McIntosh Road

From South of US 92 to North of I-4

Project Development & Environment (PD&E) Study

2nd Draft, Preliminary Engineering Report

McIntosh Road from South of US 92 to North of I-4 PD&E Study

Hillsborough County, Florida

Work Program Item Segment Number 447157-1

ETDM Project Number 14469

Federal Aid Project Number D721-007-B

Hillsborough County, Florida

Florida Department of Transportation

District Seven

In cooperation with

Hillsborough County, Public Works Department

September 2024

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. §327 and a Memorandum of Understanding dated May 26, 2022, and executed by Federal Highway Administration and FDOT.

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Hillsborough County, Florida

Prepared for:

Florida Department of Transportation

District Seven

Prepared by:
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September 2024

PROFESSIONAL ENGINEER CERTIFICATION
PRELIMINARY ENGINEERING REPORT

Project: McIntosh Road from South of US 92 to North of I-4

ETDM Number: 14469

Financial Project ID: 447157-1-52-01

Federal Aid Project Number: D721-007-B

This *Preliminary Engineering Report* contains engineering information that fulfills the purpose and need for the McIntosh Road Project Development & Environment Study from South of US 92 to North of I-4 in Hillsborough 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 CDM Smith, Inc., and that I have prepared or approved the evaluation, findings, opinions, conclusions, or technical advice for this project.

This item has been digitally signed and sealed by Mohit Garg, P.E. Number 74928 on the date adjacent to the seal.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Mohit Garg, PE
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1.0 PROJECT SUMMARY

The Florida Department of Transportation (FDOT) District Seven, in coordination with Hillsborough County, is conducting a Project Development and Environment (PD&E) study for McIntosh Road from south of US 92/State Road (SR) 600 to north of Interstate 4 (I-4)/SR 400, in Hillsborough County, as shown in **Figure 1-1** Project Location Map. The objective of the PD&E study is to assist the FDOT Office of Environmental Management (OEM) in reaching a decision on the type, location, and conceptual design of the necessary improvements to fulfill the purpose and need for the project and accommodate projected future traffic while providing accessibility and connectivity within the study area. This study documents a no build alternative, the need for improvements, and the procedures utilized to develop and evaluate various improvement alternatives, including elements such as proposed typical sections, preliminary roadway alignments, and intersection enhancements.

The PD&E study satisfies all applicable requirements, including the National Environmental Policy Act (NEPA), to qualify for federal-aid funding of subsequent development phases (design, right-of-way acquisition, and construction). This project was screened through the FDOT's Efficient Transportation Decision Making (ETDM) process as ETDM Project Number 14469. The ETDM Programming Screening Summary Report was published on October 15, 2021, containing comments from the Environmental Technical Advisory Team (ETAT) on the project's effects on various natural, physical, and social resources. A Type 2 Categorical Exclusion is the class of action for this PD&E study.

1.1 Project Description

The proposed project improvements include widening McIntosh Road from south of US 92 to north of I-4 in Hillsborough County for approximately 1.03 miles. McIntosh Road is a two-lane undivided rural roadway and is classified as a major collector under Hillsborough County's jurisdiction, except for the influence area of the I-4 interchange where FDOT maintains jurisdiction. Within the project limits McIntosh Road has unpaved flush shoulders and open drainage with a school zone in the southern portion. The proposed project improvements include widening McIntosh Road to a four-lane divided urban typical section with curb and gutter, two (2) 11-foot wide travel lanes in each direction, a 22-foot wide median and a 10-foot wide shared use path on both sides. The proposed project includes adding turn lanes to the existing I-4 ramps, which merge into the existing ramp lanes before reaching the I-4 mainline. The limits of the ramp improvement tie into to existing projects at this interchange (FPID 446133-1, 441084-1 and 443319-1). The improvements also include converting the unsignalized intersection at Gore and Muck Pond Road to a widened signalized intersection. Muck Pond Road will be reconstructed with an additional turn lane while Gore Road will tie-in with the McIntosh Road improvements. Improvements included in the No-Build Alternative at US 92 are included in FPID 447158-1. The proposed project design speed is 35 miles per hour (mph) and the context classification is C3C – Suburban Commercial.

1.2 Purpose & Need

1.2.1 Purpose

The purpose of this project is to address projected capacity needs as well as to improve safety conditions to McIntosh Road within the project area.

1.2.2 Need

The project is needed to improve capacity, safety, and system linkage to address a failing LOS, high number of crashes exceeding statewide averages for similar facilities, and a high volume of truck traffic.

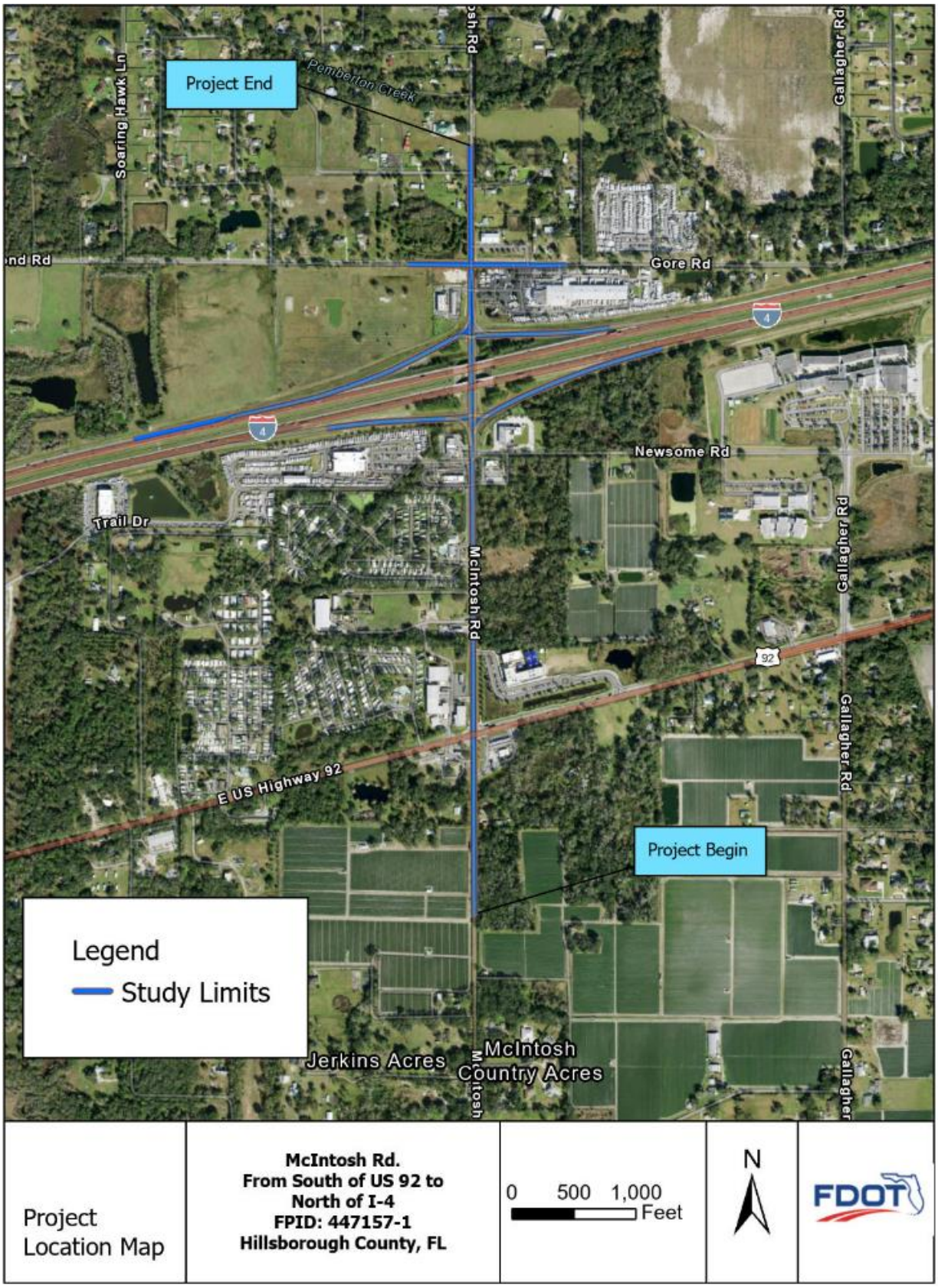


Figure 1-1 Project Location Map

1.2.3 Project Status

This project is not currently listed as a candidate for funding in the Hillsborough Transportation Planning Organization (TPO) Fiscal Year (FY) 2024/25 - 2028/29 Transportation Improvement Program (TIP). However, the project does is included the Federal Obligations section of the TIP. The project is not listed in the Cost Feasible Plan of the Hillsborough County TPO's 2045 Long Range Transportation Plan (LRTP).

1.2.4 Roadway Capacity

McIntosh Road is currently operating at Level of Service (F) based on 2020 Annual Average Daily Traffic (AADT) and is forecasted to continue to operate at LOS F in 2045 without any capacity or operational improvements. The Existing Year (2020) and the Design Year (2045) AADTs for McIntosh Road is 21,000 and 34,500, respectively, exceeding the 17,700 AADT LOS D for two-lane undivided arterials with a 40 mph posted speed limit when compared to Table 1 of the 2020 FDOT Generalized Table.

1.2.5 Safety

Crash data can be found in **Section 2.15**. The historic average crash rate (10.23) for this segment of McIntosh Road is considerably higher than the statewide average (0.69) for similar facility types. This high comparative crash rate is likely due to the on- and off-ramps for I-4 which intersect McIntosh Road along the project segment, creating multiple conflict points for vehicles entering and exiting the project area. There are also multiple merge areas within the vicinity of these ramps.

1.3 Commitments

- To avoid impacts to the eastern indigo snake, the most recent version of the USFWS Standard Protection Measures for the Eastern Indigo Snake will be utilized during site preparation and construction. If more than 25 gopher tortoise burrows, active or inactive, are identified to be impacted by the project, the FDOT will initiate ESA Section 7 consultation with the USFWS. All gopher tortoise burrows, active or inactive, will be evacuated prior to site manipulation in the vicinity of the burrow. If an indigo snake is encountered, the snake must be allowed to vacate the area prior to additional site manipulation in the vicinity. If excavating potentially occupied burrows, the excavation method should minimize the potential for injury of an indigo snake. Holes, cavities, and snake refugia other than gopher tortoise burrows will be inspected each morning before planned site manipulation of a particular area, and, if occupied by an indigo snake, no work shall commence until the snake has vacated the vicinity of the proposed work.

- Seasonal surveys for the Florida spiny-pod, pinescrub (scrub) bluestem, pygmy fringe-tree, redmargin (Simpson's) zephyrlily, sand butterfly-pea, scrub (nodding) pinweed, swamp plume polypody, Tampa mock vervain, and toothed lattice-vein fern will be performed during the design phase and coordination with USFWSFDACS-DPI will occur if impacts to listed plant species are anticipated.

Additional project commitments will be finalized and included following the public hearing.

1.4 Alternatives Analysis Summary

1.4.1 Other Adjacent Projects

Under FPID 443319-1 a proposed improvement to the I-4 interchange at McIntosh Road, which includes widening McIntosh Road and creating additional left turn storage to both Westbound (WB) and Eastbound (EB) I-4, began construction in February 2024.

Under FPID 447158-1 proposed improvements to the US 92 interchange at McIntosh Road includes widening US 92 to a four-lane divided highway with additional through lanes and turn lanes as well as crosswalk revisions. The design phase is underway.

Under FPID 446133-1 a proposed improvement to I-4 WB Auxiliary Lane from east of the Weigh Station to west of McIntosh Road includes adding an auxiliary lane to WB I-4 from east of the Weigh Station to west of McIntosh Road in Hillsborough County. The design phase is underway. Construction is funded in FDOT's five-year work program for FY 2028.

1.4.2 Alternatives Considered

Two (2) alternatives were explored within the project study area: One (1) No-Build Alternative and one (1) Build Alternative. The No-Build Alternative was analyzed and did not meet the purpose and need criteria especially for traffic and safety. The Build Alternative includes widening McIntosh Road from two- to four-lanes through the study area, improving intersection capacity by adding or extending dedicated turn lanes at all intersections and I-4 ramps, and adding shared use path on both sides of McIntosh Road. This Build Alternative is predicted to improve traffic conditions during the peak hour for the corridor to LOS E and D for Northbound (NB) and Southbound (SB), respectively. The Build Alternative is expected to improve the intersection LOS from F to B and C for the signalized ramp intersections, while the US 92 intersection is expected to improve from LOS E to LOS D.

The Build Alternative is expected to impact 3.69 acres of existing wetlands and surface waters (inclusive of pond sites), 2.06 acres of which is currently man-made surface water. No impacts to essential fish habitats are anticipated, and no adverse impacts to threatened or endangered species are anticipated. There are three (3) and two (2) potential residential and business relocations, respectively.

A TSM&O Alternative alone is not considered a viable alternative as McIntosh Road would not meet the LOS target unless it is widened to four-lanes. The Build Alternative is the preferred alternative as it meets the purpose and need of the project by providing additional capacity and is predicted to improve traffic conditions to non-failing levels with minimal environmental impacts and Right-of-Way (ROW) impacts (44.43 acres).

1.4.3 Description of Preferred Alternative

The Preferred Alternative identified within the project study area is described below and shown in **Figure 1-2**.

The preferred alternative along McIntosh Road consists of a four-lane urban curb and gutter facility within 140-foot wide of ROW with a 35 mph design speed. There will be two (2) 11-foot wide travel lanes in each direction separated by a 22-foot wide raised median. A 10-foot wide shared use path is included in each direction. **Figure 1-2** shows the proposed typical section along McIntosh Road.

The preferred alternative includes ramp improvements at I-4 which tie into existing projects (FPID 446133-1, 441084-1 and 443319-1). The limits of the proposed improvements at the EB and WB ramps are from McIntosh Road to the gore areas of I-4, no changes are proposed on the I-4 mainline. The proposed improvements consist of adding turn lanes to each ramp which merge into the existing ramp lanes. Ramp improvements consist of one-way 12-foot wide travel lanes with a 12-foot wide outside shoulder (10-foot paved) and an 8-foot wide inside shoulder (4-foot paved). The EB and WB on-ramps are proposed to be two-lane, flush-shoulder ramps within a variable width (61-foot minimum) limited access ROW. The EB and WB off-ramps are proposed to be three-lane ramps within a limited access ROW that varies in width (51-foot minimum).

The conceptual plans for the Preferred Alternative are included in **Appendix A**.

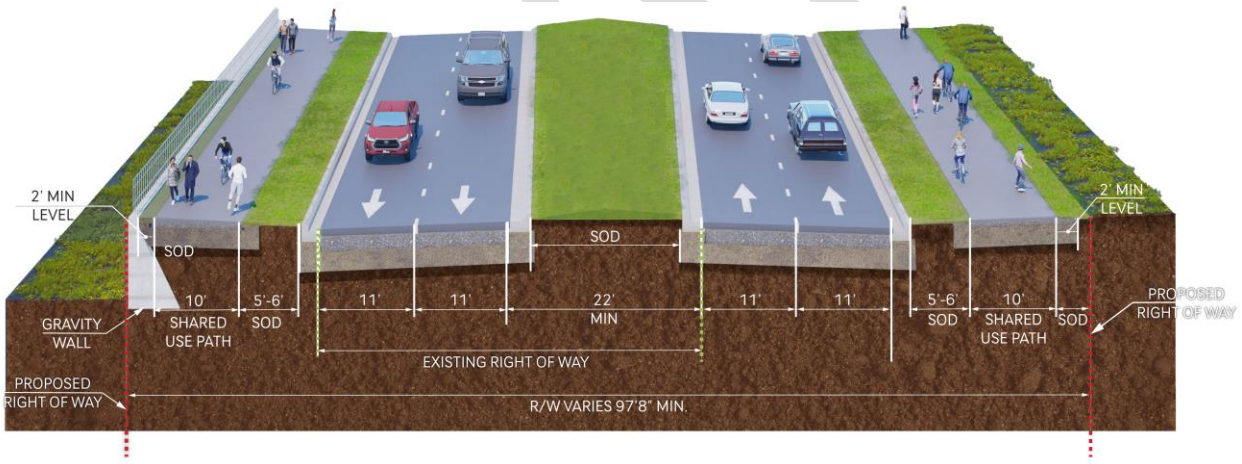


Figure 1-2 Proposed McIntosh Road Typical Section

1.5 List of Technical Documents

Public Involvement Items

- Public Involvement Plan (February 2024)
- Public Hearing Transcript (will be prepared after Public Hearing)
- Public Hearing Scrapbook (will be prepared after Public Hearing)
- Comments and Coordination Report (which includes Public Hearing Transcript, will be prepared after Public Hearing)

Engineering Items

- Project Traffic Analysis Report (August 2023)
- 2nd Draft Preliminary Engineering Report
- Draft Pond Siting Report (September 2024)
- Draft Utility Assessment Memo (September 2024)
- Draft Typical Section Package (June 2024)

Environmental Items

- ETDM Programming Screen Summary Report (October 2021)
- Draft Type 2 Categorical Exclusion (August 2024)
- Draft Noise Study Report (August 2024)
- Draft Contamination Screening Evaluation Report (July 2024)
- Draft Natural Resource Evaluation (September 2024)
- Cultural Resource Assessment Survey (July 2024)
- Draft Cultural Resource Assessment Technical Memorandum Preferred Stormwater Management Facilities (SMF) and Floodplain Compensation (FPC) Sites (July 2024)
- Draft Water Quality Impact Evaluation Checklist (July 2024)
- Draft Location Hydraulics Report (September 2024)

2.0 EXISTING CONDITIONS

2.1 Typical Section

McIntosh Road is a two-lane undivided local rural roadway with 10- to 11-foot wide travel lanes and 2- to 5-foot wide unpaved flush shoulders. There are no bicycle lanes, and the existing sidewalk segments are non-continuous. The existing roadway typical section is provided in **Figure 2-1.**

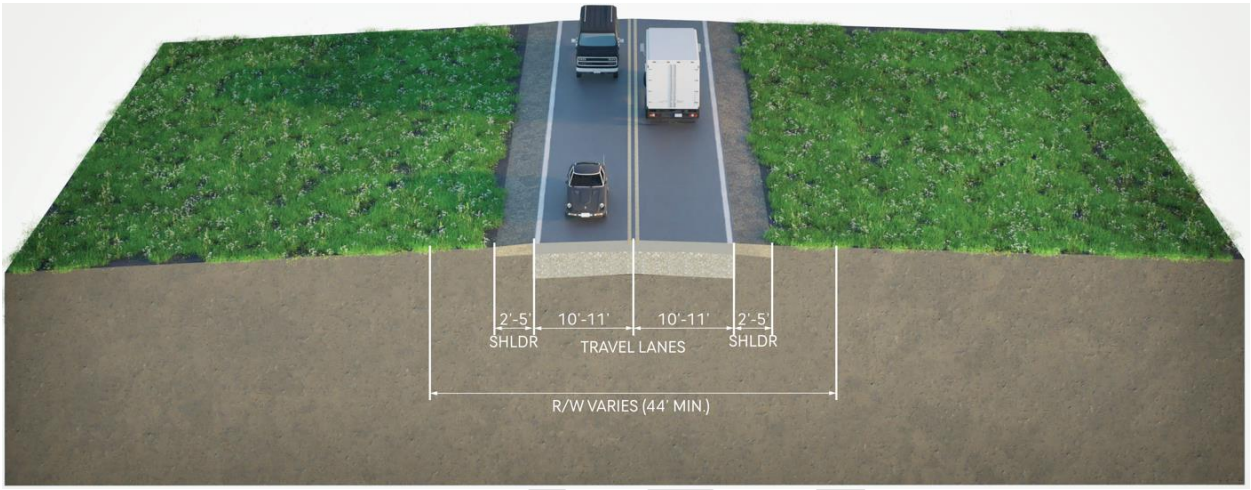


Figure 2-1 Existing Roadway Typical Section

2.2 Roadway & Context Classification

While the Hillsborough County Context Classification map, see **Figure 2-2**, indicates a C1/C2 Rural context classification, within the study area, per the FDOT Context Classification Determination Memorandum, McIntosh Road has a C3C Suburban commercial context classification. This FDOT Memo may be found in **Appendix C**.

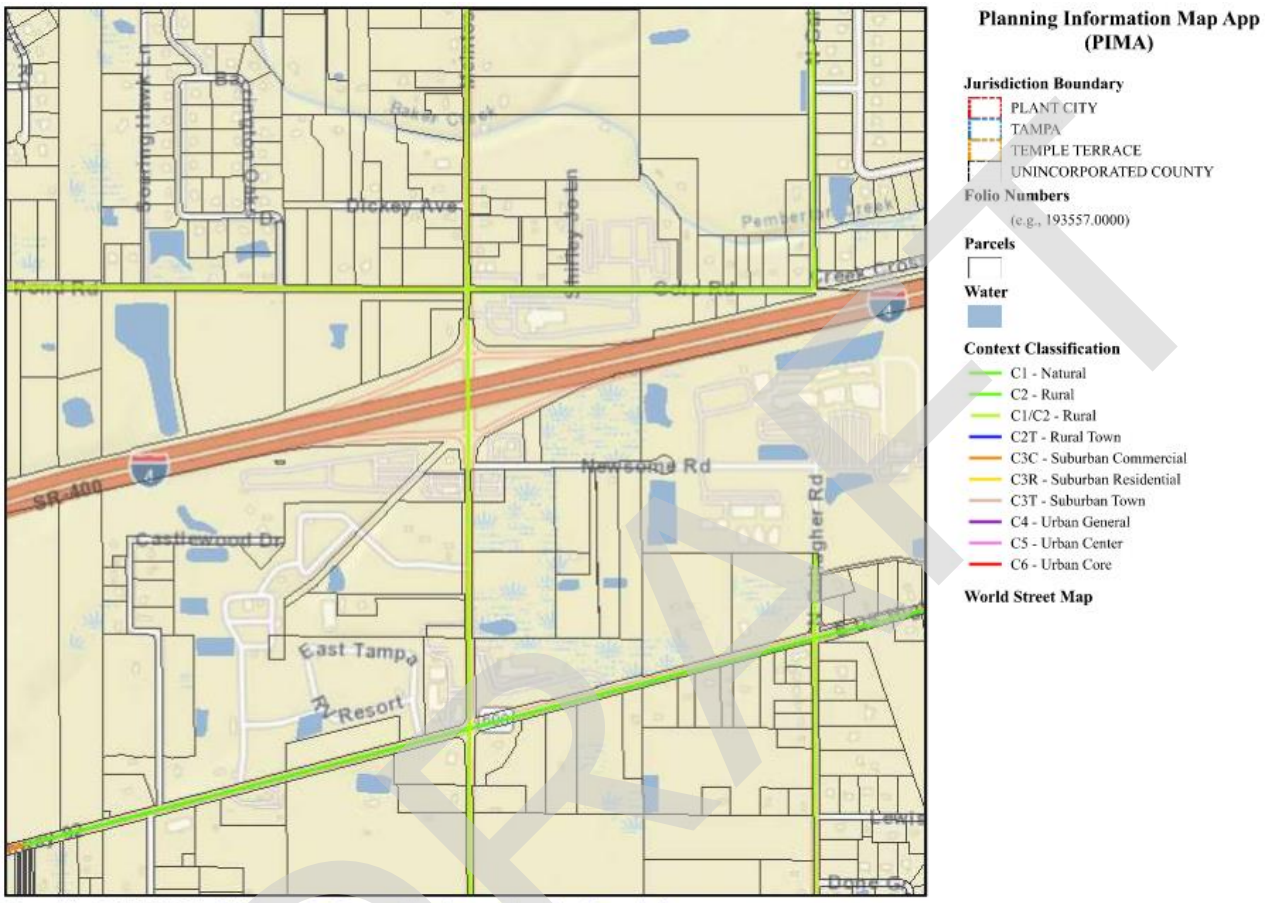


Figure 2-2 Hillsborough County Context Classification Map

The functional classification is Major Collector. The I-4 ramps are part of the I-4 limited access facility, which is in turn part of the United States Interstate Highway System. McIntosh Road is a county roadway and is not part of the Strategic Intermodal System. This segment of McIntosh Road supports area connectivity and provides a connection between US 92 and I-4, which are both Florida Division of Emergency Management (FDEM) designated evacuation routes (see **Figure 2-3**) that have high volumes of truck traffic. US 92 is major east-west facility that spans the entire state and provides relief for I-4, a Strategic Intermodal System facility, during major incidents. US 92 is also an important freight route and exhibits high volumes of trucks.

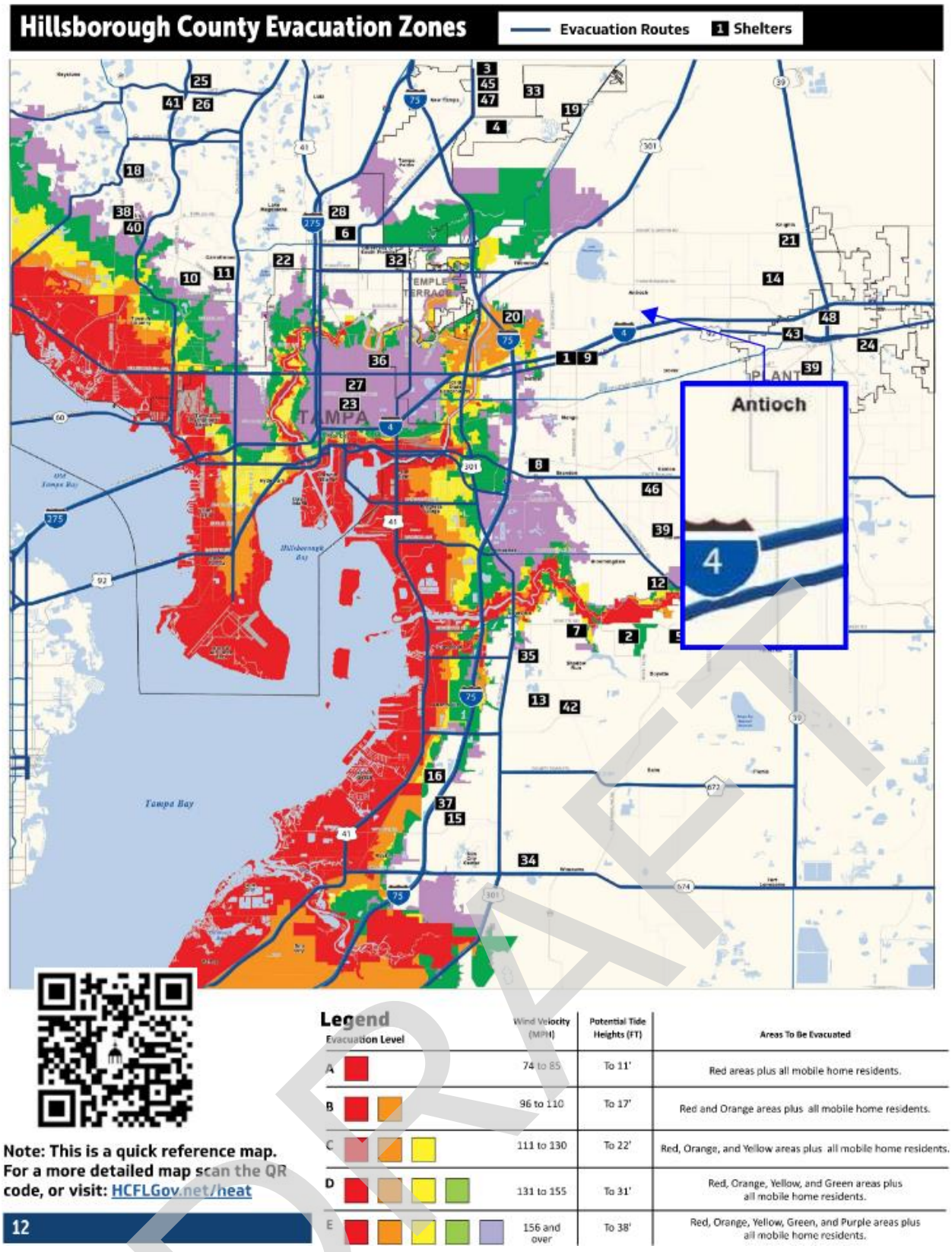


Figure 2-3 Hillsborough County Emergency Evacuation Routes

2.3 Access Management Classification

The Access management classification for McIntosh Road is 5 – Restrictive with 440-foot connection spacing. The I-4 ramps are classified as 1 – Freeway. This classification was made in consultation with Hillsborough County and the FDOT.

2.4 Right-of-Way

The existing ROW along McIntosh Road varies. At its narrowest, the ROW is 44-feet wide, but this widens out to more than 70-feet closer to the I-4 interchange. The concept plans (refer to **Appendix A**) show the existing ROW throughout the project limits with a green line.

2.5 Adjacent Land Use

The existing land use map for Hillsborough County within the project area is shown in **Figure 2-4**. Land uses are primarily commercial at either end of the corridor, with more intense commercial development near I-4. Residential lands are located along the project on the west side, north of Muck Pond Road and south of US 92. East of the corridor there are vacant lands and farmlands, with a charter school location in the northeast quadrant of the US 92 interchange.

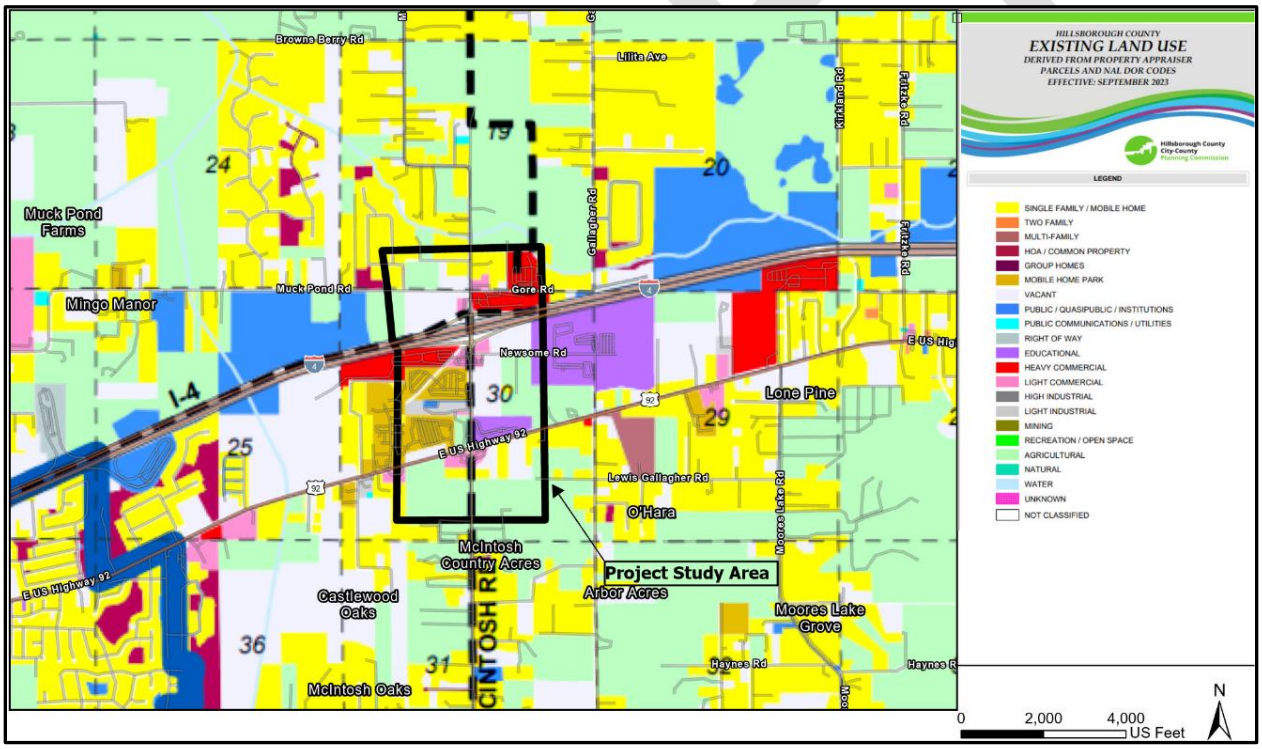


Figure 2-4 Existing Land Use Map

2.6 Pavement Condition

Pavement Condition Index scores were acquired from Hillsborough County and are summarized in **Table 2-1**.

Table 2-1 Pavement Condition Index Summary

Branch ID	Section ID	From Street	To Street	Surface[1]	Lanes	True Area (SqFt)	Last Inspection (Date)	PCI
13538.00 (McIntosh Road)	15808	McIntosh-I4 W Ramp	Gore Road	AAC (Asphalt Overlaid on Existing Asphalt)	2	4,947	9/25/2023	75
13538.00 (McIntosh Road)	15811	I4 E-McIntosh Ramp	McIntosh-I4 W Ramp	AAC	2	46,412	9/25/2023	88
13538.00 (McIntosh Road)	15812	Newsome Road	I4 E-McIntosh Ramp	AAC	2	1,545	9/25/2023	91

2.7 Design and Posted Speeds

The posted and design speed along the corridor is 45 mph from the southern terminus to US 92. From US 92 to the northern terminus the posted and design speed is 40 mph.

2.8 Horizontal Alignment

Existing horizontal geometry (roadway baseline) was obtained through survey data. Within the study area, McIntosh Road heads near due-north with minor deflection points. There are no horizontal curves within the study area. Points of inflection between tangencies are located at stationings 23+47.22, 36+91.47, 50+16.39 and 63+40.39.

2.9 Vertical Alignment

Utilizing the extracted survey information along the baseline of the existing roadway, a "best fit" profile was created to document the existing vertical alignment for evaluation along McIntosh Road. The existing profile is relatively flat with no significant vertical curves.

2.10 Multi-Modal Facilities

2.10.1 Pedestrian Accommodations

There are non-continuous lengths of 5-foot wide sidewalks within the study area. The US 92 intersection features crosswalks and connectivity to a sidewalk extending along US 92. From there, a sidewalk extends north on the east side of McIntosh Road for roughly 600-feet before terminating in a dead end at the north end of the Independence Academy parcel. A second stretch of sidewalk begins at Tampa East RV Community and extends along the west ROW line before terminating across from Newsome Road. A third section extends along the Burger King frontage south of Newsome Road North of the I-4 Interchange, a length of sidewalk begins 130-feet south of Gore Road and continues 400-feet north along the east side of McIntosh Road.

