

APPENDIX A

Amended Methodology Letter of Understanding (MLOU)

Florida Department of Transportation Interchange Access Request Methodology Letter of Understanding (MLOU) Amendment #2

Cesar Martinez, PE
Planning & Environmental Management
Florida Department of Transportation
3400 West Commercial Blvd
Fort Lauderdale, FL 33309
September 18, 2019

**SUBJECT: Interstate 95 and SW 10th Street (S.R. 869) Interchange Modification Report
Amendment 2 to the Methodology Letter of Understanding (MLOU)**

Dear Mr. Martinez:

The purpose of this letter is to request a 2nd Administrative Amendment to the Methodology Letter of Understanding (MLOU) for the **Interstate 95 (I-95) and SW 10th Street (S.R. 869)** Interchange Access Request approved on January 2017. A copy of the signed MLOU and previous amendment approved on May 2017 is provided in **Appendix A**. This amendment is requested to document certain changes that have occurred during the course of the project.

The recommended modifications to the MLOU are outlined as follows:

Project Description

C. Area of Influence

(Replace with the following)

Along Mainline:

I-95 (SR 9), from south of Sample Road (SR 834) to north of Hillsboro Boulevard (SR 810), including ingress/egress ramps to/from I-95 Express Lanes. In the I-95 NB direction, this will include the northbound egress from Express Lanes located between Sample Road and SW 10th Street interchanges and the northbound ingress to Express Lanes located north of Hillsboro Boulevard. In the I-95 SB direction, it will include the southbound egress from Express Lanes located north of Hillsboro Boulevard and the southbound ingress to Express Lanes located between SW 10th Street and Sample Road interchanges.

2.0 Analysis Years

B. Traffic Operational Analysis

(Justification to retain 2016 as the Existing Year)

The table below shows Annual Average Daily Traffic (AADT) for 2003, 2016 and 2018. Annual compound growth rates (ACGR) are shown from 2016 to 2018 and from 2003 to 2018. The purposes of showing 2003 traffic is to illustrate the historical growth on the mainline/ramps at the I-95/SW 10th Street interchange, compared to recent growth between 2016 and 2018. The calculated two growth rate illustrates that the 2016 to 2018 growth compares well with the historical trend between 2003 and 2018. At a minimum, the 2016 base year data, which is the basis of the forecast for this project, appears to be more conservative. *This comparison illustrates that 2016 traffic volumes fall within historical norms and that an updated 2018 existing year is not necessary for this SIMR.* Also, since the Opening Year is 2020, an updated 2018 existing year analysis will not provide any valuable information. It is also important to note that due to the ongoing construction in the area, most of the 2018 AADTs are estimates and not a traffic count.

Facility	2016-2018 AADT			2003-2018 AADT			FDOT Site	Notes
	FTI	FTI	Annual Growth Rate	FTI	FTI	Annual Growth Rate		
	2016	2018		2003	2018			
I-95	205,604	220,000	3%	200,460	220,000	1%	860163	2017 and 2018 data are estimates due to the ongoing construction on I-95
I-95 NB Off-Ramp	13,000*	13,500	2%	14,000	13,500	0%	864080	2018 data are estimates due to construction
I-95 NB On-Ramp	12,000*	14,000	8%	13,000	14,000	0%	864081	2018 data are estimates due to construction
I-95 SB Off-Ramp	15,000*	12,000	-11%	13,500	12,000	-1%	864082	2018 data are estimates due to construction
I-95 SB On-Ramp	14,000*	15,000	4%	15,500	15,000	0%	864083	2018 data are estimates due to construction
SW 10th Street W. of Newport Center Dr	49,000	45,500	-4%	50,500	45,500	-1%	863015	
SW 10th Street W. of Natura Blvd	35,000	44,000	12%	28,500	44,000	3%	860070	

Note: FTI - Florida Transportation Information

*2016 data are actual counts collected as part of the SW 10th Street Connector PD&E project

5.0 Travel Demand Forecasting

A. Selected Travel Demand Model

(Replace with the following)

The modeling effort was coordinated between FDOT District 4 and Florida's Turnpike to produce a consistent traffic forecasts for various traffic studies on major corridors - I-95, SW 10th Express Lanes Street, 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 for the Build scenarios, the methodology used two modeling tools:

- SERPM Travel demand model
- Express Lanes Time-of-Day Model

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 scenarios.

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.

B. Project Traffic Forecast Development Methodology

(Replace with the following)

The development of the project traffic forecast was a multi-step effort involving a combination of internal modeling procedures and post-model evaluation. 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 scenarios 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 has 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.

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). The Build 3 project traffic was determined by taking the difference between the Build 2 and Build 3 model values and adding this impact layer to the Build 2 project forecast. This process was also used to develop 2020 and 2040 Build 2 and Build 3 forecast volumes along I-95 mainline, all ramps, and arterials.

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.

C. Validation Methodology *(Replace with the following)*

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.

D. Adjustment Procedures

(Replace with the following)

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 scenario for the I-95 PD&E study and the SW 10th Street PD&E study is 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 scenario 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 model results were used north of Hillsboro.

E. Traffic Factors

(Submitted earlier as MLOU Administrative Amendment #1)

6.0 Traffic Operational Analysis

B. Traffic Analysis Software Used

(Replace with the following)

Software		System Component					
		Freeway				Crossroad	
Name	Version	Basic Segment	Weaving	Ramp Merge	Ramp Diverge	Arterials	Intersections
HCS HCM	<input type="checkbox"/> 2010 v6.9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Synchro	<input type="checkbox"/> 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SimTraffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Corsim	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vissim*	<input type="checkbox"/> 11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*VISSIM Results limited to SW 10th Street interchange intersections operations and to be obtained from the SW 10th Street Connector PD&E Study (FM 439891-22-02).

