Noise Study Report

SR 9/Interstate 95 from South of SR 869 (SW 10 Street- MP 22.00)
to North of SR 810 (Hillsboro Boulevard- MP 25.10)
Project Development & Environment Study
Broward County, Florida

Financial Management Number: 436964-1-22-01
Federal Aid Project Number: 0202-054-P
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Prepared For:
Florida Department of Transportation, District IV

October 2019

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

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1.0 INTRODUCTION

The Florida Department of Transportation (FDOT) District Four is conducting a Project Development and Environment (PD&E) Study, in accordance with the National Environmental Policy Act (NEPA), to assess potential operational and safety improvements along 3.1 miles of Interstate 95 (I-95), from just south of the SW 10th Street interchange [Mile Post (MP) 22.0] to just north of the Hillsboro Boulevard (Blvd) interchange (MP 25.10), in Broward County, Florida.

The project extends along I-95 from just south of SW 10th Street to just north of Hillsboro Boulevard and along both SW 10th Street from just west of Military Trail east to SW Natura Boulevard and along Hillsboro Boulevard from Goolsby Boulevard east to SW Natura Boulevard. The entire project lies within the city of Deerfield Beach. I-95 is part of the Strategic Intermodal System and the National Highway System which is Florida's high priority network of transportation facilities important to the state's economy, mobility and defense.

This study will evaluate the potential modification of the existing merge and diverge ramp areas along I-95 from just south of the SW 10th Street interchange to just north of the Hillsboro Blvd. Interchange. Improvements to the I-95 partial cloverleaf interchanges at SW 10th Street and Hillsboro Boulevard as well as improvements along SW 10th Street and Hillsboro Blvd. will also be considered.

The project study area is shown in **Figure 1-1**.

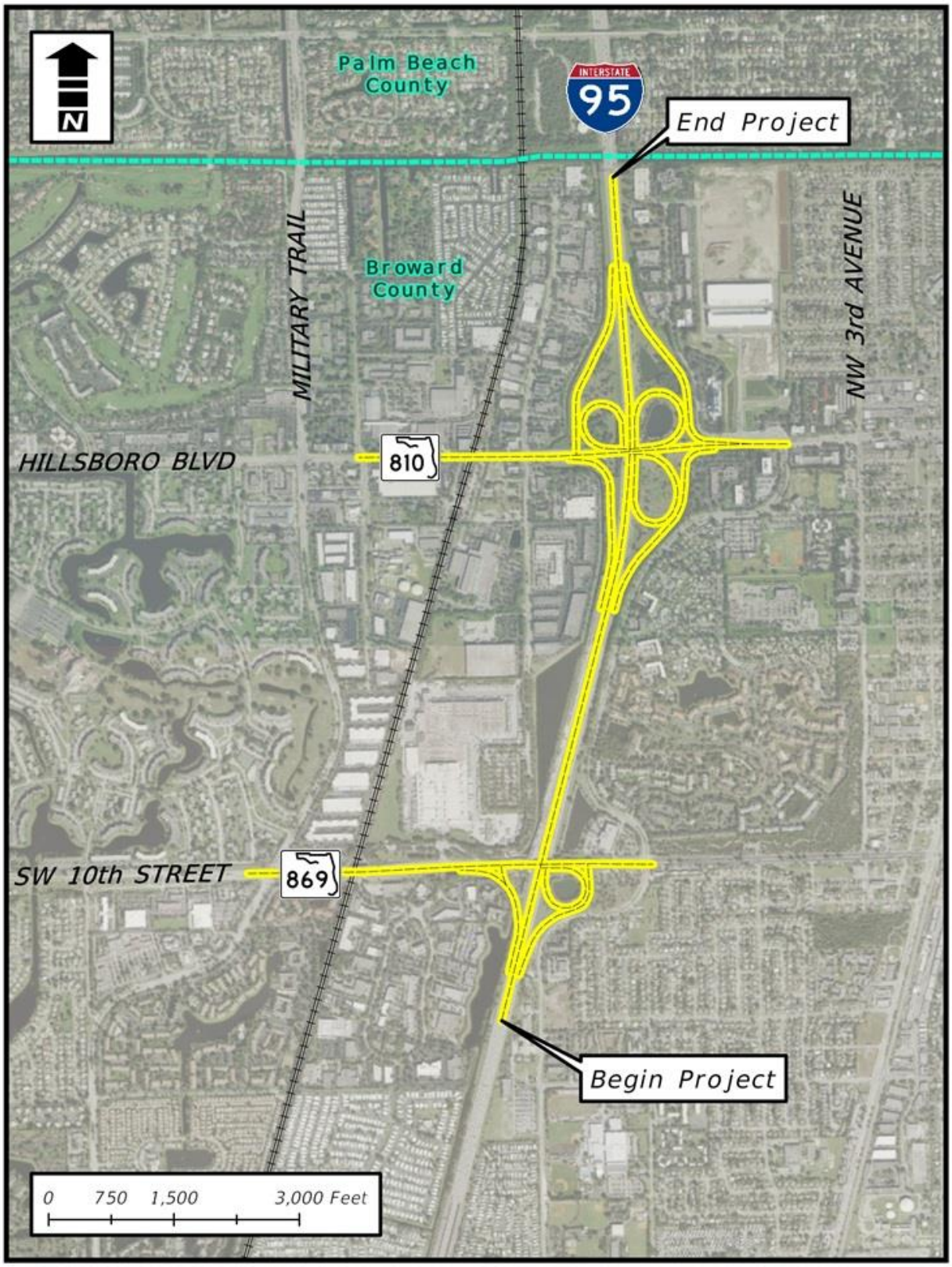


Figure 1 - 1: Project Study Area

1.1 Purpose and Need

The purpose of this project is to eliminate existing operational and safety deficiencies along I-95 between and including the interchanges at SW 10th Street and Hillsboro Boulevard, and 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.

1.1.1 Capacity/Operational Deficiencies

A need exists to improve traffic operations along I-95 between the SW 10th Street and Hillsboro Boulevard interchanges, especially at existing merge and diverge ramps that are the sources of traffic turbulence and collisions. The mainline directional volumes range from 4,400 to 5,850 vehicles per hour (vph) with ramp volumes from 800 to 1,250 vph at SW 10th Street and 400 to 1,000 vph at Hillsboro Boulevard.

Operational analyses along I-95 indicate that all freeway segments in the study area operate at Level of Service (LOS) D or better except for the following:

- The diverge segment at I-95 southbound (SB) off-ramp to SW 10th Street eastbound (EB) and westbound (WB) during the AM and PM peak periods;
- The I-95 mainline segment between I-95 SB on-ramp from SW 10th Street EB and WB and I-95 SB off-ramp to Sample Road EB and WB during the PM peak period;
- The I-95 mainline between I-95 SB On-Ramp from Palmetto Park Boulevard EB and I-95 SB Off-Ramp to Hillsboro Boulevard EB and WB during the AM peak period;
- The merge at I-95 SB on-ramp from Hillsboro Boulevard WB during AM and PM peak periods; and
- The diverge segment at I-95 northbound (NB) off-ramp to Hillsboro Boulevard EB during the AM peak period.

These conditions are existing concerns and are projected to worsen in the future if no action is taken. Year 2040 traffic projections show the mainline directional volumes ranging from 6,000 to 7,300 vph. Year 2040 peak hour directional volumes on I-95 Express are forecasted to range an additional 1,300 to 2,550 vph within the I-95 corridor. Operational analyses under the "No-Action" option in year 2040 reflects implementation of two major programmed improvements: 1) I-95 Express Phase 3 (and 2) I-95 Ramp Metering. All of the mainline freeway segments in the study area would operate at a deficient LOS (E or F) during one or both peak periods with the exception that the merge segment for I-95 SB On-Ramp from WB Hillsboro Boulevard would operate at LOS D during the PM peak hour.

1.1.2 Safety

A need exists to resolve safety issues within the project limits along I-95 as well as SW 10th Street and Hillsboro Boulevard. Crash analyses for the years 2008 through 2012 reveal that the I-95 segment within the Hillsboro Boulevard interchange area is classified as a high crash segment for four of the five study years. It should also be noted that the existing interchanges are closely located together and have short weave distances. Crash rates along SW 10th Street in the vicinity of I-95 exceed the statewide average for similar facilities for all five study years, but the segment along Hillsboro Boulevard in the vicinity of I-95 does not. Field observations indicate that the number of crashes along the Hillsboro Boulevard project segment may be influenced by queues extending from the railroad crossing into this area.

1.1.3 Evacuation and Emergency Services

The South Florida region has been identified by the National Oceanic and Atmospheric Administration (NOAA) as an area with a high degree of vulnerability to hurricanes and the Florida Division of Emergency Management has designated specific evacuation routes through the region. Both SW 10th Street and Hillsboro Boulevard are designated as emergency evacuation routes from I-95 to SR 5/US-1 and A1A. I-95 is designated as an emergency evacuation route throughout Broward County. A need exists to enhance capacity and traffic circulation along evacuation routes to improve evacuation and enhance emergency response.

1.1.4 Transportation Demand

A need exists to improve capacity and safety while meeting transportation demand and maintaining consistency with other transportation plans and projects, such as the Broward County Interchange Master Plan (IMP) and I-95 Express Lanes Phase III Project. The project is included in the FDOT Work Program with PE is scheduled for fiscal years 2017 and 2018. The Broward County MPO 2035 Long Range Transportation Plan (LRTP) included improvements to all I-95 interchanges in Broward County under Illustrative Roadway Projects. Illustrative projects are those that cannot be included in the cost feasible plan due to financial constraints but could be included in a future approved Transportation Improvement Program.

1.1.5 System Linkage

A need exists to ensure that I-95 continues to meet the minimum requirements of a component of the state's SIS and the National Highway System (NHS), as well as provides access connectivity to other major arterials such as I-595 and Florida's Turnpike SIS and the National Highway System (NHS), as well as provides access and connectivity to other major arterials such as I-595 and Florida's Turnpike.

1.1.6 Modal Interrelationships

There exists a need for capacity improvements along the I-95 project corridor to enhance the mobility of public transit and goods by alleviating current and future congestion along the corridor and on the surrounding freight and transit networks. Reduced congestion will serve to maintain and improve viable access to the major transportation facilities and businesses of the area.

Increased mobility to public transit operations are needed and will benefit as a result of this project. Although no designated Broward County Transit (BCT) Routes are provided within the SW 10th Street interchange area, Hillsboro Boulevard is serviced by BCT Route #48, which provides a connection from SR 7 to Deerfield Beach including a direct connection to the Deerfield Tri-Rail Station located just west of the Hillsboro interchange.

1.1.7 Social Demands and Economic Development

Social and economic demands on the I-95 corridor will continue to increase as population and employment increase. The Broward County MPO 2035 LRTP predicted that the population would grow from 1.7 million in 2005 to 2.3 million by 2035, an increase of 29 percent. Jobs were predicted to increase from 0.7 to 1 million during the same time period, an increase of 37 percent. A need exists for the proposed improvements to support the predicted social and economic travel.

2.0 PROJECT STUDY AREA

The project study area consists of the existing and proposed right-of-way (ROW) limits for the viable Build Alternatives and also includes the No-Action Alternative. The study area is of sufficient size to identify potential direct and indirect effects of the viable Build Alternatives on habitats and wildlife species that may occur within or adjacent to the project corridor. For the purpose of this study, the two viable Build Alternatives discussed for SW 10th Street are the North alignment and Center alignment, which encompass all proposed roadway improvements along I-95, SW 10th Street, and Hillsboro Boulevard. The project footprint is the same for both Alternatives along I-95 and Hillsboro Boulevard. The project footprint varies slightly between the two Build Alternatives along SW 10th Street.

2.1 Environmental Setting

The project is located within a densely developed urban region of northern Broward County. Along the existing I-95 corridor within the project study area, adjacent lands are characterized by residential subdivisions, individual residences, commercial developments, and business and industrial complexes.

2.2 Existing Land Use

The project is located in northern Broward County and traverses the northern region of Deerfield Beach. West of I-95 within the project limits, the dominant land uses are industrial and commercial, including a Publix distribution center and several hotels at the interchanges. Additional land uses west of I-95 include City of Deerfield government offices located west of the CSX railroad and south of Hillsboro Boulevard, and a residential development southwest of SW 10th Street and the railroad. East of I-95 and south of Hillsboro Boulevard, land use is mainly single and multi-family residential with a mixture of commercial development at the interchanges. North of Hillsboro Boulevard, land use is mainly commercial along I-95 and Hillsboro Boulevard. Set behind the commercial development is the former Deerfield Country Club Golf Course.

2.3 Future Land Use

The City of Deerfield Beach Future Land Use Map (adopted December 3, 2013) predicts that land uses within the project area will remain similar except for the conversion of the former Deerfield Country Club Golf Course into an employment center. The anticipated employment center has been branded as the Hillsboro Technology Center.

2.3.1 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 NE quadrant of the interchange is shown as Residential Moderate (10 DU/AC), Commercial and Conservation. The SE quadrant shows as Community Facility, Recreation Open Space, Residential- Medium (15 DU/AC), Residential Moderate (10 DU/AC) and Residential Low (5 DU/AC).

2.3.2 Hillsboro Boulevard Interchange

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

3.0 EXISTING CONDITIONS

Due to the uniqueness of this project, the analysis and evaluation of the existing conditions were separated into three corridors; I-95 (SR 9), SW 10th Street (SR 869) and Hillsboro Boulevard (SR 810). Data gathering for each of these corridors focused on the areas of roadway, bridge and environmental characteristics. Assessment of the existing conditions began with the collection and review of all data pertaining to the existing facilities which included conducting on-site field inventories, review of existing documents, as well as, review of other pertinent data used for the evaluation of these transportation facilities.

3.1 Functional Classification

The roadway network within the project study area is comprised of interstate expressways, state roads, county roads and local roads that provide access and traffic circulation within residential, commercial and industrial areas.

3.1.1 I-95

Within the limits of the study for access management, I-95 is defined as Limited Access Class 1.2 Freeway in an Existing Urbanized Area with a functional classification as an urban principal arterial interstate. I-95 is an essential part of the SIS and NHS networks. Within the limits of the project, I-95 has six general purpose lanes (three in each direction) and two Express (EP) lanes (one in each direction).

3.1.2 SW 10th Street

SW 10th Street has a functional classification as an urban principal arterial other. SW 10th Street is classified as a six-lane divided State Principal arterial west of I-95 and as a six-lane divided City Minor Arterial east of I-95. In addition, it is on the SHS and SIS systems being classified as a SIS corridor.

3.1.3 Hillsboro Boulevard

Hillsboro Boulevard has a functional classification as an urban principal arterial other. Hillsboro Boulevard is classified as a six-lane divided State Minor Arterial west of I-95 and as a State Principal Arterial east of I-95. In addition, it is on the SHS and SIS systems being classified as a SIS corridor classification as an urban principal arterial from the intersection at Goolsby Boulevard (MP 4.760) to I-95 (MP 5.365) Hillsboro Boulevard since it connects the I- 95 Expressway to South Florida Rail Corridor.

3.2 Access Management

3.2.1 I-95

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

3.2.2 SW 10th Street

Southwest 10th Street is designated as Class 3 for access management.

3.2.3 Hillsboro Boulevard

Hillsboro Boulevard is designated as Class 5 for access management.

3.3 Typical Sections

The following **Table 3-1** depicts the existing typical section characteristics for each corridor.

Table 3 - 1: Existing Typical Section Characteristics

Typical Section Element	Roadway		
	I-95	SW 10th Street	Hillsboro Boulevard
Number of Travel Lanes	8	6	6
Travel Lane Width	12 ft	11-12 ft	11 ft
Parking Lane Width	n/a	n/a	n/a
Curb and Gutter	n/a	Type F	Type F
Inside Shoulders Width	12 ft	n/a	n/a
Outside Shoulders Width (Bike Lane)	12 ft	Varies 4 - 8 ft	Varies 4-6 ft
Median Width	26.5 ft	14 to 17.5 ft	15.5 ft
Sidewalk Width	n/a	Varies 5-6 ft	Varies 6-7 ft
Right-of-Way Width	240 ft – 300 ft	106 ft (+)	106 – 136 ft

3.3.1 I-95

Within the limits of the study, I-95 is an eight-lane divided limited access facility consisting primarily of a two and a half-foot center barrier wall with two twelve-foot paved inside shoulders (one in each direction). The inside lane in each direction is a twelve-foot wide EP lane with a two-foot striped buffer area separating the EP lane from the three twelve-foot general purpose lanes. In each direction, along the outside of the general purpose lanes is a twelve-foot shoulder [ten-foot paved and two-foot unpaved]. In the NB direction, a twelve-foot auxiliary lane exists between the SW 10th Street on-ramp and Hillsboro Boulevard off-ramp. Additionally, in the SB direction a twelve-foot auxiliary lane exists between the Hillsboro Boulevard on-ramp and SW 10th Street off-ramp. The existing roadway segment is depicted in **Figure 3-1** and typical section for this corridor is shown in **Figure 3-2**.

Figure 3 - 1: Existing Roadway Segment – I-95 Corridor

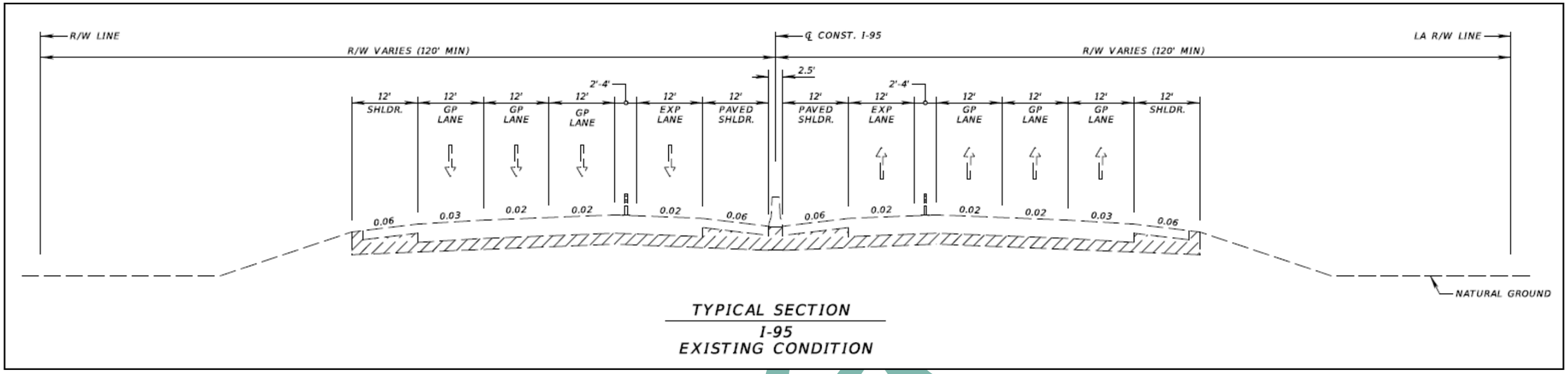


Figure 3 - 2: Existing Typical Section – I-95

3.3.2 SW 10th Street

EB along SW 10th Street from approximately 1000-feet west of the intersection at Military Trail to the intersection there are three twelve-foot lanes, a four to five-foot bike lane, and an eight-foot (four-foot paved and four-foot unpaved) outside shoulder. In the center, there is a raised curb and gutter median that varies in width from 17.5 feet.

WB along SW 10th Street from approximately 1000-feet west of the intersection at Military Trail to the intersection there are two twelve-foot lanes, a four- foot bike lane and four-foot unpaved shoulder.

In each direction, from the intersection at Military Trail to East Newport Center Drive there are three twelve-foot lanes, a four-foot bike lane, two-foot curb and gutter with a five-foot concrete sidewalk running along at the back of curb. In the center of the roadway there is a raised curb and gutter median that varies in width from 14.0 to 17.5 feet. In the WB direction, the outside lane is an auxiliary lane used for right turns and/or acceleration that terminates at the intersection with Military Trail. In the EB direction a fourth (outside) twelve to 14-foot wide lane exists as an auxiliary lane used for right turns and/or acceleration and terminates at the SB on-ramp to I-95.

From East Newport Center Drive to SW Natura Boulevard/FAU Research Park Boulevard there are three eleven-foot lanes in each direction, two-foot curb and gutter with a six- foot concrete sidewalk running along at the back of curb with no bicycle lane or shoulder. EB the third lane (outside) terminates at the NB entrance ramp to I-95 and then remerges west of the NB I-95 off-ramp intersection continuing on to the FAU Research Park Boulevard intersection. WB are three eleven-foot lanes, two-foot curb and gutter with a six-foot concrete sidewalk running along at the back of curb with no bike lane or shoulder present. A fourth WB lane emerges at the SB I-95 off-ramp intersection and terminates at the East Newport Center Drive intersection. In the center of the roadway there is a raised curb and gutter median that varies in width from 14 to 17.5 feet.

The existing roadway segment is depicted in **Figure 3-3** and typical section for this corridor is shown in **Figure 3-4**.

Figure 3 - 3: Existing Roadway Segment – SW 10th Street

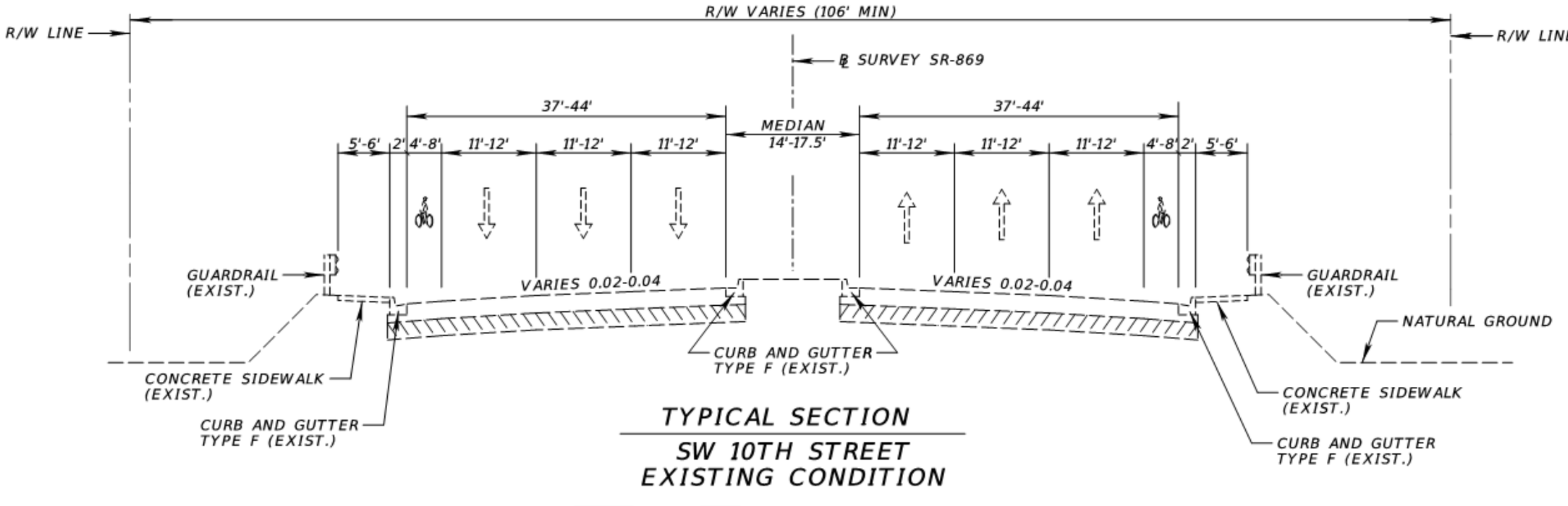


Figure 3 - 4: Existing Typical Section – SW 10th Street

3.3.3 Hillsboro Boulevard

Along Hillsboro Boulevard from east of Military Trail intersection to the intersection with Natura Boulevard/Fairway Drive is an urban arterial typical section having a fifteen and a half-foot raised median, six eleven-foot thru lanes (3 lanes in each direction) and two four-foot bicycle lanes (one in each direction) with Type F curb and gutter on both sides of the roadway. In each direction outside the bicycle lanes is a two-foot curb and gutter with six-foot concrete sidewalk running along at the back of curb. Total right-of-way width varies.

The existing roadway segment is depicted in **Figure 3-5** and typical section for this corridor is shown in **Figure 3-6**.

