	E (60.5)	E (61.8)	A (8.0)					E (58.7)		F (87.9)	D (49.2)
			Approach	E (60.5)			C (26.0)						E (77.9)			
		Volume to Capacity ratio	Movement		1.12	1.12	0.82	0.44					0.40		0.93	
		Queue Length 95th (ft)	Movement		837	837	398	202					215		#527	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (8.4)	A (0.1)		A (6.1)		E (63.8)		F (91.5)				C (21.9)
			Approach	A (5.1)			A (6.1)			E (79.5)						
		Volume to Capacity ratio	Movement		0.42	0.32		0.41		0.52		0.95				
		Queue Length 95th (ft)	Movement		m98	m0		127		249		#477				
	FAU Research Park Boulevard	LOS (Delay)	Movement	E (76.1)	E (64.1)	F (86.8)	F (89.3)	D (48.9)	C (35.0)	E (78.0)	D (53.1)	D (52.1)	D (51.7)	F (92.4)	E (77.9)	E (65.0)
			Approach	E (69.4)			E (55.5)			E (63.4)			E (75.1)			
		Volume to Capacity ratio	Movement	0.82	0.75	0.28	0.84	0.73	0.12	0.91	0.22	0.16	0.66	0.90	0.77	
		Queue Length 95th (ft)	Movement	m245	m583	m181	287	639	72	#480	133	72	318	507	393	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Table 5.24: 2040 Build 2 Sub Scenario – Sample Road Intersection Analysis Results

AM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			AM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (16.8)		E (69.9)	A (1.4)		E (57.1)		D (46.4)				B (15.1)
			Approach		B (16.8)			A (7.0)			D (51.0)					
		Volume to Capacity ratio	Movement		0.59		0.79	0.52		0.69		0.13				
		Queue Length 95th (ft)	Movement		374		#237	32		181		65				
	NW 5th Avenue	LOS (Delay)	Movement	E (58.5)	A (2.2)			A (9.9)	A (3.9)				D (51.2)		D (47.0)	B (10.5)
			Approach		A (4.4)			A (9.7)						D (49.5)		
		Volume to Capacity ratio	Movement	0.78	0.53			0.49	0.06				0.61		0.22	
		Queue Length 95th (ft)	Movement	m#175	46			278	m5				140		81	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		A (6.0)	A (1.9)		A (7.5)					C (20.7)		C (27.0)	A (9.3)
			Approach		A (4.5)			A (7.5)						C (24.0)		
		Volume to Capacity ratio	Movement		0.47	0.66		0.52					0.60		0.80	
		Queue Length 95th (ft)	Movement		164	453		164					128		#185	
	I-95 Northbound Ramps	LOS (Delay)	Movement		A (6.6)			A (7.1)	A (0.2)	C (22.5)		C (22.0)				A (9.3)
			Approach		A (6.6)			A (5.4)			C (22.3)					
		Volume to Capacity ratio	Movement		0.44			0.67	0.38	0.69		0.65				
		Queue Length 95th (ft)	Movement		102			m158	m0	144		127				
	NE 3rd Avenue	LOS (Delay)	Movement	F (86.7)	C (21.5)		E (58.0)	E (56.7)		D (41.3)	D (36.1)	C (31.9)	C (30.3)	D (36.9)	F (111.8)	D (52.8)
			Approach		D (37.4)			E (56.8)			D (37.8)			F (83.4)		
		Volume to Capacity ratio	Movement	1.00	0.61		0.55	0.99		0.72	0.45	0.05	0.32	0.45	1.08	
		Queue Length 95th (ft)	Movement	#281	301		91	#628		#220	225	0	98	222	#613	

PM Peak

Arterial	Signal Controlled Intersections	Mesure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection
				Eastbound			Westbound			Northbound			Southbound			PM LOS (Delay)
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Sample Road	NW 5th Terrace	LOS (Delay)	Movement		B (19.1)		F (93.5)	A (1.8)		E (63.3)		D (52.6)				B (16.7)
			Approach		B (19.1)			B (10.7)			E (57.8)					
		Volume to Capacity ratio	Movement		0.64		0.95	0.64		0.67		0.08				
		Queue Length 95th (ft)	Movement		444		#394	41		164		58				
	NW 5th Avenue	LOS (Delay)	Movement	F (105.6)	A (1.8)			B (12.0)	A (6.1)				E (56.7)		D (52.7)	B (13.0)
			Approach		A (9.1)			B (11.4)						D (54.9)		
		Volume to Capacity ratio	Movement	1.03	0.52			0.66	0.20				0.57		0.11	
		Queue Length 95th (ft)	Movement	#335	38			429	m21				122		65	
	I-95 Southbound Off-ramp	LOS (Delay)	Movement		B (12.4)	A (0.8)		B (15.4)					B (18.6)		C (34.8)	B (15.5)
			Approach		A (9.4)			B (15.4)						C (28.1)		
		Volume to Capacity ratio	Movement		0.62	0.45		0.81					0.52		0.91	
		Queue Length 95th (ft)	Movement		346	47		294					137		#285	
	I-95 Northbound Ramps	LOS (Delay)	Movement		B (15.9)			B (17.8)	A (0.2)	D (38.6)		C (30.7)				C (21.5)
			Approach		B (15.9)			B (14.3)			D (35.7)					
		Volume to Capacity ratio	Movement		0.73			0.73	0.29	0.84		0.62				
		Queue Length 95th (ft)	Movement		315			m272	m0	522		318				
	NE 3rd Avenue	LOS (Delay)	Movement	F (87.5)	C (27.6)		F (120.6)	D (39.6)		F (126.7)	E (60.4)	D (40.3)	D (41.9)	E (58.0)	E (67.9)	D (48.9)
			Approach		D (39.4)			D (44.5)			F (81.1)			E (61.5)		
		Volume to Capacity ratio	Movement	0.97	0.84		0.93	0.86		1.09	0.82	0.08	0.51	0.76	0.83	
		Queue Length 95th (ft)	Movement	#343	#611		#217	#662		#280	358	0	87	291	303	

Synchro Version 9.2.914.6. HCM 2000 MOEs reported.