Note: Synchro Version 9 and HCS 2010 Ver 6.9 were the most current versions available at the onset of the project. In order to maintain consistency between various on-going projects in the area, the same versions have been used throughout this study.

7.0 Safety Analysis

A. Detailed crash data within the study area will be analyzed and documented

(Replace with the following)

Detailed crash data within the study area will be analyzed and documented consistent with FDOT Interchange Access Request User’s Guide – January 2018, Sections 3.3.1 & 2.

Year: 2012 -2016

Source: FDOT’s Crash Analysis Reporting (CAR) system database.

Safety analysis of the Build improvements will also be evaluated using the Highway Safety Manual (HSM) methodology. It is important to note that many of the improvements proposed under the Build conditions are unconventional and unique. If the HSM methodology is found to be inadequate in assessing the safety benefits of these improvements, a traditional Crash Reduction Analysis will be conducted.

Please sign the appropriate signature block to show your concurrence with the proposed Administrative Amendment #2 to the approved Methodology Letter of Understanding (MLOU) signed in May 2017. Thank you in advance for your consideration and processing of this request.

Sincerely,

Pramod Choudhary, PE, PTOE
Transportation Engineering Manager
AECOM Technical Services, Inc.

Attachment

Methodology Letter of Understanding (MLOU)
MLOU Administrative Amendment #1

**METHODOLOGY LETTER OF UNDERSTANDING - ADMINISTRATIVE AMENDMENT
#2**





Type of Request: IJR IMR IOAR SIMR

Type of Process: Programmatic Non-Programmatic

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

Financial Project No: 436964-1-22-02

The undersigned approve and concur to amend the approved Methodology Letter of Understanding (MLOU) as stated in the letter dated May 3, 2017. All other methodology and procedures set forth in the MLOU remain unchanged and in force.

<i>Requestor</i>	<small>DocuSigned by:</small>  <small>012297CDFB0B4BA...</small>	11/18/2019 2:02 PM EST
	<small>Robert E. Bostian, Jr., PE</small> <small>FDOT District 4</small>	<i>Date</i>
<i>Interchange Review Coordinator</i>	<small>DocuSigned by:</small>  <small>DC7B7B72D0BD4A2</small>	11/18/2019 3:18 PM EST
	<small>Cesar Martinez, PE</small> <small>FDOT District 4 Project Development Manager</small>	<i>Date</i>
<i>System Management Administrator</i>	<small>DocuSigned by:</small>  <small>4AD03E6A337F4G1...</small>	11/18/2019 4:00 PM EST
	<small>Jenna Bowman, PE</small> <small>Systems Implementation Manager – FDOT Central Office</small>	<i>Date</i>
<i>District Transportation Engineer</i>	<small>DocuSigned by:</small>  <small>4203ECE57D2A4A3</small>	11/19/2019 9:46 AM EST
	<small>Chad Thompson</small> <small>Federal Highway Administration</small>	<i>Date</i>

Appendix A

I-95 and SW 10th Street (SR 869) Interchange Modification Report MLOU

Florida Department of Transportation Interchange Access Request Methodology Letter of Understanding (MLOU) Amendment

Scott Peterson
Planning & Environmental Management
Florida Department of Transportation
3400 West Commercial Blvd
Fort Lauderdale, FL 33309
May 4, 2017

**SUBJECT: Interstate 95 and SW 10th Street (S.R. 869) Interchange Modification Report
Amendment to the Methodology Letter of Understanding (MLOU)**

Dear Mr. Martinez:

The purpose of this letter is to request an Administrative Amendment to the Methodology Letter of Understanding (MLOU) for the **Interstate 95 (I-95) and SW 10th Street (S.R. 869)** Interchange Access Request. A copy of the signed MLOU is provided in **Appendix A**. This amendment is requested to document changes in the traffic K factor values. The changes are recommended due to FDOT policy changes and information related to project area historical AADT growth and recently collected existing characteristics.

The recommended modifications to the MLOU are outlined as follows:

5.0 Travel Demand Forecasting

E. Traffic Factors

(Update with the following)

- Utilizing recommended ranges identified in the Project Traffic Forecasting Handbook and Procedure (525-030-120).
- Utilizing other factors, identified below

Description:

The directional design hour volumes (DDHV) development process for the I-95 IMR will involve the application of the standard procedure of adjusting the average annual daily traffic (AADT) volumes with the Standard K and D₃₀ traffic factors. However, it will be adjusted to produce AM and PM peak hour volumes along the different corridors as follows:

- Standard K will be applied to the highest peak hour period between AM or PM; the other period K factor will be determined as a ratio based on existing counts.
- I-95 mainline Standard K = 7.0% is proposed
- Standard K = 8.0 will be applied to I-95 ramps and along the crossing corridors between the I-95 Ramps. Other K factors will be based on existing and historical counts. D factors will be calculated by link for each

peak period based on existing and historical data.

As outlined in the Project Traffic Forecasting Handbook, FDOT has replaced the previous K30 factor development with Standard K factors based on research of Florida roadway characteristics and a recognized inability to continue to cost effectively design urban roadway based on the 30th highest hour demand volumes. Such is the case with I-95 within the study area, Standard K factors have been established statewide by using the data measured at the continuous count sites, and it is expected that future K values (Standard K) will be lower than existing field measured K values.

