1 Executive Summary

1.1 Introduction

This Interchange Justification Report (IJR) is being conducted on behalf of the Florida Department of Transportation (FDOT) as part of the *I-75 at NW 49th Street Project Development & Environment (PD&E) Study* for a new interchange on Interstate 75 (I-75) along the proposed extension of NW 49th Street in Marion County, Florida. This IJR follows a previously approved IJR completed in 2016 on behalf of Marion County. The 2016 IJR evaluated the No Build and Urban Diamond Interchange alternatives. This new IJR is being developed as part of the *I-75 at NW 49th Street PD&E Study* which updates the traffic forecasting and evaluates additional alternatives. **Figure 1-1** shows the project location and Area of Influence (AOI). The proposed interchange is needed to support the economic viability of the Ocala 489, a 489 acre industrial and commercial development, and contiguous commerce district/employment center. This commerce park 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; adding a projected 25,000+ daily trips to the roadway network upon full-buildout, 12%, or 3,000 vehicles of which are projected to be trucks.

1.2 Project Purpose and Need

The purpose of a new I-75 interchange at NW 49th/35th Street is to provide relief to the congestion and operational deficiencies at both existing contiguous I-75 interchanges, by providing an alternate access to I-75 for the projected increase in truck volumes resulting from the future commerce district. The need for an interchange at I-75 and NW 49th Street can be summarized into four (4) different discussion areas:

- ***Economic Viability and Job Creation:*** The proposed interchange is needed to support the economic viability of the Ocala 489, 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.
- ***Improve Interstate and Regional Mobility:*** The proposed interchange is needed to provide a more direct and efficient access to I-75 thus facilitating interstate and regional mobility. In particular, the interchange is needed to serve the “long haul” trips associated

with the Ocala 489. From a regional perspective, Marion County is approximately midway between Miami and Atlanta and occupies a strategic location due to its relative proximity to other important metropolitan areas. The proposed interchange is thus needed to support the efficient movements of goods.

- ***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 develop an east-west corridor parallel to US 27 and SR 326.
- ***Accommodate Future Traffic Growth:*** The proposed interchange is needed to accommodate projected future year traffic volumes. Marion County has experienced a significant and sustained growth in population since 1970. It is projected 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 growth, traffic volumes are increasing and will continue to increase in the future.

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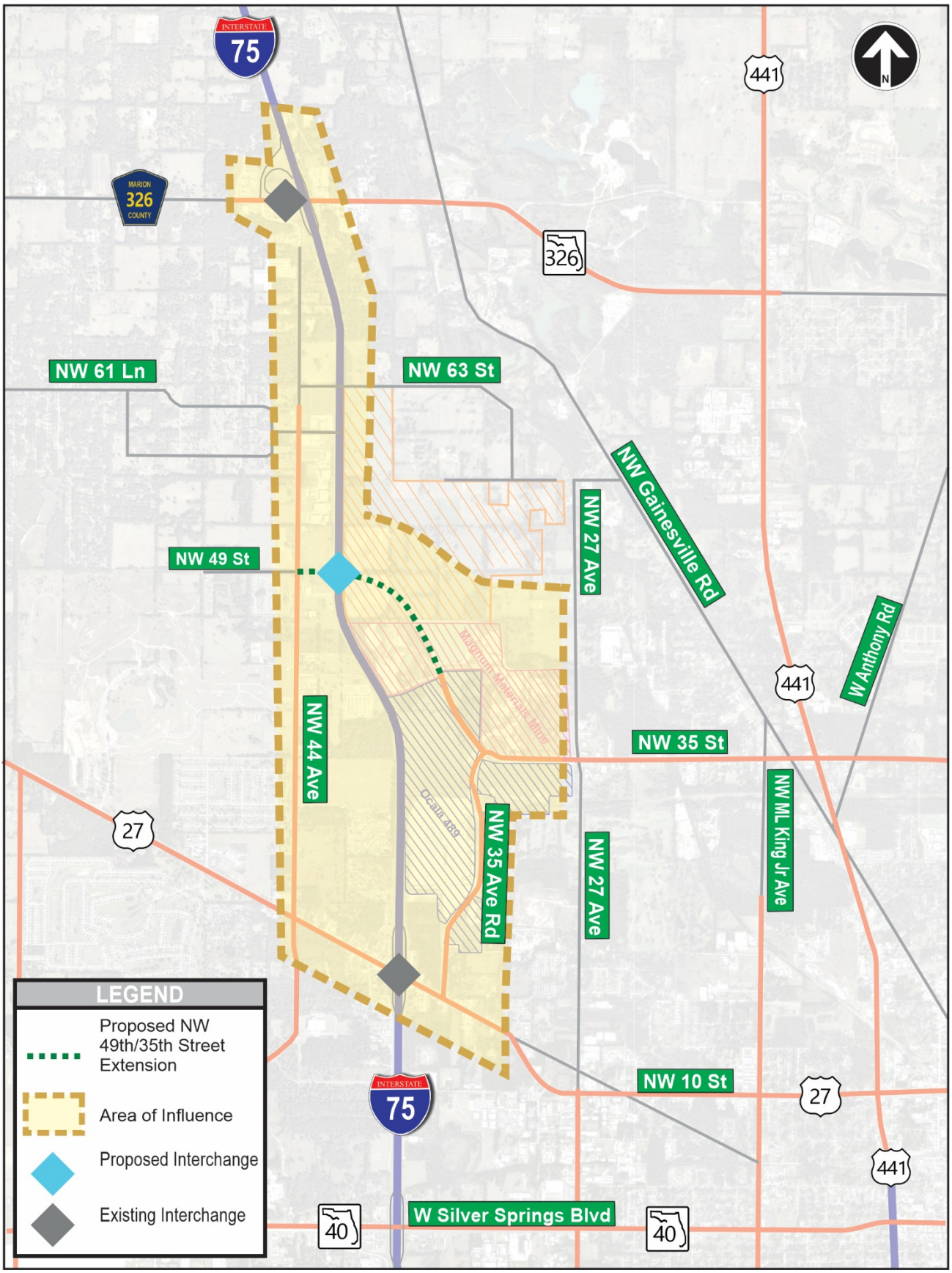

