# FINAL PRELIMINARY ENGINEERING REPORT

## I-75 (SR 93) Interchange at NW 49 Street PD&E Study

Marion County, Florida

Financial Project ID Number: 435209-1-22-01

ETDM Number: 14242

January 2020

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 Federal Highway Administration and FDOT.

# PROFESSIONAL ENGINEER CERTIFICATION

## PRELIMINARY ENGINEERING REPORT

**Project:** I-75 (SR 93) Interchange at NW 49 Street PD&E Study

**ETDM Number:** 14242

**Financial Project ID:** 435209-1-22-01

**Federal Aid Project Number:** N/A

This preliminary engineering report contains engineering information that fulfills the purpose and need for the I-75 (SR 93) at NW 49 Street Project Development & Environment Study in Marion County, Florida. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

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

carlos rodriguez

Digitally signed by carlos rodriguez
Date: 2021.01.15 14:10:41 -05'00'

This item has been digitally signed and sealed by Carlos David Rodriguez on the date adjacent to the seal.

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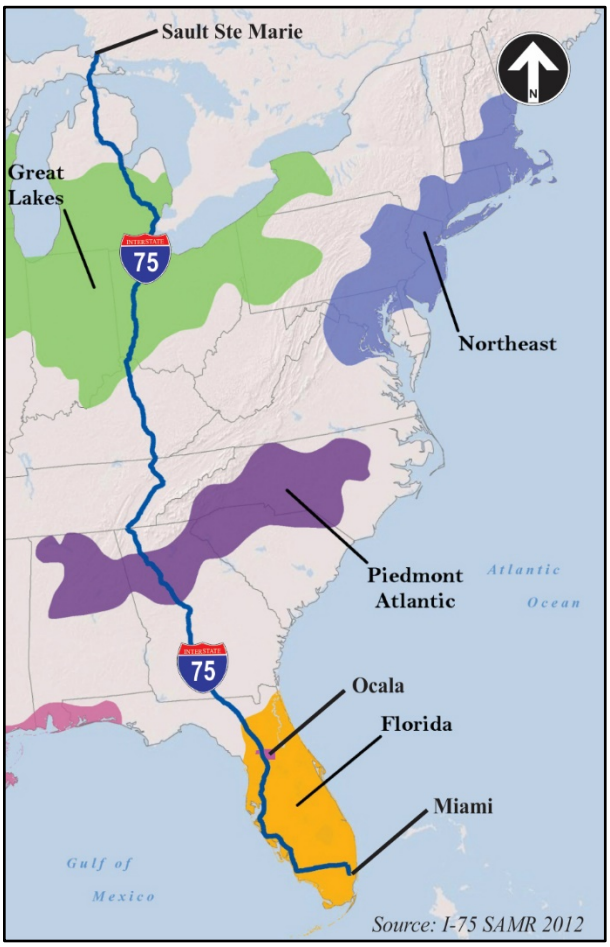
# 1.0 PROJECT SUMMARY

## 1.1 Project Description

The Florida Department of Transportation (FDOT) in conjunction with Marion County is conducting a Project Development and Environment (PD&E) Study for a new interchange on Interstate 75 (I-75) at NW 49 Street, located just west of the City of Ocala in Marion County, Florida. The purpose of this Preliminary Engineering Report (PER) is to document the potential benefits and impacts of a proposed interchange on I-75.

**Figure 1-1 - Interstate 75 Limits**




I-75 (SR 93) is a major north-south interstate highway extending from Miami, Florida on the south to Sault Ste. Marie, Michigan in the north (see **Figure 1-1**). I-75 is the second longest north-south facility in the country (after I-95) traversing six different states. Within the project area, I-75 generally borders the City of Ocala, seat of Marion County in north central Florida. The greater Ocala area has recently experienced one of the highest growth rates in the country for a city its size, and the Marion County Comprehensive Plan outlines a vision to enhance the livability of its residents and promote economic growth in the region. In this vein, the County has designated approximately 3000 acres adjacent to I-75 as a future commerce park. The Ocala 489, located in this area has been established as a "Florida Enterprise Zone" and is composed of a recently constructed FedEx Ground Distribution Hub, Chewy distribution center, an AutoZone distribution center designated as a CSX Select Site, the Florida Crossroads Logistics Center a Red Rock Development, and the remaining undeveloped sites. Development in this area will result in traffic volume increases along I-75 and the entire local roadway network.

**Figure 1-2** depicts the project vicinity. There are two existing I-75 interchanges within the project vicinity. The I-75/US 27 interchange is located approximately 2 miles south of the proposed interchange and the I-75/SR 326 interchange, approximately 2 miles to the north. An Interchange Justification Report (IJR) completed in May 2016 concluded that the existing I-75 interchange ramp movements and intersections at US 27 and at SR 326 are expected to operate at failing levels of service by 2035. A new I-75 interchange at NW 49 Street (approximately midway between the two existing interchanges) is proposed to relieve congestion on the adjacent interchanges. The western limit of this project is NW 44 Avenue (west of I-75) and the eastern limit is the future NW 35 Street extension to the northern end of limerock pit (Magnum Materials Mine), just southeast of the new proposed interchange (Phase 2B). It should be noted that this proposed NW 35 Street extension (Phase 2B) connection will be constructed by the County and is funded for construction in 2021, so it will be completed prior to the interchange being constructed.

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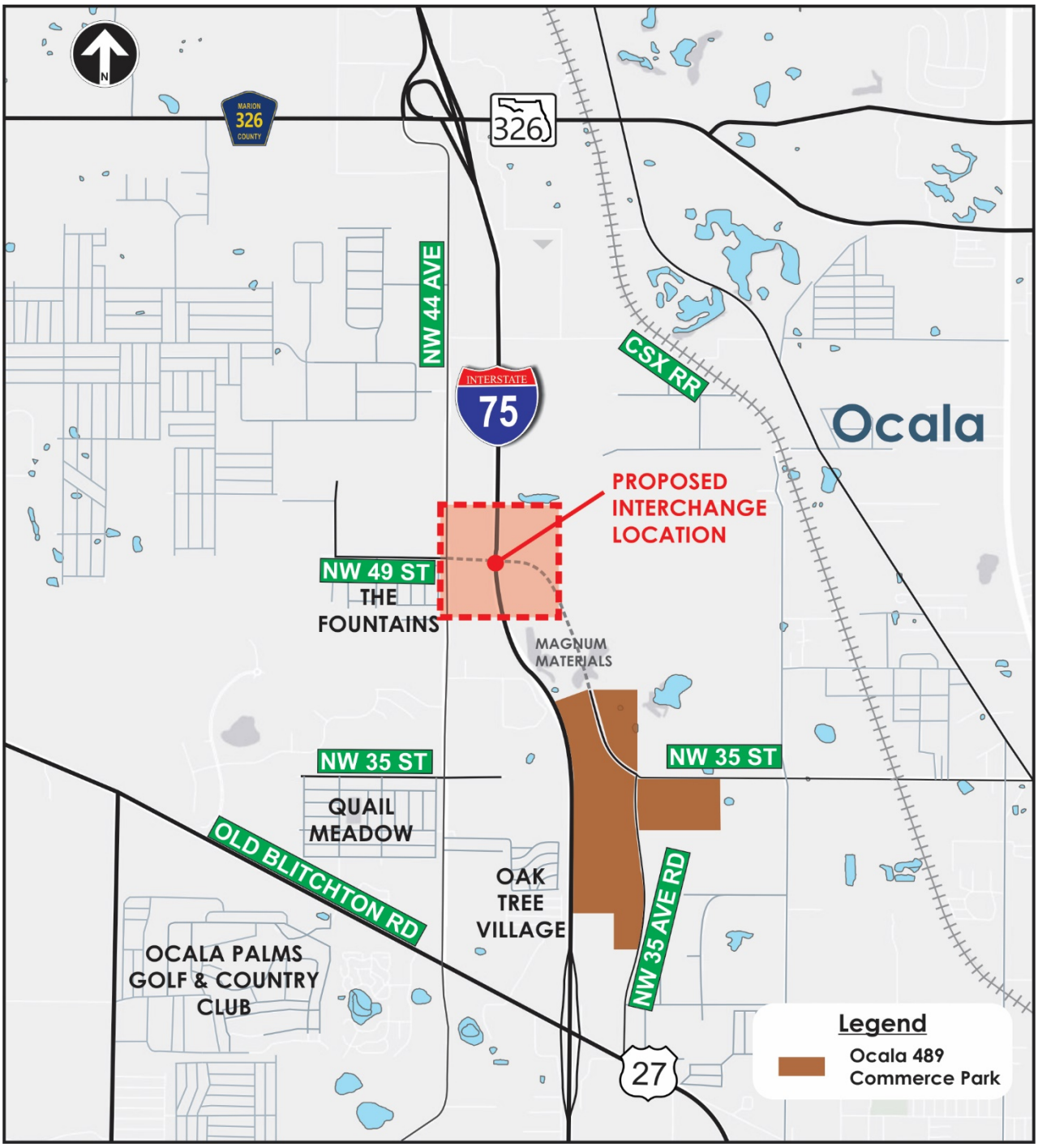
**Figure 1-2 - Location Map**



## 1.2 Purpose & Need

### 1.2.1 Purpose

The purpose of a new I-75 interchange at NW 49 Street is to relieve congestion on adjacent interchanges by providing an alternate access to I-75 for the projected increase in truck volumes resulting from the future commerce district.

### 1.2.2 Need

The overall study was initiated with a detailed, comprehensive analysis of existing/projected substandard conditions. In general terms, some of the most critical potential needs include:

#### 1.2.2.1 Economic Viability and Job Creation

The proposed interchange is needed to support the economic viability of the Ocala 489, a 489 acre industrial and commercial development, which is intended to serve as an economic engine for job creation in the region and is envisioned as a strategic central inland hub for freight-related traffic (see **Figure 1-3**). The Ocala 489 has been established as a Florida Enterprise Zone, a designation which provides numerous tax credits to businesses located within the Commerce Park. In addition, this commerce park includes a site, recently developed by AutoZone, that was designated as a CSX Select Site (the first in Florida). Select Sites are properties identified and vetted as capable locations for future manufacturing facilities along the CSX rail network. FedEx Ground, Florida Crossroads Logistics Center, and Chewy also completed new facilities within the Ocala 489. Marion County has

**Figure 1-3 - Ocala 489 Commerce Park**

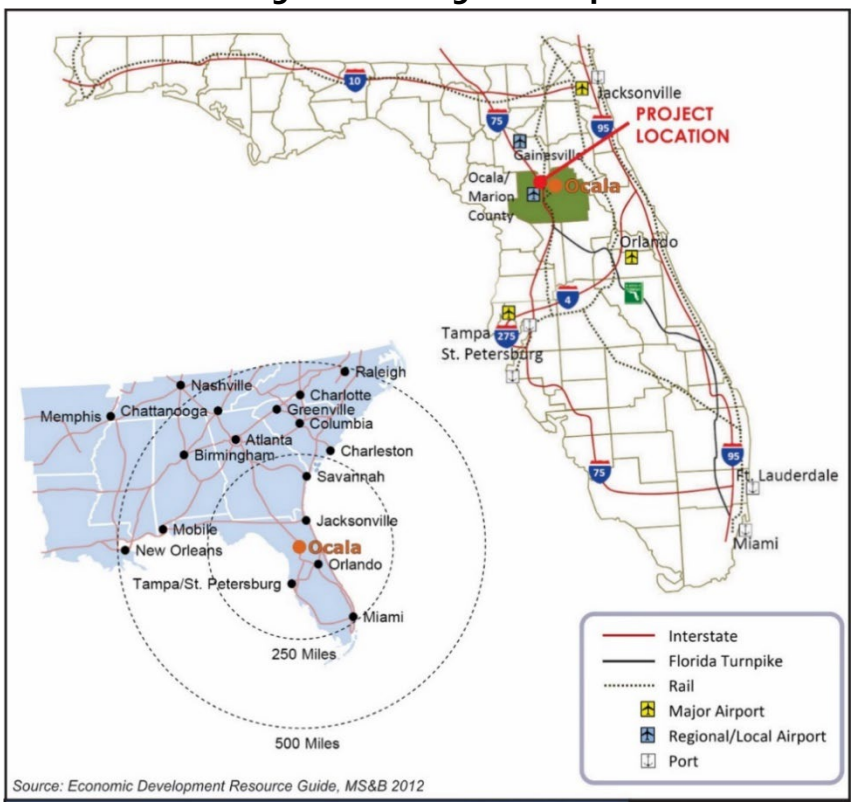
already made infrastructure improvements within the Park with the extension of NW 35 Street as a divided four lane facility.

It should be noted that the Ocala 489 is zoned M-1/M-2 or Light/Heavy Industrial and the businesses that are intended to occupy the commerce park will depend heavily on interstate and regional movement to transport raw materials and finished goods, around the State and beyond. In summary, due to its strategic location and incentives, the Ocala 489 and the commerce district/employment center will provide needed jobs in the area.

#### 1.2.2.2 Improve Interstate and Regional Mobility

The proposed interchange will provide a more direct and efficient access to I-75 thus facilitating interstate and regional mobility. As previously stated, I-75 is a vital north-south interstate facility connecting six different states. From a regional perspective (see **Figure 1-4**) Marion County is approximately midway between Miami and Atlanta and occupies a strategic location due to its relative proximity to other important metropolitan areas such as Jacksonville, Orlando, and Tampa. This strategic location coupled with the presence of a major interstate facility such as I-75 makes this area a key potential hub for commercial industry. The proposed interchange is thus needed to support the efficient movements of goods.

**Figure 1-4 - Regional Map**

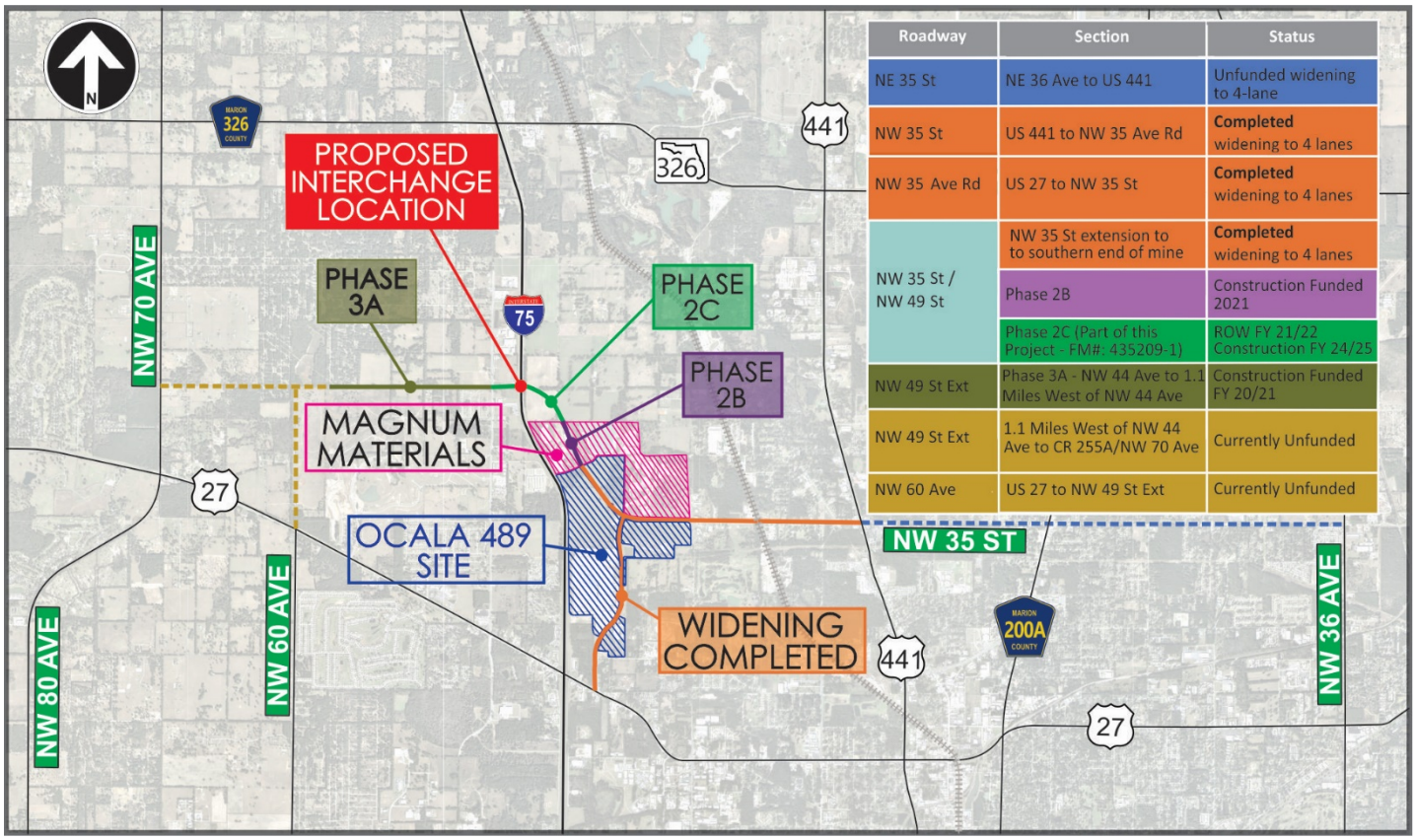


### 1.2.2.3 Address Locally Supported Long Term Regional Needs

The proposed project is needed to provide important access to I-75 as part of a locally supported long range vision to provide a future east-west corridor parallel to US 27 and SR 326. This east-west corridor begins at NE 36 Avenue, east of I-75 and Downtown Ocala and terminates at NW 70th Avenue, west of the proposed I-75 interchange. In conjunction with this new east-west corridor is a connection to US 27 at NW 35 Avenue Road and at NW 60 Avenue.

The proposed I-75 interchange is currently listed as the number one (1) priority project on the Ocala/Marion Transportation Planning Organization (TPO) FY 2025 Priority Projects List. The County has completed a number of improvements in the area in support of the proposed interchange and the Ocala 489 (see **Figure 1-5**), including extension of NW 35 Avenue Road. Phase 2A of the NW 35 Avenue Road extension was recently completed by the County, Phase 2B (through the Magnum Materials Mine) is a Marion County project currently in Final Design and programmed for construction in 2021, and Phase 2C (see **Figure 1-5**) is the connection between the proposed interchange and the future NW 35 Avenue Road (Phase 2B) that will be completed as part of the proposed interchange.

**Figure 1-5 - Adjacent Projects**



#### 1.2.2.4 Accommodate Future Traffic Growth

As previously stated, one of the primary justifications for the new interchange is to accommodate projected future year traffic volumes. Marion County has experienced sustained growth in population since 1970. Growth is expected to continue in the future. According to the currently adopted Central Florida Regional Planning Model (CFRPM Version 6.1) socio-economic data for 2010 and 2040, the projected population for Marion County is expected to grow from approximately 325,199 to over 490,204 in population by 2040. As a result of this population growth, traffic volumes are increasing and will continue to increase in the future.

It should be noted that the existing SR 326 interchange located north of the proposed interchange would be a rather indirect option for trucks serving the Ocala 489 and therefore most of the truck traffic associated with the Commerce Park would likely utilize the US 27 interchange, severely degrading operations and safety at the interchange throughout the day. The need for the new interchange is based on projected traffic volumes in design year 2045 from build-out of not only the Ocala 489 but also the adjacent commerce district/employment center totaling 5,000 +/- acres. It is projected from the CFRPM 6.1 model that build-out in design year 2045 will add 25,000 daily trips to the roadway network with approximately 12%, or 3,000 vehicles, of which are projected to be trucks. As a result of this projected population growth, traffic volumes are increasing and will continue to increase in the future.

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## 1.3 Commitments

FDOT has made a series of commitments and recommendations during this PD&E Study. The following sections summarize the commitments and recommendations that will be adhered to during the future transportation phases:

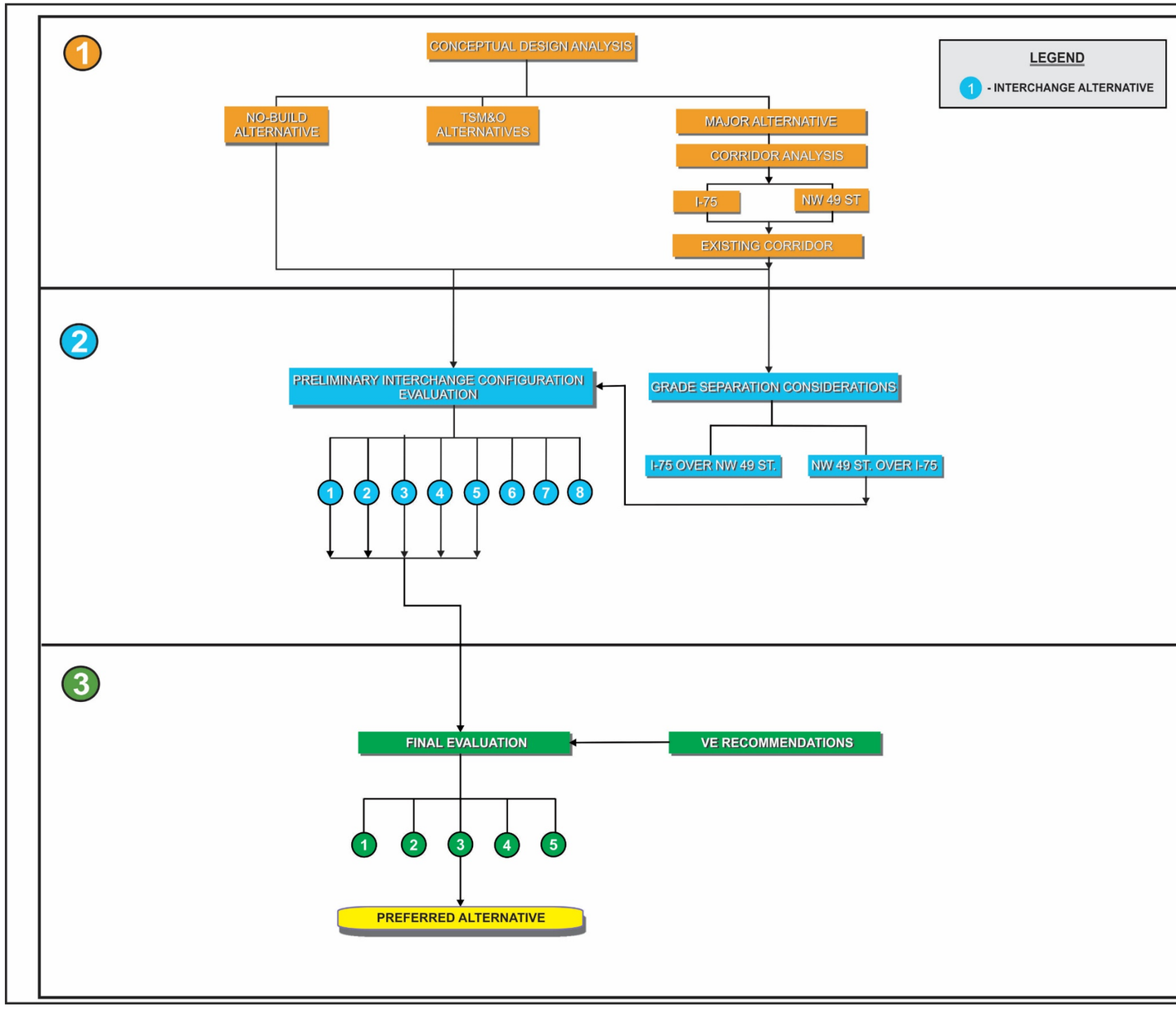
1. The Standard Protection Measures for the Eastern Indigo Snake will be implemented during construction.
2. A survey for the Southeastern American kestrel will be performed during the design phase.
3. A survey for Lewton's polygala and longspurred mint will be performed during the design phase.

## 1.4 Alternatives Analysis Summary

As illustrated on **Figure 1-6**, a multi-phase alternative development, evaluation and selection process was employed to properly assess all alternatives considered for the proposed interchange improvements. Essentially, three (3) different phases comprised the alternative selection process for the proposed project as illustrated in the figure. The alternatives considered included the No-Build Alternative, Transportation Systems Management and Operations (TSM&O) Alternatives short term improvements, and Build Alternatives.

The first step in the Build Alternatives analysis was a grade separation evaluation to determine whether I-75 should cross over NW 49 Street or if NW 49 Street should cross over I-75. The results of the benefit-cost analysis performed indicated that NW 49 Street over I-75 is the best solution. Eight preliminary interchange configurations were then evaluated including a Diamond Interchange, Single Point Urban Interchange (SPUI), Diverging Diamond Interchange (DDI), Partial Cloverleaf SE, Partial Cloverleaf NE, Roundabout, Bowtie Interchange, and a Modified T-Diamond. The top Five ranked alternatives including the Diamond Interchange, SPUI, DDI, Partial Cloverleaf SE, and Partial Cloverleaf NE which were selected for a more stringent evaluation. The "No-Build" alternative has also been included as a viable alternative carried through the alternative analysis and study process. In addition to the alternative evaluation, a Value Engineering (VE) Workshop was held in June of 2019 which recommended a DDI. Based on the results obtained from the evaluation and the VE recommendations, the DDI alternative is the preferred alternative. Please see Section 4 for more details.

**Figure 1-6 - Alternative Selection Process**




| DESCRIPTION | | |
|---|---|---|
| PHASE DESIGNATION | PURPOSE | EVALUATION TECHNIQUE |
| CONCEPTUAL DESIGN ANALYSIS | INITIAL CONSIDERATION OF NO PROJECT AND MINOR OPTIONS AS WELL AS ALTERNATIVE CORRIDORS | FATAL FLAW ASSESSMENTS AND SCREENING |
| PRELIMINARY INTERCHANGE GENERATION & EVALUATION | DETERMINATION OF GRADE SEPARATION CONSIDERATIONS AND PRELIMINARY EVALUATION OF VARIOUS INTERCHANGE CONFIGURATIONS TO GAUGE THEIR EFFECTIVENESS WITH RESPECT TO THE PROJECT OBJECTIVES | • FATAL FLAW ASSESSMENT<br>• EVALUATION MATRIX WITH DESCRIPTIVE MEASURES |
| FINAL EVALUATION | REMAINING ALTERNATIVES ARE FURTHER SCREENED TO GAUGE THEIR TRAFFIC OPERATIONAL CHARACTERISTICS | • MORE STRINGENT SCREENING METHODS ARE USED INCLUDING A SUMMARY TABLE COMPARING THE PERFORMANCE OF THE REMAINING ALTERNATIVES . |

## 1.5 Description of Preferred Alternative

After a comprehensive evaluation process, one alternative was selected as being the most effective option. This alternative is illustrated on **Figures 1-7 and 1-8**.

The preferred alternative, diverging diamond interchange (Alternative 3), consists of a diamond interchange in which the two directions of traffic on the minor road (NW 49 Street) crossover, or diverge, to the opposite side between the signalized crossover intersections at the on/off ramps (shown on **Figure 1-8**). This eliminates the need for left-turning vehicles to cross the paths of approaching through vehicles, facilitating operational maneuvers and eliminating the potential for side-impact crashes. This allows for a simple two-phase operation at the two signalized intersections within the interchange (no left turns), thus improving efficiency. The preferred alternative also includes the extension of NW 49 Street from NW 44 Avenue to Marion County's future NW 35 Street extension (currently in final design). NW 49 Street (shown on **Figure 1-7**) will feature four 12-foot travel lanes with 7-foot bicycle lanes, a 28-foot raised median, and 6-foot sidewalks. The proposed right-of-way for NW 49 Street is 122 feet. NW 49 Street will curve towards the south east of I-75 to connect to Marion County's future NW 35 Street extension (Phase 2B) connection through the Magnum Materials Mine which is funded for construction in 2021 by the County. At the western limit, the proposed NW 49 Street will tie in to the existing NW 49 Street at the NW 44 Avenue intersection. Improvements at the NW 44 Avenue intersection include the addition of a northbound right turn lane and a southbound left turn lane for access to the proposed NW 49 Street and interchange ramps. Additionally, based on the preliminary profile of NW 49 Street, the intersection of NW 44 Avenue would need to be reconstructed to raise the profile approximately 2 feet. The northern and southern ramp tie-ins to I-75 are not shown on Figure 1-8 but can be found in the concept plans in **Appendix B.** Four stormwater treatment and attenuation ponds are shown on **Figure 1-8** to meet water management district and FDOT drainage requirements.