The current identified value for Standard K on I-95 mainline is 8%, however recently collected traffic data within the project area has demonstrated a lower value is appropriate. Applying a Standard K factor of 8% produces a design hour trend or DDHVs which significantly exceed historical growth trends.

Exhibit 1 shows that the historical AADT growth is <1%. Traffic volumes from the telemetered traffic monitoring site (TTMS) #0163 on I-95 just north of 48th Street in Pompano Beach (just south of SW 10th Street) were used to calculate the growth rate. The volumes show a flat growth rate over the last 15 years. The chart below shows the historical AADT volumes for I-95, with a 2015 AADT of 204,200.

Exhibit 1 - I-95 Historical AADT Volumes

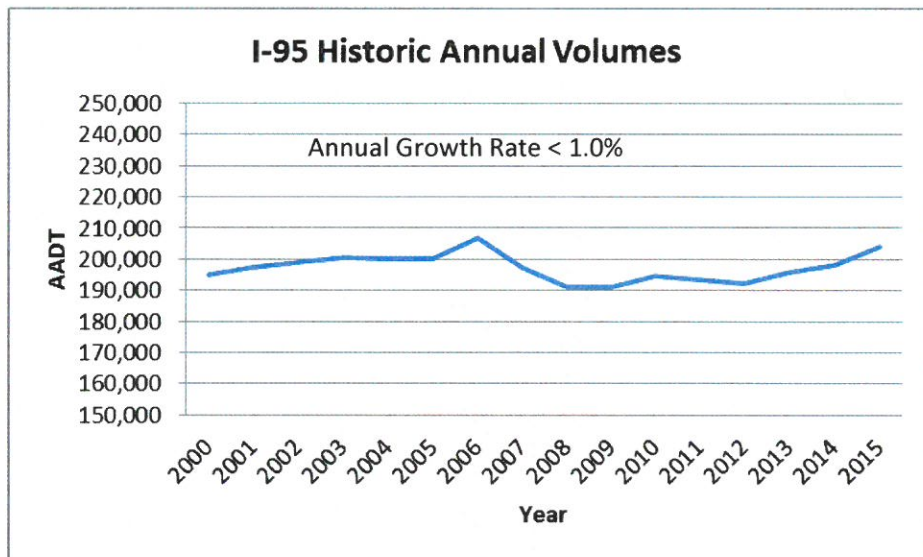


Exhibit 2 shows existing values for K and D factors. The values for K factor for I-95 mainline lanes currently range between 6.4% and 6.7%. The existing ramp K values are between 6.3% and 8.4%.

Exhibit 2 - I-95 Existing Data

I-95 Interchange	Profile	Existing 2016 (PTFM)				
		2016 AADT	AM Peak Hr Vol		PM Peak Hr Vol	
			SB AM	NB AM	SB PM	NB PM
SR 810 - Hillsboro Blvd		207,800	6,020	7,880	6,850	6,720
		27,500	1,150	1,170	1,000	1,170
		32,800	1,300	1,150	1,420	1,140
		213,100	6,170	7,860	7,270	6,690
SR 869 - SW 10 th St		31,500	910	1,360	960	1,090
		30,300	1,180	990	1,170	1,220
		211,900	6,440	7,490	7,480	6,820
SR 834 - Sample Rd		27,100	790	1,190	990	900
		37,800	1,660	710	1,320	1,480
		222,600	7,310	7,010	7,810	7,400

I-95 Interchange	Profile	2016 Observed K and D Values				
		2016 AADT	AM Peak Hr Vol		PM Peak Hr Vol	
			K	D	K	D
SR 810 - Hillsboro Blvd		207,800	6.7%	56.7%	6.5%	50.5%
		27,500	8.4%	50.4%	7.9%	53.9%
		32,800	7.5%	53.1%	7.8%	55.5%
		213,100	6.6%	56.0%	6.6%	52.1%
SR 869 - SW 10 th St		31,500	7.2%	59.9%	6.5%	53.2%
		30,300	7.2%	54.4%	7.9%	51.0%
		211,900	6.6%	53.8%	6.7%	52.3%
SR 834 - Sample Rd		27,100	7.3%	60.1%	7.0%	52.4%
		37,800	6.3%	70.0%	7.4%	52.9%
		222,600	6.4%	51.0%	6.8%	51.3%

Exhibit 3 shows that the projected DDHV using a K factor of 8% yields a growth rate greater than 1%, which contradicts AADT historical trend and project specific growth of 0.5% per year. However, the projected DDHVs using a K factor of 7% yields a growth rate less than 1%.

Exhibit 3 - I-95 2040 Volumes, K and D Factors, and Growth Rate

2040 AADT	I-95/SW 10th PTFM (NBNI) (Standard K 8% approach)				I-95/SW 10th PTFM (NBNI) (Std. K 7% Mainline and K 8% Ramps)			
	AM DDHV		PM DDHV		AM DDHV		PM DDHV	
	SB AM	NB AM	SB PM	NB PM	SB AM	NB AM	SB PM	NB PM
234,200	8,110	10,620	9,220	9,050	7,130	9,330	8,080	7,970
30,900	1,430	1,470	1,270	1,470	1,430	1,470	1,270	1,470
39,700	1,640	1,450	1,720	1,440	1,640	1,450	1,720	1,440
243,000	8,320	10,600	9,670	9,020	7,340	9,310	8,530	7,940
37,800	1,420	1,660	1,500	1,320	1,420	1,660	1,500	1,320
39,200	1,580	1,315	1,560	1,590	1,580	1,315	1,560	1,590
244,400	8,480	10,255	9,730	9,290	7,500	8,965	8,590	8,210
33,300	1,050	1,460	1,310	1,150	1,050	1,460	1,310	1,150
42,600	1,970	970	1,580	1,810	1,970	970	1,580	1,810
253,700	9,400	9,765	10,000	9,950	8,420	8,475	8,860	8,870