Figure 1-1: Project Location and Area of Influence

1.3 Qualifying Provisions

Via a Programmatic Agreement between the Federal Highway Administration (FHWA) and FDOT, the I-75 at NW 49th Street IJR will be reviewed for approval by FDOT. Per the Methodology Letter of Understanding (MLOU) along with the MLOU Amendment, and consistent with the 2020 *FDOT Interchange Access Request User's Guide (IARUG),* this document follows the two FHWA policy requirements. Therefore, the following specific evaluation criteria, termed FHWA's Policy Requirements, serve as the basis for review and approval of the proposed project as documented in the 2020 IARUG.

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

A traffic operational analysis was conducted as part of this study. The analysis was performed for the AM and PM peak hours using the methodologies documented in the Highway Capacity Manual (HCM) 2010 as applied using the Highway Capacity Software (HCS) 6.8, SYNCHRO 10 and Vissim 2020.00-07.

The operational analysis provided a performance evaluation for each individual element within the system (for example freeway segments, freeway ramp junctions, crossroad ramp terminals and other crossroad intersections). The analysis indicated that the proposed Diverging Diamond

Interchange (DDI) is the recommended alternative and is not projected to have a significant adverse impact on operations along the I-75 mainline system or the existing adjacent interchanges within the study limits.

Figures 1-2 and **1-3** present the segmented breakdown of the I-75 mainline and interchange ramps under the No Build and DDI alternatives; along with the summarized results for the 2045 AM segment and merge/diverge analysis. The differences between No Build and the DDI alternatives are as follow:

- **2045 AM Northbound:**
  - *No Build conditions*
    - I-75 south of US 27 including the off-ramp diverge operates at Level of Services (LOS) F and the basic segment between US 27 and SR 326, operates at LOS E.
  - *Build conditions*
    - Similar to No Build, I-75 south of US 27 operates at LOS F.
    - Shifts in travel patterns reflect the use of I-75 as a by-pass between US 27 and NW 49th Street. Under No Build, for segment densities that are close to the LOS D maximum threshold of 35 pc/mi/ln; the shift in traffic from improved connectivity corresponds to a minimal density increase resulting in LOS E segments under Build.
    - North of US 27 interchange, through the NW 49th Street interchange LOS are the same or better than under No Build.
    - SR 326 diverge segment, the minimal increase in density is at the 35 pc/mi/ln LOS D target threshold.
- **2045 AM Southbound:**
  - *No Build conditions*
    - I-75 south of US 27 including the on-ramp merge operates at LOS E.
  - *Build conditions*
    - I-75 at the US 27 on-ramp merge condition; the traffic pattern shift from improved connectivity creates a slight increase in density where the LOS E threshold is exceeded.
    - All remaining locations meet the LOS D target.