Figure 3 - 5: Existing Roadway Segment – Hillsboro Boulevard

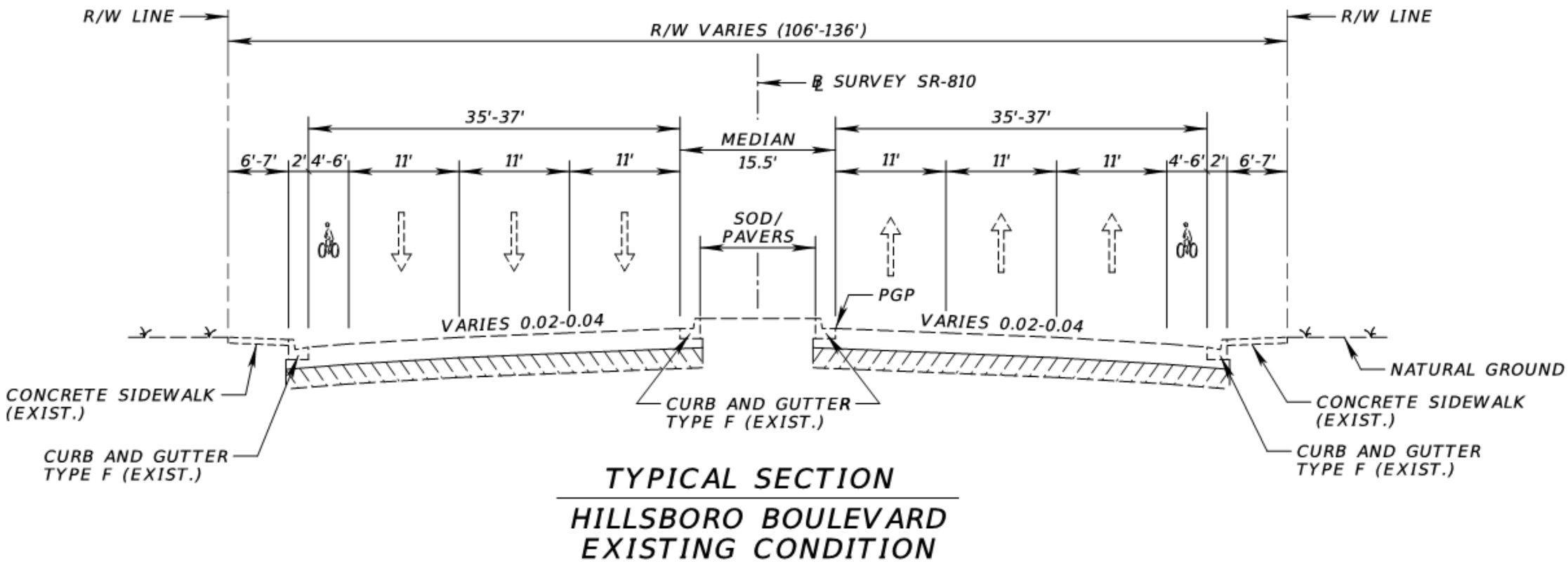


Figure 3 - 6: Existing Typical Section – Hillsboro Boulevard

3.4 Right-of-Way

3.4.1 I-95

The existing right-of-way along I-95 varies with a minimum of 240 feet and varies based on shoulder width and natural ground.

3.4.2 SW 10th Street

The existing right-of-way along SW 10th Street varies with a minimum of 125 feet and varies based on median width, shoulder width and natural ground with a typical width between 180 to 250 feet.

3.4.3 Hillsboro Boulevard

The existing right-of-way along Hillsboro Boulevard varies from 106 to 136 feet and varies based on median width.

Please refer to the Preliminary Engineering Report for additional details of existing roadway conditions and typical sections.

3.5 Pavement Type and Operational Conditions

3.5.1 Pavement Condition

FDOT performs annual surveys of the entire State highway system in support of the Department's Pavement Management Program. The data collected (in terms of crack, ride, and rut measurements) is used to assess the condition and performance of the State's roadway as well as to predict future rehabilitation needs.

3.5.1.1 I-95 Pavement Type and Condition

The existing pavement type along I-95 is asphalt pavement (FC-5). Based on data obtained from the Pavement Condition Survey, I-95 was last resurfaced in 2008. The NB lanes along I-95 have adequate pavement ratings. The SB lanes along I-95 has adequate pavement ratings for Rideability and Rutting. I-95 is currently under construction to add lanes for

I-95 Express within the limits of this study (FM 433108-6, Phase 3B-1) and will be completely resurfaced as part of that project.

3.5.1.2 SW 10th Street Pavement Type and Condition

The existing pavement type along SW 10th Street is asphalt pavement (FC-9.5). Based on data obtained from the Pavement Condition Survey, SW 10th Street was last resurfaced in 2014. Both the EB and WB lanes have adequate pavement ratings.

3.5.1.3 Hillsboro Pavement Type and Condition

The existing pavement type along Hillsboro Boulevard is asphalt pavement (FC-9.5). Within the limits of this study, Hillsboro Boulevard was last resurfaced in 2017 (FM 430602-1). Therefore, both the EB and WB lanes have adequate pavement ratings.

4.0 PROJECT ALTERNATIVES

Alternatives evaluated during the PD&E Study include the No-Action Alternative, the Transportation Systems Management and Operations (TSM&O) Alternative, and the Build Alternatives as described below. Alternatives were developed and evaluated based on the ability to meet the project purpose and needs.

4.1 No-Action Alternative

The No-Action Alternative assumes that no improvements would be implemented within the project corridor. It serves as a baseline for comparison against the Build Alternatives. It will however, include on-going construction projects and all funded or programmed improvements scheduled to be opened to traffic in the analysis years being considered. These improvements must be part of the FDOT's adopted Five-Year Work Program, Broward County MPO, Cost Feasible LRTP, transportation elements of Local Government Comprehensive Plans (LGCP), or developer-funded transportation improvements specified in approved development orders.

The advantage of the No-Action Alternative is that it requires no expenditure of public funds for design, right-of-way acquisition, construction or utility relocation. In addition, there would be no disruptions due to construction, no direct or indirect impacts to the environment and/or the socio-economic characteristics from the project. However, the No-Action Alternative does not address the purpose and need of the project and operational and safety conditions within the project area will become progressively worse as traffic volumes continue to increase.

4.2 Transportation Systems Management and Operations (TSM&O)

Transportation Systems Management and Operations (TSM&O) aims to optimize the performance of existing multimodal infrastructure through implementation of systems and services to preserve capacity and improve the safety and reliability of our transportation system. TSM&O improvements include traffic management and operations solutions such as Information

Technology System (ITS) devices, signal retiming, and adaptive signal control.

However, a TSM&O Alternative will not significantly improve the capacity issues through the corridor by the design year 2040. Long-term improvements are necessary to mitigate the existing traffic conditions and increase capacity to accommodate future travel demand.

4.3 Build Alternatives

Build Alternatives were developed along I-95, SW 10th Street and Hillsboro Boulevard to address the purpose and needs of the project.

4.3.1 Interstate 95

All Build Alternatives considered for I-95 include:

- Two 12-foot wide express lanes (one in each direction)
- Six 12-foot wide general purpose lanes (three in each direction)
- Four-foot wide buffer with tubular markers separating the general purpose lanes from the express lanes
- A 12-foot wide paved inside shoulder
- A 12-foot wide outside shoulder (ten-feet paved and two-feet unpaved)
- A 2.5-foot wide center barrier wall
- Twelve-foot wide auxiliary lanes at selected locations

4.3.1.1 Alternative 1

Alternative 1 provides a 3-lane, physically separated collector-distributor (CD) roadway on the east side of I-95 between SW 10th Street and Hillsboro Boulevard that combines the EB to NB and WB to NB on-ramps. A proposed auxiliary lane on the west side combines the EB to SB and WB to SB on-ramps. Widening is proposed in the median along I-95 to provide one 12 foot express lane in each direction.

4.3.1.2 Alternative 2

Alternative 2 provides a braided ramp for the 3-lane proposed NB CD roadway on the east side of I-95 to separate the traffic destined to I-95 mainline from traffic exiting at Hillsboro Boulevard. A braided ramp is also proposed on the west side of I-95 for the SB CD roadway to separate the traffic destined to I-95 mainline from traffic exiting at SW 10th Street. Widening is proposed in the median along I-95 to provide one 12-ft express lane in each direction.

4.3.2 SW 10th Street

Build Alternatives considered along SW 10th Street provide two connector lanes in each direction with direct connect access ramps to/from the I-95 express lanes. A WB on-ramp and EB off-ramp access to the connector lanes is provided just east of the Military Trail intersection. Improvements at the NB off-ramp terminal to accommodate triple lefts and triple rights as well as relocating the WB to NB entrance ramp from the southeast quadrant of the interchange to the northeast quadrant remain the same for both Build Alternatives.

Three 11-foot lanes with 7-foot buffered bike lanes and 6-foot sidewalks are provided along local SW 10th Street. A roundabout is provided at the intersection of W. and E. Newport Center Drive. Triple rights are provided at the NB and SB legs of the SW 12th Avenue/E. Newport Center Drive intersection. Two alignments were considered for the connector lanes:

- North Alignment (**Figure 4-1**), and
- Center Alignment (**Figure 4-2**).

Both north and center alignment options are basically the same. The north alignment; however, provides direct access to the connector lanes from SW 12th Avenue. Minor right-of-way acquisition is required for the north alignment on the north and south sides of SW 10th Street including six privately-owned and three government-owned parcels. No relocations are required.

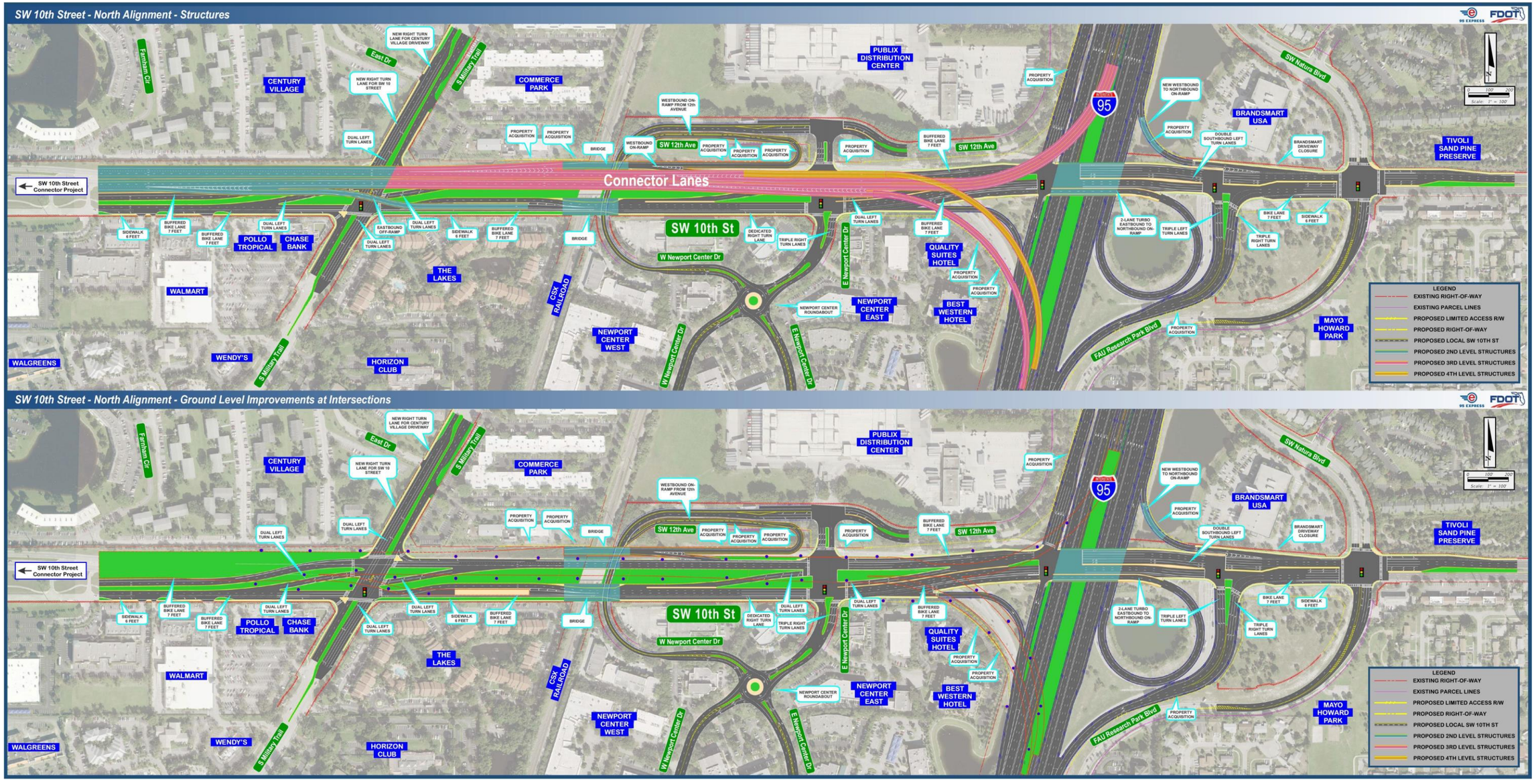


Figure 4 - 1: SW 10th Street North Alignment

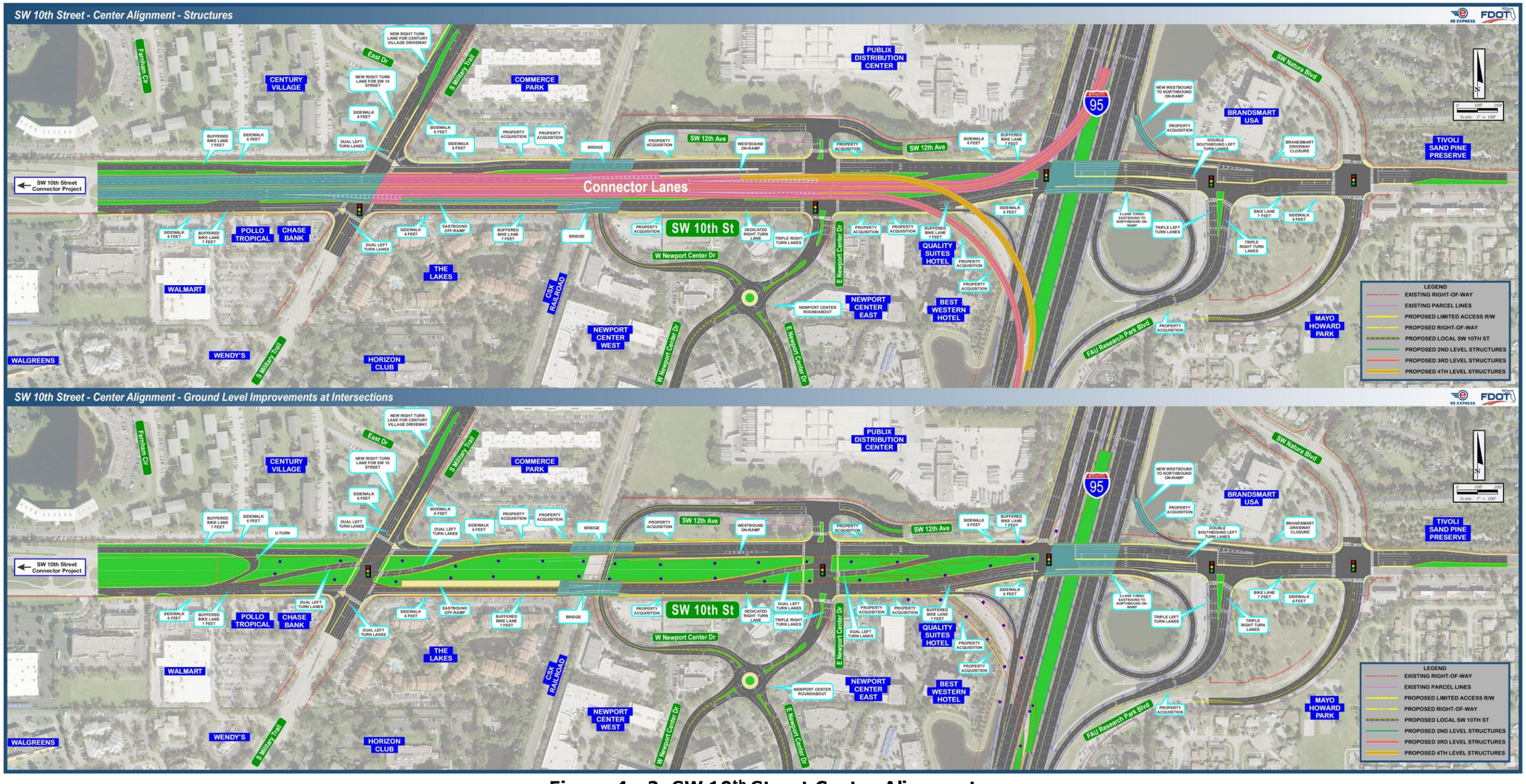


Figure 4 - 2: SW 10th Street Center Alignment

The center alignment Alternative also requires minor right-of-way acquisition on the north side as well as on the south side including 15 privately-owned and nine-government owned parcels. No relocations are required.

4.3.3 Hillsboro Boulevard

Two Build Alternatives were considered along Hillsboro Boulevard. Alternative 1 proposes a depressed section while Alternative 2 proposes an elevated section. Improvements at the I-95 ramp terminals remained the same for both Build Alternatives and include providing a 2-lane NB exit ramp combining both exit ramps into a single ramp with a signal controlled. The NB exit ramp terminal with expanded storage for a triple left and double right turn lanes. Additional improvements include expanding the north leg of Jim Moran Boulevard to allow for SB double left and double right turn lanes, extending the NB to WB left turn lane storage and the EB to SB right turn storage at Natura Boulevard.

4.3.3.1 Alternative 1

Alternative 1 proposes a depressed section from Goolsby Boulevard to SW 12th Avenue with two 11-foot lanes in each direction and a 7.5-foot inside shoulder. An access road is proposed on each side with one 11-foot lane, a 7-foot buffered bike lane and a 6-foot sidewalk. This Alternative was deemed not viable due to impacts to the South Florida Rail line (**Figure 4-3**) and access to adjacent properties.

4.3.3.2 Alternative 2

Alternative 2 proposes an elevated section from Goolsby Boulevard to SW 12th Avenue with two 11-foot lanes in each direction, a 7.5-foot inside shoulder, and a 13-foot median. An access road is proposed on each side with one 11-foot lane, a 7-foot buffered bike lane and a 6-foot sidewalk (**Figure 4-4**). This Alternative was deemed not viable due to the access impacts to adjacent properties and the steep profile grade required to meet existing grade before the I-95 interchange.

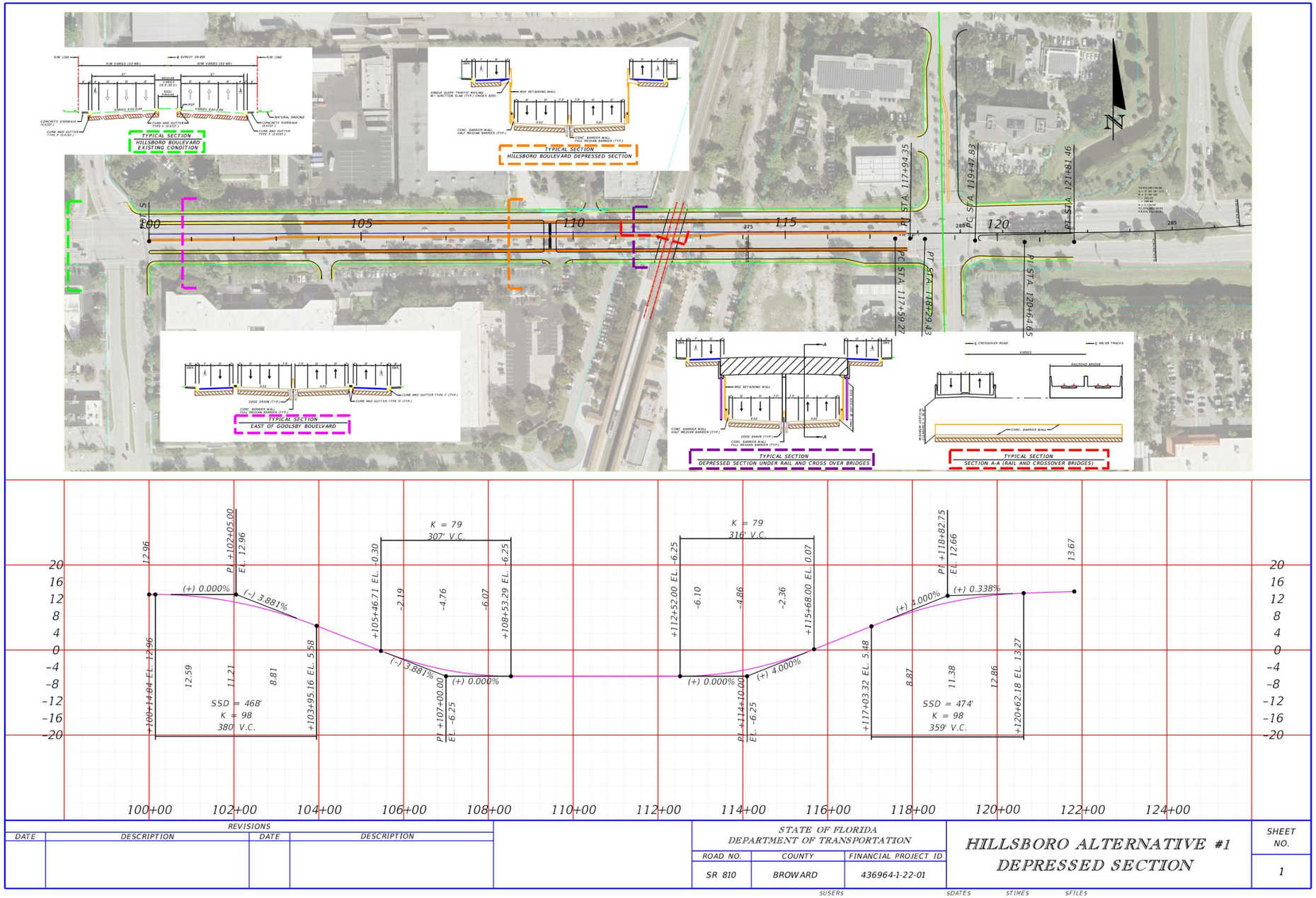


Figure 4 - 3: Hillsboro Boulevard Alternative 1

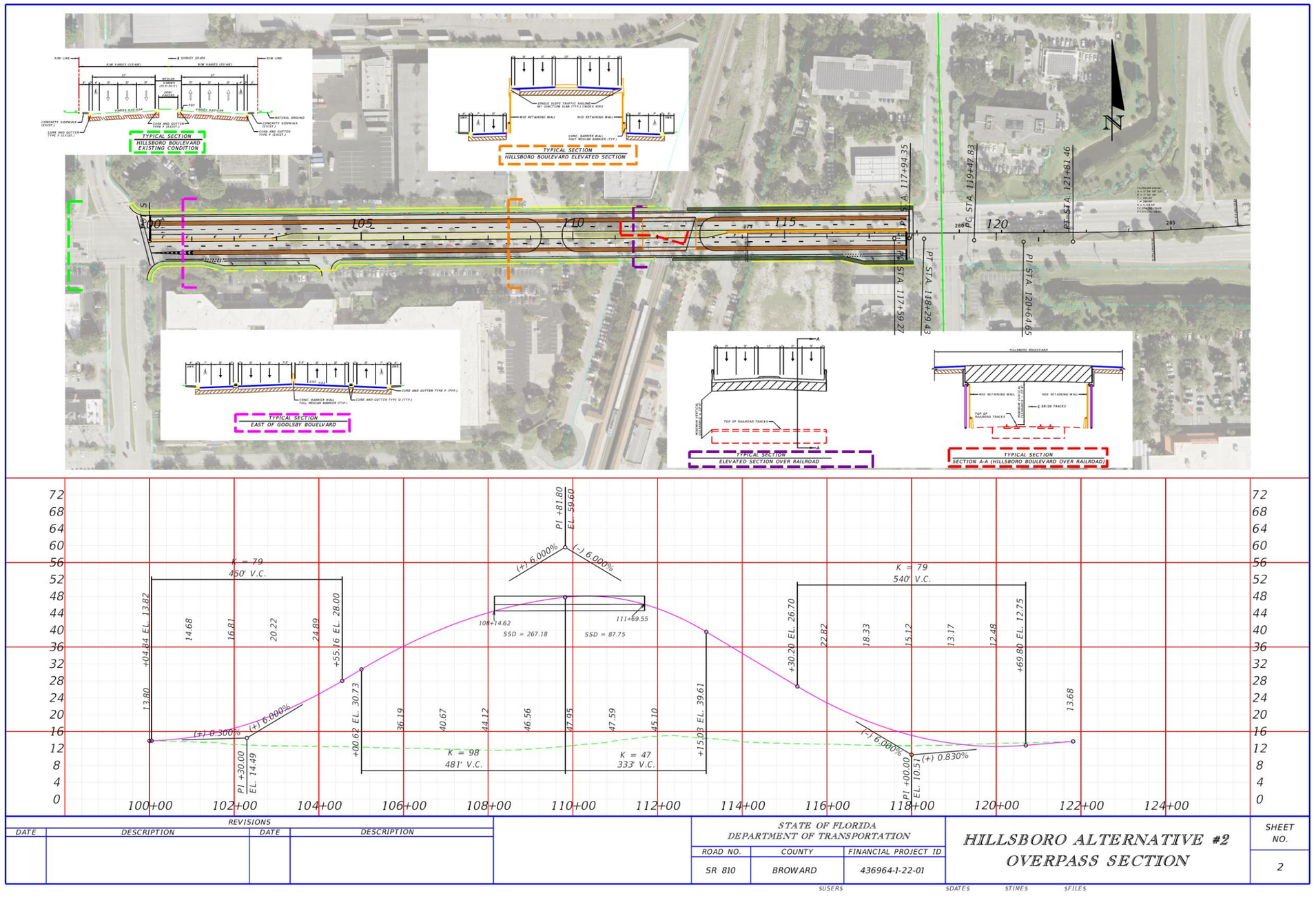


Figure 4 - 4: Hillsboro Boulevard Alternative 2

4.3.4 Bridge Widening (I-95 Northbound Bridge over Hillsboro Boulevard)

The existing I-95 NB bridge over Hillsboro Boulevard (Bridge No. 860194) has a concrete superstructure with pre-stressed American Association of State Highway and Transportation Officials (AASHTO) Type II and Type III beams set on a curved alignment with a slight skew along the substructure of the multi-column intermediate piers and pile end bents. The bridge was constructed originally around 1972 and was widened along the inside with the original outside traffic railing being replaced with FDOT F Shape Traffic Railing (Index No. 14286) around 1990. The bridge is comprised of four simple spans of 41 feet-3 inches, 74 feet-3 inches, 74 feet-3 inches and 41 feet-3 inches for a total overall length of 231 feet-0 inches. The total bridge width is approximately 87 feet-2 inches. The bridge currently carries an HOV lane, three travel lanes, one merge lane, and shoulders on both sides. A FDOT F shape concrete traffic railing barrier borders the bridge on each side. According to the as-built plans, the minimum vertical clearance is approximately 15.40 feet. To accommodate roadway improvements on I-95, Bridge No. 860194 NB lanes will need to be widened to accommodate the additional express lane and one general purpose lane. The engineering analysis performed concluded that the best option for widening the bridge is strengthening two existing beams with insufficient load rating factors or replacing them along with partial reconstruction of the deck.