LOS notes:

Delay is in sec/veh units

:Level of service (LOS) E reflecting at capacity operations

:Level of service (LOS) F reflecting over capacity operations

Queue notes:

HCM methodology does not report queues, results are from Synchro report outputs

~: Volume exceeds capacity, queue is theoretically infinite

#: 95th percentile volume exceeds capacity

m: Upstream metering is in effect

Tables 5.25 summarizes the results of the off-ramp signals back of queue analyses for the AM and PM peak hours for 2040 Build 2 Sub Scenario conditions. HCM methodology does not provide queue lengths. The 95th percentile queues were obtained from Synchro reports. The analysis indicates that the queues on the off-ramps are not expected to exceed the length of off-ramps and are not likely to affect the I-95 mainline operations.

Table 5.25: 2040 Build 2 Sub Scenario – Off-Ramp Signals Queuing Analysis Results

Intersection	Approach	Movement	Turn Lane Storage (ft)	Off-Ramp Length (ft)(1)	Queue (ft)	
					AM	PM
2040 Build 2 Sub Scenario						
Hillsboro Boulevard at I-95 SB Off-Ramp	Southbound	L (EB)	295	1,910	702	669
		R (WB)	295	1,910	454	256
Hillsboro Boulevard at I-95 NB Off-Ramp	Northbound	L (WB)	350	3,485	98	92
		R (EB)	350	3,485	292	#263
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	500	3,535	250	215
		R (WB)	500	3,535	#732	#527
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	530	1,065	#417	249
		R (EB)	530	1,065	307	#477
Sample Road at I-95 SB Off-Ramp	Southbound	L (EB)	200	1,345	128	137
		R (WB)	200	1,345	#185	#285
Sample Road at I-95 NB Off-Ramp	Northbound	L (WB)	230	1,525	144	522
		R (EB)	230	1,525	127	318

(1) Available off-ramp lengths were calculated by deducting the deceleration length of 615 feet from total off-ramp lengths

#: 95th percentile volume exceeds capacity

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5.6.3 VISSIM Analysis of 2040 No-Build and Build 2 Sub Scenario

Some of the Synchro analysis results did not appear to be reasonable probably because of its limitations pertaining to over-saturated traffic conditions, closely spaced intersections, and free-flow right turn lane treatment. Synchro analysis failed to fully capture the operational benefits of the proposed improvements. For example, the analysis results for the southbound right turn movement from the I-95 southbound off-ramp to SW 10th Street, did not appear reasonable under the No-Build and Build conditions. Tables 4.5 and 5.23, presented earlier, provide a summary of the Synchro intersection analysis results for SW 10th Street for the 2040 No-Build and 2040 Build 2 Sub Scenario, respectively. Table 4.5 shows that the free-flow southbound right turn movement from the I-95 southbound off-ramp will have a delay of less than 5 seconds per vehicle and practically zero queue length.

With the heavy westbound traffic, weaving movements, and the proximity of the Newport Center Drive intersection, it is very unlikely that this movement will not experience any operational issues as indicated by the Synchro results. Similarly, Table 5.23 shows that the proposed signal controlled dual southbound right turn lanes will operate at LOS E/F despite the elimination of the signal for the westbound to I-95 southbound movement and the reconfiguration of the ramp terminal to physically separate the eastbound to I-95 northbound traffic from the eastbound through traffic. Therefore, in order to reasonably compare the No-Build and Build alternatives, additional traffic analysis such as traffic simulation was needed to make an informed decision. VISSIM traffic simulation analysis results for the SW 10th Street interchange were obtained from the approved SW 10th Street Connector PD&E Study. In terms of traffic forecast, the preferred alternative included in the SW 10th Street Connector PD&E Study is consistent with Build 2 Sub Scenario in this SIMR report. VISSIM results for the preferred alternative in the SW 10th Street Connector PD&E study are consistent with Build 2 Sub Scenario of this SIMR

Table 5.26 below shows a comparison of the Synchro and VISSIM analysis results for the SW 10th Street interchange ramp approaches and movements. It can be observed that Synchro analysis shows zero queue and LOS A for the free-flow southbound right turn movement under the 2040 No-Build conditions whereas VISSIM shows 32 and over 200 seconds of delay during the AM and PM peak hours, respectively, and much longer queues for the same movement. Similarly, under the 2040 Build 2 Sub Scenario conditions, Synchro analysis shows LOS E/F for the signal controlled dual southbound right turn movement whereas VISSIM shows this movement to operate at LOS D/C. The reliability of the results from VISSIM analysis is much higher than the results from Synchro analysis. Therefore, it can be concluded that the I-95 ramps at SW 10th Street are expected to operate much better under the Build 2 Sub Scenario conditions than under the No-Build conditions in 2040.

Table 5.26: 2040 Comparison of SYNCHRO and VISSIM Results
SW 10th Street Interchange Ramp Approaches

Intersection	Approach	Movt.	SYNCHRO MOEs				VISSIM MOEs [1]			
			Off-Ramp Length (ft)	AM (PM) Queue	AM (PM) Delay	AM (PM) LOS	Off-Ramp Length (ft)	AM(PM) Queues	AM (PM) Delay	AM (PM) LOS
No-Build Alternative										
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	1,360	#241(133)	68.2(48.0)	E(D)	1,360	272 (13,147)	99 (200+)	F (F)
		R (WB)	1,360	0 (0)	2.4(4.8)	A(A)	1,360	272 (13,147)	32 (200+)	C (F)
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	1,760	#638(#681)	94.3(109.1)	F(F)	1,760	290 (9,552)	50 (200+)	D (F)
		R (EB)	1,760	#748(#792)	132.9(148.9)	F(F)	1,760	220 (180)	47 (200+)	D (F)
Build 2 Alternative										
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	4,150	250(215)	44.6(58.7)	D(E)	4,150	376 (262)	74 (108)	E (F)
		R (WB)	4,150	#732(#527)	73.4(87.9)	E(F)	4,150	376 (262)	39 (28)	D (C)
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	1,680	#417(249)	88.6(63.8)	F(E)	1,680	352 (241)	57 (49)	E (D)
		R (EB)	1,680	307(#477)	77.3(91.5)	E(F)	1,680	239 (298)	52 (52)	D (D)

(1) VISSIM MOEs obtained from the Project Traffic Analysis Report (PTAR) dated May 2021 for SR 869/SW 10th Street Connector PD&E Study.