Figures 1-4 and **1-5** present the 2045 PM segment and merge/diverge analysis results for the No Build and DDI alternatives. Along with the directional peak change, the shifts in travel patterns, reflecting decreases and increases in traffic are similar to those observed for the AM.

Figure 1-2: No Build 2045 AM I-75 Segment & Merge/Diverge Analysis Summary

	2045 AM No Build												
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)	57.4	55.4	69.1	65.9	67.5	64.2	69.8	64.3	73.9	68.4	72.0	
	Level of Service	E	E	C	D	D	C	C	C	B	D	C	
	Density (pc/mi/ln)	39.4	36.6	25.0	28.4	27.1	25.9	24.2	23.8	17.8	28.2	21.1	
	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	5,496	1,297	4,199	216	4,415	330	4,085	901	3,184	529	3,713	
	Interchange			US 27						SR 326			
I-75 Northbound	Volumes	6,200	1,204	4,996	244	5,240	1,239	4,001		772	4,773		
	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)	48.4	60.8	62.7	61.1	60.0	62.6	70.3		62.2	64.9		
	Level of Service	F	F	D	D	E	D	C		D	D		
	Density (pc/mi/ln)	52.7	40.8	32.8	31.2	36.1	34.1	23.5		30.3	30.1		

Figure 1-3: DDI Alternative 2045 AM I-75 Segment & Merge/Diverge Analysis Summary

	DDI 2045 AM															
I-75 Southbound	Distance (ft)		1,500	3,168	1,500	3,676	1,500	7,530	1,500	2,307	1,500	380	1,500	1,815	1,500	
	Accel/Decel Lanes (ft)		800	N/A	616		1,010	N/A	580		1,073	N/A	1,500	N/A	268	
	Speed (mph)	53.4	53.4	63.5	64.8	61.0	59.5	66.9	64.5	64.9	63.2	69.0	63.1	73.7	67.9	72.1
	LOS	E	F	D	D	D	D	C	D	D	C	C	C	C	C	C
	Density (pc/mi/ln)	44.9	37.8	30.6	31.6	34.1	31.5	25.7	29.4	28.7	26.4	25.2	24.7	18.2	27.9	20.9
	Segment Type	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Merge	Basic	Diverge	Basic
	Truck%	11.0	14.0	11.0	6.0	12.0	12.0	12.0	12.0	12.0	23.0	12.0	23.0	12.0	23.0	10.0
														Loop		
	Volumes	5,825	1,092	4,733	306	5,039	883	4,156	351	4,507	307	4,200	959	3,241	442	3,683
	Interchange			US 27				NW 49 Street						SR 326		
I-75 Northbound	Volumes	6,501	1,043	5,458	335	5,793	746	5,047	415	5,462	1,250	4,212		726	4,938	
	Truck%	11.0	14.0	11.0	6.0	12.0	12.0	12.0	12.0	12.0	23.0	12.0		23.0	10.0	
	Segment Type	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic		Merge	Basic	
	Distance (ft)		1,500	3,029	1,500	1,585	1,500	10,173	1,500	1,900	1,500	2,809		1,500		
	Accel/Decel Lanes (ft)		671	N/A	847	3,247	491	N/A	1,057	3,172	671	N/A		941		
	Speed (mph)	44.8	60.5	57.3	56.4	53.5	63.3	60.9	54.7	57.0	62.0	68.9		61.1	63.5	
	LOS	F	F	E	E	E	E	D	E	E	E	C		D	D	
	Density (pc/mi/ln)	59.7	44.0	39.2	35.9	44.8	38.4	34.3	36.0	39.6	35.0	25.3		30.9	31.8	

Figure 1-4: No Build 2045 PM I-75 Segment & Merge/Diverge Analysis Summary

	2045 PM No Build												
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)	47.1	46.2	62.5	65.6	60.0	61.3	63.2	60.9	70.2	68.2	66.6	
	Level of Service	F	F	D	D	E	D	D	D	C	D	D	
	Density (pc/mi/ln)	54.9	41.1	33.0	32.3	36.0	30.7	32.1	28.8	23.6	32.8	28.1	
	Segment Type	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Merge	Basic	Diverge	Basic	
	Truck%	11.0	14.0	11.0	6.0	12.0	23.0	12.0	23.0	12.0	23.0	10.0	
										Loop			
	Volumes	6,290	1,276	5,014	220	5,234	320	4,914	906	4,008	567	4,575	
	Interchange			US 27						SR 326			
I-75 Northbound	Volumes	5,413	1,265	4,148	265	4,413	1,326	3,087		750	3,837		
	Truck%	11.0	14.0	11.0	6.0	12.0	23.0	12.0		23.0	10.0		
	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)	58.4	61.1	69.5	63.7	67.5	62.1	74.2		65.1	71.4		
	Level of Service	E	D	C	C	D	D	B		C	C		
	Density (pc/mi/ln)	38.1	34.6	24.6	26.5	27.0	30.6	17.2		24.8	22.0		