Please refer to the Preliminary Engineering Report for details of the engineering analysis performed for this bridge.

5.0 TRAFFIC NOISE ANALYSIS

Prior to conducting a detailed noise analysis, a desk-top review of the project was performed to determine if noise levels will likely increase as a result of the proposed improvements, if noise sensitive receptor sites are located within the project area, or if noise impacts are likely to occur. The desk-top review indicated that the proposed improvements associated with the project may cause design year (2040) traffic noise levels to approach or exceed the FHWA NAC at noise sensitive sites within the project limits. Therefore, in accordance with Part 2, Chapter 18 – *Highway Traffic Noise* of the FDOT PD&E Manual, a more detailed noise analysis was performed. The methods and results of this traffic noise analysis are summarized within this section and involved the following procedures:

- Identification of noise sensitive receptor sites;
- Field measurement of noise levels and noise model validation;
- Prediction of existing and future noise levels;
- Assessment of traffic noise impacts; and,
- Evaluation of the feasibility and reasonableness of noise abatement.

The recommended Build Alternative (herein referred to as the *Build Alternative*) is Alternative 1.
All design year alternatives include the improvements currently being constructed with the I-95 Express Lanes Phase III Project.

The FHWA Traffic Noise Model (TNM) Version 2.5 (February 2004) was used to predict traffic noise levels and to analyze the effectiveness of noise barriers. This model estimates the acoustic intensity at a noise sensitive site (the receptor) from a series of roadway segments (the source). Model-predicted noise levels are influenced by several factors, such as vehicle speed and distribution of vehicle types. Noise levels are also affected by characteristics of the source-to-receptor site path, including the effects of intervening barriers, obstructions (houses, trees, etc.), ground surface type (hard or soft) and topography. Elevation data for the existing travel lanes and the limited-access right of way lines were obtained from existing roadway plans where available.

Noise levels presented in this report represent the hourly equivalent sound level [Leq(h)]. The Leq(h) is the steady-state sound level, which contains

the same amount of acoustic energy as the actual time-varying sound level over a one-hour period. The Leq(h) is measured in A-weighted decibels [abbreviated as dB(A)], which closely approximate the range of frequencies a human ear can hear.

5.1 Noise Sensitive Receptor Sites

The FHWA has established NAC for seven land use activity categories. These criteria determine when an impact occurs and when consideration of noise abatement is required. Maximum noise level thresholds have been established for five of these activity categories. These maximum thresholds, or criteria levels, represent acceptable traffic noise level conditions. The NAC levels are presented in Error! Reference source not found.. Noise abatement measures must be considered when predicted noise levels approach or exceed the NAC levels or when a substantial noise increase occurs. The FDOT defines "approach" as within one dB(A) of the FHWA criteria. A substantial noise increase is defined as when the existing noise level is predicted to be exceeded by 15 dB(A) or more as a result of the transportation improvement project.

Table 5 - 1: Noise Abatement Criteria

Activity Category	Activity Leq(H)[1]		Evaluation Location	Description of Activity Category
	FHWA	FDOT		
A	57	56	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[2]	67	66	Exterior	Residential
C[2]	67	66	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	51	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools,

				and television studios.
E[2]	72	71	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	–	–	–	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	–	–	–	Undeveloped lands that are not permitted.

(Based on Table 1 of 23 CFR Part 772)
[1] The Leq(h) Activity Criteria values are for impact determination only, and are not a design standard for noise abatement measures.
[2] Includes undeveloped lands permitted for this activity category.
Note: FDOT defines that a substantial noise increase occurs when the existing noise level is predicted to be exceeded by 15 decibels or more as a result of the transportation improvement project. When this occurs, the requirement for abatement consideration will be followed.

The developed lands along the project corridor were evaluated to identify the noise sensitive receptor sites that may be impacted by traffic noise associated with the proposed improvements. Noise sensitive receptor sites represent any property where frequent exterior human use occurs and where a lowered noise level would be of benefit. This includes residential units (FHWA Noise Abatement Activity Category B), other noise sensitive areas including parks, playgrounds, medical facilities, schools, and places of worship (Category C) and certain commercial properties (Category E). Noise sensitive sites also include interior use areas where no exterior activities occur for facilities such as auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, recording studios and schools (Category D).

5.1.1 I-95 - Southern Project Terminus to SW 10th Street (SR 869)

Noise sensitive sites along the segment of the I-95 project corridor from the southern project terminus to SW 10th Street are depicted in **Figure 5-1**, below. Noise sensitive sites are found along both sides of this project segment. These noise sensitive sites include approximately 375 residences, primarily mobile-homes in two communities (Highland Village and Country Knolls), but also includes the Praxis of Deerfield Beach condominiums. One school is located along the east side of this project segment, Deerfield Beach

High School. Other noise sensitive sites along the east side of this project segment include a Cracker Barrel Restaurant at 1250 FAU Research Park Boulevard and Deerfield Beach Teen Center at 1303 FAU Research Park Boulevard. Other noise sensitive sites west of this project segment also include two hotels, the Best Western Plus at 1050 East Newport Center Drive and a Comfort Suites at 1040 East Newport Center Drive. This segment of the project also includes office buildings and institutional uses that are not considered noise sensitive (i.e., Activity Category F).

Two noise barriers are located along this project segment, one along each side of the corridor. These noise barriers are as follows:

- 86070000NB2265 – Eastern limited-access right of way line, NE 48th Street to NE 52nd Street (1002+55 to 1022+20), 2,015 feet long, 14 feet tall.
- 86070800SB2264 – Western limited-access right of way line, NW 48th Street to NE 53rd Place (1001+73 to 1028+51), 2,675 feet long, 16 feet tall.

Figure 5 - 1: Noise Sensitive Sites from Southern Project Terminus to SW 10th Street (SR 869)

5.1.2 I-95 - SW 10th Street (SR 869) To Hillsboro Boulevard (SR 810)

Noise sensitive sites along this segment of the I-95 project corridor are shown on **Figure 5-2**, below. Noise sensitive sites are found only along the east side of this segment of I-95 and include approximately 115 residences, primarily condominiums or apartments. Several single-family homes are included in this number. Pools at the Tivoli Park and Natura communities was also considered to be noise sensitive. This segment of the project also includes retail stores, office buildings and warehouses that are not considered noise sensitive (i.e., Activity Category F).

A new noise barrier has recently been constructed along the east side of the corridor as part of the FDOT's I-95 Express project, as follows:

- CD3-E10 (I-95 Express) – Eastern limited-access right of way line, north SW 10th Street to south of Hillsboro Boulevard [Station (Sta.) 1060+50 to 1101+00], 4,335 feet long, 20 feet tall.

Figure 5 - 2: Noise Sensitive Sites from SW 10th Street (SR 869) To Hillsboro Boulevard (SR 810)

5.1.3 I-95 – Hillsboro Boulevard (SR 810) to Northern Project Terminus

Noise sensitive sites along this segment of the I-95 project corridor are shown on **Figure 5-3**, below. No residences are found along this project segment. Non-residential noise sensitive sites are found on both sides of this project segment. The Double Tree by Hilton Hotel Deerfield Beach, located at 100 Fairway Drive, is located to the east. To the west, a playground at JM Family Daycare located at 640 Jim Moran Boulevard and a walking trail at the JM&A Group office campus located at 700 Jim Moran Boulevard are found. This segment of the project also includes office buildings, warehouses and industrial/light industrial enterprises that are not considered noise sensitive (i.e., Activity Category F).

There are no existing or planned noise barriers along this segment of I-95.

Figure 5 - 3: Noise Sensitive Sites

5.1.4 SW 10th Street (SR 869)

The residential noise sensitive sites west of I-95 along SW 10th Street (SR 869) include over 200 apartments in the two and three-story Lakes at Deerfield Apartments located at 1100 S Military Trail. A pool and tennis courts at the Lakes at Deerfield Apartments and a walking trail at the Tivoli Sand Pines Preserve are the only non-residential noise sensitive site along SW 10th Street within the limits of the project. This corridor also includes commercial use, office buildings and institutional uses that are not considered noise sensitive (i.e., Activity Category F).

5.1.5 Hillsboro Boulevard (SR 810)

There are no noise sensitive sites along Hillsboro Boulevard within the limits of this project. This corridor primarily includes commercial use, office buildings and institutional uses that are not considered noise sensitive (i.e., Activity Category F).

5.2 Field Measurement of Noise Levels and Model Validation

Measurements of sample existing noise levels along the project corridor were performed using procedures defined in the FHWA report *Measurement of Highway-Related Noise* (FHWA-PD-96-046). Field measurements of existing noise levels were conducted on May 2, 2018 at four locations within the project study area. The locations of the field measurement sites are depicted on **Figures 5-4 to 5-7** and described in Error! Reference source not found..

Table 5 - 2: Field Measurement Data

Field Receptor	Location	Sample Run	Time/ Date	Measured 10-Minute Traffic Volume (Auto/MT/HT/B/ Mcy)	Distance From Roadway (Feet)	Measured Traffic Noise Level [dB(A)]	Modeled Traffic Noise Level [dB(A)]	Difference (Measured - Modeled) [dB(A)]
FR-1	Deerfield Beach Teen Center 1303 FAU Research Park Blvd	A	2:21PM 05-02-18	NB: 1020/35/51/0/1 SB: 1031/39/36/0/0	53	74.9	75.9	-1
					137	69.4	72.3	-2.9
		B	2:36PM 05-02-18	NB: 1156/36/40/1/0 SB: 1049/35/36/0/0	53	74.6	75.1	-0.5
					137	69.4	71.5	-2.1
		C	2:52PM 05-02-18	NB: 1091/29/55/0/2 SB: 1169/40/29/3/0	53	76.5	75.1	1.4
					137	68.7	71.4	-2.7
FR-2	Single-family homes along the east side of I-95. Near I-95 Station 1371+20.	A	11:03AM 05-02-18	NB: 825/32/66/1/1 SB: 970/31/36/0/1	60	74.9	76.1	-1.2
					120	72.0	74.3	-2.3
		B	11:21AM 05-02-18	NB: 916/41/56/0/1 SB: 1016/37/56/1/0	60	74.8	76.1	-1.3
					120	72.2	74.3	-2.1
		C	11:36AM 05-02-18	NB: 869/36/58/2/1 SB: 1062/36/37/2/0	60	75.0	76.2	-1.2
					120	72.3	74.4	-2.1
FR-3	Tivoli Sand Pines Preserve. Near SW 10th Street Station 45+10.	A	9:45AM 05-02-18	EB: 153/9/0/0/2 WB: 172/3/0/0/1	100	57.6	57.4	0.2
		B	10:00AM 05-02-18	EB: 152/5/5/0/2 WB: 126/1/0/2/1	100	57.2	56.8	0.4
		C	10:14AM 05-02-18	EB: 125/6/3/0/1 WB: 130/3/1/1/2	100	57.8	57.0	0.8
FR-4	The Lakes at Deerfield apartment homes located at 1100 S. Military Trail. Near SW 10th Street	A	12:32PM 05-02-18	EB: 307/12/4/1/0 WB: 339/12/7/1/0	40	66.2	68.2	-2
					130	65.0	64.0	1
		B	12:48PM 05-02-18	EB: 261/10/9/1/0 WB: 293/11/6/1/0	40	70.9	68.5	2.4
					130	66.2	64.5	1.7
		C	1:23PM 05-02-18	EB: 260/10/11/0/0 WB: 286/8/7/0/0	40	67.7	68.5	-0.8
					130	66.4	64.5	1.9

Notes: MT = Medium Trucks, HT = Heavy Trucks, B = Bus, Mcy = Motorcycles, NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound

Three repetitions of ten-minute readings were measured at each site to ensure reasonable results. Where possible, readings were taken at the first and second rows in residential communities. Unusual noises at the monitoring sites were documented to facilitate identification of any atypical noise sources along the alignment. Rion Model NL-21 Type-II integrating sound level meters were used to collect noise level data. Foam wind screens and adjustable tripods were also used. The sound level meters were

calibrated to 94 dB at 1000 Hertz using a Rion Model NC-73 acoustical calibrator.

Traffic data was collected by the project team during each measurement period. Traffic speeds were measured using Bushnell Model# 101911 radar speed measuring equipment. Traffic volumes, speed data and noise levels were collected during 12 ten-minute sampling periods. The ambient temperature during the measurement periods was approximately 80 to 88 degrees Fahrenheit, and the wind generally from the east/southeast; and the average wind speed generally remained less than approximately seven miles per hour (MPH) throughout the measurement periods. The relative humidity was approximately 57 to 66 percent and the cloud cover varied between 10 to 90 percent throughout the measurement periods. All roadway surfaces remained clean and dry during the measurements. The data collected were then used as inputs to the TNM. The dates, times, traffic data and the measured and TNM-predicted noise levels are presented in Error! Reference source not found..

5.2.1 Field Measurements Sites

5.2.1.1 Site FR-1

This measurement site is located along the east side of I-95, at the Deerfield Beach Teen Center located at 1303 FAU Research Park Blvd (See **Figure 5-4**, below). This site is representative of noise sensitive single-family homes located east of I-95 between the southern project terminus and SW 10th Street. Traffic noise levels at this site were measured approximately 98 and 180 feet from the near edge of the outside NB I-95 travel lane in order to be representative of nearby first and second row residences. Noise level readings were taken between 2:05 and 2:52 PM. Existing traffic noise levels were found to range from 74.6 to 76.5 dB(A) at the near location and 68.7 to 69.4 dB(A) at the far location.

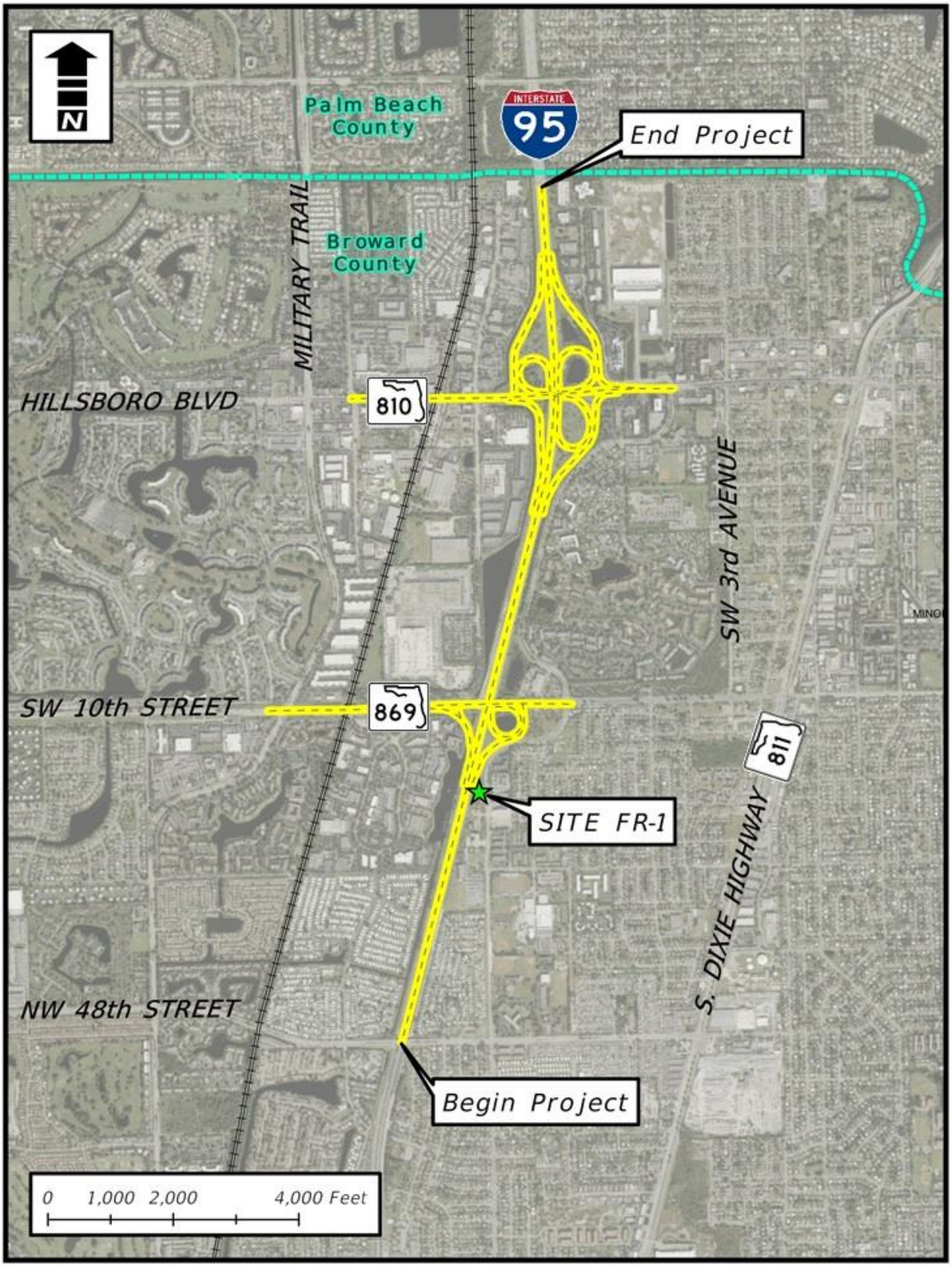


Figure 5 - 4: Site FR-1

5.2.1.2 Site FR-2

This measurement site is located along the east side of I-95, between the NB lane of I-95 and SW Natura Boulevard (See **Figure 5-5**, below). This site is representative of noise sensitive single-family homes located east of the corridor between SW 10th Street and Hillsboro Boulevard. Traffic noise levels at this site were measured approximately 60 and 120 feet from the near edge of the outside NB I-95 travel lane in order to be representative of nearby first and second row residences. Noise level readings were taken between 11:03 AM and 11:52 AM. Existing traffic noise levels were found to range from 74.8 to 75.0 dB(A) at the near location and 72.0 to 72.3 dB(A) at the far location.

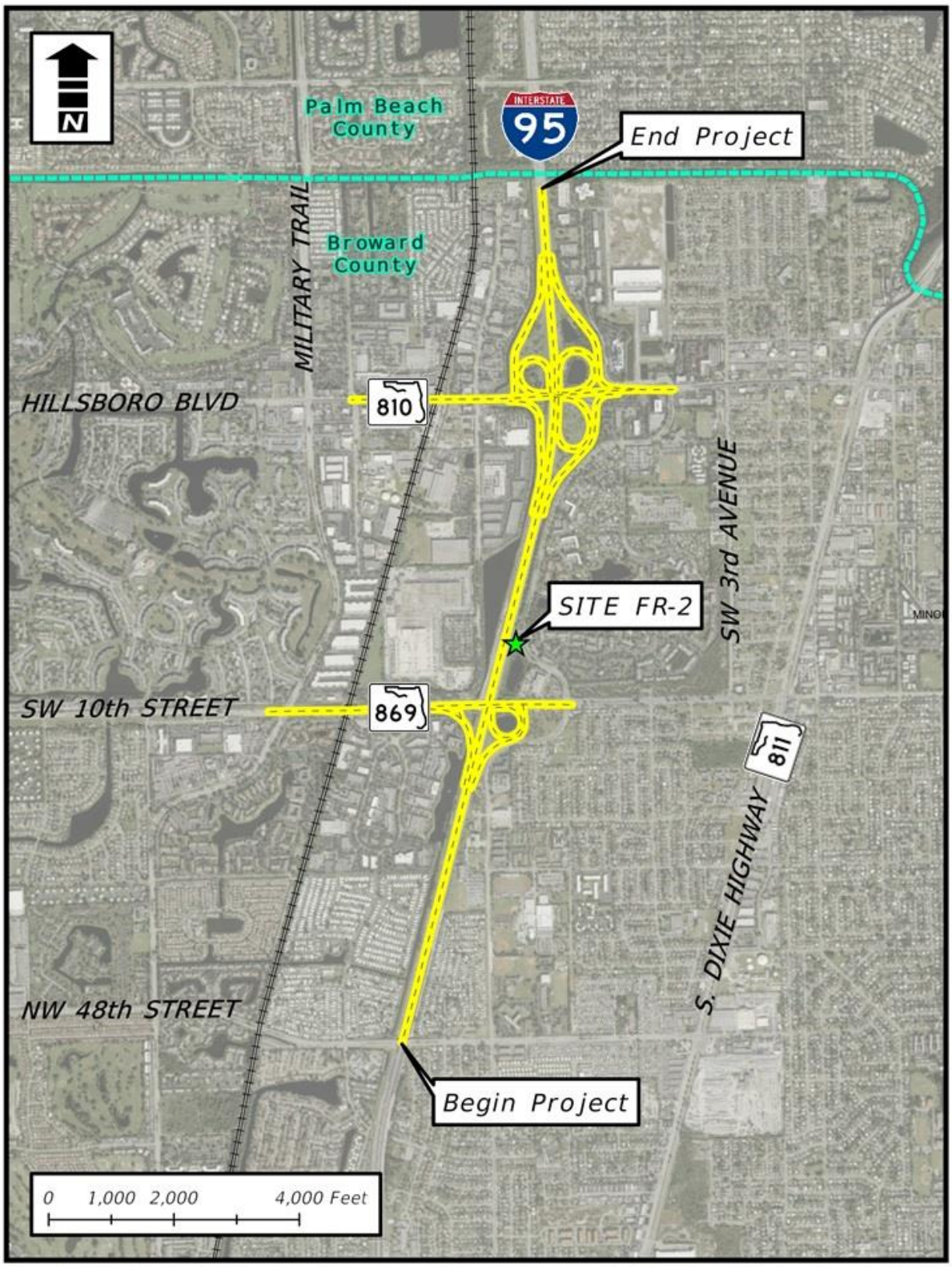


Figure 5 - 5: Site FR-2

5.2.1.3 Site FR-3

This measurement site is located within Tivoli Sand Pines Preserve along the north side of SR 869/SW 10th Street, at the intersection of SW 6th Avenue and SR 869/SW 10th Street (See **Figure 5-6**, below). This site is representative of noise sensitive sites located north of SR 869/SW 10th Street between I-95 and S. Dixie Highway. Traffic noise levels at this site were measured approximately 100 feet from the near edge of the WB SW 10th Street travel lane in order to be representative of visitors on nature trail at Tivoli Sand Pines Preserve. Noise level readings were taken between 9:45 AM and 10:28 AM. Existing traffic noise levels were found to range from 57.2 to 57.8 dB(A) at the noise level reading location.