All lengths are in feet. Queue lengths exceeding the available storage are shown in Red.

A queue length of 9,552 feet from VISSIM means the queue spills over to the I-95 NB mainline

#: 95th percentile volume exceeds capacity

Table 5.23 provides a comparison of the network-wide MOEs for the 2040 No-Build and Build 2 Sub Scenario. These MOEs were obtained from VISSIM analysis documented in the PTAR dated June 2020 for the SW 10th Street Connector PD&E Study. The comparison clearly shows the Build 2 Sub Scenario to be better than the No-Build for all MOEs.

Table 5.27: 2040 Network-Wide Output (VISSIM)

AM PEAK	No-Build Alternative	Build 2 Sub Scenario	
	Value	Value	Difference
Total Delay (hr)	4,801	1,374	-71%
Total Travel Time (hr)	10,797	8,155	-24%
Total Stops	489,849	90,061	-82%
Latent Demand	3,427	1	-100%
Average Delay (mm:ss)	3:09	0:50	-74%
Average Speed (mph)	28	42	50%
PM PEAK	**No-Build Alternative**	**Build 2 Sub Scenario**	
	Value	**Value**	**Difference**
Total Delay (hr)	21,267	1,853	-91%
Total Travel Time (hr)	25,553	9,260	-64%
Total Stops	2,437,510	173,248	-93%
Latent Demand	33,729	22	-100%
Average Delay (mm:ss)	17:55	1:02	-94%
Average Speed (mph)	8	40	400%
2040 Horizon	**Daily TT Savings (hr)**	**Ann. TT Savings (hr)**	**Ann. Benefits ($)**
Build Alt*	18,935	4,923,100	$ 94,523,520

*Benefits over 2040 No-Build Alternative using AM & PM Peak Period at 260 days.

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5.7 Safety Analysis of the 2040 No-Build and Build Alternatives

5.7.1 HSM Analysis

As discussed earlier under Section 3.4, the crash data was obtained from FDOT Crash Analysis Reporting System (CARS) and summarized in Table 3.5. It was found that the percentages of the major crash types and the contributing factors were found to be very similar across the three interchanges. In order to assess the benefits of the proposed interchange and roadway design improvements as part of the three Build alternatives, the theories and methods contained in Part C of the American Association of State and Highway Transportation Officials (AASHTO) Highway Safety Manual (HSM) were used. Part C of the HSM outlines procedures to estimate the frequency of crashes expected on a roadway based on geometric and traffic characteristics. The crash frequency is estimated based on predictive methods using Safety Performance Functions (SPFs) to determine base condition performance. Crash modification factors (CMFs') are then applied to account for the unique characteristics of the site being analyzed. The Empirical Bayes (EB) Method is applied to determine the expected crash frequency for the "No-Build" condition. The EB Method combines the predicted average crash frequency, determined as part of the predictive method, and the observed crash frequency to determine the expected crash frequency. The addition of the observed crash frequency provides a more statistically reliable estimate of the expected average crash frequency. The HSM Arterial Spreadsheets and Excel file provided by FDOT for use on Freeways and Ramps were utilized to conduct this analysis. The limits of this analysis included:

I-95 from south of Sample Road to north of Hillsboro Boulevard

Including: Three freeway segments (including associated weaving sections), seven ramp terminals, nine merging segments, and seven diverging segments

Sample Road from NW 5th Terrace to NE 3rd Avenue

Including: Three arterial segments and three arterial intersections

SW 10th Street from South Military Trail to Natura Boulevard

Including: Five arterial segments and three arterial intersections

Hillsboro Boulevard from SW 12th Avenue to Natura Boulevard

Including: Three arterial segments and two arterial intersections

The primary modifications along the freeway segments include the addition of collector-distributor (C-D) roads at the SW 10th Street and Hillsboro Blvd Interchanges and the resultant reorganization of freeway entry and exit points, which contributed to changes in the predicted crash frequencies. Additionally, the ramp terminals at SW 10th Street were re-designed.

While the HSM predictive method is a very useful tool in assessing the safety impacts of new and modified roadways, there are still some limitations. These methods are relatively new and research is still being conducted to determine the safety impacts and predictive methods for some of the new and developing traffic management strategies and innovative roadway designs being produced at this time. One of the major factors that impacted the analysis, primarily in the vicinity of SW 10th Street, is the SPFs dependency on length and AADT. A good example of this is seen when comparing the freeway segments for the SW 10th Street No-Build and Build 1 conditions, where the AADT is the same and only the geometry changes. In the No-Build condition, SW 10th Street is a traditional interchange with merge and diverge points in both directions, resulting in an effective freeway length (total length minus merge and diverge areas) of 1.45 miles. However, in the Build conditions, these merge and diverge areas are relocated or eliminated through the use of C-D roads (braided ramps) and auxiliary lanes resulting in longer effective freeway length. I-95 EL lanes are proposed to directly connect with ramps to and from west along SW 10th Street. I-95 EL lanes are proposed to braid over GP lanes to connect to off-ramps, and thus eliminate the need for two-sided weaving between the at-grade Express Lanes access points and the on and off-ramps to SW 10th St. The proposed C-D road between Hillsboro Blvd. and SW 10th Street eliminates the existing southbound weaving section between these interchanges and the northbound short merge and diverge segments, thereby reducing I-95 merge and diverge conflict points from five(5) in the southbound direction to four(4) conflict points, and from six(6) in the northbound direction to four(4) conflict points. Due to the SPFs reliance on length and AADT, this increase in length results in more crashes predicted in Build 1 vs. No-Build. Therefore, even though from an operational standpoint, the re-organization of the merge and diverge points will most likely yield good results with increased safety, better average speeds and travel time reliability through the interchange, these benefits cannot be reflected in the HSM analysis.