**Figure 1-7 - NW 49 Street Preferred Alternative Typical Section**

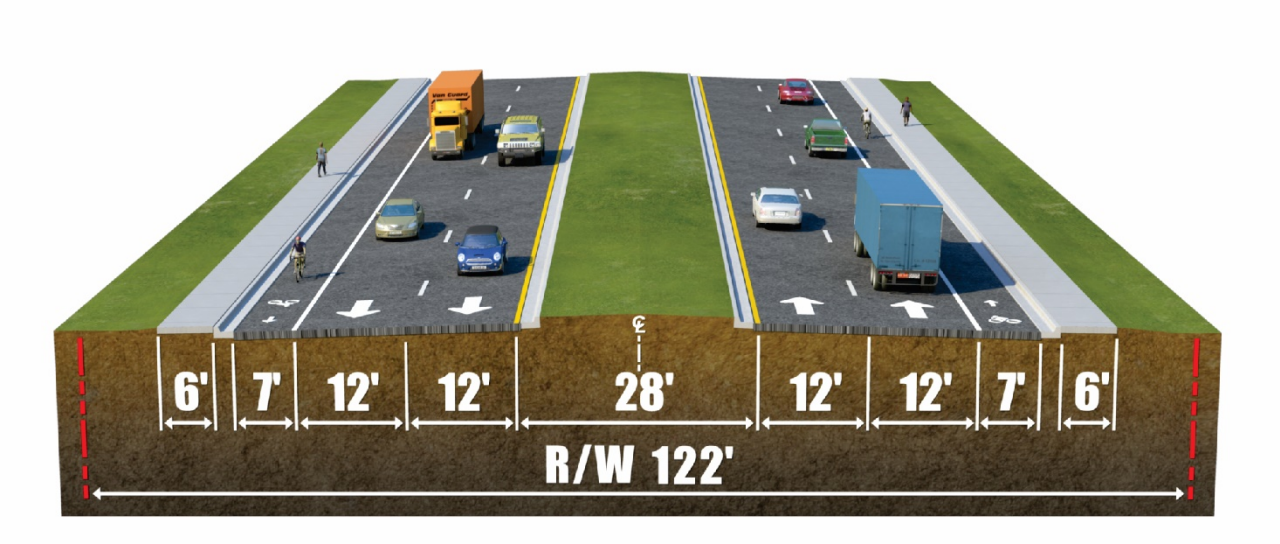
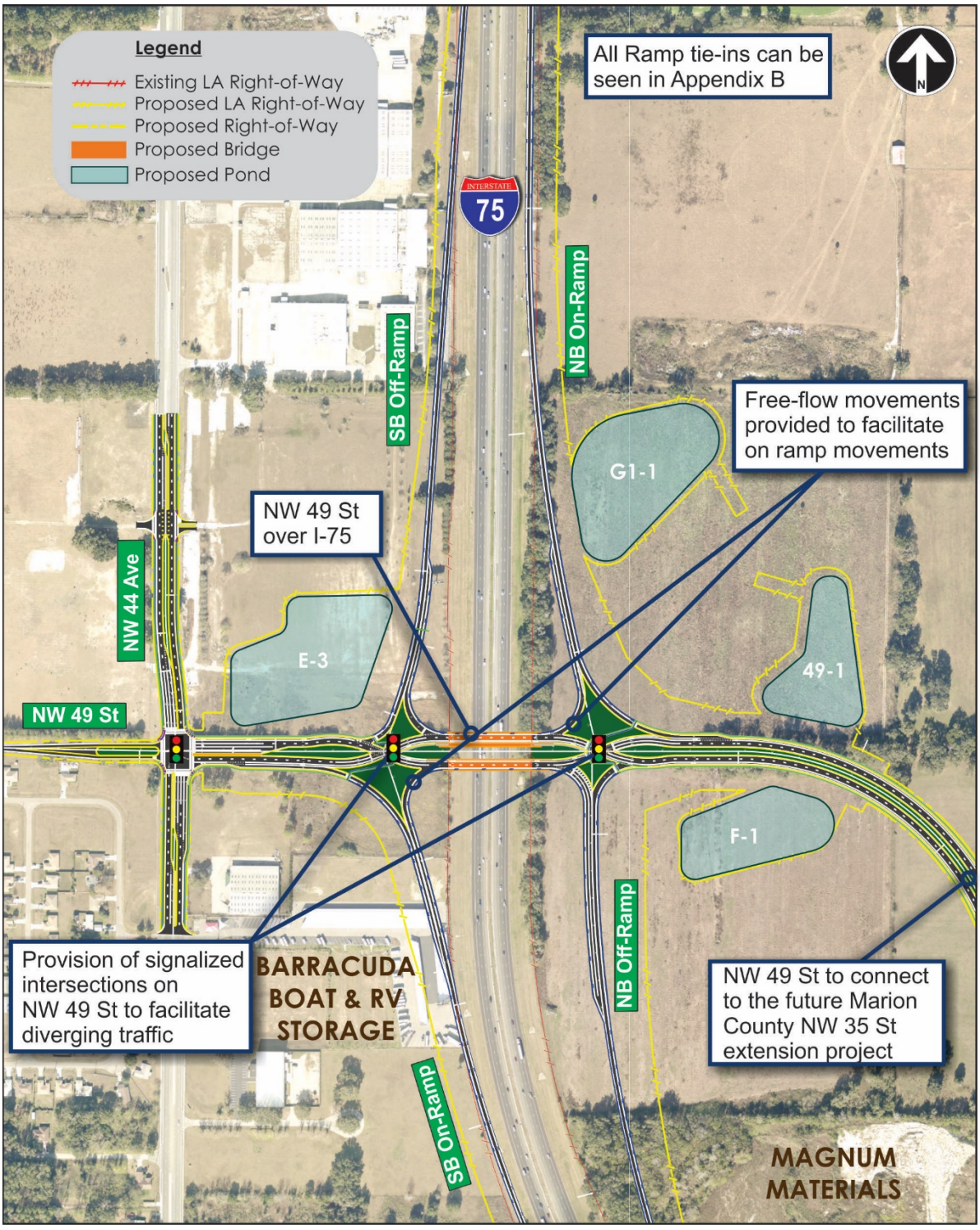


**Figure 1-8 - Preferred Interchange Alternative**



## 1.6 List of Technical Documents

The following is a list of all supplemental documents to this Preliminary Engineering Report.

- Final Interchange Justification Report – December 2020
- Final Categorical Exclusion Type II – December 2020
- Final Cultural Resource Assessment Survey – January 2019
- Final Contamination Screening Evaluation Report – October 2020
- Final Natural Resources Evaluation – October 2020
- Final Noise Study Report – October 2020
- Final Conceptual Stage Relocation Plan – October 2020
- Final Pond Siting Report – December 2020
- Final Location Hydraulics Report – December 2020
- Final Sociocultural Effects Evaluation Technical Memorandum – October 2020

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# 2.0 EXISTING CONDITIONS

Existing environmental features were evaluated in the development of alternatives and a summary of those are included in Section 6.2 of this report.

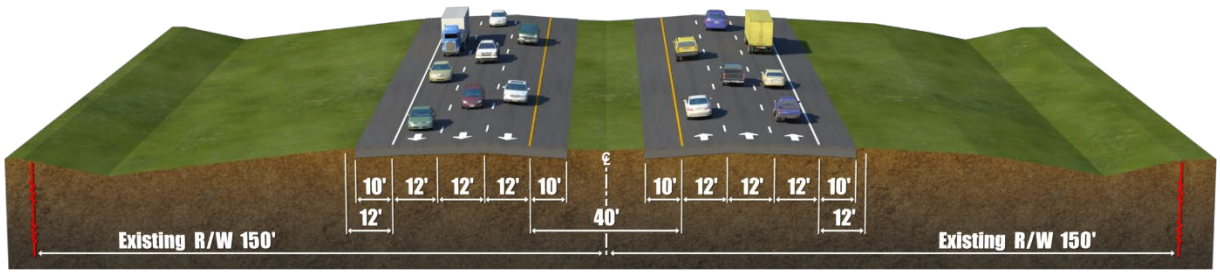
## 2.1 Roadway

Existing typical sections for I-75 and NW 49 Street are illustrated on **Figures 2-1** and **2-2**. The following discussion describes the typical sections for each of these facilities:

I-75

Throughout the project study area, the typical section for I-75 consists of a six (6) lane divided section within a 300-feet limited access right-of-way. Three (3) 12-foot wide lanes are provided in both the northbound and southbound directions. Inside shoulders are 12-feet wide with 10-feet paved in the northbound and southbound direction, respectively, and the median is 40-feet wide, partially grassed and guardrail protection is provided. Outside shoulders are 12-feet wide with 10-feet paved.

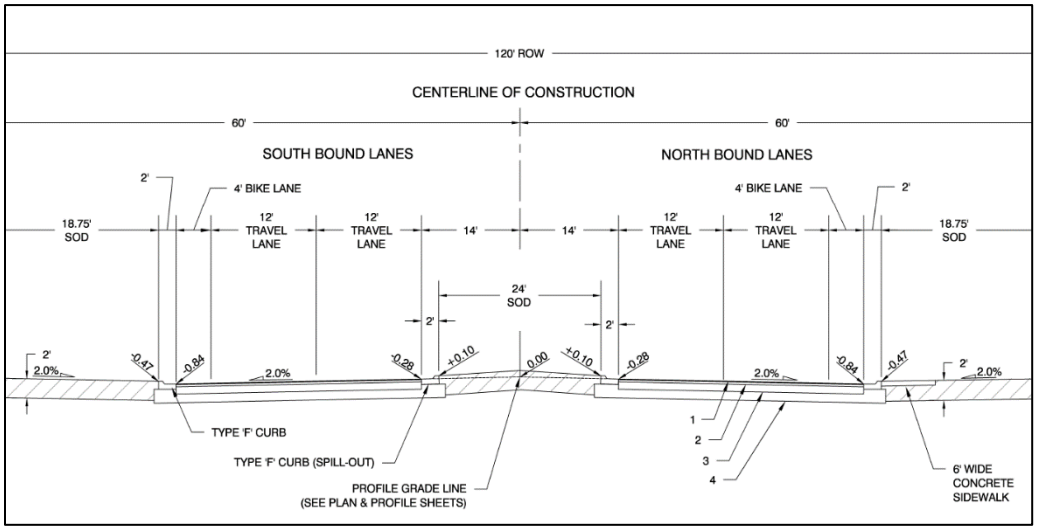
**Figure 2-1 - Existing I-75 Typical Section**




NW 49 Street

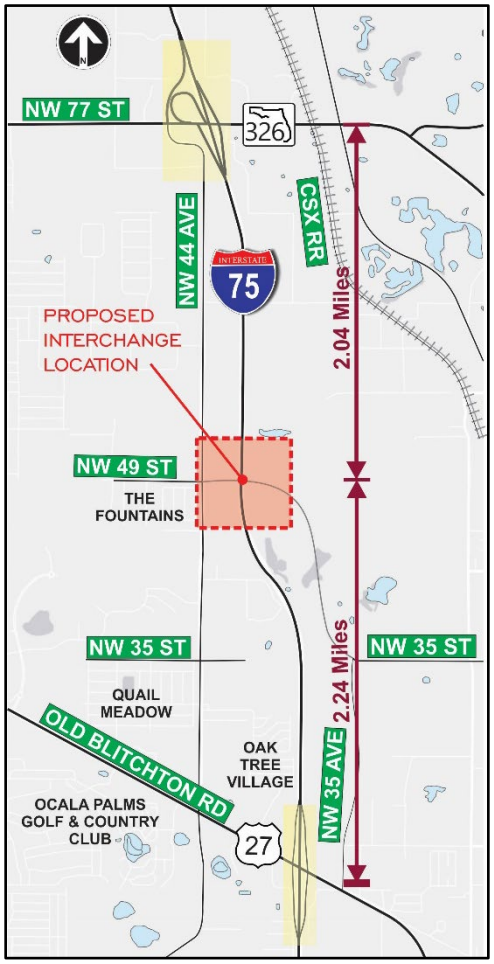
As previously stated, Marion County is planning to construct the future NW 35 Street extension to the northern end of a limerock pit, just southeast of the new proposed interchange. This section will thus be "existing" when the proposed interchange is constructed. This four (4) lane divided urban arterial (see **Figure 2-2**) features four, 12-feet wide lanes, a 28-feet raised median, 7-feet bicycle lanes and a 6-feet sidewalk along both sides.

**Figure 2-2 - NW 35 Street Typical Section**




## 2.1.1 Existing Interchanges

**Figure 2-3 - Existing Interchanges**




I-75 at US 27 Interchange (see **Figure 2-3** bottom)

This diamond interchange with signalized ramp terminal intersections and single merge and diverge ramp gores on I-75 is located approximately 2 miles south of the project area. The southbound off-ramp has single left and right turn approach lanes onto US 27 and the northbound off-ramp has dual right and dual left turn approach lanes onto US 27.

I-75 at SR 326 (NW 77th Street) Interchange (see **Figure 2-3** top)

This modified diamond interchange provides a westbound SR 326 to southbound I-75 loop ramp on the northwest quadrant of the interchange. The NW 44 Avenue intersection and the I-75 southbound on-ramp are on the southwest quadrant.

## 2.2 Right-of-Way

The existing right-of-way associated with all major roadway facilities within the project limits is as follows:

- I-75 RW is 300-ft
- NW 49 Street is approximately 100-ft (west of NW 44 Avenue)
- Proposed NW 35 Street Extension (Phase 2B) that this project is connecting to is 120-ft

## 2.3 Roadway Classification & Context Classification

**Table 2-1** describes the principal characteristics of major facilities within the project's area of influence including their functional classification. The functional classification is the process by which streets and highways are grouped into classes or systems according to the character of service they are intended to provide. The arterial system serves the highest degree of through traffic and largest proportion of total traffic.

**Table 2-1 - Existing Characteristics of Major Facilities within the Area of Influence**

| Facility Name | Functional Classification | Number of Lanes | Median Type | Remarks |
|---|---|---|---|---|
| NW 49 St. | Undivided local urban | 2 lanes | Undivided | Site of proposed new interchange connection to I-75. Vital component of Ocala/Marion County's plan for a new east-west corridor parallel to US 27. |
| NW 44 Ave. | Urban collector | 4 lanes | Divided | Important urban collector and parallel to I-75 serving the generally commercial and residential land uses just west of I-75. |
| NW 35 Ave. Rd. | Urban collector | 4 lanes | Divided | Provides direct access to the Ocala 489 Commerce Park and effective connection to both NW 35 Street / NW 49 Street and US 27. |
| US 27 | Urban principal arterial | 4 lanes | Divided | Major east-west arterial connecting to US 441, US 301 and SR 40 and traversing the Downtown Ocala Area. Provides a diamond interchange at I-75 that is located approximately 2 miles south of the proposed project. |
| SR 326 | Urban principal arterial | 4 lanes | Divided | Major east-west facility which bypasses Downtown Ocala and allows improved east-west connectivity north of Ocala. Provides a modified diamond interchange at I-75 approximately 2 miles north of the proposed project. |

The Context Classification identifies the various built environments to ensure that transportation facilities truly support the safety, comfort and mobility of all users based on the unique context of each roadway. Currently, the project location is most like a C3C environment because of the agricultural and industrial land uses, with nearby commercial and low-density residential land uses. Existing buildings are one story tall. The zoning is designated as light and heavy industrial,

and as heavy business with a floor-area-ratio of 0.7. The future land use is designated as Commerce Districts, encompassing a mix of office, commercial, industrial, and public land uses, with nearby residential (see **Figure 2-4**). A Context Classification Request Form was prepared and approved June 19, 2020, concurring with the proposed Context Classification of C3C.

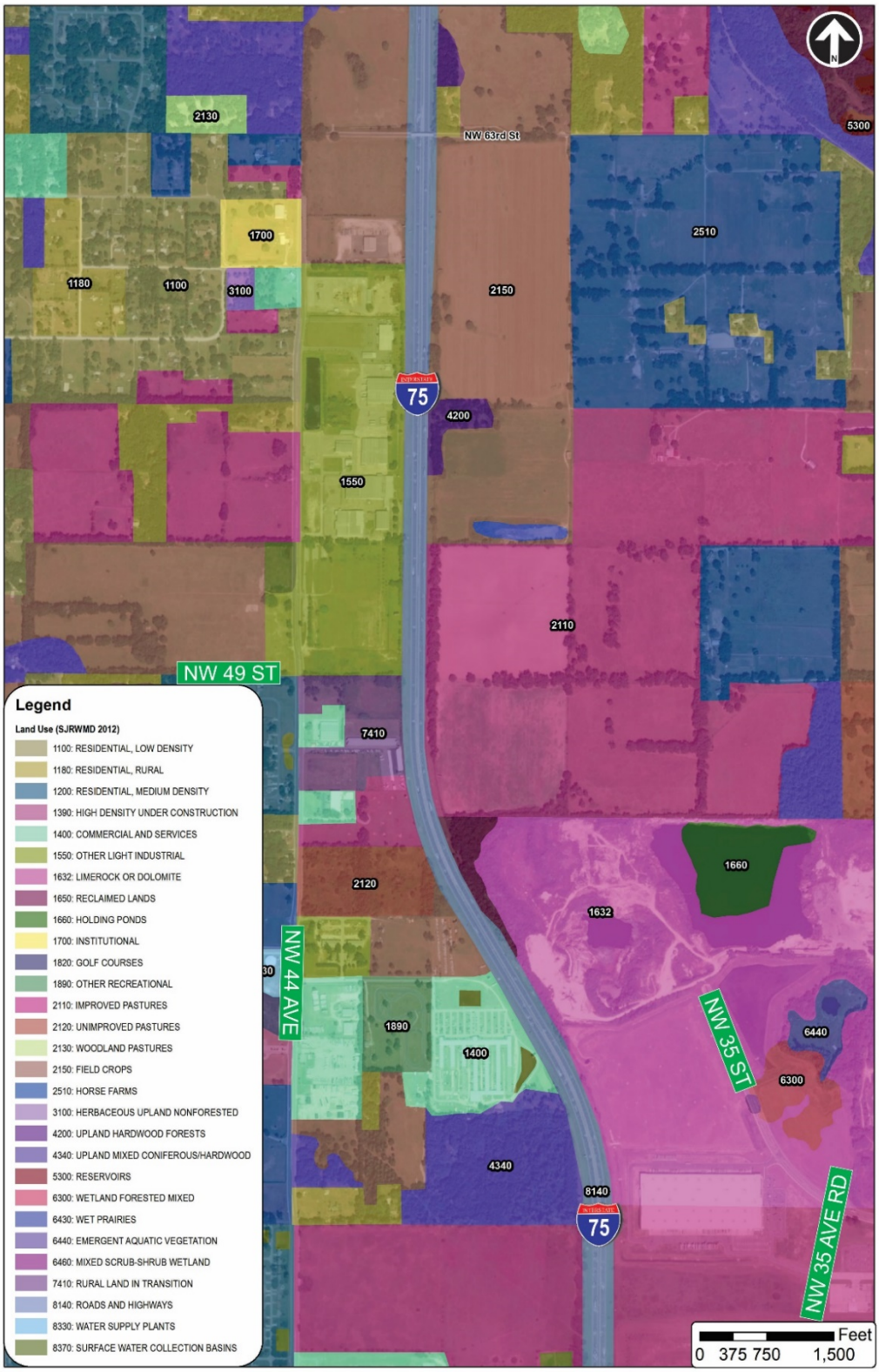
**Figure 2-4 - NW 49 Street Context Classification**


## 2.4 Adjacent Land Use

Major land uses in the project area include small, undeveloped natural areas, large pastures used for livestock, residential areas, and large industrial parks. Land use cover descriptions provided for both uplands and wetlands are classified utilizing the Florida Land Use Cover and Forms Classifications System (FLUCCS) designations. Existing land use in the project area was initially determined utilizing U.S. Geological Survey (USGS) maps, historical images, aerial photographs, and land use mapping from the St. Johns River Water Management District (SJRWMD) (2012). Land use categories reported by SJRWMD were verified in the field.

The most recent FLUCCS data for land use in the project area were downloaded from the SJRWMD website and are mapped on **Figure 2-5**. The predominant land use types in the project area west of I-75 are Other Light Industrial (FLUCCS 1550) and Rural Land in Transition (FLUCCS 7410). East of I-75, the predominant land types are Improved Pastures (FLUCCS 2110) with a smaller area of Field Crops (FLUCCS 2150), both of which are part of the Baldwin Angus Ranch. The Magnum Materials mine in the southeastern part of the project area is mapped as Reclaimed Lands (FLUCCS 1650) and Limerock or Dolomite (FLUCCS 1632). Additional land use information is included in the Natural Resources Evaluation, a supplemental document to this report.

## Figure 2-5 - Existing Land Use



## 2.5 Access Management Classification

Administrative Rule 14-97 establishes the seven classifications for state highways that contain separation standards for access features as stated in the FDOT Median Handbook. Access Class 1 applies specifically to freeways such as I-75 which do not provide direct property connections. For median openings near freeway interchanges, the standard distance to the first full median opening shall be at least 2,640 feet as measure from the end of the taper of the off-ramp.

## 2.6 Design and Posted Speeds

Within this section of I-75, the design speed is 70 mph with a posted speed limit of 70 mph. The proposed NW 35 Street extension will have a design and posted speed of 45 mph.

## 2.7 Vertical and Horizontal Alignment

The proposed I-75 interchange location is just north of the point of tangency (PT) (see **Table 2-2**) of existing reverse curve along I-75 which meets design standards and extends south of the subject location, continuing on a tangent, crossing the I-75/US 27 interchange. North of the proposed interchange, I-75 is generally on tangent and then features a 1°30' curve just south of the existing I-75/SR 326 interchange. In terms of vertical alignment, the existing I-75 facility exhibits a series of very long flat grades with no existing vertical curves. NW 44 Avenue within the limits of project is generally flat with no major changes in grade and no existing vertical curves. The future NW 35 Street extension was in final design by Marion County at the time of this report. All proposed improvements will tie to the future NW 35 Street.

**Table 2-2 - Existing Horizontal Curves along I-75**

| Location | D.S. | PI sta. (milepost) | Delta | D | T (feet) | L (feet) | R (feet) | e (ft/ft) | PC sta. (milepost) | PT sta. (milepost) |
|---|---|---|---|---|---|---|---|---|---|---|
| Just north of I-75/US 27 interchange and south of subject project location | 70 | 1009+94.47 | 30°59'08" | 1°45'00" | 907 | 1,770 | 3,274 | 0.065 | 1000+86.95 | 1018+57.55 |
| Just south of subject project location | 70 | 1044+91.75 | 31°05'20" | 1°45'00" | 910 | 1,776 | 3,274 | 0.065 | 1035+81.04 | 1053+57.55 |
| North of subject project location and just south of I-75/SR 326 interchange | 70 | 1130+32.02 | 18°04'59" | 1°30'00" | 607 | 1,205 | 3,819 | 0.055 | 1124+24.20 | 1136+29.74 |

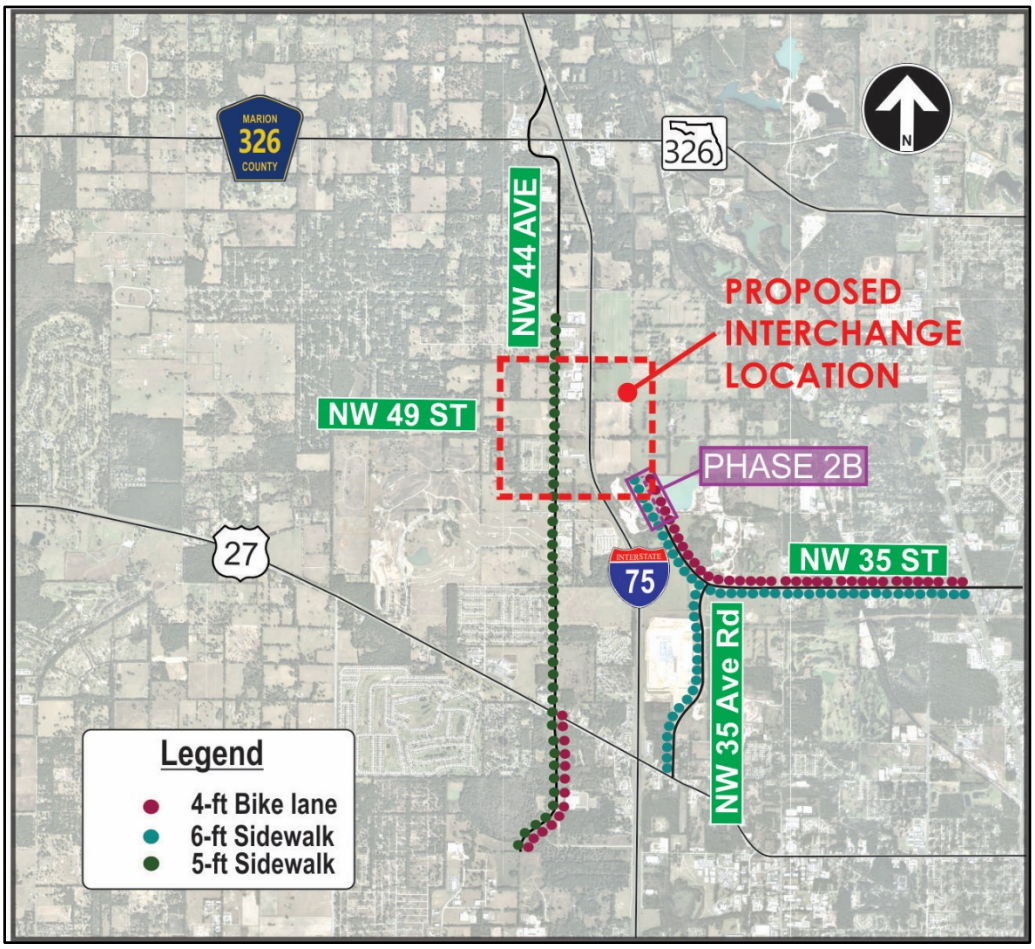
## 2.8 Pedestrian Accommodations

The only pedestrian facility present within the immediate project vicinity is along NW 44 Avenue which features wide sidewalks along both sides of the road. The proposed extension of NW 35 Street to the north end of the limerock mine being constructed by Marion County will provide both pedestrian and bicycle features.

## 2.9 Bicycle Facilities

The only bicycle facility present within the immediate project vicinity is along NW 44 Avenue which features wide sidewalks along both sides of the road (see **Figure 2-6**). However, as previously mentioned, the proposed extension of NW 35 Street to the north end of the limerock mine will provide on-street bicycle facilities. It will thus comply with the "Complete Streets" concept.

**Figure 2-6 - Existing Bicycle Facilities**



## 2.10 Transit Facilities

The Ocala SunTran bus system serves the Ocala metropolitan area and adjacent communities with six distinct routes. None of the routes presently serve the project area. However, the Ocala Marion TPO SunTran Transit Development Plan includes a planned realignment and expansion of the Blue route to Blue routes A and B. Blue B route would extend north from US 27 along NW 35 Avenue Road to provide service to the Ocala 489. According to the Plan, "the alignment would benefit ridership due to the directness of travel between major anchor points and the available transfers at the Downtown Transfer Station."

## 2.11 Pavement Condition

Visual inspection of the existing I-75 pavement within the study area was supplemented with an additional investigation of the FDOT's Pavement Condition Survey database. The database also indicated that the pavement is in very good condition (crack rating of 10.0) and rideability was also good (rating of 8.6). Each section of pavement is rated for cracking and rideability on a 0-10 scale with 0 the worst and 10 the best. Pavement with a crack rating of 6.4 or less is considered deficient. For speed limits less than or equal to 45 mph, a ride rating of 5.4 is considered deficient. Condition reports for NW 44 Avenue are not available, however based on visual inspection during field reviews, the pavement for NW 44 Avenue appeared to be in good condition.

## 2.12 Traffic Volumes and Operational Conditions

Turning Movement Counts (TMCs) and 72-Hour Classification Counts were collected for the study intersections and roadway systems within the Area of Influence (AOI) between September 26 and September 28, 2017. In addition to collecting traffic counts, data was obtained from the FDOT 2017 Florida Traffic Online (FTO) and the Ocala/Marion TPO 2013-2017 Traffic Counts & Trends Manual. The County counts were used for comparison and supplemented FDOT counts as necessary.

The raw traffic data was adjusted following the procedures set forth in the 2014 FDOT Project Traffic Forecasting Handbook. The classification counts were reviewed including the percent heavy vehicles (% Truck) and directional (D) split for each location. Based on the results, D was established for surface street segments. A D factor along the I-75 mainline was developed using the 5-year average (2013-2017) D for the corresponding locations; obtained from the 2017 FDOT FTO. The daily %Trucks ($\%T_{Daily}$) for I-75 mainline was developed the same way. Classification count data was used to establish the $\%T_{Daily}$ for ramps and roadway segments (surface street).

**Figure 2-7** summarizes the existing year (2017) Annual Average Daily Traffic (AADT) and **Figure 2-8** illustrates the balanced volumes for intersections within the project's AOI.