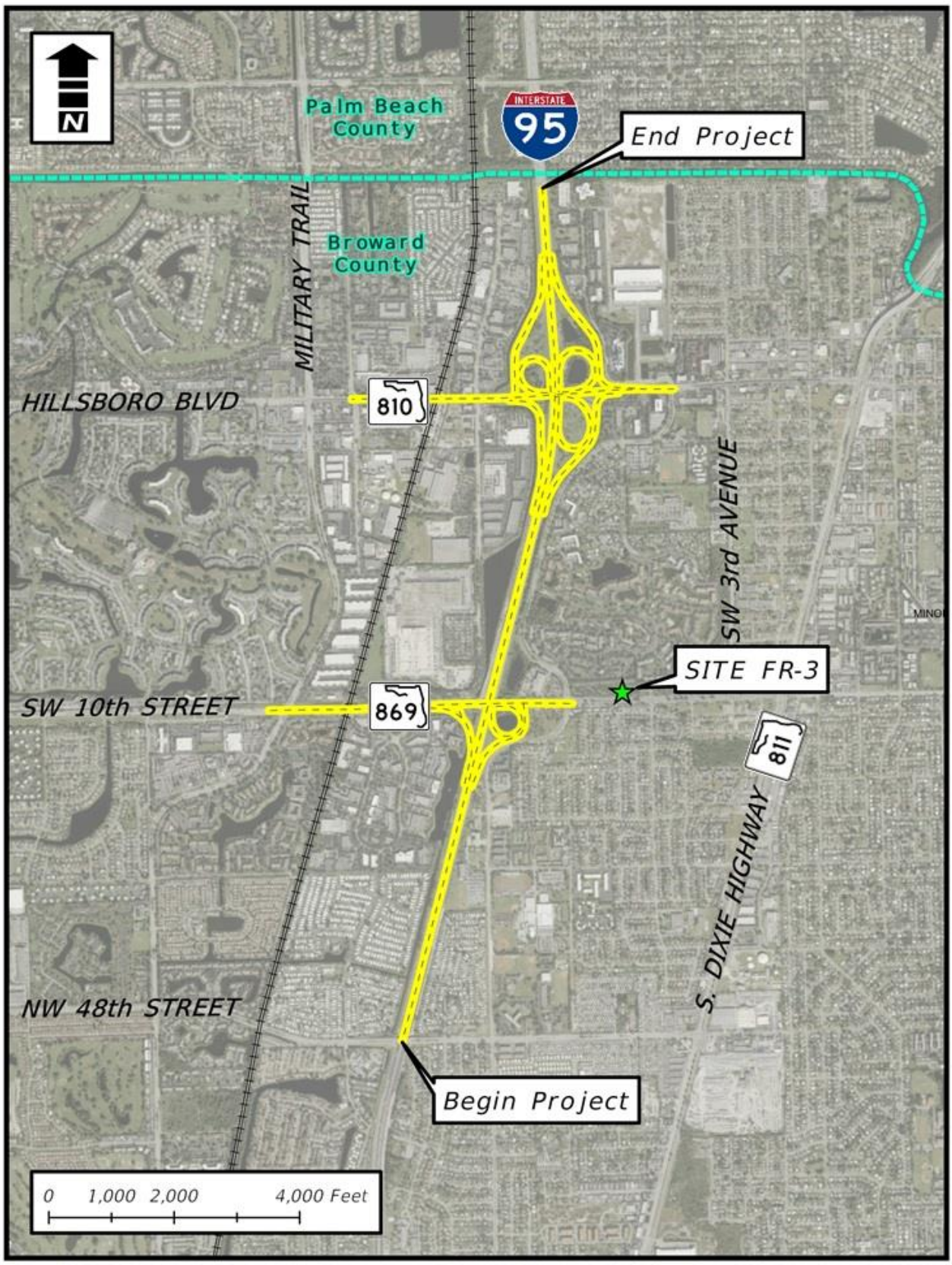


Figure 5 - 6: Site FR-3

5.2.1.4 Site FR-4

This measurement site is located along the south side of SR 869/SW 10th Street, at the Lakes at Deerfield apartments (See **Figure 5-7**, below). This site is representative of noise sensitive multi-family homes located south of the SR 869/SW 10th Street between I-95 and Military Trail. Traffic noise levels at this site were measured approximately 40 and 130 feet from the near edge of the EB SW 10th Street travel lane in order to be representative of the nearby residences. Noise level readings were taken between 12:32 and 1:23 PM. Existing traffic noise levels were found to range from 66.2 to 67.7 dB(A) at the near location and 65.0 to 66.4 dB(A) at the far location.

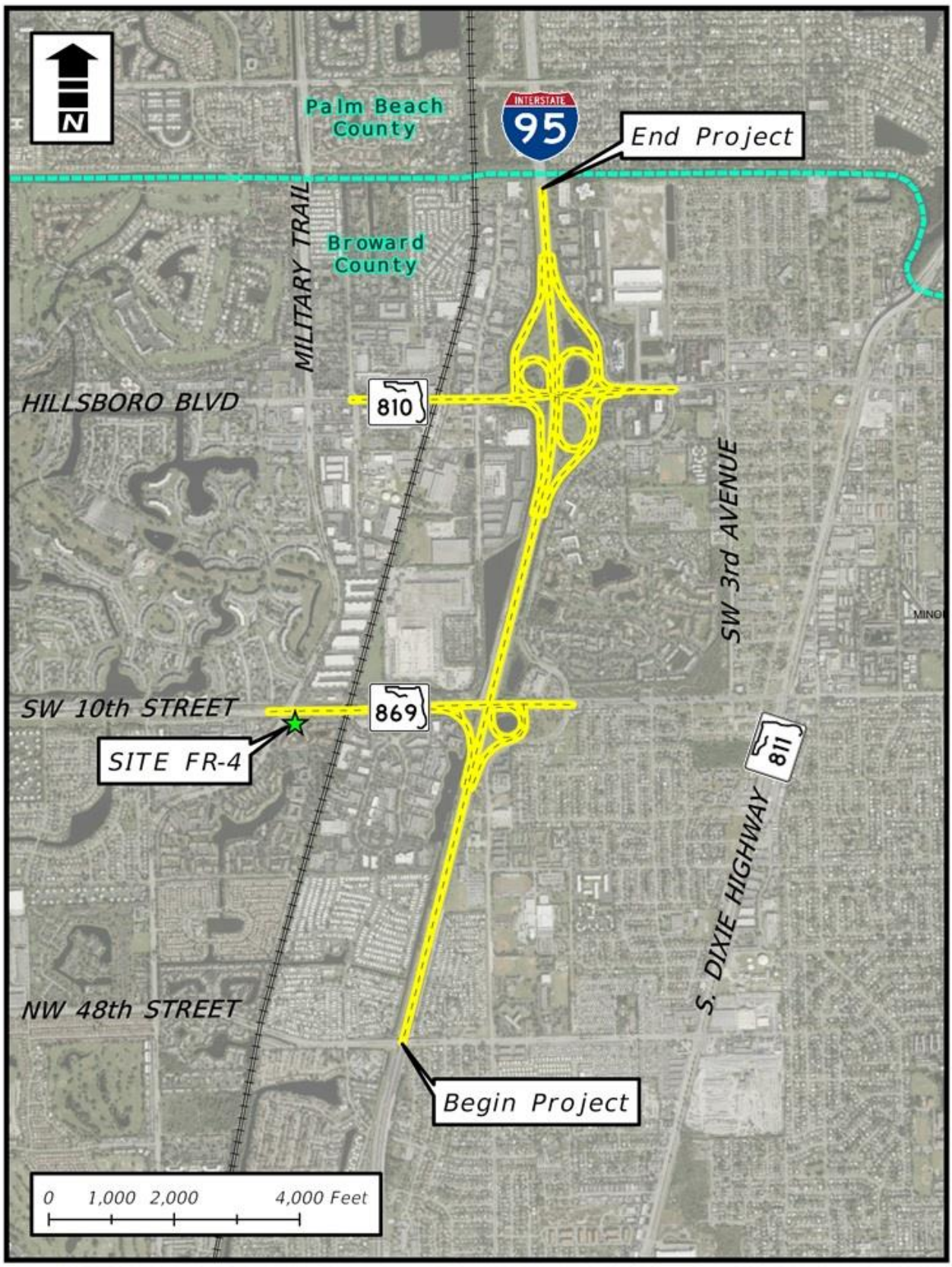


Figure 5 - 7: Site FR-4

5.2.1.5 Field Measurement Summary

Existing noise levels were measured at four sites along the project corridor during 12 ten-minute long sampling periods. Traffic noise levels were found to range from 68.7 to 75.0 dB(A) at the two sites along I-95 (FR-1 and FR-2) and from 57.2 to 67.7 dB(A) at the two sites along the arterial roadways (FR-3 and FR-4 along SR 869/SW 10th Street). In all cases, traffic noise from either I-95 or the arterial roadways was the predominant source of noise at the nearby noise sensitive sites.

5.3 Computer Noise Model Validation

Site conditions and traffic data gathered during the field measurements were used to develop inputs to the FHWA's TNM 2.5 for computer models representative of the existing conditions. Additional geometric information necessary for these models was developed from aerial photographs and/or MicroStation files of the existing conditions in the project study area. The TNM results were then compared to the noise level data collected for each field measurement sample. The results of this analysis are shown in **Table 5-2**. The model inputs for the field conditions are deemed to be within an acceptable level of accuracy if the predicted noise levels are within ±3.0 dB(A) of the measured noise levels. These model inputs are then used as a basis for additional model runs used to predict existing and future noise levels at representative nearby noise sensitive locations. The difference for each of the field measurements falls within the ±3.0 dB(A) verification limit in accordance with Chapter 18 of the FDOT PD&E Manual. Thus, further use of the TNM model on this project is supported.

5.4 Noise Model Development

After verification of the prediction methodology, computer models were developed for the existing year (2018) conditions, and the design year (2040) No-Action Alternative and recommended Build Alternative. The TNM models for all Alternatives were developed using geometric information from the project master plans. Traffic data used in the TNM models were derived from traffic data provided by the FDOT traffic consultant for the project and from data contained in the 2012 FDOT Quality/Level of Service Handbook tables. These data may be found in **Appendix A**. According to Chapter 18 of the PD&E Manual, "Maximum peak-hourly traffic representing Level of

Service (LOS) "C", or demand LOS of "A", "B", or "C" will be used (unless analysis shows that other conditions create a "worst-case" level)". In cases where traffic volumes on project roadways were predicted to operate at worse than LOS C, the LOS C project data were used. In overcapacity situations, this represents the highest traffic volume traveling at the highest average speed, which typically generates the highest noise levels at a given site during a normal day.

Representative receptor sites were used in the TNM model inputs to estimate noise levels associated with existing and future conditions within the project study area. These sites were chosen based on noise sensitivity, roadway proximity, anticipated impacts from the proposed project, and homogeneity (i.e., the site is representative of other nearby sites). For single-family homes, traffic noise levels were predicted at the edge of the dwelling unit closest to the nearest primary roadway. For other noise sensitive sites that may be impacted, traffic noise levels were predicted where the exterior activity occurs. For the prediction of interior noise levels, receptor sites were placed ten feet inside the building at the edge closest to roadway. Building noise reduction factors identified in *Figure 18-3* of Chapter 18 of the PD&E Manual and window conditions were used to estimate the noise reduction due to the physical structure. All receptor sites were modeled five feet above the local ground elevation. One-hundred fifty-six model receptors representative of approximately 454 residential noise sensitive sites and the 18 non-residential noise sensitive sites described in **Section 5.1** of this report were input into the TNM model. These locations are described in **Table 5-3**.

5.5 Predicted Noise Levels

The TNM results for the worst-case traffic conditions for the existing (2018) conditions and the Design Year (2040) No-Action Alternative and the Build Alternative are summarized in the following sections. Predicted noise levels for individual model receptors are presented in **Table 5-3**.

5.5.1 I-95

Existing traffic noise levels at the residences along I-95 are predicted by TNM to range from 52.5 to 70.4 dB(A) during peak periods. Design year worst-case traffic noise levels with the No-Action Alternative are predicted to range from 53.2 to 72.5 dB(A) and to be no more than 3.1 dB(A) greater than existing levels at these residences. Design year worst-case traffic noise levels at the residences are predicted to range from 53.8 to 71.1 dB(A) with the recommended Build Alternative. These predicted levels are no more than 3.4 dB(A) greater than the existing levels and 1.8 dB(A) greater than those of the No-Action Alternative. Existing traffic noise levels at the non-residential noise sensitive sites along I-95 are predicted to range from 45.0 dB(A) inside the UM Health offices to 77.1 dB(A) at the Teen Center Basketball court during peak periods. Design year worst-case traffic noise levels with the No-Action Alternative are predicted to range from 46.7 to 78.9 dB(A) at the same locations, no more than 2.0 dB(A) greater than existing levels at these sites. Design year worst-case traffic noise levels with the recommended Build Alternative are predicted to range from 45.6 to 78.4 dB(A); no more than 3.0 dB(A) greater than the existing levels and 1.8 dB(A) greater than those of the No-Action Alternative.

5.5.2 SW 10th Street (SR 869)

Existing traffic noise levels at residences along SR 869/SW 10th Street are predicted by TNM to range from 50.8 to 65.9 dB(A) during peak periods. Design year worst-case traffic noise levels with the No-Action Alternative are predicted to range from 51.4 to 66.4 dB(A) and to be no more than 1.1 dB(A) greater than existing levels at these residences. Design year worst-case traffic noise levels at the residences are predicted to range from 56.0 to 68.2 dB(A) with the recommended Build Alternative. These predicted levels are no more than 6.8 dB(A) greater than the existing levels and 6.2 dB(A) greater than those of the No-Action Alternative. Existing traffic noise levels at the non-residential noise sensitive sites along SR 869/SW 10th Street are predicted to range from 51.7 to 66.4 dB(A) during peak periods. Design year worst-case traffic noise levels with the No-Action Alternative are predicted to range from 52.3 to 67.1 dB(A), no more than 0.8 dB(A) greater than existing levels at these sites. Design year worst-case traffic noise levels with the recommended Build Alternative are predicted to range from 55.8 to 67.7

dB(A); up to 4.1 dB(A) greater than the existing levels and up to 3.5 dB(A) greater than those of the No-Action Alternative.

Table 5 - 3: Modeled Noise Receptor Locations and Noise Analysis Results

Representative Model Receptor	Location	Type	Description (Noise Abatement Activity Category)	FDOT Noise Abatement Approach Criteria [dB(A)]	Location (Station)	Number Of Noise Sensitive Sites	Distance To Nearest Traffic Lane* [Existing/No-Action/Build] (Feet)	Predicted Traffic Noise Levels [LAeq1h, dB(A)]		
								Existing (2018)	Design Year (2040)	
									No-Action	Build
I-95 - Southern Project Terminus to SW 10th Street (SR 869)										
East Side										
HV1	Highland Village Mobile Home Park	SFH	Residential (B)	66	1306+80	2	102/79/80	69.7	71.7	71.1
HV2	Highland Village Mobile Home Park	SFH	Residential (B)	66	1309+50	5	89/61/68	62.6	64.7	64.6
HV3	Highland Village Mobile Home Park	SFH	Residential (B)	66	1312+00	10	89/56/70	62.4	64.8	64.5
HV4	Highland Village Mobile Home Park	SFH	Residential (B)	66	1316+90	10	85/50/70	62.1	64.6	64.2
HV5	Highland Village Mobile Home Park	SFH	Residential (B)	66	1320+20	6	93/58/80	62.8	65.1	64.8
HV6	Highland Village Mobile Home Park	SFH	Residential (B)	66	1323+60	7	97/63/82	63.3	65.6	65.2
HV7	Highland Village Mobile Home Park	SFH	Residential (B)	66	1325+80	2	104/73/82	70.4	72.5	68.9
HV8	Highland Village Mobile Home Park	SFH	Residential (B)	66	1307+40	3	221/197/199	62.4	63.7	63.8
HV9	Highland Village Mobile Home Park	SFH	Residential (B)	66	1310+00	5	217/186/195	59.7	61.7	61.5
HV10	Highland Village Mobile Home Park	SFH	Residential (B)	66	1312+40	6	221/191/202	58.7	60.1	59.8
HV11	Highland Village Mobile Home Park	SFH	Residential (B)	66	1317+00	11	223/188/208	59.2	60.3	60.2
HV12	Highland Village Mobile Home Park	SFH	Residential (B)	66	1319+80	5	213/179/200	58.8	59.9	59.8
HV13	Highland Village Mobile Home Park	SFH	Residential (B)	66	1322+80	4	215/181/201	60.6	61.9	62.0
HV14	Highland Village Mobile Home Park	SFH	Residential (B)	66	1325+60	2	207/176/185	66.9	68.5	68.4
DBHSTennis	Deerfield Beach High School Tennis Court	Tennis Courts	Active Sports Area (C)	66	1326+60	1	888/859/870	58.6	60.1	60.6
DBHSFootball	Deerfield Beach High School Football Field	Sports Field	Active Sports Area (C)	66	1330+20	1	880/856/852	57.2	58.3	59.1
PRAX1(a)	Praxis Senior Community	MFH	Residential (B)	66	1336+60	2	612/590/575	58.9	60.7	61.6
PRAX1(b)	Praxis Senior Community	MFH	Residential (B)	66	1336+60	2	612/590/575	62.1	63.3	64.1
PRAX1(c)	Praxis Senior Community	MFH	Residential (B)	66	1336+60	2	612/590/575	63.4	64.3	64.9
PRAX1(d)	Praxis Senior Community	MFH	Residential (B)	66	1336+60	2	612/590/575	63.9	65.2	66.0
PRAX2(a)	Praxis Senior Community	MFH	Residential (B)	66	1337+25	2	599/576/561	59.5	61.5	62.4
PRAX2(b)	Praxis Senior Community	MFH	Residential (B)	66	1337+25	2	599/576/561	63.1	64.3	64.9
PRAX2(c)	Praxis Senior Community	MFH	Residential (B)	66	1337+25	2	599/576/561	64.3	65.2	65.6
PRAX2(d)	Praxis Senior Community	MFH	Residential (B)	66	1337+25	2	599/576/561	64.8	66.1	66.5
PRAX3(a)	Praxis Senior Community	MFH	Residential (B)	66	1337+75	2	589/566/551	59.3	61.3	62.3
PRAX3(b)	Praxis Senior Community	MFH	Residential (B)	66	1337+75	2	589/566/551	62.8	64.0	64.8
PRAX3(c)	Praxis Senior Community	MFH	Residential (B)	66	1337+75	2	589/566/551	64.1	65.0	65.6

Representative Model Receptor	Location	Type	Description (Noise Abatement Activity Category)	FDOT Noise Abatement Approach Criteria [dB(A)]	Location (Station)	Number Of Noise Sensitive Sites	Distance To Nearest Traffic Lane* [Existing/No-Action/Build] (Feet)	Predicted Traffic Noise Levels [LAeq1h, dB(A)]		
								Existing (2018)	Design Year (2040)	
									No-Action	Build
PRAX3(d)	Praxis Senior Community	MFH	Residential (B)	66	1337+75	2	589/566/551	64.6	66.0	66.7
PRAX4(a)	Praxis Senior Community	MFH	Residential (B)	66	1338+60	2	570/547/531	60.2	62.1	63.0
PRAX4(b)	Praxis Senior Community	MFH	Residential (B)	66	1338+60	2	570/547/531	63.4	64.6	65.1
PRAX4(c)	Praxis Senior Community	MFH	Residential (B)	66	1338+60	2	570/547/531	64.6	65.5	65.8
PRAX4(d)	Praxis Senior Community	MFH	Residential (B)	66	1338+60	2	570/547/531	65.1	66.5	66.5
PRAX5(a)	Praxis Senior Community	MFH	Residential (B)	66	1339+00	2	569/547/530	58.8	60.7	61.7
PRAX5(b)	Praxis Senior Community	MFH	Residential (B)	66	1339+00	2	569/547/530	62.0	63.2	64.0
PRAX5(c)	Praxis Senior Community	MFH	Residential (B)	66	1339+00	2	569/547/530	63.2	64.1	64.8
PRAX5(d)	Praxis Senior Community	MFH	Residential (B)	66	1339+00	2	569/547/530	63.8	65.1	65.9
PRAX6(a)	Praxis Senior Community	MFH	Residential (B)	66	1339+70	2	550/527/510	60.0	61.9	62.6
PRAX6(b)	Praxis Senior Community	MFH	Residential (B)	66	1339+70	2	550/527/510	63.2	64.4	64.7
PRAX6(c)	Praxis Senior Community	MFH	Residential (B)	66	1339+70	2	550/527/510	64.4	65.3	65.2
PRAX6(d)	Praxis Senior Community	MFH	Residential (B)	66	1339+70	2	550/527/510	65.0	66.3	65.8
PRAX7(a)	Praxis Senior Community	MFH	Residential (B)	66	1336+90	2	683/660/645	54.6	56.5	57.3
PRAX7(b)	Praxis Senior Community	MFH	Residential (B)	66	1336+90	2	683/660/645	58.7	60.0	60.6
PRAX7(c)	Praxis Senior Community	MFH	Residential (B)	66	1336+90	2	683/660/645	60.6	61.5	62.0
PRAX7(d)	Praxis Senior Community	MFH	Residential (B)	66	1336+90	2	683/660/645	61.3	62.3	63.1
PRAX8(a)	Praxis Senior Community	MFH	Residential (B)	66	1338+80	2	633/610/593	53.7	55.4	56.0
PRAX8(b)	Praxis Senior Community	MFH	Residential (B)	66	1338+80	2	633/610/593	56.4	57.6	58.5
PRAX8(c)	Praxis Senior Community	MFH	Residential (B)	66	1338+80	2	633/610/593	57.5	58.3	59.2
PRAX8(d)	Praxis Senior Community	MFH	Residential (B)	66	1338+80	2	633/610/593	58.4	59.7	60.5
PRAX9(a)	Praxis Senior Community	MFH	Residential (B)	66	1339+90	2	606/583/565	53.0	54.9	55.3
PRAX9(b)	Praxis Senior Community	MFH	Residential (B)	66	1339+90	2	606/583/565	56.1	57.4	57.9
PRAX9(c)	Praxis Senior Community	MFH	Residential (B)	66	1339+90	2	606/583/565	57.2	58.1	58.5
PRAX9(d)	Praxis Senior Community	MFH	Residential (B)	66	1339+90	2	606/583/565	58.0	59.5	59.7
DBTCBBall	Deerfield Beach Teen Center Basketball Court	Public Institution Structure	Active Sports Area (C)	66	1347+40	1	65/45/19	77.1	78.9	78.4
CBpatio	Cracker Barrel Restaurant	Restaurant Exterior Patio	Sensitive Commercial (E)	71	1348+50	1	411/391/372	65.2	67.0	67.1
SFH1	Single-Family Homes	SFH	Residential (B)	66	1350+80	3	408/394/394	58.9	60.7	61.1
SFH2	Single-Family Homes	SFH	Residential (B)	66	1352+60	1	233/215/215	65.0	67.7	67.9
SFH3	Single-Family Homes	SFH	Residential (B)	66	1353+60	1	152/134/134	66.1	69.2	69.5

Representative Model Receptor	Location	Type	Description (Noise Abatement Activity Category)	FDOT Noise Abatement Approach Criteria [dB(A)]	Location (Station)	Number Of Noise Sensitive Sites	Distance To Nearest Traffic Lane* [Existing/No-Action/Build] (Feet)	Predicted Traffic Noise Levels [LAeq1h, dB(A)]		
								Existing (2018)	Design Year (2040)	
									No-Action	Build
SFH4	Single-Family Homes	SFH	Residential (B)	66	1354+00	3	153/140/140	65.7	67.6	68.7
SFH5	Single-Family Homes	SFH	Residential (B)	66	1353+80	2	49/49/49	62.5	63.5	65.0
SFH6	Single-Family Homes	SFH	Residential (B)	66	1353+60	2	50/50/50	63.5	64.5	66.0
SFH7	Single-Family Homes	SFH	Residential (B)	66	1352+00	3	328/309/309	56.6	58.1	58.2
MayoPark1	Mayo Howard Park	Park	Park (C)	66	1355+00	1	93/92/92	59.5	60.5	62.2
MayoPark2	Mayo Howard Park	Park	Park (C)	66	1354+20	1	122/120/120	58.5	59.3	61.1
West Side										
CK1	Country Knolls	SFH	Residential (B)	66	1307+60	3	157/139/146	67.8	69.1	68.3
CK2	Country Knolls	SFH	Residential (B)	66	1311+50	10	147/127/136	62.9	64.3	64.4
CK3	Country Knolls	SFH	Residential (B)	66	1314+80	4	159/139/147	62.7	63.9	64.7
CK4	Country Knolls	SFH	Residential (B)	66	1310+00	4	254/234/243	60.1	60.6	60.5
CK5	Country Knolls	SFH	Residential (B)	66	1312+00	7	262/243/251	56.7	57.3	57.6
CK6	Country Knolls	SFH	Residential (B)	66	1314+80	3	269/249/258	59.0	59.9	60.4
HM1	Highland Meadows Estates	SFH	Residential (B)	66	1317+40	4	148/128/136	62.9	64.3	65.0
HM2	Highland Meadows Estates	SFH	Residential (B)	66	1322+80	12	153/133/130	62.8	64.2	65.7
HM3	Highland Meadows Estates	SFH	Residential (B)	66	1326+80	15	154/133/124	63.6	65.1	66.4
HM4	Highland Meadows Estates	SFH	Residential (B)	66	1330+20	4	155/134/125	65.3	67.1	68.1
HM5	Highland Meadows Estates	SFH	Residential (B)	66	1318+00	6	253/233/242	57.0	57.6	58.2
HM6	Highland Meadows Estates	SFH	Residential (B)	66	1323+20	6	280/260/257	56.7	57.2	58.2
HM7	Highland Meadows Estates	SFH	Residential (B)	66	1327+00	6	257/236/227	57.0	57.6	58.6
HM8	Highland Meadows Estates	SFH	Residential (B)	66	1329+40	3	276/256/246	58.5	59.5	60.4
HMPool	Highland Meadows Estates Pool	Pool	Res. Pool (C)	66	1327+80	1	497/476/467	61.1	62.1	60.8
UMHealth(Int)	UM Health	Medical Office	Interior (D)	51	1346+60	1	355/341/313	45.0	46.7	45.6
BWPool	Best Western Pool	Pool	Sensitive Commercial (E)	71	1354+00	1	272/275/216	65.8	67.0	66.6
CSPool	Comfort Suites Pool	Pool	Sensitive Commercial (E)	71	1357+60	1	175/172/153	62.2	62.9	63.6
I-95 - SW 10th Street (SR 869) To Hillsboro Boulevard (SR 810)										
East Side										
TIV1(a)	Tivoli Park	MFH	Residential (B)	66	1368+00	4	619/590/562	56.4	57.1	58.4
TIV1(b)	Tivoli Park	MFH	Residential (B)	66	1368+00	4	404/374/347	62.7	63.5	64.0
TIV2(a)	Tivoli Park	MFH	Residential (B)	66	1369+60	2	404/374/347	57.5	58.1	59.4