Figure 1-5: DDI Alternative 2045 PM I-75 Segment & Merge/Diverge Analysis Summary

	DDI 2045 PM														
I-75 Southbound	Distance (ft)		1,500	3,168	1,500	3,676	1,500	7,530	1,500	2,307	1,500	380	1,500	1,815	1,500	
	Accel/Decel Lanes (ft)		800	N/A	616		1,010	N/A	580		1,073	N/A	1,500	N/A	268	
	Speed (mph)	43.0	42.9	57.4	64.3	53.6	55.4	61.0	64.0	57.2	59.6	60.9	58.7	69.1	67.5	65.6
	LOS	F	F	E	E	E	E	D	D	E	D	D	D	C	D	D
	Density (pc/mi/ln)	63.3	42.3	39.1	37.1	44.6	35.4	34.1	33.9	39.4	31.9	35.0	30.4	25.0	33.2	29.3
	Segment Type	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Merge	Basic	Diverge	Basic
	Truck%	11.0	14.0	11.0	6.0	12.0	12.0	12.0	12.0	12.0	23.0	12.0	23.0	12.0	23.0	10.0
														Loop		
	Volumes	6,626	1,175	5,451	330	5,781	746	5,035	415	5,450	299	5,151	967	4,184	506	4,690
	Interchange		US 27					NW 49 Street						SR 326		
I-75 Northbound	Volumes	5,796	1,110	4,686	346	5,032	883	4,149	351	4,500	1,340	3,160		707	3,867	
	Truck%	11.0	14.0	11.0	6.0	12.0	12.0	12.0	12.0	12.0	23.0	12.0		23.0	10.0	
	Segment Type	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic		Merge	Basic	
	Distance (ft)		1,500	3,029	1,500	1,585	1,500	10,173	1,500	1,900	1,500	2,809		1,500		
	Accel/Decel Lanes (ft)		671	N/A	847	3,247	491	N/A	1,057	3,172	671	N/A		941		
	Speed (mph)	53.7	60.9	63.9	60.2	61.0	63.2	66.9	46.2	64.9	62.1	74.0		64.3	71.2	
	LOS	E	E	D	D	D	D	C	E	D	D	B		C	C	
	Density (pc/mi/ln)	44.4	36.5	30.2	32.0	34.1	33.7	25.6	38.8	28.6	31.0	17.7		24.8	22.2	

The differences between the No Build and DDI alternatives under 2045 PM are as follow:

- **2045 PM Northbound:**
  - *No Build conditions*
    - I-75 mainline segment south of US 27 operates at LOS E.
    - All remaining locations meet the LOS D target.
  - *Build conditions*
    - For the US 27 off-ramp diverge; shift in travel pattern from improved connectivity corresponds to a minimal increase in density where the LOS D target threshold is exceeded at LOS E.
    - The NW 49th Street on-ramp merge operates at LOS E; both adjacent mainline segments meet the LOS D target.
    - Remaining northbound segments meet the LOS D target.
- **2045 PM Southbound:**
  - *No Build conditions*
    - I-75 on-ramp merge from US 27 and adjacent mainline segment operate at LOS F.
    - I-75 segment between US 27 and SR 326 operates at LOS E.
  - *Build conditions*
    - I-75 off-ramp diverge to US 27 and adjacent mainline segment, the ramp volume increase from improved connectivity creates a minor increase in density resulting in LOS E.
    - Remaining southbound segments operate similar to No Build conditions.

As shown in the No Build segment and merge/diverge analysis results, the segments of I-75 between US 27 and SR 326 do not meet the LOS D target in year 2045 and are anticipated to operate at LOS E during either the AM or PM peak hours. The proposed interchange along NW 49th Street is projected to meet the LOS D target; however, similar No Build I-75 segment operations (segments operating at LOS E) are also projected under build conditions. Therefore, a year of failure analysis was performed for the DDI alternative where I-75 segments reach LOS E in 2045. The analysis was conducted by interpolating volumes between years 2035 and 2045; then entering the volume for each year into HCS, until LOS E results were reached. Analysis results are summarized as follow:

- **AM Northbound:**
  - I-75 mainline segment south of US 27 - 2035

- I-75 mainline segment between US 27 and NW 49th Street – 2037
- NW 49th Street off-ramp diverge condition – 2041
- NW 49th Street on-ramp merge condition – 2044
- I-75 mainline segment between NW 49th Street and SR 326 – 2041

○ **PM Southbound:**

- I-75 south of US 27 - 2035
- I-75 mainline segment between SR 326 and NW 49th Street – 2041
- NW 49th Street on-ramp merge condition – 2045
- I-75 mainline segment between NW 49th Street and US 27 – 2037

Based on the year of failure analysis, additional I-75 mainline improvements may be required in order for I-75 to meet the LOS D target through design year. The analysis also shows that the proposed DDI at the NW 49th Street interchange will not have a significant adverse impact on operations along the I-75 mainline system or the existing adjacent interchanges within the study limits, when compared to No Build conditions; therefore, meeting this FHWA policy requirement. To address identified mainline deficiencies, the District is looking into potential improvements via separate projects or other methods such as the I-75 PD&E Study (FM Number 443623-1-22-01 & 443624-1-22-01) to improve overall operations on the I-75 mainline. The results and recommendations of this IJR will be shared with the I-75 PD&E Study team and District Traffic Operations group.

Table 1-1 presents the 2045 No Build and DDI alternative intersection delay and LOS during the AM and PM peak hours. Under No Build conditions, none of the signalized intersections meet the LOS D target except for the intersection of I-75 northbound ramps at US 27; however, the northbound off-ramp approach fails.

For Build conditions, the only signalized intersections within the AOI operating at the LOS D Target or better are the US 27 northbound ramps and the SR 326 northbound ramps intersections. The shift in traffic patterns from improved connectivity is expected to reduce total ramp volumes at both existing interchanges (US 27 and SR 326) by approximately 1,000 vehicles per day under the build condition. Although not meeting the LOS D Target for some intersections, during the AM peak hour, all intersection delays are reduced when compared to No Build conditions. During the PM peak hour, delays are decreased at all but three intersections. The difference in overall intersection delay, compared to No Build is not significant at the three intersections.

Table 1-1: 2045 No Build & DDI Alternative Intersection Delay and LOS

#	Intersection	DIR	No Build								Build DDI							
			AM				PM				AM				PM			
			App.		Int.		App.		Int.		App.		Int.		App.		Int.	
			Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS
1	NW 44 Ave at US 27	EB	151.8	F	89.5	F	54.3	D	105.1	F	111.1	F	70.5	E	39.0	D	111.1	F
		WB	34.4	C			153.7	F			33.0	C			171.5	F		
		NB	64.2	E			66.2	E			49.7	D			60.4	E		
		SB	51.5	D			50.5	D			45.9	D			48.3	D		
2	I-75 SB at US 27	EB	142.4	F	108.3	F	77.5	E	68.8	E	90.5	F	57.6	E	62.2	E	58.5	E
		WB	73.3	E			63.7	E			21.4	C			53.7	D		
		SB	59.6	E			59.2	E			50.7	D			97.9	F		
3	I-75 NB at US 27	EB	6.7	A	25.4	C	1.2	A	46.2	D	2.2	A	15.5	B	1.5	A	39.6	D
		WB	21.8	C			36.3	D			19.4	B			45.4	D		
		NB	60.8	E			119.6	F			33.7	C			77.3	E		
4	NW 35 Ave Rd at US 27	EB	66.5	E	125.6	F	101.1	F	199.2	F	49.0	D	112.7	F	99.6	F	218.1	F
		WB	69.0	E			178.3	F			60.6	E			193.5	F		
		NB	57.4	E			54.8	D			55.0	E			55.0	D		
		SB	415.1	F			463.0	F			397.8	F			517.8	F		
5	NW 44 Ave at NW 49 ST	EB	61.6	E	96.8	F	64.7	E	88.4	F	43.0	D	30.1	C	42.6	D	28.4	C
		WB	81.6	F			159.6	F			36.1	D			33.2	C		
		NB	208.6	F			64.9	E			25.0	C			21.8	C		
		SB	37.7	D			25.3	C			27.2	C			27.2	C		
6	NW 44 Ave/ I-75 SB Off at SR 326	EB	22.7	C	68.6	E	25.6	C	74.2	E	15.8	B	19.4	B	19.8	B	24.9	C
		WB	47.6	D			43.2	D			15.9	B			20.5	C		
		NB	111.5	F			145.5	F			28.3	C			32.7	C		
		SB	116.3	F			96.8	F			24.2	C			31.5	C		
7	I-75 SB On-Ramp (Loop) at SR 326 *Unsignalized*	EB	0.0	A	10.4	B	0.0	A	1.5	A	0.0	A	4.4	A	0.0	A	1.2	A
		WB	17.1	C			2.2	A			6.5	A			1.5	A		
		NB	15	C			14.7	B			13.6	B			12.6	B		
8	I-75 NB Off/ I75 NB On at SR 326[1]	EB	45.7	D	418.3	F	95.7	F	332.0	F	13.9	B	365.7	F	57.8	E	367.2	F
		WB	329.8	F			395.6	F			251.1	F			431.3	F		
		NB	851.8	F			409.4	F			774.4	F			431.2	F		
9	I75 SB at NW 49 ST[1]	SBR									21.4	C	18.2	B	20.8	C	17.3	B
		SBL									34.8	C			28.3	C		
		EBT									18.2	B			9.9	A		
		WBT									13.8	B			18.4	B		
10	I75 NB at NW 49 ST[1]	NBL									32.4	C	20.5	B	30.1	C	19.3	B
		NBR									16.3	B			19.3	B		
		EBT									13.6	B			7.3	A		
		WBT									18.6	B			20.2	C		