2.10.2 Bicycle Facilities

There are no bicycle facilities within the study area.

2.10.3 Transit Facilities

There are no transit facilities within the study area.

2.11 Intersection Layout and Traffic Control

The primary intersections within the study area are:

1. McIntosh Road and US 92 (Signalized)
2. McIntosh Road and Newsome Road (Stop Controlled)
3. McIntosh Road and I-4 EB ramps (Signalized)
4. McIntosh Road and I-4 WB ramps (Signalized)
5. McIntosh Road and Muck Pond/Gore Road (Stop Controlled)

The existing lane geometry for each of the study intersections is shown in **Figure 2-5**.

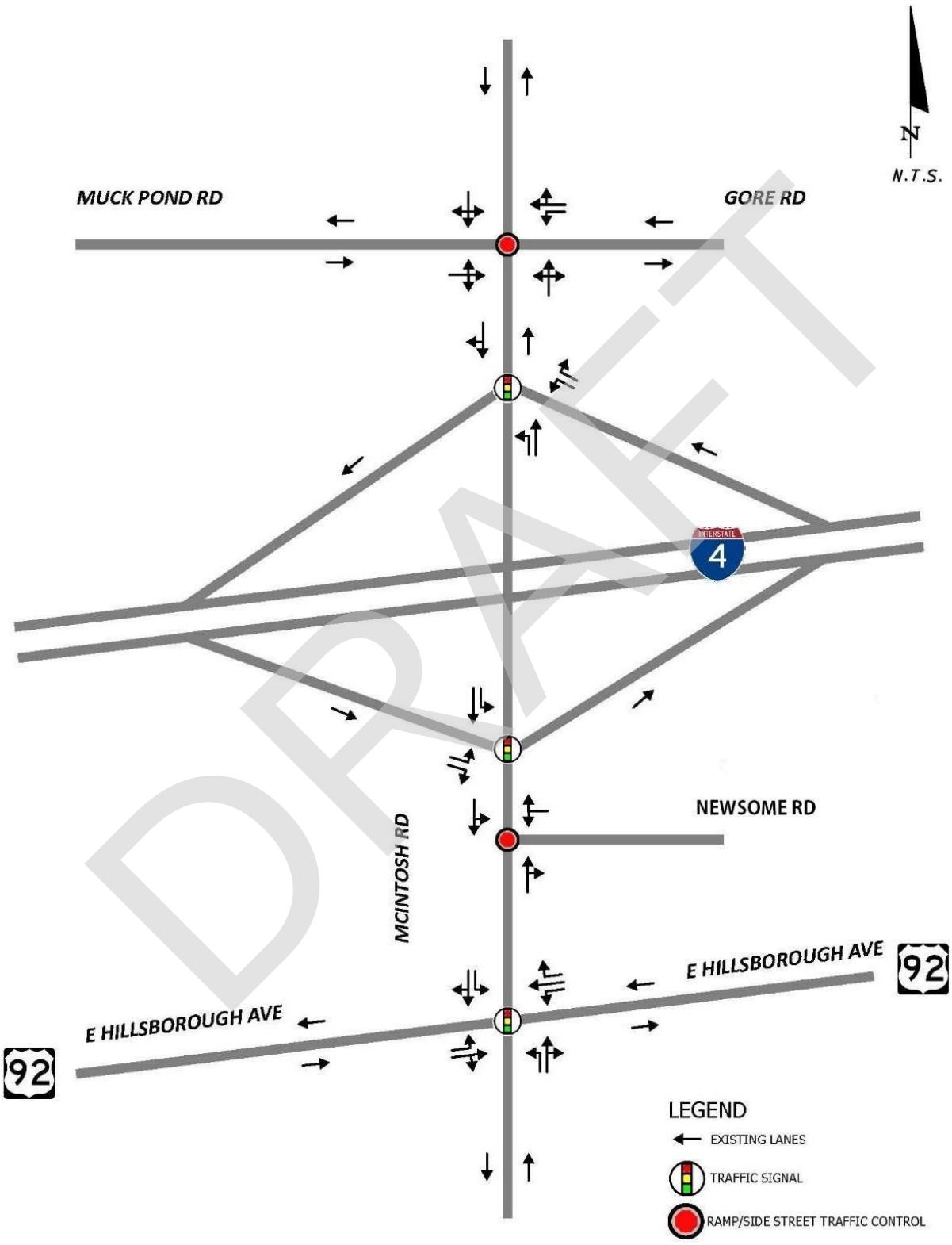


Figure 2-5 Existing Intersection Geometry

2.12 Existing Median Openings

As McIntosh Road is an undivided roadway, there are no existing median openings within the project area.

2.13 Traffic Volumes and Operational Conditions

The information in this section has been summarized from the project's PTAR.

2.13.1 Annual Average Daily Traffic (AADT) Volumes

The Existing Year (2020) AADT volumes are shown graphically in **Figure 2-6**.

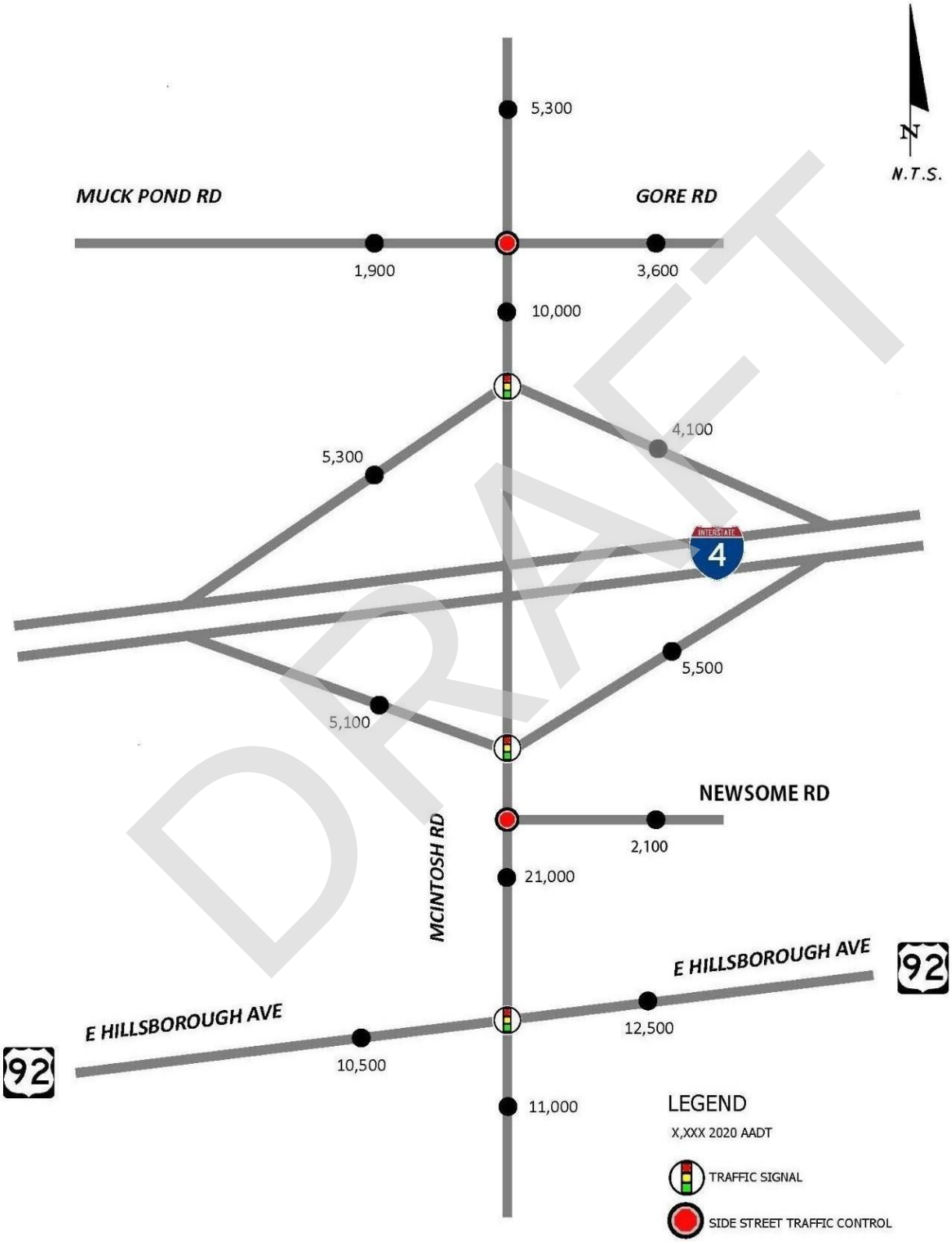


Figure 2-6 Existing Year (2020) AADT Volumes

2.13.2 Traffic Factors

The K and D factors are the percentage of daily traffic volumes occurring during the peak hour and the proportion of traffic traveling in the peak direction, respectively. A Standard K factor of 9.0% and a D factor of 57% were used in this study. A D-factor of 74% was used on McIntosh Road north of Muck Pond Road/Gore Road for the AM peak hour based on the turning movement counts.

Design Hour Trucks (DHT) is the percentage of daily truck traffic during the design hour. A DHT of 5.0% was used in the report based on historical truck percentage at the I-4 ramps. These traffic factors were taken from the approved I-4 at McIntosh Road Non-Interchange Access Request (Non-IAR).

2.13.3 Turning Movement Volumes

The K and D factors were applied to the 2020 AADTs to obtain the directional design hour volumes (DDHVs). The intersection turning volumes were determined by applying turning movement percentages derived from existing Turning Movement Counts (TMCs) to the segment DDHVs. Once the segment DDHVs and intersection turning movements were calculated, the existing design hour traffic volumes were subsequently adjusted and balanced through the system.

The AM and PM turning movement counts collected for Newsome Road were directly applied to network and the turning movements at the NB approach of the I-4 EB ramps intersection and I-4 WB ramps intersection were adjusted slightly to maintain balance in the network since there is no access or driveways between Newsome Road and the I-4 ramp terminals intersections. The existing year 2020 AM and PM peak hours turning movement volumes are shown in **Figure 2-7**.

2.13.4 Existing (2020) Operational Analysis

There are three (3) signalized intersections and two (2) unsignalized intersections along McIntosh Road within the study area. An analysis of the existing signalized intersections was performed using existing signal phasing/timing information obtained from Hillsborough County. The intersections operations were analyzed using Synchro version 11.1 and the Highway Capacity Manual (HCM), 6th Edition and the results are summarized in **Tables 2-2** and **2-3**. A target LOS of D is established for the study area. The key measures of effectiveness are 95th percentile queue length and delay for overall intersection and individual movements.

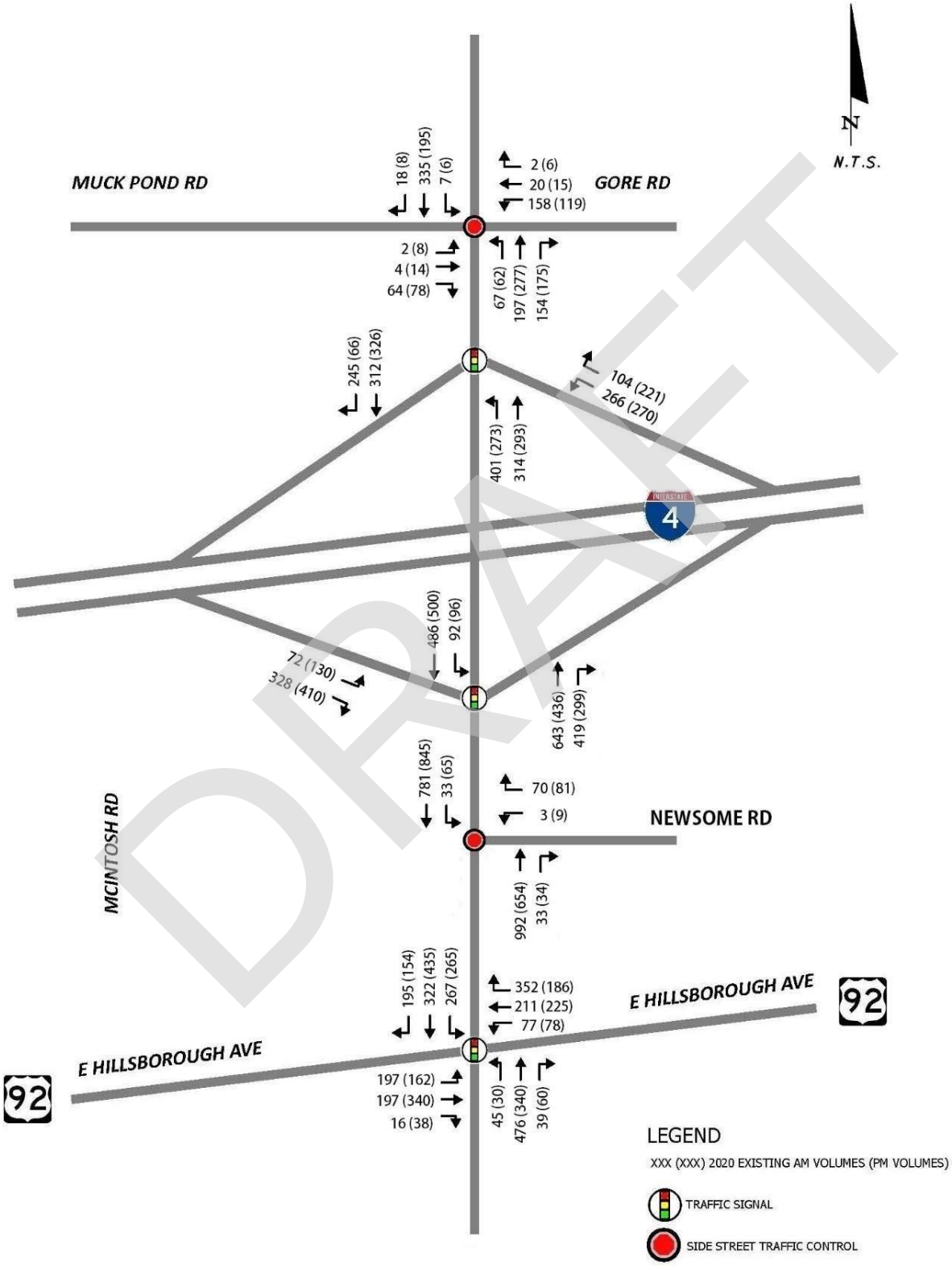


Figure 2-7 Existing Year (2020) Turning Movement Volumes

Table 2-2 Existing Year (2020) Intersection Delay and LOS Results

Approach	Movement	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Approach LOS	Delay (sec)	LOS	Approach LOS
Intersection: McIntosh Road at Muck Pond Road/Gore Road*							
Eastbound	Left/Thru/Right	12	B	B	12.6	B	B
Westbound	Left	54	F	E	34.2	D	D
	Thru/Right	18.2	C		15.4	C	
Northbound	Left	8.3	A		7.8	A	
Southbound	Left	8.1	A		8.4	A	
Intersection: McIntosh Road at I-4 WB Ramps**							
Westbound	Left	57.8	E	E	32.8	C	C
Northbound	Left	30.4	C	B	14.5	B	B
	Through	6.5	A		7.2	A	
Southbound	Thru/Right	32.3	C	C	23.1	C	C
		Intersection	**30.9**	**C**	**Intersection**	**19.5**	**B**
Intersection: McIntosh Road at I-4 EB Ramps**							
Eastbound	Left	71.7	E	E	45.8	D	D
Northbound	Thru/Right	32.9	C	C	16.0	B	B
Southbound	Left	27.4	C	A	12.3	B	A
	Through	2.8	A		4.7	A	
		Intersection	**25.7**	**C**	**Intersection**	**14.5**	**B**
Intersection McIntosh Road at Newsome Road*							
Westbound	Left/Right	28.1	D	D	23.1	C	C
Southbound	Left	11.1	B		9.6	A	
Intersection: McIntosh Road at US 92							
Eastbound	Left	39.8	D	D	30.0	C	D
	Thru/Right	42.2	D		48.5	D	
Westbound	Left	39.4	D	D	32.4	C	C
	Through	49.1	D		38.5	D	
	Right	40.6	D		25.9	C	
Northbound	Left	40.0	D	E	35.4	D	D
	Thru/Right	58.9	E		41.4	D	
Southbound	Left	58.2	E	D	35.0	C	C
	Thru/Right	26.4	C		23.8	C	
		Intersection	**44.2**	**D**	**Intersection**	**34.6**	**C**

*Per HCM 6th Edition: For Two Way Stop Control (TWSC) intersections only minor movements delay and LOS are reported. HCM 6th Edition does not calculate LOS for major street thru movements and approached or for the intersection as a whole.

**HCM 6th Edition does not include unsignalized delay on approach delay and intersection delay calculations.

The NB right turn movement at the I-4 EB ramp terminal intersection and the SB right turn movement at the I-4 WB ramp terminal intersection were analyzed as part of the traffic signal to reflect the operations in the field. **Table 2-2** shows the I-4 WB off-ramp operating at LOS E during AM peak hour and LOS C during the PM peak hour and the I-4 EB off-ramp operating at LOS E during the AM peak hour and LOS D during the PM peak hour.

Table 2-3 shows the vehicle queue results for the intersection movements. The storage length for some of the movements was taken as the distance from the intersection to the nearest upstream access point.

Table 2-3 Existing Year (2020) Intersection Vehicle Queues

Intersection	Movement	Storage (feet)	AM Peak Hour Queues (95th Percentile)		PM Peak Hour Queues (95th Percentile)	
			Veh	Feet**	Veh	Feet**
McIntosh Road at Muck Pond Road/Gore Road	EB Left/Thru/Right	1,000	0.4	10	0.7	18
	WB Left	175	5	125	2.7	68
	WB Thru/Right	1,000	0.3	8	0.2	5
	NB Left	480	0.2	5	0.2	5
	SB Left	1,000	0.0	0	0.0	0
McIntosh Road at I-4 WB Ramps*	WB Left	1,200	12.8	320	8.1	203
	NB Left	75	10.7	268	4.0	100
	NB Through	600	4.1	103	3.0	75
	SB Thru/Right	480	18.7	468	9.1	228
McIntosh Road at I-4 EB Ramps*	EB Left	1,200	4.6	115	5.3	133
	NB Thru/Right	260	30.3	758	13.4	335
	SB Left	70	2.8	70	1.1	28
	SB Through	600	2.5	63	3.5	88
McIntosh Road at Newsome Road	WB Left/Right	1,000	1.4	35	1.4	35
	SB Left	260	0.2	5	0.3	8
McIntosh Road at US 92	EB Left	250	9.6	240	5.8	145
	EB Thru/Right	1,000	10.7	268	16.0	400
	WB Left	450	3.9	98	2.9	73
	WB Through	1,000	11.3	283	9.2	230
	WB Right	500	16.7	418	6.4	160
	NB Left	180	2.4	60	1.2	30
	NB Thru/Right	1,000	27.6	690	15.6	390
	SB Left	150	13.2	330	9.2	230
	SB Thru/Right	2,000	19.3	483	17.3	433

*For ramps, the storage was determined as the length of the ramp or as the storage length when provided. The length of the ramp includes an adjustment for deceleration distance.
**Queue in feet estimated by multiplying the number of vehicles times 25-feet.
Highlights indicate queue exceeds storage length.

Table 2-3 shows the NB left turn queue at the I-4 WB ramp terminal intersection impacting the NB through movement. The NB through queue at the I-4 EB ramp extends south of the Newsome Road intersection during both peak hours. The SB left turn queue impacts the SB through movement at the US 92 intersection during both peak hours.

It should be noted that the I-4 EB off-ramp right turn lane was constructed after the 2020 traffic counts were collected and that is the reason the analyzed geometry differs from current existing conditions. The I-4 EB off-ramp right turn lane will be included in the opening and design years analyses. The existing year (2020) Synchro results and the signal timing information are shown in the PTAR included in **Appendix B.**

2.14 Managed Lanes

There are no managed lanes nor toll lanes within the corridor.

2.15 Crash Data and Safety Analysis

A five-year historical crash analysis was performed for years 2015-2019. Crash data for the I-4 ramps was obtained from the FDOT District Seven Crash Data Management System, which pulls data from the FDOT Crash Analysis Reporting (CAR) Online, and crash data for McIntosh Road was obtained from FDOT State Safety Office (SSO) Geographic Information System (GIS).

The McIntosh Road influence area for which crash data was analyzed includes the I-4 on/off ramps from/to McIntosh Road. The crash data for McIntosh Road includes 1,000-feet south of the US 92 intersection to 1,000-feet north of the Muck Pond/Gore Road intersection. **Table 2-4** provides a summary of the total crashes per year in the study area and the location of the crashes. **Table 2-5** provides a summary of the crash severity along the corridor.

Table 2-4 Number of Crashes

Year	Location		Total
	I-4 on/off ramps	McIntosh Road	
2015	10	27	37
2016	13	18	31
2017	10	18	28
2018	9	13	22
2019	8	5	13
Total	**50**	**81**	**131**

Table 2-5 Crash Summary

Location	Total Number of Crashes	Number of Fatal Crashes	Number of Fatalities	Number of Injury Crashes	Number of Injuries	Number of Property Damage Only (PDO) Crashes
I-4 on/off ramps	50	0	0	19	25	31
McIntosh Road	81	0	0	29	41	52
Total	**131**	**0**	**0**	**48**	**66**	**83**

As shown in **Tables 2-4** and **Table 2-5**, 131 crashes occurred in the McIntosh Road study area, of which forty-eight (48) were injury crashes, resulting in sixty-six (66) injuries. There were eighty-three (83) crashes with Property Damage Only (PDO) crashes. There were no fatal crashes in the study area for the analyzed years. On average, the crash frequency for the McIntosh Road study area is twenty-six (26) crashes per year.

Table 2-6 summarizes the types of crashes. The most predominant crash type for the study area is rear end with sixty-three (63) crashes (48%). At the I-4 on/off ramps the predominant type of crash is rear end with thirty-one (31) crashes (62%). Along McIntosh Road, the most predominant crash types are angle with thirty-six (36) crashes (44%) and rear end with thirty-two (32) crashes (40%).

Table 2-6 Crash Type Summary

Type of Crash	Location		Total
	I-4 on/off ramps	McIntosh Road	
Rear End	31	32	63
Angle	4	36	40
Sideswipe	3	4	7
Head-on	0	1	1
Hit Fixed Object	4	0	4
Hit Non-Fixed Object	1	0	1
Single Vehicle	2	0	2
Bike	0	0	0
Run Off Road	1	0	1
Pedestrian	0	0	0
Left Turn	4	0	4
Unknown/Other	0	8	8
Total	**50**	**81**	**131**

Table 2-7 shows the common cause of crashes is operating a motor vehicle in a careless or negligent manner with fifty-five (55) crashes (42%) followed by failed to yield the right-of-way with thirty-six (36) crashes (20%). **Table 2-8** shows eighty-eight (88) of the crashes (67%) occurred at daylight, and 116 of the crashes (89%) occurred on dry pavement.

Table 2-7 Cause of Crashes

Cause of Crash	Location		Total
	I-4 on/off ramps	McIntosh Road	
Failed to Keep in Proper Lane	1	2	3
Followed too Closely	3	10	13
Failed to Yield Right-of-Way	7	29	36
No Contributing Action	3	1	4
Other Contributing Actions	1	0	1
Improper Turn	0	4	4
Operated MV* in Careless or Negligent Manner	29	26	55
Drove Too Fast for Conditions	0	1	1
Ran off Roadway	0	3	3
Over-Correcting/Over-Steering	0	1	1
Unknown	4	2	6
Improper Passing	0	1	1
Swerved or Avoided: Due to Wind, Slippery Surface, MV*, Object, Non-Motorist in Roadway, etc.	0	1	1
Operated MV* in Erratic, Reckless, or Aggressive Manner	1	0	1
Improper Backing	0	0	0
Exceeded Posted Speed	1	0	1
Total	**50**	**81**	**131**

*MV = motor vehicle

Table 2-8 Lighting and Pavement Conditions

Lighting Condition	Location		Total
	I-4 on/off ramps	McIntosh Road	
Daylight	30	58	88
Dark-Lighted	10	10	20
Dusk	2	7	9
Dark-Not Lighted	0	3	3
Dawn	8	3	11
Total	**50**	**81**	**131**
Pavement Condition			
Dry	45	71	116
Wet	5	10	15
Total	**50**	**81**	**131**

2.16 Railroad Crossings

There are no railroad crossings within the study area.

2.17 Drainage

A Pond Siting Report (PSR) was prepared for this project, which outlines the existing and proposed drainage conditions.

Stormwater runoff sheet flows from the roadway into roadside ditches, which discharge into existing culverts and cross drains throughout the corridor. The culverts and cross drains from the beginning of the project on McIntosh Road south of US 92 discharge to Baker Canal Tributary 3. The culverts and cross drains on McIntosh Road from north of US 92 to north of I-4 discharge to the Baker Canal Tributary 2. Both tributaries discharge to Baker Creek/Pemberton Creek, which flows north to Lake Thonotosassa. The project lies within two (2) Waterbody IDs (WBID): WBID 1522E for Baker Creek East and WBID 1547 for Seffner Canal, which is listed as impaired for E. coli. A map showing the WBID limits can be found within Appendix A of the PSR. Based on a review of the Southwest Florida Water Management District (SWFWMD) website and a Public Records request, there are no formal stormwater treatment facilities for McIntosh Road.

Six (6) subbasins have been identified within the limits of the project area. Two (2) of these subbasins, Basin 2 and Basin 7, include portions of US 92.

The Hillsborough County Storm Water Management Model (HC-SWMM) Pemberton Creek model was used to identify floodplain areas within the project limits. Correspondence with FDOT District Seven Tampa Operations Roadway Maintenance Office revealed that there was an ongoing localized flooding issue at the southeast corner of the intersection of McIntosh Road and US 92. However, this was before the recent Drainage Connection Permit and reconstruction of the site for a gas station.

Geotechnical borings were performed to estimate the Seasonal High Groundwater Table (SHGWT) elevations throughout the project area. The SHGWT is on average between 2.0- to 2.5-feet below the existing ground elevation.

2.18 Lighting

At the intersection of US 92 and McIntosh Road, there are existing light emitting diode (LED) luminaires attached to joint use poles. The existing lighting is maintained by the Tampa Electric Company (TECO) through an agreement with Hillsborough County. The power service for the luminaires is fed from an unmetered aerial feed provided by TECO.

There is no existing corridor lighting on McIntosh Road from north of US 92 to north of I-4.
There is existing high mast lighting within the project limits that provides illumination for the mainline and ramps. The high mast lighting is maintained by the FDOT. The existing high mast poles near the WB interchange are anticipated to be impacted.

2.19 Utilities

A preliminary list of utilities present within the study area is shown in **Table 2-9**, alongside relevant contact information.

Table 2-9 Utility Contact Information

Company Name	Contact	Phone	Email
Comcast	Jason Palmer	305-319-1601	Jason_Palmer3@comcast.com
Frontier	Kraivuth (Woody) Choeykrajang	813-877-7480	Kraivuth.choeykrajang@ftr.com
Spectrum Sunshine State LLC	Aaron Sweet	813-560-1766	Aaron.Sweet@charter.com
TECO	Jason Payne	813-765-2494	CSAdmin@tecoenergy.com
Uniti	Terry Young	251-422-3872	Terry.Young@uniti.com
Verizon Business MCI	Mike Krol	813-410-4803	Michael.Krol@verizon.com
Zayo	Jake Sansom	813-763-5999	ZayoFLRelocations@zayo.com

2.20 Soils and Geotechnical Data

The Natural Resources Conservation Service (NRCS) Soil Survey of Hillsborough County indicates that there are multiple soil types that exist within and adjacent to the study area. The dominant soil types and their soil map unit identification numbers are as follows: Basinger, Holopaw, and Samsula soils, depressional (5); Immokalee fine sand, 0 to 2 percent slopes (21); Malabar fine sand, 0 to 2 percent slopes (27); Myakka fine sand, 0 to 2 percent slopes (29); Ona fine sand, 0 to 2 percent slopes (33); Paisley fine sand, depressional (37); St. Johns fine sand (46), Seffner fine sand, 0 to 2 percent slopes (47) and Winder fine sand, frequently flooded (60). Soils within a 500-foot buffer from the project limits as shown in **Figure 2-8** were evaluated. Acreages and percentages of soil types near the project limits can be found in **Table 2-10**. A detailed soils map is shown in **Figure 2-8**.

Table 2-10 Soil Data

Map Unit Symbol	Soil Name	Acres in AOI*	Percent of AOI*
5	Basinger, Holopaw, and Samsula soils, depressional	15.4	6.3%
21	Immokalee fine sand, 0 to 2 percent slopes	5.4	2.2%
27	Malabar fine sand, 0 to 2 percent slopes	7.4	3.0%
29	Myakka fine sand, 0 to 2 percent slopes	154.9	62.7%
33	Ona fine sand, 0 to 2 percent slopes	13.3	5.4%
37	Paisley fine sand, depressional	20.7	8.4%
46	St. Johns fine sand	15.5	6.3%
47	Seffner fine sand, 0 to 2 percent slopes	11.3	4.6%
60	Winder fine sand, frequently flooded	3.1	1.2%
	Total	**247.1**	**100.00%**

*Area of Interest

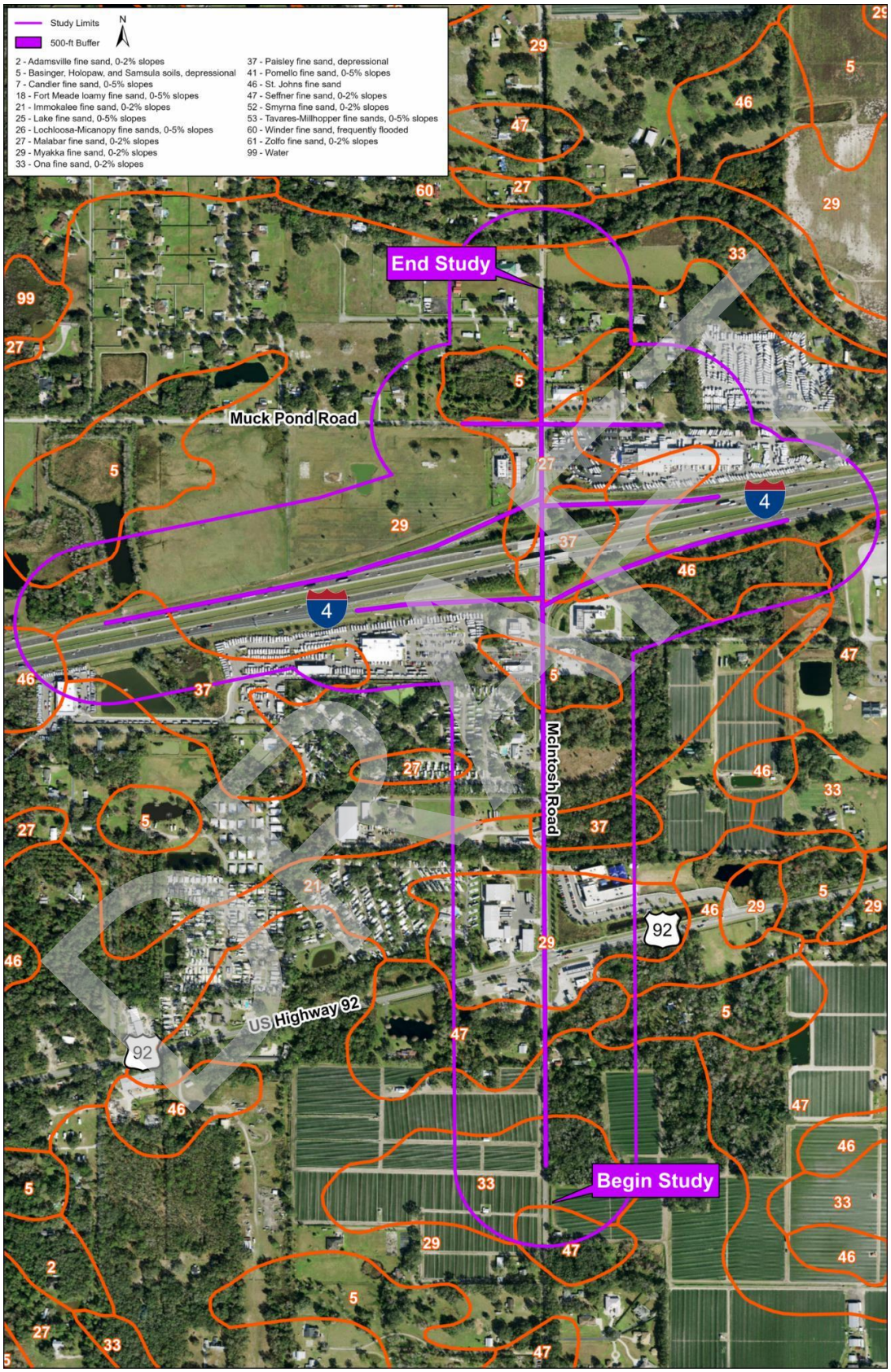


Figure 2-8 Soils Map

A brief description of dominant soil types is provided below:

Basinger, Holopaw, and Samsula soils, depressional (Map Unit 5) – The soils in this map unit are nearly level, very poorly drained and exists in swamps and depressions on the flatwoods. Undrained areas are frequently ponded for very long periods. In most years, the undrained areas are ponded for about six months. Organic soils (A-8) are reported to a depth of 34 inches below the natural ground surface within the Samsula soil. The natural vegetation consists of cypress. The understory includes bluestem, maidencane, panicum, Jamaica sawgrass and cutgrass.

Immokalee fine sand, 0 to 2 percent slopes (Map Unit 21) – This soil is nearly level, poorly drained, and exists on broad plains on the flatwoods. In most years, a seasonal high water table fluctuates from the soil surface to a depth of 10 inches for more than 2 months and recedes to a depth of 10 to 40 inches for 8 months or more. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is low. In most areas it is used for cultivated crops, improved pasture or citrus crops or for homesite or urban development. The natural vegetation consists of longleaf pine and slash pine. The understory includes creeping bluestem, chalky bluestem, lopsided Indiangrass, saw palmetto, pineland threeawn and wax myrtle.