2040 AADT	I-95/SW 10th PTFM (NBNI) (Standard K 8% approach)				I-95/SW 10th PTFM (NBNI) (Std. K Ramps and K 7% Mainline)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	K	D	K	D	K	D	K	D
234,200	8.0%	56.7%	7.8%	50.5%	7.0%	56.7%	6.9%	50.3%
30,900	9.4%	50.7%	8.9%	53.6%	9.4%	50.7%	8.9%	53.6%
39,700	7.8%	53.1%	8.0%	54.4%	7.8%	53.1%	8.0%	54.4%
243,000	7.8%	56.0%	7.7%	51.7%	6.9%	55.9%	6.8%	51.8%
37,800	8.1%	53.9%	7.5%	53.2%	8.1%	53.9%	7.5%	53.2%
39,200	7.4%	54.6%	8.0%	50.5%	7.4%	54.6%	8.0%	50.5%
244,400	7.7%	54.7%	7.8%	51.2%	6.7%	54.4%	6.9%	51.1%
33,300	7.5%	58.2%	7.4%	53.3%	7.5%	58.2%	7.4%	53.3%
42,600	6.9%	67.0%	8.0%	53.4%	6.9%	67.0%	8.0%	53.4%
253,700	7.6%	51.0%	7.9%	50.1%	6.7%	50.2%	7.0%	50.0%

2040 AADT	I-95/SW 10th PTFM (NBNI) (Standard K 8% approach)				I-95/SW 10th PTFM (NBNI) (Std. K Ramps and K 7% Mainline)			
	Growth Rate (2016 to 2040)				Growth Rate (2016 to 2040)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	SB	NB	SB	NB	SB	NB	SB	NB
0.5%	1.2%	1.3%	1.2%	1.2%	0.7%	0.7%	0.7%	0.7%
0.5%	0.9%	1.0%	1.0%	1.0%	0.9%	1.0%	1.0%	1.0%
0.8%	1.0%	1.0%	0.8%	1.0%	1.0%	1.0%	0.8%	1.0%
0.5%	1.3%	1.3%	1.2%	1.3%	0.7%	0.7%	0.7%	0.7%
0.8%	1.9%	0.8%	1.9%	0.8%	1.9%	0.8%	1.9%	0.8%
1.1%	1.2%	1.2%	1.2%	1.1%	1.2%	1.2%	1.2%	1.1%
0.6%	1.2%	1.3%	1.1%	1.3%	0.6%	0.8%	0.6%	0.8%
0.9%	1.2%	0.9%	1.2%	1.0%	1.2%	0.9%	1.2%	1.0%
0.5%	0.7%	1.3%	0.8%	0.8%	0.7%	1.3%	0.8%	0.8%
0.5%	1.1%	1.4%	1.0%	1.2%	0.6%	0.8%	0.5%	0.8%

- 24T and DHT_f will be calculated for each intersection or link based on existing and historical data. A minimum DHT_f factor of 2.0% will be used.
- PHF for Existing Year Analysis will be based on existing counts.
- PHF for Future Year Analyses: PHF=0.95 for I-95 Mainline and Ramp movements; PHF=0.92 for cross streets; If Adaptive Signal Control is provided, then PHF=1.00.
- TMTool, rounding and balancing will be conducted; therefore, the final K and D may not match the initial values.

The proposed revision to the traffic factors for the project are outlined below:

Roadway	K	D	24T	DHT_f	PHF
I-95 Mainline	7.0	50.5 to 56.7	4.0 to 6.0	2.0 to 3.0	0.85 to 0.99
I-95 Ramps	8.0	100	4.0 to 6.0	2.0 to 3.0	0.85 to 0.99
SW 10 th Street	5.7 to 12.8	50.0 to 83.4	3.0 to 8.0	2.0 to 3.0	0.93 to 0.97
Hillsboro Boulevard	6.3 to 9.0	50.0 to 93.3	3.0 to 9.0	2.0	0.94 to 0.96
Sample Road	3.9 to 9.5	50.7 to 71.2	3.0 to 7.0	2.0 to 3.0	0.92 to 0.96

Source: AECOM preliminary calculations based on existing and historical volume data. A minimum DHT_f factor of 2.0% will be used. DHT_f factors for the Publix Distribution Center along SW 10th Street will be significantly higher within the immediate area.

Please sign the appropriate signature block to show your concurrence with the proposed Administrative Amendment #1 to the approved Methodology Letter of Understanding (MLOU) signed on January 2017. Thank you in advance for your consideration and processing of this request.

Sincerely,

Pramod Choudhary, PE, PTOE
 Transportation Engineering Manager
 AECOM Technical Services, Inc.

Attachment


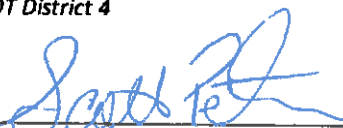
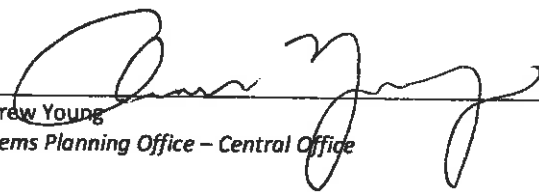
Methodology Letter of Understanding (MLOU)

**METHODOLOGY LETTER OF UNDERSTANDING - ADMINISTRATIVE AMENDMENT
#1**

**Interstate 95 and SW 10th Street (S.R. 869)
Interchange Modification Report**

Financial Project No: 436964-1-22-02

The undersigned approve and concur to amend the approved Methodology Letter of Understanding (MLOU) as stated in the letter dated May 3, 2017. All other methodology and procedures set forth in the MLOU remain unchanged and in force.