**Figure 2-7 - Existing AADT Volumes (2017)**

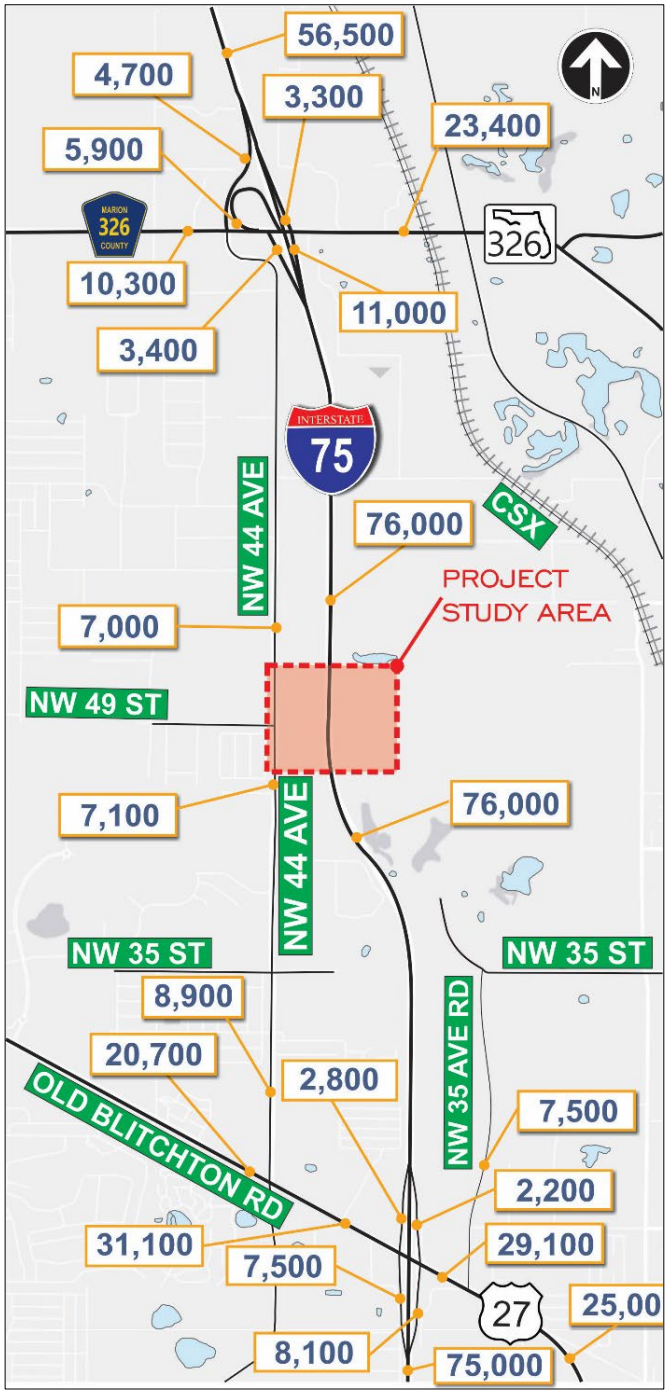
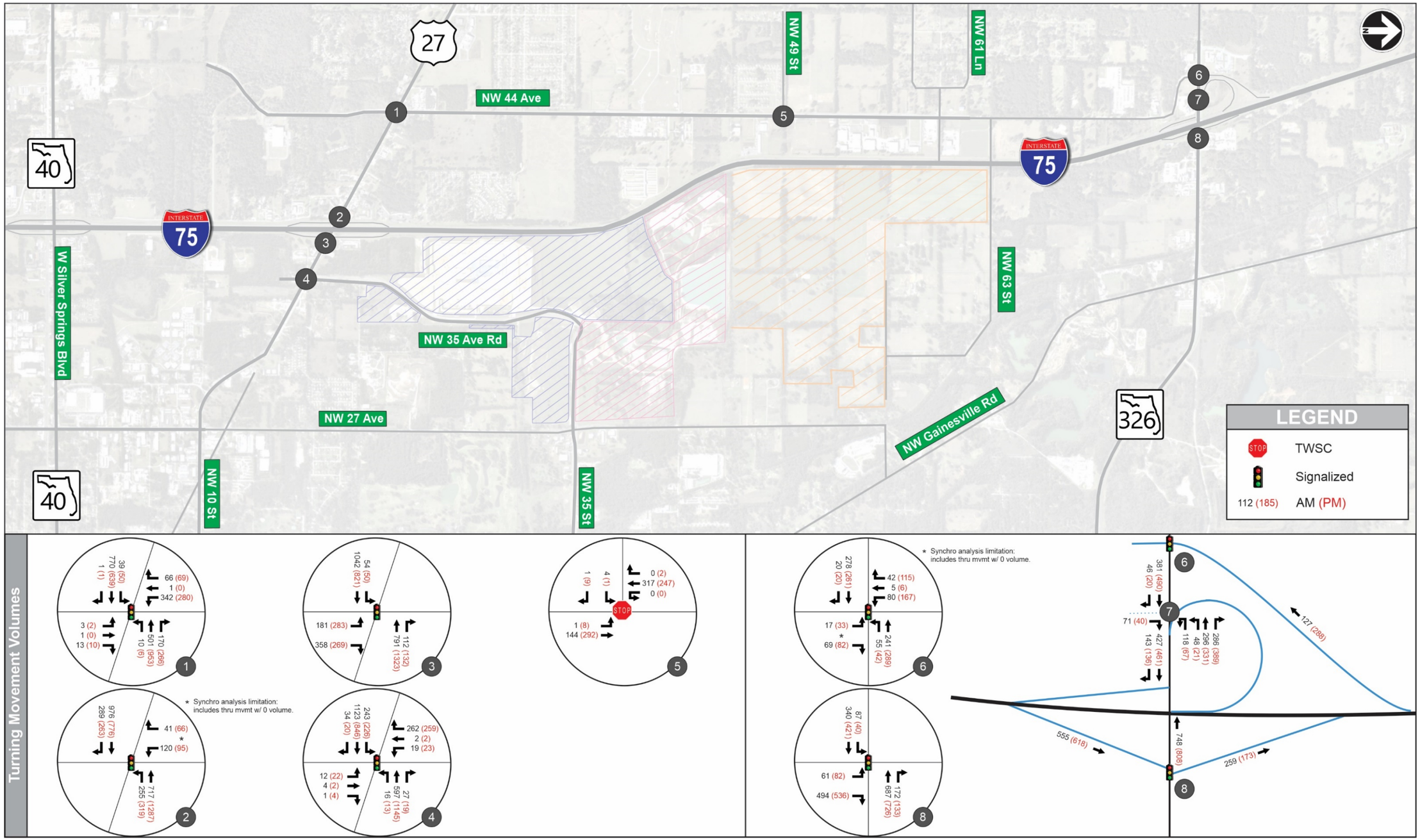


**Figure 2-8 - Existing Balanced Intersection Volumes (2017)**



The AOI defines the study area for the IJR. As defined in the FDOT Interchange Access Request User Guide (IARUG) and as directed by the Department, the AOI includes at a minimum, one interchange on either side of the subject interchange and signalized intersections within one-half mile on the cross streets.

The following interchanges are included in the AOI:

- I-75 at US 27
- NW 49 Street at I-75 northbound ramps (Proposed)
- NW 49 Street at I-75 southbound ramps (Proposed)
- I-75 at SR 326

The following existing intersections are within the AOI of the project study area:

- US 27 at NW 44 Avenue
- US 27 at I-75 northbound ramps
- US 27 at I-75 southbound ramps
- US 27 at NW 35 Avenue Road
- NW 49 Street at NW 44 Avenue
- SR 326 at I-75 northbound ramps
- SR 326 at I-75 southbound ramps /NW 44 Avenue

**Existing Operational Performance**

The LOS for the existing conditions was determined using the most current procedures as outlined in the Highway Capacity Manual (HCM) 2010. Per the approved MLOU, the analysis was performed for the peak hours using the methodologies documented in the HCM 2010 as applied using HCS 6.8 and SYNCHRO 10. It should be noted that HCM 2000 was used under certain phasing and lane configuration conditions that are not recognized by HCM 2010 analysis methodologies. Specific analysis techniques utilized in this study included procedures for basic freeway segments, merge/diverge analysis as well as stop controlled and signalized intersection analysis.

Roadways within the AOI were evaluated to determine the operating Level of Service (LOS). The purpose of this evaluation is to identify any deficiency in the existing system. LOS is a qualitative measure of the effect of a number of factors including speed and travel time, traffic interruptions due to traffic signals, freedom to maneuver, safety, driving comfort, convenience, and operating cost. LOS is designated as “A” through “F” and covers the entire range of traffic operation for transportation facilities. LOS “A” represents the best operating condition while LOS “F” represents the worst.

The LOS targets for the study segments are presented in **Table 2-3** based upon FDOT District 5 LOS Summary Report, consistent with FDOT Policy 000-525-006c Level of Service for the State Highway System (SHS), and the Transportation Element of the Ocala and Marion County Comprehensive Plans.

**Table 2-3 - LOS Target**

| Roadway | Location/Segment | LOS Targets |
|---|---|---|
| I-75 | North of SR 326 | C |
| I-75 | South of US 27 to south of SR 326 | D |
| US 27 | West of I-75 to east of NE 35 Avenue | D |
| SR 326 | West of I-75 to east of I-75 | D |

### Existing LOS Analyses

**Figures 2-9** and **2-10** present the existing segmented breakdown of the I-75 mainline and interchange ramps by segment type, segment length and speed, change lane length, peak hour volume, and %Trucks. The figure also summarizes the HCS analysis results for mainline segment (basic freeway) and merge/diverge (ramp junction) locations; speed, density and LOS. The analyses indicate that the existing I-75 segments and merge/diverge areas are operating within LOS targets.

**Table 2-4** summarizes the Synchro analysis results for intersection approach, overall intersection delay and LOS. The overall LOS at each intersection meets the LOS D target. However, the southbound approach at the intersection of US 27 and NW 35 Avenue Road operates at LOS F during the AM and PM peak hours. In addition, the northbound approaches at the US 27 intersections of NW 35 Avenue Road and NW 44 Avenue operate at LOS E during the PM peak hour. It should be noted that Yield controlled right turn movements at the I-75 and SR 326 off-ramps were coded in Synchro as signalized with permitted right turn on red; since HCM2010 methodology omits Yield and Stop controlled movements at signalized intersections. HCM2000 was used for SR 326 at I-75 northbound ramps since HCM2010 generated an unrealistic LOS (over 500 sec/veh delay for the northbound right turn movement).

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## Figure 2-9 - Existing (2017) AM I-75 Segment & Merge/Diverge Analysis Summary

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I-75 Southbound | Distance (ft) | | 1,500 | 3,168 | 1,500 | 16,570 | 1,500 | 380 | 1500 | 1,815 | 1,500 | |
| | Accel/Decel Lanes (ft) | | 800 | N/A | 616 | 17,881 | 1,073 | 380 | 1500 | N/A | 268 | |
| | Speed (mph) | 75.0 | 66.5 | 75.0 | 65.3 | 75.0 | 68.1 | 75.0 | 68.3 | 75.0 | 68.9 | 75.0 |
| | Level of Service | A | B | A | B | A | A | A | A | A | B | A |
| | Density (pc/mi/ln) | 10.7 | 13.6 | 7.3 | 10.5 | 8.3 | 8.1 | 7.5 | 5.4 | 5.8 | 11.4 | 6.6 |
| | Segment Type | Basic | Merge | Basic | Diverge | Basic | Merge | Basic | Merge | Basic | Diverge | Basic |
| | Truck % | 11 | 14 | 11 | 6 | 12 | 23 | 12 | 23 | 12 | 23 | 10 |
| | | | | | | | | | | Loop | | |
| | Volumes | **1850** | **545** | **1305** | **162** | **1467** | **143** | **1324** | **286** | **1038** | **127** | **1165** |
| **Interchange** | | | **US 27** | | | | | **SR 326** | | | | |
| I-75 Northbound | Volumes | **2446** | **539** | **1907** | **166** | **2073** | **555** | **1518** | | **259** | **1777** | |
| | Truck % | 11 | 14 | 11 | 6 | 12 | 23 | 12 | | 23 | 10 | |
| | Segment Type | Basic | Diverge | Basic | Merge | Basic | Diverge | Basic | | Merge | Basic | |
| | Distance (ft) | | 1,500 | 3,029 | 1,500 | 16,650 | 1,500 | 2,809 | | 1,500 | | |
| | Accel/Decel Lanes (ft) | | 671 | N/A | 847 | 18,132 | 671 | N/A | | 941 | | |
| | Speed (mph) | 75.0 | 62.2 | 75.0 | 67.0 | 75.0 | 61.6 | 75.0 | | 67.8 | 75.0 | |
| | Level of Service | B | B | A | B | B | B | A | | B | A | |
| | Density (pc/mi/ln) | 13.3 | 17.2 | 10.3 | 12.6 | 11.3 | 15.2 | 8.3 | | 10.7 | 10.0 | |

## Figure 2-10 - Existing (2017) PM I-75 Segment & Merge/Diverge Analysis Summary

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I-75 Southbound | Distance (ft) | | 1,500 | 3,168 | 1,500 | 16,570 | 1,500 | 380 | 1500 | 1,815 | 1,500 | |
| | Accel/Decel Lanes (ft) | | 800 | | 616 | 17,881 | 1,073 | 380 | 1500 | N/A | 268 | |
| | Speed (mph) | 75.0 | 66.0 | 75.0 | 65.6 | 75.0 | 67.7 | 75.0 | 68.1 | 75.0 | 68.5 | 75.0 |
| | Level of Service | B | B | A | B | A | B | A | A | A | B | A |
| | Density (pc/mi/ln) | 13.0 | 16.2 | 9.3 | 13.0 | 10.2 | 10.3 | 9.5 | 7.8 | 7.3 | 14.9 | 9.0 |
| | Segment Type | Basic | Merge | Basic | Diverge | Basic | Merge | Basic | Merge | Basic | Diverge | Basic |
| | Truck% | 11 | 14 | 11 | 6 | 12 | 23 | 12 | 23 | 12 | 23 | 10 |
| | | | | | | | | | | Loop | | |
| | Volumes | **2277** | **583** | **1694** | **162** | **1856** | **136** | **1720** | **389** | **1331** | **288** | **1619** |
| **Interchange** | | | **US 27** | | | | | **SR 326** | | | | |
| I-75 Northbound | Volumes | **2519** | **552** | **1967** | **182** | **2149** | **618** | **1531** | | **173** | **1704** | |
| | Truck% | 11 | 14 | 11 | 6 | 12 | 23 | 12 | | 23 | 10 | |
| | Segment Type | Basic | Diverge | Basic | Merge | Basic | Diverge | Basic | | Merge | Basic | |
| | Distance (ft) | | 1,500 | 3,029 | 1,500 | 16,650 | 1,500 | 2,809 | | 1,500 | | |
| | Accel/Decel Lanes (ft) | | 671 | N/A | 847 | 18,132 | 671 | N/A | | 941 | | |
| | Speed (mph) | 74.9 | 62.5 | 75.0 | 66.8 | 75.0 | 63.5 | 75.0 | | 68.1 | 75.0 | |
| | Level of Service | B | B | B | B | B | B | A | | B | A | |
| | Density (vehicles) | 14.3 | 18.3 | 11.1 | 13.7 | 12.5 | 16.5 | 8.9 | | 10.7 | 9.3 | |

## Table 2-4 - Existing (2017) Intersection Delay and LOS

| Intersection | DIR | AM Peak | | | | PM Peak | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | App. | | Int. | | App. | | Int. | |
| | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| NW 44 Ave at US 27 | EB | 19.9 | B | 21.5 | C | 13.2 | B | 21.1 | C |
| | WB | 20.1 | C | | | 21.2 | C | | |
| | NB | 39.2 | D | | | 56.3 | E | | |
| | SB | 26.9 | C | | | 34.9 | C | | |
| I-75 SB at US 27 | EB | 19.3 | B | 15.7 | B | 19.6 | B | 11.7 | B |
| | WB | 6.1 | A | | | 4.6 | A | | |
| | NB | | | | | | | | |
| | SB | 53.3 | D | | | 54.6 | D | | |
| I-75 NB at US 27 | EB | 1.2 | A | 12.7 | B | 1.1 | A | 14.3 | B |
| | WB | 13.0 | B | | | 13.4 | B | | |
| | NB | 35.1 | D | | | 36.9 | D | | |
| | SB | | | | | | | | |
| NW 35 Ave at US 27 | EB | 29.9 | C | 38.9 | D | 37.0 | D | 51.1 | D |
| | WB | 30.9 | C | | | 53.2 | D | | |
| | NB | 54.5 | D | | | 56.9 | E | | |
| | SB | 95.4 | F | | | 94.0 | F | | |
| NW 44 Ave at NW 49 ST *(Int. LOS reflective of Stop controlled movement)* | EB | 11.7 | B | 11.7 | B | 9.9 | A | 9.9 | A |
| | WB | | | | | | | | |
| | NB | 0.2 | A | | | 0.2 | A | | |
| | SB | 0.0 | A | | | 0.0 | A | | |
| NW 44 Ave/I-75 SB Off at SR 326 | EB | 14.3 | B | 16.1 | B | 15.1 | B | 17.6 | B |
| | WB | 14.4 | B | | | 14.9 | B | | |
| | NB | 26.1 | C | | | 25.6 | C | | |
| | SB | 17.3 | B | | | 19.7 | B | | |
| I-75 SB On-Ramp (Loop) at SR 326 | EB | 0.0 | A | 2.5 | A | 0.0 | A | 1.4 | A |
| | WB | 3.3 | A | | | 1.8 | A | | |
| | NB | 10.6 | B | | | 10.6 | B | | |
| I-75 NB Off/I-75 NB On at SR 326* | EB | 7.8 | A | 21.7 | C | 7.7 | A | 21.8 | C |
| | WB | 20.9 | C | | | 20.5 | C | | |
| | NB | 34.0 | C | | | 33.6 | C | | |
| | SB | | | | | | | | |

Note: *LOS results based on *HCM 2000* methodology

## 2.13 Intersection Layout and Traffic Control

At the present time, there are no critical intersections or signalized locations within the immediate vicinity of the proposed interchange location. However, as previously mentioned (see Section 1.2.2.3), Marion County proposes to provide a future east-west corridor extending from NE 36 Avenue east of I-75 to NW 70 Avenue, west of I-75. The new I-75 interchange connection is a vital access component of such a corridor. Located just 1000 feet west of the proposed interchange will be the future intersection of NW 44 Avenue (a four-lane divided major urban collector) and NW 49 Street. Future projections clearly indicate the future need for signalized control at this site.

## 2.14 Railroad Crossings

There are no existing railroad crossings within the limits of the proposed project.

## 2.15 Crash Data and Safety Analysis

A safety analysis was conducted for existing conditions utilizing crash data recorded within the project's AOI between years 2013 and 2017. Crash data was obtained for a five-year period from January 1, 2013 through December 31, 2017. The crash data was obtained from the Florida Department of Transportation (FDOT) Crash Analysis Reporting (CAR) online database and the Signal Four Analytics application. **Figure 2-11** shows the crash severity, type and crash summary for the various intersections, interchange ramps and segments within the AOI. In addition, the intersections and segments were evaluated based on the criteria shown on the figure. The I-75 segments between the US 27 ramps and between the SR 326 ramps exceeded the statewide segmental crash rate for similar facilities and four of the seven intersections exceeded the statewide average crash rate for similar intersections.

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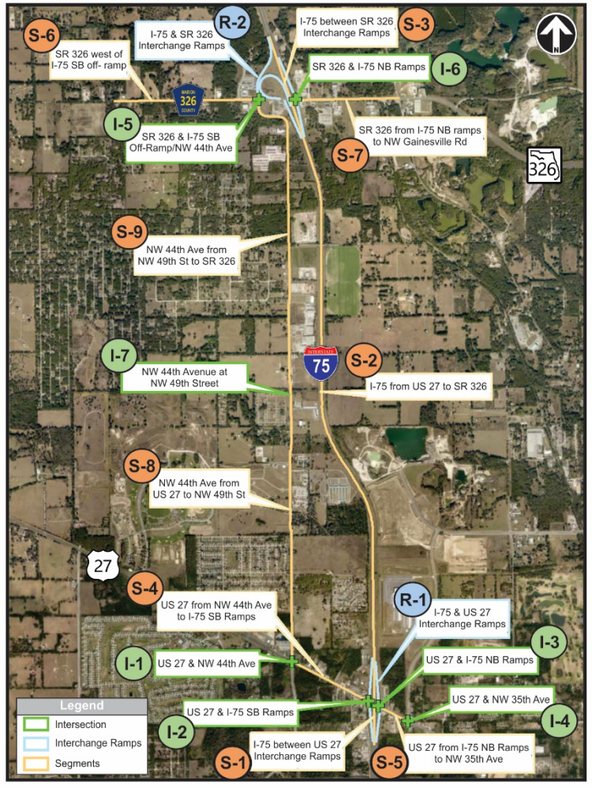
## Figure 2-11 - Existing Crash Analysis Summary




### BASIS OF EVALUATION

Intersections:
Average crash rate per million entering vehicles (MEV) for 5 study years versus the statewide average crash rate for similar intersections.

- Good – Crash Rate < statewide avg. crash rate for similar intersections
- Fair – Crash Rate = statewide avg. crash rate for similar intersections
- Poor – Crash Rate > statewide avg. crash rate for similar intersections

Segments:
Average crash rate per million vehicles miles travelled (MVMT) for 5 study years versus the segmental average crash rate for similar facilities statewide.

- Good – Crash Rate < statewide avg. crash rate for similar segments
- Fair – Crash Rate = statewide avg. crash rate for similar segments
- Poor – Crash Rate > statewide avg. crash rate for similar segments

**SEGMENTS**

| Location | Crash Severity & Type | | 2013 | 2014 | 2015 | 2016 | 2017 | Total | Rating |
|---|---|---|---|---|---|---|---|---|---|
| S-1 I-75 btwn US 27 Ramps | | *Overall* | *15* | *26* | *11* | *11* | *6* | ***69*** | Poor |
| | Severity | Injury | 4 | 4 | 4 | 3 | 2 | **17** | |
| | | PDO | 11 | 22 | 7 | 8 | 4 | **52** | |
| | Crash Type | Rear End | 4 | 14 | 8 | 6 | 3 | **35** | |
| | | Off Road | 7 | 6 | 3 | 2 | 1 | **19** | |
| | | Sideswipe | 3 | 3 | 0 | 2 | 0 | **8** | |
| | | Other | 1 | 3 | 0 | 1 | 2 | **7** | |
| S-2 I-75 from US 27 to SR 326 | | *Overall* | *55* | *81* | *111* | *82* | *82* | ***411*** | Fair |
| | Severity | Fatal | 0 | 0 | 0 | 1 | 0 | **1** | |
| | | Injury | 9 | 21 | 29 | 20 | 23 | **102** | |
| | | PDO | 46 | 60 | 82 | 61 | 59 | **308** | |
| | Crash Type | Rear End | 22 | 40 | 45 | 28 | 40 | **175** | |
| | | Off Road | 12 | 16 | 18 | 20 | 17 | **83** | |
| | | Sideswipe | 10 | 14 | 23 | 15 | 14 | **76** | |
| | | Rollover | 3 | 3 | 6 | 6 | 3 | **21** | |
| | | Other | 8 | 8 | 19 | 13 | 8 | **56** | |
| S-3 I-75 btwn SR 326 Ramps | | *Overall* | *11* | *19* | *22* | *24* | *33* | ***109*** | Poor |
| | Severity | Injury | 2 | 5 | 5 | 7 | 11 | **30** | |
| | | PDO | 9 | 14 | 17 | 17 | 22 | **79** | |
| | Crash Type | Rear End | 2 | 6 | 11 | 11 | 16 | **46** | |
| | | Sideswipe | 4 | 5 | 2 | 10 | 6 | **27** | |
| | | Off Road | 3 | 4 | 4 | 1 | 3 | **15** | |
| | | Rollover | 2 | 0 | 2 | 0 | 0 | **4** | |
| | | Other | 0 | 4 | 3 | 2 | 8 | **17** | |
| S-4 US 27 from NW 44th Ave. to I-75 SB Ramps | | *Overall* | *14* | *14* | *25* | *11* | *9* | ***73*** | Good |
| | Severity | Fatal | 0 | 0 | 0 | 1 | 0 | **1** | |
| | | Injury | 6 | 3 | 7 | 4 | 3 | **23** | |
| | | PDO | 8 | 11 | 18 | 6 | 6 | **49** | |
| | Crash Type | Rear End | 5 | 4 | 11 | 2 | 5 | **27** | |
| | | Left Turn | 3 | 4 | 4 | 4 | 1 | **16** | |
| | | Sideswipe | 1 | 1 | 3 | 2 | 1 | **8** | |
| | | Angle | 2 | 2 | 3 | 0 | 1 | **8** | |
| | | Other | 3 | 3 | 4 | 3 | 1 | **14** | |
| S-5 US 27 from I-75 NB Ramps to NW 35 Avenue Road | | *Overall* | *4* | *4* | *1* | *1* | *0* | ***10*** | Good |
| | Severity | Injury | 1 | 0 | 1 | 1 | 0 | **3** | |
| | | PDO | 3 | 4 | 0 | 0 | 0 | **7** | |
| | Crash Type | Rear End | 1 | 0 | 0 | 0 | 0 | **1** | |
| | | Sideswipe | 0 | 2 | 0 | 0 | 0 | **2** | |
| | | Other | 3 | 2 | 1 | 1 | 0 | **7** | |
| S-6 SR 326 west of I-75 SB Off-Ramp | | *Overall* | *3* | *2* | *2* | *1* | *6* | ***14*** | Fair |
| | Severity | Injury | 0 | 1 | 0 | 1 | 3 | **5** | |
| | | PDO | 3 | 1 | 2 | 0 | 3 | **9** | |
| | Crash Type | Rear End | 1 | 1 | 1 | 0 | 2 | **5** | |
| | | Left Turn | 1 | 1 | 0 | 1 | 4 | **7** | |
| | | Other | 1 | 0 | 1 | 0 | 0 | **2** | |
| S-7 SR 326 from I-75 NB Ramps to one-half mile east | | *Overall* | *11* | *23* | *35* | *35* | *28* | ***132*** | Good |
| | Severity | Fatality | *0* | *1* | *0* | *0* | *0* | ***1*** | |
| | | Injury | 3 | 4 | 7 | 9 | 12 | **35** | |
| | | PDO | 8 | 18 | 28 | 26 | 16 | **96** | |
| | Crash Type | Rear End | 3 | 3 | 2 | 7 | 8 | **23** | |
| | | Off Road | 1 | 0 | 0 | 0 | 1 | **2** | |
| | | Sideswipe | 4 | 9 | 10 | 5 | 5 | **33** | |
| | | Rollover | 0 | 0 | 1 | 0 | 0 | **1** | |
| | | Other | 3 | 11 | 22 | 23 | 14 | **73** | |
| S-8 NW 44th Ave. from US 27 to NW 49th St. | | *Overall* | *7* | *3* | *8* | *6* | *5* | ***29*** | Good |
| | Severity | Injury | 2 | 1 | 3 | 1 | 3 | **10** | |
| | | PDO | 5 | 2 | 5 | 5 | 2 | **19** | |
| | Crash Type | Off Road | 3 | 2 | 2 | 2 | 0 | **9** | |
| | | Rear End | 1 | 0 | 1 | 0 | 1 | **3** | |
| | | Left Turn | 1 | 0 | 0 | 1 | 0 | **2** | |
| | | Angle | 1 | 0 | 3 | 0 | 2 | **6** | |
| | | Other | 1 | 1 | 2 | 3 | 2 | **9** | |
| S-9 NW 44th Ave. from NW 49th St. to SR 326 | | *Overall* | *4* | *3* | *1* | *2* | *4* | ***14*** | Good |
| | Severity | Injury | 1 | 1 | 0 | 1 | 1 | **4** | |
| | | PDO | 3 | 2 | 1 | 1 | 3 | **10** | |
| | Crash Type | Off Road | 2 | 0 | 1 | 0 | 2 | **5** | |
| | | Rear End | 0 | 2 | 0 | 0 | 1 | **3** | |
| | | Left Turn | 1 | 0 | 0 | 0 | 1 | **2** | |
| | | Angle | 0 | 0 | 0 | 0 | 0 | **0** | |
| | | Other | 1 | 1 | 0 | 2 | 0 | **4** | |