The CMFs that have the biggest impact are the presence of turn lanes, protected only left-turn signal phasing and channelized right turns. When turn lanes or protected only left-turn phasing are present a CMF of lower than 1 is applied, which reduces the predicted crash rate. When a

channelized right-turn is present a CMF higher than one(1) is applied, which increases the predicted crash rate. In the No-Build condition, at SW 10th Street and the northbound on-ramp, left-turn lanes with protected only signal phasing are present for the westbound approach (entering the loop ramp to northbound I-95) and a channelized right-turn is present on the eastbound approach (entering the loop ramp to northbound I-95). However, in the Build condition this westbound left-turn movement is eliminated and replaced by an exclusive westbound to northbound ramp with a channelized right-turn entry. Based on the geometric and signal related features for the No-build condition the final CMFs are 0.55 for fatal crashes and 0.68 for Property Damage Only crashes, whereas the final CMFs for the Build Condition are 1.21 for fatal and property damage only crashes. As with the freeway segment, the potential operational benefits of eliminating the westbound left-turn movement in the Build condition are not able to be reflected by the HSM analysis and are actually being negatively represented by an increase in predicted crashes. Some of the other limitations that may have impacted this analysis include no analysis for Express Lanes. The CMF used was determined via the CMF Clearing House website, details of this CMF can be found in **Appendix Q**.

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5.7.2 Crash Reduction Analysis

As discussed above, the limitations in the HSM methodology could not quantify the safety benefits of the proposed improvements under the Build conditions. Therefore, in consultation with FDOT and District 4 Safety staff, it was determined that a traditional crash reduction analysis should be conducted to determine the safety benefits of the proposed improvements.

In order to estimate the potential safety benefits associated with proposed freeway, interchange, and arterial improvements, the crash reduction analysis utilized the following steps:

1. Identifying applicable crash reduction factors (CRF)
2. Identifying potentially correctable crashes for each improvement with an applicable CRF
3. Applying the CRFs to potentially correctable crashes to estimate the crash reduction per year.

This analysis was conducted based on historic crash data for the years 2012 to 2016. Life cycle analysis, which takes into account the project life in years and capital recovery factor, was not included in this analysis.

The following available resources in the order listed, were used to determine the applicable CRFs:

- FHWA Desktop Reference for Crash Reduction Factors
- FDOT approved Technical Report "Update of Florida Crash Reduction Factors and Countermeasures to improve the Development of District Safety Improvement Projects"
- CMFClearinghouse.org website
- Literature Review for any recent studies that may provide applicable CRFs

Based on the available CRF data, applicable CRFs were identified for the following eight proposed improvements under the Build alternatives:

1. I-95 NB auxiliary lanes between Hillsboro Boulevard and Palmetto Park Road.
2. I-95 SB auxiliary lanes between Hillsboro Boulevard and Palmetto Park Road.
3. I-95 SB auxiliary lane between SW 10th Street and Sample Road.
4. Widen NB off-ramp to SW 10th Street from one lane to two lanes.
5. Provide two right-turn lanes on the SB off-ramp to SW 10th Street.
6. Provide an additional WB left-turn lane at the SW 10th Street and SB entry/exit ramp intersection.
7. Provide dual EB and WB left turn lanes at the SW 10th Street/Newport Center Drive intersection.
8. Provide dual EB and WB left turn lanes and an exclusive EB right turn lane at the SW 10th Street/Natura Blvd Intersection

It is important to note that appropriate CRFs are not available for many of the proposed improvements under the Build alternatives. These improvements are very likely to improve the operations and consequently the safety, the benefits of which cannot be quantified due to the lack of available data. Some of the improvements for which no appropriate CRFs could be obtained are:

1. Removal of the traffic signal for the WB to SB movement at the SW 10th Street interchange. This signal is being combined with the SB off-ramp signal.
2. Elimination of the weaving between the EB Hillsboro Boulevard to I-95 NB loop ramp and the NB I-95 to WB Hillsboro Boulevard loop ramp.
3. Elimination (through braided ramps) of the conflict between the NB On-ramp from SW 10th Street and NB Off-Ramp to Hillsboro Boulevard.
4. Elimination (through braided ramps) of the conflict between the SB On-ramp from Hillsboro Boulevard and the SB Off-Ramp to SW 10th Street.
5. Elimination of the WB to SB I-95 loop ramp merge with I-95 mainline lanes at Hillsboro Boulevard
6. Increasing the storage length of the NB Off-Ramp to Hillsboro Boulevard from 2450’ to 4100’ to prevent queue spillback onto I-95 mainline.
7. Increasing the storage length of the SB Off-Ramp to SW 10th Street from 1360’ to 4150’ to prevent queue spillback onto I-95 mainline.

The 2012 to 2016 crash data related to the eight (8) improvements for which CRFs were available was obtained and a high-level review was conducted to determine which crashes may be correctable as a result of each of the proposed improvements. Crash data for all but one of the improvements was obtained from the FDOT Crash Analysis Reporting System (CARS). SW 10th Street is not a State Road east of the NB I-95 on/off ramp intersection. As such, the crash data for the SW 10th Street/Natura Boulevard intersection had to be obtained from Signal Four Analytics. The crash data was filtered to include only those crashes that would be applicable to the associated improvements. For example, only the crashes that occurred in the southbound direction were used in the analysis for the SB auxiliary lane improvements. All pertinent data is included in Appendix Q. The results of this analysis are summarized in **Table 5.28**. The analysis results show that approximately 42 crashes per year may be reduced by the proposed improvements resulting in an annual safety benefit of $6,156,952. The safety benefit per year was calculated based on the average cost per crash provided in the FDOT Design Manual which is based on the 2012 to 2016 crash data.