<i>Requestor</i>	 _____ Humberto Arrieta FDOT District 4	<u>5/22/17</u> Date
<i>Interchange Review Coordinator</i>	 _____ Scott Peterson Project Development Manager	<u>5/22/17</u> Date
<i>State Interchange Review Coordinator</i>	 _____ Andrew Young Systems Planning Office - Central Office	<u>6/2/17</u> Date

Appendix A
I-95 and SW 10th Street (SR 869) Interchange Modification Report MLOU

1.0 Project Description

Provide background or supporting information that explains the basis for the request.

A. Purpose and Need Statement

Provide the Purpose, the Need, and the Goals and Objectives.

This document serves as the Methodology Letter of Understanding (MLOU) between the Requester, the Florida Department of Transportation (FDOT) Central Office, and FDOT District Four for preparing an Interchange Modification Report (IMR) for the Interstate 95 (I-95) / State Road (SR) 9 and SW 10th Street / SR 869 Interchange in Broward County, Florida.

The primary purpose of this IMR is to identify the long-term needs through the year 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 at SW 10th Street (SR 869) and adjacent interchanges at Hillsboro Boulevard (SR 810) and Sample Road. FDOT District 4 has conducted an Interchange Master Plan (IMP) for I-95 interchanges within Broward County. This IMR relates to the proposed improvements associated with the IMP study. This MLOU outlines criteria, assumptions, processes and documentation requirements for this project.

A primary need of this IMR is to update geometric improvements that were based on prior design standards and historical design traffic projections. Increasing traffic spillbacks onto the I-95 mainline from the off-ramps, safety concerns at high crash locations, delay caused by congestion and inefficient traffic signal timings at I-95 ramp terminals will be addressed. The IMR must be compatible with the proposed I-95 Express Lanes. The goal is to define, prioritize and program necessary interchange projects.

B. Project Location

Provide project description and a map of the IAR project location.

The project area includes I-95 (SR 9), from south of Sample Road (SR 834) Interchange (MP 21.601) to north of Hillsboro Boulevard (SR 810) interchange (MP 24.641), in Broward County, Florida. **Figure 1** provides a Project Location and **Figure 2** summarizes the interchange spacing within the IMR limits.

Exhibit / Figure # - Figure 1 and Figure 2 attached

C. Area of Influence

Provide a description of the area of influence along the main line and cross street.

Along mainline:

I-95 (SR 9), from south of Sample Road (SR 834) to north of Hillsboro Boulevard (SR 810), including ingress/egress ramps from/to I-95 Express Lanes.

Along crossroads:

The anticipated area of influence (AOI) typically extends from each study interchange ramp terminal intersection to the nearest signalized intersection to the east and west or additional intersections as needed. **Table 1** summarizes the proposed study intersections.

Exhibit / Figure # - Table 1 attached

D. Project Schedule

Identify the schedule of production activities consistent with a proposed conceptual funding plan and opening year.

The work program shows available funds for FY 2019. Therefore, the Advance Production Process (APP) schedule is anticipated at this time. The scheduling notes that construction should be in conjunction with Project FM 439891-1. The exact scope is not yet finalized; however, expectations are as follows:

- Contract Letting – September 2019
- Contract Execution – December 2019
- Open to Traffic – July 2022

2.0 Analysis Years**A. Traffic Forecasting**

- Base year 2010
- Horizon year 2040

B. Traffic Operational Analysis

- Existing year 2015/2016
- Opening year 2020
- Design year 2040

A year of failure analysis shall be performed for Preferred Alternative, in case a failing LOS is obtained in Design Year.

3.0 Alternatives

The No-Build and Build alternatives shall be analyzed in the IAR. Details of all reasonable build alternatives considered, including those eliminated from further considerations, shall be documented. The documentation for the alternatives eliminated can be minimal like a summary of what was considered, reasons for elimination etc. Build Alternatives meeting purpose and need of the project shall have a more detailed description and evaluated in the IAR.

The implementation of TSM&O alternative will be considered in the IAR.

4.0 Data Collection

The type of data that may be used should be identified.

A. Transportation System Data

Data will be collected for the study from numerous sources including, but not limited to, the following.

- a. Roadway Characteristics Inventory Database
- b. Broward County traffic signal timing data
- c. FDOT Florida Traffic Online Website
- d. FDOT Florida Traffic Information (FTI) DVD
- e. FDOT Crash Data (Crash Analysis Reporting System – CARS)
- f. Field visits to confirm geometry, storage lengths, signal phasing, queues, etc.
- g. FDOT Five (5) Year Work Program
- h. SIS Funding Strategy First Five Year Plan (FY 2014/2015 through 2018/2019)
- i. SIS Funding Strategy Second Five Year Plan (FY 2019/2020 through 2023/2024)
- j. Broward Metropolitan Planning Organization (MPO) Transportation
- k. Transportation Improvement Program (TIP)
- l. FDOT traffic volume forecasts developed under the *Traffic Data Collection & Traffic Projections for I-95 PD&E Study from SW 10th Street to Hillsboro Boulevard FM No 436964-1-22-02 Dated May 19, 2016*

- m. FDOT Straight Line Diagrams
- n. Conceptual Development Alternatives (CDAs) for the I-95 Express Lanes Phase 3
- o. I-95 Broward and Palm Beach Origin-Destination Study

B. Existing and Historical Traffic Data

FDOT will provide the existing traffic data (2015/2016) for this project.