Malabar fine sand, 0 to 2 percent slopes (Map Unit 27) – This soil is nearly level, poorly drained, and exists in low-lying sloughs and shallow depressions on the flatwoods. In most years, a seasonal high water table fluctuates from the soil surface to a depth of about 10 inches for 2 to 6 months. Plastic soils (A-4/A-6) are reported at a depth of 42 inches below the natural ground surface. Permeability is rapid in the surface and subsurface layers, slow in the subsoil and moderately rapid or rapid in the substratum. The available water capacity is very low or low. In most areas, this Malabar soil has been left idle in native vegetation. In some areas, the soil has been drained and is used for cultivated crops or pasture or for homesite or urban development. The natural vegetation consists of cabbage palm, longleaf pine, and slash pine. The understory includes broomsedge, bluestem, inkberry, maidencane, saw palmetto, and wax myrtle.

Myakka fine sand, 0 to 2 percent slopes (Map Unit 29) – This soil is nearly level, poorly drained, and exists on broad plains on the flatwoods. In most years, a seasonal high water table fluctuates from the soil surface to a depth of 10 inches for 1 to 4 months and recedes to a depth of 40 inches during prolonged dry periods. In most areas, this Myakka soil is used for native pasture or cultivated crops. In a few areas, it is used for improved pasture or citrus crops, or it is used for homesite or urban development. The natural vegetation consists of longleaf pines and slash pine. The understory includes gallberry, running oak, saw palmetto, pineland threeawn and wax mrytle.

Ona fine sand, 0 to 2 percent slopes (Map Unit 33) – This soil is nearly level, poorly drained, and exists on broad plains on the flatwoods. In most years, a seasonal high water table fluctuates from the soil surface to a depth of 10 inches for more than 2 months and recedes to a depth of 10 to 40 inches for 6 months or more. In most areas, this Ona soil is used for native pasture. In a few areas, it is used for cultivated crops, improved pasture, or citrus crops or for homesite or urban development. The natural vegetation consists of longleaf pine and slash pine. The understory includes gallberry, running oak, saw palmetto, pineland threeawn, and wax myrtle.

Paisley fine sand, depressional (Map Unit 37) – This soil is level, very poorly drained, and exists in depressions and sloughs. Undrained areas are frequently ponded for long periods. A seasonal high water table fluctuates from the soil surface to a depth of about 10 inches for periods of 9 months or more. Plastic soils (A-7) are reported at a depth of 4 inches below the natural ground surface. Permeability is rapid in the surface and subsurface layers and slow in the subsoil. The available water capacity is high. In most areas, the Paisley soil has been left in natural vegetation. In some areas, it has been drained and is used for pasture. The natural vegetation consists of cypress and sweetgum. The understory includes sand cordgrass, bluestem, maidencane, and wax myrtle.

St. Johns fine sand (Map Unit 46) – This soil is nearly level, poorly drained, and exists on low-lying plains on the flatwoods. In most years, a seasonal high water table fluctuates from the soil surface to a depth of 15 inches for 2 to 6 months and recedes to a depth of 15 to 30 inches during prolonged dry periods. Permeability is rapid in the surface and subsurface layers, moderately slow or moderate in the subsoil, and rapid in the substratum. The available water capacity is moderate. In most areas, this St. Johns soil is used for native pasture or for homesite or urban development. The natural vegetation consists of longleaf pine and slash pine. The understory includes gallberry, running oak, saw palmetto, pineland threeawn, and wax myrtle.

Seffner fine sand, 0 to 2 percent slopes (Map Unit 47) – This soil is nearly level, somewhat poorly drained, and exists on the rims of depressions and on broad, low rides on the flatwoods. In most years, a seasonal high water table is at a depth of 20 inches to 40 inches for 2 to 6 months and recedes to a depth of less than 60 inches during prolonged dry periods. Permeability is rapid. The available water capacity is low or moderate. In most areas, this Seffner soil is used for cultivated crops or pasture or for homesite or urban development. In a few areas, it is used for citrus crops or has been left idle in natural vegetation. The natural vegetation consists of longleaf pine, slash pine, and laurel oak. The understory includes creeping bluestem, grassleaf goldaster, lopsided Indiangrass, saw palmetto, and pineland threeawn.

Winder fine sand, frequently flooded (Map Unit 60) – This soil is nearly level, poorly drained, and exists on the floodplains. This soil is flooded for very long periods following prolonged intense rain. In most years, a seasonal high water table fluctuates from the soil surface to a depth of about 10 inches for 2 to 6 months. Plastic soils (A-2-6) are reported at a depth of 18 inches below the natural ground surface. Permeability is rapid in the surface and subsurface layers, slow or very slow in the subsoil, and rapid in the substratum. The available water capacity is moderate. On most areas, this Winder soil has been left idle in natural vegetation. In a few areas, it is used as pasture. The natural vegetation consists of Coastal Plain willow, red maple, cabbage palm and sweetgum. The understory includes buttonbush, maidencane, sawgrass, smartweed and sedges.

2.21 Aesthetic Features

There are no decorative or aesthetic features within the right-of-way.

2.22 Traffic Signs

All roadway signage within the project limits are standard signs located along the roadway. There are no overhead or cantilever sign structures.

2.23 Noise Barriers and Perimeter Walls

There are no existing noise barriers nor perimeter walls along the corridor.

2.24 Bridges and Structures

The information associated with the existing bridges was obtained from as-built drawings, most current inspection reports, and the FDOT's Structural Inventory Detail Report. There are two (2) existing bridges within the project limits. Both bridges are along I-4 over McIntosh Road. Both bridges carry three-lanes of traffic with 10-foot wide shoulders. **Table 2-11** summarize the features of the existing bridges.

Table 2-11 Existing Bridges

Parameter	I-4 (SR 400) WB	I-4 (SR 400) EB
Facility Crossed	McIntosh Road	McIntosh Road
Bridge Number	100614	100615
Direction	WB	EB
Length (feet)	249	249
Mile Post (MP)	21.152	21.150
Number of Spans	4	4
Bridge Width (feet)	50.08	50.08
Superstructure Type	Prestressed Beam with Cast-in-Place Concrete Deck	Prestressed Beam with Cast-in-Place Concrete Deck
Sufficiency Rating	94.7	94.7
Health Index	99.71	99.69
Deck Rating	7 (Good)	7 (Good)
Superstructure Rating	7 (Good)	7 (Good)
Substructure Rating	7 (Good)	7 (Good)
Inventory Rating (tons)	45.2	45.2
Operating Rating (tons)	75.3	75.3
Vertical Clearance (feet)	18.4	18.5
Year of Construction	1998	1998

The sufficiency rating is based on an evaluation of factors that are indicative of the structure's ability to remain in service. A sufficiency rating of 100 percent would represent the structure meeting all the sufficiency requirements and a rating of zero percent would represent an entirely deficient bridge. The health index is a tool to determine the health of a bridge considering the condition of the structural elements and the service provided by the bridge. Both bridges were

constructed in 1998 with high sufficiency ratings and health index values. The existing bridges meet the minimum vertical requirements of 16.5-feet based on the as-built plans and inspection reports. Both bridges meet the current FDOT Bridge Load Rating Manual requirements. The existing median piers have 3-foot diameter columns which will require the consideration of Vehicular Collision Forces in accordance with the FDOT Structures Manual, Volume 1, Structures Design Guidelines. FDOT District Seven Structures and Maintenance Office is the bridge maintenance agency responsible for the inspection and rehabilitation of these bridges.

2.25 Environmental Characteristics

Existing environmental characteristics are documented in the following reports for this PD&E Study:

- Natural Resources Evaluation Report
- Noise Study Report
- Location Hydraulics Memorandum
- Water Quality Impact Evaluation Checklist (Pending)
- Contamination Screening Evaluation Report
- Cultural Resource Assessment Survey

3.0 PROJECT DESIGN CONTROLS & CRITERIA

3.1 Roadway Context Classification

Within the study area, McIntosh Road is classified as C3C (Suburban Commercial). Both the No-Build and Preferred Alternative retain this classification.

3.2 Design Control and Criteria

Table 3-1 Geometric Design Criteria

Design Element	Criteria	Source	Proposed
Typical Section			
Design Speed	35-55 mph	FDM Table 201.5.1	35 mph
Travel Lane Width	10-feet - Travel 10-feet - Auxiliary 11-feet - Two-Way Left Turn	FDM Table 210.2.1	11-feet
Bicycle Lane Widths	7-feet Buffered Lane (Standard/Max.) 4-feet Lane (Min.)	FDM 223.2.1	N/A – Shared Use Path
Sidewalk Widths	6-feet (Std.) 8-feet (Max.)	FDM Table 222.2.1.1	N/A – Shared Use Path
Shared Use Path Widths	8-feet (Min., Constrained Conditions) 10-feet (Min.) 12-feet (Std.) 14-feet (Max.)	FDM 224.4	10-feet
Cross Slope	0.02 (Std.) 0.015-0.040 (Allow.) - Travel 0.02 (Min.) - Auxiliary 0.02 (Max.) - Sidewalk 0.02 (Max.) - SUP	FDM Table 210.2.3	0.02
Median Width	22-feet (Std.) 15.5-feet (Min.)	FDM Table 210.3.1	22-feet (16-feet grassed)
Border Width (Minimum)	12-feet	FDM Table 210.7.1	37 feet
Clear Zone	14-feet Travel 10-feet Auxiliary	FDM Table 215.2.1	N/A
Minimum Lateral Offset Criteria	1.5-feet (crashworthy objects) Outside clear zone (non-crashworthy objects)	FDM Table 215.2.2	N/A

Design Element	Criteria	Source	Proposed
Horizontal			
Minimum Stopping Sight Distance	315-feet	FDM Table 210.11.1	N/A
Maximum Deflection Without Curve	2° 00' 00" (with C&G)	FDM 210.8.1	0.039° (max.)
	2° 00' 00" (without C&G)		n/a
	6° 00' 00" (through intersection @ 35 mph)		0°
Vertical			
Maximum Grade	7%	FDM Table 210.10.1	0.6%
Minimum Grade	0.30%	FDM 210.10.1.1	0.3%
Minimum Distance Between VPI's	250-feet	FDM 210.10.1.1	221-feet
Maximum Change in Grade (No Vertical Curve)	0.90%	FDM Table 210.10.2	0.90%
Minimum Vertical Curve	K = 47 (Crest)	FDM Table 210.10.3	164.4
	K = 49 (Sag)		326.7
Minimum Vertical Curve Length	105-feet (Crest & Sag)	FDM Table 210.10.4	105-feet
Base Clearance Above Base Clearance Water Elevation	3-feet	FDM Table 210.10.3	1.91-feet

4.0 ALTERNATIVES ANALYSIS

4.1 Previous Planning Studies

FDOT District Seven conducted an I-4 Interchange Needs Evaluation Study in 2018 to evaluate current traffic operations and identify operational deficiencies at the interchanges along I-4 from east of I-75 to the western connection of SR 570 (Polk Parkway). The study's primary goal was to identify problems at the interchanges off-ramps that cause safety and operational issues on the I-4 mainline. Proposed recommendations focused on small scale, cost feasible projects that can be funded through current FDOT programs. The I-4 Interchange Needs Evaluation Study was conducted concurrently with the I-4 PD&E Study from east of 50th Street to the Polk Parkway (FPID 431746-1). The I-4 Interchange Needs Evaluation Study also recommended long-term improvements to accommodate the expected growth in the Dover and Plant City areas in Hillsborough County. The short-term and long-term recommendations for McIntosh Road included:

- Short-term recommendations
    - Extending the NB left turn storage length at the WB I-4 ramp termini and the SB left turn storage length at the EB I-4 ramp termini
- Long-term recommendations
    - Widen McIntosh Road from two- to four-lanes from US 92 to north of I-4
    - Add a second NB to WB left turn lane and a second WB to SB left turn lane at the I-4 WB ramp termini intersection
    - Add a second EB to SB right turn lane at the I-4 EB ramp termini intersection

A Non-IAR was approved in November 2021 by FDOT District Seven for the I-4 at McIntosh Road interchange which included the short-term recommendations listed in the I-4 Interchange Needs Evaluation Study above as well as widening McIntosh Road to the outside between the ramp terminals and extending the I-4 WB off-ramp deceleration lane. This project began construction in February 2024 (FPID 443319-1).

A Design Traffic Technical Memorandum was prepared in May 2017 for the US 92 PD&E Study from east of I-4 to east of County Line Road (FPID 435749-1). The PD&E Study recommended the widening of US 92 from two-lanes to four-lanes with additional intersection improvements from east of I-4 to east of County Line Road except for the area that currently goes through Downtown Plant City which is currently a two-lane one-way pair section. The recommended additional intersection improvements at US 92 at McIntosh Road included: an additional NB and SB through lane on McIntosh Road (2 through lanes in each direction) at the US 92 intersection, an additional WB right turn lane on US 92, an additional SB left and right turn lane on McIntosh Road, and an additional NB right turn lane on McIntosh Road.

An interchange evaluation was performed for the I-4 at McIntosh Road interchange in June 2022 to evaluate the interchange operations with a tight urban diamond interchange (TUDI) configuration and a diverging diamond interchange configuration. After evaluating concepts, right-of-way, and costs, FDOT decided on the TUDI configuration for this interchange.

4.2 No-Build Alternative

The No-Build Alternative consists of the same roadway configuration and geometry of the existing conditions for the corridor and the existing intersections. Changes from the existing geometric conditions have been incorporated into the No-Build Alternative based on programmed and planned improvements. For the opening year 2025 this includes the improvements being constructed as part of the I-4/McIntosh Road Interchange project (FPID 443319-1) and shown in **Figure 4-1**.

- Extend existing NB and SB left turn lanes from McIntosh Road to I-4
- Widen McIntosh to the outside between the I-4 ramp terminals
- Extend the I-4 WB off-ramp deceleration lane by 1,500-feet

The No-Build Alternative for design year 2045 also includes improvements identified in the US 92 PD&E Study. The following intersection improvements are currently in design (FPID 447158-1) and are shown in **Figure 4-2**:

- At the US 92 intersection:
    - An additional SB left turn lane and SB right turn lane
    - An additional NB right turn lane
    - Extending the NB left turn storage length to 400-feet
    - An additional through lane in the EB and WB directions
    - An additional through lane in the NB and SB directions
    - An additional WB right turn lane
    - Extending the EB left turn storage length to 650-feet

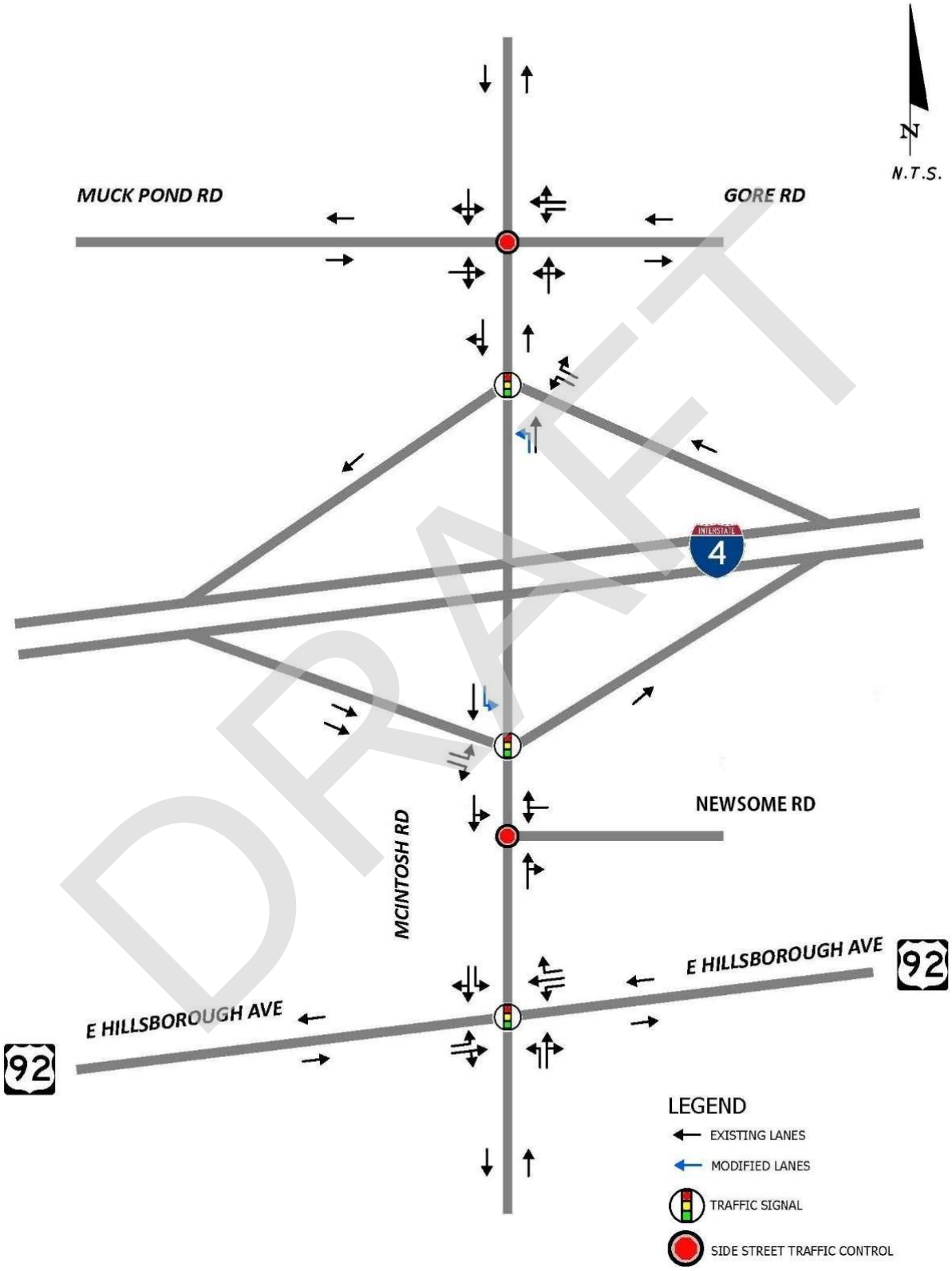


Figure 4-1 Opening Year (2025) No-Build Alternative Geometry

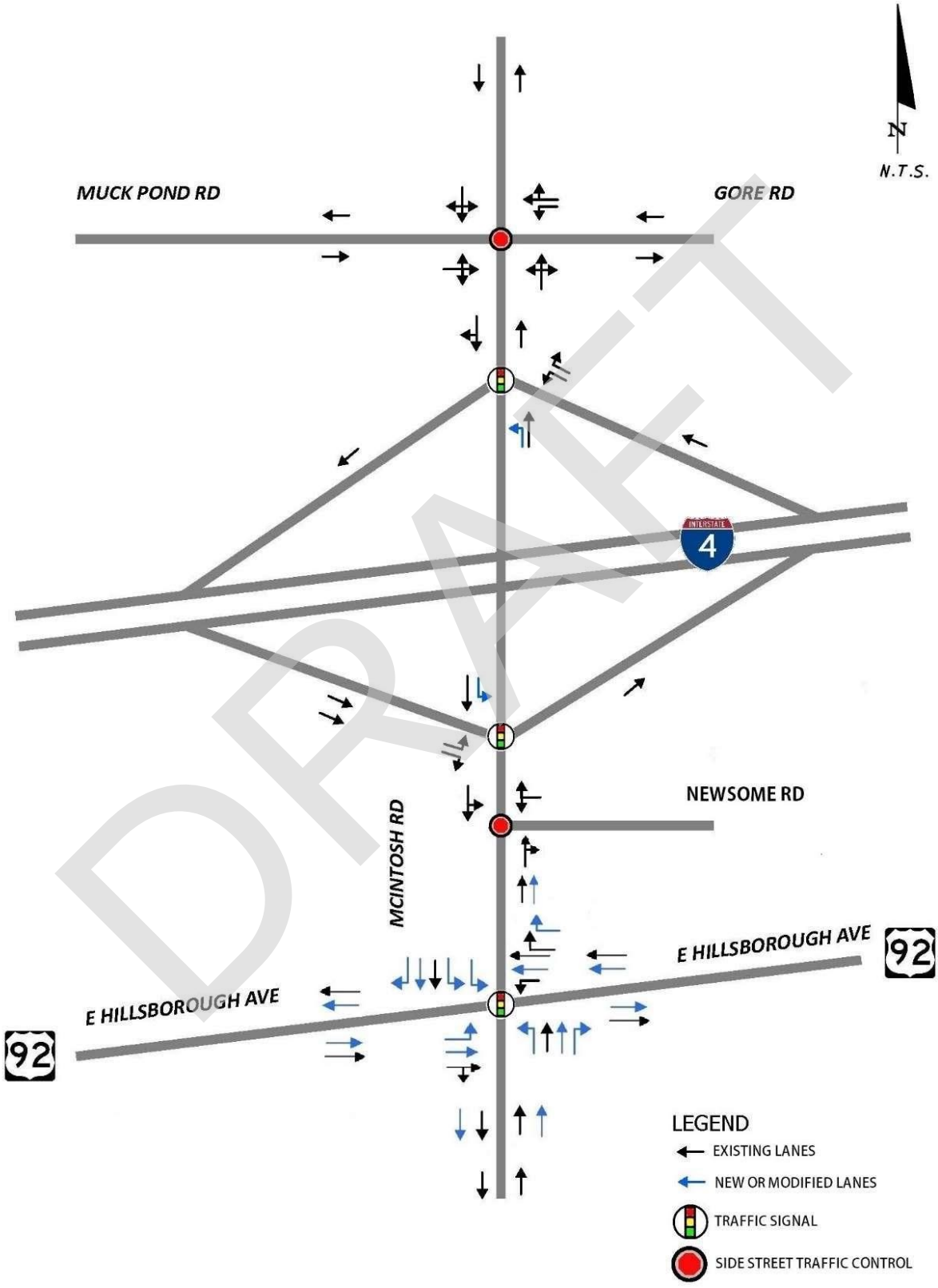


Figure 4-2 Design Year (2045) No-Build Alternative Geometry

4.2.1 Opening Year 2025 No-Build Analysis

The improvements discussed in **Section 4.1** and illustrated in **Figure 4-1** are included in the opening year 2025 No-Build analysis. **Tables 4-1** and **4-2** summarize the intersections operational analysis results for the opening year 2025 No-Build.

Table 4-1 Opening Year (2025) No-Build Intersection Delay and LOS Results

Approach	Movement	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Approach LOS	Delay (sec)	LOS	Approach LOS
Intersection: McIntosh Road at Muck Pond Road/Gore Road*							
Eastbound	Left/Thru/Right	12.5	B	B	13.6	B	B
Westbound	Left	126.3	F	F	49.2	E	E
	Thru/Right	20.8	C		17.0	C	
Northbound	Left	8.4	A		7.9	A	
Southbound	Left	8.2	A		8.4	A	
Intersection: McIntosh Road at I-4 WB Ramps**							
Westbound	Left	79.7	E	E	35.1	D	D
Northbound	Left	67.0	E	D	18.3	B	B
	Through	7.3	A		7.8	A	
Southbound	Thru/Right	68.2	E	E	24.9	C	C
Intersection		**57.2**		**E**	**Intersection**	**19.5**	**C**
Intersection: McIntosh Road at I-4 EB Ramps**							
Eastbound	Left	91.3	F	F	51.0	D	D
Northbound	Thru/Right	50.6	D	D	24.8	C	C
Southbound	Left	65.0	E	B	16.4	B	A
	Through	2.7	A		4.9	A	
Intersection		**39.7**		**D**	**Intersection**	**19.8**	**B**
Intersection McIntosh Road at Newsome Road*							
Westbound	Left/Right	40.7	E	E	31.2	D	D
Southbound	Left	12.1	B		10.0	A	

Approach	Movement	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Approach LOS	Delay (sec)	LOS	Approach LOS
Intersection: McIntosh Road at US 92							
Eastbound	Left	75.1	E	E	34.8	C	E
	Thru/Right	52.2	D		65.4	E	
Westbound	Left	45.3	D	D	36.2	D	C
	Through	57.6	E		40.7	D	
	Right	47.1	D		27.5	C	
Northbound	Left	50.0	D	F	47.3	D	D
	Thru/Right	84.7	F		52.1	D	
Southbound	Left	118.3	F	E	65.7	E	D
	Thru/Right	31.8	C		32.5	C	
Intersection		**63.3**		**E**	**Intersection**	**46.0**	**D**

*Per HCM 6th Edition: For Two Way Stop Control (TWSC) intersections only minor movements delay and LOS are reported. HCM 6th Edition does not calculate LOS for major street thru movements and approached or for the intersection as a whole.
**HCM 6th Edition does not include unsignalized delay on approach delay and intersection delay calculations.

Table 4-2 Opening Year (2025) No-Build Intersection Vehicle Queues

Intersection	Movement	Storage (feet)	AM Peak Hour Queues (95th Percentile)		PM Peak Hour Queues (95th Percentile)	
			Veh	Feet**	Veh	Feet**
McIntosh Road at Muck Pond Road/Gore Road	EB Left/Thru/Right	1,000	0.5	13	0.8	20
	WB Left	175	9.0	225	3.9	98
	WB Thru/Right	1,000	0.3	8	0.2	5
	NB Left	480	0.2	5	0.2	5
	SB Left	1,000	0.0	0	0.0	0
McIntosh Road at I-4 WB Ramps	WB Left	1,200	18.1	453	9.2	230
	NB Left	240	25.8	645	5.2	130
	NB Through	600	6.3	158	3.6	90
	SB Thru/Right	480	33.3	833	10.4	260
McIntosh Road at I-4 EB Ramps	EB Left	1,200	6.5	163	6.4	160
	NB Thru/Right	260	49.5	1,238	18.8	470
	SB Left	240	5.8	145	1.8	45
	SB Through	600	3.6	90	4.2	105
McIntosh Road at Newsome Road	WB Left/Right	1,000	2.2	55	2.1	53
	SB Left	260	0.2	5	0.3	8

Intersection	Movement	Storage (feet)	AM Peak Hour Queues (95th Percentile)		PM Peak Hour Queues (95th Percentile)	
			Veh	Feet**	Veh	Feet**
McIntosh Road at US 92	EB Left	250	9.3	233	8.1	203
	EB Thru/Right	1,000	15.0	375	23.0	575
	WB Left	450	5.5	138	3.7	93
	WB Through	1,000	15.3	383	11.3	283
	WB Right	500	22.8	570	8.2	205
	NB Left	180	3.3	83	1.7	43
	NB Thru/Right	1,000	39.5	988	19.8	495
	SB Left	150	26.2	655	14.0	350
	SB Thru/Right	2,000	26.0	650	23.8	595

*For ramps, the storage was determined as the length of the ramp or as the storage length when provided. The length of the ramp includes an adjustment for deceleration distance.
**Queue in feet estimated by multiplying the number of vehicles times 25-feet.
Highlights indicate queue length exceeds storage length.

The results on **Tables 4-1** and **4-2** show the I-4 WB off-ramp left turn movement operating at LOS E with a queue of eighteen (18) vehicles turning left (NB). Also, during the AM peak hour, the results show the NB left turn queue at the I-4 WB ramp terminal intersection is expected to reach the I-4 EB ramp termini intersection. The US 92 intersection operation will continue to worsen and the SB left turn queue at US 92 will impact McIntosh Road SB through movement during both peak hours. The 2025 No-Build Synchro results are included in the PTAR.

4.2.2 Design Year 2045 No-Build Alternative

The improvements included in **Figure 4-2** and discussed in **Section 4.2** are included in the Year 2045 No-Build Analysis. **Tables 4-3** and **4-4** summarize the intersections operational analysis results for the Year 2045 No-Build Alternative.

Table 4-3 Design Year (2045) No-Build Intersection Delay and LOS Results

Approach	Movement	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Approach LOS	Delay (sec)	LOS	Approach LOS
Intersection: McIntosh Road at Muck Pond Road/Gore Road*							
Eastbound	Left/Thru/Right	20.5	C	C	31.5	D	D
Westbound	Left	1533.2	F	F	1018.5	F	F
	Thru/Right	48.5	E		34.4	D	
Northbound	Left	9.3	A		8.3	A	
Southbound	Left	8.9	A		9.7	A	

Approach	Movement	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Approach LOS	Delay (sec)	LOS	Approach LOS
Intersection: McIntosh Road at I-4 WB Ramps**							
Westbound	Left	255.7	F	F	116.4	F	F
Northbound	Left	268.0	F	F	138.9	F	E
	Through	8.9	A		12.8	B	
Southbound	Thru/Right	216.6	F	F	79.8	E	E
Intersection		**193.4**		**F**	**Intersection**	**84.1**	**F**
Intersection: McIntosh Road at I-4 EB Ramps**							
Eastbound	Left	91.1	F	F	73.7	E	E
Northbound	Thru/Right	323.2	F	F	220.8	F	F
Southbound	Left	77.2	E	B	66.4	E	B
	Through	5.0	A		9.2	A	
Intersection		**213.9**		**F**	**Intersection**	**132.9**	**F**
Intersection McIntosh Road at Newsome Road*							
Westbound	Left/Right	1633.3	F	F	97.3	F	F
Southbound	Left	19.5	C		14.9	B	
Intersection: McIntosh Road at US 92							
Eastbound	Left	145	F	F	108.6	F	E
	Thru/Right	42.0	D		35.4	D	
Westbound	Left	44.2	D	E	34.4	C	E
	Through	81.3	F		92.1	F	
	Right	44.6	D		29.8	C	
Northbound	Left	89.1	F	F	103.2	F	F
	Through	82.0	F		108.0	F	
	Right	47.5	D		57.6	E	
Southbound	Left	90.1	F	D	111.2	F	E
	Through	41.3	D		54.9	D	
	Right	22.1	C		26.7	C	
Intersection		**67.3**		**E**	**Intersection**	**67.4**	**E**

*Per HCM 6th Edition: For Two Way Stop Control (TWSC) intersections only minor movements delay and LOS are reported. HCM 6th Edition does not calculate LOS for major street thru movements and approached or for the intersection as a whole.

**HCM 6th Edition does not include unsignalized delay on approach delay and intersection delay calculations.

Table 4-4 Design Year (2045) Intersection Vehicle Queues

Intersection	Movement	Storage (feet)	AM Peak Hour Queues (95th Percentile)		PM Peak Hour Queues (95th Percentile)	
			Veh	Feet**	Veh	Feet**
McIntosh Road at Muck Pond Road/Gore Road	EB Left/Thru/Right	1,000	1.6	40	3.3	83
	WB Left	175	30.1	753	21	525
	WB Thru/Right	1,000	1.3	33	0.8	20
	NB Left	480	0.4	10	0.3	8
	SB Left	1,000	0	0	0	0
McIntosh Road at I-4 WB Ramps	WB Left	1,200	47.2	1,180	32.8	820
	NB Left	240	74.3	1,858	40.5	1,013
	NB Through	600	12	300	14.1	353
	SB Thru/Right	480	90.3	2,258	40	1,000
McIntosh Road at I-4 EB Ramps	EB Left	1,200	9.6	240	13.3	333
	NB Thru/Right	260	209.6	5,240	129.5	3,238
	SB Left	240	8.9	223	10.6	265
	SB Through	600	10.4	260	15.5	388
McIntosh Road at Newsome Road	WB Left/Right	1,000	15	375	6.6	165
	SB Left	260	0.7	18	0.9	23
McIntosh Road at US 92	EB Left	650	31.9	798	26.9	673
	EB Thru/Right	1,000	13.9	348	18.8	470
	WB Left	450	8.3	208	8.3	208
	WB Through	1,000	22.4	560	33.3	833
	WB Right	500	16.9	423	9.2	230
	NB Left	400	6.4	160	4.6	115
	NB Through	1,000	26.2	655	20.8	520
	NB Right	400	3.9	98	6.5	163
	SB Left	500	16.4	410	17.1	428
	SB Through	2,000	13	325	17.9	448
	SB Right	500	13	325	12.8	320

*For ramps, the storage was determined as the length of the ramp or as the storage length when provided. The length of the ramp includes an adjustment for deceleration distance.

**Queue in feet estimated by multiplying the number of vehicles times 25-feet.

Highlights indicate queue length exceeds storage length.

The results show the I-4 WB off-ramp left turn movement will continue to deteriorate by the 2045 design year under No-Build conditions and the projected queue extends almost to the available storage. The queue is projected to be forty-seven (47) vehicles in the morning and thirty-three (33) vehicles in the afternoon. The NB left turn queue at the I-4 WB ramp terminal intersection is expected to reach the I-4 EB ramp terminal intersection and extend further south of the intersection during the AM peak hour. The NB through movement queue at the I-4 EB ramp terminal intersection is expected to impact the US 92 intersection during both AM and PM peak hours. The 2045 No-Build Synchro results are included in the PTAR within **Appendix B**.

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

The objective of TSM&O is to identify non-capacity improvement strategies that improve traffic flow, manage congestion, and maximize highway operations. TSM&O alternatives should improve safety and reliability of the transportation system while minimizing environmental impacts.

TSM&O options generally include intelligent transportation systems (ITS), traffic management strategies, traffic signal and intersection improvements, auxiliary lanes, access management, and transit improvements. The TSM&O Alternative alone is not considered a viable alternative as McIntosh Road would not meet the LOS target unless it is widened to four-lanes. The incorporation of viable TSM&O improvements will be considered as part of the Build Alternative.

4.4 Future Conditions

4.4.1 Project Traffic Forecast

Design year 2045 AADTs were developed by applying a growth rate to the existing year AADTs. Opening year 2025 AADTs were then determined through interpolation of existing year and design year AADTs. Traffic factors were applied to the future year AADTs to obtain opening and design year segment design hour volumes (DHVs) and DDHVs. Lastly, the AM and PM peak hour intersection turning movement volumes for the future horizon years (i.e., 2025 and 2045) were determined by applying turning movement percentages derived from existing TMCs to the segment DDHVs.