Table 5.28: Crash Reduction Analysis Summary

Item	Improvement	BMP	EMP	CRF[1]	Source	Potentially Correctable Crashes[2] (2012-2016)	Total Crashes Reduced	Estimated Crash Reduction (per year)	Cost per crash[3]	Estimated Safety Benefit (per year)
1	I-95 NB auxiliary lanes between Hillsboro Boulevard and Palmetto Park Road.	25.013/0.000	25.334/1.354	21%	CMF Clearing House	227	47.67	9.534	$153,130	$1,459,941.42
2	I-95 SB auxiliary lanes between Hillsboro Boulevard and Palmetto Park Road.	25.334/1.337	24.980/0.000	21%	CMF Clearing House	278	58.38	11.676	$153,130	$1,787,945.88
3	I-95 SB auxiliary lane between SW 10th Street and Sample Road.	23.526	21.983	21%	CMF Clearing House	201	42.21	8.442	$153,130	$1,292,723.46
4	Widen NB off-ramp to SW 10th Street from one lane to two lanes	-	-	25%	FDOT Report	57	14.25	2.85	$153,130	$436,420.50
5	Provide two right-turn lanes on the SB off-ramp to SW 10th Street	-	-	17%	FDOT Report	52	8.84	1.768	$153,130	$270,733.84
6	Provide an additional WB left-turn lane at the SW 10th Street and SB entry/exit ramp intersection	1.955	2.135	17%	FDOT Report	44	7.48	1.496	$123,598	$184,902.61
7	Provide dual EB and WB left turn lanes at the SW 10th Street/Newport Center Drive intersection	1.774	1.874	17%	FDOT Report	62	10.54	2.108	$123,598	$260,554.58
8	Provide dual EB and WB left turn lanes and an exclusive EB right turn lane at the SW 10th Street/Natura Blvd Intersection[4]	n/a	n/a	28%	FDOT Report	67	18.76	3.752	$123,598	$463,739.70
						Total	**208**	**42**		**$6,156,951.99**

1. See appendix Q for CRF Reference Information
2. See Appendix Q for Crash Data
3. Cost per crash based on FDOT Design Manual Section 122.6.1 Table 122.6.1
4. This portion of SW 10th Street is not part of the SHS, crash data was obtained from Signal Four Analytics

In Table 5.28, items 1 thru 6 are related to I-95 mainline/ramp improvements and items 7 and 8 are related to improvements along SW 10th Street. Out of the total estimated annual safety benefit of $6,156,951.99, $5,432,667.71 is caused by improvements along I-95 and $724,284.28 is caused by improvements along SW 10th Street. The total number of estimated crash reduction per year is 42. A reduction of 36 crashes per year are related to I-95 improvements and a reduction of 6 crashes are related to SW 10th Street improvements.

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6 OTHER CONSIDERATIONS

6.1 Potential Design Exceptions and Variations

The anticipated design exceptions for I-95 are as follows:

Stopping Sight Distance – The stopping sight distance for the outside express lane and the inside general-purpose lane will not meet the required distance required per AASHTO at several segments throughout the project due to the express lane tubular markers obstructing the line of sight for drivers.
Horizontal Stopping Sight Distance - The stopping sight distance for the direct connect fly over ramps will not meet the required distance per AASHTO due to the concrete shoulder barrier obstructing the line of sight for drivers.
Outside shoulder width- The outside shoulder width for the existing I-95 NB bridge over Hillsboro Boulevard does not meet the required shoulder width at some sections and will require a design exception.
Horizontal Curve Radius – The horizontal curve radius for the WB to SB direct connect ramp, does not meet the required curve radius for design speed 50 mph with a max superelevation = 10%, but meets the curve radius with a max super elevation = 12%. Therefore, the horizontal curve radius will require a design exception.
Horizontal Curve Length for multiple connector and braided ramps.
Border Width for the I-95 mainline segment and several ramp connectors.
Vertical Curve Length for the I-95 NB bridge over Hillsboro Blvd.
Buffer width between the express lanes and general-purpose lanes.
Inside shoulder width of the SB direct connect ramp to general-purpose lanes.
Inside shoulder width of the SB direct connect ramp to express lanes.
Inside/Outside shoulder width of the single lane direct connect ramps.
Outside shoulder width of the NB double lane direct connect ramp.
Outside shoulder width of the SB connector to SW 10 Street.

The anticipated design variations for cross streets are as follows:

SW 10 Street
Horizontal Curve Length
Horizontal Curve Radius

Hillsboro Boulevard
Radii for EB to NB and WB to SB loop on-ramps at Hillsboro Boulevard.

Access Management Plan and the typical section package are contained in **Appendix R.**

7 PROJECT JUSTIFICATION

7.1 FHWA's Policy on Access to the Interstate System

The Federal Highway Administration's (FHWA's) newly adopted policy on *Access to the Interstate System* became effective on May 22, 2017 and replaces the policy of August 27, 2009 on *Access to the Interstate System*, published at 74 Federal Register 43743. The changes in this policy are made to ensure this policy focuses on safety, operational, and engineering issues. The consideration of social, economic, and environmental impacts discussed in the 2009 policy are removed from this policy. However, the removal from this policy does not eliminate the need to consider those matters. Those issues will be addressed under the National Environmental Policy Act and other statutes and regulations applicable to the approval process.

This policy is effective as of May 22, 2017.