[1]LOS results based on HCM 2000 methodology; [2]Delay in sec/veh

Table 1-2 summarizes the network performance from the Vissim analysis. All performance measures show improvement under the DDI alternative compared to No Build. Network statistic improvements are as follow:

- **AM Peak**
  - Total Delay: Reduced by 37%
  - Total Stops: Reduced by 47%
  - Average Speed: Increased by 3 mph
  - Vehicles Arrived: Increased by 1,188 vehicles
  - Vehicle-Miles Traveled: Increase by 15,464 miles
  - Latent Delay: Reduced by 387 hours
  - Latent Demand: Reduced by 1,697 hours
- **PM Peak**
  - Total Delay: Reduced by 15%
  - Total Stops: Reduced by 25%
  - Average Speed: Increased by 2 mph
  - Vehicles Arrived: Increased by 1,466 vehicles
  - Vehicle-Miles Traveled: Increase by 16,387 miles
  - Latent Delay: Reduced by 51 hours
  - Latent Demand: Reduced by 217 hours

Table 1-2 2045 Vissim Network Performance Summary

Peak Hour	15-min Period	No Build							DDI						
		Total Delay (Hours)	Total Stops	Average Speed (mph)	Vehicles Arrived (Vehicles)	Vehicle-Miles Traveled	Latent Delay (Hours)	Latent Demand (Vehicles)	Total Delay (Hours)	Total Stops	Average Speed (mph)	Vehicles Arrived (Vehicles)	Vehicle-Miles Traveled	Latent Delay (Hours)	Latent Demand (Vehicles)
AM	1	21	1,980	58	2,854	13,513	0	0	24	2,152	56	2,874	14,262	0	0
	2	33	3,034	56	3,558	16,829	0	0	36	3,142	55	3,565	17,796	0	0
	3	43	3,981	55	4,048	18,965	0	1	46	4,026	54	4,081	19,997	0	1
	4	53	5,095	54	4,283	20,027	0	1	53	4,666	54	4,359	21,230	0	1
	5	**93**	**9,964**	**50**	**4,667**	**22,275**	**0**	**3**	**83**	**7,802**	**51**	**4,746**	**23,652**	**1**	**5**
	6	**165**	**18,817**	**44**	**4,878**	**22,897**	**9**	**97**	**127**	**13,118**	**47**	**5,087**	**24,632**	**3**	**19**
	7	**215**	**24,529**	**40**	**4,832**	**22,799**	**47**	**293**	**166**	**17,774**	**44**	**5,032**	**24,507**	**14**	**109**
	8	**211**	**23,218**	**39**	**4,694**	**21,326**	**75**	**326**	**160**	**17,568**	**43**	**4,797**	**22,682**	**22**	**89**
	9	187	20,770	40	4,496	20,691	84	347	133	14,654	45	4,602	22,012	21	79
	10	182	20,154	41	4,507	20,757	91	382	116	12,211	47	4,630	22,262	19	74
	11	178	19,332	42	4,574	21,335	100	403	106	10,502	48	4,692	22,650	19	76
	12	176	20,012	41	4,393	19,981	97	357	89	8,646	49	4,507	21,177	17	60
	Total[1]	**1,557**	**170,886**	**46**	**51,784**	**241,395**	**503**	**2,210**	**1,139**	**116,261**	**49**	**52,972**	**256,859**	**116**	**513**
PM	1	78	6,781	51	4,465	20,171	0	2	85	6,904	50	4,545	21,429	1	9
	2	88	7,486	49	4,428	19,854	4	20	89	6,701	49	4,553	21,113	7	29
	3	113	9,992	47	4,572	21,238	12	73	108	8,479	48	4,672	22,600	21	127
	4	137	12,609	45	4,739	21,598	37	183	123	9,860	47	4,892	23,030	50	239
	5	158	16,407	43	4,748	21,700	67	330	135	11,555	46	4,870	23,210	79	374
	6	175	17,801	42	4,724	21,355	105	474	146	13,453	44	4,901	22,797	112	499
	7	198	20,597	41	4,759	22,182	151	717	160	15,527	44	4,911	23,637	153	702
	8	221	24,377	39	4,839	22,198	217	971	184	19,593	42	4,985	23,932	206	902
	9	236	26,684	38	4,797	21,984	275	1,199	211	23,172	40	4,912	23,441	255	1,110
	10	222	25,246	38	4,620	20,428	316	1,282	191	21,240	40	4,794	21,733	293	1,190
	11	176	19,134	40	4,429	19,423	327	1,310	144	14,620	43	4,504	20,576	302	1,201
	12	134	13,881	43	4,152	18,122	326	1,255	106	9,755	46	4,199	19,142	307	1,217
	Total[1]	**1,936**	**200,995**	**43**	**55,272**	**250,253**	**1,837**	**7,816**	**1,682**	**160,859**	**45**	**56,738**	**266,640**	**1,786**	**7,599**