4.4.2 Growth Rate Analysis

A robust analysis was undertaken to determine the appropriate growth rate for the corridor. The growth rate analysis included a detailed assessment of historical traffic growth trends, travel demand model highway assignment growth (TBRPM 2015/2045), and socio-economic growth (TBRPM 2015/2045). A compounded annual growth rate of 2.0% was recommended for the study area.

Table 4-5 and **Figure 4-3** show the projected opening year (2025) and design year (2045) AADTs. **Figure 4-4** shows the opening year (2025) AM and PM peak hour turning movement volumes and **Figure 4-5** shows the design year (2045) AM and PM peak hour turning movement volumes.

Table 4-5 Opening Year (2025) and Design Year (2045) AADTs

Location	Year 2020	Opening Year 2025	Opening Year 2025 Rounded	Design Year 20245	Design Year 2045 Rounded
I-4 EB Off-ramp	5,100	5,631	5,600	8,367	8,400
I-4 EB On-ramp	5,500	6,072	6,100	9,023	9,000
I-4 WB Off-ramp	4,100	4,527	4,500	6,726	6,700
I-4 WB On-ramp	5,300	5,852	5,900	8,695	8,700
McIntosh Road north of Muck Pond Road/Gore Road	5,300	5,852	5,900	8,695	8,700
McIntosh Road north of I-4	10,000	11,041	11,000	16,406	16,500
McIntosh Road south of I-4	21,000	23,186	23,000	34,453	34,500
Muck Pond Road west of McIntosh Road	1,900	2,098	2,100	3,117	3,100
Gore Road east of McIntosh Road	3,600	3,975	4,000	5,906	5,900
McIntosh Road south of US 92	11,000	12,145	12,000	18,407	18,000
US 92 west of McIntosh Rd	10,500	12,351	12,500	23,643	23,500
US 92 east of McIntosh Rd	12,500	14,703	14,500	28,146	28,000
Newsome Road	2,100	2,319	2,300	3,445	3,400

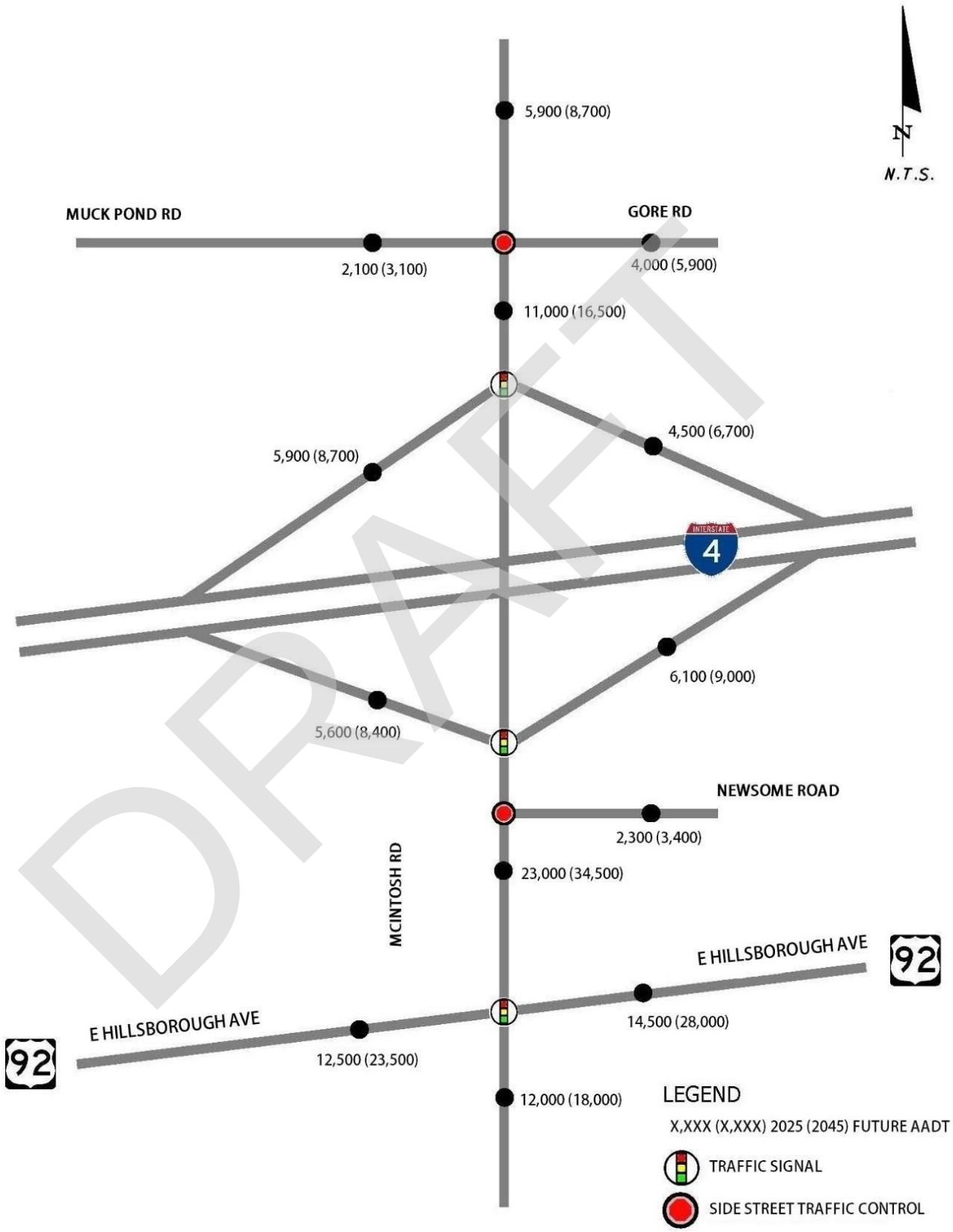


Figure 4-3 Opening Year (2025) and Design Year (2045) AADTs

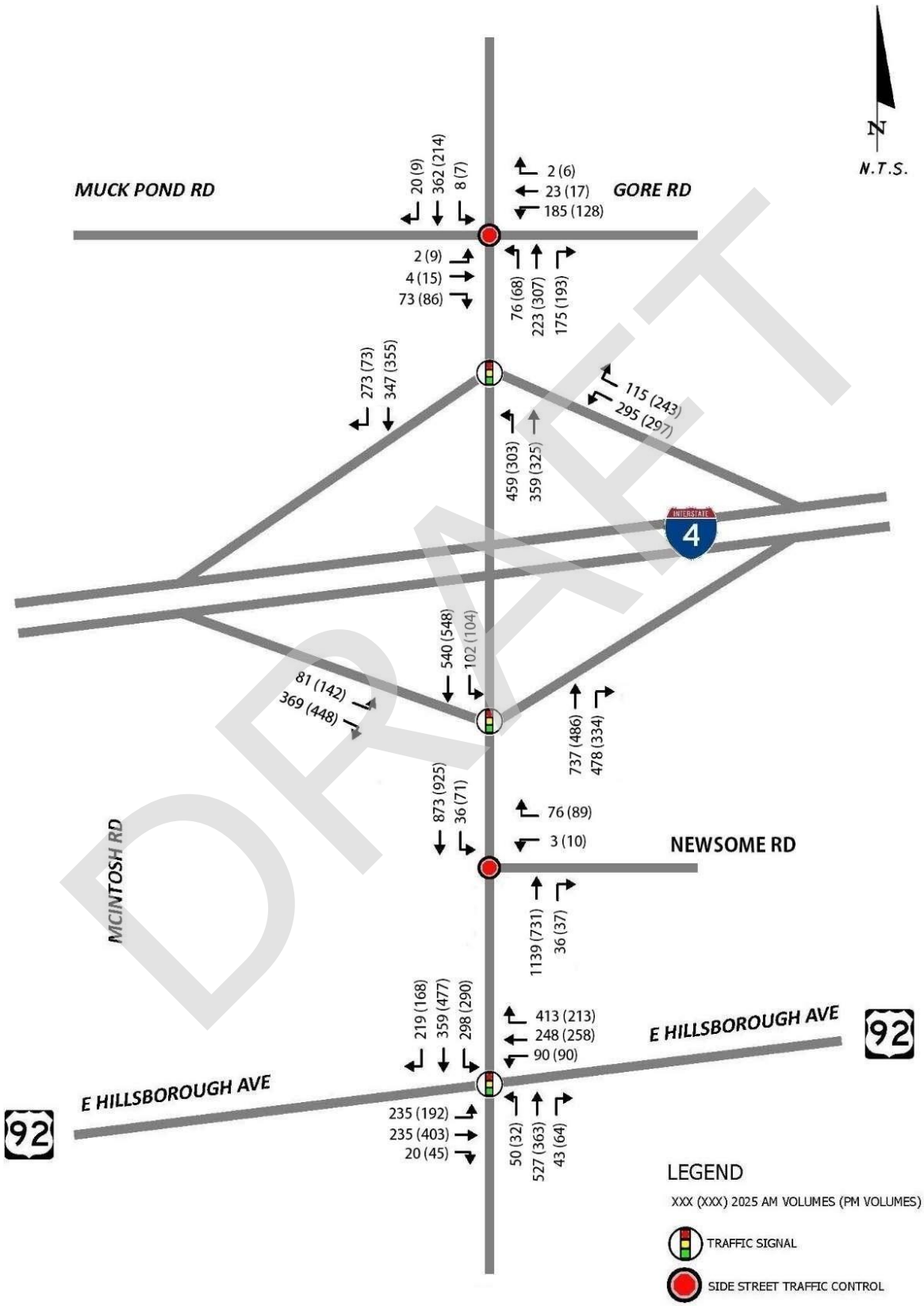


Figure 4-4 Opening Year (2025) Turning Movement Volumes

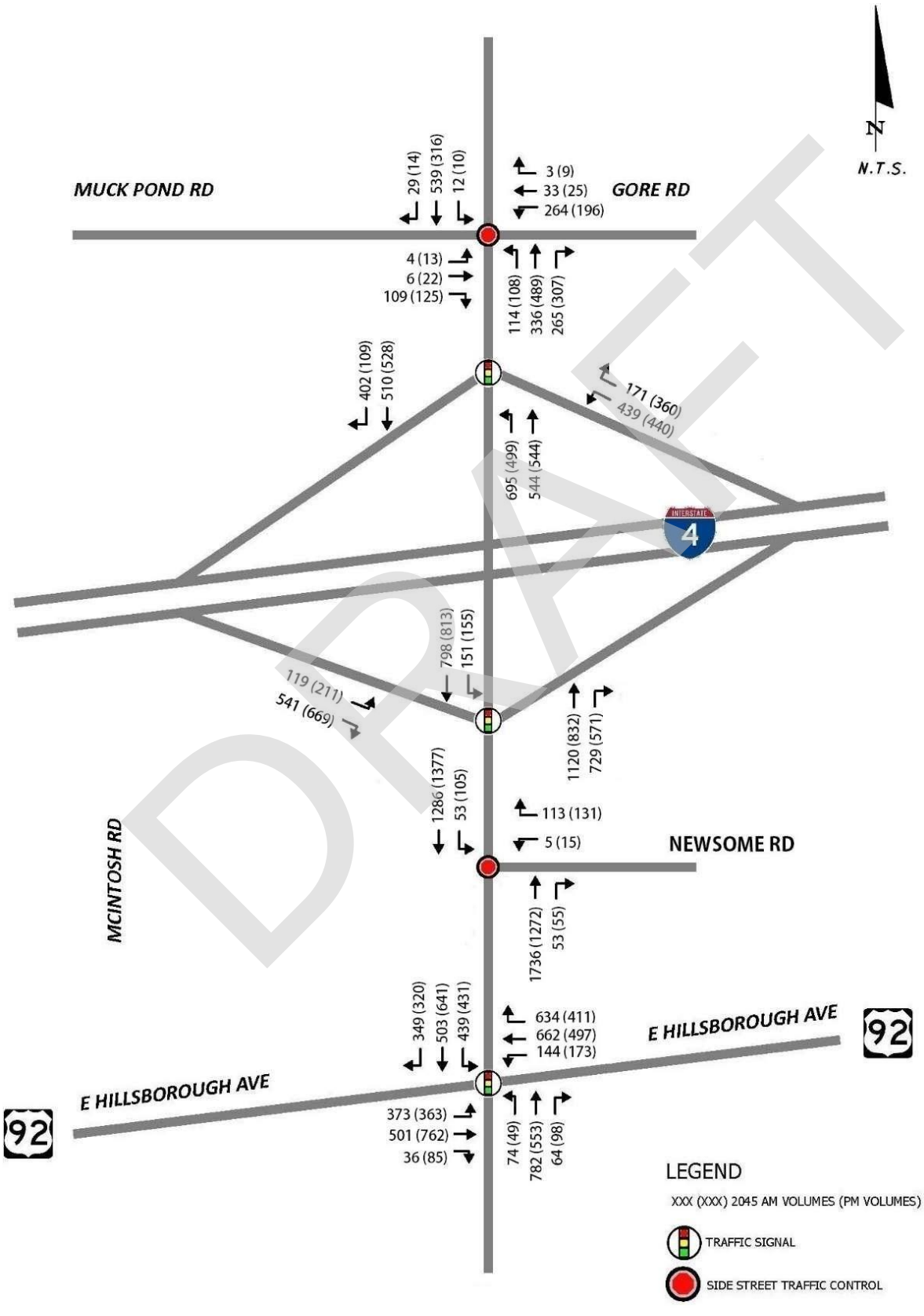


Figure 4-5 Design Year (2045) Turning Movement Volumes

4.4.3 Future Land Use

Suburban Mixed Use, Residential, and Public/Quasi Public are the primary future land use designations adjacent to the corridor. **Figure 4-6** shows a map of the future land use designations. Strawberry Crest High School and Bailey Elementary School are the existing facilities in the Public / Quasi Public map designations.

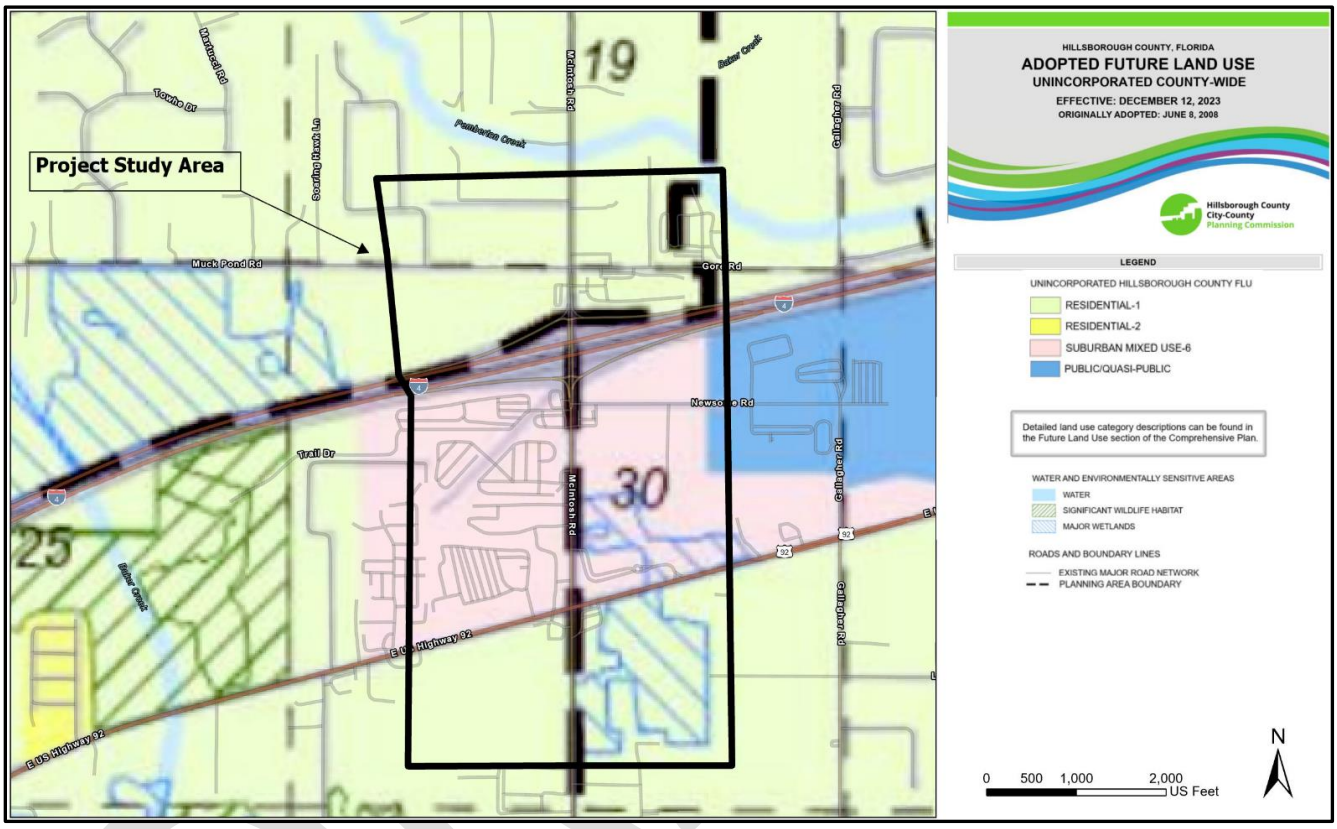


Figure 4-6 Future Land Use Map

4.5 Build Alternative(s)

The Build Alternative consists of the improvements identified in the US 92 PD&E Study for the US 92 intersection, as discussed in the No Build Alternative section above, plus the following improvements:

- Widening of McIntosh Road from a two-lane undivided roadway to a four-lane divided roadway from south of the US 92 intersection to north of the Muck Pond Road/Gore Road intersection
- TUDI with the following improvements:
    - At the Muck Pond Road/Gore Road intersection
        - Adding a SB left turn lane
        - Adding an EB right turn lane
        - Adding a NB left turn and NB right turn lane
        - Extending the storage length of the WB left turn lane from 175-feet to 300-feet
    - At the I-4 WB ramp terminal intersection:

        - Dual NB left turn lanes extending south to south of the Newsome Road intersection
        - Adding an additional I-4 WB left turn lane creating dual left turn lanes
        - Adding a SB to WB right turn lane
    - At the I-4 EB ramp terminal intersection
        - Adding an additional I-4 EB right turn lane to create dual right turn lanes
        - Adding a NB right turn lane which creates a two-lane EB on-ramp. The two-lanes merge into one-lane before entering I-4 mainline
- Access management improvements at the Newsome Road intersection

With the access management improvements, the vehicles making the left from Newsome Road were assumed to make a right turn and make a U-turn movement at Muck Pond Road/Gore Road. Vehicles making a SB left from McIntosh Road to access Newsome Road to access 7-Eleven and Burger King were assumed to stay in the area and visit Raceway Gas Station and McDonalds on the other side of the road instead. The Build Alternative improvements for opening year 2025 and design year 2045 are shown in **Figure 4-7**.

4.5.1 Opening Year 2025 Build Alternative

The improvements included in **Figure 4-7** and discussed in **Section 4.5** are included in the Year 2025 Build Analysis. **Tables 4-6** and **4-7** summarize the intersections operational analysis results for the Year 2025 Build Alternative. All the intersections are expected to operate at LOS D or better and none of the intersection movement queues are expected to exceed their storage length. The 2025 Build Synchro results are included in the PTAR in **Appendix B**.

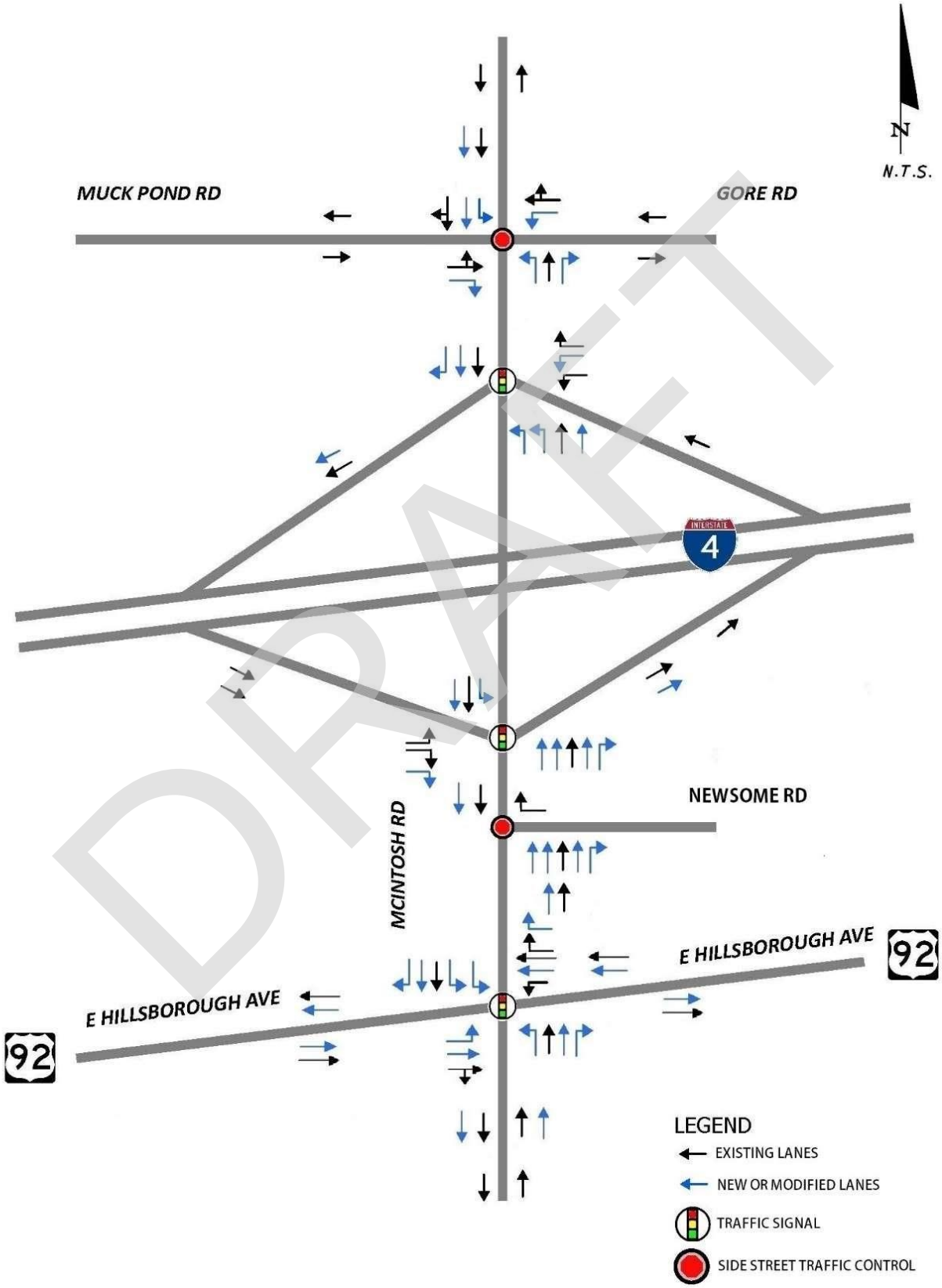


Figure 4-7 Build Alternative Geometry

Table 4-6 Opening Year (2025) Build Intersection Delay and LOS Results

Approach	Movement	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Approach LOS	Delay (sec)	LOS	Approach LOS
Intersection: McIntosh Road at Muck Pond Road/Gore Road*							
Eastbound	Left/Thru	16.3	C	B	16.8	C	B
	Right	10.0	B		9.4	A	
Westbound	Left	21.4	C	C	18.2	C	C
	Thru/Right	15.3	C		13.6	C	
Northbound	Left	8.6	A		8.3	A	
Southbound	Left	8.3	A		8.6	A	
Intersection: McIntosh Road at I-4 WB Ramps**							
Westbound	Left	35.0	C	C	32.4	C	C
Northbound	Left	6.1	A	A	6.1	A	A
	Through	0.1	A		0.1	A	
Southbound	Through	11.5	B	B	10.5	B	B
	Intersection	**11.7**		**B**	**Intersection**	**11.8**	**B**
Intersection: McIntosh Road at I-4 EB Ramps**							
Eastbound	Left	26.6	C	D	25.9	C	C
	Right	39.0	D		35.1	D	
Northbound	Through	10.9	B	B	12.0	B	B
Southbound	Left	6.9	A	A	8.0	A	A
	Through	0.3	A		0.3	A	
	Intersection	**13.9**		**B**	**Intersection**	**15.1**	**B**
Intersection McIntosh Road at Newsome Road*							
Westbound	Right	15.5	C	C	13.2	B	B
Intersection: McIntosh Road at US 92							
Eastbound	Left	78.7	E	E	72.6	E	E
	Thru/Right	41.5	D		57.1	E	
Westbound	Left	47.7	D	D	53.8	D	D
	Through	55.0	D		63.1	E	
	Right	31.1	C		26.6	C	
Northbound	Left	43.7	D	D	41.6	D	D
	Through	50.1	D		44.8	D	
	Right	41.6	D		41.5	D	
Southbound	Left	22.1	C	B	15.5	B	B
	Through	17.6	B		13.3	B	
	Right	8.4	A		5.9	A	
	Intersection	**38.4**		**D**	**Intersection**	**37.9**	**D**

*Per HCM 6th Edition: For Two Way Stop Control (TWSC) intersections only minor movements delay and LOS are reported. HCM 6th Edition does not calculate LOS for major street thru movements and approached or for the intersection as a whole.

**HCM 6th Edition does not include unsignalized delay on approach delay and intersection delay calculations.

Table 4-7 Opening Year (2025) Build Alternative Intersection Vehicle Queues

Intersection	Movement	Storage (feet)	AM Peak Hour Queues (95th Percentile)		PM Peak Hour Queues (95th Percentile)	
			Veh	Feet**	Veh	Feet**
McIntosh Road at Muck Pond Road/Gore Road	EB Left/Thru	1,000	0.1	3	0.2	5
	EB Right	300	0.3	8	0.3	8
	WB Left	300	2.5	63	1.4	35
	WB Thru/Right	1,000	0.2	5	0.2	5
	NB Left	480	0.2	5	0.2	5
	SB Left	1,000	0.0	0	0.0	0
McIntosh Road at I-4 WB Ramps	WB Left*	1,250	4.9	123	4.7	118
	NB Left	600	2.0	50	1.3	33
	NB Through	600	0.2	3	0.1	3
	SB Through	480	2.8	70	2.7	68
McIntosh Road at I-4 EB Ramps	EB Left	1,570	2.3	58	4.0	100
	EB Right*	1,325	6.6	165	7.5	188
	NB Through	260	2.8	70	2.0	50
	SB Left	240	1.0	25	1.2	30
	SB Through	600	0.1	3	0.2	5
McIntosh Road at Newsome Road	WB Right	1,000	0.7	18	0.7	18
McIntosh Road at US 92	EB Left	650	15.3	383	12.4	310
	EB Thru/Right	1,000	6.8	170	12.8	320
	WB Left	450	5.1	128	5.5	138
	WB Through	1,000	7.6	190	8.4	210
	WB Right	500	9.1	228	4.4	110
	NB Left	400	2.7	68	1.7	43
	NB Through	1,000	13.8	345	9.5	238
	NB Right	400	2.3	58	3.4	85
	SB Left	500	5.2	130	4.1	103
	SB Through	2,000	5.9	148	6.6	165
	SB Right	500	4.6	115	2.7	68

*For ramps, the storage was determined as the length of the ramp or as the storage length when provided. The length of the ramp includes an adjustment for deceleration distance.

**Queue in feet estimated by multiplying the number of vehicles times 25-feet.

4.5.2 Design Year 2045 Build Alternative

Tables 4-8 and **4-9** summarize the intersections operational analysis results for the Year 2045 Build Alternative.

All the intersections are expected to operate at LOS D or better in design year 2045 except for the US 92 intersection during the morning peak hour, which is shown operating at LOS E. The queues from the ramps are not expected to impact the I-4 mainline.

The queue for the EB left at the US 92 intersection is expected to exceed the storage length during the morning peak hour. The 2045 Build Synchro results are included in the PTAR.

The unsignalized intersection of Newsome Road will be changed to a right in/right out condition with the Build Alternative. Four (4) NB through lanes will be approaching the unsignalized intersection and HCM 6th Edition unsignalized analysis only allows a maximum of three-lanes on the major street. The NB through movement volume was calculated by adding the NB left turn movement volume plus the NB through volume at Newsome Road minus the NB left turn movement adjusted equally by the number of lanes plus the vehicles making the left from Newsome Road that were assumed to make a right turn and make a U-turn movement at Muck Pond Road/Gore Road.

The unsignalized analysis for Newsome Road was conducted using HCS 7 and those results are shown in **Table 4-6** and **Table 4-7**. The HCS results are included in the PTAR.

Table 4-8 Design Year (2045) Build Intersection Delay and LOS Results

Approach	Movement	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Approach LOS	Delay (sec)	LOS	Approach LOS
Intersection: McIntosh Road at Muck Pond Road/Gore Road*							
Eastbound	Left/Thru	24.1	C	B	28.7	D	B
	Right	11.3	B		10.2	B	
Westbound	Left	113.7	F	F	63.8	F	F
	Thru/Right	22.1	C		18.7	C	
Northbound	Left	9.7	A		8.9	A	
Southbound	Left	8.9	A		9.7	A	
Intersection: McIntosh Road at I-4 WB Ramps**							
Westbound	Left	37.8	D	D	32.1	C	C
Northbound	Left	9.3	A	A	26.8	C	B
	Through	0.2	A		0.3	A	
Southbound	Through	20.9	C	C	19.8	B	B
	Intersection	**15.4**		**B**	**Intersection**	**18.8**	**B**
Intersection: McIntosh Road at I-4 EB Ramps**							
Eastbound	Left	27.3	C	D	24.9	C	D
	Right	47.9	D		51.6	D	
Northbound	Thru/Right	17.3	B	B	18.1	B	B
Southbound	Left	43.8	D	A	37.7	D	A
	Through	0.5	A		0.6	A	
	Intersection	**20.3**		**C**	**Intersection**	**22.7**	**C**
Intersection McIntosh Road at Newsome Road*							
Westbound	Right	27.6	D	D	21.4	C	C
Intersection: McIntosh Road at US 92							
Eastbound	Left	113.0	F	E	92.9	F	E
	Thru/Right	39.9	D		51.2	D	
Westbound	Left	44.3	D	D	46.3	D	D
	Through	82.5	F		58.7	E	
	Right	21.6	C		13.6	B	
Northbound	Left	89.2	F	E	94.1	F	D
	Through	59.6	E		53.6	D	
	Right	29.8	C		24.7	C	
Southbound	Left	98.4	F	D	87.6	F	D
	Through	37.4	D		40.1	D	
	Right	17.9	B		18.2	B	
	Intersection	**57.4**		**E**	**Intersection**	**51.5**	**D**

*Per HCM 6th Edition: For Two Way Stop Control (TWSC) intersections only minor movements delay and LOS are reported. HCM 6th Edition does not calculate LOS for major street thru movements and approached or for the intersection as a whole.

**HCM 6th Edition does not include unsignalized delay on approach delay and intersection delay calculations.

Table 4-9 Design Year (2045) Build Alternative Intersection Vehicle Queues

Intersection	Movement	Storage (feet)	AM Peak Hour Queues (95th Percentile)		PM Peak Hour Queues (95th Percentile)	
			Veh	Feet**	Veh	Feet**
McIntosh Road at Muck Pond Road/Gore Road	EB Left/Thru	1,000	0.2	5	0.7	18
	EB Right	300	0.6	15	0.6	15
	WB Left	300	11.3	283	6.6	165
	WB Thru/Right	1,000	0.5	13	0.4	10
	NB Left	480	0.5	13	0.4	10
	SB Left	1,000	0.0	0	0.0	0
McIntosh Road at I-4 WB Ramps	WB Left*	1,250	8.1	203	6.9	173
	NB Left	600	4.1	103	6.1	153
	NB Through	600	0.1	3	0.2	5
	SB Through	480	6.8	170	6.4	160
McIntosh Road at I-4 EB Ramps	EB Left	1,570	3.7	93	5.7	143
	EB Right*	1,325	10.7	268	12.4	310
	NB Through	260	6.6	165	4.6	115
	SB Left	240	5.8	145	5.0	125
	SB Through	600	0.2	5	0.3	8
McIntosh Road at Newsome Road	WB Right	1,000	2.2	55	2.0	50
McIntosh Road at US 92	EB Left	650	28.9	723	24.3	608
	EB Thru/Right	1,000	13.6	340	21.6	540
	WB Left	450	8.3	208	9.2	230
	WB Through	1,000	22.5	563	14.1	353
	WB Right	500	9.3	233	5.2	130
	NB Left	400	6.4	160	4.2	105
	NB Through	1,000	22.8	570	14.9	373
	NB Right	400	3.6	90	5.3	133
	SB Left	500	17.0	425	15.0	375
	SB Through	2,000	12.4	310	15.0	375
	SB Right	500	11.7	293	10.3	258

*Average of both turn lanes.
**Queue in feet estimated by multiplying the number of vehicles times 25-feet.
Highlights indicate queue length exceeds storage length.

4.5.3 Future Conditions Safety Analysis

The Build Alternative improvements for McIntosh Road include widening McIntosh Road from a two-lane undivided roadway to a four-lane divided roadway, access management, and additional left turn and right turn lanes at the I-4 ramp terminal intersections. A crash modification factor (CMF) of 0.341 was obtained from the CMF Clearinghouse. CMF ID 7566 was used because it includes Florida data. The CMF represents a reduction of 66% in total crashes along McIntosh Road. Therefore, the improvement is expected to reduce 66% of the 81 applicable crashes that occur along McIntosh Road. The information for CMF 7566 is included in the PTAR.

4.5.4 Summary of Analysis Results

As shown in **Table 4-10**, the Build Alternative improves the intersection delays compared to the No-Build Alternative. **Table 4-11** shows the arterial LOS results of the No-Build and Build Alternatives. The widening of McIntosh Road will improve the capacity, operation, and safety along McIntosh Road and improve connectivity between I-4 and US 92.