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 level of service 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, the Federal Highway Administration's (FHWA) 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, and ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis should, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (Title 23, Code of Federal Regulations (CFR), paragraphs 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, should 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 should 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 should 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 SIMR confirmed that the proposed Build 2 Alternative interchange modifications are not expected to have any adverse impacts on safety and operations on the interstate facility (I-95) and in the contrary are anticipated to improve the operating conditions along the mainline and service interchanges.

The proposed elimination of the loop ramp in the northeast quadrant of the Hillsboro Boulevard interchange will remove the weaving movement between the ramp terminals and thereby improve the safety and flow of traffic along Hillsboro Boulevard. The proposed improvements along SW 10th Street under the Build alternatives are expected to significantly improve the operations at the NB off-ramp terminal intersection from LOS E and F to LOS B and C. According to the VISSIM analysis, the queue length at the NB and SB off-ramp at SW 10th Street is anticipated to exceed the off-ramp length for the 2040 No-Build conditions and it could adversely impact the flow of traffic along I-95.

The proposed improvements under the 2040 Build conditions are projected to significantly reduce the queue length for this ramp, thereby preventing it from adversely affecting the operations along I-95. I-95 EL lanes are proposed to directly connect with ramps to and from west along SW 10th Street. I-95 EL lanes are proposed to braid over GP lanes to connect to off-ramps, and thus eliminate the need for two-sided weaving between the at-grade Express Lanes access points and the on and off-ramps to SW 10th St. The proposed C-D road between Hillsboro Blvd. and SW 10th Street eliminates the existing southbound weaving section between these interchanges and northbound short merge and diverge segments, thereby reducing I-95 merge and diverge conflict points from five(5) in the southbound direction to four(4) conflict points, and from six(6) in the northbound direction to four(4) conflict points.

In terms of average travel speeds along the I-95 mainline derived from the HCS freeway segment analysis, the Build Alternative 2 is expected to increase travel speed from 58 MPH to 66 MPH during the AM peak hour and from 59 MPH to 67 MPH during the PM peak hour. Note that the average travel speed was derived from the HCS freeway segment analysis only. Queue lengths on both NB and SB off-ramps are anticipated to spill back to the I-95 mainline extensively according to the VISSIM analysis results, and therefore, in reality the average travel speed along the I-95 mainline is anticipated to be much lower than the HCS analysis results for the 2040 No-Build conditions.

The Build Alternative 2 is projected to significantly improve the LOS at the ramp terminal intersections along SW 10th Street from LOS E and F to LOS D or better. The projected failing conditions under the No-Build Alternative are expected to increase future crash risk within the

project corridor. This potential for increased crash risk is alleviated by the capacity improvements proposed in the Build alternatives.

A traditional crash reduction analysis was conducted to estimate the potential safety benefits of the proposed freeway, interchange, and arterial improvements. The analysis shows that the proposed improvements are expected to reduce approximately 42 crashes per year. A reduction of 36 crashes are caused by I-95 improvements and a reduction of 6 crashes are caused by SW 10th Street improvements. As a result, an annual safety benefit will be approximately 6.1 million dollars. Out of the 6.1 million dollars, approximately 5.4 million dollars are caused by improvements along I-95 and approximately 700k dollars are caused by improvements along SW 10th Street.

The comparison between No-Build and Build Alternative 2 Sub Scenario for year 2040 conditions shows greater benefits of the Build 2 alternative in terms of annual travel time saving, network-wide delay and speed, and queue lengths on the SW 10th Street off-ramps. Build Alternative 2 Sub Scenario incorporates the approved SW 10th Connector, thereby inducing additional traffic demand.

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.*

This SIMR does not propose any new interchanges along I-95. These existing interchanges provide access to public roads only. The improvements proposed at the interchanges will maintain full access to the existing cross streets and accommodate all movements.

8 CONCEPTUAL FUNDING

The interchange is funded for construction in multiple years. A funding plan for the proposed project has been developed and the right-of-way phases has been programmed. The first part of the interchange improvements will be programed under 436964-2 as part of a Design/Build project as follows:

Construction Funding - FY 2024
Letting Date - July 2023
Open to Traffic – Winter of 2028

Funding has been identified in the Work Program for the preliminary design, right of way, utility and design build phases in FY 2019 through FY 2024. The construction cost for the ultimate buildout of the interchange is approximately $580 million with the 436964-2 estimated construction cost at $380 million.

Cost estimates have been developed based on an engineer's opinion of probable cost using current FDOT Long Range Estimates (LRE) base costs.

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9 CONCLUSION AND RECOMMENDATION

The primary purpose of the I-95 Systems Interchange Modification Report (SIMR) project is to identify the long-term needs of the I-95 interchange at SW 10th Street (SR 869) and the adjacent interchange at Hillsboro Boulevard (SR 810) through 2040 , develop design concepts to address traffic spillbacks onto I-95, improve interchange operations, reduce congestion, enhance safety, and obtain the determination of safety, operational and engineering(SO&E) acceptability of the preferred alternative. This SIMR evaluates the traffic operations of the No-Build, Build 1, and Build 2 alternatives and also presents the performance of Build 2 with the presence of the SW 10th Street Connector Lane PD&E Study preferred alternative as Build 2 sub-scenario.