[1]Average Speed results based on the weighted average with Arrived Vehicles

A predictive crash analysis was conducted to compare predicted crashes of the No Build and the five Build alternatives. The analysis was conducted for future conditions utilizing the predictive methods set forth in the Highway Safety Manual (HSM) Parts C and D. A summary of the predicted number of annual crashes for the project site (interchange alternatives) is provided in **Table 1-3** and for the AOI in **Table 1-4**. The predicted number of annual crashes for the interchange alternatives range from 96.3 crashes per year for the DDI alternative, the best in regard to safety; to 108.0 crashes per year for the Diamond alternative, ranking the worst. In addition, the project AOI shows a net reduction in total crashes from 321.9 crashes under No Build to 317.2 crashes under Build conditions. It should be noted that compared to No Build, Build Annual Average Daily Traffic (AADT) values are higher; which inherently increases predicted crashes, even when the same scenario is maintained.

Table 1-3: Project Site Predicted 2045 Annual Crashes

Location	DIAMOND			SPUI			ParClo SE			ParClo NE			DDI		
	FI	PDO	Total	FI	PDO	Total	FI	PDO	Total	FI	PDO	Total	FI	PDO	Total
I-75 (N of US 27 to NW 49th Street to S of SR 326)	19.4	48.5	**67.8**	19.8	49.9	**69.7**	17.6	44.3	**61.8**	18.5	46.8	**65.3**	19.4	48.5	**67.8**
I-75 & NW 49th Street Interchange[1]	11.9	25.3	**37.2**	8.0	22.2	**30.1**	12.9	26.6	**39.5**	10.2	19.2	**29.4**	8.0	17.5	**25.5**
NW 49th Street, NW 44th Avenue to I-75	0.1	0.2	**0.3**	0.1	0.3	**0.4**	0.1	0.2	**0.3**	0.1	0.2	**0.3**	0.1	0.2	**0.3**
NW 49th Street, East of I-75	0.2	0.5	**0.7**	0.2	0.5	**0.7**	0.2	0.5	**0.7**	0.2	0.5	**0.7**	0.2	0.5	**0.7**
NW 44th Avenue at NW 49th Street	0.7	1.3	**2.0**	0.7	1.3	**2.0**	0.7	1.3	**2.0**	0.6	1.3	**1.9**	0.7	1.3	**2.0**
TOTALS	**32.2**	**75.8**	**108.0**	**28.7**	**74.2**	**102.9**	**31.4**	**72.9**	**104.3**	**29.6**	**68.1**	**97.7**	28.3	68.1	**96.3**