Table 4-10 Design Year (2045) Intersection Analysis Summary

Intersection	No-Build (2045) Intersection Results				Build (2045) Intersection Results			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
McIntosh Road at Muck Pond Road/Gore Road*	1,533.2	F	1,018.5	F	113.7	F	63.8	F
McIntosh Road at I-4 WB Ramps	193.4	F	84.1	F	15.4	B	18.8	B
McIntosh Road at I-4 EB Ramps	213.9	F	132.9	F	20.3	C	22.7	C
McIntosh Road at Newsome Road**	1,633.3	F	97.3	F	27.6	D	21.4	C
McIntosh Road at US 92	67.3	E	67.4	E	57.4	E	51.5	D

*Represents highest movement delay for the unsignalized intersection.

**Additional analysis results shown under Build Alternative.

Table 4-11 Design Year (2045) Arterial LOS

Cross Street Along McIntosh Road	No-Build (2045)				Build (2045)			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS
Northbound Direction								
US 92	6.7	F	5.4	F	6.0	F	8.2	F
I-4 EB On-Ramp	3.4	F	4.6	F	27.8	C	28.4	B
I-4 WB On-Ramp	17.9	D	15.2	E	20.2	D	22.1	C
Total	**4.6**	**F**	**5.4**	**F**	**13.8**	**E**	**16.7**	**E**
Southbound Direction								
US 92	17.9	D	15.9	F	18.5	D	18.4	D
I-4 EB On-Ramp	16.0	E	12.9	F	18.4	D	14.8	E
I-4 WB On-Ramp	4.7	F	9.6	F	18.3	D	18.2	D
Total	**9.0**	**F**	**12.6**	**F**	**18.4**	**D**	**17.7**	**D**

5.0 PROJECT COORDINATION & PUBLIC INVOLVEMENT

5.1 Agency Coordination

Agency coordination for this project has occurred through the ETDM process (ETDM Number: 14469) and Environmental Screening Tool (EST). The EPA and SWFWMD expressed social and contamination concerns, respectively. Alternatives have been developed to avoid disproportionate impact to minority and low-income populations. For contamination, a Contamination Screening Evaluation Report has been completed to identify medium and high risk rated contamination sites. During design, Level II contamination testing will be conducted to determine if any remediation is required to construct the project. If so, a Level III contamination testing will be completed to determine remediation activities prior to and/or during construction. SMF and floodplain compensation sites will avoid locations with known contamination issues and meet SWFWMD requirements to avoid impacting surface and/or ground water due to known contamination sites.

Numerous local, regional, state, and federal agencies were identified as having an interest in this project through jurisdictional review or expressed interest. These agencies were identified and contacted through the Advance Notification (AN) process at the outset of the project in accordance with the *PD&E Manual*. The AN Package was distributed by the Florida State Clearinghouse on April 16th, 2021, for the project. Coordination with agencies is summarized below:

- Met with Hillsborough County on November 13, 2023 to update the county on project status and to gain input on the Hillsborough County's preferences on typical section and alignment.

5.2 Public Involvement

A comprehensive Public Involvement Plan (PIP) was developed for this project and prepared under separate cover. The PIP outlines the strategies used to address public involvement and outreach over the course of the study. A project website, www.fdotd7studies.com/projects/mcintosh-rd-us92-to-i4/, was created to provide the public with project specific information and to give the public an opportunity to make comments and sign up for the project mailing list. A project newsletter was mailed out to all property owners within 300-feet of the centerline in October 2023 and is available on the project website. Following the newsletter mailing and project website, no public comments have been received from the public. At the conclusion of the study, a Comments and Coordination Report will be prepared to fully document the public involvement activities conducted throughout the project.

5.3 Public Hearing

A public hearing will be conducted on September 26th, 2024. This section will be updated following the public hearing.

6.0 DESIGN FEATURES OF THE PREFERRED ALTERNATIVE

6.1 Engineering Details of the Preferred Alternative

6.1.1 Typical Section

See **Figure 1-2** for the preferred typical section. The proposed design speed for the urban typical section is 35 mph. Conceptual plans for the Preferred Alternative are included in **Appendix A**.

6.1.2 Bridges and Structures

There are no bridges within the Preferred Alternative. Twin bridges along I-4 (numbers 10190614 and 10190615) cross over McIntosh Road within the project limits, but they will not be altered.

6.1.3 Right-of-Way and Relocations

To accommodate the roadway widening and anticipated off site stormwater and floodplain compensation sites, acquisition of additional ROW and permanent easements are anticipated. ROW and permanent easements will need to be acquired from twenty-six (26) parcels totaling 44.43 acres. The ROW requirement for the roadway widening and intersection improvements across twenty-two (22) parcels totals 5.51 acres. The ROW requirement for constructing and maintaining proposed off-site facilities for stormwater management and floodplain compensation along the project impacts ten (10) parcels for a minimum of 38.74 acres. The permanent drainage easement requirement is 0.19 acres. As the entire project and pond sites will be located on land with a future land use map designation of non-agricultural, farmlands form and coordination with NRCS is not required.

The acquisition of ROW may result in the relocation of three (3) residences and two (2) businesses. The proposed ROW acquisition includes two (2) residential relocations accounting for 0.33 acres for roadway widening on the south side of US 92 and one (1) residential relocation accounting for 1.71 acres for roadway widening and floodplain compensation north of Gore Road. The two (2) business relocations include 0.09 acres of roadway widening at Hungry Howie's, north of US 92, and 0.40 acres of roadway widening at Burger King, south of I-4.

6.1.4 Horizontal Geometry

The Build Alternative utilizes the proposed typical sections. The centerline of the proposed typical section is offset 11-feet to the right of the existing roadway centerline and the proposed four-lane facility will be constructed symmetrically around that centerline. The existing horizontal alignment for McIntosh Road was obtained from baseline survey data obtained from Hillsborough County and FDOT's survey section. There are no horizontal curves within the study area. There are four (4) horizontal points of intersection (HPI), each with a deflection angle of 0.047 degrees or less. The HPIs meet design standards for 35 mph design speed. **Table 6-1** summarizes the horizontal geometry within the project limits.

Table 6-1 Horizontal Geometry

HPI (Back) (Sta.)	HPI (Ahead) (Sta.)	Tangential Direction (degree)	Tangential direction (degree)	Deflection Angle (degree)
6+33.99	19+78.25	0.112	0.085	0.027
19+78.25	33+03.16	0.085	0.124	0.039
33+03.16	46+27.17	0.124	0.098	0.026
46+27.17	54+87.94	0.098	0.145	0.047

6.1.5 Vertical Geometry

The proposed profile from the beginning of the project to the intersection of US 92 will be adjusted to ensure that the vertical alignment meets the design standards and is modeled after the existing profile of US 92 to produce smooth tie-ins. The alignment north of US 92 will consider the existing ground profile of McIntosh Road and will be a "best-fit" to transition from the rural typical section into the urban typical section. The study area is relatively flat, with the steepest grade at 0.4%. There are a total of four (4) vertical curves along the profile. The vertical curves meet design standards for 35 mph design speed. **Table 6-2** summarizes the vertical alignment of McIntosh Road within the project limits.

Table 6-2 Vertical Alignment

PVC (Sta.)	PVT (Sta.)	Algebraic Grade Difference (%)	Type	Curve Length (feet)	FDOT Min. Length (feet)	K value	FDOT Min. K Value
4+51.11	5+71.11	0.127	Crest	120	105	944.32	47
12+83.84	20+83.84	0.600	Crest	800	105	1331.28	47
33+00.33	39+00.33	0.600	Sag	600	105	1000.00	49
42+92.66	49+92.66	0.700	Crest	700	105	985.88	47

6.1.6 Bicycle and Pedestrian Accommodations

Ten-foot wide shared use paths are proposed along both the NB and SB lanes along McIntosh Road. Near the southern end of the study area, the proposed shared use path will tie-in to the proposed shared use path along US 92.

6.1.7 Multi-Modal Accommodations

Per the *Hillsborough Area Regional Transit Authority Transit Development Plan Update FY 2021-2030*, no bus stops or other transit connections exist or are proposed within the study area.

6.1.8 Access Management

McIntosh Road will be converted from a non-restrictive two-lane roadway to a class 5 restrictive-median roadway with 245-foot minimum connection spacing (35 mph design speed). Median openings are spaced at a minimum of 660 feet for both directional and full.

6.1.9 Intersection and Interchange Concepts

All study intersections under the Build Alternative were examined for geometry and control enhancements to improve operations. The following intersections were evaluated along McIntosh Road:

- Muck Pond Road/Gore Road (Stop-Controlled)
- I-4 WB ramp terminal (Signalized)
- I-4 EB ramp terminal (Signalized)
- Newsome Road (Stop-Controlled)
- US 92 (Signalized)

The Build Alternative largely maintains the existing intersection control schemes, with the exception of Newsome Road, which will be restricted to right-in/right-out movements.

6.1.10 Intelligent Transportation System and TSM&O Strategies

The ITS within the project limits consists of the I-4 Freeway Management System (FMS) and the Hillsborough County Advanced Traffic Management System (ATMS). The I-4 FMS includes underground fiber optic infrastructure and electrical infrastructure along WB I-4, as well as a closed-circuit television (CCTV) camera site that is located on the west side of McIntosh Road between EB and WB I-4 mainlines. In addition, wrong-way vehicle detection systems (WWVDSs) are planned for deployment at the I-4 off-ramps to McIntosh Road; however, the construction of them is currently unfunded. The Hillsborough County ATMS includes wireless communications to the existing traffic signal controller at US 92 and McIntosh Road.

Additional TSM&O strategies or technologies for the I-4 FMS that should be considered for the project would be related to its operations and maintenance. This would include the potential for deploying arterial dynamic message signs (ADMSs) on the McIntosh Road approaches to I-4. The ADMSs would provide travel conditions related messages that the traveling public could use to make travel related decisions. In addition, impacted FMS infrastructure will be resolved with the project. The anticipated impacts include the underground fiber optic and electrical infrastructure that serves the CCTV camera site located on the west side of McIntosh Road between EB and WB I-4 mainlines as well as the WWVDSs on the I-4 off-ramps to McIntosh Road should they be deployed prior to this project.

Additional TSM&O strategies or technologies for the Hillsborough County ATMS that should be considered for the project include the installation of fiber optic infrastructure along McIntosh Road from US 92 to the I-4 interchange and a CCTV camera at the US 92 and McIntosh Road intersection. The fiber optic infrastructure installation would provide connectivity to the US 92 and McIntosh Road intersection via the I-4 FMS fiber optic infrastructure. The connectivity and CCTV camera will enhance the County's and State's abilities to monitor the traffic signal's operations, monitor the traffic conditions around the intersection, and make changes to the traffic signal's operations.

6.1.11 Conceptual Lighting Analysis

Lighting will be evaluated in the design phase.

6.1.12 Utilities

There are seven (7) utility agency owners (UAO) identified within the study area. Responses will be incorporated between initial and final submittal.

6.1.13 Drainage and Stormwater Management Facilities

In the proposed condition, roadway runoff will be collected via closed storm sewer systems and treated in stormwater management facilities (SMFs). Due to the high groundwater table in the area, the SMFs will be wet detention ponds. Each basin will be treated in a separate pond, with the exception of Basins 1 and 7, which are being combined, for a total of five (5) ponds. Ten (10) SMFs have been identified as alternatives for this project. The preferred SMF alternatives have been selected and are listed in **Table 6-3**.

Table 6-3 Preferred SMF Alternatives

Basin	Pond Site	Pond Area (ac.)	Est. Total Cost ($)[1]	Floodplain Impacts	Potential Relocations	Risk[2]	Utility Impacts	Total Parcel Acquisition
1 & 7	SMF 1 & 7-1	2.58	$886,585	No	1R	Low	None	1
2	SMF 2-2	2.51	$3,129,459	Yes (Minimal)	None	Low	None	1
3	SMF 3-1	3.35	$5,076,462	Yes (Minimal)	None	Low	None	1
4	Existing FDOT Pond 7	N/A	TBD	No	None	N/A	None	0
5	SMF 5-2	2.18	$1,926,943	Yes (Minimal)	None	Low	None	1

[1] Estimated total cost is based on preliminary construction and right-of-way costs.
[2] Contamination Risk.

6.1.14 Floodplain Analysis

Based on coordination with the FDOT District Seven District Drainage Engineer, the Hillsborough County HC-SWMM Pemberton Creek model was used to identify special flood hazard areas. Floodplain impact volumes were computed based on the 100-year flood elevations from the SWMM Model.

The proposed reconstruction will impact the 100-year floodplains for both Baker Creek Tributary 2 and Baker Creek Tributary 3, as well as isolated floodplain areas. The estimated 100-year floodplain impacts total 20.70 acre-feet divided into five (5) floodplain impact areas. Ten (10) floodplain compensation sites have been identified as alternatives to provide floodplain compensation for the anticipated floodplain impacts, and five (5) FPC sites were identified as preferred alternatives. The project is not located within a regulatory floodway. See **Table 6-4** for preferred FPC sites.

Table 6-4 Preferred FPC Sites

Basin	FPC Site	FPC Site Area (ac.)	Est. Total Cost ($)[1]	Floodplain Impacts	Potential Relocations	Risk[2]	Utility Impacts	Total Parcel Acquisition
FPC 1	FPC 1-1	3.21	$1,167,544	N/A	None	Med	None	1
FPC 2	FPC 2-1	5.46	$869,216	N/A	None	Low	None	1
FPC 3	FPC 3-2	6.87	$4,491,005	N/A	None	Med	None	2
FPC 4	FPC 4-1	10.94	$6,886,899	N/A	1R	Low	None	1
FPC 5	FPC 5-1	1.64	$1,059,539	N/A	None	Low	None	1

[1] Estimated total cost is based on preliminary construction and right-of-way costs.
[2] Contamination Risk.

Modifications to existing drainage structures (replacement and/or extension of cross drains) included in this project will result in an insignificant change in their capacity to carry floodwater. These modifications will cause minimal increases in flood heights and flood limits which will not result in any significant adverse impacts on the natural and beneficial floodplain values or any significant change in flood risks or damage. There will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes as the result of modifications to existing drainage structures. Therefore, it has been determined that this encroachment is not significant.

6.1.15 Transportation Management Plan

McIntosh Road provides access to businesses, residential properties, and local side streets along this corridor. Due to its importance, the existing travel lanes should be maintained to the maximum extent possible during construction. Lane closures, if necessary, would occur during night or other off-peak hours.

6.1.16 Special Features

To minimize ROW impacts, a gravity wall is proposed along the along the eastern side of McIntosh Road north of US 92.

6.1.17 Design Variations and Design Exceptions

There are no proposed variations or exceptions within the study area.

6.1.18 Cost Estimates

The preliminary cost estimates for the Preferred (Build) Alternative ($millions, rounded) are included in **Table 6-5**. Construction costs are based on FDOT's LRE cost estimating system prepared in April 2024. These costs include components for earthwork, roadway, shoulder, shared use path, median, signing/marking, signalization, drainage (including SMF and FPC sites) as well as temporary traffic control, mobilization and an initial contingency. Estimated costs for gravity walls or retaining walls will be refined in the design phase as field survey is collected to establish needs and wall heights. All costs are preliminary and will be refined as the design phase progresses.

Table 6-5 Estimated Project Costs

Estimated Costs Present Day Costs in $ Million Rounded up to the Nearest $0.1 Million	Total Project
Design (10% of construction)	$4.5
Right of Way for Roadway Widening	$32.8
Right of Way for Stormwater Ponds & Floodplain Compensation Site	$25.5
Wetlands Mitigation	$0.2
Construction Inspection (10% of construction)	$4.5
Construction of Roadway, Drainage and Ponds[1]	$45.3
Total Project Estimated Costs	$112.8

[1] Construction cost based on LRE system prepared April 2024.

6.1.19 Planning Consistency

FDOT is working with Plan Hillsborough to update the Transportation Planning Organization's (TPO) Long Range Transportation Plan (LRTP) to include the project. The TPO's Transportation Improvement Program (TIP) and the FDOT State Transportation Improvement Program (STIP) include funding for the Design phase. Future phases for R/W and construction will need to be added to the TIP and STIP.

6.2 Summary of Environmental Impacts of the Preferred Alternative

6.2.1 Section 4(f)

There are no publicly owned parks and recreation areas, wildlife and waterfowl refuges, and publicly or privately owned historic sites within the study area.

6.2.2 Cultural Resources

As documented in the Cultural Resources Assessment Survey (CRAS) and the CRAS Technical Memorandum for Preferred SMF and FPC Sites, there were no potential resources identified within the project area of potential effect (APE) that meet the eligibility of criteria for inclusion on the National Register of Historic Places, therefore no historic properties will be affected.

6.2.3 Wetlands

Pursuant to Executive Order 11990 entitled "Protection of Wetlands" (May 1977), the US Department of Transportation (USDOT) developed a policy, Preservation of the Nation's Wetlands (USDOT Order 5660.1A), dated August 24, 1978, which requires all federally funded highway projects to protect wetlands to the fullest extent possible. In accordance with this policy, as well as the FDOT PD&E Manual, the project Build Alternative was assessed to determine potential wetland impacts associated with its construction.

The boundaries of all wetlands and other surface waters within the study area were approximated using both a desktop and field review. Jurisdictional delineations/formal determinations will be

completed during the permitting phase of the project. Based on the evaluation completed, approximately 14.45 acres of wetlands and other surface waters occur within the study area. Of these 14.45 acres, 3.69 acres will be impacted by the roadway Build Alternative. Direct impact to wetlands account for only 1.63 acres with the rest being impacts to human-made other surface waters.

Transportation safety standards for additional lanes and widths, side slopes, turn radius, clear zone, sight distance and stormwater treatment requirements necessitate these impacts. The habitat functions of impacted wetlands were quantitatively and qualitatively assessed using the Uniform Mitigation Assessment Method (UMAM). The roadway Build Alternative evaluation resulted in an estimated UMAM functional loss of 0.761 acres.

Unavoidable wetland impacts which will result from the construction of this project will be mitigated pursuant to Section 373.4137, Florida Statutes (F.S.). The project anticipates using commercially available mitigation credits from agency-approved banks with an appropriate geographic service area to provide compensatory mitigation sufficient to offset unavoidable project impacts to wetlands and wetland-dependent species habitat. The mitigation banks within the Hillsborough River Basin include the Hillsborough River Mitigation Bank, Wiggins Prairie Mitigation Bank, Fox Branch Ranch, Two Rivers Mitigation Bank and the North Tampa Mitigation Bank. Although credit availability among these banks will likely change in the time between this PD&E study's conclusion and the project's future environmental permitting efforts, sufficient mitigation credits are available to offset the impacts from the proposed improvements. The exact impact acreage and number of mitigation credits required to fully offset the lost value of functions resulting from the project's wetland impacts will be determined during the design phase and in coordination with the state and federal environmental permitting agencies. With compensatory mitigation completed within the same watershed where the impacts are incurred, the project will not result in cumulative impacts.

6.2.4 Protected Species and Habitat

Literature reviews, agency database searches and field reviews were conducted to assess federal and state-protected species presence, their habitat, and designated critical habitat occurring or potentially occurring within the project study area. Thirty-four (34) species (twelve (12) federally listed, twenty (20)State listed, one (1) federally protected, one (1) State protected) were evaluated based on species ranges including Hillsborough County. Two (2) managed species, the bald eagle (*Haliaeetus leucocephalus*) and Florida black bear (*Ursus americana floridana*), are also discussed based on the potential for occurrence within the study area and their protection under other existing regulations. **Table 6-6** details effect determinations for these listed species.

The project study area was evaluated for the presence of federal and/or state-protected species and their suitable habitat. Based on this evaluation the proposed "***may affect, but is not likely to adversely affect***" the eastern indigo snake (*Drymarchon couperi*), Florida pine snake (*Pituophis melanoleucus mugitus*), gopher tortoise (*Gopherus polyphemus*), short-tailed snake (*Lampropeltis extenuate*), bald eagle (*Haliaeetus leucocephalus*), Florida sandhill crane (*Antigone canadensis pratensis*), little blue heron (*Egretta caerulea*), reddish egret (*Egretta rufescens*), roseate spoonbill (*Patalea ajaja*), tricolored heron (*Egretta tricolor*), wood stork (*Mycteria americana*), Florida spiny-pod (*Matelea* floridana), pinescrub bluestem (*Schizachyrium niveum*), redmargin zephyrlily

(*Zephyranthes simpsonii*), sand butterfly-pea (*Centrosema arenicola*), scrub pinweed (*Lechea cernua*), swamp plume polypody (*Pecluma ptilodon*), Tampa mock vervain (*Glandularia tampensis*) and toothed lattice-vein fern (*Thelypteris serrata*). The project is anticipated to have "***no effect***" on the American oystercatcher (*Haematopus palliates*), Audubon's crested caracara (*Caracara cheriway*), black skimmer (*Rynchops niger*), eastern black rail (*Laterallus jamaicensis ssp. jamaicensis*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), Florida burrowing owl (*Athene cunicularia*), Florida grasshopper sparrow (*Ammodramus savannarum floridanus*), Florida scrub jay (*Aphelocoma coerulescens*), least tern (*Sternula antillarum*), southeastern American kestrel (*Falco sparverius Paulus*), whooping crane *(Grus americana*), and pygmy fringe-tree (*Chionanthus pygmaeus*).

Table 6-6 Effect Determinations for Listed Species

Species	Common Name	State Status (FWC)	Federal Status (USFWS)	Effect Determination	Potential for Occurrence
REPTILES					
Drymarchon corais couperi	Eastern indigo snake	FT	T	MANLAA	Moderate
Pituophis melanoleucus mugitus	Florida pine snake	ST	--	No adverse effect anticipated	Low
Gopherus polyphemus	Gopher tortoise	ST	--	No adverse effect anticipated	Low
Lampropeltis extenuata	Short-tailed snake	ST	--	No adverse effect anticipated	Low
BIRDS					
Haematopus palliates	American oystercatcher	ST	--	No effect	None
Caracara cheriway	Audubon's crested caracara	FT	T	No effect	Low
Haliaeetus leucocephalus	Bald eagle[1]	--	--	--	Moderate
Rynchops niger	Black skimmer	ST	--	No effect	None
Laterallus jamaicensis jamaicensis	Eastern black rail	FT	T	No effect	None
Rostrhamus sociabilis plumbeus	Everglade snail kite	FE	E	No effect	None
Athene cunicularia	Florida burrowing owl	ST	--	No effect	None
Ammodramus savannarum floridanus	Florida grasshopper sparrow	FE	E	No effect	None
Antigone canadensis pratensis	Florida sandhill crane	ST	--	No adverse effect anticipated	Moderate
Aphelocoma coerulescens	Florida scrub jay	FT	T	No effect	None
Sternula antillarum	Least tern	ST	E*	No effect	None
Egretta caerulea	Little blue heron	ST	--	No adverse effect anticipated	Moderate

Species	Common Name	State Status (FWC)	Federal Status (USFWS)	Effect Determination	Potential for Occurrence
Egretta rufescens	Reddish egret	ST	--	No adverse effect anticipated	Moderate
Patalea ajaja	Roseate spoonbill	ST	--	No adverse effect anticipated	Moderate
Falco sparverius paulus	Southeastern American kestrel	ST	--	No effect	None
Egretta tricolor	Tricolored heron	ST	--	No adverse effect anticipated	Moderate
Grus americana	Whooping crane	--	EXPN	No effect	Low
Mycteria americana	Wood stork	FT	T	MANLAA	Moderate
INSECTS					
Danaus plexippus	Monarch butterfly	--	C	--	Low
MAMMALS					
Ursus americanus floridanus	Florida black bear[2]	--	--	--	Low
Perimyotis subflavus	Tricolored bat	--	PE	--	Low
PLANTS					
Matelea floridana	Florida spiny-pod	SE	--	No adverse effect anticipated	Low
Schizachyrium niveum	Pinescrub (scrub) bluestem	SE	--	No adverse effect anticipated	Low
Chionanthus pygmaeus	Pygmy fringe-tree	SE	E	No effect	Low
Zephyranthes simpsonii	Redmargin (Simpson's) zephyrlily	ST	--	No adverse effect anticipated	Low
Centrosema Arenicola	Sand butterfly-pea	SE	--	No adverse effect anticipated	Low
Lechea cernua	Scrub (nodding) pinweed	ST	--	No adverse effect anticipated	Low
Pecluma plumula	Swamp plume polypody	SE	--	No adverse effect anticipated	Low
Glandularia	Tampa mock	SE	--	No adverse effect	Low

Species	Common Name	State Status (FWC)	Federal Status (USFWS)	Effect Determination	Potential for Occurrence
tampensis	vervain			anticipated	
Thelypteris serrata	Toothed lattice-vein fern	SE	--	No adverse effect anticipated	Low

-- Not Listed; MANLAA: May Affect, Not Likely to Adversely Affect
C: Candidate Species, EXPN: Experimental population; Non-essential
E: Endangered; FE: Federal Endangered
T: Threatened; FT: Federal Threatened; PT: Proposed Threatened; ST: State-Designated Threatened
[1] Protected under the Bald and Golden Eagles Protection Act (16 U.S.C. 668-668c)
[2] Protected under the Florida Black Bear Conservation Rule (68A-4.009, F.A.C.)

6.2.5 Essential Fish Habitat

As no Essential Fish Habitat (EFH) is located within the study area, there will be no involvement with EFH. During the ETDM Programming Screen, the National Marine Fisheries Service (NMFS) stated there would be no direct or indirect impacts to NMFS trust resources. NMFS determined no involvement in this project as resources for which they are responsible are not present in the project area.

6.2.6 Highway Traffic Noise

This Noise Study Report (NSR) was prepared as part of the widening of McIntosh Road PD&E study as required by the FDOT Traffic Noise Modeling and Analysis Practitioners Handbook (December 2018). The analysis was performed following the requirements of Title 23, Part 772 of the Code of Federal Regulations (23 CFR 772)—Procedures for Abatement of Highway Traffic Noise and Construction Noise (July 13, 2010).

Eighty-six (86) noise-sensitive receptors (i.e., discrete representative locations on a property with noise-sensitive land uses) were evaluated representing seventeen (17) single-family residences, one (1) school representing four (4) outdoor recreational receptors at Independence Academy, 57 RV sites at the Tampa East RV Resort, six (6) recreational uses for the Tampa East RV Resort, and two (2) outdoor dining areas at restaurants. Noise levels in 2045 in the vicinity of the project are predicted to approach, meet, or exceed the FHWA Noise Abatement Criteria (NAC) at two (2) residences and five (5) RV sites. Based on the noise analysis performed to date, there are no feasible and reasonable solutions available to mitigate the noise impacts at the locations described above.

Seven (7) noise-sensitive receptors were predicted to approach, meet, or exceed the NAC in the Preferred Alternative (2045) scenario, including two (2) residences (that are planned for ROW acquisition and relocation) and five (5) RV park sites at the Tampa East RV Resort. None of the sites were predicted to experience a substantial increase of 15.0 decibels or more on the A-weighted scale (dB[A]) or more in traffic noise because of the project. Two (2) single-family residences (receptors 1-1 and 1-2) were impacted but are planned for ROW acquisition and relocation with the construction of the project. A noise barrier was not analyzed in this location because of this.

6.2.7 Permits

The permits listed in **Table 6-7** are anticipated for this project and will be applied for during the design or construction phase as appropriate:

Table 6-7 Anticipated Permits

Coordinating Agency	Permit
USACE/FDEP	404 Permit
FDEP	NPDES Permit
SWFWMD	Individual ERP Permit

6.2.8 Contamination

The Level I *Contamination Screening Evaluation Report* documented twenty-five (25) sites of potential environmental concern. With sixteen (16) sites rated as a low risk, eight (8) sites rated as a medium risk, and one (1) site rated as a high risk. The medium- and high-risk sites warrant additional assessment for contamination impacts.

6.3 Comparative Alternatives Evaluation

The evaluation summary matrix was developed to compare the No-Build Alternative and the Preferred Alternative based on preliminary estimates of costs (ROW acquisition, wetland mitigation, engineering, and construction) and environmental factors, as shown in **Table 6-8**. The data for the Preferred Alternative was developed based on the Preferred Alternative "footprint" along with base map information collected and prepared for this study. The construction cost estimates were prepared using the Department's Long Range Estimates (LRE) program.

Table 6-8 Evaluation Matrix

Evaluation Criteria	No-Build Alternative	Preferred Build Alternative
Potential Business / Residential Impacts		
Number of business relocations	0	2
Number of residential relocations	0	3
Potential ROW Impacts[1]		
Number of affected parcels	0	26
Area of ROW anticipated to be acquired for road widening (acres)	0	5.51
Area of ROW anticipated to be acquired for Stormwater Ponds and Floodplain Compensation Sites (acres)	0	38.74
Potential Environmental Impacts		
Archaeological Sites / Historic Resources (Potentially Eligible or Eligible)	0/0	0/0
Section 4(f) Resources identified / impacted	0/0	0/0
Noise impacted receptors	0	7
Wetlands that are not Other Surface Waters (acres)	0	1.63
Other Surface Waters (acres)	0	2.06
Potential for Federal and/or State Listed Species	0	Moderate
Petroleum & Hazardous Materials Sites	0	0 (High) / 6 (Medium)
Estimated Costs[2] *(Present Day Cost in $ Millions)*		
Design (10% of construction)	$0.0	$4.5
Right of Way for Roadway Widening	$0.0	$32.8
Right of Way for Stormwater Ponds & Floodplain Compensation Sites	$0.0	$25.5
Wetland Mitigation	$0.0	$0.2
Construction Engineering & Inspection (10% of construction)	$0.0	$4.5
Construction of Roadway, Drainage and Ponds	$0.0	$45.3
Total Project Estimated Costs	**$0.0**	**$112.8**

[1] Based on estimated total area for the McIntosh Road widening and preferred stormwater ponds and floodplain compensation sites.
[2] Construction cost based on LRE system prepared April 2024.

6.4 Selection of the Preferred Alternative

The Build Alternative evaluated in **Section 4.5** and compared with the No-Build Alternative in **Section 4.2** has been selected as the Preferred Alternative. The Build Alternative provides improved capacity, safety, and system linkage to address the failing LOS, high number of crashes exceeding statewide averages for similar facilities, future growth of traffic and a high volume of truck traffic. A detailed description of the Preferred Alternative is presented in **Section 6.1** and will be presented at the public hearing. Concept plans are provided in **Appendix A**.

Appendix A
Conceptual Design Plans

CONTRACT PLANS COMPONENTS

ROADWAY PLANS

INDEX OF ROADWAY PLANS

SHEET NO.	SHEET DESCRIPTION
01	KEY SHEET
02	PROJECT LAYOUT PLAN SHEET
03-13	CONCEPT PLAN SHEETS

STATE OF FLORIDA

DEPARTMENT OF TRANSPORTATION

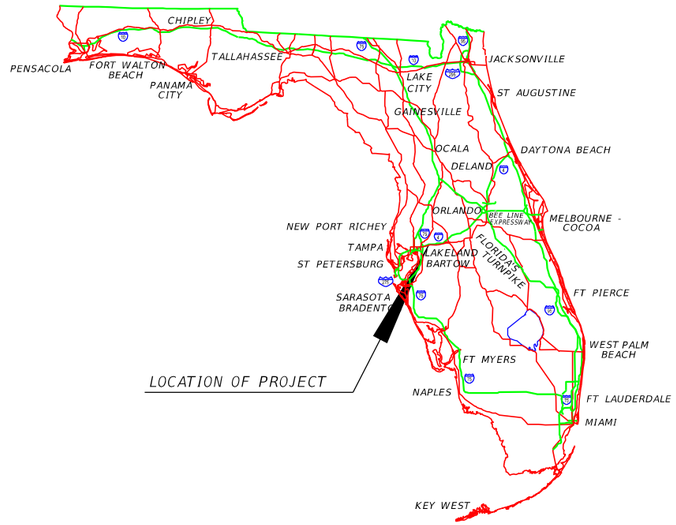
PROJECT DEVELOPMENT AND ENVIRONMENT STUDY CONCEPT PLANS

FINANCIAL PROJECT ID 447157-1-32-01
(FEDERAL FUNDS)
HILLSBOROUGH COUNTY (10900031 & 10000622)

MCINTOSH ROAD

ADD LANES AND RECONSTRUCT
FROM S. OF US 92 TO N. OF I-4

PROJECT LOCATION URL:	https://tinyurl.com/34tuk4p2
PROJECT LIMITS:	BEGIN MP 0.204 – END MP 0.443 (#10900031) BEGIN MP 0.000 – END MP 0.795 (#10000622)
EXCEPTIONS:	NONE
BRIDGE LIMITS:	NONE
RAILROAD CROSSING:	NONE



GOVERNING STANDARD PLANS:

Florida Department of Transportation, FY 2024-25 Standard Plans for Road and Bridge Construction and applicable Interim Revisions (IRs).

Standard Plans for Road Construction and associated IRs are available at the following website: http://www.fdot.gov/design/standardplans

APPLICABLE IRs: N/A

Standard Plans for Bridge Construction are included in the Structures Plans Component

GOVERNING STANDARD SPECIFICATIONS:

Florida Department of Transportation, FY 2024-25 Standard Specifications for Road and Bridge Construction at the following website:
http://www.fdot.gov/programmanagement/Implemented/SpecBooks

ROADWAY PLANS ENGINEER OF RECORD:

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TAMPA, FL 33607
813-281-2900
CONTRACT NO.: CAE10
VENDOR NO.: 04-247365

FDOT PROJECT MANAGER:

CRAIG FOX, P.E.