**INTERSECTIONS**

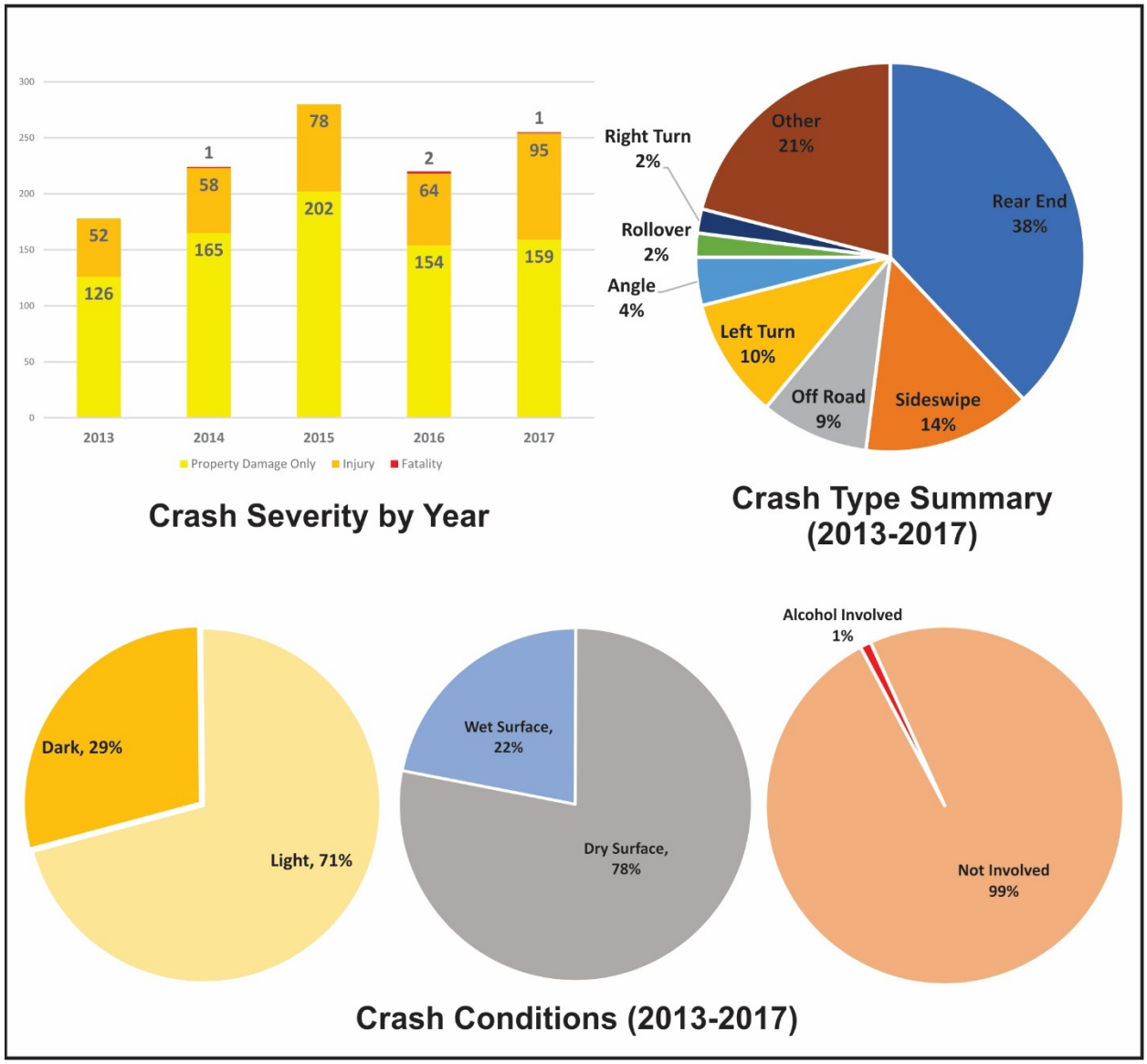
| Location | Crash Severity & Type | | 2013 | 2014 | 2015 | 2016 | 2017 | Total | Rating |
|---|---|---|---|---|---|---|---|---|---|
| I-1 US 27 at NW 44th Ave. | | *Overall* | *9* | *9* | *11* | *7* | *10* | ***46*** | Poor |
| | Severity | Injury | 6 | 5 | 3 | 4 | 6 | **24** | |
| | | PDO | 3 | 4 | 8 | 3 | 4 | **22** | |
| | Crash Type | Rear End | 3 | 5 | 6 | 5 | 7 | **26** | |
| | | Left Turn | 2 | 2 | 1 | 2 | 2 | **9** | |
| | | Angle | 0 | 2 | 1 | 0 | 0 | **3** | |
| | | Off Road | 1 | 0 | 1 | 0 | 0 | **2** | |
| | | Other | 3 | 0 | 2 | 0 | 1 | **6** | |
| I-2 US 27 at I-75 SB Ramps | | *Overall* | *2* | *3* | *5* | *6* | *11* | ***27*** | Poor |
| | Severity | Injury | 1 | 1 | 4 | 1 | 4 | **11** | |
| | | PDO | 1 | 2 | 1 | 5 | 7 | **16** | |
| | Crash Type | Rear End | 1 | 2 | 1 | 2 | 6 | **12** | |
| | | Left Turn | 1 | 1 | 4 | 1 | 4 | **11** | |
| | | Other | 0 | 0 | 0 | 3 | 1 | **4** | |
| I-3 US 27 at I-75 NB Ramps | | *Overall* | *6* | *6* | *10* | *4* | *4* | ***30*** | Fair |
| | Severity | Injury | 3 | 4 | 5 | 0 | 2 | **14** | |
| | | PDO | 3 | 2 | 5 | 4 | 2 | **16** | |
| | Crash Type | Rear End | 2 | 2 | 4 | 2 | 1 | **11** | |
| | | Left Turn | 1 | 1 | 2 | 0 | 1 | **5** | |
| | | Other | 3 | 3 | 4 | 2 | 2 | **14** | |
| I-4 US 27 at NW 35th Avenue Road | | *Overall* | *3* | *4* | *10* | *7* | *14* | ***38*** | Poor |
| | Severity | Injury | 0 | 2 | 2 | 3 | 9 | **16** | |
| | | PDO | 3 | 2 | 8 | 4 | 5 | **22** | |
| | Crash Type | Rear End | 1 | 2 | 5 | 4 | 8 | **20** | |
| | | Left Turn | 0 | 1 | 2 | 0 | 2 | **5** | |
| | | Other | 2 | 1 | 3 | 3 | 4 | **13** | |
| I-5 SR 326 at I-75 SB Off-Ramp/NW 44th Ave. | | *Overall* | *6* | *4* | *7* | *2* | *12* | ***31*** | Fair |
| | Severity | Injury | 2 | 0 | 2 | 1 | 4 | **9** | |
| | | PDO | 4 | 4 | 5 | 1 | 8 | **22** | |
| | Crash Type | Rear End | 3 | 1 | 4 | 1 | 9 | **18** | |
| | | Left Turn | 2 | 2 | 1 | 1 | 1 | **7** | |
| | | Sideswipe | 1 | 0 | 2 | 0 | 0 | **3** | |
| | | Other | 0 | 1 | 0 | 0 | 2 | **3** | |
| I-6 SR 326 at I-75 NB Ramps | | *Overall* | *21* | *15* | *14* | *5* | *7* | ***62*** | Poor |
| | Severity | Injury | 7 | 3 | 5 | 1 | 4 | **20** | |
| | | PDO | 14 | 12 | 9 | 4 | 3 | **42** | |
| | Crash Type | Rear End | 10 | 13 | 8 | 0 | 0 | **31** | |
| | | Sideswipe | 3 | 0 | 2 | 1 | 1 | **7** | |
| | | Left Turn | 5 | 1 | 1 | 2 | 2 | **11** | |
| | | Other | 3 | 1 | 3 | 2 | 4 | **13** | |
| I-7 NW 44th Avenue at NW 49th Street | | *Overall* | *0* | *1* | *0* | *1* | *1* | ***3*** | Good |
| | Severity | Injury | 0 | 1 | 0 | 1 | 1 | **3** | |
| | | PDO | 0 | 0 | 0 | 0 | 0 | **0** | |
| | Crash Type | Rear End | 0 | 0 | 0 | 0 | 0 | **0** | |
| | | Head On | 0 | 1 | 0 | 0 | 0 | **1** | |
| | | Right Turn | 0 | 0 | 0 | 1 | 0 | **1** | |
| | | Other | 0 | 0 | 0 | 0 | 1 | **1** | |

**RAMPS**

| Location | Crash Severity & Type | | 2013 | 2014 | 2015 | 2016 | 2017 | Total |
|---|---|---|---|---|---|---|---|---|
| R-1 I-75 at US 27 Interchange Ramps | | *Overall* | *2* | *1* | *3* | *3* | *5* | ***14*** |
| | Severity | Injury | 2 | 0 | 0 | 2 | 2 | **6** |
| | | PDO | 0 | 1 | 3 | 1 | 3 | **8** |
| | Crash Type | Rollover | 2 | 0 | 0 | 0 | 0 | **2** |
| | | Sideswipe | 0 | 0 | 1 | 1 | 0 | **2** |
| | | Rear End | 0 | 0 | 1 | 2 | 2 | **5** |
| | | Other | 0 | 1 | 1 | 0 | 3 | **5** |
| R-2 I-75 at SR 326 Interchange Ramps | | *Overall* | *5* | *6* | *4* | *12* | *19* | ***46*** |
| | Severity | Fatal | 0 | 0 | 0 | 0 | 1 | **1** |
| | | Injury | 3 | 2 | 1 | 4 | 6 | **16** |
| | | PDO | 2 | 4 | 3 | 8 | 12 | **29** |
| | Crash Type | Rollover | 3 | 3 | 3 | 0 | 0 | **9** |
| | | Sideswipe | 0 | 0 | 0 | 3 | 3 | **6** |
| | | Right Turn | 0 | 1 | 0 | 0 | 1 | **2** |
| | | Off Road | 1 | 1 | 0 | 3 | 1 | **6** |
| | | Other | 1 | 1 | 1 | 6 | 14 | **23** |

**Figure 2-12** summarizes the crash characteristics, including the severity, type and various crash conditions of the cumulative data recorded within the AOI. There were 1,157 crashes recorded within the AOI during the five-year period. It should be noted that there was a noticeable increase in annual crashes in years 2014 and 2015; but the corresponding AADTs did not increase significantly to support such a change. In view of this, a detailed safety study is recommended for this area, which is beyond the scope of this project. Additional detailed information is included in the IJR.

**Figure 2-12 - Summary of Crash Characteristics**



## 2.16 Drainage

Drainage from I-75 generally flows to roadside ditches that ultimately discharge to offsite floodplains or depressional storage areas to the east. The ditches are permitted ponds with SJRWMD for the widening to six-lanes of I-75 (SJRWMD Permit #19796-1). There are (3) three cross drains functioning as equalizer pipes and/or emergency “popoffs” between existing dry retention swales (see **Table 2-5**). The dry retention swales utilize a series of ditch blocks to collect and treat runoff from I-75. The project is within the SJRWMD Ocklawaha Basin.

The western side of the existing I-75 right-of-way is the boundary between SJRWMD to the east and South West Florida Water Management District (SWFWMD) to the west. Runoff on west side of I-75 generally drains toward NW 44 Ave.

Additional information is provided in the Pond Siting Report prepared for this project.

There are no FEMA regulated floodways within the limits of the project. Most of the project area is located outside of the floodplain however, there are areas on the east side of I-75 designated as Zone AE as shown on **Figure 2-13**. Additional information is provided in the Location Hydraulic Report prepared for this project.

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**Figure 2-13 - Existing Drainage**

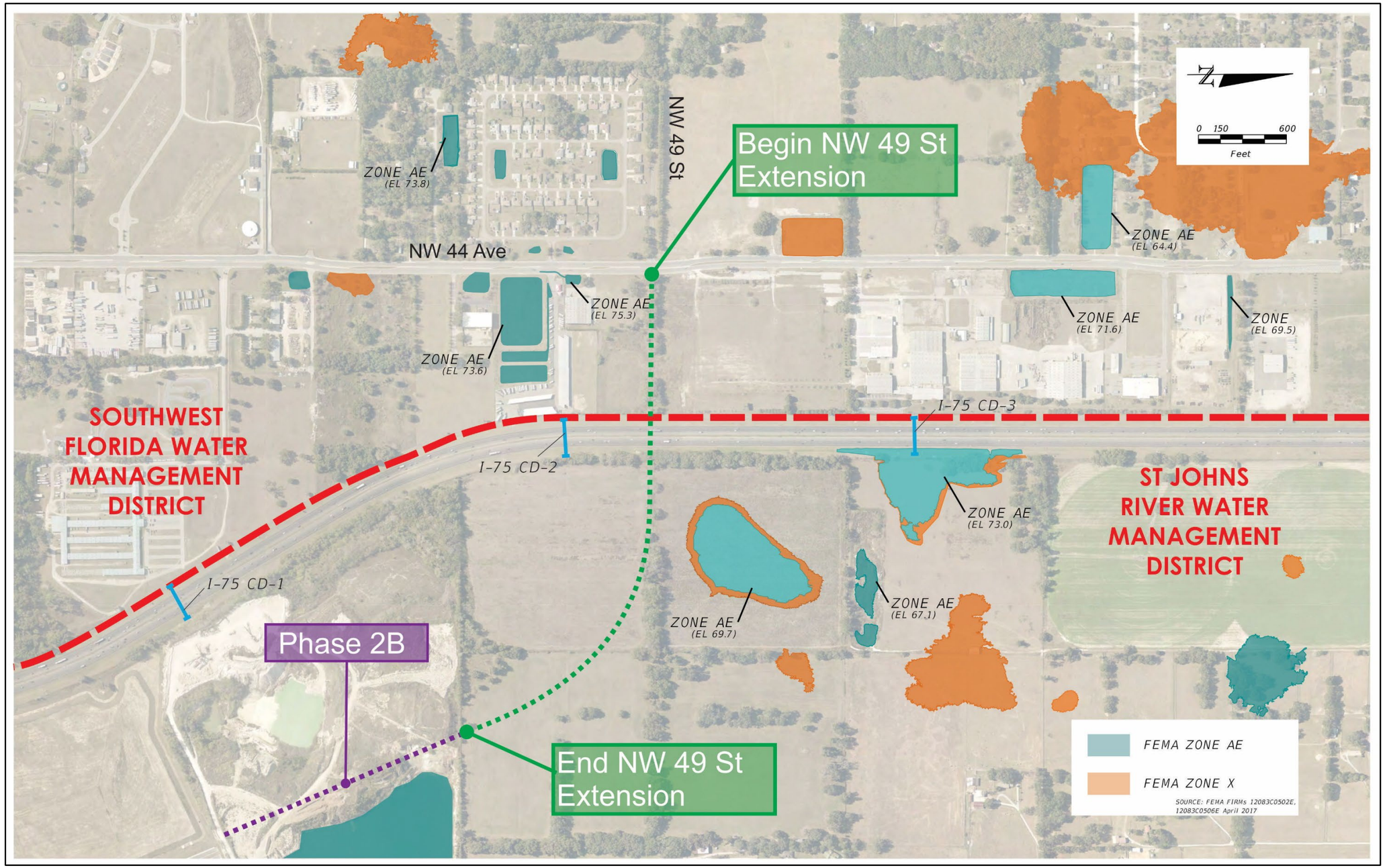


**Table 2-5 - Existing I-75 Cross Drain General Information**

| Cross Drain ID | Station Location | Pipe Description | Date of Plan |
|---|---|---|---|
| I-75 CD-1 | 2447+00 | 24" RCP | 1992 |
| I-75 CD-2 | 2475+00 | 24" RCP | 1992 |
| I-75 CD-3 | 2500+00 | 24" RCP | 1992 |

## 2.17 Soils and Geotechnical Data

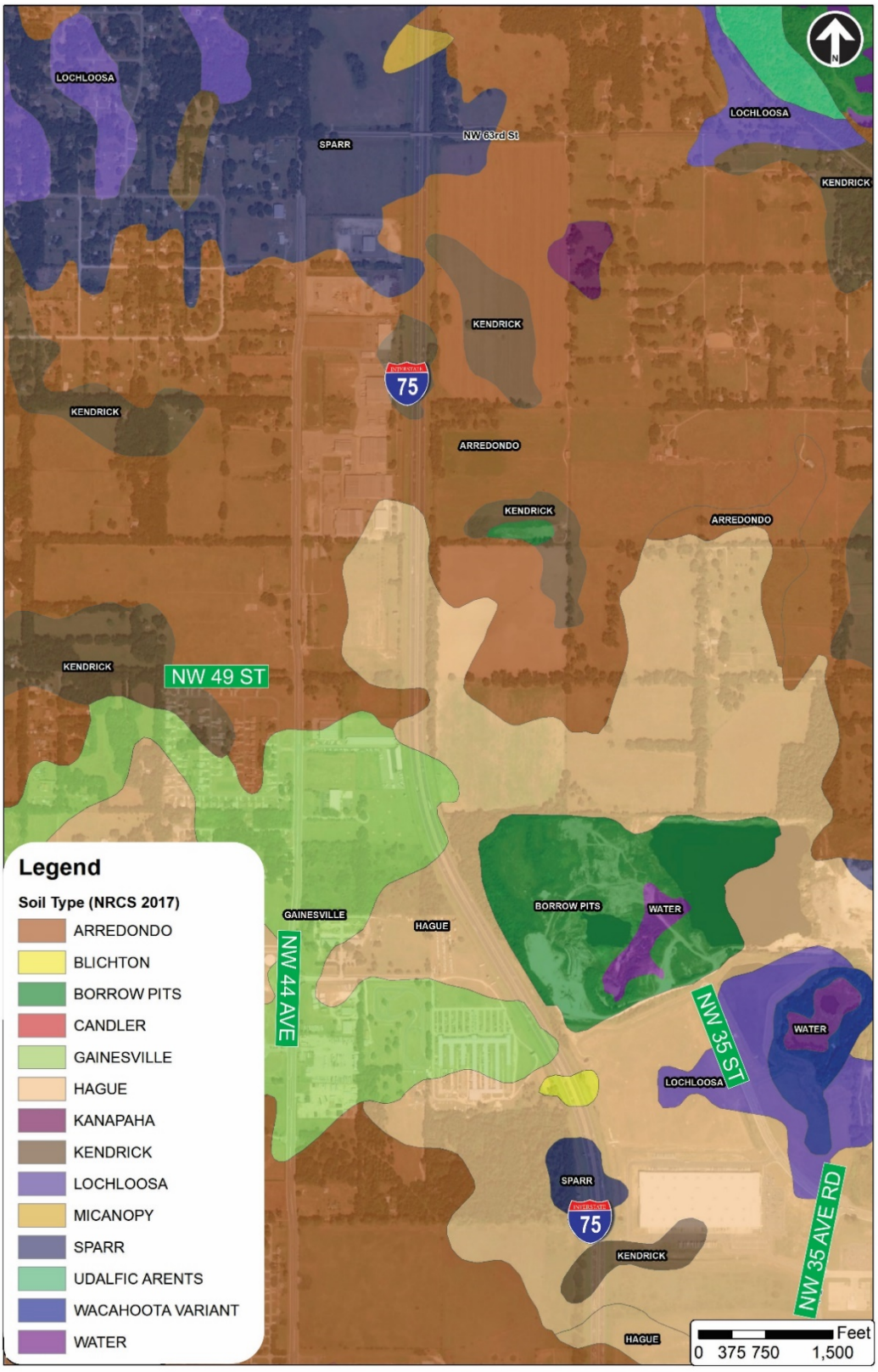
The Natural Resources Conservation Service (NRCS) (2017) maps six soil types occurring in the project area (**Table 2-6** and **Figure 2-14**). No hydric soils are mapped in the project area. Farmland Soils of Local Importance occur in the project area and include Blichton, Gainesville, Hague, and Kendrick soil series.

**Table 2-6 - Soils in Project Corridor**

| Soil Type | Environmental Association |
|---|---|
| Arredondo Sand | 0-5% slopes; Arredondo soils are on nearly level to strongly sloping uplands in the Lower Coastal Plain. The Arredondo series consists of well drained soils that are rapidly permeable in the thick, sandy surface and subsurface layers and moderate to very slow in the subsoil. They form in sandy and loamy marine deposits on the Ocala uplift. This is not a hydric soil. This is a **suitable soil for sand skink habitat**. |
| Blichton Sand | 0-8% slopes; The Blichton series consists of very deep, very poorly drained, moderately slow or slowly permeable soils on uplands in central Florida. They formed in thick beds of loamy and sandy marine sediments. This is not a hydric soil. This is a Farmland Soil of Local Importance. |
| Gainesville Loamy Sand | 0-15% slopes; Gainesville series consists of well drained, rapidly permeable soils formed in thick beds of sandy marine deposits. They are on nearly level to strongly sloping uplands in the lower Coastal Plain. This is not a hydric soil. This is a **suitable soil for sand skink habitat**. This is a Farmland Soil of Local Importance. |
| Hague Sand | 2-5% slopes; The Hague series consists of very deep, well drained soils that formed in sandy and loamy marine deposits. This is not a hydric soil. This is a **suitable soil for sand skink habitat**. This is a Farmland Soil of Local Importance. |
| Kendrick Loamy Sand | 0-8% slopes; The Kendrick series consists of well drained, slowly to moderately slowly permeable soils formed in thick beds of loamy marine sediments on nearly level to sloping areas in the Coastal Plain. This is not a hydric soil. This is a **suitable soil for sand skink habitat**. This is a Farmland Soil of Local Importance. |
| Sparr Fine Sand | 0-8% slopes; The Sparr series consists of very deep, somewhat poorly drained, moderately slowly to slowly permeable soils on uplands of the coastal plain. They formed in thick beds of sandy and loamy marine sediments. This is not a hydric soil. |
| Borrow Pits | These are excavated areas associated with the Magnum Materials mine. |

**Source: NRCS 2012; USDA 1987: 22-23, 25, 28, 31-34, 36, 45, 55**

**Figure 2-14 - Existing Soils**



## 2.18 Utilities

Utility companies with known facilities within the proposed project limits were contacted and requested to submit as-built plans and all proposed utilities within the project limits. **Table 2-7** presents a list of utilities withing the project limits and their approximate location which was compiled from utility responses received.

**Table 2-7 - Existing Utilities**

| Utility | Contact Information | Remarks |
|---|---|---|
| City of Ocala Electric | Randy Hahn<br>rhahn@ocalafl.org | • Overhead Electric 12.5kV primary voltage facility along NW 44 Ave. with 120/240v short service conductors.<br>• Underground primary cable loop at the commercial building locations east side of NW 44 Ave. near NW 60 St. |
| City of Ocala Fiber Network | William Weakland<br>(352) 401-3999<br>wweakland@ocalafl.org | • 12-ct, 6-ct, and 4-ct overhead fiber optic cable attached to the pole line along NW 44 Ave.<br>• Buried fiber optic cable crossing diagonally at NW 44 Ave. at NW 47 St. |
| City of Ocala Water Resources | Sean Lanier<br>(352) 351-6772<br>slanier@ocalafl.org | No facilities within project limits. |
| Centurylink | Jeff Griffin<br>(407) 814-5344<br>Jeff.w.griffin@centurylink.com | No facilities within project limits. |
| Cox Cable | Craig Sanders<br>(352) 873-5631<br>Craig.sanders@cox.com | • Overhead cable TV attached to the pole line along the west side of NW 44 Ave. |
| Duke Energy – Distribution | Robb Brown<br>(352) 459-4671<br>Robb.brown@duke-energy.com | No facilities within project limits. |
| Duke Energy - Transmission | Joel Chatham<br>(407) 942-9460<br>Joel.catham@duke-energy.com | No facilities within project limits. |
| Florida Gas Transmission Company | Joseph E. Sanchez<br>(407) 838-7171<br>Joseph.e.sanchez@energytransfer.com | No facilities within project limits. |
| Marion County Utilities | Kevin Vickers<br>(352) 307-4624<br>Kevin.vickers@marioncountyfl.org | • 12-inch and 6-inch water main along the west side of NW 44 Ave. with 6-inch, 8-inch, and 12-inch services crossing NW 44 Ave. and several fire hydrants throughout the project limits.<br>• 6-inch and 8-inch gravity sewer main along the east side of NW 44 Ave. with a county-owned lift station approx. 250-ft north of NW 49 St. on the west side of NW 44 Ave. and a privately-owned lift station location within the property on the east side of NW 44 Ave. at NW 47 St. |
| Teco Peoples Gas Ocala | Bruce Stout<br>(407)466-2662<br>bstout@tecoenergy.com | • 6-inch steel gas main along NW 44 Ave. generally located below the median of NW 44 Ave. south of NW 49 St. and along the east side of NW 44 Ave. north of NW 49 St. |

## 2.19 Lighting

There is no existing roadway lighting along the subject project but there is lighting provided at the NW 44 Avenue and NW 49 Street intersection.

## 2.20 Signs

There are no traffic signs and/or overhead traffic signs located within the subject project.

## 2.21 Aesthetic Features

There are no aesthetic features within the project limits.

## 2.22 Bridges and Structures

There are no existing bridges and structures within the subject project.

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# 3.0 PROJECT DESIGN CONTROLS & CRITERIA

Design controls and criteria must be established prior to the formulation of design alternatives to ensure an adequate, safe, functional and operational roadway. These criteria are needed to develop typical sections, horizontal and vertical alignments, and other design features such as drainage, aesthetics, landscaping, and multimodal facilities. The controls and standards are those specified by the Florida Department of Transportation (FDOT) for state roadways. In addition, the consideration of the facility's Context Classification strives to ensure that "state roadways are supportive of safe and comfortable travel for their anticipated users".

## 3.1 Roadway Context Classification

As previously stated, (see Section 2.3), NW 49 Street, has been classified in terms of its context classification. The proposed section of NW 49 Street within and adjacent to this project will serve as an effective urban arterial to facilitate mobility and access to commercial and residential land uses in the area. In general terms, this facility has been classified as "C3C-Suburban Commercial" since it will serve "mostly non-residential uses with large building footprints and large parking lots within large blocks and a disconnected or sparse roadway network".

## 3.2 Design Control and Criteria

### 3.2.1 Geometric Design Criteria

Geometric criteria pertaining to the proposed improvements are documented in several FDOT manuals, including the FDOT 2020 Design Manual (FDM), Federal Highway Administration publications, and in publications of the American Association of State Highway and Transportation Officials (AASHTO). The design criteria used in this project are based on these publications. These manuals are outlined in Referenced Documents in **Appendix A**. **Table 3-1** shows the Roadway Design Criteria and **Table 3-2** the Bridge Design Criteria.