[1]*Merge/Diverge/Ramps/Ramp Termini*

Table 1-4: AOI Cumulative Predicted 2045 Annual Crash Summary

Location	FI	PDO	NO BUILD	FI	PDO	BUILD
I-75 (S of US 27-N Ramps & S Ramps-N of SR 326)	18.5	48.1	**66.6**	19.4	51.0	**70.3**
I-75 & US 27 Interchange[1]	28.2	39.9	**68.0**	27.1	38.4	**65.5**
I-75 & SR 326 Interchange[1]	41.2	76.6	**117.7**	40.2	77.4	**117.7**
US 27 (Arterial & Intersections)	13.5	28.4	**41.8**	12.8	27.0	**39.8**
SR 326 (Arterial & Intersections)	4.7	12.0	**16.7**	4.6	11.8	**16.4**
NW 44th Avenue AOI (N & S of NW 49th St)	3.0	8.0	**11.0**	2.0	5.4	**7.4**
TOTALS	**109.0**	**212.9**	**321.9**	**106.1**	**211.0**	**317.2**

[1]*Merge/Diverge/Ramps/Ramp Termini*

The proposed interchange ramp gores would be located at a minimum of 0.87 miles away from the US 27 ramp gores and a minimum of 0.90 miles away from the SR 326 ramp gores; and do not create weaving segments.

2. *The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).*

The new interchange will be designed to meet or exceed current FDOT Design Standards and will serve all traffic movements. The interchange will connect to the extension of NW 49th Street. This roadway project is currently under design, with funding for construction in 2024/25; it will conform to FDOT Design Standards and will be a public roadway.

Marion County and the City of Ocala have already constructed public roadways that will facilitate access to the proposed interchange. Specifically, the four-laning of NW 35th Street from US 441 (North Pine Avenue) to NW 35th Avenue Road and the four-lane construction of NW 35th Avenue Road north from US 27 (NW Blitchton Road) to intersect with the NW 35th Street project.

1.4 Summary Request

As discussed previously, the recommended DDI alternative meets FHWA's Two Policy Requirements. Based on the analysis presented in this document, approval is requested of a new interchange to be located at I-75 and the planned extension of NW 49th Street, as part of a PD&E Study. The I-75 and NW 49th Street interchange is currently listed as the number one (1) priority project on the Ocala/Marion Transportation Planning Organization (TPO) adopted Fiscal Year (FY) 2025 Priority Projects. In addition, the PD&E Study and Preliminary Design for this project are included in the current FDOT Five Year (2021 - 2025) Work Program in Years prior to 2020, 2020 and 2023, respectively; presented in more detail in Sections 2 and 9.

The DDI alternative provides the highest performing operations and lowest predicted number of crashes when compared to the other Build alternatives. In terms of environmental, socio-economic, cost, and other engineering factors, the DDI alternative ranked first in the alternative evaluation matrix. Based on the aforementioned, the DDI alternative is the recommended interchange configuration for I-75 at NW 49th Street. Recommended storage lengths are provided in **Table 1-5**. It should be noted that recommended storage lengths do not include deceleration and taper lengths. Additional storage is also suggested to accommodate the heavy truck traffic that is anticipated at the proposed interchange to support the industrial/commercial Ocala 489 commerce park.

For maximum operational efficiency, it is recommended to integrate the proposed interchange into the surrounding existing and planned Transportation Systems Management & Operations (TSM&O) network as identified in the Marion County TSM&O Master Plan and the FDOT F.R.A.M.E. project (FM Number 440900-1). In addition to inclusion of the recommended interchange into the TSM&O network, the recommended DDI alternative is also being designed to accommodate future improvements should the need arise. Finally, based on the year of failure analysis, additional I-75 mainline improvements may be required in order for I-75 to meet the LOS D target through design year. As previously mentioned, the District is looking into potential improvements to the I-75 mainline via separate projects or other methods such as the I-75 PD&E Study (FM Number 443623-1-22-01 & 443624-1-22-01) to improve overall operations on the I-75 mainline. The results and recommendations of this IJR will be shared with the I-75 PD&E Study team and District Traffic Operations group.

Table 1-5: 2045 Recommended Turn Lane Storage Lengths

Interchange	Ramps	Movement	Turn Bay Length[1] (ft)	95th Percentile Queue Length[2] (ft)		Vissim Max Queue Length (ft)		Recommended Storage Length[3] (ft)
				AM	PM	AM	PM	
DDI	I-75 NB	WBR	250	40	37	4	0	50
		NBL	-	0	0	228	256	275
	I-75 SB	EBR	300	24	13	201	265	275
		SBL	-	0	0	166	207	225

[1] *Turn Bay Length used in traffic analysis; Turn Bay Length = Storage + Deceleration + Taper Lengths*

[2] *Queue length from Synchro Analysis*

[3] *Recommended Storage Length does not include Deceleration+ Taper Lengths.*