Traffic data includes:

- Arterial bi-directional counts in 15-minute increments
- Weekday peak period (AM and PM) turning movement counts (TMCs) at AOI signalized intersections and on- and off-ramp terminal intersections. TMCs include passenger vehicles, buses, trucks and pedestrian/bicyclist counts where applicable.

System-wide AM and PM peak hours will be identified from the traffic data and existing peak hour volumes will be determined.

The traffic data will be supplemented with existing and historical traffic data (AADTs) from the FDOT Florida Traffic Online website and available previous studies.

C. Land Use Data

The Broward MPO 2040 Long Range Transportation Plan (LRTP), Deerfield Beach comprehensive plans, applicable master plans, and active development of regional impacts (DRI) applications will be reviewed and documented in the IMR.

D. Environmental Data

Efficient Transportation Decision Making (ETDM) Environmental Data, Environmental Data from Broward County Environmental Protection and Growth Management Department and the Florida Geographic Data Library (FGDL) will be reviewed. Environmental issues, including socio-cultural features, contamination, natural resource features and noise sensitive receptors will be investigated, documented and considered as part of the IMR.

E. Planned and Programmed Projects

Applicable master plans, SIS Plans, FDOT's Five (5) Year Work Program, SW 10th Street PD&E draft tentative work program, interchange planning and safety studies performed by FDOT District Four, Broward MPO TIP, Broward MPO 2040 LRTP, local government comprehensive plans, and active development of regional impact (DRI) applications will be reviewed and documented in the I-95 IMR. Additionally, the I-95 Express Lanes Phase 3 will be reviewed to identify planned and programmed improvements within the IMR limits. The IMR improvements will be developed consistent with these plans or steps will be taken to achieve consistency.

5.0 Travel Demand Forecasting

A. Selected Travel Demand Model(s)

The modeling efforts have been provided by FDOT on the *Traffic Data Collection & Traffic Projections for I-95 PD&E Study from SW 10th Street to Hillsboro Boulevard FM No 436964-1-22-02 Dated May 19, 2016*. The Southeast Florida Regional Planning Model (SERPM), Version 7.061 has been used for travel forecasting for this project. SERPM 7.061 is an Activity-Based Model (ABM) that simulates both household-level and person-level travel choices including intra-household interactions with household members. SERPM 7.061 model is validated to Year 2010 conditions and includes a future year 2040 scenario based on the adopted Cost Feasible plans from Miami-Dade MPO, Broward MPO, and Palm Beach MPO. It is approved by the Regional Transportation Technical Advisory Committee - Modeling Subcommittee (RTTAC-MS) in South Florida for transportation engineering and planning studies. The RTTAC-MS comprises representatives from FDOT District 4, District 6, and the three MPOs in South Florida.

B. Project Traffic Forecast Development Methodology

Describe the methodology and assumptions in developing the future year traffic volumes (AADT and DDHV)

As presented on the *Traffic Data Collection & Traffic Projections for I-95 PD&E Study from SW 10th Street to Hillsboro Boulevard FM No 436964-1-22-02 Dated May 19, 2016*, the comprehensive traffic forecasting method was used to develop the AADT for these PD&E studies. The traffic forecasting methodology used for each approach of each intersection was based on the 2016 AADT (from field), and 2010 and 2040 SERPM 7.061 model volumes. The recommended 2040 AADT were calculated by applying the model growth rate to the 2016 AADT. For all the roadway links, the 2016 and 2040 AADT has 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.

C. Validation Methodology

Describe the validation methodology using current FDOT procedures and data collection procedure.

Identify how modifications to the travel demand forecasting model will be made, including modifications to the facility type and area type for links, modifications to socio-economic data and all input and output modeling files for review.

Model validations have been conducted under the *Traffic Data Collection & Traffic Projections for I-95 PD&E Study from SW 10th Street to Hillsboro Boulevard FM No 436964-1-22-02 Dated May 19, 2016*. The SERPM 7.061 model has already been validated to Year 2010 conditions following the standard model validation procedures and principles and best practices in the industry. In addition, the growth rates of historical counts, historical counts plus model projections, SERPM socioeconomic growth, and the comprehensive model to model projections methodology were summarized and compared with each other. Based on the comparison and discussions with the FDOT Project Manager, the comprehensive traffic forecasting method was used to develop the AADT for these PD&E studies.

D. Adjustment Procedures

Identify the process used to adjust modeled future year traffic to the defined analysis years. Discuss how trends/growth-rates will be factored into this, if applicable.

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 SERPM 7.061 2040 model volumes are lower than the SERPM 7.061 2010 model volumes, or are not included in the SERPM 7.061 network, the future 2020, 2030, and 2040 AADTs were calculated using 2016 AADT and a compound growth factor of 0.5%.