Representative Model Receptor	Location	Type	Description (Noise Abatement Activity Category)	FDOT Noise Abatement Approach Criteria [dB(A)]	Location (Station)	Number Of Noise Sensitive Sites	Distance To Nearest Traffic Lane* [Existing/No-Action/Build] (Feet)	Predicted Traffic Noise Levels [LAeq1h, dB(A)]		
								Existing (2018)	Design Year (2040)	
									No-Action	Build
TIV2(b)	Tivoli Park	MFH	Residential (B)	66	1369+60	2	539/507/481	63.6	64.4	65.0
TIV6(a)	Tivoli Park	MFH	Residential (B)	66	1370+40	6	539/507/481	54.0	54.7	55.4
TIV6(b)	Tivoli Park	MFH	Residential (B)	66	1370+40	6	339/308/281	57.7	58.6	59.7
TIV3(a)	Tivoli Park	MFH	Residential (B)	66	1370+40	2	339/308/281	57.8	58.5	59.6
TIV3(b)	Tivoli Park	MFH	Residential (B)	66	1370+40	2	262/229/202	63.6	64.3	64.9
TIV4(a)	Tivoli Park	MFH	Residential (B)	66	1372+40	2	262/229/202	59.2	59.9	60.8
TIV4(b)	Tivoli Park	MFH	Residential (B)	66	1372+40	2	419/385/359	64.0	64.8	65.1
TIV7(a)	Tivoli Park	MFH	Residential (B)	66	1372+80	4	419/385/359	55.6	56.4	57.2
TIV7(b)	Tivoli Park	MFH	Residential (B)	66	1372+80	4	241/207/182	58.2	59.1	59.3
TIV5(b)	Tivoli Park	MFH	Residential (B)	66	1373+40	2	241/207/182	64.6	65.3	65.6
TIV5(a)	Tivoli Park	MFH	Residential (B)	66	1373+40	2	569/535/525	57.8	58.1	58.3
TIV8(b)	Tivoli Park	MFH	Residential (B)	66	1375+00	4	569/535/525	57.7	58.3	59.1
TIV8(a)	Tivoli Park	MFH	Residential (B)	66	1375+00	4	619/590/562	56.2	56.8	57.6
TIV9(a)	Tivoli Park	MFH	Residential (B)	66	1377+00	4	588/560/552	56.7	57.5	57.9
TIV9(b)	Tivoli Park	MFH	Residential (B)	66	1377+00	4	588/560/552	57.7	58.4	59.3
TIV10	Tivoli Park	MFH	Residential (B)	66	1380+00	1	457/435/416	56.8	57.6	58.3
TIV Pool	Tivoli Park Pool	Pool	Res. Pool (C)	66	1381+40	1	533/511/497	54.5	55.1	56.6
NAT1	Natura	MFH	Residential (B)	66	1386+80	4	252/229/192	58.7	59.3	60.5
NAT2	Natura	MFH	Residential (B)	66	1386+60	4	336/314/277	57.8	58.0	58.6
NAT3	Natura	MFH	Residential (B)	66	1388+00	4	290/268/231	59.3	59.7	59.9
NAT4(a)	Natura	MFH	Residential (B)	66	1389+00	1	247/230/193	58.1	58.7	58.7
NAT4(b)	Natura	MFH	Residential (B)	66	1389+00	1	247/230/193	61.0	61.7	61.8
NAT4(c)	Natura	MFH	Residential (B)	66	1389+00	1	247/230/193	62.9	63.2	64.3
NAT5(a)	Natura	MFH	Residential (B)	66	1394+20	2	305/303/280	55.4	56.2	56.3
NAT5(b)	Natura	MFH	Residential (B)	66	1394+20	2	305/303/280	58.9	59.8	59.9
NAT5(c)	Natura	MFH	Residential (B)	66	1394+20	2	305/303/280	63.5	64.3	64.4
NAT6	Natura	MFH	Residential (B)	66	1395+80	2	226/224/206	62.0	62.4	62.3
NAT7	Natura	MFH	Residential (B)	66	1396+60	2	231/229/214	62.7	62.1	61.7
NAT8	Natura	MFH	Residential (B)	66	1398+00	2	212/205/205	61.4	62.0	62.4
NAT9	Natura	MFH	Residential (B)	66	1399+80	3	199/199/199	61.1	61.5	63.3
NAT10	Natura	MFH	Residential (B)	66	1401+40	2	210/201/201	62.0	62.4	62.0
NAT11	Natura	MFH	Residential (B)	66	1402+20	3	237/234/234	61.7	62.0	62.1

Representative Model Receptor	Location	Type	Description (Noise Abatement Activity Category)	FDOT Noise Abatement Approach Criteria [dB(A)]	Location (Station)	Number Of Noise Sensitive Sites	Distance To Nearest Traffic Lane* [Existing/No-Action/Build] (Feet)	Predicted Traffic Noise Levels [LAeq1h, dB(A)]		
								Existing (2018)	Design Year (2040)	
									No-Action	Build
NAT12	Natura	MFH	Residential (B)	66	1402+60	2	361/359/359	60.3	60.7	60.7
NAT13	Natura	MFH	Residential (B)	66	1395+80	4	336/334/318	52.5	53.2	53.8
NAT14	Natura	MFH	Residential (B)	66	1397+60	2	282275/275	58.0	58.6	58.9
NAT15	Natura	MFH	Residential (B)	66	1398+80	4	289/291/291	57.6	58.1	58.6
NAT16	Natura	MFH	Residential (B)	66	1400+80	3	294/287/287	58.4	59.1	58.5
NAT17	Natura	MFH	Residential (B)	66	1401+80	4	351/348/348	58.6	59.3	58.8
NATPool	Natura Pool	Pool	Res. Pool (C)	66	1391+60	1	535/533/500	52.8	53.2	53.8
Hillsboro Boulevard (SR 810) to northern project terminus										
East Side										
HiltonPool	Hilton Pool	Pool	Sensitive Commercial (E)	71	1418+60	1	265265/265	61.2	61.0	62.2
West Side										
JM-Pg	JM Family Daycare Playground	Playground	Playground (C)	66	1441+20	1	356/357/350	66.5	68.5	68.8
JM-WT	JM&A Group Walking Trail	Trail	Trail (C)	66	1445+20	1	575/577/570	61.8	63.4	64.8
SW 10th Street (SR 869)										
South Side										
LD1(a)	The Lakes at Deerfield	MFH	Residential (B)	66	1354+50	4	118/118/118	60.9	62.0	63.4
LD1(b)	The Lakes at Deerfield	MFH	Residential (B)	66	1354+50	2	118/118/118	63.4	64.1	65.0
LD1(c)	The Lakes at Deerfield	MFH	Residential (B)	66	1354+50	4	118/118/118	64.1	64.9	66.1
LD2(a)	The Lakes at Deerfield	MFH	Residential (B)	66	1356+00	4	294/294/226	62.0	63.1	64.8
LD2(b)	The Lakes at Deerfield	MFH	Residential (B)	66	1356+00	4	294/294/226	64.6	65.3	66.2
LD2(c)	The Lakes at Deerfield	MFH	Residential (B)	66	1356+00	2	294/294/226	65.3	66.0	67.4
LD3(a)	The Lakes at Deerfield	MFH	Residential (B)	66	1357+20	4	174/174/124	64.6	65.3	65.2
LD3(b)	The Lakes at Deerfield	MFH	Residential (B)	66	1357+20	4	174/174/124	64.7	65.3	67.1
LD3(c)	The Lakes at Deerfield	MFH	Residential (B)	66	1357+20	2	174/174/124	64.7	65.4	68.2
LD4(a)	The Lakes at Deerfield	MFH	Residential (B)	66	1356+20	4	298/298/248	56.6	57.2	56.0
LD4(b)	The Lakes at Deerfield	MFH	Residential (B)	66	1356+20	4	298/298/248	59.4	60.0	57.3
LD4(c)	The Lakes at Deerfield	MFH	Residential (B)	66	1356+20	2	298/298/248	61.0	61.6	63.0
LD5(a)	The Lakes at Deerfield	MFH	Residential (B)	66	1357+00	1	215/215/165	61.2	62.2	61.0
LD5(b)	The Lakes at Deerfield	MFH	Residential (B)	66	1357+00	4	215/215/165	64.1	64.6	62.6
LD5(c)	The Lakes at Deerfield	MFH	Residential (B)	66	1357+00	2	215/215/165	65.1	65.7	65.2
LD6(a)	The Lakes at Deerfield	MFH	Residential (B)	66	1357+40	4	176/176/122	61.3	62.0	60.7

Representative Model Receptor	Location	Type	Description (Noise Abatement Activity Category)	FDOT Noise Abatement Approach Criteria [dB(A)]	Location (Station)	Number Of Noise Sensitive Sites	Distance To Nearest Traffic Lane* [Existing/No-Action/Build] (Feet)	Predicted Traffic Noise Levels [LAeq1h, dB(A)]		
								Existing (2018)	Design Year (2040)	
									No-Action	Build
LD6(b)	The Lakes at Deerfield	MFH	Residential (B)	66	1357+40	4	176/176/122	64.3	65.0	63.0
LD6(c)	The Lakes at Deerfield	MFH	Residential (B)	66	1357+40	2	176/176/122	65.9	66.4	65.8
LD7(a)	The Lakes at Deerfield	MFH	Residential (B)	66	1357+40	4	178/178/93	60.5	61.1	60.2
LD7(b)	The Lakes at Deerfield	MFH	Residential (B)	66	1357+40	4	178/178/93	62.6	63.2	62.4
LD7(c)	The Lakes at Deerfield	MFH	Residential (B)	66	1357+40	2	178/178/93	65.2	65.8	64.6
LD8(a)	The Lakes at Deerfield	MFH	Residential (B)	66	1355+60	4	358/358/273	50.8	51.4	57.6
LD8(b)	The Lakes at Deerfield	MFH	Residential (B)	66	1355+60	4	358/358/273	53.3	53.9	58.6
LD8(c)	The Lakes at Deerfield	MFH	Residential (B)	66	1355+60	2	358/358/273	58.4	59.0	62.2
LD9(a)	The Lakes at Deerfield	MFH	Residential (B)	66	1355+10	4	405/405/346	51.3	51.9	56.3
LD9(b)	The Lakes at Deerfield	MFH	Residential (B)	66	1355+10	4	405/405/346	54.2	54.8	58.7
LD9(c)	The Lakes at Deerfield	MFH	Residential (B)	66	1355+10	2	405/405/346	57.9	58.5	61.8
LDPool	The Lakes at Deerfield Pool	Pool	Res. Pool (C)	66	1355+20	1	383/383/333	51.7	52.3	55.8
LDTennis	The Lakes at Deerfield Tennis Court	Tennis Courts	Active Sports Area (C)	66	1356+30	1	279/279/230	54.7	55.5	58.5
North Side										
TSPPark	Tivoli Sand Pine Preserve	Trail	Trail (C)	66	1362+20	1	619/590/562	66.4	67.1	67.7

Notes: * = To existing edge-of-pavement of the nearest travel lane.
Bold numbers indicate Build Alternative noise levels equal or exceeding FDOT Noise Abatement Criteria
SFH = Single-Family Home, MFH = Multi-Family Home (i.e., apartments, condominiums), SLU = Special Land Use site

5.6 Noise Impact Analysis

Approximately 454 residences with the potential to be impacted by the proposed improvements were identified along I-95, SR 869/SW 10th Street, and SR 810/Hillsboro Blvd. within the project study area. These residences include single-family homes, mobile-homes, two to four-unit multi-family homes and apartment/condominium complexes. Also, 18 noise sensitive non-residential/special-use sites were identified in the project study area. These include parks, playgrounds, hotel and residential pools, tennis courts, sports fields, basketball courts, restaurant outdoor seating areas and medical office interiors. Under the existing conditions, the primary source of noise at the nearby noise sensitive sites is traffic on the subject roadways (I-95 and SW 10th Street) but also FAU Research Park Boulevard, Natura Boulevard, S Military Trail and Hillsboro Boulevard.

During the design year, the primary source of noise in the area is expected to remain traffic on the nearby roadways listed above. The planned improvements will add elevated direct-connect ramps between I-95 and SW 10th Street and a new CD system along the east side of I-95 between SW 10th Street and Hillsboro Boulevard. Predicted design year traffic noise levels for the Build Alternative were compared to the NAC and to noise levels predicted for the existing conditions, to assess potential noise impacts associated with the proposed project (see **Table 5-3**).

Build Alternative traffic noise levels at the residences are expected to range from approximately 53.8 to 71.1 dB(A) during the project's design year. Build Alternative traffic noise levels at the non-residential/special-use sites are expected to range from approximately 45.6 dB(A) at UM Health to 78.4 dB(A) at the basketball court located at the Deerfield Beach Teen Center. The worst-case design year traffic noise levels with the Build Alternative are predicted to be no more than 6.8 dB(A) greater than existing levels and 6.2 greater than the design year No-Action noise levels.

5.6.1 I-95 - Southern Project Terminus to SW 10th Street (SR 869)

Build Alternative traffic noise levels are predicted to approach or exceed the FHWA NAC - 67 dB(A) at 41 residences along the segment of the I-95 project corridor between the southern project terminus and SW 10th Street.

Build Alternative traffic noise levels at the non-residential noise sensitive sites along this project segment are predicted to approach or exceed the FHWA NAC - 67 dB(A) at the Teen Center basketball court. No other sites are predicted to be impacted by Build Alternative traffic noise.

5.6.2 I-95 - SW 10th Street (SR 869) to Hillsboro Boulevard (SR 810)

Build Alternative traffic noise levels are not predicted to approach or exceed the FHWA NAC - 67 dB(A) at any of the residences along the segment of the I-95 project corridor between SW 10th Street and Hillsboro Boulevard. All of these sites are located behind a recently constructed 20-foot tall noise barrier along the eastern limited-access right-of-way line. No other sites are predicted to be impacted by Build Alternative traffic noise.

5.6.3 I-95 – Hillsboro Boulevard (SR 810) to the Northern Project Terminus

The Build Alternative traffic noise level at the playground at the JM Family Daycare Center is predicted to approach or exceed the FHWA NAC – 67 dB(A). No other sites are predicted to be impacted by Build Alternative traffic noise.

5.6.4 SW 10th Street (SR 869)– Western Project Terminus to the Eastern Project Terminus

Build Alternative traffic noise levels are predicted to approach or exceed the FHWA NAC - 67 dB(A) at 14 residences along SW 10th Street. Build Alternative traffic noise levels at the non-residential noise sensitive sites along this project segment are predicted to approach or exceed the FHWA NAC - 67 dB(A) along the walking trail at the Tivoli Sand Pines Preserve.

5.7 Noise Impacts Summary

Build Alternative traffic noise levels are predicted to approach or exceed the FHWA NAC - 67 dB(A) at a total of 55 residences within the limits of the project. For the non-residential noise sensitive sites within the limits of the project, Build Alternative traffic noise levels are predicted to approach or exceed the correlating FHWA NAC at three such sites, basketball courts at

the Deerfield Beach Teen Center, the walking trail at the Tivoli Sand Pines Preserve and the playground at the JM Family Daycare Center [NAC = 67 dB(A) for all]. Therefore, based on the FHWA and FDOT methodologies used to evaluate traffic noise levels in this study, modifications proposed with this project were determined to generate noise impacts at noise sensitive sites within the project study area and consideration of noise abatement is required to mitigate these impacts. An analysis of noise abatement measures considered for the sites that approach or exceed the NAC is presented in **Section 6**. Although a number of sites approach or exceed the NAC, the proposed improvements do not result in any substantial noise increases (i.e., greater than 15 dB(A) over existing levels).

6.0 NOISE BARRIER ANALYSIS

As described above in **Section 5.7**, predicted design year traffic noise levels with the Build Alternative will approach or exceed the NAC at 55 residences and a basketball court at the City of Deerfield Beach Teen Center, the walking trail at the Tivoli Sand Pine Preserve park and the playground at the JM Family Daycare Center. The FDOT requires that the reasonableness and feasibility of noise abatement be considered when the NAC is approached or exceeded. Noise abatement was considered for impacted sites in the three areas identified in **Table 6-1** by Common Noise Environment (CNE). A CNE represents a group of impacted receptor sites that would benefit from the same noise barrier or barrier system (i.e., overlapping/continuous barriers) and are exposed to similar noise sources and levels, traffic volumes, traffic mix, speeds and topographic features. Generally, CNEs occur between two secondary noise sources, such as interchanges, intersections and/or cross-roads or where defined by ground features such as canals. Noise abatement was considered for the impacted residences, basketball court, walking trail and playground listed above.

The most common and effective noise abatement measure for projects such as this is construction of a noise barrier as close as possible to the impacted sites. Noise barriers reduce noise by blocking the sound path between a roadway and a noise sensitive area. To be effective, noise barriers must be long, continuous, and have sufficient height to block the path between the noise source and the receptor site.

According to FHWA guidelines, in cases where traffic noise impacts are predicted to occur behind an existing noise barrier as a result of planned improvements, the reasonableness and feasibility of the existing noise barrier should be reassessed to determine if the noise barrier will satisfy FDOT's current noise policy requirements. This is accomplished by comparing the predicted noise levels with the existing noise barrier to the levels predicted without the noise barrier. If the existing noise barrier still meets the FDOT's current policy requirements, then no further analysis is necessary. This is the case even if noise levels are predicted to exceed the NAC behind the existing noise barrier since the goal of noise abatement is to achieve a substantial reduction in noise levels, not to reduce noise levels below the NAC. In cases where an existing noise barrier do not comply with

FDOT's current requirements, the feasibility and reasonableness of extending, supplementing, retrofitting or replacing the existing noise barrier will be considered in order to satisfy those requirements. Since traffic noise impacts are predicted to occur behind the two existing noise barriers along I-95 south of SW 10th Street, this type of analysis was conducted for these noise barriers.

Table 6 - 1: Locations Evaluated for Noise Barriers

Common Noise Environment Identification Number	General Location (Address or Cross Streets)	Relative Location	Type of Noise Sensitive Site (Noise Abatement Activity Category)	Number of Impacted Receptors	Noise Barrier Analysis Section in Report
I95HV	Highland Village (NE 48th Street to NE 52nd Street)	East of I-95	Residential (Activity Category B)	6	7.1
I95Praxis	Praxis Apartments FAU Research Park Boulevard between (SW 15th Street and SW 14th Street)	East of I-95	Residential (Activity Category B)	6	7.2
I95Teen	City of Deerfield Beach Teen Center (1303 FAU Research Park Boulevard)	East of I-95	Sports Field (Activity Category C)	1 Special Use	7.3
I95DH	Deerfield Highlands (SW 12th Court to SW 11th Court)	East of I-95	Residential (Activity Category B)	7	7.4
TSPPark	Tivoli Sand Pines Preserve (501 SW 10th Street)	North of SW 10th Street	Park Walking Trail (Activity Category C)	1 Special Use	7.5
JMPG	JM Family Daycare Center (640 Jim Moran Boulevard)	West of I-95	Playground (Activity Category C)	1 Special Use	7.6
I95CK_HM	Highland Meadows (NE 48th Street to NE 53rd Place)	West of I-95	Residential (Activity Category B)	22	7.7
LAKES	Lakes at Deerfield Apartments (1100 S. Military Trail)	South of SW 10th Street	Residential (Activity Category B)	14	7.8

A wide range of factors are used to evaluate the feasibility and reasonableness of noise abatement measures. Feasibility primarily concerns

the ability to reduce noise levels by at least five dB(A) at the impacted receptor sites using standard construction methods and techniques. Engineering considerations typically assessed during the feasibility analysis include access, drainage, utilities, safety and maintenance.

Current FDOT structural standards require that noise barriers located within the roadway clear recovery zone (e.g., at the edge-of-pavement) meet crash test requirements stipulated by National Cooperative Highway Research Program (NCHRP) 350 Test Level 4 criteria. They must either be constructed of a crash-approved noise barrier design or be protected by a supplemental traffic barrier or guardrail meeting Level 4 criteria offset a minimum of five feet from the front face of the noise barrier. Crash-approved noise barrier designs currently permitted by FDOT are limited to a maximum height of eight feet on structures and 14 feet on fill. Ground-mounted noise barriers not located within the roadway clear recovery zone are limited by FDOT to a maximum height of 22 feet.

Reasonableness implies that common sense and good judgment were applied in a decision related to noise abatement. A reasonableness analysis includes consideration of the cost of abatement, the amount of noise abatement benefit, and the consideration of the viewpoints of the impacted and benefited property owners and residents. The FDOT's current Statewide average noise barrier unit cost is $30 per square-foot. To be deemed reasonable, a noise barrier must, at a minimum, meet two important FDOT criteria:

- The estimated construction cost cannot exceed the FDOT's reasonable cost criteria of $42,000 per benefited receptor site; and,
- According to the FDOT's noise reduction reasonableness criteria, the noise barrier must reduce noise levels by at least seven dB(A) at one or more impacted receptor sites.

As part of the reasonableness cost analysis, various conceptual noise barrier designs were evaluated for each impacted area to determine the most effective location, length and height that will achieve the desired noise level reduction at reasonable cost. In addition, the primary method for determining the cost of noise abatement involves a review of the cost per benefited receptor site for the construction of a noise barrier benefiting a

single location or common noise environment (e.g., a subdivision or contiguous impact area).

The locations of the noise barriers that were considered are shown in **Appendix B**. The following discussion provides the details of the feasibility and reasonableness analysis for noise barriers considered for each of the impacted sites.

6.1 CNE I95HV–Highland Village East of I-95 between NE 48th Street to NE 52nd Street

Six residences along the east side of I-95 between NE 48th Street and NE 52nd Street are expected to experience design year traffic noise levels approaching or exceeding the FHWA NAC [67 dB(A)] with the Build Alternative. These sites are shown on **Sheet 1** in **Appendix B**. Two of the impacted noise sensitive sites are located at the southern terminus of the existing 2,015-foot long, 14-foot tall ground-mounted noise barrier along the eastern limited-access right of way line between NE 48th Street and NE 52nd Street. Four of the impacted sites are located near the northern terminus of this noise barrier. With the Build Alternative, the design year traffic noise levels behind this noise barrier are predicted to range from 59.8 to 71.1 dB(A), an average increase of approximately 1.4 dB(A) over existing levels.

The primary planned improvement near the residences is the construction of the beginnings of the direct-connect ramps between I-95 and SW 10th Street. These improvements will move traffic along the NB lanes of I-95 up to 15 feet closer to the residences in Highland Village. NE 48th Street is elevated over I-95 just south of this community. Also, an overhead powerline corridor runs between the current southern terminus of the existing noise barrier and NE 48th Street.

The existing noise barrier was evaluated to determine if it would reduce traffic noise levels with the planned improvements by at least seven dB(A) for at least one residence, which it does. The existing noise barrier was also evaluated to determine if would continue to benefit enough sites [by providing a noise level reduction of at least five dB(A)] to meet FDOT's cost reasonableness criteria, which it also does. However, noise levels at the two impacted residences near the noise barrier's northern terminus are not

predicted to be reduced by at least 5.0 dB(A). It was determined that traffic noise impacts at these residences could be mitigated by extending the noise barrier northward. Increasing the height of the existing noise barrier was also considered; however, this would require replacing the existing noise barrier with a taller noise barrier. The results of the noise barrier analysis for these residences are summarized in **Table 6-2**. The noise barrier design concept for this site is shown on **Sheet 1** in **Appendix B**.

A 14-foot tall, 270-foot long ground-mounted noise barrier located along the eastern limited access right of way line from the end of the existing noise barrier at Sta. 5717+10 northward to Sta. 5719+80 was considered to be the most feasible and effective noise abatement Alternative for the impacted residences. This noise barrier design concept will match the height of the existing noise barrier. This concept is referred to as I95HV-CD2 in **Table 6-2**. The additional cost of this noise barrier extension is estimated to be $113,400 (based on FDOT's $30 per square-foot cost estimate).

With this 270-foot long extension, the overall noise barrier is expected to reduce noise levels at the impacted sites by 5.1 to 11.7 dB(A). Therefore, the two impacted residences that are not benefited with the existing noise barrier will be benefited when the noise barrier is extended to the north. Overall, the extended noise barrier is predicted to benefit 64 residences at a cost of $959,700 overall and $14,995 per benefited site. Therefore, the cost per benefited site of this noise barrier is within the FDOT's noise barrier cost criteria ($42,000 per benefited site) and it will attain the FDOT's noise reduction reasonableness requirement of seven dB(A) at one or more sites.