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Dated 07/29/24

CONSTRUCTION CONTRACT NO.	FISCAL YEAR	SHEET NO.
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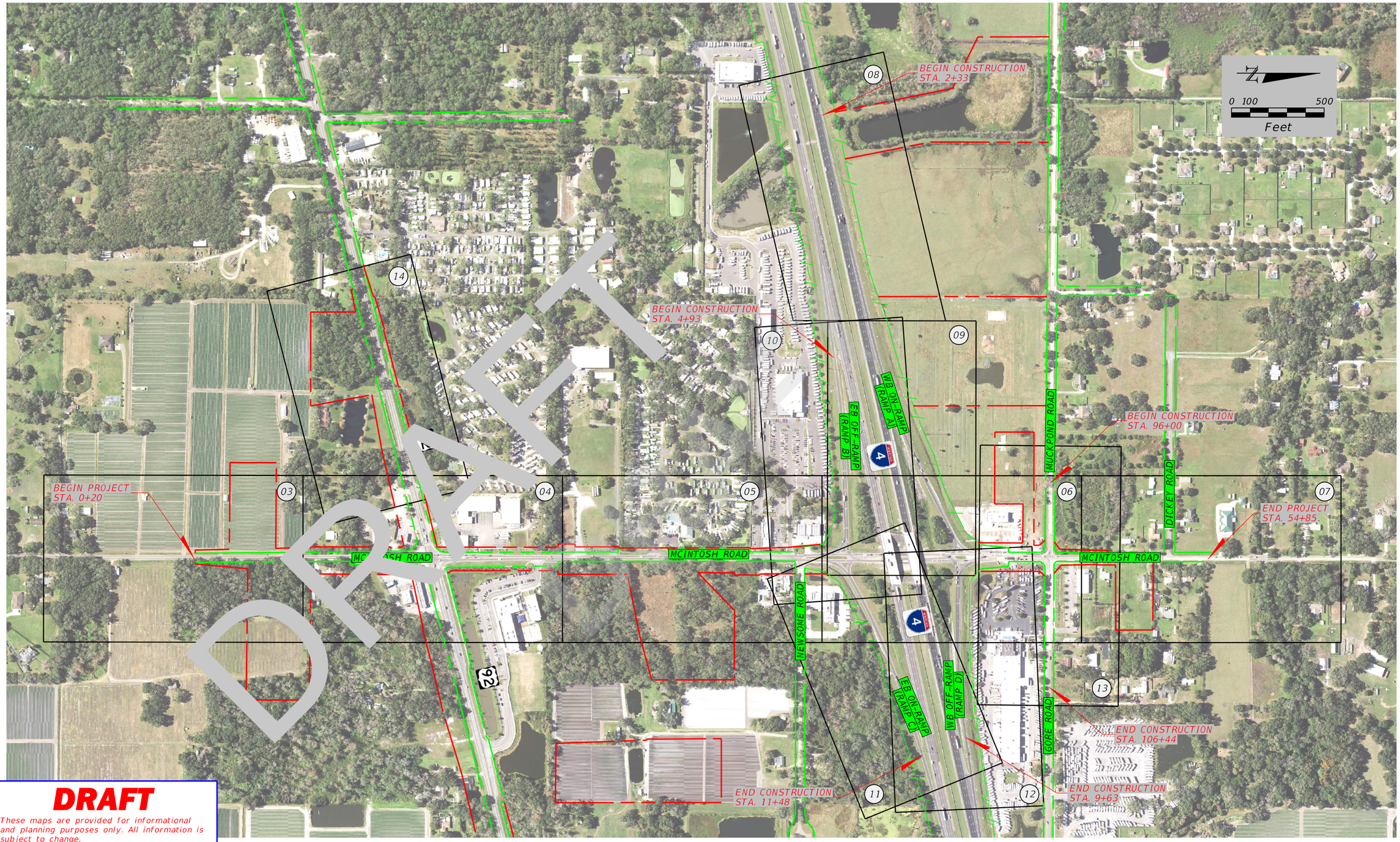

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LEGEND

- EXISTING ROW
- EXISTING LA ROW
- PROPOSED ROW
- PLAN SHEET BOUNDARY
- (#.#) PLAN SHEET NUMBER

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	HILLSBOROUGH	447157-1-32-01

ENGINEER OF RECORD

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MCINTOSH RD. PD&E STUDY

FROM S. OF US 92 TO N. OF I-4
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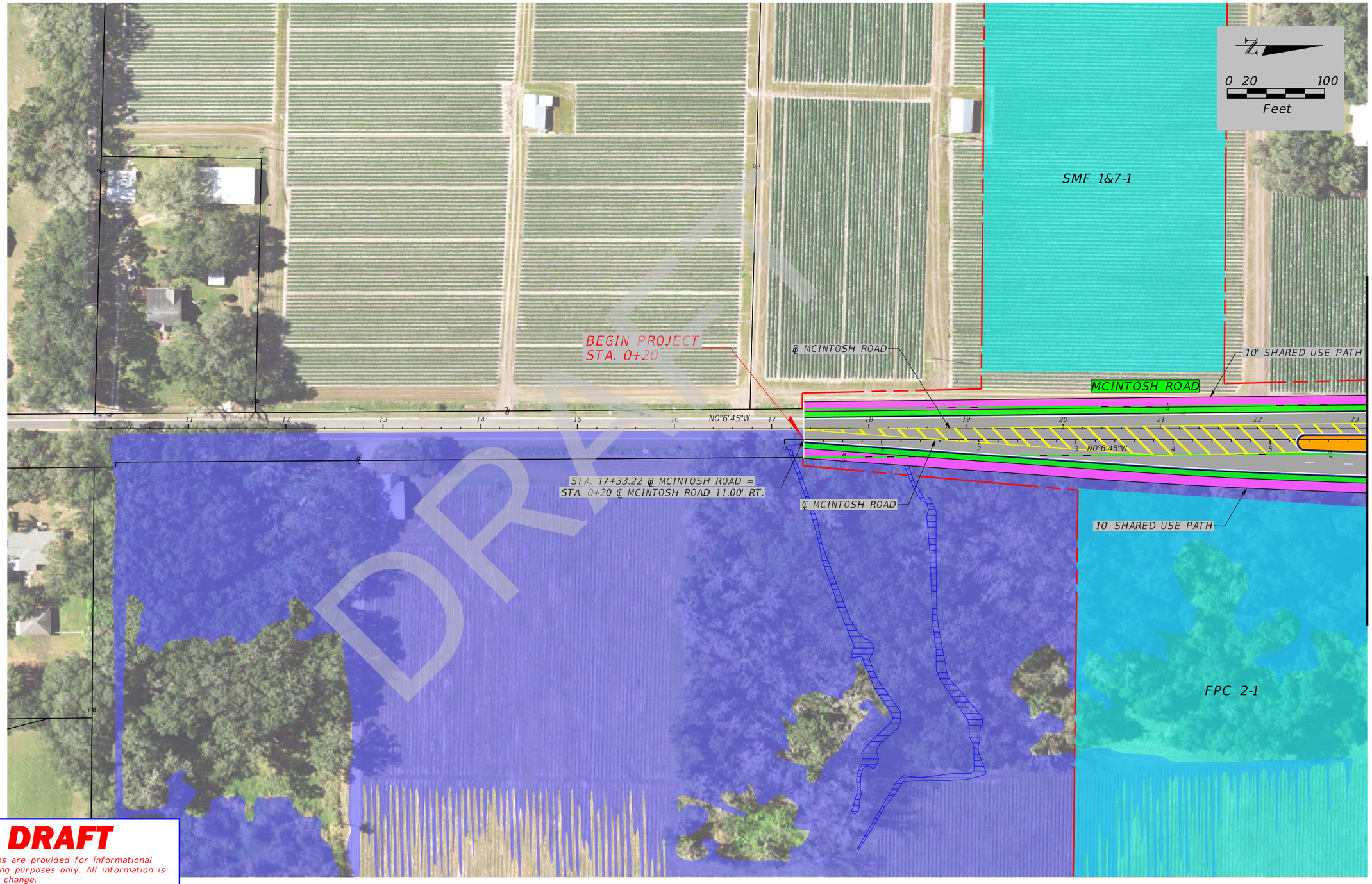

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- PROPOSED GRAVITY WALL
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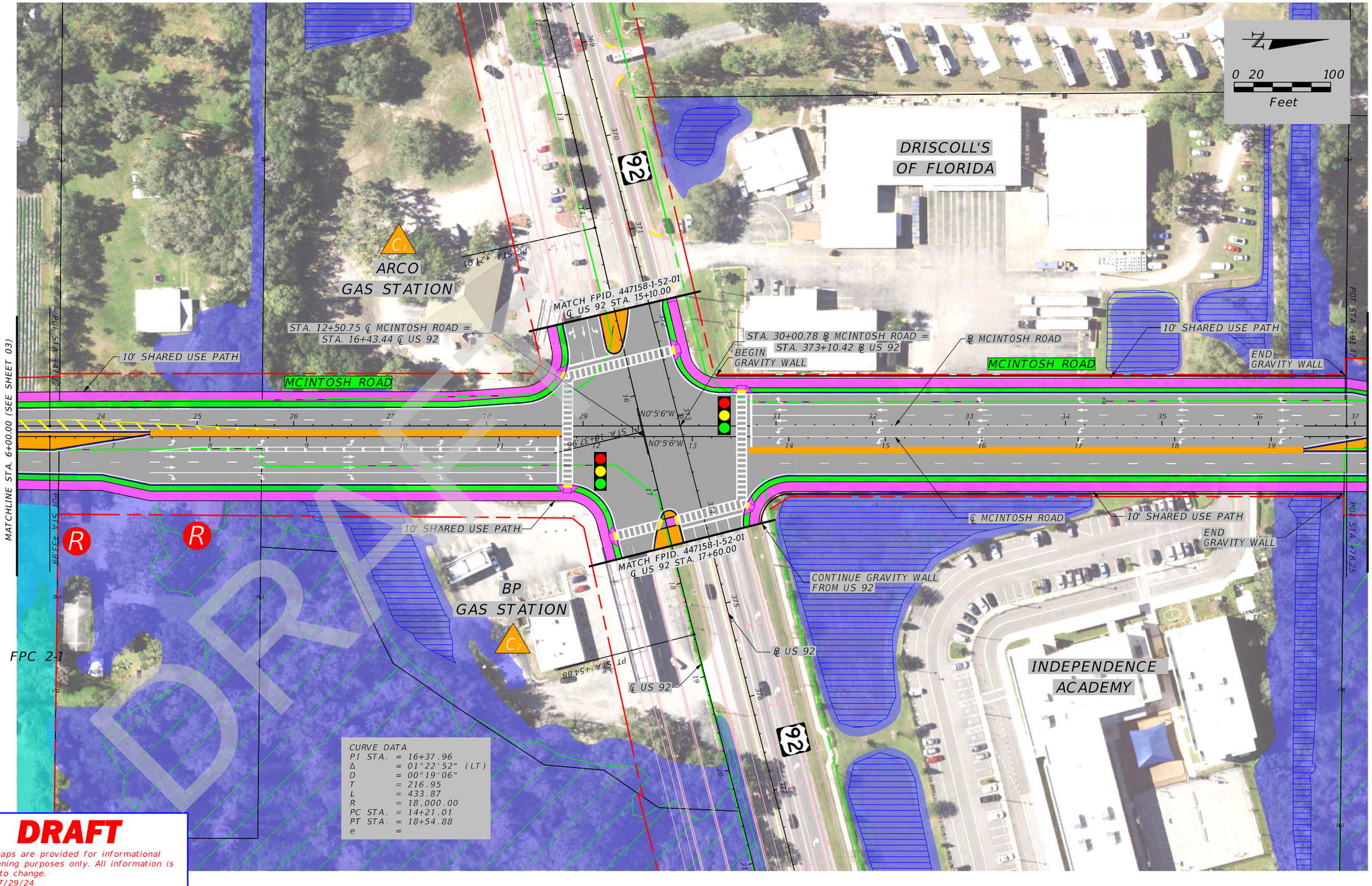

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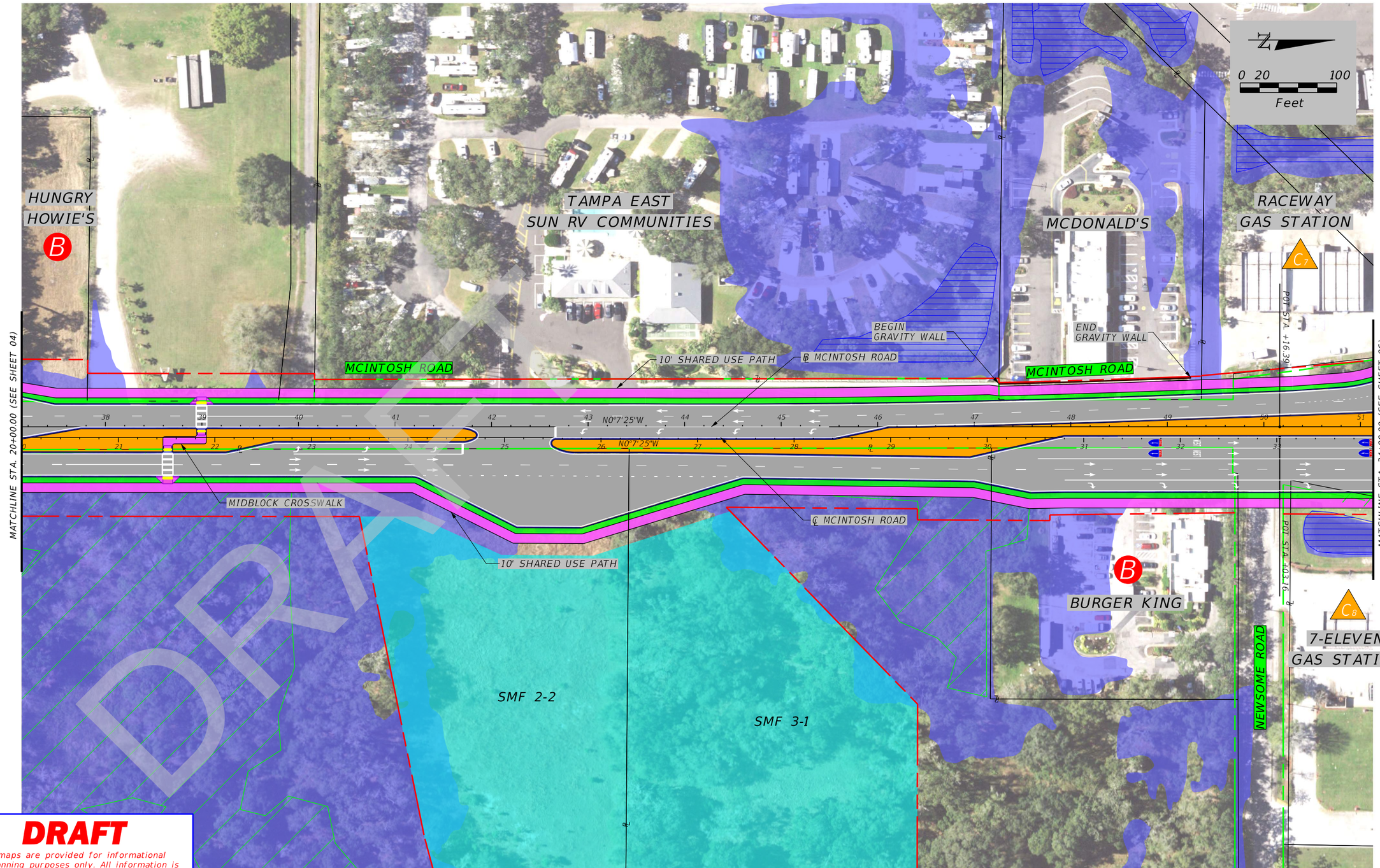

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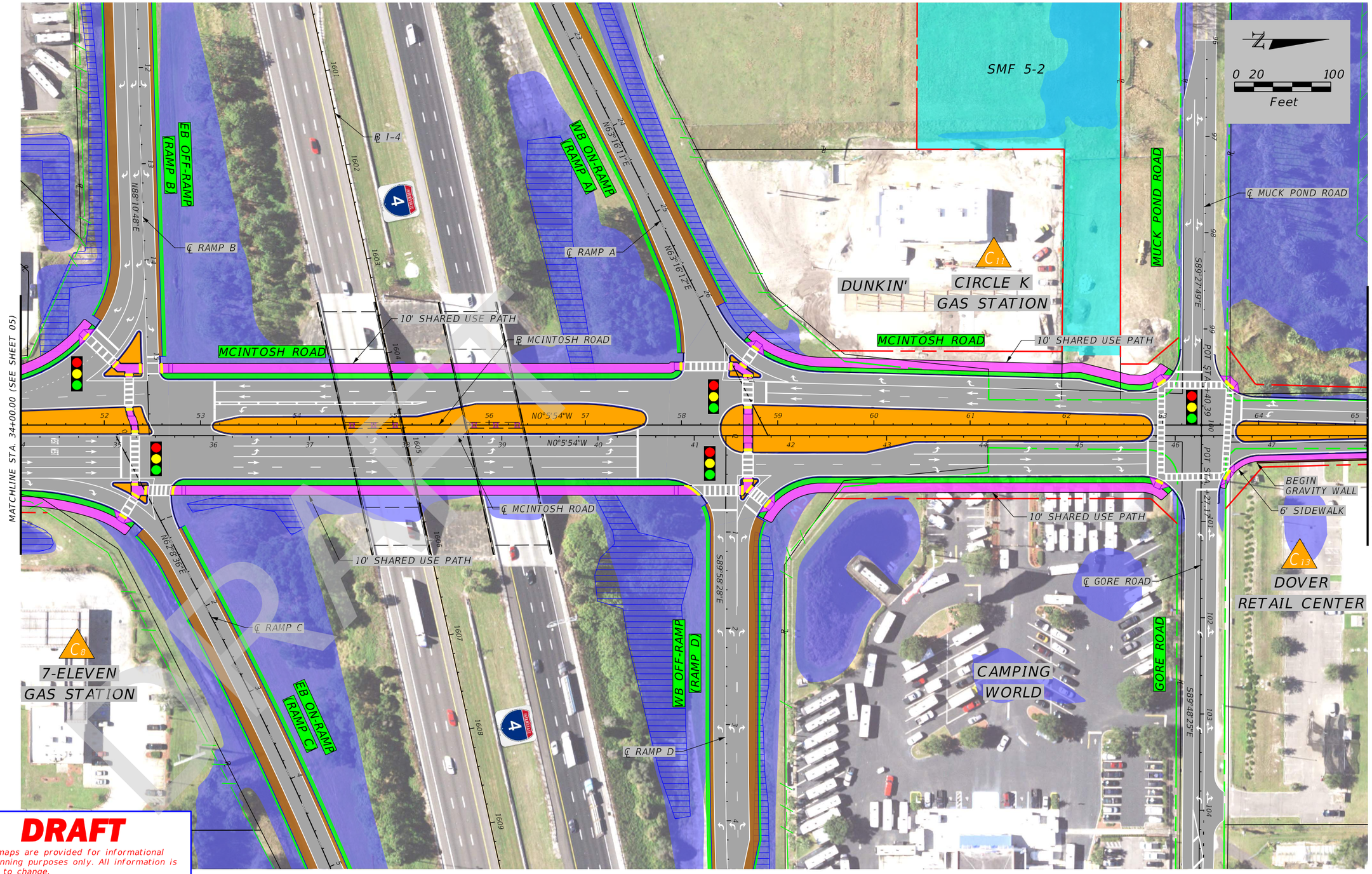

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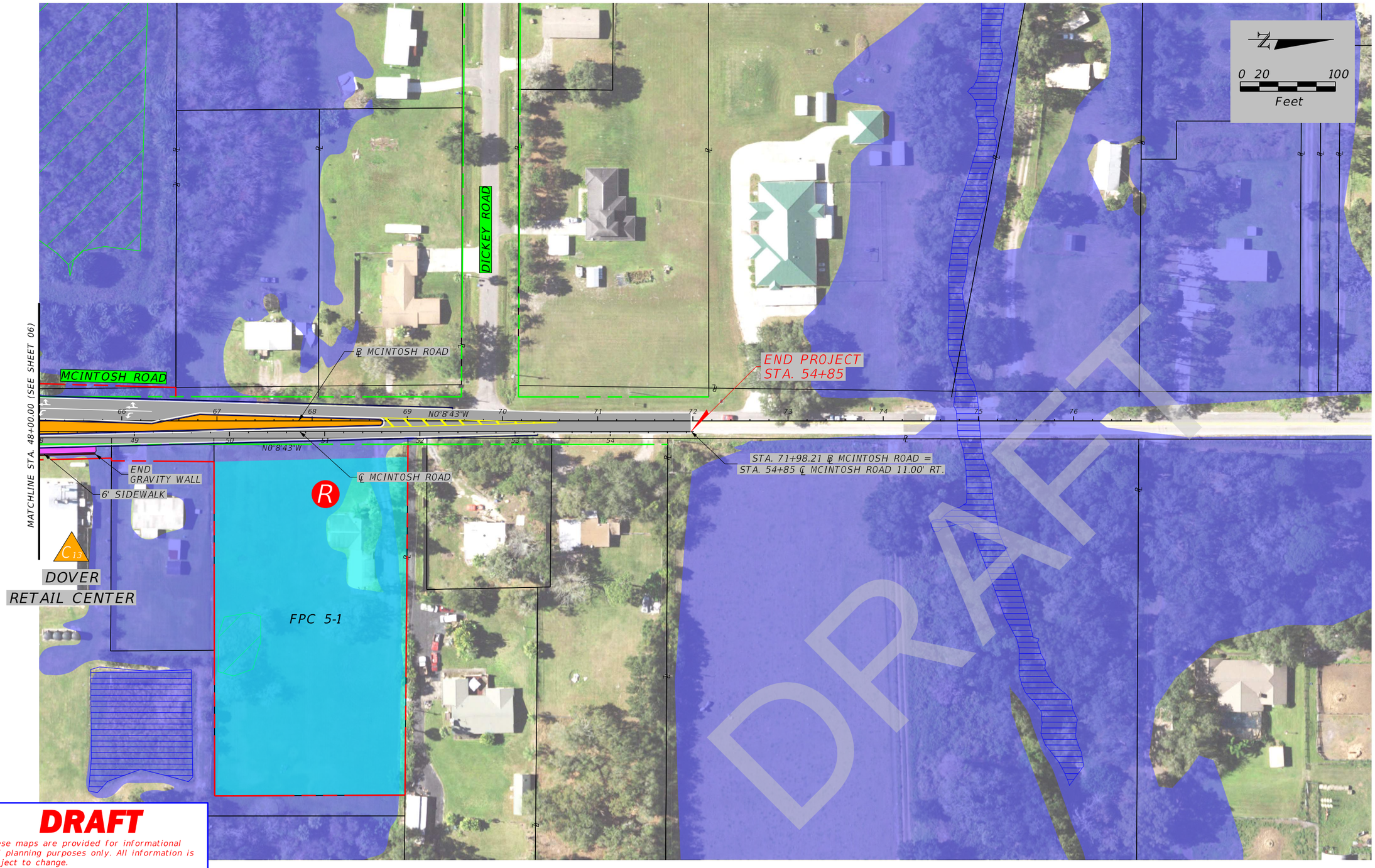

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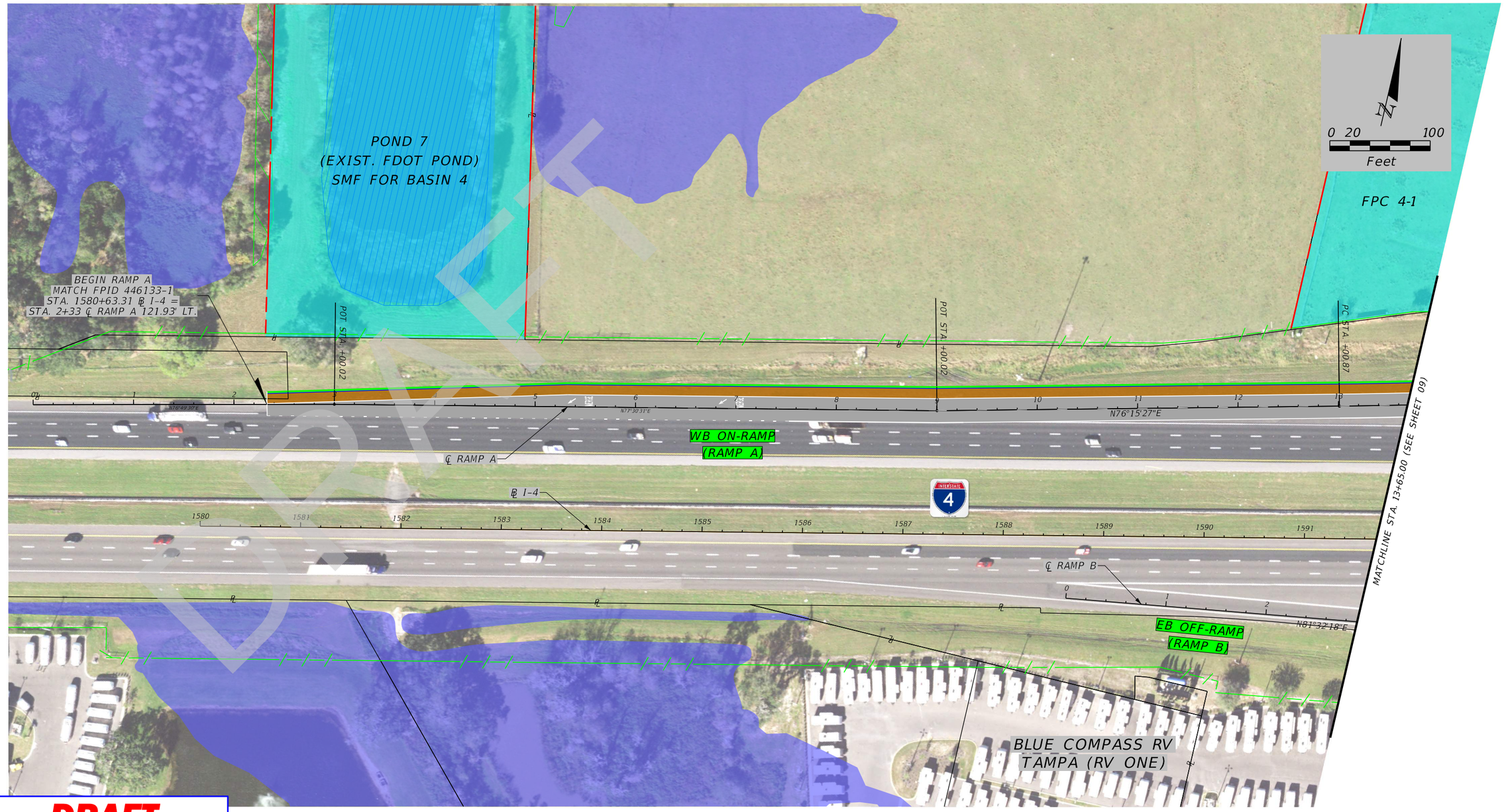

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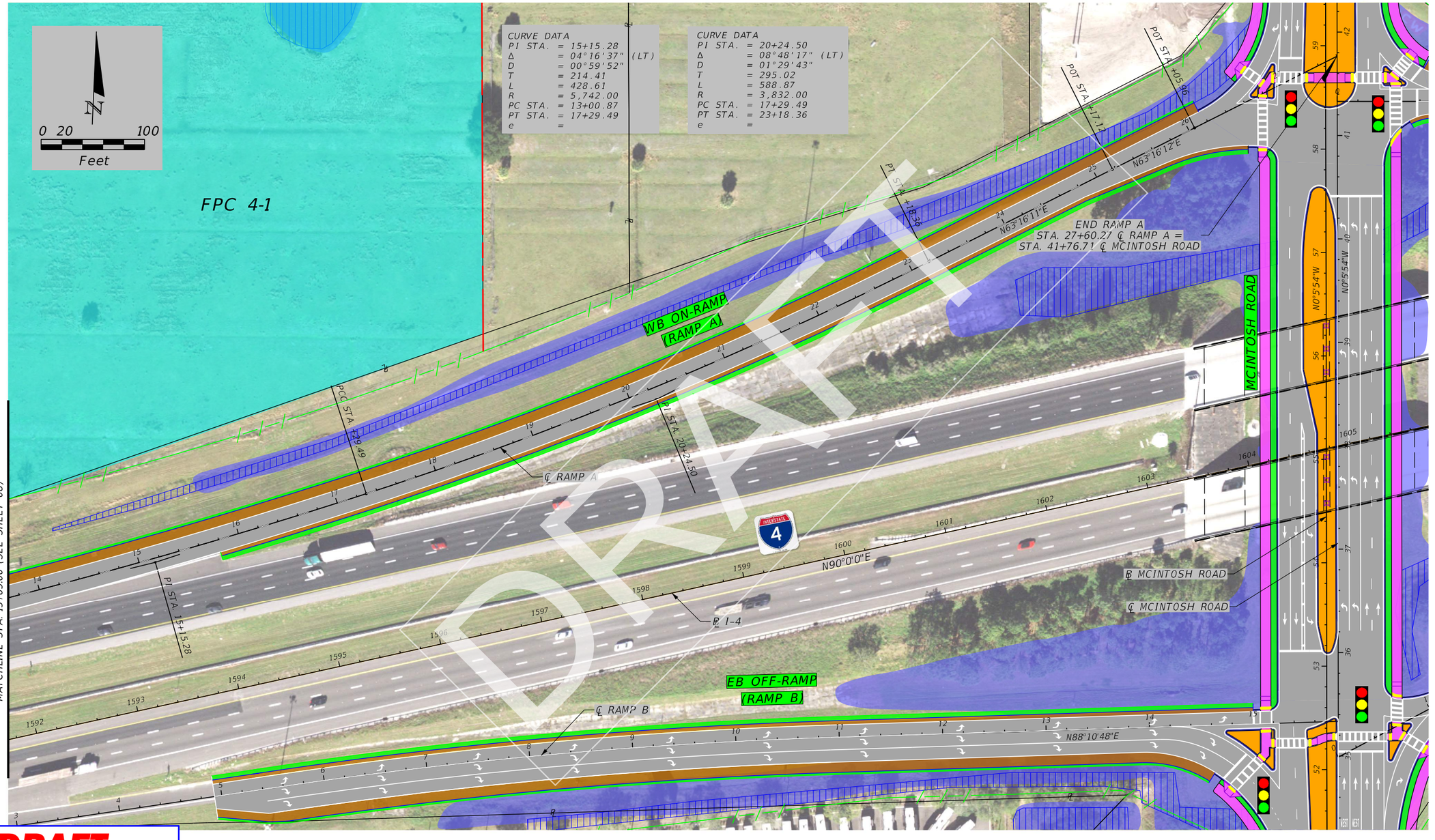

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MCINTOSH RD. PD&E STUDY

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FPC 4-1

℄ RAMP A

WB ON-RAMP
(RAMP A)

℄ I-4

N90°0'0"E

BEGIN RAMP B
MATCH FPID 441084-1
STA. 1593+54.77 ℄ I-4 =
STA. 4+93 ℄ RAMP B 96.68' RT.