The information and analysis indicate that several of the merge, diverge and weaving areas have been designated as High Crash Locations at some point within the last three years of analysis (2013-2015). Similarly, the No-Build Alternative is projected to experience operational failures , where demand exceeds capacity extensively, at multiple merge, diverge and weave locations along I-95 within the study interchanges. The preferred Build 2 Alternative modifications to the interchange address projected deficiencies in the future. Listed below are specific modifications and projected benefits:

- The proposed Build 2 alternative with a 7,900 foot SB auxiliary lane on I-95 between the SB entrance ramp from SW 10th Street and the SB exit ramp to Sample Road creates a 4-lane mainline segment on SB I-95 and is projected to significantly improve the operations in the SB direction.
- The proposed NB braided ramps at the SW 10th Street interchange and the SB braided ramps at Hillsboro Boulevard not only reduce the number of merge and diverge points along I-95 but also provides for longer off-ramp storage lengths. Freeway analysis projects significant improvements over the No-Build conditions in the merge, diverge and mainline operations in both directions.
- The interchange ramp terminal improvements proposed under the Build 2 alternative are projected to significantly improve the operations at the ramp terminals and potentially eliminate the possibility of off-ramp queues spilling on to the mainline.
- The proposed elimination of the SB on-ramp signal at SW 10th Street and the proposed improvements along SW 10th Street are expected to significantly improve the flow of traffic along the arterial, particularly at the interchange. The improved operations are projected to improve the safety along the corridor.
- A new I-95 NB on-ramp is introduced from WB SW 10 Street as a free-flow right turn on the NE quadrant of the interchange. The new I-95 NB on-ramp connects with EB on-ramp and the EB SW 10 Street Connector carrying traffic destined to the I-95 general-purpose lanes. A combination of these on-ramps forms a I-95 NB CD road. The NB CD road braids

over the NB Hillsboro Boulevard off-ramp, continues northward, and connects with Hillsboro Blvd. EB and WB on-ramps. Then the NB CD road merges with the I-95 mainline north of Hillsboro Blvd. The proposed NB CD road is anticipated to shift I-95 mainline traffic from SW 10th Street to Hillsboro Boulevard.

These improvements address the traffic operation deficiencies by eliminating or improving the failing conditions within the interchange influence area and improving safety by reducing congestion and improving operating conditions along SW 10th Street and Hillsboro Boulevard. A traditional crash reduction analysis shows that the proposed improvements are likely to reduce approximately 42 crashes per year resulting in an annual safety benefit of more than six (6) million dollars.

Table 9.1 provides a comparison of the Design Year 2040 intersection analysis results. It is evident from this summary table that the Build 2 alternative is projected to provide better operating conditions than the Build 1 and No-Build in Design Year 2040.

Table 9.2 provides a comparison of the off-ramp queuing analysis results for Design Year 2040. The analysis indicates that under the Build alternatives, it is highly unlikely for the off-ramp queues to exceed the available storage lengths. It is also important to note that the Build queues are shorter than the No-Build queues in most instances.

The operational analysis conducted for the SIMR confirmed that the proposed interchange modifications are not expected to have any adverse impacts on safety and operations on the interstate facility (I-95) and in the contrary are anticipated to improve the operating conditions along the mainline and service interchanges. The proposed elimination of the loop ramp in the northeast quadrant of the Hillsborough Boulevard interchange will remove the weaving movement between the ramp terminals and thereby improve the safety and flow of traffic along Hillsborough Boulevard. The proposed improvements along SW 10th Street under the Build 2 alternative is expected to significantly improve the operations at the NB off-ramp terminal intersection from LOS E and F to LOS C and B.

I-95 EL lanes are proposed to directly connect with ramps to and from west along SW 10th Street. I-95 EL lanes are proposed to braid over GP lanes to connect to off-ramps, and thus eliminate the need for two-sided weaving. The proposed C-D road between Hillsboro Blvd. and SW 10th Street eliminates the existing weaving section between these interchanges , thereby reducing I-95 merge and diverge conflict points from five(5) in the southbound direction to four(4) conflict points, and from six(6) in the northbound direction to four(4) conflict points. A traditional crash reduction analysis was conducted to quantify the potential safety benefits of the proposed freeway, interchange, and arterial improvements.

According to the VISSIM analysis, the queue lengths at the NB and SB off-ramps at SW 10th Street are anticipated to exceed the off-ramp lengths for the 2040 No-Build conditions and it could adversely impact the flow of traffic along I-95. The proposed improvements under the

2040 Build conditions are projected to significantly reduce the queue length for these ramps and should prevent queues from adversely affecting the operations along I-95.

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Table 9.1: 2040 Comparison of No-Build and Build Alternatives - Intersection Analysis Results