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## Table 3-1 - Roadway Design Criteria

| | Roadway Classifications | Urban Principal Arterial Interstate I-75 | Urban Principal Arterial Interstate – Ramps | Urban Arterial – NW 49 Street & NW 44 Avenue |
|---|---|---|---|---|
| General Criteria | Standard | **2020 FDM** | **2020 FDM** | **2020 FDM** |
| | Design Speed | 70 mph | 30-50 mph | 45 mph |
| | Design Vehicle | WB-62FL | WB-62FL | WB-62FL |
| Horizontal Alignment | Max. Defl. w/o Curves | 0º 45' 00" | 0º 45' 00" | 1º 00' 00" |
| | Min. Length of Curves | 30V | 15V (30V for high speed ramps) | 15V |
| | Min. Curv., radius w/ super | 3º 00' 00" (e max = 0.10) | 3º 00' 00" (e max = 0.10) | 10º 15' 00" |
| | Min. Curv., radius w/o super | 0º 15' 00" | 0º 30' 00" (e max = 0.10) & 2º 00' 00" (e max = 0.05) | 0º 45' 00" (e max = 0.10) & 2º 45' 00" (e max = 0.05) |
| Section Features | Lane Widths, through | 12' | 15' (1 lane) & 24' (2 lane) | 11' |
| | Lane Widths, turning | - - | - - | - - |
| | Median Widths | 64' | - - | 22' |
| | Inside Shoulder | 12' (10' paved) | 1 Lane: 6' (2' paved)<br>2 Lane: 8' (4' paved) | 8' (0' paved) |
| | Outside Shoulder | 12' (10' paved) | 1 Lane: 6' (4' paved)<br>2 Lane: 10' (8' paved) | 10' (5' paved) |
| Vertical Clearance | Roadway over Roadway | 16'-6" | 16'-6" | 16'-6" |
| | Overhead Sign Structure | 17'-6" | 17'-6" | 17'-6" |
| Clear Zone | Clearance | 36' | 14' to 24' (1 to 2 lane)<br>10' (loop ramp) | 24' |
| | Pavement Cross Slope | 2% (third lane 3%) | 2% | 2% |
| | Border Width | 94' | 94' | 14' |
| Vertical Alignment | Maximum Grade | 3% | 5% (directional)<br>7% (loop) | 6% |
| | Minimum Grade | 0% | 0% | 0.3% |
| | Max change in grade w/o curve | 0.20% | 0.60% (directional)<br>0.90% (loop) | 0.70% |
| | Minimum SSD | 820' for 2% grade or less | 360' for 2% grade or less (directional)<br>200' for 2% grade or less (loop) | 360' for 2% grade or less |
| | Minimum Length of Crest Curves | 1800' | 300' (directional)<br>90' (loop) | 135' |
| | Minimum K Value Crest Curves | 401 | 98 (directional)<br>31 (loop) | 98 |
| | Minimum Length of SAG Curves | 800' | 200' (directional)<br>90' (loop) | 135' |
| | Minimum K Value SAG Curves | 181 | 96 (directional)<br>37 (loop) | 79 |
| Multimodal Features | Sidewalk Width | - | - | 6' |
| | Shared Use Path Width | - | - | 8-14' |
| | Bike Lane Width | - | - | 7' Buffered |
| | Curb and Gutter Type | - | - | E, F |

**Table 3-2 - Bridge Design Criteria**

| Design Element | Design Standard | Source |
|---|---|---|
| Design Specifications | AASHTO LRFD Bridge Design Specifications, 8th Edition | AASHTO |
| | FDOT Design Manual, January 2020 | FDOT |
| | FDOT Structures Manual, January 2020<br>• Structures Design Guidelines (SDG)<br>• Structures Detailing Manual (SDM) | FDOT |
| | AASHTO LRFD Bridge Design Specifications, 8th Edition (LRFD) | AASHTO |
| Governing Standards and Construction Specifications | FDOT FY 2020-21 Standard Plans and July 2020 Standard Specifications for Road and Bridge Construction | FDOT |
| Design Methodology | LRFD method using strength, service (extreme event) and fatigue limit states. For bridges designed by grid or 3-D analyses provide name and version number of design software | LRFD, FDOT |
| Design Loadings | Live Loads: HL-93 with Dynamic Load Allowance | LRFD 3.6 |
| | Dynamic Load Allowance:<br>• Deck joints: 75%:<br>• Fatigue and Fracture: 15%<br>• All Other Limit States: 33% | LRFD 3.6 |
| | Pedestrian Loads: 75 psf | LRFD 3.6 |
| | 36” Single Slope Traffic Railing: 430 plf | SDG 2.2 |
| | Pedestrian/Bicycle Railing (27” Concrete Parapet): 225 plf | SDG 2.2 |
| | Aluminum Pedestrian/Bicycle Bullet Railing: 10 plf | SDG 2.2 |
| | Stay-In-Place Forms: 20 psf | SDG 2.2 |
| | Unit Weight of Soil: 115 pcf | SDG 2.2 |
| | Unit Weight of Reinforced Concrete: 150 pcf | SDG 2.2 |
| | Unit Weight of Structural Steel: 490 pcf | LRFD 3.5 |
| Seismic Provisions | Minimum bridge support lengths only | SDG 2.3 |
| Wind Load | Design Wind Speed: 150 mph | SDG 2.4 |
| Vehicular Collision Force | For intermediate piers | SDG 2.6 |
| Thermal Forces | • Mean temperature: 70 °F<br>• Temperature rise/fall (concrete only): 35 °F<br>• Temperature rise/fall (concrete deck on steel girder): 40 °F | SDG 2.7 |
| | Coefficient of thermal expansion – concrete: 6.0 x $10^{-6}$/°F | LRFD 5.4 |
| | Coefficient of thermal expansion – steel: 6.5 x $10^{-6}$/°F | LRFD 6.4 |
| Environmental Classification | Substructure: moderately aggressive | SDG 1.3 |
| | Superstructure: slightly aggressive | SDG 1.3 |
| Clearance | Horizontal: 36 ft edge of travel lane & multilane ramps | FDM 215 |
| | Horizontal: 24 ft edge of auxiliary lane & single lane ramps | FDM 215 |
| | Vertical: 16.5 ft | FDM 260 |

LRFD- Load and Resistance Factor Design
SDG - Structures Design Guidelines
SDM - Structures Detailing Manual

### 3.2.2 Drainage Criteria

The design criteria for stormwater management facilities for this project are governed by the rules and criteria set forth by the permitting agency and the FDOT. I-75 has dry retention swale systems in this area permitted by St. Johns River Water Management District (SJRWMD) which discharge primarily to the east. As a portion of the interchange footprint will be within SWFWMD, an interagency agreement is expected for a single permit with SJRWMD. For this reason, the criteria from the 2013 SJRWMD Applicant's Handbook and the 2013 SJRWMD Permit Information Manual are considered for the PD&E Study, in conjunction with the 2020 FDOT Drainage Manual.

Per SJRWMD design criteria, discharge from this project will not cause an increase in the total pre-development flood stage. In determining the treatment volume of direct runoff, dry retention system criteria was used for this analysis. All basins within the project area were delineated and evaluated through review of U.S.G.S. Quadrangle Sheets, Aerial Photogrammetry, SJRWMD topographical maps, available topographic survey, existing permit data, existing construction plans and field verification of offsite contributing areas.

**Water Quality and Pond Recovery for On-Line Dry Retention**

Dry Retention (on-line) systems are expected based on the available geotechnical information. SJRWMD criteria for dry ponds includes:

- Treatment Required: Greater of 0.5" over the basin or 1.25" over the impervious area
- On-line retention of an additional 0.5" of runoff from the drainage area over the larger volume specified above.
- Recover treatment volume within 72 hours following a storm event assuming average antecedent moisture condition.
- For closed basins the required runoff storage volumes should recover within 14 days after the storm event.

**Water Quantity**

The project area drains to offsite floodplains and/or depressional areas which are landlocked. Based on closed basin criteria, dry retention ponds will:

- Attain the difference between the pre- and post-development runoff volume for the 100yr-10day and 25yr-96hr storm events.

- Fully recover the stormwater attenuation runoff volume within 14 days (25yr-96hr storm) or 30 days (100yr-10day storm) through percolation. Ponds that do not meet the recovery criteria via percolation through native soils should demonstrate that a subsequent "stacked" design storm event can be contained without increase in discharge as compared to the pre-development basin conditions.
- As part of the design criteria, systems in the Ocklawaha River Hydrologic Basin must demonstrate:
    - On-site storage and outlet capacity are designed for the 25-year event.
    - If there is discharge into receiving water bodies within the basin, outlet capacity design should be checked and further refined, if necessary, for the 10-year event.
        - Per coordination with the SJRWMD, for outfall into landlocked depressional areas, it is acceptable to show that there is no discharge from the 25-year/96-hour storm event from the receiving depressional areas.

**Pond Configuration (FDOT Criteria)**

To establish the right-of-way requirements for proposed ponds, the following design features were considered:

- Ponds have been sized to provide 15 to 20 feet of horizontal clearance between the front of the berm and the right-of-way line.
- Maintenance berm shall be at least 15 feet with a slope of 1:8 or flatter.
- Corners of ponds set to provide an acceptable turning radius for maintenance equipment (30-foot minimum inside radius).
- 1-foot freeboard above maximum design stage below front of maintenance berm.

# 4.0 ALTERNATIVES ANALYSIS

## 4.1 Previous Planning Studies

In May 2016, an IJR was completed on behalf of Marion County documenting the need for and analysis of a new I-75 interchange at the planned extension of NW 49 Street in Marion County. The 2016 IJR evaluated a "No Build" and Urban Diamond Interchange alternatives. A new IJR is being developed as part of this PD&E Study which updates the previous traffic forecasting, using the most recent Central Florida Regional Planning Model (CFRPM version 6.1) and evaluates additional Build alternatives.

The need for the proposed interchange was previously described in Section 1.2.2 of this document and this project is currently included in the Ocala/Marion TPO adopted 2040 LRTP as a financially feasible transportation improvement. In addition, the proposed interchange is also consistent with the Marion County Comprehensive Plan and Marion County's long term planning objectives.

## 4.2 No-Build (No-Action) Alternative

The "No Build" alternative is an alternative solution frequently used in PD&E studies that assumes the retainment of existing conditions. The "No Build" Alternative is a viable alternative that is considered all the way through the project. This provides a comparison of existing conditions to implementing the proposed improvements to those incurred by continuing to use the existing facility. In this case, the "No Build" alternative would entail the retainage of the existing conditions within the project limits with its present operational and access deficiencies. The existing facility within the project confines is inadequate in terms of future capacity and access. It is evident that because of the reasons previously discussed in this document, adoption of this alternative would not solve any of the existing needs associated with the project. However, the "No Build" alternative will be maintained as a viable option providing an effective yardstick or baseline condition by which other project alternatives will be compared throughout the project alternative selection process.

## 4.3 Transportation Systems Management and Operations (TSM&O) Alternative

The Transportation Systems Management and Operations (TSM&O) alternatives are comprised of generally minor improvements options that are usually generated to alleviate specific traffic congestion/safety problems, or to obtain maximum utilization out of the existing facility by improving operational efficiency. These alternatives do not serve as a benchmark function but

rather they ensure that a wide range of realistic alternatives are considered by decision makers. In our case however, one of the primary needs for the project involves the provision of a direct connection to I-75 to serve the vehicular and truck traffic associated with the Ocala 489. None of the traditional low cost TSM&O strategies would thus be applicable and therefore it is recommended that they may not be further considered. It is however possible to consider potential improvements to the existing roadway system to ascertain whether improvements to the existing contiguous interchanges would significantly alleviate the projected traffic deficiencies.

### 4.3.1 Existing Roadway System Improvement Alternatives

In order to improve the No-Build conditions and provide the Level of Service of D target, various potential options involving improvements to the I-75 interchanges at US 27 and SR 326 were considered. In addition, a new overpass over I-75 from NW 35 Street to NW 44 Avenue was also considered previously by Marion County. **Table 4-1** describes and evaluates these options.

**Table 4-1 - Existing Roadway System Improvement Alternatives**

| Potential Improvement Location | Description | Remarks |
|---|---|---|
| I-75/SR 326 Interchange & vicinity | • Widen interchange ramps to facilitate truck ingress and egress between I-75 and SR 326.<br>• Construct eastbound right turn lane at the SR 326/NW Gainesville Road intersection. | Improvements of this interchange are rather impractical in the context of solving access issues to the Ocala 489. Since most of the trucks will still likely utilize the I-75/US 27 interchange due to its much closer proximity. |
| NW 35 Street/NW 44 Avenue Extension | • Provide an extension of NW 35 Street west to NW 44 Avenue and a new overpass over I-75 | Since this expensive option does not provide direct connection to I-75, it would increase the traffic burden on the local street network (especially NW 44 Avenue). There will be likely public opposition along NW 44 Avenue and Marion County has expressed no interest in pursuing this alternative. |
| I-75/US 27 Interchange | • Widen US 27 to 6 lanes from west of I-75 to just east of NW 35 Avenue. Provide dual EB/WB left turn lanes under new I-75 bridge.<br>• Replace existing I-75 bridge with longer and higher structure.<br>• Provide dual southbound left turn lanes and replace existing signals.<br>• Add eastbound elevated directional left turn ramp at the US 27/NW 35 Avenue intersection. | The improvements associated with the existing US 27/I-75 interchange are not only expensive but also complex. The provision of a new elevated directional ramp at the US 27/NW 35 Avenue would be impractical and expensive. |

In general terms, although these improvements would be beneficial, they still would not fully comply with the primary project need of providing new direct access to I-75. In addition, the following considerations render these alternatives unreasonable and impractical:

1) Improvements to the I-75/SR 326 Interchange: These improvements are only of limited value in terms of improving truck access to and from the Ocala 489. This interchange is much farther away than the I-75/US 27 interchange and few trucks destined or originating at the Ocala 489

would likely use it. This lack of trip attraction would place additional traffic burden in terms of operations and safety along the US 27 0.25-mile section between I-75 and NW 35 Avenue.

2) Extension of NW 35 Street from NW 35 Avenue Road to NW 44 Avenue and a new overpass over I-75: This option is similar to the build option (the proposed interchange) except that it lacks the principal benefit of a direct connection to I-75. Because of the reasons stated on **Table 4-1**, it is not considered practical nor viable.

3) Improvements to the I-75/US 27 Interchange: These improvements are very expensive (over $30 million) and complex. The replacement of the existing I-75 bridge over US 27 and the provision of an effective eastbound US 27 to northbound NW 35 Avenue could be challenging and impractical.

## 4.4 Future Conditions

Land Use - The existing land use in the project area varies and includes undeveloped and unused vegetated areas, residences, agriculture and commercial properties. The future land use abutting the proposed interchange will not only feature the Ocala 489 industrial and commercial development (see additional details in Section 1.2.2.1) which serves as a vital economic engine for job creation in the region but also a much larger commercial district (see **Figure 4-1**) covering approximately 3,000 acres. It is clear that the additional access provided by the proposed interchange will be an essential component of the effective operation of the Commerce District.

Traffic Demand - As previously stated, an IJR has been prepared as part of the documentation for this project. Future traffic volumes were developed using the current CFRPM version 6.1. Although the CFRPM 6.1 has a 2010 base year, a 2015 network and socio-economic dataset was developed by the Department with input from the Ocala-Marion TPO. The CFRPM 6.1 validation and subarea refinement was performed for the base year 2015. These adjustments were then used as a baseline to develop design traffic volumes for the Opening Year 2025, Interim Year 2035 and Design Year 2045. **Figure 4-2** illustrates the Design Year 2045 AADT developed for the project for both the No Build and Build conditions. Additional details including an operational analysis are included in the IJR prepared for this project. As shown on **Table 4-2**, the proposed interchange will result in a reduction in the design year (2045) traffic volumes on US 27 and SR 326, the two contiguous I-75 interchange locations, as well as NW 35 Avenue Road, generally resulting in reduced delays and improved levels of service.

**Figure 4-1 - Future Land Use**

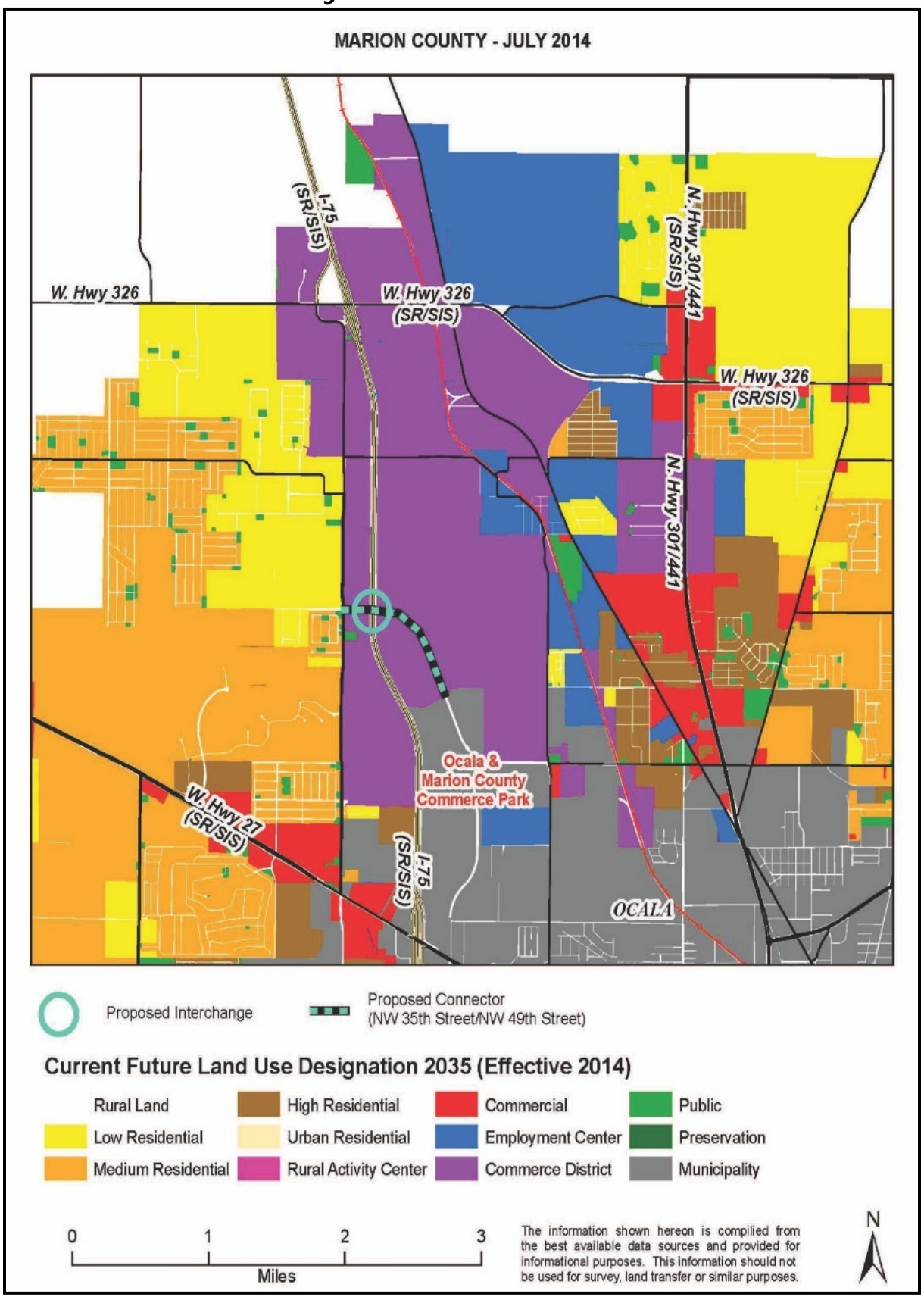


**Figure 4-2 - 2045 AADT**

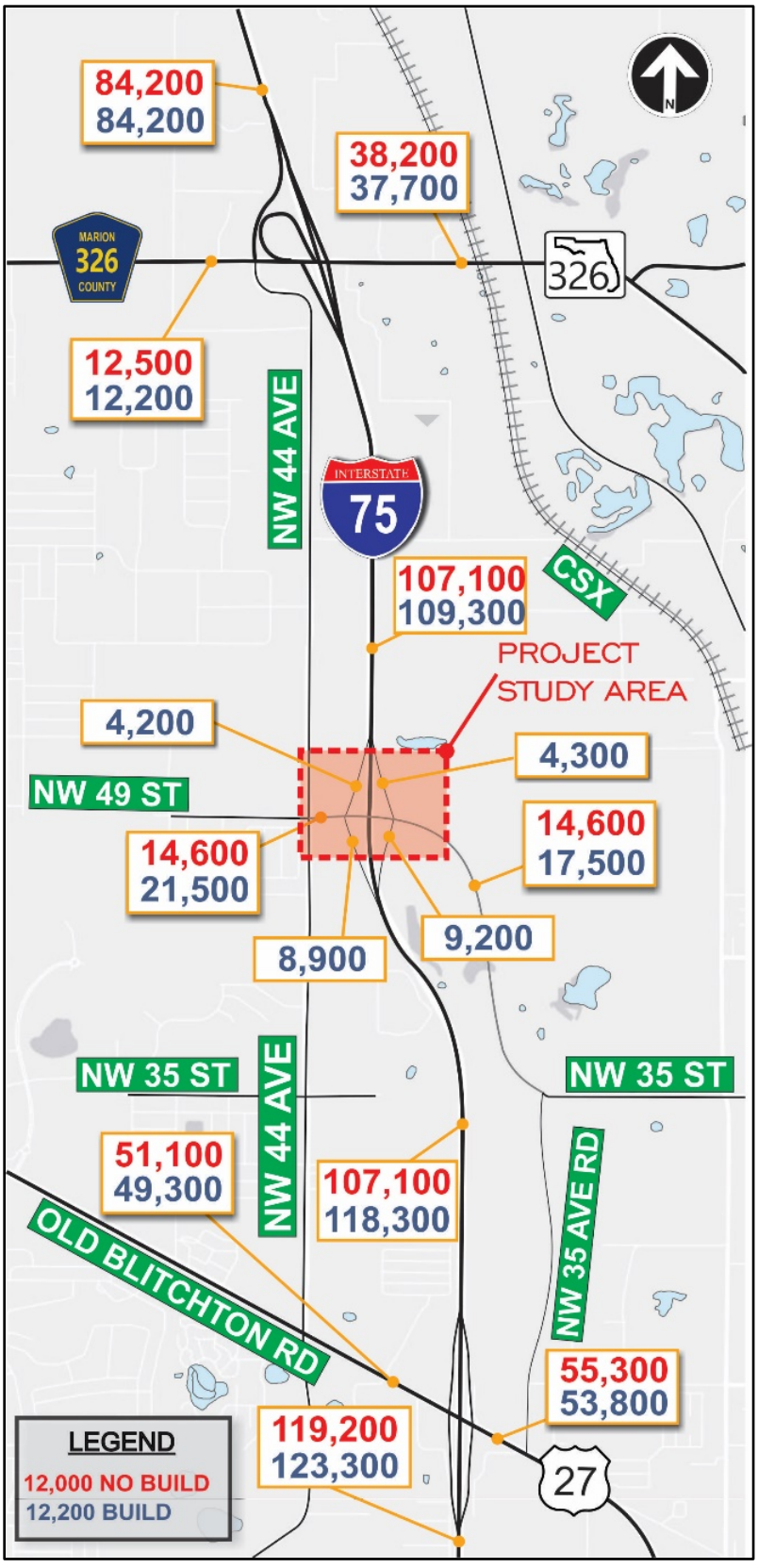


**Table 4-2 - Projected Traffic Effects of the Proposed Interchange (Year 2045)**

| LOCATION | % of Traffic Impact Reduction (AADT) | | |
|---|---|---|---|
| | No-Build (2045) | Build (2045) | % Change |
| US 27 W of I-75 | 51,100 | 49,300 | -3.52% |
| US 27 E of I-75 | 55,300 | 53,800 | -2.71% |
| I 75 NB Off Ramp at US 27 | 14,600 | 12,800 | -12.33% |
| I 75 SB On Ramp at US 27 | 15,200 | 13,500 | -11.18% |
| I 75 NB On Ramp at US 27 | 2,700 | 3,600 | 33.33% |
| I 75 SB Off Ramp at US 27 | 2,900 | 4,300 | 48.28% |
| NW 35 Ave Rd N of US 27 | 24,700 | 21,600 | -12.55% |
| SR 326 W of I-75 | 12,500 | 12,200 | -2.40% |
| SR 326 E of I-75 | 38,200 | 37,700 | -1.31% |
| NW 49 St East of I-75 | 14,600 | 17,500 | 19.86% |
| NW 49 St West of I-75 | 14,600 | 21,500 | 47.26% |

## 4.5 Build Alternatives

An important initial component of the build alternatives is the consideration of alternative corridor options for the proposed project. A brief description of this task follows:

### 4.5.1 Alternative Corridors

#### 4.5.1.1 Corridor Considerations

As previously stated, (see Section 1.2.2.3), the proposed interchange connection site is part of Marion County's long range vision to provide a future east-west corridor parallel to US 27 and SR 326 (see **Figure 1-5**). The County recently completed the construction of the expansion of NW 35 Street and NW 35 Avenue Road and is currently in the final design of the extension of NW 35 Street to the north end of the limerock mine (the eastern limit of this project). It is thus clear that any significant modifications to the proposed interchange location would not be compatible with the County's recently completed and on-going efforts as well as previous interchange approval (2016). The selected NW 49 Street interchange location would provide ideal spacing (2 miles±) between the two adjacent I-75 interchanges and is currently listed as the number one (1) priority

project on the Ocala/Marion TPO Fiscal Year (FY) 2021 Priority Project's list. Additionally, the interchange location allows for the County's planned extension of NW 49 Street further west.

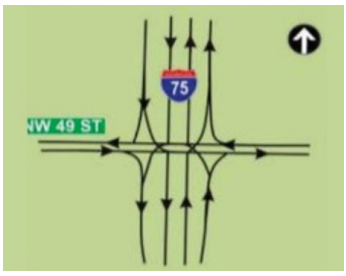
The next step involves the generation of various alternatives within the existing corridor which strive to mitigate or remove the existing and projected deficiencies. The following sections describe the generation and evaluation associated with these alternatives.

### 4.5.2 Grade Separation Considerations

In order to determine the optimum grade separation option at the proposed I-75/NW 49 Street interchange site, a benefit cost analysis was performed which economic as well as other factors. There are two distinct alternatives as follows: Alternative 1: Provide two directional four lane I-75 bridges over NW 49 Street, and Alternative 2: Provide a four lane NW 49 Street bridge over the existing at grade I-75. The benefit cost analysis results show that Alternative 2 is superior to Alternative 1 since it offers comparable road user benefits at a much lower cost (construction cost of approximately $9.2 million versus $22.4 million). Results indicate that although Alternative 1 provides some additional benefits in terms of its effect on NW 49 Street, its drastic difference in cost (41% higher construction cost) renders its adoption unjustifiable. The details of the analysis are included in **Appendix C**.

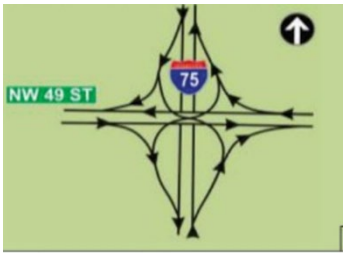
### 4.5.3 Interchange Alternatives

The following describes some of the main characteristics of eight (8) different interchange configurations. In general terms, five of the alternatives involve different variations of diamond interchanges. Other options included partial cloverleaf and single point urban interchanges. As previously stated, traffic projections indicate the need to widen I-75 in the future to 8 lanes. In view of this fact, all interchange configurations will span over the full I-75 right-of-way (300 feet) as well as provide longer on/off ramps in order to be compatible with future widening options and minimize the potential for throwaway. A brief description of each of the alternatives follows:

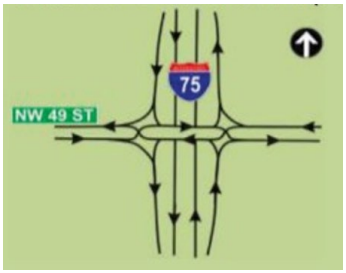



Alternative 1: Diamond Interchange: This common interchange configuration is characterized by diverge ramps in advance of the interchange and merge ramps beyond the interchange. Both the merge and diverge ramps connect to the grade separated intersecting roadway, where generally two signals control the conflicting turning movements. Some of the advantages of this configuration include its smaller footprint (resulting in cost savings and impact minimization) as well as general driver familiarity with its operation due to its extensive use. Alternative 1 features

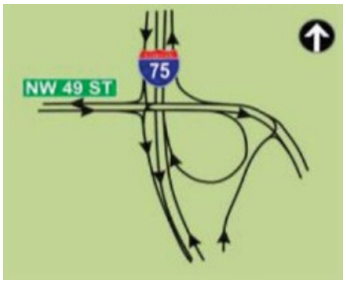
several free flow right turns and signalized left turn movements along an elevated (over I-75) NW 49 Street. The close proximity of the NW 44 Avenue/NW 49 Street signalized intersection presents operational challenges in terms of weaving and merging maneuvers (especially for the high numbers of trucks) for the exiting southbound I-75 traffic destined south along NW 44 Avenue.




Alternative 2: Single Point Urban Interchange (SPUI): A single point urban interchange (SPUI) is similar in configuration to a diamond interchange but has the advantage of allowing opposing left turns to proceed simultaneously by compressing the two intersections of a diamond into one single intersection over the freeway.

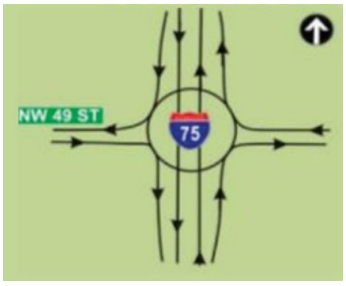



Alternative 3: Diverging Diamond Interchange (DDI): A diverging diamond interchange (DDI) is a type of diamond interchange in which the two directions of traffic on the minor (non-freeway) road cross to the opposite side on both sides of the bridge at the freeway crossing. It is unusual in that it requires traffic on the minor road to briefly drive on the opposite side of the road from what is customary. This eliminates the need for left-turning vehicles to cross the paths of approaching through vehicles, facilitating operational maneuvers and eliminating the potential for side-impact crashes. The main advantage of this configuration is that it allows for a simple two phase operation at all signalized intersections within the interchange, thus improving efficiency.