PI STA. 8+11.60

℄ RAMP B

EB OFF-RAMP
(RAMP B)

PC STA. +31.05

PT STA. +91.46

POT STA. +10.07

POT STA. +38.76

POT STA. +21.11

CURVE DATA
PI STA. = 8+11.60
Δ = 06°54'26" (RT)
D = 01°13'57"
T = 280.55
L = 560.41
R = 4,648.62
PC STA. = 5+31.05
PT STA. = 10+91.46
e =

BLUE COMPASS RV
TAMPA (RV ONE)

℄ MCINTOSH ROAD

℄ MCINTOSH ROAD

END RAMP B
STA. 15+82.57 ℄ RAMP B =
STA. 35+33.44 ℄ MCINTOSH ROAD

N88°10'48"E

EB ON-RAMP
(RAMP C)

N62°8'36"E

℄ RAMP C

7-ELEVEN
GAS STATION

C8

RACEWAY
GAS STATION

C7

POT STA. +16.39

POT STA. +03.16

NEWSOME ROAD

MCINTOSH ROAD

MCDONALD'S

B

BURGER KING

N

0 20 100
Feet

DRAFT

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	HILLSBOROUGH	447157-1-32-01

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TAMPA, FL 33607

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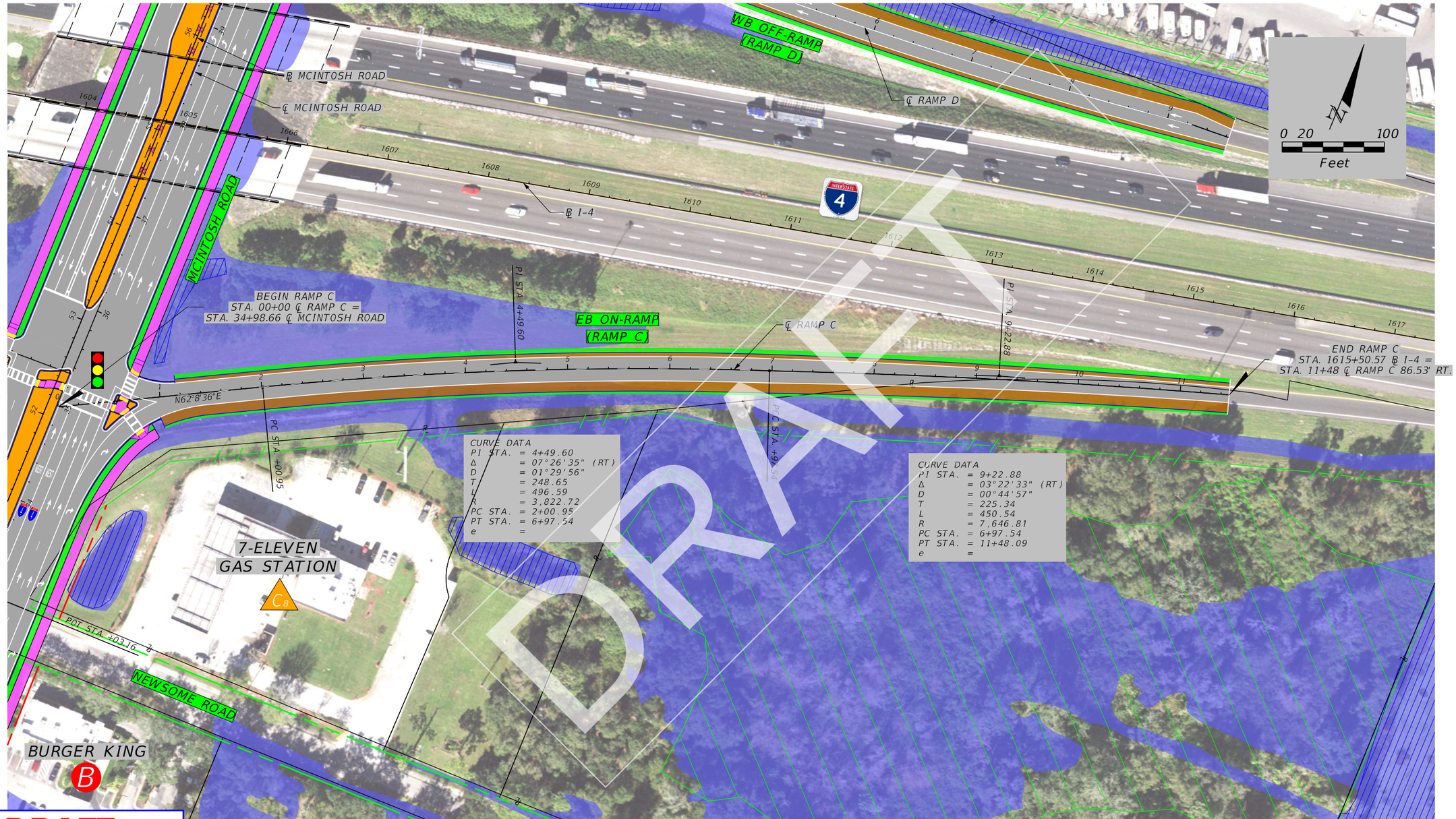

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Dated 07/29/24

LEGEND

- B — BUSINESS RELOCATION
- R — RESIDENTIAL RELOCATION
- C — POTENTIAL CONTAMINATION SITE
- WETLANDS BOUNDARY
- OTHER SURFACE WATERS BOUNDARY
- PREFERRED SMF AND FPC AREA
- FLOODPLAIN AREAS (HILLS. COUNTY STORMWATER MANAGEMENT MODEL)
- IMPROVEMENTS BY FDOT
- PROPOSED SOD
- PROPOSED TRAFFIC SEPARATOR
- PROPOSED SHARED USE PATH
- PROPOSED PAVED SHOULDER
- PROPOSED TRAFFIC SIGNAL
- PROPERTY LINE
- EXISTING ROW
- EXISTING LA ROW
- PROPOSED ROW
- PROPOSED GRAVITY WALL
- US 92 IMPROVEMENTS FPID. 447158-1-52-01

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	HILLSBOROUGH	447157-1-32-01

ENGINEER OF RECORD
REJA E. RABBI, P.E.
LICENSE NUMBER: 84637
CDM SMITH
4010 W. BOY SCOUT BLVD. STE. 450
TAMPA, FL 33607

MCINTOSH RD. PD&E STUDY
FROM S. OF US 92 TO N. OF I-4
PREFERRED ALTERNATIVE CONCEPT PLANS

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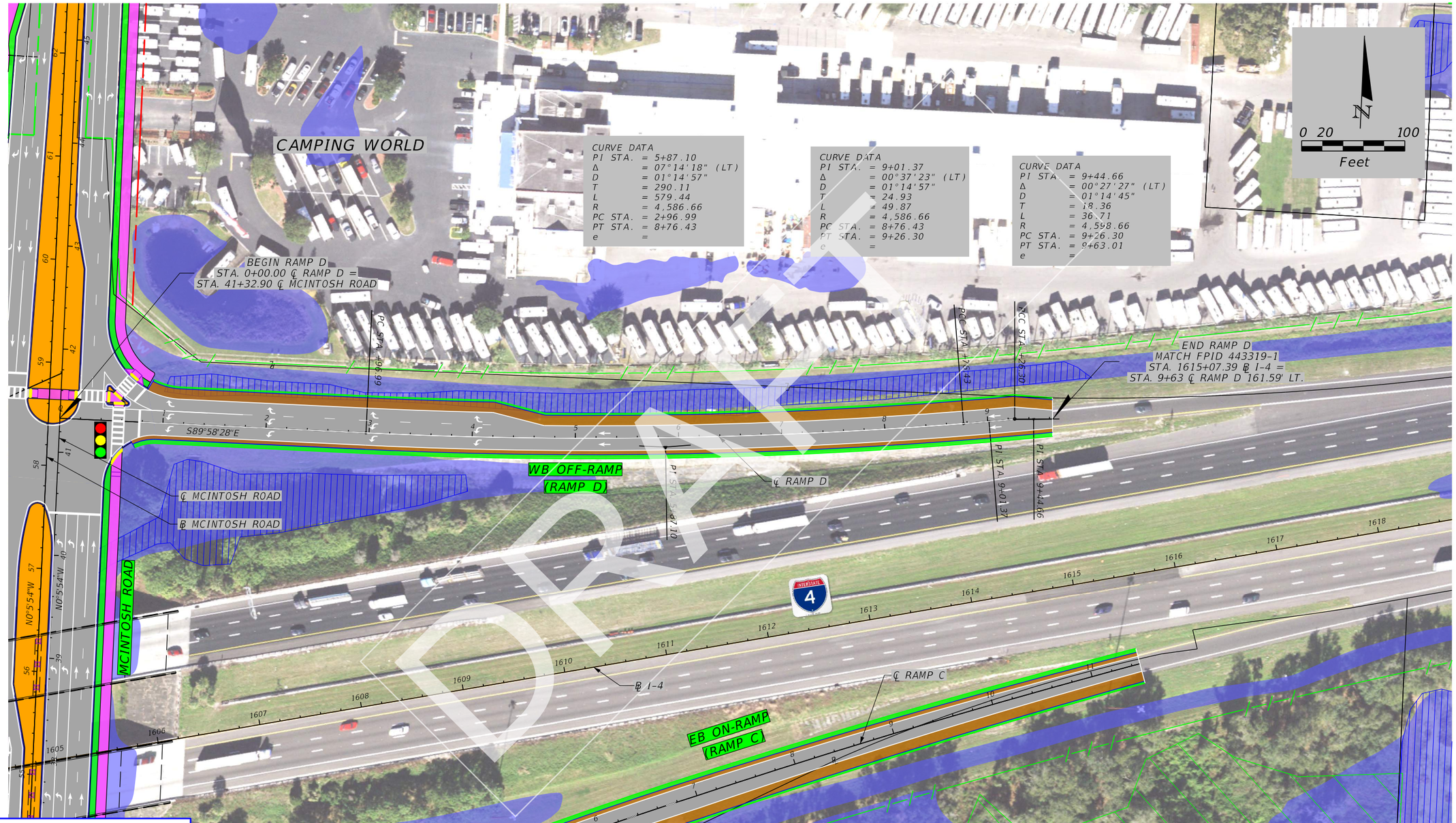

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Dated 07/29/24

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- PROPOSED GRAVITY WALL
- US 92 IMPROVEMENTS FPID. 447158-1-52-01

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	HILLSBOROUGH	447157-1-32-01

ENGINEER OF RECORD
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TAMPA, FL 33607

MCINTOSH RD. PD&E STUDY

FROM S. OF US 92 TO N. OF I-4
PREFERRED ALTERNATIVE CONCEPT PLANS

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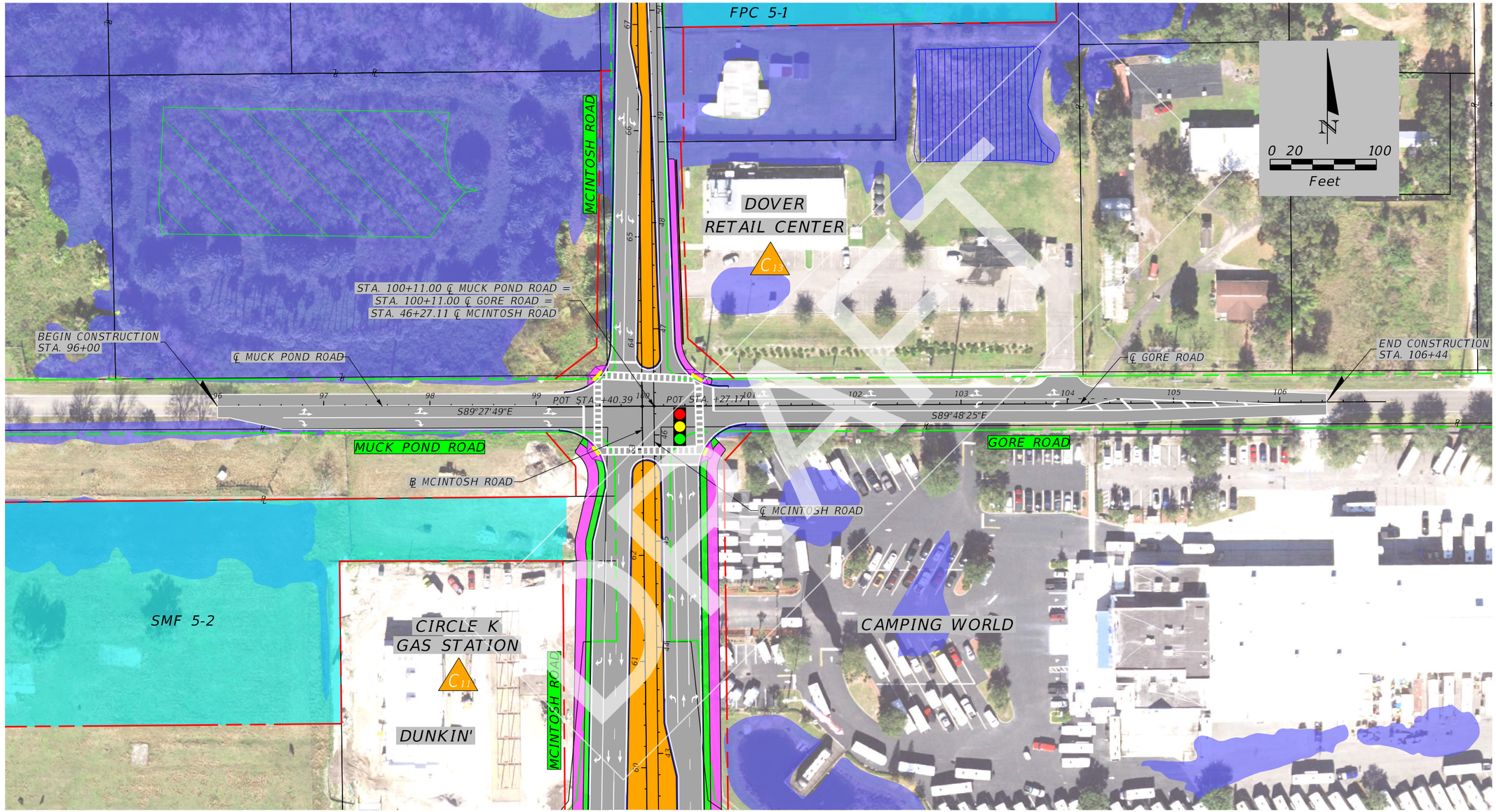

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Dated 07/29/24

LEGEND

- BUSINESS RELOCATION
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- PROPERTY LINE
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- EXISTING LA ROW
- PROPOSED ROW
- PROPOSED GRAVITY WALL
- US 92 IMPROVEMENTS FPID. 447158-1-52-01

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	HILLSBOROUGH	447157-1-32-01

ENGINEER OF RECORD
REJA E. RABBI, P.E.
LICENSE NUMBER: 84637
CDM SMITH
4010 W. BOY SCOUT BLVD. STE. 450
TAMPA, FL 33607

MCINTOSH RD. PD&E STUDY
FROM S. OF US 92 TO N. OF I-4
PREFERRED ALTERNATIVE CONCEPT PLANS

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Appendix B
PTAR

PROJECT TRAFFIC ANALYSIS REPORT

Florida Department of Transportation

District Seven

Branch Forbes Road Project Development & Environment (PD&E) Study

South of US 92 to North of I-4

Hillsborough County, Florida

Financial Management Number: 447159-1

ETDM Number: 14470

Date: December 2022

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 May 26, 2022, and executed by FHWA and FDOT.

Authorized Signature

Rosana Correa-Verdejo, PE, PTOE

Print/Type Name

Project Manager

Title

5401 W Kennedy Boulevard, Suite 300

Address

Tampa, FL 33609

Address

Branch Forbes Road
South of US 92 to North of I-4
Project Development & Environment (PD&E) Study

Draft
Project Traffic Analysis Report

Work Program Item Segment No. 447159-1
Federal Project No. D721 009 B
ETDM Project No. 14470
Hillsborough County, Florida

Prepared for:

Florida Department of Transportation
District Seven

Prepared by:
JACOBS
5401 West Kennedy Boulevard, Suite 300
Tampa, FL 33609

December 2022

Traffic forecast for the project was developed using:	
☒ Travel Demand Model	☐ Growth Rates
Type of Travel Demand Model Used: ☒ Metropolitan Planning Model ☐ Other Model TBRPM v9.1	*Refer to appropriate section of Project Traffic Analysis Report that discusses growth rates*
Is the travel demand model based on the latest adopted Long Range Transportation Plan?	
☒ YES	☐ NO
11/05/2019 Date when MPO adopted the latest Long Range Transportation Plan	Explain why?
2015 Base Year of Travel Demand Model	
2045 Horizon Year of Travel Demand Model	
Long Range Transportation Plan documentation is available at (provide web address): https://planhillsborough.org/2045lrtp/	
Traffic Data and Factors	
Standard K = 9.0% D Factor = 56.0% T_{Daily} = 10.0%	Data Collection Year = 2020 Opening Year = 2025 Interim Year = N/A Design Year = 2045
Discuss any changes in land use, economics, population and employment data since the model was built N/A	
Traffic Analysis Assumptions	
Discuss study area, data calibration/validation parameters, analysis tools, analysis periods and MOEs The Design Year Annual Average Daily Traffic (AADT) were developed using a calculated growth rate from the results of the TBRPM v9.1. Existing Year (2020), Opening Year (2025) and Design Year (2045) operations were analyzed using Synchro v11.1 and Highway Capacity Manual (HCM) results were reported. Measures of Effectiveness (MOEs) of delay, queues, and LOS were reported.	

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) District 7 is conducting a Project Development and Environment (PD&E) study along Branch Forbes Road from south of US 92 to north of Interstate 4 (I-4), in Hillsborough County. The study focuses on widening this section of Branch Forbes Road from a two-lane undivided facility to a four-lane divided facility and includes pedestrian and bicycle accommodations. The study also evaluates issues related to traffic operations, safety, access management and freight movements. The project will improve congestion and safety along this segment of Branch Forbes Road and continue to improve system linkage for this area. Operational improvements are also being evaluated for the I-4 interchange.

The PD&E study objectives include: determine proposed typical sections and develop preliminary conceptual design plans for proposed improvements, while minimizing impacts to the environment; consider agency and public comments; and ensure project compliance with all applicable federal and state laws. A Type 2 Categorical Exclusion is the class of action for this study. The proposed improvements include construction of stormwater management facility (SMF) and floodplain compensation (FPC) sites. The PD&E study satisfies all applicable requirements, including the National Environmental Policy Act (NEPA), to qualify for federal-aid funding of subsequent development phases (design, right of way acquisition, and construction).

The purpose of this Project Traffic Analysis Report (PTAR) is to provide FDOT District Seven the necessary traffic data and operational analysis to conduct the environmental evaluations needed for the recommended improvements along Branch Forbes study area. The following intersections were evaluated along Branch Forbes Road:

- Harvey Tew Road
- I-4 westbound ramp terminal
- I-4 eastbound ramp terminal
- Glenn Harwell Road/Beauchamp Road
- US 92

Existing conditions evaluations show the I-4 westbound (WB) off-ramp operating at Level of Service (LOS) F during both peak hours and operating with excessive delays. The AM peak hour results also show the US 92 intersection operating at LOS F. The PM peak hour results also show the I-4 eastbound (EB) off-ramp operating at LOS F with long delays and the US 92 intersection operating at LOS E with some of the movements experiencing long delays. The westbound through/right and the southbound left turn movements queues exceed their storage lengths at the US 92 intersection. The southbound left turn queue impacts the southbound through movement on Branch Forbes Road during both peak hours.

The following improvements were evaluated under the Build Alternative:

- Widening of Branch Forbes Road from a two-lane undivided roadway to a four-lane divided roadway from south of the US 92 intersection to north of the Harvey Tew Road intersection.
- Tight Urban Diamond Interchange (TUDI) with the following improvements:
    - At the I-4 westbound ramp terminal intersection:
        - Dual northbound left turn lanes extending south to north of the Glen Harwell Road/Beauchamp Road intersection
        - Adding an additional 500-foot (ft) left turn lane creating dual left turn lanes
    - At the I-4 eastbound ramp terminal intersection:
        - Adding an additional I-4 eastbound right turn lane to create dual right turn lanes
- Access management improvements at the Glen Harwell Road/Beauchamp Road intersection
- At US 92 intersection:
    - An additional through lane in the eastbound and westbound directions
    - An additional westbound right turn lane
    - An additional southbound left turn lane
    - Extending the eastbound left turn storage length to 475 ft and the westbound left turn storage length to 325 ft

As shown in **Table E-1**, the Build Alternative improves the intersection delays compared to the No-Build Alternative. **Table E-2** shows the arterial LOS results of the No-Build and Build Alternatives. The widening of Branch Forbes Road will improve the capacity, operations, and safety along Branch Forbes Road and improve connectivity between I-4 and US 92.

The intersection of Keene Road was added to the Build intersection analysis as part of the access management improvement at the Glen Harwell Road/Beauchamp Road. The analysis emphasis was on estimating the storage length needed for the southbound U-turn movement that is re-routed from Glen Harwell Road. Additional access management improvements will be evaluated in the PD&E Study and coordinated with Hillsborough County.

Table E-1 Design Year (2045) Intersection Analysis Summary

Intersection	No-Build (2045) Intersection Results				Build (2045) Intersection Results			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Harvey Tew Road*	891.7	F	186.0	F	337.5	F	82.7	F
I-4 WB Ramps	152.3	F	77.5	E	36.0	D	31.2	C
I-4 EB Ramps	59.3	E	43.2	D	22.3	C	26.6	C
Glen Harwell Road/ Beauchamp Road*	Err	**	Err	**	28.0	D	32.4	D
Keene Drive	--	--	--	--	388.3	F	7074.4	F
US 92	118.4	F	120.3	F	130.2	F	63.9	E

*Represents highest movement delay for the unsignalized intersection.
**No results provided, or computations not completed. Delay threshold is exceeded.

Table E-2 Design Year (2045) Arterial LOS Results

Cross Street along Branch Forbes Road	No-Build (2045)				Build (2045)			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS
Northbound Direction								
US 92	3.6	F	6.4	F	1.4	F	4.8	F
I-4 EB On-ramp	3.7	F	3.9	F	21.3	D	19.2	D
I-4 WB On-ramp	18.6	D	10.6	F	24.2	C	19.8	D
Total	**4.3**	**F**	**5.1**	**F**	**4.2**	**F**	**10.3**	**F**
Southbound Direction								
I-4 WB On-ramp	3.9	F	11.6	F	14.0	E	16.4	E
I-4 EB On-ramp	26.4	C	20.7	D	21.1	D	15.5	E
US 92	18.0	D	14.2	E	19.6	D	18.2	D
Total	**7.6**	**F**	**13.6**	**E**	**17.1**	**D**	**17.0**	**D**

Additional improvements were evaluated at the US 92 at Branch Forbes Road intersection to improve the intersection operations for design year: an additional northbound through lane (550 feet long) and an additional eastbound left turn lane. **Tables E-3** show the intersection operational results with the additional improvements at the US 92 intersection and **Table E-4** shows the arterial LOS results. The US 92 intersection is expected to operate at LOS E in the AM peak hour, but the intersection delay is reduced by 50% when compared to the No-Build Alternative. During the PM peak hour, the intersection LOS improves from F to D.

Table E-3 Design Year (2045) Intersection Analysis Summary with Additional US 92 Intersection Improvements

Intersection	No-Build (2045) Intersection Results				Build (2045) Intersection Results			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Harvey Tew Road*	891.7	F	186.0	F	337.5	F	82.7	F
I-4 WB Ramps	152.3	F	77.5	E	36.8	D	31.8	C
I-4 EB Ramps	59.3	E	43.2	D	22.6	C	28.0	C
Glen Harwell Road/ Beauchamp Road*	Err	**	Err	**	28.0	D	32.4	D
Keene Drive	--	--	--	--	388.3	F	7074.4	F
US 92	118.4	F	120.3	F	58.6	E	49.7	D

*Represents highest movement delay for the unsignalized intersection.
**No results provided, or computations not completed. Delay threshold is exceeded.

Table E-4 Design Year (2045) Arterial LOS Results with Additional US 92 Intersection Improvements

Cross Street along Branch Forbes Road	No-Build (2045)				Build (2045)			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS
Northbound Direction								
US 92	3.6	F	6.4	F	5.6	F	6.8	F
I-4 EB On-ramp	3.7	F	3.9	F	21.0	D	19.3	D
I-4 WB On-ramp	18.6	D	10.6	F	23.5	C	19.0	D
Total	**4.3**	**F**	**5.1**	**F**	**11.8**	**F**	**12.6**	**F**
Southbound Direction								
I-4 WB On-ramp	3.9	F	11.6	F	14.1	E	16.4	E
I-4 EB On-ramp	26.4	C	20.7	D	21.3	D	14.8	E
US 92	18.0	D	14.2	E	19.3	D	18.9	D
Total	**7.6**	**F**	**13.6**	**E**	**17.1**	**D**	**17.2**	**D**

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Glossary of Terms

Term	Definition
AADT	Annual Average Daily Traffic
D	Directional Factor
DDI	Diverging Diamond Interchange
DHT	Design Hour Trucks
DDHV	Directional Design Hour Volumes
DHV	Design Hour Volumes
ETAT	Environmental Technical Advisory Team
ETDM	Efficient Transportation Decision Making
FDEM	Florida Division of Emergency Management
FDOT	Florida Department of Transportation
FPC	Floodplain Compensation
FTO	Florida Traffic Online
HCM	Highway Capacity Manual
IOAR	Interchange Operational Analysis Report
K	Design Hour Traffic Factor
LOS	Level of Service
MOCF	Model Output Conversion Factor
mph	Miles per Hour
MVMT	Million Vehicle Miles Traveled
NEPA	National Environmental Policy Act
OEM	Office of Environmental Management
PD&E	Project Development and Environment
PSWADT	Peak Season Weekday Average Daily Traffic
PTAR	Project Traffic Analysis Report
ROW	Right of Way
SIS	Strategic Intermodal System
SMF	Stormwater Management Facility
SSOGis	State Safety Office Geographic Information System
TBRPM	Tampa Bay Regional Planning Model
TUDI	Tight Urban Diamond Interchange
TMC	Turning Movement Counts
TWSC	Two Way Stop Control

SECTION 1 INTRODUCTION

1.1 PD&E STUDY PURPOSE

The objective of the Project Development and Environment (PD&E) study is to assist the Florida Department of Transportation (FDOT) Office of Environmental Management (OEM) in reaching a decision on the type, location, and conceptual design of the proposed improvements for the widening of Branch Forbes Road from south of US 92 to north of I-4 and operational improvements at the I-4 interchange, including stormwater management facility (SMF) and floodplain compensation (FPC) sites. This study documents the need for the improvements as well as the procedures utilized to develop and evaluate various improvements, including elements such as proposed typical sections, preliminary horizontal alignments, intersection enhancement alternatives, and interchange operational improvements.

The PD&E study satisfies all applicable requirements, including the National Environmental Policy Act (NEPA), to qualify for federal-aid funding of subsequent development phases [design, right of way (ROW) acquisition, and construction]. This project was screened through the FDOT's Efficient Transportation Decision Making (ETDM) process as ETDM Project No. 14470. The ETDM Programming Screen Summary Report was published on September 23, 2021, containing comments from the Environmental Technical Advisory Team (ETAT) on the project's effects on various natural, physical, and social resources. A Type 2 Categorical Exclusion is the Class of Action for this PD&E study.

1.2 PROJECT PURPOSE AND NEED

1.2.1 Purpose

The purpose of the project is to address capacity needs as well as to improve safety conditions within the project area.

1.2.2 Need

The project is needed to improve capacity, safety and system linkage.

1.2.3 Transportation Demand/Capacity

Branch Forbes Road currently operates at an unacceptable Level of Service (LOS) F and is forecasted to continue to operate at LOS F in 2045 without any capacity or operational improvements. The Existing Year (2020) Annual Average Daily Traffic (AADT) for Branch Forbes is 22,000 exceeding the 14,800 AADT Level of Service (LOS) D for two-lane undivided arterials with a 35 miles per hour (mph) posted speed limit when compared to Table 1 of the FDOT Generalized Tables.

1.2.4 Safety

Between 2015 and 2019 the total number of crashes on Branch Forbes Road within the project area was 183. The historic average crash rate (5.12 crashes per million vehicle miles traveled or MVMT) for

this segment of Branch Forbes Road is considerably higher than the statewide average (0.69 MVMT) for similar facility types. This high comparative crash rate is likely due to the on- and off-ramps for I-4 which intersect Branch Forbes Road and the US 92 intersection along the project segment which creates multiple conflict points for vehicles entering and exiting within the area. Rear-end crashes were the predominant crash type, followed by angle crashes, representing 75% of the total number of crashes.

1.2.5 System Linkage

The project is needed to support area connectivity between US 92 and I-4, which are both Florida Division of Emergency Management (FDEM) designated evacuation routes that have high volumes of trucks. US 92 is major east-west facility that spans the entire state and provides relief for I-4, a Strategic Intermodal System (SIS) facility, during major traffic incidents. US 92 is also an important freight route in Hillsborough County.

1.3 PROJECT DESCRIPTION

The project will reconstruct Branch Forbes Road to widen the roadway to accommodate future capacity and multimodal needs including bike lanes and sidewalks along Branch Forbes Road from south of US 92 to north of I-4, a distance of approximately 0.89 miles in Hillsborough County, Florida. A project location map is provided as **Figure 1-1**. The project also includes safety and operational improvements at the I-4 interchange and evaluation of SMF and FPC sites.

1.4 PREVIOUS STUDIES

FDOT District Seven conducted an Interstate 4 (I-4) Interchange Needs Evaluation Study in 2018 to evaluate current traffic operations and identify operational deficiencies at the interchanges along I-4 from east of I-75 to the western connection of SR 570 (Polk Parkway). The study's primary goal was to identify problems at the interchanges off-ramps that cause safety and operational issues on the I-4 mainline. Proposed recommendations focused on small scale, cost feasible projects that can be funded through current FDOT programs. The I-4 Interchange Needs Evaluation Study was conducted concurrently with the I-4 Project Development and Environment (PD&E) Study from east of 50th Street to the Polk Parkway (Work Program Item Segment Number 431746-1). The I-4 Interchange Needs Evaluation Study also recommended long-term improvements to accommodate the expected growth in the Dover and Plant City areas in Hillsborough County. The short-term and long-term recommendations for Branch Forbes Road included:

- Short-term recommendations
    - Installing a traffic signal at both I-4 eastbound and westbound ramp termini intersections
    - Extending the northbound and southbound left turn storage length at both eastbound and westbound I-4 ramp termini
    - Adding an 840-foot right turn lane at the eastbound off-ramp

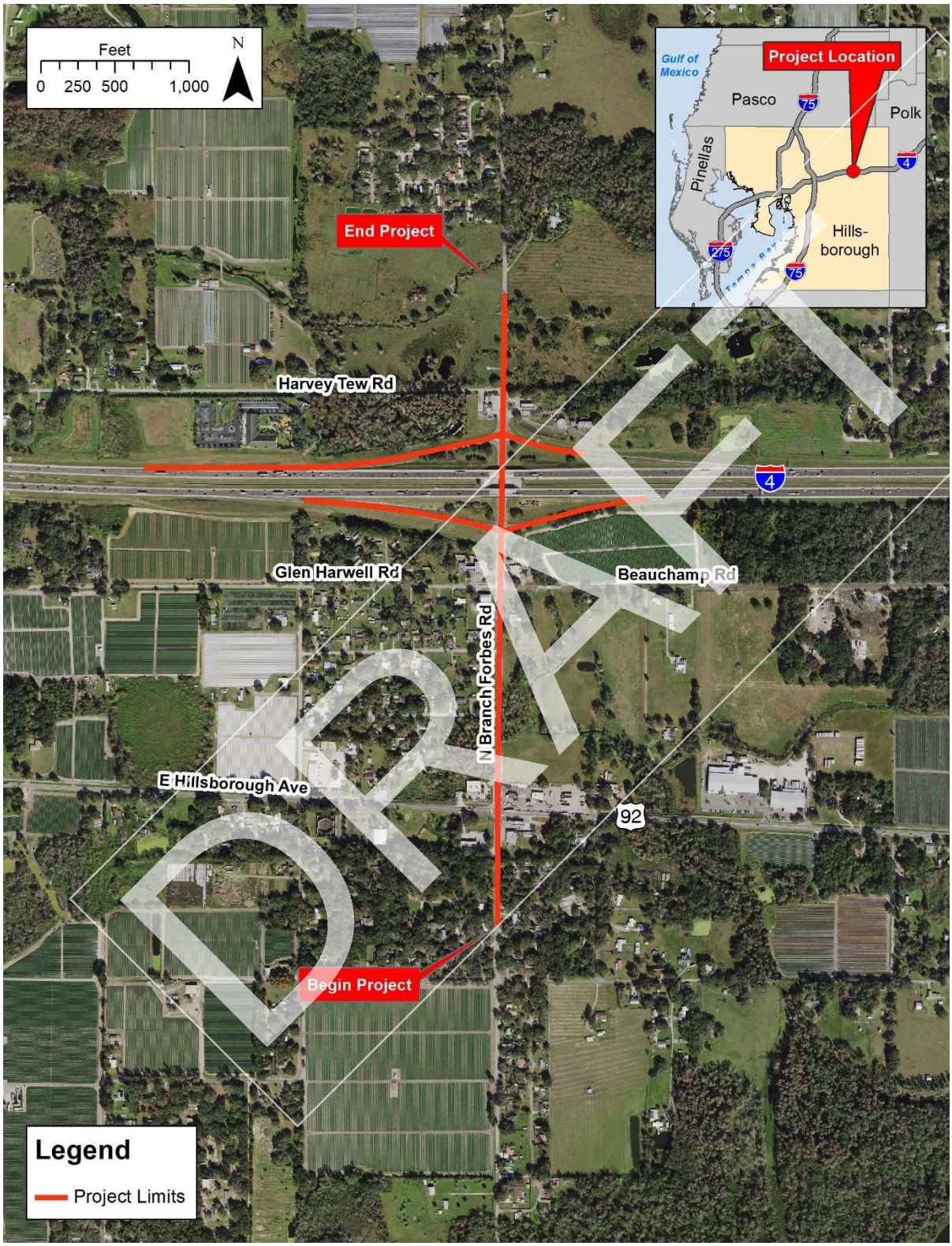


Figure 1-1 Project Location Map

- Long-term recommendations:
    - Widen Branch Forbes Road from two to four lanes from US 92 to north of I-4
    - Add a second northbound to westbound left turn lane and a second westbound to southbound left-turn lane at the I-4 westbound ramp termini intersection
    - Add a second receiving lane at the I-4 westbound on-ramp

An Interchange Operational Analysis Report (IOAR) was approved in June 2021 by FDOT Central Office (CO) for the I-4 at Branch Forbes Road interchange which included the short-term recommendations listed in the I-4 Interchange Needs Evaluation Study. The short-term improvements are currently under design and construction is scheduled for Fiscal Year 2024.

A Design Traffic Technical Memorandum was conducted in May 2017 for the US 92 PD&E Study from east of I-4 to east of County Line Road. The PD&E Study recommended the widening of US 92 from two lanes to four lanes with additional intersection improvements from east of I-4 to east of County Line Road except for the area that currently goes through Downtown Plant City which is currently a two-lane one-way pair section. The recommended additional intersection improvements at US 92 at Branch Forbes Road included: and additional southbound left turn lane and a westbound right turn lane.

An interchange evaluation was performed for the I-4 at Branch Forbes Road interchange on June 2022 to evaluate the interchange operations with a tight urban diamond interchange (TUDI) configuration and a diverging diamond interchange (DDI) configuration. After evaluating concepts, right-of-way, and costs, FDOT decided on the TUDI configuration for the interstate. The TUDI configuration will be included in the Build Alternative evaluation on this Project Traffic Analysis Report (PTAR).

1.5 EXISTING FACILITY AND PROPOSED IMPROVEMENTS

1.5.1 Existing Facility

Branch Forbes Road is owned and maintained by Hillsborough County, with the exception of the I-4 interchange and limited access right-of-way (ROW) from Glen Harwell Road to Harvey Tew Road which is maintained by FDOT. Within the project area, Branch Forbes Road is currently a two-lane undivided facility functionally classified as an Urban Major Collector and has a posted speed limit of 35 mph along the majority of the project and 45 mph at the southern and northern termini. The existing lanes widths vary from 10-foot to 11-foot along the corridor, and there are no paved shoulders with approximately 2-feet to 5-feet unpaved shoulders. The existing Branch Forbes Road within the project limits has no bicycle lanes, sidewalks or other facilities for pedestrians and bicyclists, with the exception of two small segments of sidewalk on the west side of Branch Forbes Road, one north of the US 92 intersection and the other south of I-4. The existing typical section is provided as **Figure 1-2**.

1.5.2 Proposed Improvements

The proposed typical section includes a four-lane divided facility with a 22-foot median and curb and gutter. There will be two 11-foot travel lanes in each direction with 5-foot to 7-foot wide bicycle lanes and a 6-foot wide sidewalk on both sides of the road. The proposed ROW will vary along the corridor but will be a minimum of 106 foot. The proposed typical section is provided below as **Figure 1-3**. Operational improvements are also proposed for the I-4 interchange. The improvements include signalizing the ramp intersections, adding turn lanes, modifying access management, and providing other safety and operational enhancements. No improvements to the I-4 mainline are included as part of this study.