Improving the existing noise barrier by constructing a 14-foot tall, 270-foot long northward extension is recommended for further consideration and public input. This noise barrier concept will match the height of the existing noise barrier. This noise barrier concept satisfies the other reasonableness and feasibility factors considered in the evaluation of noise abatement measures including safety, constructability, utilities and drainage. This noise barrier concept does not have any sight distance issues, any substantial conflicts with utilities or drainage facilities and it can be constructed using standard construction methods. However, this noise barrier extension will encroach upon an existing marquee sign for the People's Trust Insurance Company offices. This sign, however, does not meet the criteria for

consideration of outdoor advertising with respect to noise barriers according to the guidelines in Chapter 18. Therefore, this noise barrier is not expected to obstruct any existing, conforming and legally permitted outdoor advertising.

Table 6 - 2: Noise Barrier Analysis for Common Noise Environment-I95HV

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
I95HV Highland Village East Side of I-95 from NE 48th Street to NE 52nd Street.	Existing	Ground-Mounted	14	2,015	1306+65	5717+10	6	5.4 (8.4)	4	58	62	10.3 (14.1)	$846,300[A]	$13,600[A]	Benefits 4 of the 6 impacted sites; therefore, does not benefit all of the impacted sites. Provides at least a 7.0 dB(A) reduction at most sites. No additional costs.
	I95HV-CD1	Ground-Mounted	14	2,235	1306+65 (Extension begins at 5717+10)	5719+30	6	7.6 (11.5)	4	58	62	10.7 (14.1)	$938,700[A]	$15,140[A]	**Not Recommended** – 220-foot long extension of existing noise barrier. Does not benefit any additional sites. Provides at least a 7.0 dB(A) reduction at most sites. Would partially block nearby marquee sign for People's Trust Insurance Company offices. Additional cost = $92,400.
	I95HV-CD2	Ground-Mounted	14	2,285	1306+65 (Extension begins at 5717+10)	5719+80	6	7.9 (11.7)	6	58	64	10.2 (14.1)	$959,700[A]	$14,995[A]	**Recommended** – 270-foot long extension of existing noise barrier. Benefits two additional impacted residences compared to existing noise barrier. Provides at least a 7.0 dB(A) reduction at most sites. Noticeable 4.2 dB(A) improvement at impacted site at north end. Would partially block nearby marquee sign for People's Trust Insurance Company offices. Additional cost = $113,400.
	I95HV-CD3	Ground-Mounted	14	2,335	1306+65 (Extension begins at 5717+10)	5720+30	6	8.1 (11.9)	6	58	64	10.3 (14.1)	$980,700[A]	$15,323[A]	**Not Recommended** - 320-foot long extension of existing noise barrier. Does not benefit any additional residences compared to the recommended noise barrier design concept. Provides at least a 7.0 dB(A) reduction at most sites. Noticeable 4.7 dB(A) improvement at impacted site at north end. Would block nearby marquee sign for People's Trust Insurance Company offices to a greater degree than the recommended noise barrier design concept. Additional costs = $134,400.

Note: [A] = This estimated overall cost is only used to evaluate cost reasonableness in accordance with FHWA guidelines for existing noise barriers.

6.2 CNE I95Praxis–East of FAU Research Park Boulevard between NE 15th Street and NE 14th Street

Six apartments in the Praxis Apartments along the east side of FAU Research Park Boulevard between NE 15th Street and NE 14th Street are expected to experience design year traffic noise levels approaching or exceeding the FHWA NAC [67 dB(A)] with the Build Alternative. These sites are shown on **Sheet 1** in **Appendix B**. The design year traffic Build Alternative noise levels at these apartments are predicted to range from 55.3 to 66.7 dB(A), representing an increase of up to 3.0 dB(A) from existing levels.

The primary improvements near these apartments include realigning the NB I-95 off-ramp and mainline to accommodate the direct-connect ramps between I-95 and SW 10th Street. The NB lanes will be moved up to approximately 50 feet closer to the apartments; however, the near lanes of I-95 will remain over 500 feet away. Moreover, heavily-trafficked FAU Research Park Boulevard is located directly adjacent to this apartment complex.

Within the limits of the project, the most feasible location for noise abatement for this apartment complex is along the eastern limited-access right-of-way line. This places the noise barrier approximately 500 feet from the nearest apartments, with traffic noise from FAU Research Park Boulevard further diminishing the effectiveness of this noise barrier. The results of the noise barrier analysis for these apartments are summarized in **Table 6-3**. The noise barrier design concept for this site is shown on **Sheet 1** in **Appendix B**.

A ground-mounted noise barrier at least 20 feet tall located along the eastern limited-access right of way line would be required to provide a noise level reduction of at least five dB(A) at any of the apartments. Increasing the height to the FDOT's maximum allowable height for ground-mounted noise barriers (22 feet) only provided a maximum noise level reduction of 5.8 dB(A). Due to the distance between the only feasible location that the noise barrier can be built and the receptors, and due to traffic on FAU Research Park Boulevard, it was not possible to provide a noise barrier that would reduce noise levels enough to meet FDOT's Noise Reduction Design

Goal [7.0 dB(A)]. Therefore, at this time, this noise barrier is not recommended for further consideration during Final Design.

Table 6 - 3: Noise Barrier Analysis for Common Noise Environment-I95Praxis

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
I95Praxis East side of FAU Research Park Boulevard from SW 15th Street to SW 14th Street.	I95Praxis-CD1	Ground-Mounted	20	1,150	5724+25	75+65	6	3.4 (3.8)	0	4	4	5.4 (5.5)	$690,000	$172,500	**Not Recommended** – Does not achieve 7.0 dB(A) at any of the benefited sites.
	I95Praxis - CD2	Ground-Mounted	22	1,100	5724+25	75+15	6	3.5 (4.1)	0	8	8	5.3 (5.8)	$726,000	$90,750	**Not Recommended** – Does not achieve 7.0 dB(A) at any of the benefited sites.

Table 6 - 4: Noise Barrier Analysis for Common Noise Environment-I95Teen

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
I95Teen Deerfield Beach Teen Center East side of I-95 between NE 15th Street and NE 14th Street	I95Teen-CD1	Ground-Mounted	8	350	1341+60	79+80	1 SLU	6.6 (8.1)	1 SLU	0	1 SLU	6.6 (8.1)	$84,000	See Table 7-5	**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
	I95Teen-CD2	Ground-Mounted	10	270	1342+00	79+40	1 SLU	7.1 (9.3)	1 SLU	0	1 SLU	7.1 (9.3)	$81,000	See Table 7-5	**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
	I95Teen-CD3	Ground-Mounted	12	250	1342+00	79+20	1 SLU	7.6 (9.9)	1 SLU	0	1 SLU	7.6 (9.9)	$90,000	See Table 7-5	**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
	I95Teen-CD4	Ground-Mounted	14	230	1342+00	79+00	1 SLU	7.6 (10.2)	1 SLU	0	1 SLU	7.6 (10.2)	$96,600	See Table 7-5	**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
	I95Teen-CD5	Ground-Mounted	22	210	1342+20	79+00	1 SLU	7.7 (10.6)	1 SLU	0	1 SLU	7.7 (10.6)	$138,600	See Table 7-5	**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.

6.3 CNE I95Teen–City of Deerfield Beach Teen Center

The results of the noise barrier analysis for the City of Deerfield Beach Teen Center located at Tivoli Sand Pine Preserve located at 1303 FAU Research Park Boulevard east of I-95 are summarized in **Table 6-4**. The teen center is shown on **Sheet 2** in **Appendix B**. The design year traffic Build Alternative noise level at a basketball court on the north side of the teen center is predicted to be 78.4 dB(A), greater than the FHWA NAC [67 dB(A)]. This noise level exceeds the predicted existing traffic noise level by 1.3 dB(A).

The most feasible location to provide noise abatement for this basketball court was determined to be along the eastern limited-access right of way line directly adjacent to the court.

Several noise barrier design concepts were evaluated, design concept I95Teen-CD2 is considered the most reasonable and feasible noise barrier design for this basketball court. A 10-foot tall, 270-foot long noise barrier would be the most cost reasonable design that would reduce traffic noise levels in the park by at least 7.0 dB(A). The estimated cost of this noise barrier is $81,000 overall.

The FDOT's special land use methodology was used to determine if the cost of this noise barrier would be reasonable based on the level of activity of the basketball court. The results of this analysis are shown in **Table 6-5**. The usage rate of the park necessary to meet the FDOT's cost reasonableness criteria for special land use was evaluated based on the noise barrier design concept described above. It was determined that at least 114 people per day, based on each spending one hour would be necessary to meet the FDOT's cost reasonableness requirements for this noise barrier. The teen center's operating hours are currently from 10AM to 7PM; therefore, a usage rate of 13 people per hour would be needed for the noise barrier to be cost reasonable. Based on this requirement, actual consistent usage of the courts is expected to be below a level sufficient to meet the cost criterion for construction of a noise barrier at this location. Therefore, noise abatement is not recommended for further consideration and public input for the I95Teen noise barrier due to insufficient usage.

Table 6 - 5: Special Use Site Noise Barrier Analysis for Common Noise Environment-I95 Teen

Item	Criteria	Input	Units
		I95Teen-CD2	
1	Enter Length of Proposed Barrier	270	feet
2	Enter Height of Proposed Barrier	10	feet
3	Multiply item 1 by item 2	2,700	$feet^2$
4	Enter the average amount of time that a person stays at the site per visit	1	hours
5	Enter the average number of people that use this site per day that will receive at least 5 dB(A) benefit from abatement at the site	**114**	persons
6	Multiply item 4 by item 5	114	person-hours
7	Divide item 3 by item 6	23.71	$feet^2$/person-hours
8	Multiply item 7 by $42,000	$995,935	$/person-hours/$ft^2$
9	Does item 8 exceed the "abatement cost factor" of: $995,935/person-hour/$ft^2$?	N/A	Yes/No
10	If item 9 is no, abatement is reasonable.	N/A	
11	If item 9 is yes, abatement is not reasonable.	N/A	

6.4 CNE I95DH–Deerfield Heights East of FAU Research Park Boulevard between NE 12th Court and NE 11th Court

Seven single-family residences in the Deerfield Highlands community along the east side of FAU Research Park Boulevard between NE 12th Court and NE 11th Court are expected to experience design year traffic noise levels approaching or exceeding the FHWA NAC [67 dB(A)] with the Build Alternative. These sites are shown on **Sheet 1** in **Appendix B**. The design year traffic Build Alternative noise levels at these residences are predicted to range from 58.2 to 69.5 dB(A), representing an increase of up to 3.4 dB(A) from existing levels.

The primary improvements near these residences include realigning the NB I-95 off-ramp and mainline to accommodate the direct-connect ramps between I-95 and SW 10th Street and to accommodate new turn lanes at the terminus of the off-ramp. The off-ramp lanes will be moved up to

approximately 50 feet closer to the residences and heavily-trafficked FAU Research Park Boulevard is located directly adjacent to these residences. The most feasible location within the limits of the project for noise abatement for these residences is along the eastern limited-access right-of-way line of the offramp. This places the noise barrier more than 100 feet from the nearest residences, with traffic noise from FAU Research Park Boulevard also further diminishing the effectiveness of this noise barrier. The results of the noise barrier analysis for these residences are summarized in **Table 6-6**. The noise barrier design concept for this site is shown on **Sheet 2** in **Appendix B**.

An 18-foot tall, 850-foot long ground mounted noise barrier located along the limited access right of way line of the off-ramp between Sta. 82+00 and 90+50 was considered to be the most feasible and effective noise abatement Alternative for the impacted residences. This noise barrier design concept is referred to as I95DH-CD5 in **Table 6-6**. This concept would reduce noise levels at the impacted sites by up to 7.2 dB(A). Only two of the seven impacted sites were predicted to experience a noise level reduction of at least 5.0 dB(A) and thus be benefited by this noise barrier concept. Two non-impacted sites were predicted to be benefited incidentally.

The estimated cost of this noise barrier is $459,000 overall and $114,750 per benefited site. Therefore, the cost per benefited site of this noise barrier exceeds the FDOT's $42,000 per benefited site noise barrier cost criteria.

Based on the results of this analysis, Noise Barrier I-95DH is not recommended for further consideration and public input since it was not possible to provide reasonable noise abatement performance at a cost within the FDOT's noise barrier cost criteria. Changes to the height or length of the noise barrier did not provide a feasible and/or reasonable noise barrier option. Therefore, at this time, this noise barrier is recommended for further consideration during Final Design.

6.5 CNE TSPPark–Tivoli Sand Pine Preserve North of SW 10th Street between Natura Boulevard and the Eastern Project Limit

The results of the noise barrier analysis for the Tivoli Sand Pine Preserve located north of SW 10th Street between Natura Boulevard and the Eastern

Project Limit are summarized in **Table 6-7**. The park is shown on **Sheet 2** in **Appendix B**. The design year traffic Build Alternative noise level along a walking trail along the interior of the park closest to SW 10th Street is predicted to be 67.7 dB(A), greater than the FHWA NAC [67 dB(A)]. This noise level exceeds the predicted existing traffic noise level by 1.3 dB(A).

The most feasible location to provide noise abatement for the park was determined to be along the south right of way line of SW 10th Street between Natura Boulevard and the eastern project limit.

Table 6 - 6: Noise Barrier Analysis for Common Noise Environment-I95DH

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
I95DH Deerfield Highlands East side of I-95 from SW 12th Court to SW 11th Court.	I95DH-CD1	Ground-Mounted	10	1,425	76+25	90+50	7	2.9 (5.1)	1	0	1	5.1 (5.1)	$427,500	$427,500	**Not Recommended** – Only benefits one site. Does not achieve 7.0 dB(A) at any of the benefited sites.
	I95DH-CD2	Ground-Mounted	12	1,425	76+25	90+50	7	3.4 (6.0)	1	2	3	5.6 (6.0)	$513,000	$171,000	**Not Recommended** – Does not achieve 7.0 dB(A) at any of the benefited sites.
	I95DH-CD3	Ground-Mounted	14	1,000	80+50	90+50	7	3.7 (6.8)	2	2	4	6.0 (6.8)	$420,000	$105,000	**Not Recommended** – Does not achieve 7.0 dB(A) at any of the benefited sites.
	I95DH-CD4	Ground-Mounted	16	1,000	80+50	90+50	7	3.9 (7.3)	2	2	4	6.4 (7.3)	$480,000	$120,000	**Not Recommended** – Cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria.
	I95DH-CD5	Ground-Mounted	18	850	82+00	90+50	7	3.7 (6.1)	2	2	4	6.1 (7.2)	$459,000	$114,750	**Not Recommended** – Cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria.
	I95DH-CD6	Ground-Mounted	20	800	82+50	90+50	7	3.7 (5.9)	2	2	4	6.2 (7.7)	$480,000	$120,000	**Not Recommended** – Cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria.
	I95DH-CD7	Ground-Mounted	22	800	82+50	90+50	7	3.8 (6.1)	2	2	4	6.5 (8.3)	$528,000	$132,000	**Not Recommended** – Cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria.

Table 6 - 7: Noise Barrier Analysis for Common Noise Environment-TSPPark

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
TSPPark Tivoli Sand Pine Preserve North side SW 10th Street from Natura Boulevard to Eastern Project Limit	TSPPark-CD1	Ground-Mounted	8	600	410+00	416+00	1 SLU	5.6 (5.9)	1 SLU	N/A	1 SLU	5.6 (5.9)	$144,000	See Table 7-8	**Not Recommended** – Does not achieve 7.0 dB(A) at any of the benefited sites.
	TSPPark-CD2	Ground-Mounted	10	600	410+00	416+00	1 SLU	6.6 (6.9)	1 SLU	N/A	1 SLU	6.6 (6.9)	$180,000	See Table 7-8	**Not Recommended** – Does not achieve 7.0 dB(A) at any of the benefited sites.
	TSPPark-CD3	Ground-Mounted	12	600	410+00	416+00	1 SLU	7.1 (7.5)	1 SLU	N/A	1 SLU	7.1 (7.5)	$216,000	See Table 7-8	**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
	TSPPark-CD4	Ground-Mounted	14	600	410+00	416+00	1 SLU	7.5 (7.9)	1 SLU	N/A	1 SLU	7.5 (7.9)	$252,000	See Table 7-8	**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.

Table 6 - 8: Special Use Site Noise Barrier Analysis for Common Noise Environment-TSPPark

Item	Criteria	Input	Units
		TSPPARK-CD3	
1	Enter Length of Proposed Barrier	600	feet
2	Enter Height of Proposed Barrier	12	feet
3	Multiply item 1 by item 2	7,200	$feet^2$
4	Enter the average amount of time that a person stays at the site per visit	0.33	hours
5	Enter the average number of people that use this site per day that will receive at least 5 dB(A) benefit from abatement at the site	**921**	persons
6	Multiply item 4 by item 5	304	person-hours
7	Divide item 3 by item 6	23.71	$feet^2$/person-hours
8	Multiply item 7 by $42,000	$995,935	$/person-hours/$ft^2$
9	Does item 8 exceed the "abatement cost factor" of: $995,935/person-hour/$ft^2$?	N/A	Yes/No
10	If item 9 is no, abatement is reasonable.	N/A	
11	If item 9 is yes, abatement is not reasonable.	N/A	

Several noise barrier design concepts were evaluated, design concept TSPPark-CD3 is considered the most reasonable and feasible noise barrier design for this walking trail. A 12-foot tall, 600-foot long noise barrier would be the most cost reasonable design that would reduce traffic noise levels in the park by at least 7.0 dB(A). The estimated cost of this noise barrier is $216,000 overall.

The FDOT's special land use methodology was used to determine if the cost of this noise barrier would be reasonable based on the level of activity in the impacted portions of the walking trail. The results of this analysis are shown in **Table 6-8**. The usage rate of the park necessary to meet the FDOT's cost reasonableness criteria for special land use was evaluated based on the noise barrier design concept described above. It was determined that at least 921 people per day, based on each spending a conservatively estimated 20 minutes walking the approximately 1,000 feet of the walking trail within the abated areas of the park would be necessary to meet the FDOT's cost reasonableness requirements for this noise barrier. This would require that over the course of 14 hours per day, 66 people per hour used

the walking trail. Based on this requirement, actual usage of this park is expected to be well below a level sufficient to meet the cost criterion for construction of a noise barrier at this location. Therefore, noise abatement is not recommended for further consideration and public input for the TSPPark noise barrier due to insufficient usage.

6.6 CNE I95CK_HM–Country Knolls and Highland Meadows West of I-95 between NE 48th Street to NE 53rd Court

There are 22 residences along the west side of I-95 between NE 48th Street and NE 53rd Court are expected to experience design year traffic noise levels approaching or exceeding the FHWA NAC [67 dB(A)] with the Build Alternative. These sites are shown on **Sheet 1** in **Appendix B**. Three of the impacted noise sensitive sites are located at the southern terminus of the existing 2,675-foot long, 16-foot tall ground-mounted noise barrier along the eastern limited-access right of way line between NE 48th Street and NE 52nd Street. The remaining 19 impacted sites are located in the Highland Meadows community behind the northern half of this noise barrier. With the Build Alternative, the design year traffic noise levels behind this noise barrier are predicted to range from 57.6 to 68.3 dB(A), an average increase of approximately 2.0 dB(A) over existing levels.

The primary planned improvement near the residences is the construction of the beginnings of the direct-connect ramps between I-95 and SW 10th Street. These improvements will move traffic along the SB lanes of I-95 between 0 and 15 feet closer to the nearby residences. NE 48th Street is elevated over I-95 just south of this community. Also, an overhead powerline corridor runs between the current southern terminus of the existing noise barrier and NE 48th Street.

The existing noise barrier was evaluated to determine if it would reduce traffic noise levels with the planned improvements by at least seven dB(A) for at least one residence, which it does. The results of this analysis are presented in **Table 6-9**. For all of the nearby noise sensitive sites, the average noise level reduction provided by the existing noise barrier is 8.1 dB(A). The existing noise barrier was also evaluated to determine if would continue to benefit enough sites [by providing a noise level reduction of at least five dB(A)] to meet FDOT's cost reasonableness criteria, which it also

does. Also, the noise levels at all of the impacted residences will continue to be reduced by at least 5.0 dB(A) with the Build Alternative. Based on the results of this noise barrier analysis, the existing noise barrier will continue to provide a substantial noise reduction with the Build Alternative even though impacts are predicted to occur behind the noise barrier. In accordance with FHWA guidelines, the existing noise barrier will continue to meet the FDOT's current noise policy requirements with the Build Alternative and no further analysis is necessary.

6.7 CNE JMPG-JM Family Daycare Center Playground

The results of the noise barrier analysis for the JM Family Daycare Center playground located west of I-95 at 640 Jim Moran Boulevard are summarized in **Table 6-10**. The playground is shown on **Sheet 3** in **Appendix B**. The design year traffic Build Alternative noise level at the playground is predicted to be 68.8 dB(A), greater than the FHWA NAC [67 dB(A)]. This noise level exceeds the predicted existing traffic noise level by 2.3 dB(A).

The most feasible location to provide noise abatement for the playground was determined to be along the west limited-access right of way line of I-95 from south of SW 6th Street to the Hillsboro Canal.

Several noise barrier design concepts were evaluated, design concept JMPG-CD2 is considered the most reasonable and feasible noise barrier design for this playground. A 16-foot tall, 1,040-foot long noise barrier would be the most cost reasonable design that would reduce traffic noise levels in the playground by at least 7.0 dB(A). The estimated cost of this noise barrier is $499,200 overall.

The FDOT's special land use methodology was used to determine if the cost of this noise barrier would be reasonable based on the level of activity in the playground. The results of this analysis are shown in **Table 6-11**. The usage rate of the playground necessary to meet the FDOT's cost reasonableness criteria for special land use was evaluated based on the noise barrier design concept described above. It was determined that at least 702 children per day, each spending one hour per day would be necessary to meet the FDOT's cost reasonableness requirements for this noise barrier. This would

require that over the course of an 8-hour day, 88 children per hour used the playground. Based on this requirement, actual usage of this playground is expected to be well below a level sufficient to meet the cost criterion for construction of a noise barrier at this location. Therefore, noise abatement is not recommended for further consideration and public input for the JMPG noise barrier due to insufficient usage.

Table 6 - 9: Noise Barrier Analysis for Common Noise Environment-I95CK_HM

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
I95HM Highland Meadows Estates West side of I-95 from NE 48th Street to NE 53rd Place.	Existing	Ground-Mounted	16	2,675	1306+20	6093+45	22	8.9 (10.9)	22	58	80	8.9 (11.7)	$1,284,000	$16,050	Benefits all of the impacted sites. Provides at least a 7.0 dB(A) reduction at 58 of the 87 nearby residences. No additional costs.

Table 6 - 10: Noise Barrier Analysis for Common Noise Environment-JMPG

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
JMPG JM Family Daycare Center Playground West side of I-95 at NW 6th Street	JMPG-CD1	Ground-Mounted	14	1,200	1433+80	1445+80	1 SLU	4.5 (4.5)	1 SLU	N/A	1 SLU	5.7 (6.1)	$504,000	See Table 7-11	**Not Recommended** – Does not achieve 7.0 dB(A) at any of the benefited sites.
	JMPG-CD2	Ground-Mounted	16	1,040	1435+40	1445+80	1 SLU	5.0 (5.0)	1 SLU	N/A	1 SLU	6.3 (7.5)	$499,200	See Table 7-11	**Not Recommended** – Cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
	JMPG-CD3	Ground-Mounted	18	960	1436+20	1445+80	1 SLU	5.0 (5.0)	1 SLU	N/A	1 SLU	6.7 (8.2)	$518,400	See Table 7-11	**Not Recommended** – Cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
	JMPG-CD4	Ground-Mounted	22	900	1436+80	1445+80	1 SLU	5.0 (5.0)	1 SLU	N/A	1 SLU	6.9 (8.5)	$594,000	See Table 7-11	**Not Recommended** – Cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.

Table 6 - 11: Special Use Site Noise Barrier Analysis for Common Noise Environment-JMPG

Item	Criteria	Input	Units
		JMPG-CD2	
1	Enter Length of Proposed Barrier	1,040	feet
2	Enter Height of Proposed Barrier	16	feet
3	Multiply item 1 by item 2	16,640	$feet^2$
4	Enter the average amount of time that a person stays at the site per visit	1	hours
5	Enter the average number of people that use this site per day that will receive at least 5 dB(A) benefit from abatement at the site	**702**	persons
6	Multiply item 4 by item 5	702	person-hours
7	Divide item 3 by item 6	23.71	$feet^2$/person-hours
8	Multiply item 7 by $42,000	$995,935	$/person-hours/$ft^2$
9	Does item 8 exceed the "abatement cost factor" of: $995,935/person-hour/$ft^2$?	N/A	Yes/No
10	If item 9 is no, abatement is reasonable.	N/A	
11	If item 9 is yes, abatement is not reasonable.	N/A	

6.8 CNE Lakes–Lakes at Deerfield Apartments South of SW 10th Street between Military Trail and the Railroad

There are 14 apartments in the Lakes at Deerfield Apartments along the south side of SW 10th Street at Military Trail are expected to experience design year traffic noise levels approaching or exceeding the FHWA NAC [67 dB(A)] with the Build Alternative. These sites are shown on **Sheet 4** in **Appendix B**. The design year traffic Build Alternative noise levels at these apartments are predicted to range from 56.0 to 68.2 dB(A), representing an increase of up to 6.8 dB(A) from existing levels.