E. Traffic Factors

- Utilizing recommended ranges identified in the Project Traffic Forecasting Handbook and Procedure (525-030-120).
- Utilizing other factors, identified below

Description:

The directional design hour volumes (DDHV) development process for the I-95 IMR will involve the application of the standard procedure of adjusting the average annual daily traffic (AADT) volumes with the Standard K and D₃₀ traffic factors. However, it will be adjusted to produce AM

and PM peak hour volumes along the different corridors as follows:

- Standard K will be applied to the highest peak hour period between AM or PM; the other period K factor will be determined as a ratio based on existing counts.
Standard K = 9.0 will be applied to I-95 mainline, ramps, and along the crossing corridors between the I-95 Ramps. Other K factors will be based on existing and historical counts. D factors will be calculated by link for each peak period based on existing and historical data.
- 24T and DHT_f will be calculated for each intersection or link based on existing and historical data. A minimum DHT_f factor of 2.0% will be used.
- PHF for Existing Year Analysis will be based on existing counts.
- PHF for Future Year Analyses: PHF=0.95 for I-95 Mainline; PHF=0.92 for intersections and I-95 Ramps; If Adaptive Signal Control, then PHF=1.00.
- TMTTool, rounding and balancing will be conducted; therefore, the final K and D may not match the initial values.

Roadway	K	D	24T	DHT_f	PHF
I-95	9.0	50.5 to 100	4.0 to 6.0	2.0 to 3.0	0.85 to 0.99
SW 10 th Street	5.7 to 12.8	50.0 to 83.4	3.0 to 8.0	2.0 to 3.0	0.93 to 0.97
Hillsboro Boulevard	6.3 to 9.0	50.0 to 93.3	3.0 to 9.0	2.0	0.94 to 0.96
Sample Road	3.9 to 9.5	50.7 to 71.2	3.0 to 7.0	2.0 to 3.0	0.92 to 0.96

Source: AECOM preliminary calculations based on existing and historical volume data. A minimum DHT_f factor of 2.0% will be used.

6.0 Traffic Operational Analysis

The area type, traffic conditions, and analysis tools to be used are summarized in this section.

A. Existing Area Type/Traffic Conditions

Area Type	Conditions	
	Under Saturated	Saturated
Rural	<input type="checkbox"/>	<input type="checkbox"/>
Urban Area/Transitioning Area	<input checked="" type="checkbox"/>	<input type="checkbox"/>

B. Traffic Analysis Software Used

Software	System Component						
	Version	Freeway			Crossroad		
Name	Version	Basic Segment	Weaving	Ramp Merge	Ramp Diverge	Arterials	Intersections
HCS HCM	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Synchro	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SimTraffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Corsim	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vissim	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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C. Calibration Methodology

- Calibration methodology and parameters utilized will be documented.
- Calibration Measures of Effectiveness (MOEs) and calibration targets.

Calibration will be conducted and documented based on the guidelines presented on the *FDOT Traffic Analysis Handbook, March 2014*.

D. Selection of Measures of Effectiveness (MOE)

- The Level of Service criteria for each roadway classification, including mainline, ramps, ramp terminal intersections and the crossroad beyond the interchange ramp terminal intersections are identified below.

Analyses of the I-95 system, including the mainline and the interchange ramps, will be based on criteria and policies detailed in the *FDOT Interstate Access Request User's Guide, 2015 Edition*. Freeway and ramp operations analyses will be conducted utilizing Highway Capacity Software (HCS 2010) (MOE: Density). Intersection analyses will be conducted using Synchro 9.0 software and results will be reported utilizing the HCM 2010 output when feasible. Otherwise, results will be reported utilizing the HCM 2000 output (MOE: Delay).

FDOT Topic No. 525-000-006 provides Level of Service (LOS) standards for the State Highway System (SHS). The following LOS criteria are considered acceptable for the IMR.

- Urbanized Areas over 500,000
 - SIS Facilities – LOS D
 - Other State Roads – LOS D

- In addition to the Level of Service criteria, state other operational MOEs to be utilized for the evaluation of alternatives.

In addition to the signalized intersection LOS criteria stated above, operational criteria will also include the following:

- Maximum volume-to-capacity (v/c) ratio
 - Each intersection movement should have a v/c ratio of 1.0 or less.
- Interchange ramp queue length
 - The 95th percentile queue will be utilized to determine the required storage length for all interchange off-ramp queue lengths. The 95th percentile queue will be calculated utilizing HCM 2010 methodology when feasible. Otherwise, the intersection Queue Report will be utilized.

7.0 Safety Analysis

- A. Detailed crash data within the study area will be analyzed and documented.

Years: 2012, 2013, and 2014
 Source: FDOT Crash Data (CARS)

8.0 Consistency with Other Plans/Projects

- A. The request will be reviewed for consistency with facility Master Plans, Actions Plans, SIS Plan, MPO Long Range Transportation Plans, Local Government Comprehensive Plans or development applications, etc.

- B. Where the request is inconsistent with any plan, steps to bring the plan into consistency will be

developed.

- C. *The operational relationship of this request to the other interchanges will be reviewed and documented. The following other IARs are located within the area of influence: None. The I-95 IMR will consider the relationship of the interchanges within the study area*

9.0 Environmental Considerations

- A. *Status of Environmental Approval and permitting process.*
 The IMR will identify potential long-term improvements to the interstate and adjacent roadway network. Once improvements have been identified, a determination of Environmental Approval and permitting process will be conducted.

- B. *Identify the environmental considerations that could influence the outcome of the alternative development and selection process.*
 Environmental issues, including socio-cultural features, contamination, natural resource features, and noise sensitive receptors, will be investigated, documented, and considered as part of the IMR.

10.0 Coordination

Yes	No/NA	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	An appropriate effort of coordination will be made with appropriate proposed developments in the area.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Request will identify and include (if applicable) a commitment to complete the other non-interchange/non-intersection improvements that are necessary for the interchange/intersection to function as proposed.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Request will document whether the project requires financial or infrastructure commitments from other agencies, organizations, or private entities.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Request will document any pre-condition contingencies required in regards to the timing of other improvements and their inclusion in a TIP/STIP/LRTP prior to the Interstate access acceptance (final approval of NEPA document).
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Request will document the funding and phasing.