Arterial	Signal Controlled Intersections	Existing 2016	2040			
			No-Build	Build 1	Build 2	Build 2A
		LOS (Delay)	LOS (Delay)	LOS (Delay)	LOS (Delay)	LOS (Delay)
AM Peak						
Hillsboro Blvd	SW 12th Avenue	C (32.8)	D (40.0)	D (39.3)	D (40.6)	D (40.4)
	I-95 Southbound Off-ramp	C (22.2)	C (20.4)	C (20.9)	B (19.2)	B (19.7)
	I-95 Northbound Off-ramp		B (10.5)	B (13.2)	B (12.4)	B (13.1)
	SW Natura Blvd/Fairway Dr	E (77.4)	F (80.0)	F (80.4)	F (80.4)	F (80.2)
PM Peak						
Hillsboro Blvd	SW 12th Avenue	D (42.0)	E (60.2)	E (59.2)	E (56.3)	E (60.1)
	I-95 Southbound Off-ramp	B (17.8)	B (16.7)	B (17.9)	B (18.3)	B (15.6)
	I-95 Northbound Off-ramp		A (9.8)	B (13.4)	B (12.5)	B (13.3)
	SW Natura Blvd/Fairway Dr	C (32.4)	D (38.0)	D (37.8)	D (38.1)	D (37.4)
AM Peak						
SW 10th Street	South Military Trail	F (84.8)	F (140.5)	F (180.1)	F (92.8)	E (76.1)
	East Newport Center Drive	C (32.2)	C (34.5)	C (27.8)	C (30.7)	C (33.9)
	I-95 Southbound On-ramp	B (19.1)	C (24.8)			
	I-95 Southbound Off-ramp	D (35.7)	B (17.9)	F (87.3)	D (42.7)	D (43.3)
	I-95 Northbound Ramps	D (48.6)	E (58.5)	C (26.8)	C (26.9)	C (22.4)
	FAU Research Park Blvd	D (38.4)	C (30.1)	D (43.8)	D (51.2)	D (49.9)
PM Peak						
SW 10th Street	South Military Trail	F (95.4)	F (141.4)	F (158.2)	F (105.3)	E (76.4)
	East Newport Center Drive	D (40.9)	E (64.5)	D (46.2)	D (54.1)	D (53.7)
	I-95 Southbound On-ramp	B (15.3)	D (35.6)			
	I-95 Southbound Off-ramp	D (46.2)	B (14.8)	F (121.9)	C (35.0)	D (49.2)
	I-95 Northbound Ramps	F (97.2)	F (81.3)	D (40.8)	B (19.1)	C (21.9)
	FAU Research Park Blvd	D (49.2)	D (38.8)	D (49.4)	E (61.6)	E (65.0)
AM Peak						
Sample Road	NW 5th Terrace	B (16.1)	B (15.1)	B (15.1)	B (15.2)	B (15.1)
	NW 5th Avenue	B (15.9)	B (10.6)	B (10.6)	B (10.4)	B (10.5)
	I-95 Southbound Off-ramp	B (11.3)	A (9.4)	A (9.4)	A (9.2)	A (9.3)
	I-95 Northbound Ramps	B (10.5)	A (9.3)	A (9.3)	A (9.2)	A (9.3)
	NE 3rd Avenue	D (45.6)	D (52.8)	D (52.8)	D (52.0)	D (52.8)
PM Peak						
Sample Road	NW 5th Terrace	B (15.9)	B (18.3)	B (16.9)	B (16.9)	B (16.7)
	NW 5th Avenue	B (12.8)	B (14.2)	B (13.3)	B (13.1)	B (13.0)
	I-95 Southbound Off-ramp	B (17.8)	B (19.2)	B (14.4)	B (14.1)	B (15.5)
	I-95 Northbound Ramps	C (24.1)	C (22.7)	C (21.0)	C (21.3)	C (21.5)
	NE 3rd Avenue	D (47.5)	D (46.4)	D (48.7)	D (48.4)	D (48.9)

Table 9.2: 2040 No-Build & Build - Off-Ramp Signals Queing Analysis Results

Intersection	Approach	Movt.	No-Build Queue Lengths		Build Queue Lengths			
			Off-Ramp Length (ft)	AM (PM) Queue	Off-Ramp Length (ft)	Build 1 AM(PM)	Build 2 AM(PM)	Build 2A AM(PM)
Hillsboro Boulevard at I-95 SB Off-Ramp	Southbound	L (EB)	2,525	719 (733)	2,525	719 (733)	693 (693)	702 (669)
		R (WB)	2,525	473(286)	2,525	473(286)	448(277)	454 (256)
Hillsboro Boulevard at I-95 NB Off-Ramp	Northbound	L (WB)	N/A	N/A	4,100	121(118)	98(97)	98 (92)
		R (EB)	2,450	268(228)	4,100	282(#240)	282(#240)	292 (#263)
SW 10th Street at I-95 SB Off-Ramp	Southbound	L (EB)	1,360	#241(133)	4,150	274(190)	293(228)	250(215)
		R (WB)	1,360	0 (0)	4,150	#990(#1,240)	454(#384)	#732(#527)
SW 10th Street at I-95 NB Off-Ramp	Northbound	L (WB)	1,760	#638(#681)	1,680	#509(#545)	361(278)	#417(249)
		R (EB)	1,760	#748(#792)	1,680	310(#541)	303(#434)	307(#477)
Sample Road at I-95 SB Off-Ramp	Southbound	L (EB)	1,960	127(226)	1,960	108(118)	123(136)	128 (137)
		R (WB)	1,960	#189(382)	1,960	138(#243)	#182(#276)	#185 (#285)
Sample Road at I-95 NB Off-Ramp	Northbound	L (WB)	2,140	143(488)	2,140	124(416)	143(513)	144 (522)
		R (EB)	2,140	126(292)	2,140	104(230)	126(307)	127 (318)

Queue Notes:

#: 95th percentile volume exceeds capacity

APPENDIX A

Amended Methodology Letter of Understanding (MLOU)

APPENDIX B

Raw Traffic Data & Signal Timing Data

APPENDIX C

2016 Existing Freeway HCS Operational Analysis

APPENDIX D

2016 Existing Synchro Intersection Analysis

APPENDIX E

2013 – 2015 Historical Crash Maps and Statistical Summaries

APPENDIX F

Travel Demand Forecast – SW 10th Street PD&E PTFM, January 2019

APPENDIX G

2020 & 2040 No-Build Freeway HCS Analysis

APPENDIX H

2020 & 2040 No-Build Synchro Intersection Analysis

APPENDIX I

SW 10th Street Connector & I-95 Interchange Supplemental Traffic Forecast Scenarios
SW 10th Street at I-95 – Alternatives Analysis Memorandum
SW 10th Street Eastbound Weave Operations from the Connector Lane Egress, West of Newport Center Drive, to the Newport Center Drive and I-95 Intersections

APPENDIX J

Build 1, Build 2 and Sub Scenario Conceptual and Signing Plans

APPENDIX K

2020 & 2040 Build 1 Freeway HCS Operational Analysis

APPENDIX L

2020 & 2040 Build 1 Synchro Intersection Analysis

APPENDIX M

2020 & 2040 Build 2 Freeway HCS Operational Analysis

APPENDIX N

2020 & 2040 Build 2 Synchro Intersection Analysis

APPENDIX O

2020 & 2040 Build 2 Sub Scenario Freeway HCS
Operational Analysis

APPENDIX P

2020 & 2040 Build 2 Sub Scenario Synchro
Intersection Analysis

APPENDIX Q

2040 No-Build and Build Safety Analysis

APPENDIX R

Access Management Plan & Typical Section Package