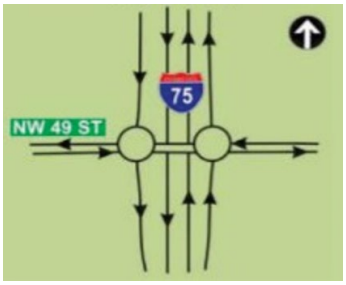



Alternative 4: Partial Cloverleaf SE: While a full cloverleaf interchange has loop and slip ramps in all four quadrants, a partial cloverleaf (Parclo) has at least one quadrant without a loop ramp. Typically, loop ramps are implemented where there is a heavy left turn movement which is accommodated on the free-flow loop ramp. The large right-of-way footprint required for loop ramps on the two western quadrants of the interchange would potentially impact the operations at the NW 44 Avenue intersection located approximately 1,100 feet to the west of I-75 by creating an undesirably short weave section between the interchange and this intersection. In view of this fact, provision of loop ramps was only considered on the two eastern interchange quadrants, where sufficient right-of-way is available without conflict. The Parclo-SE (Alternative 4) features a loop ramp on the SE quadrant serving the eastbound to northbound traffic movement while all other movements are served by diamond ramps.

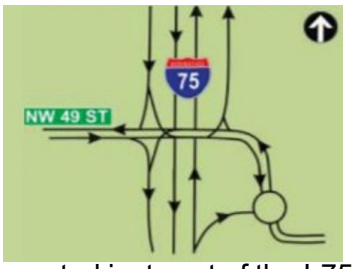

Alternative 5: Partial Cloverleaf NE: This option is similar to the previous one except that the loop ramp is provided on the NE quadrant to serve the northbound to westbound traffic movement while all other movements are served by diamond ramps.




Alternative 6: Roundabout: This type of interchange features a roundabout configuration over (or under) a crossing freeway. The access ramps to and from the freeway and arterial road converge at a single roundabout which is separated from the freeway with bridges. This configuration has the potential advantage of avoiding the use of signals.




Alternative 7: Bowtie Interchange: This configuration is similar to a diamond interchange except that the signalized arterial ramps intersections are substituted by a pair of roundabouts. This configuration generally reduces costs (by eliminating signals and potentially reducing the need for wider bridges) and allowing easy u-turns.

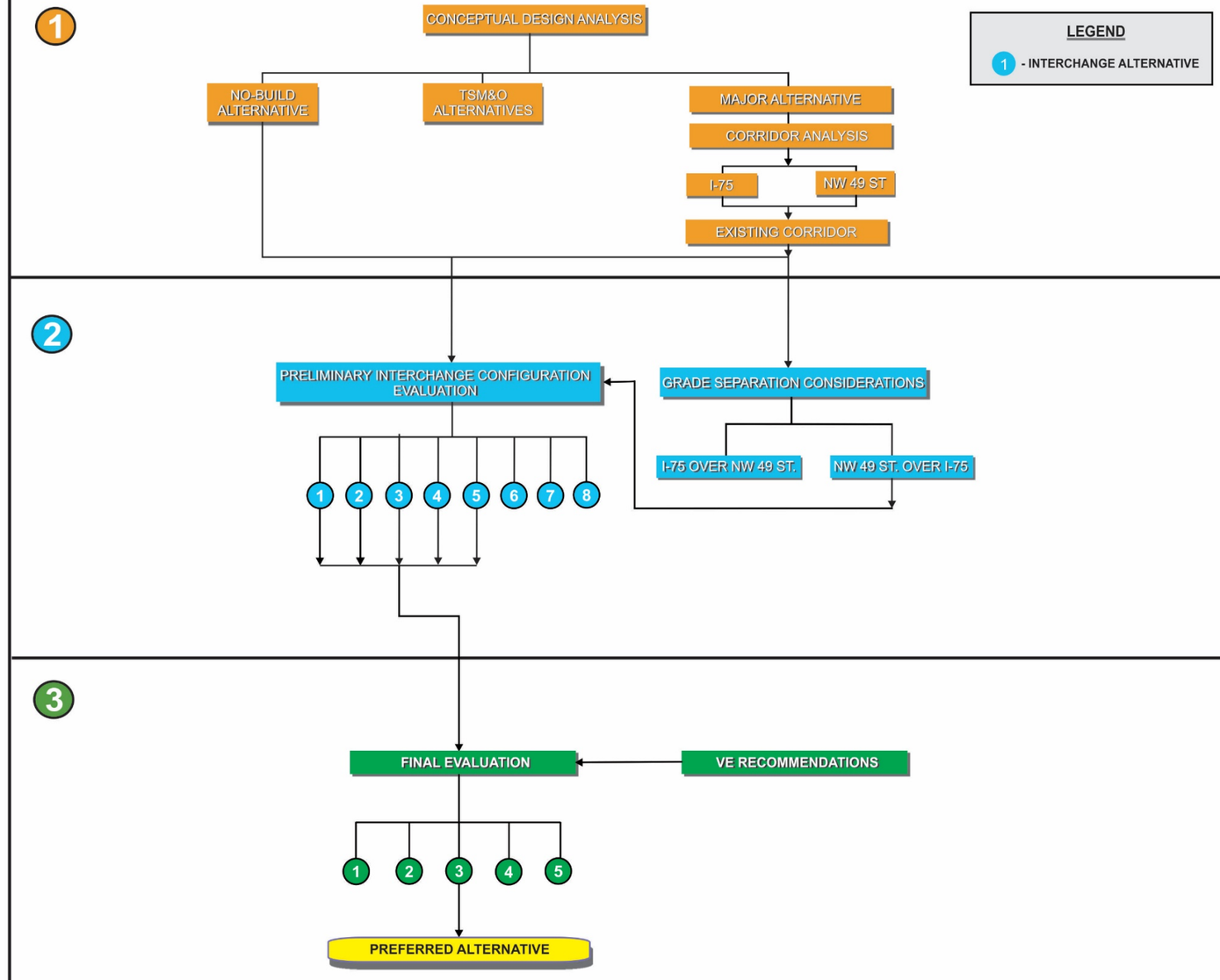



Alternative 8: Modified T-Diamond: This option strives to maximize the limited available distance between NW 44 Avenue and the interchange by providing a tight diamond configuration along the western half of the interchange. The proposed NW 35/NW 49 Street connection would be realigned closer to I-75 and a T-intersection created just east of the I-75 crossing. The northbound I-75 exit ramp would be provided just south and east with a roundabout connection to the NW 35/NW 49 Avenue connection.

## 4.6 Comparative Alternatives Evaluation

As illustrated on **Figure 4-3**, a multi-phase alternative development, evaluation and selection process was employed to properly assess all alternatives considered for the proposed interchange improvements within the project limits. Essentially, three (3) different phases comprised the alternative selection process for the proposed project as illustrated in the figure. Those alternative options found most feasible, which merited further development and evaluation, are shown in yellow in the various evaluation tables. A discussion of each of the different phases follows:

**Figure 4-3 - Alternative Selection Process**



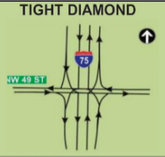
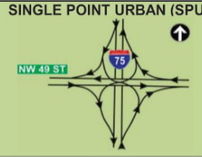
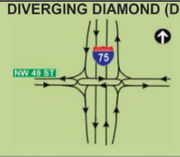
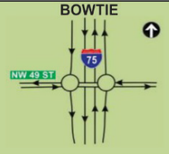

| DESCRIPTION | | |
|---|---|---|
| **PHASE DESIGNATION** | **PURPOSE** | **EVALUATION TECHNIQUE** |
| CONCEPTUAL DESIGN ANALYSIS | INITIAL CONSIDERATION OF NO PROJECT AND MINOR OPTIONS AS WELL AS ALTERNATIVE CORRIDORS | FATAL FLAW ASSESSMENTS AND SCREENING |
| PRELIMINARY INTERCHANGE GENERATION & EVALUATION | DETERMINATION OF GRADE SEPARATION CONSIDERATIONS AND PRELIMINARY EVALUATION OF VARIOUS INTERCHANGE CONFIGURATIONS TO GAUGE THEIR EFFECTIVENESS WITH RESPECT TO THE PROJECT OBJECTIVES | • FATAL FLAW ASSESSMENT<br>• EVALUATION MATRIX WITH DESCRIPTIVE MEASURES |
| FINAL EVALUATION | REMAINING ALTERNATIVES ARE FURTHER SCREENED TO GAUGE THEIR TRAFFIC OPERATIONAL CHARACTERISTICS | • MORE STRINGENT SCREENING METHODS ARE USED INCLUDING A SUMMARY TABLE COMPARING THE PERFORMANCE OF THE REMAINING ALTERNATIVES . |

### 4.6.1 Preliminary Interchange Configuration Evaluation

**Table 4-3** is a numerical/descriptive matrix which illustrates, describes and evaluates the features of all generated interchange configuration alternatives. It is important to note that the main purpose of this evaluation is not necessarily to determine the best option, but rather to identify which alternative configurations are clearly inferior so that they can be eliminated before even more stringent evaluation criteria and procedures are used during the next evaluation phase. The evaluation used involved the generation of a weighting scheme for each of the evaluation parameters. Four (4) different evaluation parameters including engineering, social & economic, environmental and cost factors were used. Each parameter was assigned a value ranging from 5 to 10 depending on its degree of importance. These parameter weightings were developed from the average of individual weighting sets prepared by members of the consultant's team reflecting a broad range of professional backgrounds. In addition, the alternative performance with respect to each parameter was compared using two criteria; 1) the overall effect on the specified parameter and/or 2) the relative effect between the competing configuration alternatives. The overall effect received one of the five judgmental values (++ = 1.00, + = 0.80, o = 0.60, - = 0.40, - - = 0.20). If, however any of the alternatives had an overall negative effect, then the worst alternative received a (- -) and the relatively better alternative received a higher score (-). If any two values were approximately equal then they both received the relatively lowest score. If the alternatives had an overall positive effect then the best alternative received a (++) and the relatively worse alternative received a lower score (+). A common value, therefore, signifies an equal overall and relative effect.

This evaluation involves a combination of both qualitative and quantitative values resulting in an overall score. Each score indicated on the table is the result of multiplying the judgmental analysis rating times the relative weight for that parameter. For example in **Table 4-3** Alternative 7 (Bowtie) under the "geometric features" parameter was given a (- -) designation (judgmental value = 0.2) because its large footprint requirement coupled with the close proximity of NW 44 Avenue and high truck presence might make this option impractical. This judgment value of 0.2 was then multiplied by the relative weight of the "geometric and operational features" parameter (8.0) resulting in an overall score of 1.6.

## Table 4-3 - Preliminary Interchange Configuration Evaluation

| | | ALTERNATIVES | TIGHT DIAMOND | SINGLE POINT URBAN (SPUI) | DIVERGING DIAMOND (DDI) | PARCLO "SE" | PARCLO "NE" | ROUNDABOUT | BOWTIE | MODIFIED T-DIAMOND |
|---|---|---|---|---|---|---|---|---|---|---|
| | | LEGEND: ++ VERY GOOD 1.0; + GOOD 0.8; O FAIR 0.6; - POOR 0.4; -- VERY POOR 0.2 |  |  |  |  |  |  |  |  |
| | | PARAMETERS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| ENGINEERING | 41 | GEOMETRIC FEATURES 8 | • Generally simple and common geometric configuration. • Features smooth roadway transition and allows higher design speeds for ramp connections. • No issues with sight distance requirements nor with horizontal and vertical alignment problems. + 6.4 | • Features smooth roadway transitions for right on and off ramps. • Allows higher design speed for ramp connections but some minor challenges pertaining to sight distance at off ramps. • Due to vertical geometry would require a much larger bridge over I-75 to accommodate all features. + 6.4 | • Requires 12 major curves with smaller radius. • Generally shortens the length of the approach to the NW 44 Ave intersection due to the length of geometry for crossover intersections,. + 6.4 | • Generally simple and common geometric configuration. • Lower design speed for ramp connections. • No major issues with sight distance requirements. ++ 8.0 | • Generally simple and common geometric configuration. • No major issues with sight distance requirements. ++ 8.0 | • Does not provide the required space to meet all horizontal and vertical requirements. • Requires multiple structures over I-75. • Lower design speed. -- 1.6 | • Does not provide the required space to meet all horizontal and vertical requirements. • Lower design speed. • Shortens the length approach to the NW 44 Ave. intersection. -- 1.6 | • Features smooth roadway transitions and allows higher design speeds for ramp connections. • Requires 7 major curves with moderate to difficult geometry. o 4.8 |
| | | OPERATIONAL/ TRAFFIC SERVICE ISSUES 9 | • Generally significant improvement in vehicular operational efficiency over existing. '• Requires the provision of two closely spaced signals which provides medium to low traffic capacity. + 7.2 | • Slightly worse in terms of vehicular operational efficiency as compared to the diamond. • Provides low to medium traffic capacity. - 3.6 | • Provides higher traffic capacity because only two signal phases needed, thus shorter cycle length. • Longer storage between the ramp terminals. • Better signal network synchronization than diamond configuration. • Potential weaving along NW 49 St. between ramp termini. + 7.2 | • Elimination of eastbound left turns from the arterial to the freeway and waiting queues to make such turns is an advantage. • Requires provision of two signals to control traffic. • Provides higher traffic capacity for future growth. + 7.2 | • Elimination of westbound left turns from the freeway to the arterial and waiting queues to make such turns is a major advantage. • Requires provision of two signals to control traffic. • Provides higher traffic capacity for future traffic growth. + 7.2 | • Avoids the need for traffic signals. • Provides medium to high traffic capacity but might not be able to handle high left turn volumes. o 5.4 | • Generally similar to a diamond configuration but replaces the two adjacent signals with roundabouts. • Can include multilane roundabouts and bypass lanes for high right turn traffic. • Traffic from one roundabout can spill back onto downstream roundabout negatively affecting traffic service. - 3.6 | • Maximizes distance between ramp terminal intersections facilitating operational maneuvers . • Location of northbound I-75 exit ramp south of NW 49 St. facilitates eastbound access but westbound access is less direct. o 5.4 |
| | | SAFETY 10 | Generally safe configuration although it requires the use of two traffic signals. + 8.0 | • Generally safer than the standard diamond configuration in terms of vehicular traffic due to reduced conflict points. • Virtually no driver confusion (FHWA study). ++ 10.0 | • Makes wrong way turn into an off-ramp more difficult. • Virtually no driver confusion (FHWA study). ++ 10.0 | Eliminates eastbound to northbound left turn at arterial entrance ramp thus improving safety due to reduced conflict points. ++ 10.0 | Eliminates northbound to westbound left turns at freeway ramp thus improving safety due to reduced conflict points. ++ 10.0 | • Generally shown to be superior in terms of safety to most other interchange configurations. • Makes wrong way turn into an off-ramp more difficult. • Effective configuration in terms of managing speeds along the minor road. ++ 10.0 | Generally comparable to the diamond option but the elimination of the two adjacent signals should result in a slightly safer condition. ++ 10.0 | Generally safe configuration, but location of northbound I-75 exit ramp south of NW 49 St. reduces the northbound spacing from the US 27 interchange. + 8.0 |
| | | MULTIMODAL EFFECTS 9 | No significant detrimental effects for pedestrians and bicyclists. + 7.2 | Generally not recommended where heavy pedestrian and bicycle traffic is expected due to stringent signal timing requirements for crossing maneuvers. - 3.6 | • Pedestrian and bicyclist crossings are shorter. • Requires median pedestrian crossings (not typical). o 5.4 | No significant detrimental effects for pedestrians and bicyclists. + 7.2 | No significant detrimental effects for pedestrians and bicyclists. + 7.2 | • Moderate detrimental effect for pedestrians and bicyclists. • Multiple roundabouts are generally less safe for pedestrians and bicyclists than signals. - 3.6 | • Configuration requires a longer route for pedestrians and bicyclists. • Multiple roundabouts are generally less safe for pedestrians and bicyclists than signals. - 3.6 | No significant detrimental effects for pedestrians and bicyclists. + 7.2 |
| | | CONSTRUCTABILITY & MOT IMPLICATIONS 5 | No significant detrimental effects. o 3.0 | No significant detrimental effects. o 3.0 | No significant detrimental effects. o 3.0 | No significant detrimental effects. o 3.0 | No significant detrimental effects. o 3.0 | No significant detrimental effects. o 3.0 | No significant detrimental effects. o 3.0 | No significant detrimental effects. o 3.0 |
| SOCIO-ECONOMIC | 25 | R/W & RELOCATION IMPACTS 9 | Relatively minor to moderate right-of-way impacts. o 5.4 | Relatively minor to moderate right-of-way impacts. o 5.4 | Moderate right-of-way impacts. o 5.4 | • Higher right-of-way impacts since the provision of a loop only increases the required footprint. • Loop on SE quadrant slightly impacts the mine. - 3.6 | Higher right-of-way impacts since the provision of a loop only increases the required footprint. - 3.6 | Moderate right-of-way impacts. o 5.4 | Moderate to high right-of-way impacts since the roundabouts at both ends increase the required footprint. o 5.4 | Relatively minor right-of-way impacts along the western quadrants but generally moderate to high along the eastern quadrants. - 3.6 |
| | | IMPACTS TO SENSITIVE SITES 8 | No impacts. + 6.4 | No impacts. + 6.4 | No impacts. + 6.4 | No impacts + 6.4 | No impacts + 6.4 | No impacts + 6.4 | No impacts + 6.4 | No impacts + 6.4 |
| | | CONTROVERSY POTENTIAL 8 | No controversy expected since this configuration is familiar and generally accepted by the public. o 4.8 | No significant controversy expected. o 4.8 | No significant controversy. o 4.8 | No significant controversy expected. o 4.8 | No significant controversy expected. o 4.8 | Marion County officials have expressed concern about driver behavior under a roundabout configuration. - 3.2 | No significant controversy expected but longer multimodal route effect might be objectionable. - 3.2 | •It deviates from Marion County's conceptual NW 35/NW 49 Ave. extension alignment, a potential controversial issue. •Baldwin Angus Ranch expressed concerns that this option would render the SE quadrant useless. -- 1.6 |
| ENVIRONMENTAL | 20 | NATURAL/ AGRICULTURAL LAND USE ENCROACHMENT 7 | Minimal overall footprint. ++ 7.0 | Minimal overall footprint. ++ 7.0 | Only slightly wider footprint than Alternative 1 and Alternative 2 into agricultural land use. ++ 7.0 | Moderate overall footprint. + 5.6 | Similar footprint as Alternative 4 but it requires slightly more agricultural land and encroaches into mixed hardwoods. + 5.6 | Moderate overall footprint. + 5.6 | Large footprint requiring agricultural land uses and encroaches into hardwood forests. - 2.8 | Large footprint of agricultural and hardwood forest land uses. - 2.8 |
| | | WETLAND IMPACTS 5 | No significant impacts expected. + 4.0 | No significant impacts expected. + 4.0 | No significant impacts expected. + 4.0 | No significant impacts expected. + 4.0 | No significant impacts expected. + 4.0 | No significant impacts expected. + 4.0 | No significant impacts expected. + 4.0 | No significant impacts expected. + 4.0 |
| | | WILDLIFE/HABITAT IMPACTS 8 | Minimal overall footprint and potential sand skink habitat impacts. ++ 8.0 | Minimal overall footprint and potential sand skink habitat impacts. ++ 8.0 | Generally comparable to Alternative 1. ++ 8.0 | Higher impacts to potential sand skink habitat than previous alternatives, but smaller impacts than Alternatives 7 and 8. o 4.8 | Similar to Alternative 3. ++ 8.0 | Similar potential sand skink habitat impacts to Alternative 4. o 4.8 | Large footprint into potential sand skink habitat and survey area. - 3.2 | Second largest footprint into potential sand skink habitat and survey area. - 3.2 |
| COST | 14 | CONSTRUCTION & MAINTENANCE 7 | Generally moderate cost but required dual signal installation will increase maintenance cost. o 4.2 | Higher cost due to significantly higher structural cost. -- 1.4 | Generally moderate cost but required dual signal installation will increase maintenance cost. o 4.2 | Generally moderate cost but required dual signal installation will increase maintenance cost. o 4.2 | Generally moderate cost but required dual signal installation will increase maintenance cost. o 4.2 | Slightly higher structural cost. - 2.8 | Generally moderate cost and also avoids the maintenance cost associated with traffic signals. o 4.2 | Generally moderate cost. o 4.2 |
| | | RIGHT-OF-WAY 7 | Moderate cost - 2.8 | Relatively minor cost o 4.2 | Moderate cost - 2.8 | Relatively highest cost -- 1.4 | Relatively highest cost -- 1.4 | Moderate cost - 2.8 | Moderate cost - 2.8 | Relatively minor cost. o 4.2 |
| | | RESULTING SCORE | **74.40** | **67.80** | **74.60** | **70.20** | **73.40** | **58.60** | **53.80** | **58.40** |

According to the results obtained on **Table 4-4**, the scores for the first five alternatives are relatively close, while alternatives 6, 7 and 8 scored much lower. **Table 4-4** illustrates a Preliminary Elimination Process based on the criterion that "the maximum gap between the last selected alternative and the next must not be greater than one standard deviation". Based on this criterion, Alternatives 1, 2, 3, 4 and 5 were selected for further evaluation.

**Table 4-4 - Preliminary Alternative Typical Section Elimination Process**

| Alternative | Score | Standard Deviation | Reasons for Elimination |
|---|---|---|---|
| 1 (Diamond) | 74.40 | *7.748* | Remains Viable |
| 2 (SPUI) | 67.80 | | Remains Viable |
| 3 (DDI) | 74.60 | | Remains Viable |
| 4 (Parclo SE) | 70.20 | | Remains Viable |
| 5 (Parclo NE) | 73.40 | | Remains Viable |
| 6 (Roundabout) | 58.60 | | Failed Criterion #1 |
| 7 (Bowtie) | 53.80 | | Failed Criterion #1 |
| 8 (Modified T-Diamond) | 58.40 | | Failed Criterion #1 |

Selection Criterion

#1 – The maximum gap between the last selected alternative and the next must not be greater than one standard deviation

### 4.6.2 Final Evaluation

In order to further screen the five remaining design configurations, the diamond, SPUI, DDI, Partial Cloverleaf SE, and Partial Cloverleaf SE were developed in more detailed (shown on **Figures 4-4** thru **4-8)** and an additional evaluation was performed. The evaluation approach included the establishment of a set of pertinent parameters deemed appropriate for the measurement of the desirability of the design configuration alternatives, with a quantitative evaluation of each alternative leading to the selection of the best option. **Table 4-5** is a summary table which compares the performance of the five remaining build interchange configuration alternatives. In addition, the "No-Build" alternative has also been included as a viable alternative carried through the alternative analysis and study process.

In addition to the alternative evaluation, a Value Engineering (VE) Workshop was held in June of 2019 and the VE Report documents the decisions reached as a result of the VE. As noted in the VE Report, one of the recommendations was a DDI. Some benefits stated that the DDI alternative has the potential to have the longest service life and safety benefits and it is locally accepted. Based on the VE recommendation and the results obtained from the summary table, the DDI alternative is the preferred option.