**Explain if No or Not Applicable (N/A) is checked:*

11.0 Anticipated Design Exceptions and Variations

- Design exceptions/variations are not anticipated, but if an exception/variation should arise it will be processed per FHWA and FDOT standards.*

- The following exceptions/variations to FDOT, AASHTO or FHWA rules, policies, standards, criteria or procedures have been identified:*

12.0 Conceptual Signing Plan

- A conceptual signing and marking plan shall be prepared and included in the access request.*

13.0 Access Management Plan

- Access management plan within the area of influence will not be changed by the proposed*

improvements to the interchange.

- The improvement will affect access management within the area of influence will be changed. An access management plan will be developed within the area of influence to complement the improvements to the interchange:*

14.0 FHWA Policy Points

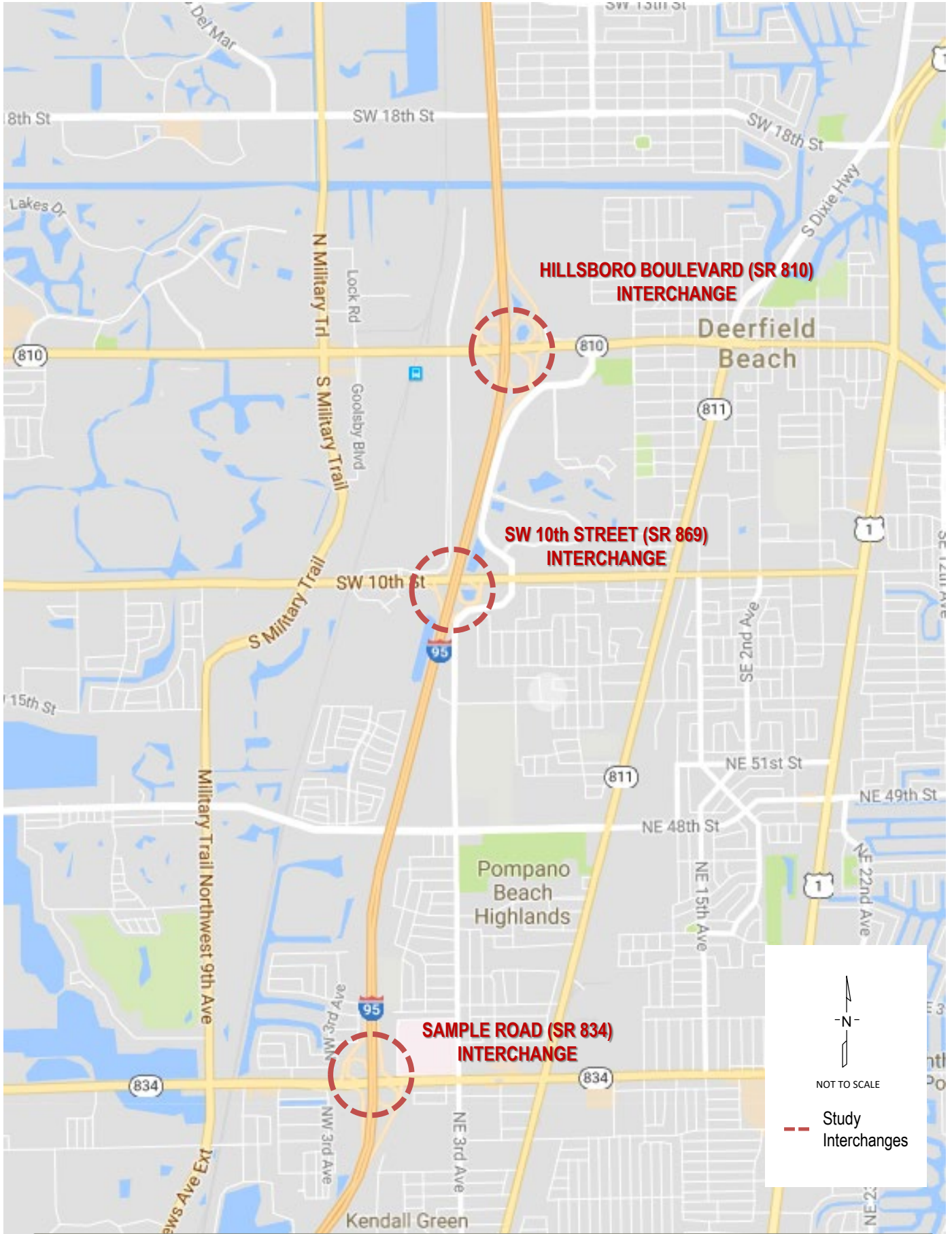
- The FHWA eight policy points will be addressed within the access request.*

Table 1: Proposed Study Intersections

Interchange	List of Intersections
Sample Road (SR 834)	<ul style="list-style-type: none"> • I-95 NB off ramp at Sample Road • I-95 SB off ramp at Sample Road • Sample Road at 5th Terrace/5th Ave • Sample Road at NE 3rd Avenue
SW 10 th Street (SR 869)	<ul style="list-style-type: none"> • I-95 NB off 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)	<ul style="list-style-type: none"> • 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

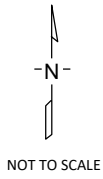


Project Location Map





Area of Influence



Legend

- Area of Influence
- Project Intersections