The primary improvements near these apartments include realignment of SW 10th Street, construction of elevated direct-connect ramps to/from I-95, construction of new ramp connections between the elevated direct-connect ramps and SW 10th Street, new turn-lanes on S Military Trail and other intersection improvements at S Military Trail. The near edge of S Military Trail will be moved up to approximately 15 feet closer to the apartments;

the near edge of pavement along SW 10th Street will be moved up to approximately 75 feet closer to the apartments.

Noise impacts are only predicted to occur at the apartments located along S Military Trail since much of the elevated portions of the EB direct-connect off-ramp to SW 10th Street and the EB lanes of SW 10th Street are located on embankment or MSE walls that block noise and reduce traffic noise levels on the north side of the apartment complex. The most feasible location within the limits of the project for noise abatement for these apartments is along the right-of-way line on the east side of S Military Trail and along the south side of SW 10th Street. Noise barriers were also considered along the elevated structures of the EB direct-connect off-ramp to SW 10th Street and at the back of the sidewalk along the southern perimeter between S Military Trail and the rail corridor. Here, noise barriers would be limited to a maximum height of eight feet since they would be located on structures. The results of the noise barrier analysis for these apartments are summarized in **Table 6-12**. The noise barrier design concept for this site is shown on **Sheet 4** in **Appendix B**.

Due to the elevation of the EB direct-connect off-ramp, a 22-foot tall, 545-foot long ground mounted noise barrier located along the eastern right of way line of S Military Trail between Sta. 142+30 and 147+70 was considered to be the most feasible and effective noise abatement Alternative for the impacted residences. This noise barrier design concept is referred to as LAKES-CD1 in **Table 6-11**. This concept would reduce noise levels at the impacted sites by up to 6.3 dB(A). Only two of the 14 impacted sites were predicted to experience a noise level reduction of at least 5.0 dB(A) and thus be benefited by this noise barrier concept. Eight non-impacted sites were predicted to be benefited incidentally.

The estimated cost of this noise barrier is $359,700 overall and $35,970 per benefited site. Therefore, the cost per benefited site of this noise barrier is within the FDOT's $42,000 per benefited site noise barrier cost criteria. However, it was not possible to reduce noise levels by at least seven dB(A) at one or more sites in accordance with the FDOT's noise reduction design requirement with this noise barrier design concept.

Supplementing this noise barrier with additional structure-mounted noise barriers on the elevated structure of the EB direct-connect off-ramp to SW 10th Street and at the back of the sidewalk along the southern perimeter east of S Military Trail was also considered. Adding an 8-foot tall, 815-foot long structure-mounted noise barrier at the back of the south sidewalk and an 8-foot tall, 700-foot long structure-mounted noise barrier on the off-ramp (See LAKES-CD2) resulted in a maximum noise level reduction of 6.8 dB(A). It was not possible to reduce noise levels further with longer noise barriers or additional noise barriers.

Noise Barrier LAKES is not recommended based on the project information available at this time. However, since this noise barrier was predicted to result in a maximum noise level reduction just under the FDOT's noise reduction design requirement, this noise barrier should be reconsidered during project design when more detailed project design information is available.

Table 6 - 12: Noise Barrier Analysis for Common Noise Environment-Lakes

Common Noise Environment	Conceptual Noise Barrier Design Number	Noise Barrier Type	Height (feet)	Length (feet)	Begin Station Number	End Station Number	Number of Impacted Receptor Sites	Average (Maximum) Noise Reduction for Impacted Receptor Sites dB(A)	Number of Impacted/ Benefited Receptor Sites	Number of Not Impacted/ Benefited Receptor Sites	Total Number of Benefited Receptor Sites	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Cost ($30 per square foot)	Average Cost/Site Benefited	Comments
LAKES Lakes at Deerfield Apartments South side of SW 10th Street at Military Trail.	LAKES-CD1	Ground-Mounted	22	545	142+30	147+70	14	3.0 (6.3)	2	8	10	6.2 (6.5)	$359,700	$35,970	**Not Recommended** – Does not achieve 7.0 dB(A) at any of the benefited sites.
	LAKES-CD2	Ground-Mounted	22	545	142+30	147+70	14	3.6 (6.7)	6	8	14	6.4 (6.8)	$723,300	$51,664	**Not Recommended** – Does not achieve 7.0 dB(A) at any of the benefited sites. Noise Barrier LAKES is not recommended based on the project information available at this time. However, since this noise barrier was predicted to result in a maximum noise level reduction just under the FDOT's noise reduction design requirement, this noise barrier should be reconsidered during project design when more detailed project design information is available.
		Structure-Mounted	8	815	97+50	105+60									
		Structure-Mounted	8	700	95+00	102+00									

7.0 SUMMARY AND CONCLUSIONS

In summary, traffic noise levels were predicted for noise sensitive locations along the project corridor for the existing conditions and the design year (2040) No-Action and recommended Build Alternatives. Build Alternative traffic noise levels at the residences are expected to range from approximately 53.8 to 71.1 dB(A) during the project's design year. Build Alternative traffic noise levels at the non-residential/special-use sites are expected to range from approximately 45.6 dB(A) inside the UM Health medical offices to 78.4 dB(A) on the basketball court at the Deerfield Beach Teen Center. The worst-case design year traffic noise levels with the Build Alternative are predicted to be no more than 6.8 dB(A) greater than existing levels and 6.2 dB(A) greater than the expected design year No-Action noise levels.

Design year traffic noise levels with the planned improvements are predicted to approach or exceed the FHWA NAC for residential use [67 dB(A)] at 55 residences. The design year traffic noise level with the planned improvements is predicted to equal the NAC at a basketball court at the City of Deerfield Beach Teen Center, the walking trail at the Tivoli Sand Pine Preserve park and the playground at the JM Family Daycare Center for [All Activity Class C sites, NAC = 67.0 dB(A)]. Therefore, based on the FHWA and FDOT methodologies used to evaluate traffic noise levels in this study, modifications proposed with this project were determined to generate noise impacts at noise sensitive sites within the project study area and consideration of noise abatement is required to mitigate these impacts. An analysis of noise abatement measures considered for the sites that approach or exceed the NAC is presented in **Section 5**. Although a number of sites approach or exceed the NAC, the proposed improvements do not result in any substantial noise increases (i.e., greater than 15 dB(A) over existing levels).

In accordance with traffic noise study requirements set forth by both the FHWA and FDOT, noise barriers were considered for all noise sensitive receptor sites where design year Build Alternative traffic noise levels were predicted to equal or exceed the NAC. Noise barriers were evaluated at three locations to mitigate noise impacts. **Table 7-1** summarizes the results of the noise barrier analyses and recommendations for each of the eight locations

where noise barriers were evaluated. The locations where barriers were evaluated or planned are depicted in the figures in **Appendix B**.

Table 7 - 1: Noise Barrier Summary and Recommendations

General Location (Cross Streets or Address)	Noise Barrier Conceptual Design	Noise Barrier Type	Height (feet)	Length (feet)	Limits (Begin/ End Station Number)	Number of Benefited Receptors (Impacted/ Not Impacted/ Total)	Average (Maximum) Noise Reduction for all Benefited Receptor Sites dB(A)	Estimated Overall Cost ($30 per square foot)	Estimated Cost/Site Benefited	Meets FDOT's Reasonable Cost Criteria of $42,000/ Site Benefited	Meets FDOT's Noise Reduction Design Goal	Noise Barrier Recommended for Further Consideration and Community Input	Comments
Highland Village East Side of I-95 from NE 48th Street to NE 52nd Street.	I95HV-CD2	Ground-Mounted	14	2,285 - Includes 270-foot long Extension	1306+65 to 5719+80	6/58/64	10.2 (14.1)	$959,700[A]	$14,995	Yes [A]	Yes	Yes	**Recommended** – 270-foot long extension of existing noise barrier. Benefits two additional impacted residences compared to existing noise barrier. Provides at least a 7.0 dB(A) reduction at most sites. Noticeable 4.2 dB(A) improvement at impacted site at north end. Would partially block nearby marquee sign for People's Trust Insurance Company offices
Praxis Apartments East side of FAU Research Park Boulevard from SW 15th Street to SW 14th Street.	I95Praxis -CD2	Ground-Mounted	22	1,100	5724+25 to 75+15	0/8/8	5.3 (5.8)	$726,000	$90,750	No	No	No	**Not Recommended** – Apartments are more than 500 feet from the near lane of I-95. FAU Research Park Boulevard is located adjacent to these apartments. Does not achieve 7.0 dB(A) at any of the benefited sites. Cost exceeds FDOT's cost reasonableness criteria.
Deerfield Beach Teen Center East side of I-95 between NE 15th Street and NE 14th Street	I95Teen-CD2	Ground-Mounted	10	270	1342+00 to 79+40	1 SLU	7.1 (9.3)	$81,000	Cost exceeds reasonableness criteria for Special Use Sites	N/A	Yes	No	**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
Deerfield Highlands East side of FAU Research Park Boulevard from SW 12th Court to SW 11th Court.	I95DH-CD5	Ground-Mounted	18	850	82+00 to 90+50	2/2/4	6.1 (7.2)	$459,000	$114,750	No	Yes	No	**Not Recommended** – Residences are more than 100 feet from the near lane of the NB I-95 off-ramp to SW 10th Street. FAU Research Park Boulevard is located adjacent to these residences. Cost exceeds FDOT's cost reasonableness criteria.
Tivoli Sand Pine Preserve North side SW 10th Street from Natura Boulevard to Eastern Project Limit	TSPPark-CD3	Ground-Mounted	12	600	410+00 to 416+00	1 SLU	7.1 (7.5)	$216,000	Cost exceeds reasonableness criteria for Special Use Sites	N/A	Yes	No	**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
Highland Meadows Estates West side of I-95 from NE 48th Street to NE 53rd Place	Existing	Ground-Mounted	16	2,675	1306+20 to 6093+45	31/46/80	8.9 (11.7)	$1,284,000[B]	$16,050	Yes [B]	Yes	N/A	Existing noise barrier benefits all of the impacted sites. Provides at least a 7.0 dB(A) reduction at 58 of the 87 nearby residences. No additional costs.
JM Family Daycare Center Playground West side of I-95 at NW 6th Street	JMPG-CD2	Ground-Mounted	16	1,040	1435+40 to 1445+80	1 SLU	6.3 (7.5)	$499,200	Cost exceeds reasonableness criteria for Special Use Sites	N/A	Yes	No	**Not Recommended** – Based on needed usage, cost exceeds FDOT's Noise Barrier Cost Reasonable Cost Criteria for Special Use Sites.
Lakes at Deerfield Apartments South side of SW 10th Street at S Military Trail	LAKES-CD1	Ground-Mounted	22	545	142+30 to 147+70	2/8/10	6.2 (6.5)	$359,700	$35,970	Yes	No	No	**Not Recommended** – Does not achieve 7.0 dB(A) at any of the benefited sites. However, this noise barrier should be reconsidered during project design when more detailed project design information is available.

Notes: [A] = This estimated overall cost is only used to evaluate cost reasonableness in accordance with FHWA guidelines for existing noise barriers. Actual cost of the noise barrier extension is $113,400.
[B] = This estimated cost is used only the evaluate cost reasonableness in accordance with FHWA guidelines for existing noise barriers.

7.1 Recommended Noise Barriers

At this time, noise barriers are recommended for further consideration and public input at one of these locations: I95HV – East side of I-95 north of NE 52nd Street. This noise barrier is a 270-foot long, 14-foot tall extension of an existing noise barrier. Extending this noise barrier will benefit an additional two impacted residences.

The FDOT is committed to the construction of feasible and reasonable noise abatement measures at the noise- impacted locations identified in **Table 7-1** contingent upon the following conditions:

- Final recommendations on the construction of abatement measures are determined during the project's final design and through the public involvement process;
- Detailed noise analyses during the final design process support the need, feasibility and reasonableness of providing abatement;
- Cost analysis indicates that the cost of the noise barriers will not exceed the cost reasonable criterion;
- Community input supporting types, heights, and locations of the noise barriers is provided to the District Four Office; and,
- Safety and engineering aspects as related to the roadway user and the adjacent property owner have been reviewed and any conflicts or issues resolved.

It is likely that the noise abatement measure for this location will be constructed if found feasible based on the contingencies listed above. If, during the Final Design phase, any of the contingency conditions listed above cause abatement to no longer be considered reasonable or feasible for a given location(s), such determination(s) will be made prior to requesting approval for construction advertisement. Commitments regarding the exact abatement measure locations, heights, and type (or approved Alternatives) will be made during project reevaluation and at a time before the construction advertisement is approved.

7.2 Noise Barriers Found Not Feasible or Reasonable

Traffic noise impacts predicted to occur behind the existing noise barrier along the west side of I-95 between NE 48th Street and NE 53rd Place. This noise barrier was evaluated in accordance with FHWA guidelines for existing noise barriers. It was determined that the existing noise barrier will continue to provide a substantial noise reduction with the Build Alternative even though impacts are predicted to occur behind the noise barrier. In accordance with FHWA guidelines, the existing noise barrier will continue to meet the FDOT's current noise policy requirements with the Build Alternative and no further analysis is necessary.

The noise level reduction provided by the noise barrier design concepts for the following CNEs did not meet FDOT's Noise Reduction Design Goal:

- I95Praxis – Praxis Apartments, east side of I-95 from SW 15th Street to SW 14th Street [5.8 dB(A) maximum].
- LAKES – Lakes at Deerfield Apartments, SW 10th Street at S Military Trail [6.5 dB(A) maximum].

However, since the LAKES noise barrier was predicted to result in a maximum noise level reduction just under the FDOT's noise reduction design requirement, a noise barrier for the 14 impacted sites at the Lakes at Deerfield Apartments should be reconsidered during project design when more detailed project design information is available.

The estimated cost to provide noise abatement for the following residential neighborhood exceeded FDOT's reasonable cost criteria of $42,000 per benefited site:

- I95DH – Deerfield Highlands, east side of I-95 from SW 12th Court to SW 11th Court ($114,750 per benefited site).

The estimated cost to provide noise abatement for the following special use sites do not have sufficient usage to meet FDOT's reasonable cost criteria for special use sites ($995,935 $/person-hours/square-foot):

- I95Teen – Deerfield Beach Teen Center, east side of I-95 at SW 11th Court.
- TSPPark - Tivoli Sand Pine Preserve, north side of SW 10th Street between Natura Boulevard and the eastern project limit.
- JMPG - JM Family Daycare Center Playground, west side of I-95 at NW 6th Street.

Therefore, with the exception to the LAKES noise barrier as explained above, noise barriers are not recommended for further consideration or construction at these locations. Based on the noise analyses performed to date, there are no apparent solutions available to mitigate the noise impacts at 21 residences and one special land use site. The traffic noise impacts to these noise sensitive sites are considered to be an unavoidable consequence of the project.

8.0 CONSTRUCTION NOISE AND VIBRATION

During construction of the project, there is the potential for noise impacts to be substantially greater than those resulting from normal traffic operations due to the heavy equipment typically used to build roadways. In addition, construction activities may result in vibration impacts. Therefore, early identification of potential noise/vibration sensitive sites along the project corridor is important in minimizing noise and vibration impacts. The project area does include residences, hotels, places of worship and medical offices that may be affected by noise and vibration associated with construction activities. These sites are identified in **Table 5-3**. Construction noise and vibration impacts to these sites will be minimized by adherence to the controls listed in the latest edition of the FDOT's *Standard Specifications for Road and Bridge Construction*. According to Section 335.02 of the Florida Statutes, the FDOT is exempt from compliance with local ordinances. However, it is the FDOT's policy is to follow the requirements of local ordinances to the extent that is considered reasonable. Also, the contractor will be instructed to coordinate with the project engineer and the District Noise Specialist should unanticipated noise or vibration issues arise during project construction.

9.0 COORDINATION WITH LOCAL OFFICIALS

Agency coordination to obtain noise-related information for this project occurred through the ETDM Programming Screening (ETDM #14244) and the Advance Notification process. The ETDM review occurred between September 9, 2015 to October 24, 2015, and the Programming Screen Summary Report was published on December 21, 2015. No comments were received on noise-related issues.

To aid in promoting land use compatibility, a copy of the NSR, which provides information that can be used to protect future land development from becoming incompatible with anticipated traffic noise levels, will be provided to Broward County. In addition, generalized future noise impact contours for properties in the immediate vicinity of the project have been developed for Noise Abatement Activity Categories B/C and E (i.e., residential/other sensitive land uses and sensitive commercial, respectively). These contours represent the approximate distance from the edge of the nearest proposed travel lane of a roadway to the limits of the area predicted to approach [i.e., within 1 dB(A)] or exceed the NAC in the Design Year 2040. These contours do not consider any shielding of noise provided by structures between the receiver and the proposed travel lanes. Contours were generally developed for portions of the project that are located away from significant ground features such as existing noise barriers. Within the project corridor, the distance between the proposed edge of the outside travel lane and the contour at various locations are presented in **Table 9-1**. To minimize the potential for incompatible land use, noise sensitive land uses should be located beyond this distance.

Table 9 - 1: Design Year (2040) Noise Impact Contour Distances

Location	Distance from Proposed Nearest Travel Lane to Noise Contour Line (Feet)	
	51/71 dB(A) – Activity Category D/E	66 dB(A) – Activity Category B/C
I-95 – South of SW 10th Street East of I-95 Sta. 1331+00	235	405
I-95 –SW 10th Street to Hillsboro Boulevard East of I-95 Sta. 1430+00	N/A*	N/A*
I-95 – North of Hillsboro Boulevard East of I-95 Sta. 1437+00	300	530
SW 10th Street – East of I-95 East of Natura Boulevard Sta. 412+00	25	70

Notes N/A = Impact level not met due to existing noise barrier and roadway elevation.

10.0 REFERENCES

Florida Department of Transportation, "*Project Development and Environment Manual, Part 2, Chapter 18-Highway Traffic Noise*", January 14, 2019.

23 CFR Part 772, "*Procedures for Abatement of Highway Traffic Noise and Construction Noise*", Federal Register, Vol. 75, No. 133, Tuesday, July 13, 2010; pages 39834-39839.

Federal Highway Administration Report FHWA-HEP-10-025, "*Highway Traffic Noise: Analysis and Abatement Guidance*", June 2010 (revised December 2010); 76 pages.

Florida Statute 335.17, "*State highway construction; means of noise abatement*". 1989; 1 page.

Florida Department of Transportation Policy, "*Noise Abatement*". Topic 000-360-005-f; Effective September 20, 2007; 1 page.

Federal Highway Administration Report Number FHWA-PD-96-046, "*Measurement of Highway-Related Noise*". Cynthia S.Y. Lee and Gregg Fleming; May 1996; 206 pages.

Florida Department of Transportation, "*Standard Specifications for Road and Bridge Construction*". 2010; 996 pages.

Federal Highway Administration Report FHWA-HEP-06-015, "*FHWA Highway Construction Noise Handbook: Final Report*". August 2006; 185 pages.

Appendix A

TNM Traffic Data

Traffic Data Used in TNM Model†

Roadway Segment	Existing (2015)					Design Year (2045) No-Build					Design Year (2045) Build				
	# of Lanes	AM Peak	PM Peak	LOS C	TNM Data	# of Lanes	AM Peak	PM Peak	LOS C	TNM Data	# of Lanes	AM Peak	Peak-Hour	LOS C	TNM Data
I-95															
I-95 (Express Lanes are Separate) Northbound Southern Project Terminus to Express Lanes Crossover	4	6,990	6820	6080	6,080	3	6,620	6,400	4,580	4,580	4	6,520	5,980	5,859	5,859
I-95 (Express Lanes are Separate) Northbound Express Lanes Crossover to Combined EB/WB SW 10th St Off-Ramp	4	6,990	6820	6080	6,080	3	7,540	7,170	4,580	4,580	4	7,340	6,800	5,859	5,859
I-95 (Express Lanes are Separate) Northbound Combined EB/WB SW 10th St Off-Ramp to SW 10th St On-Ramp (Existing Conditions and No Build Alternative Only)	4	6,000	5600	6080	6,000	3	6,220	5,580	4,580	4,580	N/A	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Northbound SW 10th St On-Ramp to Hillsboro Blvd Off-Ramp (Existing Conditions and No Build Alternative Only)	4	7,360	6690	6080	6,080	3	7,880	6,900	4,580	4,580	N/A	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Northbound EB Hillsboro Blvd Off-Ramp to EB Hillsboro Blvd On-Ramp (Existing Conditions and No Build Alternative Only)	4	6,690	6060	6080	6,080	3	7,080	6,150	4,580	4,580	N/A	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Northbound EB Hillsboro Blvd On-Ramp to WB Hillsboro Blvd Off-Ramp (Existing Conditions and No Build Alternative Only)	4	7,200	6635	6080	6,080	3	7,740	6,880	4,580	4,580	N/A	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Northbound WB Hillsboro Blvd Off-Ramp to WB Hillsoboro Blvd On-Ramp (Existing Conditions and No Build Alternative Only)	4	6,720	6125	6080	6,080	3	7,090	6,190	4,580	4,580	N/A	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Northbound WB Hillsboro Blvd On-Ramp to Express Lanes Crossover (Existing Conditions and No Build Alternative Only)	4	7,380	6720	6080	6,080	3	7,900	6,930	4,580	4,580	N/A	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Northbound Express Lanes Crossover to Northern Project Terminus (Existing Conditions and No Build Alternative Only)	4	7,380	6720	6080	6,080	3	6,160	5,650	4,580	4,580	N/A	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Northbound Combined EB/WB SW 10th St Off-Ramp to Combined EB/WB Hillsboro Off-Ramp (Build Alterntaive Only)	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	0	3	5,900	5,450	4,809	4,809
I-95 (Express Lanes are Separate) Northbound Combined EB/WB Hillsboro Off-Ramp to Combined EB/WB SW 10th St On-Ramp (Build Alterntaive Only)	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	0	3	4,530	4,090	4,809	4,530
I-95 (Express Lanes are Separate) Northbound Combined EB/WB SW 10th St On-Ramp to Combined EB/WB Hillsboro On-Ramp (Build Alterntaive Only)	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	0	4	5,600	5,510	5,859	5,600
I-95 (Express Lanes are Separate) Northbound Combined EB/WB Hillsboro On-Ramp to Express Lanes Crossover (Build Alterntaive Only)	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	0	4	6,940	6,900	5,859	5,859
I-95 (Express Lanes are Separate) Northbound Express Lanes Crossover to Northern Project Terminus (Build Alterntaive Only)	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	0	4	6,060	6,060	5,859	5,859
I-95 (Express Lanes are Separate) Southbound Northern Project Terminus to Express Lanes Crossover (Existing Conditions and No Build Alternative Only)	4	6,020	6850	6080	6,020	3	4,870	5,150	4,580	4,580	N/A	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Southbound Express Lanes Crossover to Combined Hillsoboro Blvd Off-Ramp (Existing Conditions and No Build Alternative Only)	4	6,020	6850	6080	6,020	3	6,280	6,740	4,580	4,580	N/A	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Southbound Combined Hillsboro Blvd Off-Ramp to WB Hillsboro Blvd On-Ramp (Existing Conditions and No Build Alternative Only)	4	4,870	5850	6080	4,870	3	4,850	5,470	4,580	4,580	N/A	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Southbound WB Hillsboro Blvd On-Ramp to EB Hillsboro Blvd On-Ramp (Existing Conditions and No Build Alternative Only)	4	5,470	6600	6080	5,470	3	5,600	6,360	4,580	4,580	N/A	N/A	N/A	N/A	0