**Figure 4-4 - Preliminary Diamond Interchange**

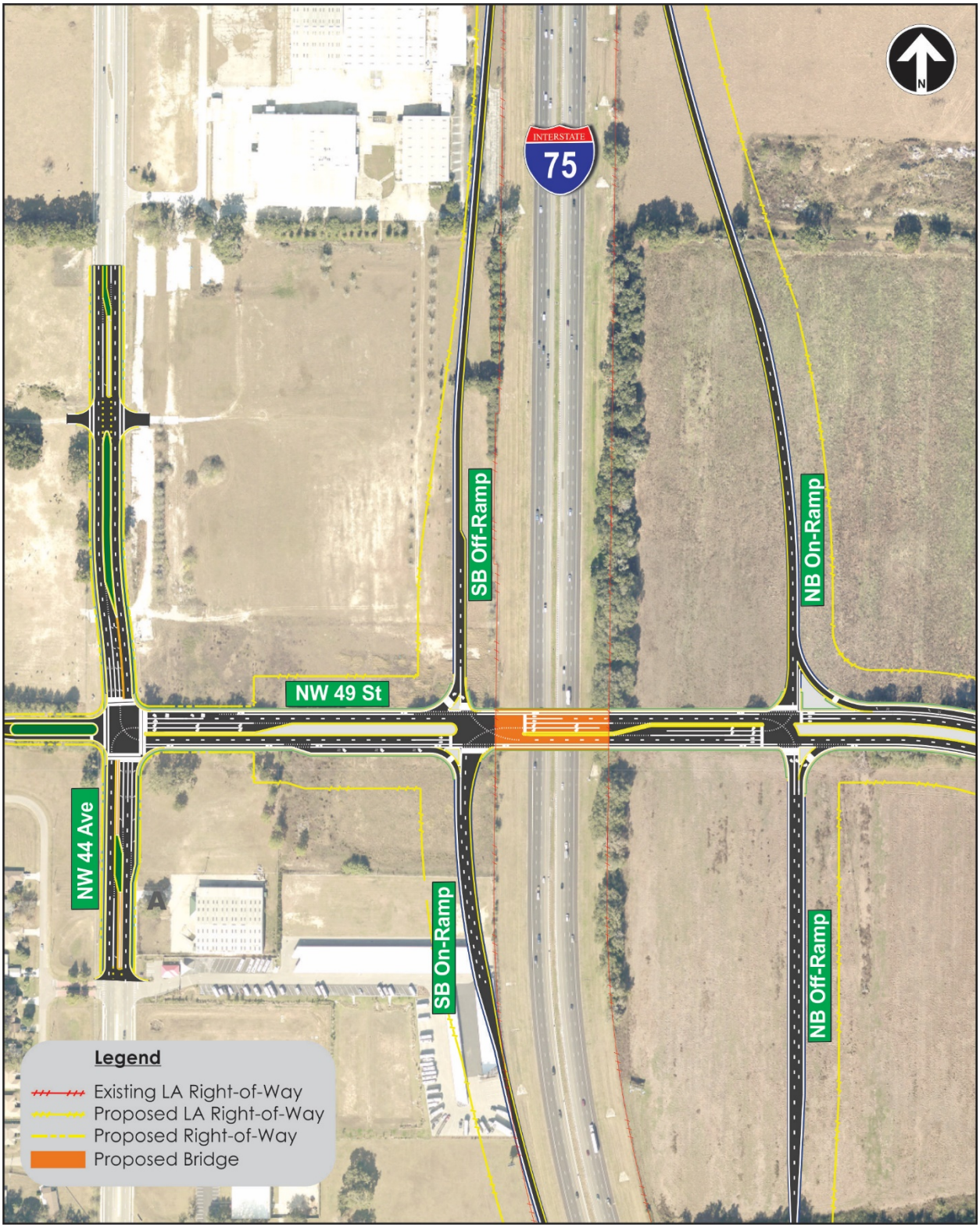


**Figure 4-5 - Preliminary SPUI Interchange**

**Figure 4-6 - Preliminary Diverging Diamond Interchange**

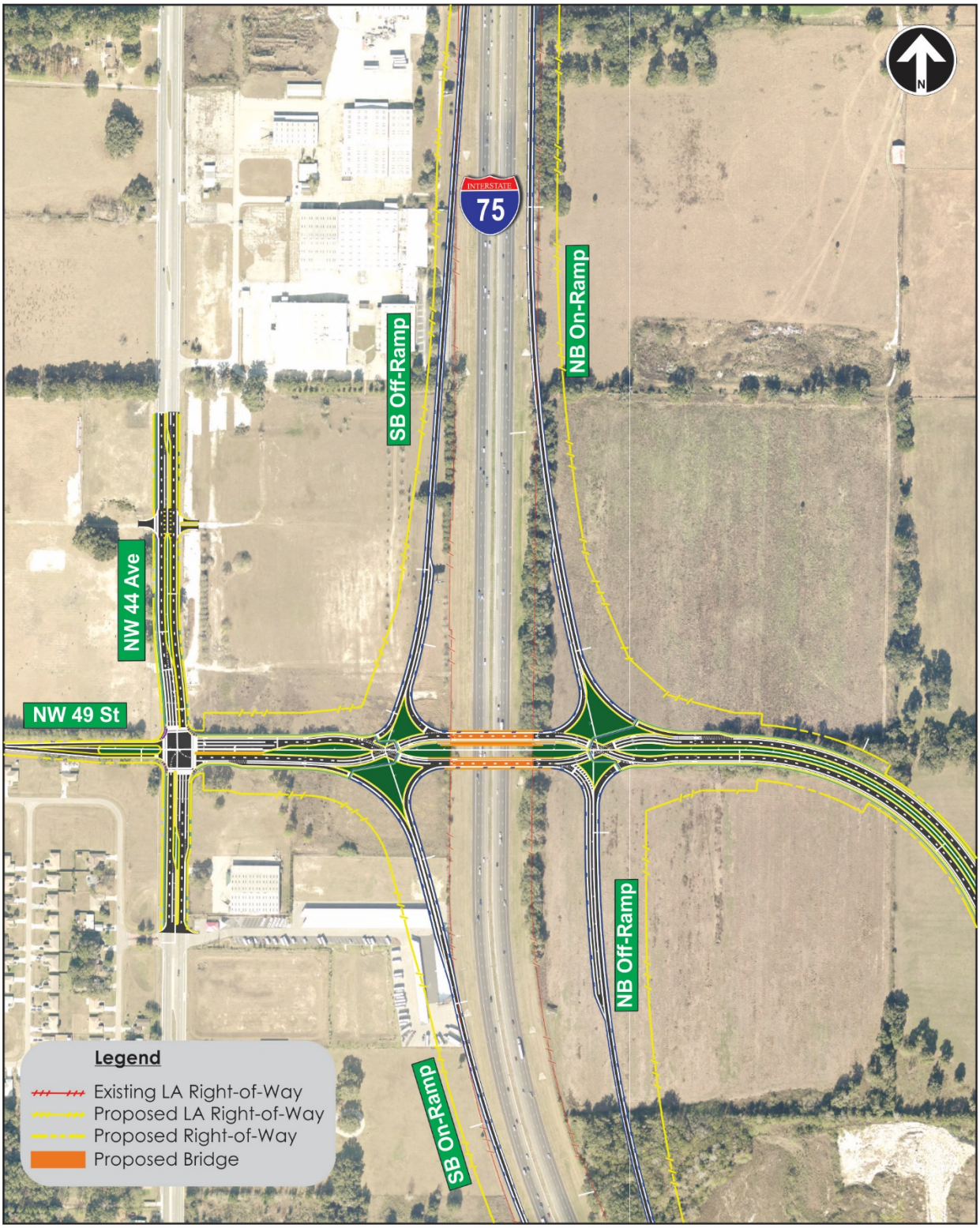


**Figure 4-7 - Preliminary Parclo SE Interchange**

**Figure 4-8 - Preliminary Parclo NE Interchange**

**Table 4-5 - Final Alternative Evaluation**

| | ALTERNATIVES | | | | | |
|---|---|---|---|---|---|---|
| | NO BUILD | DIAMOND | SPUI | DDI | PARCLO SE | PARCLO NE |
| DESCRIPTION | No improvements | New interchange | New interchange | New interchange | New interchange | New interchange |
| PLANNING CONSISTENCY | | | | | | |
| CONSISTENCY WITH LONG RANGE TRANSPORTATION PLAN | NO | YES | YES | YES | YES | YES |
| SOCIAL ENVIRONMENT | | | | | | |
| NUMBER OF PARCELS AFFECTED | 0 | 26 | 24 | 26 | 26 | 26 |
| RELOCATION POTENTIAL | 0 | 1 | 1 | 1 | 1 | 1 |
| RIGHT-OF-WAY IMPACTS (WITH PONDS) | 0 | 94 acres | 60 acres | 86 acres | 89 acres | 95 acres |
| PHYSICAL ENVIRONMENT | | | | | | |
| POTENTIALLY CONTAMINATED SITES | 0 | 4 | 4 | 4 | 4 | 4 |
| AIR QUALITY | Worse where there is increased congestion | Better air quality due to less congestion | Better air quality due to less congestion | Better air quality due to less congestion | Better air quality due to less congestion | Better air quality due to less congestion |
| NATURAL ENVIRONMENT | | | | | | |
| APPROXIMATE WETLAND IMPACTS | 0 | 0 | 0 | 0 | 0 | Wet prairies - 0.60 acres |
| FLOODPLAIN IMPACTS | 0 | 7 acres | 2 acres | 1.5 acres | 2 acres | 15 acres |
| IMPACTS TO POTENTIAL SAND SKINK HABITAT* | 0 | N/A | N/A | N/A | N/A | N/A |
| FARMLAND OF LOCAL IMPORTANCE (NRCS) | 0 | 53 acres | 35 acres | 45 acres | 64 acres | 37 acres |
| ENGINEERING ISSUES | | | | | | |
| LEVEL OF SERVICE - I-75 SB / NB RAMPS | - | C / C | D / D | B / B | C / B | C / A |
| - NW 44 AVE/NW 49 ST | - | C | C | C | C | C |
| BIKE / PEDESTRIAN / ADA | No Improvements | Bike lanes and Sidewalks proposed | Bike lanes and Sidewalks proposed | Bike lanes and Sidewalks proposed | Bike lanes and Sidewalks proposed | Bike lanes and Sidewalks proposed |
| EMERGENCY EVACUATION | Potentially worse due to no interchange | Improved with additional access | Improved with additional access | Improved with additional access | Improved with additional access | Improved with additional access |
| COST | | | | | | |
| ESTIMATED CONSTRUCTION COST (EXCLUDES PONDS) | 0 | $36.52 Million | $54.0 Million | $35.7 Million | $36.5 Million | $35.8 Million |

*Note: Potential sand skink habitat was originally determined using three parameters (county, soils, elevations). Field assessments and coordination with USFWS determined that sand skink skink presence was unlikely, so no impacts are anticipated.

# 5.0 PROJECT COORDINATION & PUBLIC INVOLVEMENT

A Public Involvement Plan (PIP) has been developed and is being carried out as part of the project. The purpose of this program is to establish and maintain communication with the public at-large and individuals and agencies concerned with the project and its potential impacts.

Various public outreach and agency coordination activities took place throughout the PD&E process to help develop, refine and evaluate the various interchange alternatives. A summary of the outreach efforts and meetings conducted to date, as well as selected detailed descriptions of specific activities are also provided in the following sections. A complete summary of the meetings, including meeting notifications, presentations, display materials, comments, sign-in sheets and media coverage is provided in the Comments and Coordination Report, available separately.

## 5.1 Agency Coordination

### 5.1.1 Advance Notification & Programming Screen Summary Report

An Advance Notification Package was prepared and sent to the Florida State Clearinghouse on April 18, 2016, where it was then distributed to the appropriate state agencies for review. The Advance Notification was also distributed to appropriate non-state agencies and tribal nations.

In addition, a Programming Screen Summary Report was generated by the ETDM Coordinator for the I-75 at NW 49 Street Interchange PD&E Study. The purpose of this report is to summarize the results of the ETAT Programming Screen review of the project; providing details concerning agency comments about potential effects to natural, cultural, and community resources; and provide additional documentation of activities related to the Programming Phase of this project. Comments received as part of the ETDM process were reviewed and incorporated into the alternatives development process and supporting environmental documents.

### 5.1.2 Local Agencies and Stakeholder Coordination

Another key aspect of the PIP of this project included meetings with interested parties other than the Federal and State environmental, permit and review agencies. These include representatives of public agencies and project stakeholders. **Table 5-1** summarizes the various agency and stakeholders meetings conducted to date. All input received as a result of the meetings listed below were taken into consideration as part of the alternatives development and evaluation process and in close coordination with Marion County.

**Table 5-1 - Agency/Stakeholder Coordination**

| Date | Stakeholder/Government Agency | Topic |
|---|---|---|
| 7/6/17 | Ocala/Marion TPO | Project Kick-off Meeting |
| 8/24/17 | Ocala 2035 Leadership | Project Kick-off Meeting |
| 9/21/17 | West Ocala CRA | Project Kick-off Meeting |
| 11/14/17 | Ocala TPO, TAC and CAC | Project Kick-off Meeting |
| 11/28/17 | Ocala TPO Meeting | Project Status |
| 3/26/18 | Ocala TPO/Marion County | Status/Field Work Coordination |
| 6/28/18 | Ocala TPO Meeting | Status/Overview |
| 2/6/19 | Alternative Public Informational Meeting | Provide info/Status/Solicit |
| 2/6/19 | Baldwin Angus Ranch/FDOT/Marion County | Status/Solicit Input |
| 2/11/19 | Ocala TAC and CAC | Informational Meeting |
| 3/12/19 | Baldwin Angus Ranch/FDOT/Marion County | Status/Solicit Input |
| 3/12/19 | Barracuda Boat and RV Storage/FDOT | Status/Solicit Input |
| 3/12/19 | ELA-Marion County | Watershed Opportunities/Meeting |
| 6/25/19 | Marion County | Discussion on Alternative Analysis |
| 8/14/19 | Marion County Board of Commissioners | Discussion on Alternative Analysis |
| 10/8/19 | Barracuda Boat and RV Storage/FDOT | Status/Solicit Input |
| 9/3/20 | SJRWMD | Permit coordination, ELA |
| 9/17/20 | Marion County | Project Update |

## 5.2 Public Involvement

Public Information meetings began in July 2017 and have continued throughout the study process. The Ocala Star Banner was used to notify the public of the project and upcoming public meetings. The study website www.cflroads.com/project/435209-1 was utilized to upload study materials and allow for public commenting throughout the PD&E Study. All input received served as valuable information that was taken into consideration for the refinement of the alternatives and the development of the alternatives evaluation matrix. Representatives from the FDOT were available at each meeting to discuss the project and answer questions.

### 5.2.1 Public Kick-Off Meeting

A project kick-off meeting was held with staff from Marion County, City of Ocala and the Ocala/Marion TPO on July 6, 2017. Public Kick-Off presentations for the I-75 at NW 49 Street Interchange PD&E Study were given at the August 24, 2017 Ocala 2035 Leadership meeting, the

September 21, 2017 West Ocala CRA meeting, the November 14, 2017 Ocala/Marion TPO Citizens Advisory Committee (CAC) and Technical Advisory Committee (TAC) meetings, and at the November 28, 2017 Ocala/Marion TPO Board meeting. The purpose was to present an overview of the project to the public and to the elected officials. The study team was present if there were any questions that needed to be addressed from public and elected and agency officials. In general attendees wanted to know about the project time frame. Three comments were received from the TPO Board: Mr. Bryant recommended removing the bicycle lanes and including a multiuse path on one side, Mr. Moore noted he does not support roundabouts, and Mr. Zalak reminded the team this area will be used by heavy trucks that require sufficient room to get up to operating speeds.

### 5.2.2 Alternative Public Informational Meeting

An Alternative Public Information Meeting was held on February 6, 2019 at the Community Room of the Ocala Police Department. This meeting provided an opportunity for residents, businesses, stakeholders and other interested parties to view project information, view alternatives, ask questions of the study team and provide comments. Public meeting notices were sent by U.S. mail and published in local newspapers and the Florida Administrative Register (FAR). A total of 54 people signed into the meeting including staff members. Comments were received during the 10-day comment period. In general, overall sentiment regarding the project was positive and the community is looking forward to a new interchange with I-75. Many residents were concerned about potential residential relocations as a result of the project.

### 5.2.3 Public Hearing

The Public Hearing was held on November 18, 2020 virtually via GoToWebinar and in-person at the Southeastern Livestock Pavilion Auditorium. The hearing was advertised in the Ocala StarBanner on November 3, 2020 and on November 11, 2020. Copies of the following reports were on display at Deland Library and Marion County Public Library twenty one (21) days before the Public Hearing: Preliminary Engineering Report, Categorical Exclusion Type II, Cultural Resource Assessment Survey, Contamination Screening Evaluation Report, Natural Resources Evaluation, Noise Study Report, Conceptual Stage Relocation Plan, Pond Siting Report, Location Hydraulics Report, and Sociocultural Effects Evaluation Technical Memorandum. A total of Seventy-nine (79) residents, interested parties, elected and appointed officials, FDOT staff and consultants attended the Public Hearing. 40 of those attendees participated through GoToWebinar. One (1) comment card was submitted at the Public Hearing and four (4) comments were submitted via email. Six (6) attendees submitted speaker cards and spoke before

the panel after the formal presentation. In general, the attendees were in support of the project. Comments received were regarding the schedule of future project phases, as well as noise and right-of-way impacts to the Fountains neighborhood. All comments submitted from the public and responses can be seen in the Comments and Coordination Report.

# 6.0 DESIGN FEATURES OF THE PREFERRED ALTERNATIVE

After a comprehensive evaluation process, Alternative 3, the DDI, was selected as being the preferred alternative. This alternative is illustrated on **Figure 6-1**.

The preferred alternative, diverging diamond interchange (Alternative 3), consists of a diamond interchange in which the two directions of traffic on the minor road (NW 49 Street) crossover, or diverge, to the opposite side between the signalized crossover intersections at the on/off ramps (shown on **Figure 6-1** and displayed on the concept plans and typical section package in **Appendix B**). This eliminates the need for left-turning vehicles to cross the paths of approaching through vehicles, facilitating operational maneuvers and increasing safety. This allows for a simple two-phase operation at the two signalized intersections within the interchange (no left turns), thus improving efficiency. As previously stated, an on-going FDOT District 5 PD&E Study is evaluating alternatives to widen I-75 in the future to 8 lanes. In view of this fact, the NW 49 Street bridge concept over I-75 was designed to span over the full I-75 right-of-way (300 feet). Additionally, longer on/off ramps are provided in order to be compatible with future widening options and minimize the potential for throwaway. The right turn movements at the on and off ramps will be signal controlled to provide safe pedestrian crossing maneuvers.

Four stormwater treatment and attenuation ponds are shown on **Figure 6-1** to meet water management district and FDOT drainage requirements.

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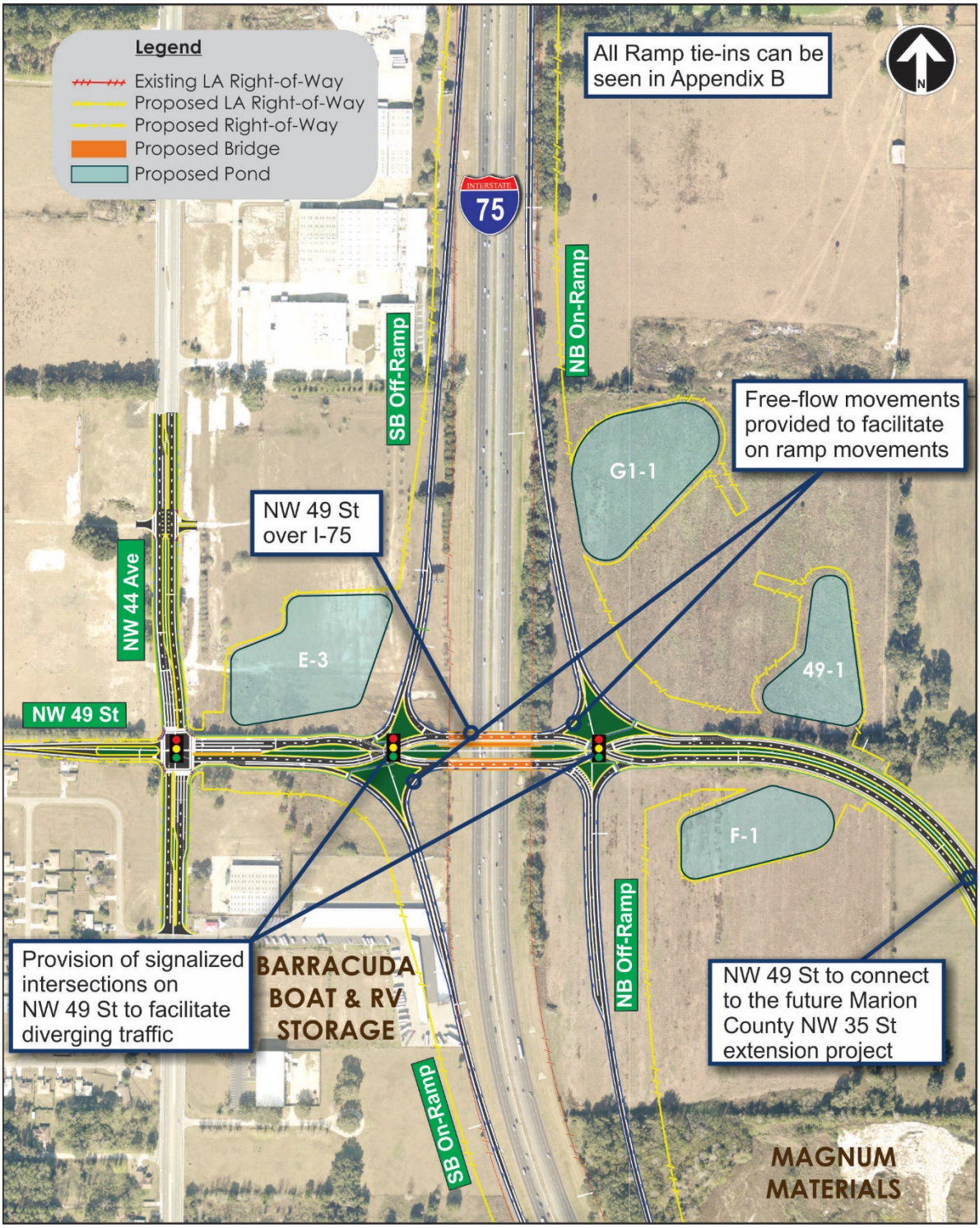
**Figure 6-1 - Preferred Alternative**

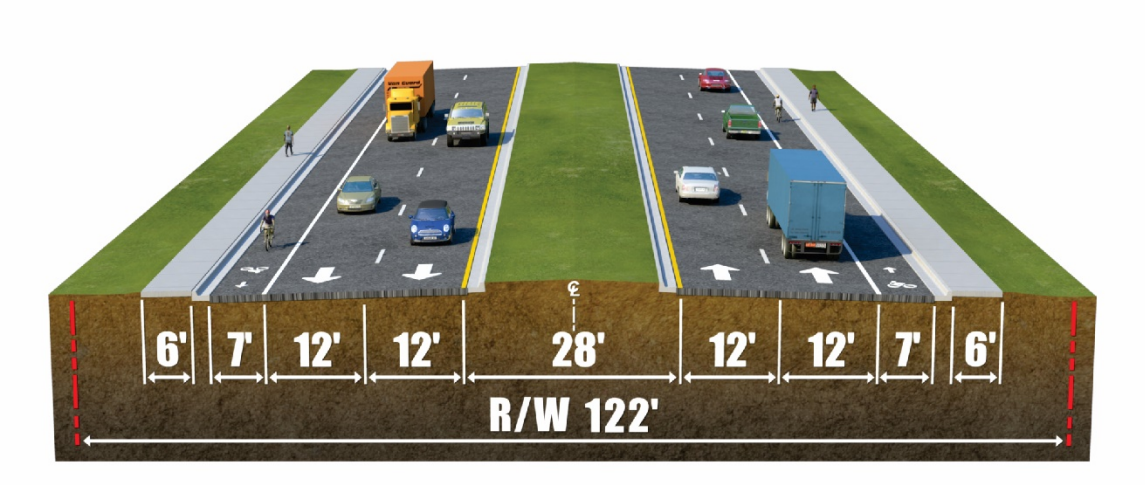


## 6.1 Engineering Details of the Preferred Alternative

### 6.1.1 Typical Sections

NW 49 Street (shown on **Figure 6-2**) will feature four 12-foot travel lanes with 7-foot bicycle lanes, a 28-foot raised median, and 6-foot sidewalk. The proposed right-of-way for NW 49 Street is 122 feet. NW 49 Street will curve towards the south east of I-75 to connect to Marion County's future NW 35 Street extension through Magnum Materials Mine. The typical sections are also illustrated in the Typical Section Package (see **Appendix B**).

**Figure 6-2 - NW 49 Street Preferred Typical Section**




### 6.1.2 Bridges and Structures

The proposed bridge typical section for the eastbound bridge includes a 6-foot shoulder, two 12-foot lanes, one 7-foot bicycle lane, a 12-foot shared use path along with two concrete traffic railings and a concrete parapet with pedestrian/bicycle bullet railings for an out-to-out width of 52 feet, 8 inches. The westbound bridge on the south portion of the interchange will carry westbound traffic on NW 49 Street along with traffic from I-75 northbound off ramp and to I-75 southbound on ramp. The typical section for the westbound bridge will carry a 6-foot shoulder, two 12-foot lanes, one 7-foot bicycle lane, and two concrete traffic railings for an out-to-out width of 39 feet, 8 inches. There will be a 46-foot, 4-inch gap between the two bridges. The new bridges will span the entire existing I-75 right-of-way (ROW) which is 300 feet using Florida-I Beams (FIBs).

The proposed bridges will consist of 2 spans that are approximately 157.5 feet each and supported by FIB-78. The total bridge length will be approximately 315 feet. The superstructure will consist of an 8½ inch reinforced concrete deck supported on 6.5 feet deep concrete beam for an approximate minimum superstructure depth of 7.75 feet including build-up. The total

superstructure depth will be approximately 9.0 feet which accounts for the deck cross slope. The substructure will consist of pile end bents supported on one row of piles with wrap around MSE walls. This type of end bent configuration will reduce the total bridge length since slope protection for the spill-through End Bents will not be required. The intermediate support will consist of a multi-column pier located at the centerline of I-75. Please refer to **Figure 6-3** for a plan, elevation and typical section of the preferred option.

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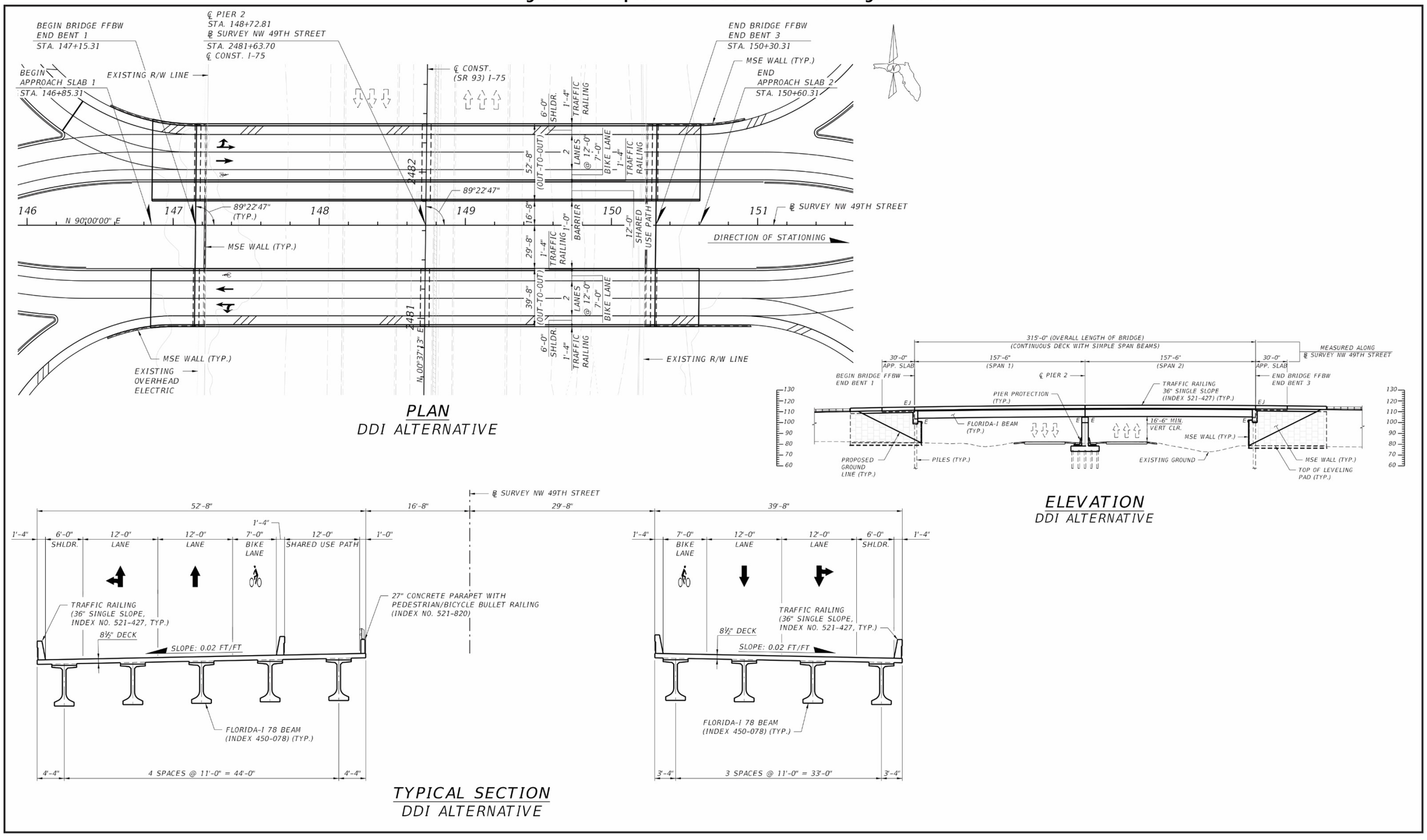
**Figure 6-3 - Proposed NW 49 Street over I-75 Bridge Characteristics**



### 6.1.3 Right-of-Way and Relocations

The proposed project is anticipated to require one business relocation and will impact 26 parcels with a total of 86 acres. A map of anticipated right-of-way impacts is included in **Appendix D**. Additionally, 13 outdoor advertising signs are anticipated to be impacted. During final design, existing billboards should be preserved where feasible.

The relocation of one business, Barracuda Boat and RV Storage, is anticipated under the preferred alternative. There would be no residential relocations under the preferred alternative. Nearby replacement commercial sites are available. Relocation advisory services and assistance will be provided in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Act). Right-of-way costs are estimated at $46,681,000 (included in **Appendix D)**.

### 6.1.4 Horizontal and Vertical Geometry

**Table 6-1** summarizes the horizontal curve data proposed for the preferred alternative (curve data is displayed on the concept plans see **Appendix B**). **Table 6-2** summarizes the vertical data proposed for the preferred alternative.

**Table 6-1 - Proposed Horizontal Curve Data**

| Location | Curve Number | Design Speed | PI STA | Delta | D | T | L | R | e% | PC STA | PT STA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NW 49 St west of NW 44 Ave | CL_49_PSE_1 | 45 mph | 135+95.63 | 1°26' 23" (LT) | 0°08'43" | 495.63 | 991.21 | 39444 | N.C. | 131+00.00 | 140+91.21 |
| NW 49 St east of I-75 | CL_49_PSE_4 | 45 mph | 162+28.62 | 48°50'27" (RT) | 5º45'60" | 452.23 | 849.02 | 996.00 | R.C. | 157+76.39 | 166+25.41 |
| NW 49 St east of I-75 | CL_49_PSE_5 | 45 mph | 167+87.95 | 18°32'14" (RT) | 5º45'09" | 162.54 | 322.24 | 996.00 | R.C. | 166+25.41 | 169+47.65 |

**Table 6-2 - Proposed Vertical Curve Data**

| Approximate Location | Design Speed | Type of Curve | VPI Station | VPI Elevation | Grade (Back) % | Grade (Ahead) % | Length of Curve (ft) | K |
|---|---|---|---|---|---|---|---|---|
| NW 49 Street west of I-75 | 45 mph | Sag | 134+72.73 | 74.70 | -0.330 | 0.844 | 135 | 115 |
| NW 49 Street west of I-75 | 45 mph | Sag | 136+88.85 | 76.53 | 0.844 | 4.000 | 249 | 79 |
| NW 49 Street over I-75 | 45 mph | Crest | 149+30.24 | 126.18 | 4.000 | -4.000 | 1088 | 136 |
| NW 49 Street east of I-75 | 45 mph | Sag | 161+24.58 | 78.41 | -4.000 | 2.280 | 554 | 88 |
| NW 49 Street east of I-75 | 45 mph | Crest | 172+70.17 | 104.53 | 2.280 | 1.176 | 337 | 305 |

### 6.1.5 Bicycle and Pedestrian Accommodations

As previously mentioned, Marion County has funded the construction (year 2021) of the NW 35 Street extension to the northern limit of the limerock mine, directly tying to the proposed NW 49 Street being constructed as part of this project. NW 35/NW 49 Street will feature both pedestrian and bicycle features as shown on **Figure 6-2**. Crosswalks are provided crossing the signal controlled on/off ramps. At the crossover intersections, pedestrians cross to the median where a sidewalk along the median of the DDI is provided with concrete barrier separated sidewalk on the eastbound bridge **(see Figure 6-3).** Bicycle lanes are provided through the DDI.

### 6.1.6 Multi-Modal Accommodations

There are no planned transit routes along the NW 49 Street extension. However, the design does not preclude a future expansion of the SunTran system.

### 6.1.7 Access Management

NW 49 Street is proposed to be an arterial with a restrictive median. At this time Access Class 3 applies to NW 49 Street.

Context Classification

The future land use is designated as Commerce Districts, encompassing a mix of office, commercial, industrial, and public land uses, with nearby residential. Based on the land development code, future building heights are one-to-two stories tall, with parking in the front and side of buildings, and a maximum office/retail density floor-area-ratio up to two. The future roadway connectivity measures align with a C3C based on the future roadway connectivity for approved or permitted development plans.

### 6.1.8 Intersection and Interchange Concepts

An FDOT ICE Stage 1 Screening was performed for the intersections along NW 49 Street at: NW 44 Avenue, I-75 southbound ramp terminal and I-75 northbound ramp terminal. Five intersection types at the NW 44 Avenue intersection had an average AM/PM V/Cs less than 0.60. In ascending order, they include Displaced Left Turn Full, Partial Displaced Left Turn N-S, Quadrant Roadway N-W, Traffic Signal and Partial Displaced Left Turn E-W. The traffic signal is the recommended intersection type. For both the northbound and southbound ramp terminals, the only intersection types that had an average AM/PM V/C less than 0.75 were the traffic signal and roundabout. Based on right of way limitations, intersection volumes, and potential cost, a typical signalized

intersection appears to be the appropriate control type for both northbound and southbound ramps.