Traffic Data Used in TNM Model†

Roadway Segment	Existing (2015)					Design Year (2045) No-Build					Design Year (2045) Build				
	# of Lanes	AM Peak	PM Peak	LOS C	TNM Data	# of Lanes	AM Peak	PM Peak	LOS C	TNM Data	# of Lanes	AM Peak	Peak-Hour	LOS C	TNM Data
I-95 (Express Lanes are Separate) Southbound EB Hillsboro Blvd On-Ramp to Combined SW 10th St Off-Ramp (Existing Conditions and No Build Alternative Only)	4	6,170	7270	6080	6,080	3	6,490	7,190	4,580	4,580	N/A	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Southbound Combined SW 10th St Off-Ramp to Combined EB/WB SW 10th St On-Ramp (Existing Conditions and No Build Alternative Only)	4	5,260	6310	6080	5,260	3	5,070	5,690	4,580	4,580	N/A	N/A	N/A	N/A	0
I-95 (Express Lanes are Separate) Southbound Northern Project Terminus to Express Lanes Crossover (Build Alternative Only)	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	0	4	4,860	5,440	5,859	4,860
I-95 (Express Lanes are Separate) Southbound Express Lanes Crossover to Combined EB/WB Hillsboro Blvd Off-Ramp (Build Alternative Only)	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	0	4	6,030	6,360	5,859	5,859
I-95 (Express Lanes are Separate) Southbound Combined EB/WB Hillsboro Blvd Off-Ramp to Combined EB/WB SW 10th Street Off-Ramp (Build Alternative Only)	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	0	3	4,610	5,100	4,809	4,610
I-95 (Express Lanes are Separate) Southbound Combined EB/WB SW 10th Street Off-Ramp to Combined EB/WB Hillsboro Blvd On-Ramp (Build Alternative Only)	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	0	3	3,100	3,960	4,809	3,100
I-95 (Express Lanes are Separate) Southbound Combined EB/WB Hillsboro Blvd On-Ramp to Combined EB/WB SW 10th Street On-Ramp (Build Alternative Only)	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	0	3	4,760	5,700	4,809	4,760
I-95 (Express Lanes are Separate) Southbound Combined EB/WB SW 10th St On-Ramp to Express Lanes Crossover	4	6,440	7480	6080	6,080	3	6,620	7,250	4,580	4,580	4	6,180	7,420	5,859	5,859
I-95 (Express Lanes are Separate) Southbound Express Lanes Crossover to Southern Project Terminus	4	6,440	7480	6080	6,080	3	5,670	6,480	4,580	4,580	4	5,480	6,720	5,859	5,480
Express Lanes															
I-95 Express Lanes Northbound Southern Project Terminus to GU Lanes Off-Ramp Crossover	N/A	N/A	0	N/A	N/A	2	2,370	1,810	3,320	2,370	2	2,320	1,960	3,320	2,320
I-95 Express Lanes Southbound GU Lanes On-Ramp Crossover to Southern Project Terminus	N/A	N/A	0	N/A	N/A	2	1,810	2,110	3,320	1,810	2	1,950	1,930	3,320	1,950
I-95 Express Lanes Northbound GU Lanes Off-Ramp Crossover to WB SW 10th St Express Lanes Off-Ramp	N/A	N/A	0	N/A	N/A	2	1,450	1,040	3,320	1,450	2	1,500	1,140	3,320	1,500
I-95 Express Lanes Southbound EB SW 10th St Express Lanes On-Ramp to GU Lanes On-Ramp Crossover	N/A	N/A	0	N/A	N/A	2	860	1,340	3,320	860	2	1,250	1,230	3,320	1,250
I-95 Express Lanes Northbound WB SW 10th St Express Lanes Off-Ramp to EB SW 10th St Express Lanes On-Ramp	N/A	N/A	0	N/A	N/A	2	1,450	1,040	3,320	1,450	2	1,260	540	3,320	1,260
I-95 Express Lanes Southbound WB SW 10th St Exp Lanes Off-Ramp to EB SW 10th St Express Lanes On-Ramp	N/A	N/A	0	N/A	N/A	2	860	1,340	3,320	860	2	700	1,040	3,320	700
I-95 Express Lanes Northbound EB SW 10th St Express Lanes On-Ramp to GU Lanes On-Ramp Crossover	N/A	N/A	0	N/A	N/A	2	1,450	1,040	3,320	1,450	2	2,820	1,420	3,320	2,820
I-95 Express Lanes Southbound GU Lanes Off-Ramp Crossover to WB SW 10th St Exp Lanes Off-Ramp	N/A	N/A	0	N/A	N/A	2	860	1,340	3,320	860	2	1,430	2,070	3,320	1,430
I-95 Express Lanes Northbound GU Lanes On-Ramp Crossover to Northern Project Terminus	N/A	N/A	0	N/A	N/A	2	1,450	2,320	N/A	1,450	1	3,700	2,260	N/A	3,320

Traffic Data Used in TNM Model[†]

Roadway Segment	Existing (2015)					Design Year (2045) No-Build					Design Year (2045) Build				
	# of Lanes	AM Peak	PM Peak	LOS C	TNM Data	# of Lanes	AM Peak	PM Peak	LOS C	TNM Data	# of Lanes	AM Peak	Peak-Hour	LOS C	TNM Data
I-95 Express Lanes Southbound Northern Project Terminus to GU Lanes Off-Ramp Crossover	N/A	N/A	0	N/A	N/A	2	2,270	2,930	N/A	2,270	1	2,600	2,990	N/A	2,600
SW 10th St Express Lanes (Build Alternative Only) Eastbound Western Project Terminus to NB I-95	N/A	N/A	0	N/A	N/A	N/A	N/A	0	N/A	N/A	1	1,560	1,070	N/A	1,560
SW 10th St Express Lanes (Build Alternative Only) Westbound SB I-95 to Western Project Terminus	N/A	N/A	0	N/A	N/A	N/A	N/A	0	N/A	N/A	1	730	1,630	N/A	730
SW 10th St Express Lanes (Build Alternative Only) Eastbound Western Project Terminus to SB I-95	N/A	N/A	0	0	N/A	0	N/A	0	0	N/A	0	550	1,070	0	550
SW 10th St Express Lanes (Build Alternative Only) Westbound NB I-95 to Western Project Terminus	N/A	N/A	0	0	N/A	0	N/A	0	0	N/A	0	240	1,630	0	240
SR 869/SW 10th Street															
SR 869/SW 10th St (General Use Lanes Only) Eastbound Western Project Terminus to S Military Trail	2	2,450	1890	2940	2,450	2	2,885	2,330	2,940	2,885	2	1,350	2,330	1,910	1,350
SR 869/SW 10th St (General Use Lanes Only) Westbound S Military Trail to Western Project Terminus	2	1,670	2590	1910	1,670	2	2,040	3,065	1,910	1,910	2	1,725	3,065	1,910	1,725
SR 869/SW 10th St (General Use Lanes Only) Eastbound S Military Trail to E Newport Center Dr	3	3,085	1950	3970	3,085	3	3,515	2,380	3,970	3,515	2	2,075	2,380	1,910	1,910
SR 869/SW 10th St (General Use Lanes Only) Westbound E Newport Center Dr to S Military Trail	3	1,835	2795	2940	1,835	3	2,240	3,310	2,940	2,240	3	2,485	3,310	2,940	2,485
SR 869/SW 10th St (General Use Lanes Only) Eastbound E Newport Center Dr SB I-95 On-Ramp	3	2,500	1660	3970	2,500	3	2,850	2,065	3,970	2,850	3	2,245	2,785	2,940	2,245
SR 869/SW 10th St (General Use Lanes Only) Westbound SB I-95 Off-Ramp to E Newport Center Dr	3	2,330	2305	2940	2,330	3	2,845	2,845	2,940	2,845	3	3,185	2,845	2,940	2,940
SR 869/SW 10th St (General Use Lanes Only) Eastbound SB I-95 On-Ramp to NB I-95 Ramps	2	2,095	1000	1910	1,910	2	2,565	1,375	1,910	1,910	3	2,010	2,375	2,940	2,010
SR 869/SW 10th St (General Use Lanes Only) Westbound NB I-95 Ramps to SB I-95 Off-Ramp	3	2,195	2025	2940	2,195	3	2,690	2,495	2,940	2,690	3	2,860	2,495	2,940	2,860
SR 869/SW 10th St (General Use Lanes Only) Eastbound NB I-95 Ramps to FAU Research Park Blvd	3	1,395	1590	2940	1,395	3	1,665	2,055	2,940	1,665	3	1,700	2,055	2,940	1,700
SR 869/SW 10th St (General Use Lanes Only) Westbound SW Natura Park Blvd to NB I-95 Ramps	3	1,865	1690	2940	1,865	3	2,130	1,905	2,940	2,130	3	2,180	1,905	2,940	2,180
SR 869/SW 10th St (General Use Lanes Only) Eastbound FAU Research Park Blvd to Eastern Project Terminus	3	1,360	1505	2940	1,360	3	1,515	1,940	2,940	1,515	3	1,555	1,940	2,940	1,555
SR 869/SW 10th St (General Use Lanes Only) Westbound Eastern Project Terminus to FAU Research Park Blvd	3	1,545	1400	2940	1,545	3	1,790	1,575	2,940	1,790	3	1,745	1,575	2,940	1,745
SR 810/Hillsboro Boulevard															
Hillsboro Blvd Eastbound Western Project Terminus to SB I-95 Ramps	3	1,945	2380	2940	1,945	3	2,330	2,775	2,940	2,330	3	2,215	2,755	2,940	2,215

Traffic Data Used in TNM Model[†]

Roadway Segment	Existing (2015)					Design Year (2045) No-Build					Design Year (2045) Build				
	# of Lanes	AM Peak	PM Peak	LOS C	TNM Data	# of Lanes	AM Peak	PM Peak	LOS C	TNM Data	# of Lanes	AM Peak	Peak-Hour	LOS C	TNM Data
Hillsboro Blvd Westbound SB I-95 Off-Ramp to Western Project Terminus	3	1,945	2160	2940	1,945	3	2,315	2,540	2,940	2,315	3	2,235	2,430	2,940	2,235
Hillsboro Blvd Eastbound SB I-95 Ramps to EB Hillsboro Blvd/NB I-95 On-Ramp	3	1,725	2220	2940	1,725	3	2,050	2,605	2,940	2,050	3	1,935	2,585	2,940	1,935
Hillsboro Blvd Westbound WB Hillsboro Blvd/SB I-95 On-Ramp to SB I-95 Off-Ramp	3	1,275	1670	2940	1,275	3	1,495	1,930	2,940	1,495	3	1,425	1,830	2,940	1,425
Hillsboro Blvd Eastbound EB Hillsboro Blvd/NB I-95 On-Ramp to NB I95/EB Hillsboro Blvd Off-Ramp	3	1,215	1645	2940	1,215	3	1,390	1,875	2,940	1,390	3	1,375	1,935	2,940	1,375
Hillsboro Blvd Westbound NB I-95/WB Hillsboro Blvd Off-Ramp to WB Hillsboro Blvd/SB I-95 On-Ramp	3	1,875	2420	2940	1,875	3	2,245	2,820	2,940	2,245	3	2,195	2,740	2,940	2,195
Hillsboro Blvd Eastbound NB I95/EB Hillsboro Blvd Off-Ramp to Eastern Project Terminus	3	1,885	2275	2940	1,885	3	2,190	2,625	2,940	2,190	3	2,205	2,715	2,940	2,205
Hillsboro Blvd Westbound WB Hillsboro/NB I-95 On-Ramp to NB I-95/WB Hillsboro Blvd Off-Ramp	3	1,395	1910	2940	1,395	3	1,595	2,130	2,940	1,595	3	1,655	2,160	2,940	1,655
Hillsboro Blvd Westbound Eastern Project Terminus to WB Hillsboro/NB I-95 On-Ramp	3	2,055	2505	2940	2,055	3	2,405	2,870	2,940	2,405	3	2,435	2,900	2,940	2,435
S. Military Trail															
S. Military Trail Southbound South of SW 10th St	2	910	1290	1910	910	2	1,100	1,520	1,910	1,100	2	1,015	1,510	1,910	1,015
S. Military Trail Northbound South of SW 10th St	2	1,495	1015	1910	1,495	2	1,690	1,225	1,910	1,690	2	1,520	1,260	1,910	1,520
S. Military Trail Southbound North of SW 10th St	2	1,215	1440	1910	1,215	2	1,375	1,635	1,910	1,375	2	1,330	1,885	1,910	1,330
S. Military Trail Northbound North of SW 10th St	2	1,330	1310	1910	1,330	2	1,535	1,535	1,910	1,535	2	1,470	1,455	1,910	1,470
E Newport Center Drive															
E Newport Center Dr Southbound South of SW 10th St	2	780	155	730	730	2	920	215	730	730	2	1,005	215	730	730
E Newport Center Dr Northbound South of SW 10th St	2	155	695	730	155	2	170	800	730	170	2	220	920	730	220
E Newport Center Dr Southbound North of SW 10th St	2	125	430	730	125	2	135	485	730	135	2	165	700	730	165
E Newport Center Dr Northbound North of SW 10th St	2	580	145	730	580	2	655	200	730	655	2	810	230	730	730
SW Natura Park Boulevard															
SW Natura Park Blvd Southbound North of SW 10th St	2	635	770	730	635	2	775	910	730	730	2	835	990	730	730

Traffic Data Used in TNM Model[†]

Roadway Segment	Existing (2015)					Design Year (2045) No-Build					Design Year (2045) Build				
	# of Lanes	AM Peak	PM Peak	LOS C	TNM Data	# of Lanes	AM Peak	PM Peak	LOS C	TNM Data	# of Lanes	AM Peak	Peak-Hour	LOS C	TNM Data
SW Natura Park Blvd Northbound North of SW 10th St	2	350	420	730	350	2	485	495	730	485	2	545	615	730	545
FAU Research Park Boulevard															
FAU Research Park Blvd Southbound South of SW 10th St	1	425	570	730	425	1	620	740	730	620	1	725	940	730	725
FAU Research Park Blvd Northbound South of SW 10th St	1	425	425	730	425	1	520	540	730	520	1	725	715	730	725
Ramps															
NB I-95 to SW 10th St NB to EB/WB Off-Ramp	1	990	1220	N/A	990	1	1,320	1,590	N/A	1,320	2	1,440	1,350	N/A	1,440
SW 10th St to NB I-95 (Existing Conditions and No Build Alternative Only) EB/WB to NB On-Ramp	1	1,360	1090	N/A	1,360	1	1,660	1,320	N/A	1,660	N/A	N/A	N/A	N/A	0
EB SW 10th St to NB I-95 (Build Alternative Only) EB to NB On-Ramp	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	0	2	780	1,100	N/A	780
WB SW 10th St to NB I-95 (Build Alternative Only) WB to NB On-Ramp	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	0	1	290	320	N/A	290
SB I-95 to SW 10th St SB to EB/WB Off-Ramp	1	910	960	N/A	910	1	1,420	1,500	N/A	1,420	2	1,510	1,140	N/A	1,510
SW 10th St to SB I-95 EB to SB On-Ramp	1	1,180	1170	N/A	1,180	1	1,550	1,560	N/A	1,550	2	1,420	1,720	N/A	1,420
NB I-95 to EB Hillsboro Blvd NB to EB Off-Ramp	1	670	630	N/A	670	1	800	750	N/A	800	1	830	780	N/A	830
EB Hillsboro Blvd to NB I-95 EB to NB On-Ramp	1	510	575	N/A	510	1	660	730	N/A	660	1	560	650	N/A	560
NB I-95 to WB Hillsboro Blvd NB to WB Off-Ramp	1	480	510	N/A	480	1	650	690	N/A	650	1	540	580	N/A	540
WB Hillsboro Blvd to NB I-95 WB to NB On-Ramp	1	660	595	N/A	660	1	810	740	N/A	810	1	780	740	N/A	780
SB I-95 to EB/WB Hillsboro Blvd SB to EB/WB Off-Ramp	1	1,150	1000	N/A	1,150	1	1,430	1,270	N/A	1,430	1	1,420	1,260	N/A	1,420
WB Hillsboro Blvd to SB I-95 WB to SB On-Ramp	1	600	750	N/A	600	1	750	890	N/A	750	1	770	910	N/A	770
EB Hillsboro Blvd to SB I-95 EB to SB On-Ramp	1	700	670	N/A	700	1	890	830	N/A	890	1	890	830	N/A	890
NB I-95 Express Lanes to WB SW 10th St Express Lanes (Build Alternative Only) NB to WB Off-Ramp	0	0	0	N/A	0	0	1,015	0	N/A	1,015	1	240	600	N/A	240
EB SW 10th St Express Lanes to NB I-95 Express Lanes (Build Alternative Only) EB to NB On-Ramp	0	0	0	N/A	0	0	1,015	0	N/A	1,015	1	1,560	880	N/A	1,560

Traffic Data Used in TNM Model†

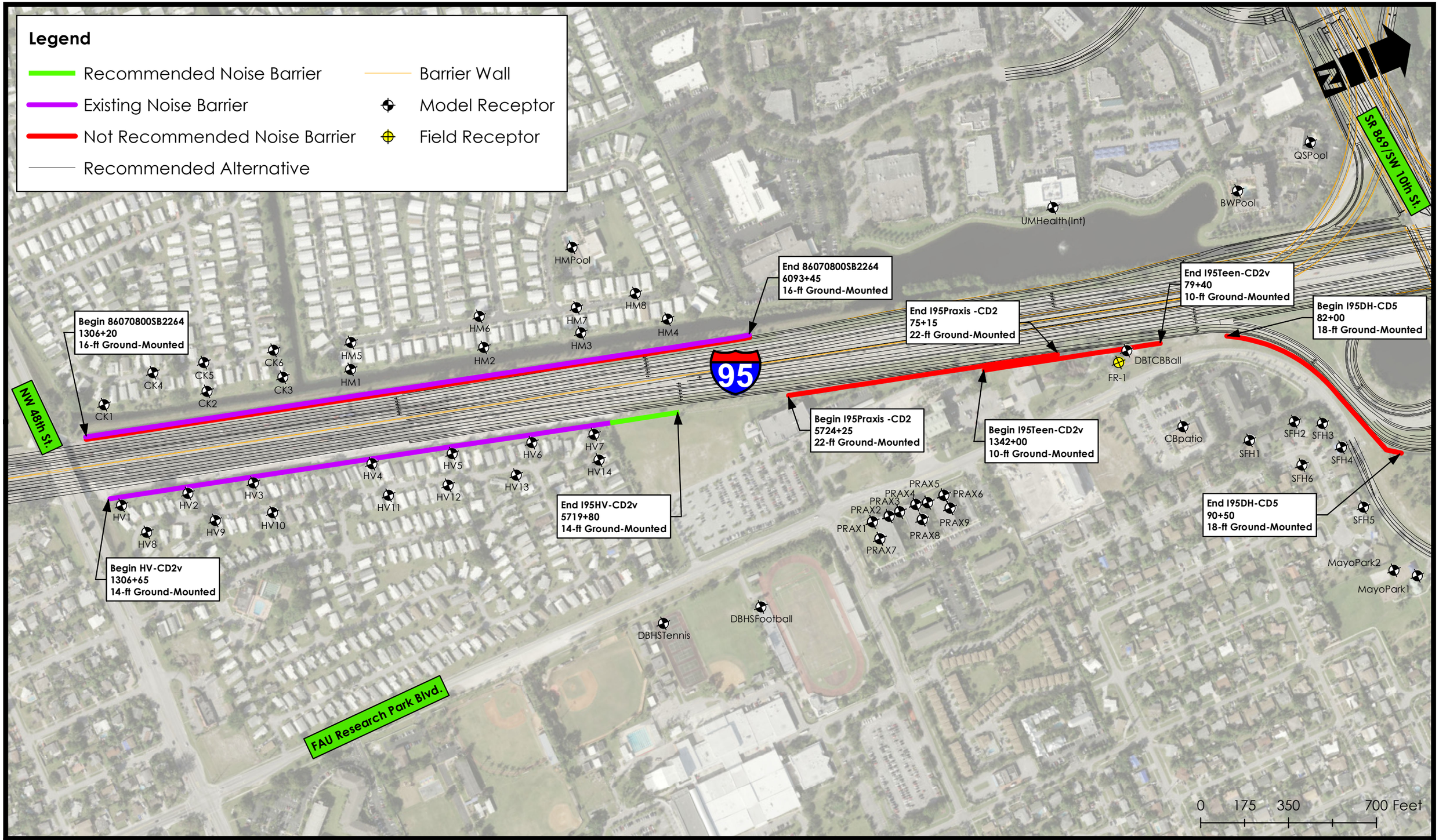
Roadway Segment	Existing (2015)					Design Year (2045) No-Build					Design Year (2045) Build				
	# of Lanes	AM Peak	PM Peak	LOS C	TNM Data	# of Lanes	AM Peak	PM Peak	LOS C	TNM Data	# of Lanes	AM Peak	Peak-Hour	LOS C	TNM Data
SB I-95 Express Lanes to WB SW 10th St Express Lanes (Build Alternative Only) SB to WB Off-Ramp	0	0	0	N/A	0	0	1,015	0	N/A	1,015	1	730	1,030	N/A	730
EB SW 10th St Express Lanes to SB I-95 Express Lanes (Build Alternative Only) EB to SB On-Ramp	0	0	0	N/A	0	0	1,015	0	N/A	1,015	1	550	190	N/A	550
EB SW 10th St Express Lanes to SW 10th Street (Build Alternative Only) EB to EB Off-Ramp	0	0	0	N/A	0	0	1,015	0	N/A	1,015	1	900	100	N/A	900

Notes:

TNM By-Lane Data is either AM Peak-Hour Volume or Level of Service C Capacity, whichever is less.
PHD = Peak-Hour Demand
LOS C = Level-of-Service C
N/A = Not applicable
I-95 Express Lanes LOS C Capacity = 1,660 vehicles per hour based on capacity used in I-95 Express PD&E.

Appendix B

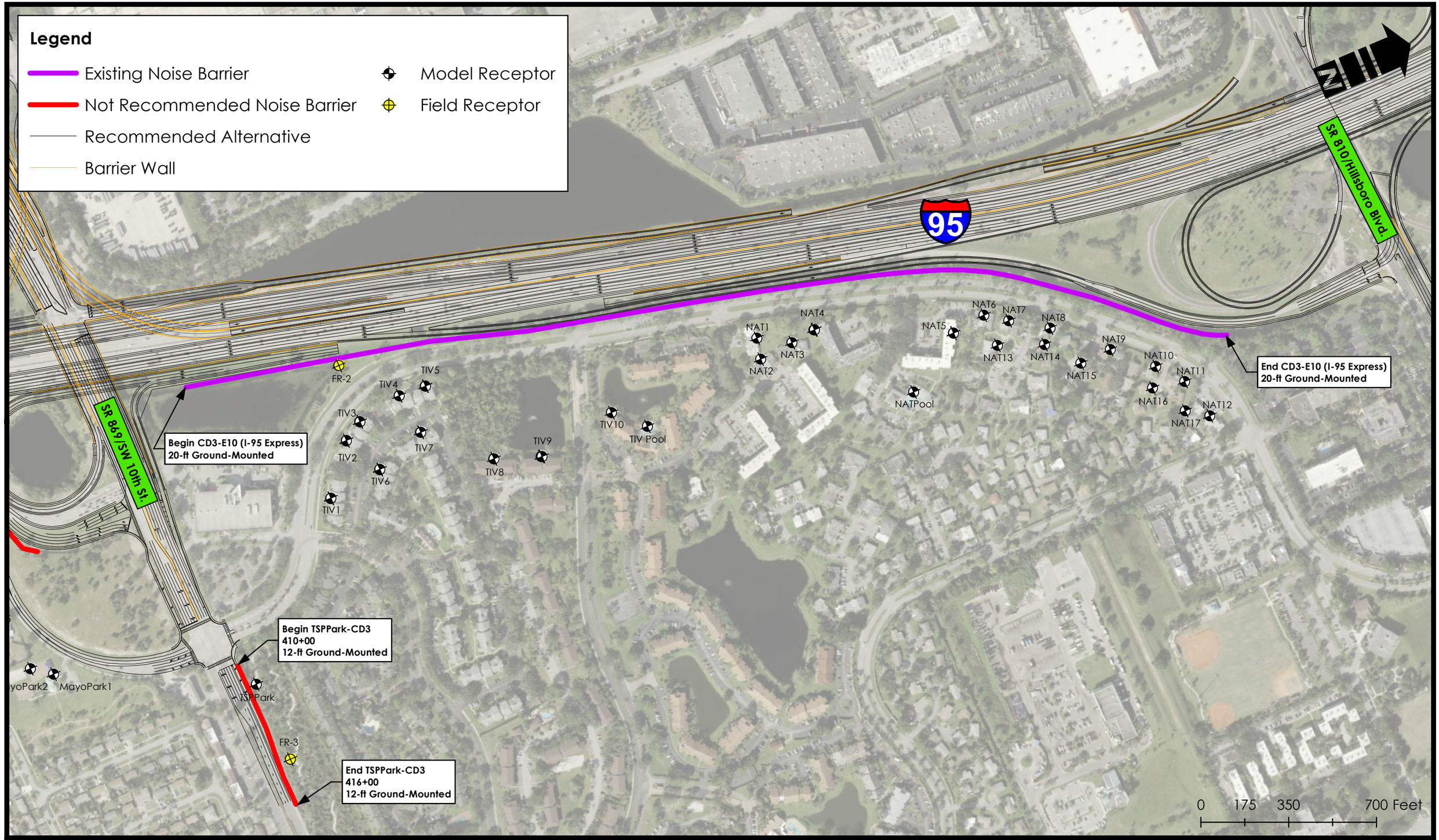
Noise Analysis Maps



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

Interstate 95 (I-95) PD&E Study
SR 9/I-95 from South of SW 10th Street (MP 22.00)
to North of Hillsboro Boulevard (MP 25.10)

Southern Project Terminus
to SR 869/SW 10th Street



Florida Department of Transportation, District IV 3400 West Commercial Boulevard Fort Lauderdale, Florida 33309	Interstate 95 (I-95) PD&E Study SR 9/I-95 from South of SW 10th Street (MP 22.00) to North of Hillsboro Boulevard (MP 25.10)	SR 869/SW 10th Street to SR 810/Hillsboro Blvd

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Legend

- Not Recommended Noise Barrier
- Recommended Alternative
- Barrier Wall
- Model Receptor
- Field Receptor

Military Trail

SR 869/SW 10th St.

FR-2

End LAKES-CD1
147+70
22-ft Ground-Mounted

Begin LAKES-CD1
142+30
22-ft Ground-Mounted

LD1 LD2 LD3 LDTennis LDPool FR-4 LD4 LD5 LD6 LD7 LD8 LD9

QSPool

BWPool

UMHealth(Int)

95

N

0 150 300 600 Feet

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Fort Lauderdale, Florida 33309

Interstate 95 (I-95) PD&E Study
SR 9/I-95 from South of SW 10th Street (MP 22.00)
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Lakes at Deerfield Apartments