The CAP-X worksheet results, ICE Stage 1 Screening Forms, and supporting documentation are provided in the IJR prepared for this study.

### 6.1.9 Intelligent Transportation System (ITS) and TSM&O Strategies

The new ramp construction will require a relocation of the I-75 fiber backbone and select ITS devices. The Maintenance of Communication (MOC) is a major component in any construction project impacting existing ITS infrastructure. MOC will be required to keep network connectivity while the backbone and devices are relocated. The ITS review identified the need to extend the current ITS facilities throughout the new construction and along NW 35 St. to NW 27 Ave. This will allow the ITS infrastructure proposed by this project to connect to the ITS expansion on NW 35 St.

Improvements to the ITS are expected to include: new Fiber Optic Network (FON), Closed-Circuit Television (CCTV) cameras, cameras, Microwave Vehicle Detection System (MVDS) sensors, Wrong Way Vehicle Detection Systems (WWVDS), and smart signal technologies, which include Advanced Transportation Controllers (ATC) and detection to allow for Intersection Movement Counts (IMC) and Automated Traffic Signal Performance Measures (ATSPM). Please note that the proposed ITS concept was based on a high-level engineering design and the final quantities should be determined at the time of design.

#### 6.1.9.1 Proposed ITS Devices

CCTV Cameras: The purpose of the CCTV cameras is to provide video coverage at all new signals and overall video coverage of the interchange for FDOT District 5 and Marion County. The cameras to be installed at the signals will be placed on the mast arms for each new signal and the CCTV camera that will monitor the interchange as a whole will be placed on a concrete pole in a location that will allow FDOT District 5 to have 100% comprehensive video coverage of the interchange.

MVDS: MVDS sensors will be placed at all on and off ramps serving I-75. These sensors will use microwave frequency to determine volume, speed, vehicle classification, and occupancy data.

WWVDS: WWVDS will be placed to alert drivers that they are traveling the wrong directions as early as possible to avoid collisions on the ramps.

Underground Power Distribution System: An underground power distribution system with Uninterrupted Power Supply (UPS) backup will be included as part of the analysis for the new I-75 interchange. For this study, one UPS per ITS device and 3 UPS for each signal will be considered. The final design firm is responsible for verifying the proposed location, determining available power sources and voltages, and coordinating with Utility Companies. The electrical design will consist of commercially available power sources. Disconnects and service meters are to be installed at the ITS device location.

ATC Controllers: ATC controllers allow for advanced traffic control applications including providing a capability for future expandability (due to their firmware based on ITE standards). While an ATC and non-ATC controller can both perform basic traffic signal operation, an ATC controller adds expanded capabilities, including ramp control (ramp metering), traffic monitoring (including ATSPM and Adaptive), and ITS beacons. The installation of ATC controllers will provide the opportunity to increase performance of all new signals. Therefore, the signals will operate more efficiently by their increased ability to be actively monitored and maintained. This also allows for the future expansion/addition of ATMS and ITS devices and functions.

Vehicle Detection: In order for ATSPM and IMC to be utilized at the proposed intersections, both loops and video detection will be installed. Inductive loops will be integrated at the stop bars of all lanes that approach intersections. Video detection cameras will be installed on the mast arms of all new signals. These technologies can detect the arrival and presence of vehicles on an intersection approach and then communicate this information to the ATC controller.

#### 6.1.9.2 ITS Cost Estimates

As part of this study, a high-level cost analysis was performed to determine the preliminary funding requirements for the deployment of the new ITS infrastructure.

There are several items that will be included to ensure a fully functional system and efficient ITS device installation. The capital cost pricing used in this calculation was a combination of the FDOT Long Range Estimate. In addition to the capital cost, a 10% cost of mobilization, a 10% cost of design, a 15% cost of Construction Engineering Inspector (CEI), a 3% cost of MOC, and a 10% cost of contingency were included in the estimate. Below is the list of the primary items:

- ✓ FOC and hardware
- ✓ Pull boxes
- ✓ Conduit

- ✓ Power services, service wire and conduit for new power connections
- ✓ CCTV cameras
- ✓ MVDS sensors
- ✓ WWVDS
- ✓ Field ethernet switches
- ✓ Device cabinets
- ✓ UPS

The overall engineer's estimate capital cost is $1,248,700. For a detailed cost breakdown and item descriptions, see **Appendix E.**

### 6.1.10 Utilities

Details of the utilities present and potentially impacted can be found in the Utility Assessment Package prepared for this study. Potential impacts to utilities occur mostly along NW 44 Avenue, where most utilities are located on the west side. This includes overhead electric, overhead and buried fiber, water and sewer mains. There is also an existing 6-inch gas main along the median and east side of NW 44 Avenue that could potentially be in conflict. Additionally, existing ITS infrastructure along I-75 is likely to be impacted.

### 6.1.11 Drainage and Stormwater Management Facilities

Drainage and stormwater management facilities were developed for the preferred alternative. The northern and southern limits of the existing drainage boundaries along I-75 were maintained while eastern/western boundaries were adjusted to include the interchange and NW 49 Street

In addition to the existing basins permitted for I-75 (D, E, F, and G) as described in Section 2.16, Basin 49 is for the NW 49 Street alignment east of I-75. The proposed stormwater management plans include offsite dry retention ponds and roadside dry retention swales with intermittent ditch blocks. Runoff from the new NW 49 Street alignment and proposed Ramp D will be collected in a closed drainage system and conveyed into proposed Pond E-3. Runoff from the remaining proposed ramps will be collected in roadside ditches and discharge into Ponds E-3, F-1, and G1-1. Pond E-3 will discharge into Basin G2. Recommended ponds are shown in **Figure 6-4** and summarized in **Table 6-3**. These measures will provide required treatment and attenuation volume. As indicated in **Table 6-3**, additional right-of-way will be required for proposed pond sites. The recommended stormwater management facilities are not expected to have significant environmental, wildlife, floodplain, or cultural resource impacts.

Further information is provided in the Pond Siting Report prepared for this project.

**Table 6-3 - Summary of Preferred Water Quality Treatment & Attenuation Ponds**

| Basin | Recommended Ponds | Pond Selection Justification |
|---|---|---|
| D | Dry Retention Swales | The recommended dry retention swales are located within the proposed FDOT ROW. Additional pond sites are not necessary since the swales will provide sufficient storage for treatment and attenuation. |
| E | Pond E-3 (5.8 acres) | Preliminary geotechnical data indicates an ESHW of 75.35' in the area of this pond. Pond E-3 is recommended and will provide sufficient volume for treatment and attenuation |
| F | Pond F-1 (3.4 acres) | Basin F flows to swales located in the eastern right-of-way located adjacent to Pond F-1. Preliminary geotechnical data indicates an ESHW of 76.2' in the area of this pond. Pond F-1 is recommended and will provide sufficient volume for treatment and attenuation. |
| G1 | Pond G1-1 (5.29 acres) | Runoff from Basin G1 flows to swales located in the eastern right-of-way located adjacent to Pond G1-1. Preliminary geotechnical data indicates an ESHW of 62.6' in the area of this pond. Pond G1-1 is recommended and will provide sufficient volume for treatment and attenuation. |
| G2 | Dry Retention Swales | The recommended dry retention swales are located within the proposed FDOT ROW. Additional pond sites are not necessary since the swales will provide sufficient storage for treatment, attenuation and floodplain compensation. |
| 49 | Pond 49-1 (3.99 acres) | Pond 49-1 is recommended and will provide sufficient volume for treatment and attenuation. Preliminary geotechnical data indicates an ESHW of 72.6' in the area of this pond. |

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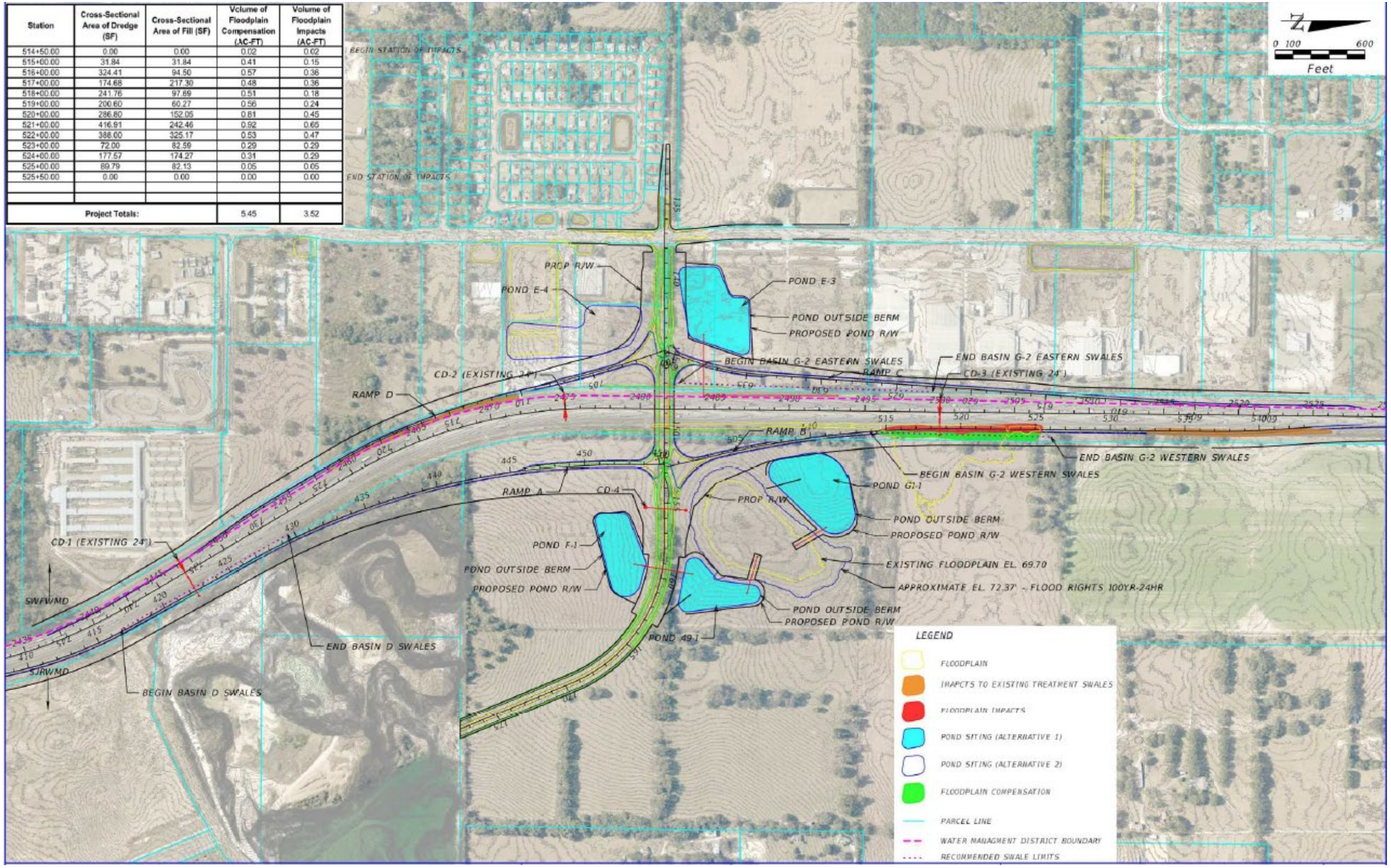
**Figure 6-4 - Preferred Pond Sites**

| Station | Cross-Sectional Area of Dredge (SF) | Cross-Sectional Area of Fill (SF) | Volume of Floodplain Compensation (AC-FT) | Volume of Floodplain Impacts (AC-FT) |
|---|---|---|---|---|
| 514+50.00 | 0.00 | 0.00 | 0.02 | 0.02 |
| 515+00.00 | 31.84 | 31.84 | 0.41 | 0.15 |
| 516+00.00 | 324.41 | 94.50 | 0.57 | 0.36 |
| 517+00.00 | 174.68 | 217.30 | 0.48 | 0.36 |
| 518+00.00 | 241.76 | 97.69 | 0.51 | 0.18 |
| 519+00.00 | 200.60 | 60.27 | 0.56 | 0.24 |
| 520+00.00 | 286.80 | 152.05 | 0.81 | 0.45 |
| 521+00.00 | 416.91 | 242.46 | 0.92 | 0.65 |
| 522+00.00 | 388.00 | 325.17 | 0.53 | 0.47 |
| 523+00.00 | 72.00 | 82.59 | 0.29 | 0.29 |
| 524+00.00 | 177.57 | 174.27 | 0.31 | 0.29 |
| 525+00.00 | 89.79 | 82.13 | 0.05 | 0.05 |
| 525+50.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | |
| | | | | |
| Project Totals: | | | 5.45 | 3.52 |



### 6.1.12 Floodplain Analysis

The Federal Emergency Management Agency (FEMA) has developed Flood Insurance Rate Maps (FIRM) for Marion County. There are no FEMA regulated floodways within the limits of the project. A small segment of the project crosses FEMA designated Zone AE (Elevation Determined). The anticipated floodplain impact due to the interchange construction is approximately 3.5 acre-feet. Floodplain encroachment can be compensated within the proposed right of way in the regraded swales with a wider footprint to provide the storage volume for water quality treatment, attenuation and compensation for floodplain impact. Please refer to **Appendix F** for FEMA floodplain maps. Additional information is available in the Location Hydraulic Report prepared for this project.

### 6.1.13 Transportation Management Plan

Extended lane closures are not anticipated as a result of the construction of this project. No major construction easement needs have been identified at this time. The NW 49 Street bridges over the I-75 mainline could be constructed with minimal maintenance of traffic using the FDOT Standard Plans Maintenance of Traffic series 102-600 since the bridges consists of simple span Florida-I Beam superstructure. The remaining construction of the interchange should not affect the existing traffic as it is all a new ramps and a roadway connection.

### 6.1.14 Special Features

No special features such as such as noise walls and retaining walls are anticipated at this time.

### 6.1.15 Design Variations and Design Exceptions

A border width variation for the I-75 Southbound Off-Ramp is required, more details can be found in the Design Variations Memorandum (see **Appendix G**).

### 6.1.16 Cost Estimates

The construction cost estimate for this project was calculated utilizing the FDOT's Long Range Estimate (LRE). The project design/construction number is: FM#: 435209-1-22-01. **Table 6-4** provides a summary of the construction cost for each of the construction projects. The detailed LRE can be found in **Appendix E**.

**Table 6-4 - Construction Cost Estimate**

| Component | Estimated Cost |
|---|---|
| Earthwork | $10,389,789 |
| Roadway | $3,884,577 |
| Shoulder | $1,501,680 |
| Median | $405,765 |
| Drainage | $5,436,008 |
| Signing | $227,195 |
| Signalization | $905,006 |
| Lighting | $730,695 |
| Bridges | $5,211,935 |
| **SUBTOTAL** | **$28,692,650** |
| MOT (10%) | $2,869,265 |
| Mobilization (10%) | $3,156,191 |
| Design (10%) | $2,869,265 |
| CEI (15%) | $4,303,898 |
| **SUBTOTAL** | **$41,891,269** |
| ITS | $1,248,700 |
| Project Unknowns (15%) | $6,283,690 |
| **TOTAL** | **$49,423,659** |

### 6.1.17 Value Engineering

A Value Engineering Workshop was held during the week of June 24, 2019 – June 28, 2019. During this workshop there were management action dispositions for the recommendations that were developed and presented at the workshop from the Value Engineering Team. These ideas represent opportunities to:

- Obtain the best return for construction dollars spent
- Assist in identifying the best approach for project delivery
- Reduce the risks associated with project delivery
- Minimize Life Cycle Costs for O & M and of ownership of the finished project
- Enhance the project outcome through recommendations and suggestions that, which may add cost to the project, would improve pedestrian access, provide innovative methods to complete construction and further optimize right of way utilization
- Reduce construction cost but doing so without compromising vital functions

- Some instances in which additional funds might be expended to avoid future, higher costs of ownership

A summary of the VE recommendations is shown in **Table 6-5**. At the time of Value Engineering Workshop, the PD&E was evaluating four alternatives. After further coordination and evaluation of the recommendations from the Value Engineering Team the DDI alternative has been proposed for further consideration under the Final Evaluation as part of the Alternative Analysis process. It was noted that the DDI has the potential to have the longest service life and safety benefits and its locally accepted. Additional recommendations were accepted to be further evaluated and implemented in final design.

**Table 6-5 – VE Recommendations**

| VE Alternative | | Recommendation |
|---|---|---|
| BR-04 | Build TUDI | Not Accepted |
| BR-06 | Build DDI | Accepted |
| BR-08 | Use A Roundabout on The East End of The Bridge | Not Accepted |
| BR-15 | Reduce Slope on NW 49 St. East of I-75 From 4% To 3% | Accepted |
| RG-02 | Build Concrete Pavement for Portions of The Ramps Near Intersections | Accepted |
| RG-04 | Build 2-Lane Roundabout At 44th Ave And NW 49 St. | Not Accepted |
| RG-19 | Build Partial Displaced Left Turn/Median U-Turn At 44 Ave (SB To EB) | Accepted |
| RG-22 | Remove Ditch Blocks from the ROW | Not Accepted |
| RG-27 | Realign I-75 NB Off-Ramp to Align with Property Development Route | Not Accepted |
| RG-34 | Build PARCLO At SE And NW Quadrants | Not Accepted |
| RG-40 | Relocate Ponds C and D to Barracuda Site | Not Accepted |
| RG-41 | Preserve Existing Billboards Where Impacted by ROW Acquisition | Accepted |
| RG-42 | Build At-grade Intersection of NW 49 St. And 44 Avenue with Quadrant Road | Not Accepted |
| RG-43 | Combine NB Loop Ramp and Slip Ramp to Merge Onto I-75 Simultaneously | Accepted |

## 6.2 Summary of Environmental Impacts of the Preferred Alternative

This environmental analysis used Geographic Information System (GIS) data as well as data from the Florida Department of Environmental Protection (FDEP), SJRWMD, SWFWMD, U.S. Fish and Wildlife Service (USFWS) and other sources described in each resource section below. The summary report from the FDOT Efficient Transportation Decision Making (ETDM) process was also consulted in evaluating potential impacts to each resource. The majority of the project area was also inspected in the field by an environmental scientist.

### 6.2.1 Future Land Use

The future land use (shown on **Figure 4-1,** Page 4-4) is designated as Commerce Districts, encompassing a mix of office, commercial, industrial, and public land uses, with nearby residential. The project is compatible with the community's development goals and is consistent with the Ocala-Marion Comprehensive Plan. Regional plans, including those of the Ocala-Marion TPO, prioritize this project to address concerns of population and employment growth in this region and increased freight/commercial vehicles associated with the Ocala-Marion County Commerce Park.

### 6.2.2 Section 4(f)

There are no public lands or other Section 4(f) resources in the project area, so no impacts are anticipated.

### 6.2.3 Cultural Resources

A Phase I cultural resource assessment survey (CRAS) was conducted which included an archaeological survey and a historic structure survey. The archaeological survey included the excavation of 63 shovel tests within the I-75 and NW 49 Street Interchange right-of-way. No archaeological sites or occurrences were identified, and no further archaeological survey is recommended.

The architectural survey resulted in the identification and evaluation of one newly recorded resource within the I-75 and NW 49 Street Interchange Area of Potential Effect (APE): 4055 NW 63 Street (8MR04310). Resource 8MR04310 lacks the architectural distinction and significant historical associations necessary to be considered for listing in the National Register of Historic Places (NRHP) and is recommended ineligible. No existing or potential historic districts were identified. Additionally, a review of the Florida Master Site File (FMSF) data indicated that one previously recorded structure (8MR01660) was located within the I-75 and NW 49 Street

Interchange APE; however, the architectural field survey confirmed that this building is no longer present within the current APE. Background research indicates the dwelling had been demolished by 1991, as shown on 1991 *Ocala West, Fla.* US Geological Survey (USGS) quadrangle map. No further architectural history survey is recommended.

The APE was subsequently expanded to accommodate additional pond sites not previously tested in the original survey. The updated archaeological survey included the excavation of 13 shovel tests, all of which were negative for cultural material. No archaeological sites or occurrences were recorded, and no further archaeological survey is recommended. Also, the architectural field reconnaissance again confirmed the absence of historic-aged buildings or structures within the APE.

The State Historic Preservation Officer (SHPO) concurred with the findings of the CRAS and CRAS Pond Addendum, on February 26, 2019 and October 22, 2020, respectively. Given the results of the CRAS, a supplemental document to this report, the proposed project will have no effect on cultural resources listed or eligible for listing in the NRHP.

### 6.2.4 Wetlands

There are no wetlands in the project corridor, so there are no anticipated short-term or long-term adverse impacts to wetlands. OSWs in the project corridor are limited to a Surface Water Collection Basin (FLUCCS 8370) west of NW 44 Avenue and small roadside ditches and swales that are part of the manmade drainage system. Several stormwater ponds and detention ponds occur on the mine property as well as the residential area west of NW 44 Avenue, but all are outside the project area.

### 6.2.5 Protected Species and Habitat

**Table 6-6** lists the federally and state listed species that were evaluated in the Natural Resources Evaluation (NRE) prepared for this study, their regulatory status, and the effect determinations under the preferred alternative. Both the U.S. Fish and Wildlife Service (USFWS) and the Florida Fish and Wildlife Conservation Commission (FWC) concurred with the effect determinations on November 19, 2020 and November 20, 2020, respectively. No federally listed species were definitively observed in the project area during field investigations. An American kestrel (Falco sparverius) was sighted in the project area in April 2018. Because of the timing of this observation, it cannot be definitively concluded if this kestrel was a member of the resident, protected sub-species (Falco sparverius paulus) or was a migrant from a non-protected Falco sparverius

population. The project is outside the core foraging areas of all known wood stork (Mycteria americana) colonies. Suitable elevations and soils for sand skinks (Neoseps reynoldsi) occur in the project area; however, coordination with USFWS concluded that potential habitat was highly isolated and relatively poor quality, so no cover-board surveys for sand skinks were required.

**Table 6-6 - Species Effect Determinations**

| Common Name | *Scientific Name* | Federal Status | State Status* | Effect Determination |
|---|---|---|---|---|
| Chapman's fringed orchid | *Platanthera chapmanii* | - | SE | No Adverse Effect Anticipated |
| Eastern indigo snake | *Drymarchon corais couperi* | FT | ST | MANLAA |
| Everglade snail kite | *Rostrhamus sociabilis plumbeus* | FE | SE | No Effect |
| Florida sandhill crane | *Grus canadensis pratensis* | - | ST | No Adverse Effect Anticipated |
| Florida scrub-jay | *Aphelocoma coerulescens* | FT | ST | No Effect |
| Gopher tortoise | *Gopherus polyphemus* | C | ST | No Adverse Effect Anticipated |
| Lewton's polygala | *Polygala lewtonii* | FE | SE | MANLAA |
| Little blue heron | *Egretta caerulea* | - | ST | No Adverse Effect Anticipated |
| Longspurred mint | *Dicerandra cornutissima* | FE | SE | MANLAA |
| Red cockaded woodpecker | *Picoides borealis* | FE | SE | No Effect |
| Pinesap | *Monotropa hypopitys* | - | SE | No Adverse Effect Anticipated |
| Sand skink | *Neoseps reynoldsi* | FT | ST | No Effect |
| Southeastern American kestrel | *Falco sparverius paulus* | - | ST | No Adverse Effect Anticipated |

Notes: FE = Federally Endangered, FT = Federally Threatened, C= Federal Candidate, ST = State-Threatened, SE = State-Endangered, * All federally listed species are also considered state listed

### 6.2.6 Essential Fish Habitat

There are no Essential Fish Habitat in the project area.

### 6.2.7 Highway Traffic Noise

Traffic noise levels were predicted for the noise-sensitive locations along the project corridor for the design year Preferred Alternative. Approximately twenty-three (23) residences in The Fountains neighborhood were identified as being sensitive to traffic noise along I-75 within the limits of this project. No non-residential or special-use noise sensitive sites were identified along the project corridor. Design year traffic noise levels at nearby residences are predicted to range from 55.0 to 63.0 dB(A). No noise-sensitive sites within the project study area are predicted to experience traffic noise levels equal to or exceeding the NAC.

None of the noise sensitive sites were predicted to experience substantial noise increases (increase of 15 dB(A) as defined by FDOT), nor approach or exceed the FHWA's Noise Abatement criteria of 67 dB(A) (for residential locations), therefore noise abatement is not required for The Fountains neighborhood.

Based on the noise analyses performed to date, there appears to be no impacted areas within the project that require abatement consideration.

### 6.2.8 Contamination

A Contamination Screening Evaluation Report (CSER) was prepared, which incorporates the requirements of the National Environmental Policy Act (NEPA) and related federal and state laws. Information was obtained for this report through interviews, observations during on-site visits and database information from the Florida Department of Environmental Protection (FDEP) and the United States Environmental Protection Agency. A total of 11 sites were identified and reviewed for potential contamination risk (see **Table 6-7 and Figure 6-5**). One site was assigned a risk rating of High, four sites were assigned a risk rating of Medium, and six sites were assigned a risk rating of Low.

Level II Contamination Assessment investigations are recommended for any areas that have proposed dewatering or subsurface work activities occurring at or adjacent to any High- or Medium-Risk sites. If dewatering will be necessary during construction, a SJRWMD/SWFWMD Water Use Permit will be required, depending on the location and results of permitting coordination. The contractor will be responsible for any dewatering permits if required. A dewatering plan may be necessary to avoid potential contamination plume exacerbation. A SJRWMD/SWFWMD Environmental Resource Permit (ERP) is also anticipated. Additional coordination with SJRWMD, SWFWMD, and FDEP may be possible to simplify Water Use and

ERP permitting under a single entity. All permits will be obtained in accordance with Federal, State, and local laws and regulations and in coordination with the District Contamination Impact Coordinator.

**Table 6-7 - Contamination Site Information**

| Site # | Facility Name | Parcel Numbers | Address/ Location | Facility ID (FDEP/RCRA) | Databases | Concern | Approximate Distance to Project | Risk Rating |
|---|---|---|---|---|---|---|---|---|
| 1 | Thermo King of Ocala, Inc. | 13531-0- | 6015 NW 44 Ave | None | None | Refrigerants, petroleum products | Co-located | Low |
| 2 | Quick King #16 | 13535-3- | 5882 NW 44 Ave | 8511206 | STCM | Fuel, petroleum products | 1,000+ feet | Medium |
| 3 | All in Removal | 13530-0- | 5877 NW 44 Ave | 9814828 | STCM | Storage Tank | Co-located | Medium |
| 4 | Scorpion Performance and Anodize, Inc. | 13538-2- | 5817 NW 44 Ave | None | None | Cleaners, Solvents | Co-located | Low |
| 5 | Hickory Springs Manufacturing Company | 13538-002-01 | 5407 NW 44 Ave | FLR 000 112 649 | Hazardous Waste | Storage Tank | Co-located | High |
| 6 | Hydro Spa LLC (Quality Bedding) | 13538-002-00 | 5345 NW 44 Ave | FLD 982 107 229 | Hazardous Waste | Storage Tank | Co-located | Medium |
| 7 | NW 49 Street Storage Field | 13539-001-00 | North of NW 49 St | None | None | Storage of unidentified objects | Co-located | Low |
| 8 | AgroConsolida-ted, LLC | 13689-001-00 | 4134 SW 47th Ct | None | None | 55 Gallon Drums | Co-located | Low |
| 9 | Voyager Inc. (Barracuda Truck and RV Storage) | 13689-000-00 | 4707 NW 44 Ave | FLD 984 184 226 | Hazardous Waste | Petroleum products | Co-located | Low |
| 10 | Baldwin Angus Ranch | 13462-000-00, 13495-000-00 | 3660 NW 56th St | 8511217, 8737114 | STCM | Storage tanks, used motor oil, fertilizers, herbicides, pesticides, anhydrous ammonia, diesel fuel, unleaded fuel | Co-located | Medium |

| Site # | Facility Name | Parcel Numbers | Address/ Location | Facility ID (FDEP/RCRA) | Databases | Concern | Approximate Distance to Project | Risk Rating |
|---|---|---|---|---|---|---|---|---|
| 11 | Magnum Materials Mine and Borrow Pits | 13715-000-00, 13698-000-00 | 3669-3711 NW 27th Ave | None | None | Mining waste water, petroleum products | Co-located | Low |

## Figure 6-5 - Potentially Contaminated Sites