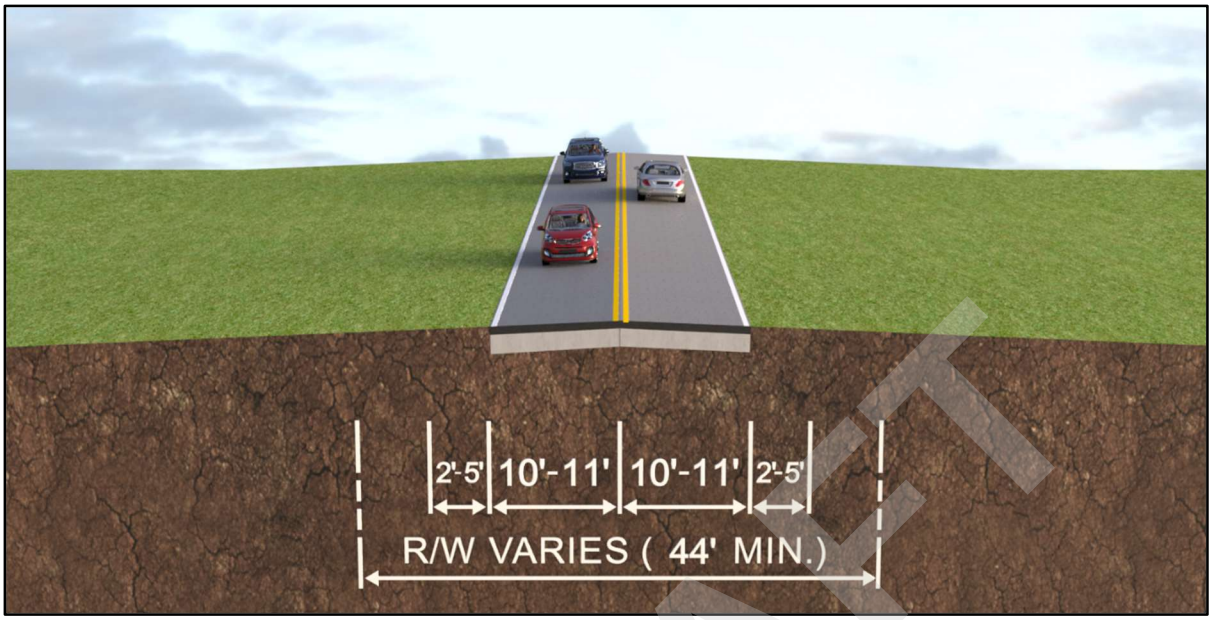


Figure 1-2 Branch Forbes Road - Existing Typical Section

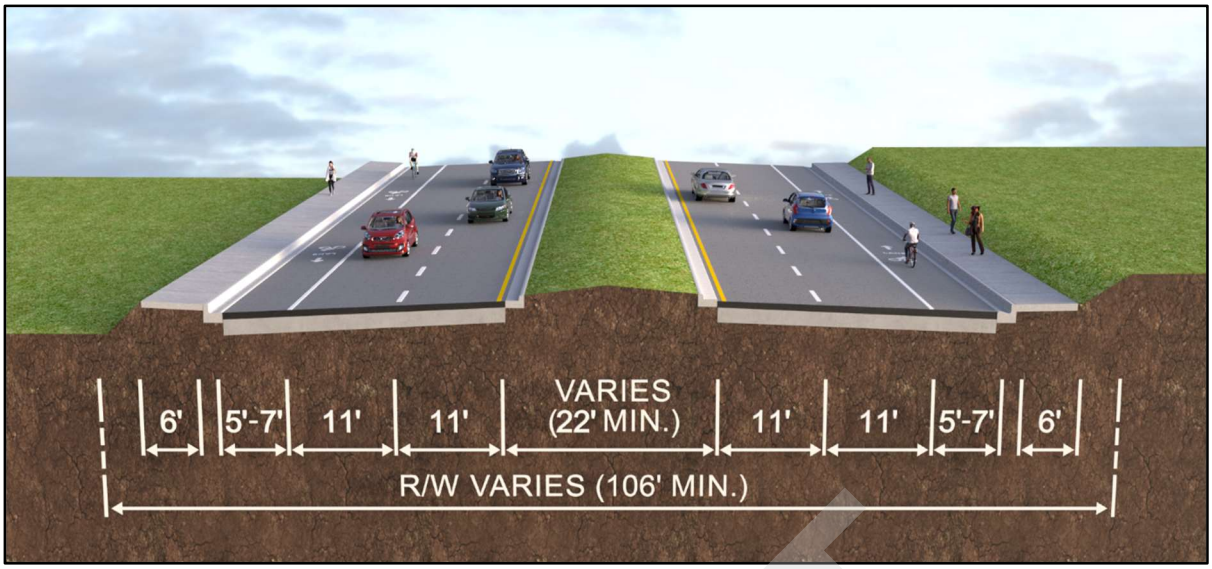


Figure 1-3 Branch Forbes Road - Proposed Typical Section

1.6 REPORT PURPOSE

The purpose of this PTAR is to provide FDOT District Seven the necessary traffic data and operational analysis to conduct the engineering and environmental evaluations needed for the recommended improvements along the Branch Forbes Road study area. This PTAR was conducted in accordance with *FDOT PD&E Manual Part 2, Chapter 2* (effective July 1, 2020).

SECTION 2 STUDY METHODOLOGY

The following study methodology was submitted to FDOT District Seven on July 5, 2022, and was approved on July 8, 2022. The approved methodology is included in **Appendix A**.

- Summarize data and improvements at the US 92 at Branch Forbes Road intersection.
- Traffic data from the I-4 at Branch Forbes Road IOAR was used.
- The years of analysis for this study are:
    - Existing Year – 2020
    - Opening Year – 2025
    - Design Year – 2045
- Evaluation of existing conditions was performed using Synchro 11 and the Highway Capacity Manual (HCM) 6th Edition results were reported.
- The travel demand forecasting procedure from the I-4 at Branch Forbes Road IOAR will be summarized.
- Future conditions traffic analyses were performed for No-Build conditions and Build Alternative using Synchro 11 and HCM 6th Edition results were reported. If HCM 6th Edition results could not be provided, then HCM 2000 results were reported.
- No-Build Alternative Analysis:
    - Opening Year 2025: Includes the interchange improvements identified in the Branch Forbes Road IOAR.
    - Design Year 2045: Includes the interchange improvements identified in the Branch Forbes Road IOAR plus US 92 intersection improvements identified in the US 92 PD&E Study.
    - Build Alternative analysis for both Opening Year 2025 and Design Year 2045 includes:
        - TUDI alternative
        - Widening of Branch Forbes Road from two to four lanes from US 92 to north of I-4
        - US 92 intersection improvements identified in the US 92 PD&E Study
- Crash data from years 2015-2019 was summarized in the study.

SECTION 3 EXISTING CONDITIONS ANALYSIS

The analyzed intersections in the study area are:

- Harvey Tew Road (unsignalized)
- I-4 westbound ramp termini (unsignalized)
- I-4 eastbound ramp termini (unsignalized)
- Glen Harwell Road/Beauchamp Road (unsignalized)
- US 92 (signalized)

Figure 3-1 shows the existing geometry and traffic control features of the intersections in the study area.

3.1 ANNUAL AVERAGE DAILY TRAFFIC VOLUMES

As mentioned in Section 2.0, the traffic data for this PTAR was taken from the approved I-4 at Branch Forbes Road IOAR dated June 2021. The approved traffic data from the IOAR is included in **Appendix B**. The Existing Year (2020) AADT volumes are summarized on **Table 3-1** and shown graphically in **Figure 3-2.**

Table 3-1 Existing Year (2020) AADTs

Location	2020 AADT
I-4 EB Off-ramp	5,800
I-4 EB On-ramp	4,400
I-4 WB Off-ramp	4,500
I-4 WB On-ramp	6,800
Branch Forbes Road north of Harvey Tew Road	7,300
Harvey Tew Road west of Branch Forbes Road	1,000
Branch Forbes Road north of I-4	8,900
Branch Forbes Road south of I-4	22,000
Beauchamp Road east of Branch Forbes Road	1,100
Glen Harwell Road west of Branch Forbes Road	1,700
Branch Forbes Road north of US 92	18,500
Branch Forbes Road south of US 92	8,500
US 92 east of Branch Forbes Road	16,500
US 92 west of Branch Forbes Road	11,000

3.2 TRAFFIC FACTORS

The K and D factors are the percentage of daily traffic volumes occurring during the peak hour and the proportion of traffic traveling in the peak direction, respectively. A Standard K factor of 9.0% and a D factor of 56% were used in this study. A D-factor of 65% was used on Branch Forbes Road north of the Harvey Tew Road intersection based on the turning movement counts.

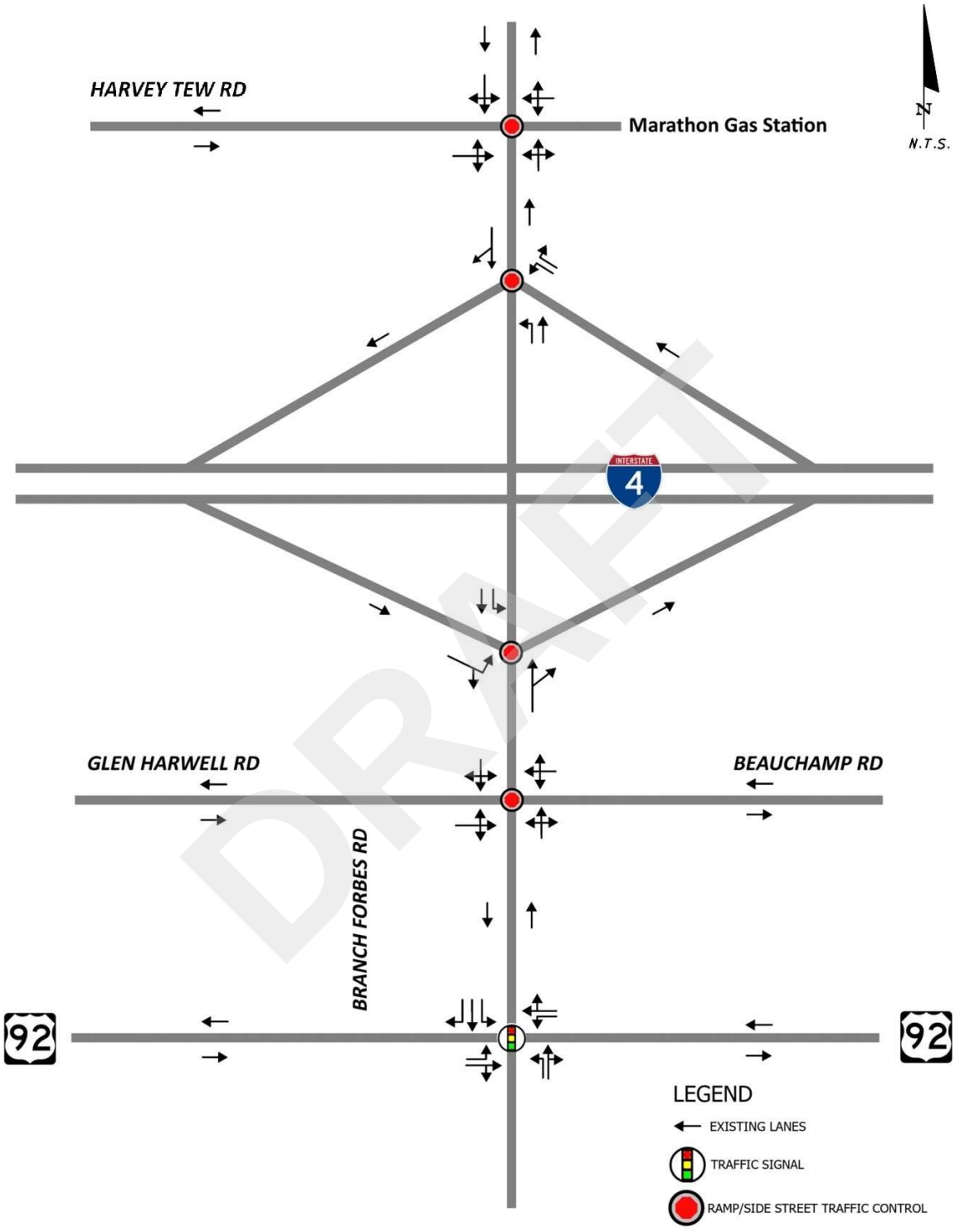


Figure 3-1 Existing Geometry

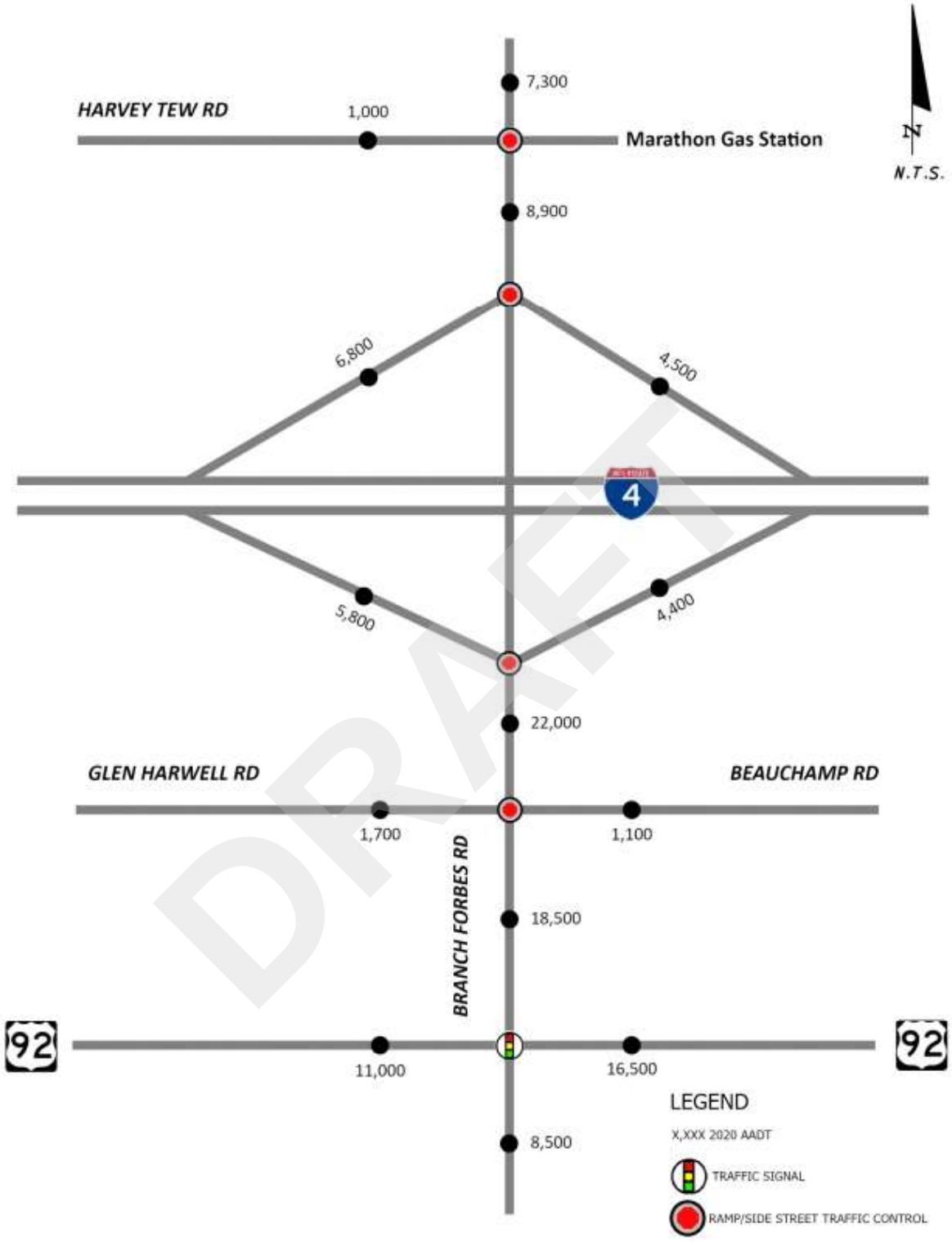


Figure 3-2 Existing Year (2020) AADT Volumes

Design Hour Trucks (DHT) is the percentage of daily truck traffic during the design hour. A DHT of 5.0% was used in the report based on historical truck percentage at the I-4 ramps. The traffic factors are shown in **Table 3-2** and were taken from the approved I-4 at Branch Forbes Road IOAR.

Table 3-2 Traffic Factors

K Factor (%)	D-Factor (%)	DHT (%)
9.0	56.0	5.0

3.3 TURNING MOVEMENT VOLUMES

The K and D factors were applied to the 2020 AADTs to obtain the directional design hour volumes (DDHVs). The intersection turning volumes were determined by applying turning movement percentages derived from existing turning movement counts (TMCs) to the segment DDHVs. Once the segment DDHVs and intersection turning movements were calculated, the existing design hour traffic volumes were subsequently adjusted and balanced through the system. Turning movement volumes for the Marathon Gas Station driveway were taken from the TMCs.

The Existing Year 2020 AM and PM peak hours turning movement volumes are shown on **Figure 3-3**.

3.4 EXISTING (2020) OPERATIONAL ANALYSIS

There are four unsignalized intersections and one signalized intersection along Branch Forbes Road within the study area. An analysis of the existing signalized intersections was performed using existing signal phasing/timing information obtained from Hillsborough County. The intersections operations were analyzed using Synchro v11.1 and the Highway Capacity Manual (HCM), 6th Edition results are summarized in **Tables 3-3 and 3-4**. A target LOS of D is established for the study area. The key measures of effectiveness are 95th percentile queue length and delay for overall intersection and individual movements.

Table 3-3 shows the delay and LOS for the existing conditions during the AM and PM peak hours. **Table 3-4** shows the vehicle queue results for the intersection movements. The storage length for some of the movements was taken as the distance from the intersection to the nearest upstream access point.

Table 3-3 shows the I-4 WB off-ramp operating at LOS F during both peak hours operating with excessive delays. The AM peak hour results also show the US 92 intersection operating at LOS F. The PM peak hour results also show the I-4 EB off-ramp operating at LOS F with long delays and the US 92 intersection operating at LOS E with some of the movements experiencing long delays. The queues that exceed the storage length for that movement are shown in bold and highlighted in yellow in **Table 3-4**. **Table 3-4** shows the westbound through/right and the southbound left movements queues exceeding their storage lengths at the US 92 intersection. The southbound left turn queue impacts the southbound through movement on Branch Forbes Road during both peak hours.

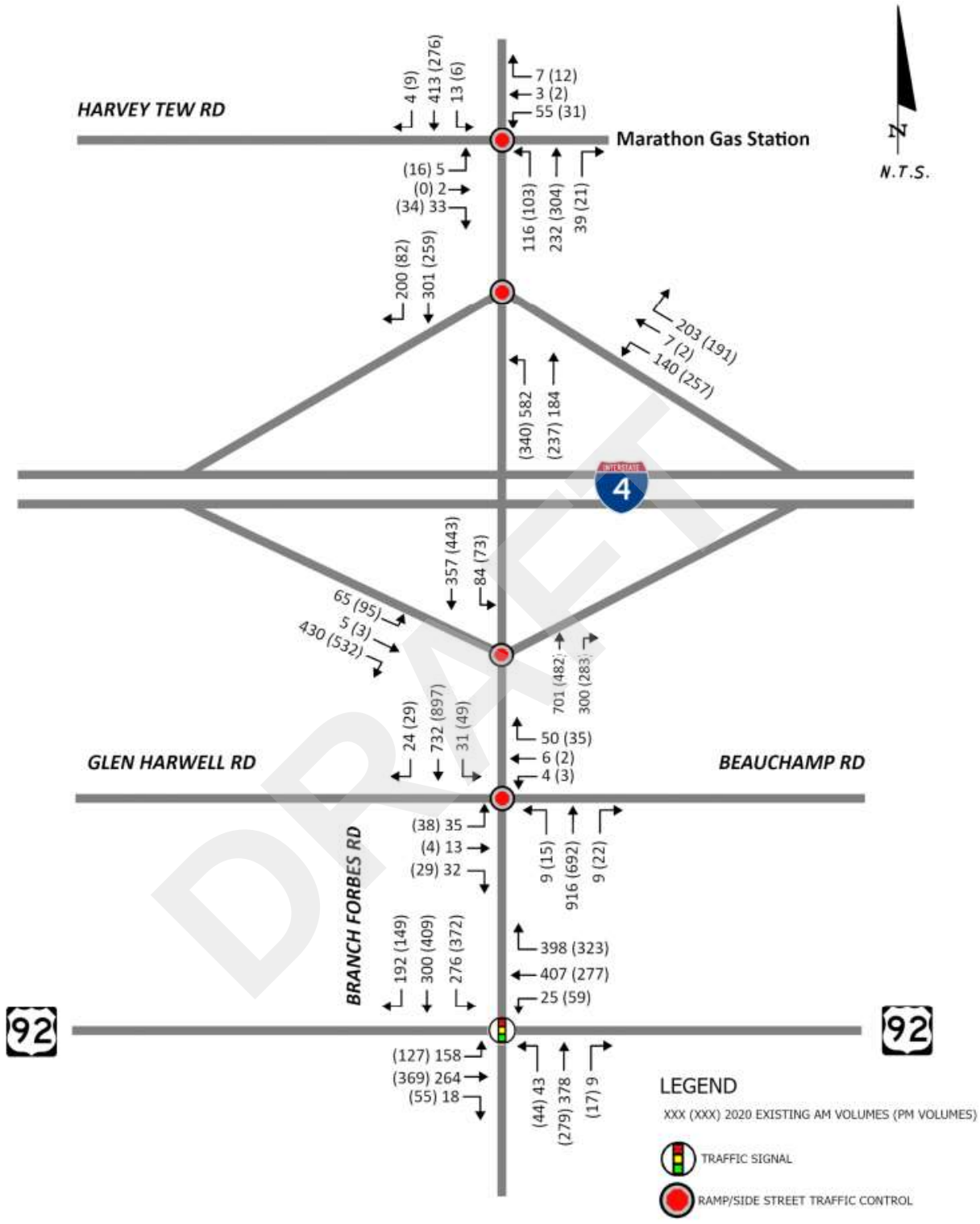


Figure 3-3 Existing Year (2020) Turning Movement Volumes

Table 3-3 Existing Year (2020) Intersection Delay and LOS Results

Approach	Movement	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Approach LOS	Delay (sec)	LOS	Approach LOS
Intersection: Branch Forbes Road at Harvey Tew Road*							
Eastbound	Left/Thru/Right	13.8	B	B	14.2	B	B
Westbound	Left/Thru/Right	31.7	D	D	20.2	C	C
Northbound	Left	8.7	A		8.2	A	
Southbound	Left	7.9	A		8.0	A	
Intersection: Branch Forbes Road at I-4 WB Ramps*							
Westbound	Left/Thru	1213.4	F	F	524.5	F	F
	Right	10.7	B		11.2	B	
Northbound	Left	10.8	B		8.9	A	
Intersection: Branch Forbes Road at I-4 EB Ramps*							
Eastbound	Left/Thru/Right	19.0	C	C	119.6	F	F
Southbound	Left	9.7	A		8.7	A	
Intersection: Branch Forbes Road at Glen Harwell Road/Beauchamp Road*							
Eastbound	Left/Thru/Right	291.5	F	F	229.6	F	F
Westbound	Left/Thru/Right	39.1	E	E	26.3	D	D
Northbound	Left	9.5	A		10.3	B	
Southbound	Left	10.4	B		9.5	A	
Intersection: Branch Forbes Road at US 92							
Eastbound	Left	41.3	D	C	32.4	C	C
	Thru/Right	16.7	B		19.2	B	
Westbound	Left	23.2	C	F	26.8	C	F
	Thru/Right	286.0	F		117.0	F	
Northbound	Left	32.5	C	E	35.5	D	D
	Thru/Right	75.2	E		46.0	D	
Southbound	Left	195.9	F	F	203.7	F	F
	Through	25.3	C		28.1	C	
	Right	23.6	C		21.7	C	
	Intersection	**137.3**	**F**		**Intersection**	**76.6**	**E**

*Per HCM 6th Edition: For Two Way Stop Control (TWSC) intersections only minor movements delay and LOS are reported. HCM 6th Edition does not calculate LOS for major street thru movements and approaches or for the intersection as a whole.

The Existing Year (2020) Synchro results and the US 92 and Branch Forbes Road signal timing information are included in **Appendix C.**

Table 3-4 Existing Year (2020) Intersection Vehicle Queues

Intersection	Movement	Storage (ft)	AM Peak Hour Queues (95th Percentile)		PM Peak Hour Queues (95th Percentile)	
			Veh	Feet**	Veh	Feet**
Branch Forbes Road at Harvey Tew Road	EB Left/Thru/Right	1,000	0.3	8	0.4	10
	WB Left/Thru/Right	85	1.4	35	0.6	15
	NB Left	330	0.4	10	0.3	8
	SB Left	1,000	0.0	0	0.0	0
Branch Forbes Road at I-4 WB Ramps	WB Left/Thru	1,800	16.9	423	21.7	543
	WB Right	1,000	1.0	25	1.0	25
	NB Left	80	2.9	73	1.2	30
Branch Forbes Road at I-4 EB Ramps	EB Left/Thru/Right	1,700	5.5	138	23.0	575
	SB Left	100	0.3	8	0.2	5
Branch Forbes Road at Glen Harwell Road/ Beauchamp Road	EB Left/Thru/Right	1,000	6.7	168	5.6	140
	WB Left/Thru/Right	1,000	1.6	40	0.7	18
	NB Left	430	0.0	0	0.1	3
	SB Left	380	0.1	3	0.2	5
Branch Forbes Road at US 92	EB Left	285	5.9	148	4.0	100
	EB Thru/Right	1,300	7.1	178	10.9	273
	WB Left	300	0.7	18	1.9	48
	WB Thru/Right	620	78.3	**1,958**	36.2	**905**
	NB Left	150	1.7	42	1.8	45
	NB Thru/Right	1,100	19.7	483	12.4	310
	SB Left	225	22.3	**558**	26.3	**658**
	SB Thru	650	9.7	243	13.2	330
	SB Right	160	6.3	158	4.6	115

*For ramps, the storage was determined as the length of the ramp or as the storage length when provided.
**Queue in feet estimated by multiplying the number of vehicles times 25 feet.

3.5 HISTORICAL CRASH ANALYSIS

A five-year historical crash analysis was performed according with Part 2, Chapter 2 of the FDOT PD&E Manual for years 2015-2019. Crash data for the I-4 ramps was obtained from the FDOT D7 Crash Data Management System, which pulls data from the FDOT Crash Analysis Reporting (CAR) Online, and crash data for Branch Forbes Road was obtained from FDOT State Safety Office Geographic Information System (SSOGis).

The Branch Forbes Road influence area for which crash data was analyzed includes the I-4 on/off ramps from/to Branch Forbes Road. The crash data for Branch Forbes Road includes 1,000 feet south of the US 92 intersection to 1,000 feet north of the Harvey Tew Road intersection. The crash data for US 92 includes 250 feet east and west of the Branch Forbes intersection. **Table 3-5** provides a

summary of the total crashes per year in the study area and the location of the crashes. **Table 3-6** provides a summary of the crash severity along the I-4 ramps, Branch Forbes Road, and US 92.

Table 3-5 Number of crashes

Year	Location			Total
	I-4 on/off ramps	Branch Forbes Road	US 92	
2015	21	13	17	51
2016	19	12	8	39
2017	16	11	19	46
2018	15	9	7	31
2019	6	0	10	16
Total	**77**	**45**	**61**	**183**

Table 3-6 Crash Summary

Location	Total Number of Crashes	Number of Fatal Crashes	Number of Fatalities	Number of Injury Crashes	Number of Injuries	Number of Property Damage Only (PDO) Crashes
I-4 on/off ramps	77	0	0	22	27	55
Branch Forbes Road	45	0	0	18	29	27
US 92	61	0	0	25	44	36
Total	**183**	**0**	**0**	**65**	**100**	**118**

As shown in **Tables 3-5 and Table 3-6**, 183 crashes occurred in the Branch Forbes Road study area, of which 65 were injury crashes, resulting in 100 injuries. 118 of crashes resulted in property damage only (PDO). There were no fatal crashes in the study area for the analyzed years. On average, the crash frequency for the Branch Forbes Road study area is 37 crashes per year.

Table 3-7 summarizes the types of crashes. The most predominant crash type for the study area is rear end with 81 crashes (44%). At the I-4 on/off ramps the predominant type of crash is rear end (68%). Along Branch Forbes Road, the most predominant type is angle (49%), and along US 92 the most predominant crash types are angle (48%) and rear end (33%).

Table 3-8 shows the common cause of crashes is operating a motor vehicle in a careless or negligent manner with 69 crashes (38%) followed by failed to yield the right-of-way with 57 crashes (31%). **Table 3-9** shows 127 of the crashes (69%) occurred at daylight, and **Table 3-10** shows 156 of the crashes (85%) occurred on dry pavement.

Table 3-7 Crash Type Summary

Type of Crash	Location			Total
	I-4 on/off ramps	Branch Forbes Road	US 92	
Rear End	52	9	20	81
Angle	6	22	29	57
Sideswipe	3	3	2	8
Head-on	0	3	2	5
Hit Fixed Object	5	0	0	5
Hit Non-Fixed Object	1	0	0	1
Single Vehicle	5	0	0	5
Bike	0	0	0	0
Run Off Road	1	0	0	1
Pedestrian	0	0	0	0
Right Turn	1	0	0	1
Left Turn	3	0	0	3
Unknown/Other	0	8	8	16
Total	**77**	**45**	**61**	**183**

Table 3-8 Cause of Crashes

Cause of Crash	Location			Total
	I-4 on/off ramps	Branch Forbes Road	US 92	
Failed to Keep in Proper Lane	1	1	2	4
Followed too Closely	3	4	1	8
Failed to Yield Right-of-Way	11	22	24	57
No Contributing Action	5	2	2	9
Other Contributing Actions	2	2	1	5
Improper Turn	0	1	0	1
Operated MV* in Careless or Negligent Manner	47	4	18	69
Drove Too Fast for Conditions	3	2	0	5
Ran off Roadway	0	0	0	0
Over-Correcting/Over-Steering	2	0	0	2
Unknown	3	5	9	17
Improper Passing	0	0	1	1
Swerved or Avoided: Due to Wind, Slippery Surface, MV*, Object, Non-Motorist in Roadway, etc.	0	1	0	1
Operated MV* in Erratic, Reckless or Aggressive Manner	0	1	0	1
Ran Red Light	0	0	3	3
Total	**77**	**45**	**61**	**183**

*MV: Motor Vehicle

Table 3-9 Lighting Condition

Lighting Condition	Location			Total
	I-4 on/off ramps	Branch Forbes Road	US 92	
Daylight	55	33	39	127
Dark-Lighted	8	2	14	24
Dusk	6	2	1	9
Dark-Not Lighted	4	8	6	18
Dawn	4	0	1	5
Unknown	0	0	0	0
Total	**77**	**45**	**61**	**183**

Table 3-10 Pavement Condition

Pavement Condition	Location			Total
	I-4 on/off ramps	Branch Forbes Road	US 92	
Dry	63	38	55	156
Wet	14	7	6	27
Total	**77**	**45**	**61**	**183**

SECTION 4 TRAVEL DEMAND FORECASTING

The travel demand forecast was developed in accordance with the procedures in the 2019 FDOT Project Traffic Forecasting Handbook and documented in the I-4 at Branch Forbes Road IOAR as stated in Section 2.0. The travel demand forecasting is summarized in the following sections.

4.1 TRAVEL DEMAND MODEL VALIDATION

The Tampa Bay Regional Planning Model (TBRPM) Version 9.1 (v9.1) was the adopted travel demand model used for the I-4 at Branch Forbes Road IOAR. The TBRPM v9.1 is a time-of-day based four-step model with Base Year 2015 and Horizon Year (Cost Affordable Year) 2045.

Prior to utilizing the traffic assignment generated by a travel demand model for forecasting, a validation of the model should be performed to ascertain its ability to reasonably replicate travel demand in the study area.

The validation consisted of assessing the reasonableness of the TBRPM v9.1 Base Year 2015 highway assignment output by means of calculating model output-to-count ratios in those links where counts were available. To this end, the 2015 Peak Season Weekday Average Daily Traffic (PSWADT) volumes generated by the model were converted to 2015 AADT by applying the Model Output Conversion Factor (MOCF) obtained from Florida Traffic Online (FTO) Peak Season Factor Category Report. The model AADTs were then compared to 2015 AADTs volumes obtained from the I-4 Interchange Needs Evaluation Study from east of I-75 to the western connection of SR 570 (Polk Parkway) and FDOT's FTO.

The Cost Affordable Year 2045 model network was reviewed for consistency with planned projects in the study area.

The results of the validation revealed that the 2015 Base Year Model either under-assigned or over-assigned traffic on critical non-interstate links within the study area. Since the travel demand model did not reasonably replicate existing travel behavior on the non-interstate links within the study area, it was concluded that the application of off-model methods would be more appropriate to estimate the project future year traffic volumes.

Off-model methods refer to the analysis conducted to determine the growth rate of the corridor since the travel demand model did not reasonably replicate existing travel behavior and the analysis and methodology is explained in **Section 4.2**.

4.2 PROJECT TRAFFIC FORECAST

Design Year 2045 AADTs were developed by applying a growth rate to the Existing Year AADTs. Opening Year 2025 AADTs were then determined through interpolation of Existing Year and Design Year AADTs.

Traffic factors were applied to the future year AADTs to obtain Opening and Design Year segment design hour volumes (DHVs) and DDHVs. Lastly, the AM and PM peak hour intersection turning movement volumes for the future horizon years (i.e., 2025 and 2045) were determined by applying turning movement percentages derived from existing TMCs to the segment DDHVs.

4.2.1 Growth Rate Analysis

A robust analysis was undertaken to determine the appropriate growth rate for the corridor. The growth rate analysis included a detailed assessment of historical traffic growth trends, travel demand model highway assignment growth (TBRPM 2015/2045), and socio-economic growth (TBRPM 2015/2045). A compounded annual growth rate of 2.5% was recommended for the study area.

Table 4-1 and **Figure 4-1** show the projected Opening Year (2025) and Design Year (2045) AADTs. **Figure 4-2** shows the Opening Year (2025) turning movement volumes and **Figure 4-3** shows the Design Year (2045) turning movement volumes.

Table 4-1 Opening Year (2025) and Design Year (2045) AADTs

Location	Year 2020	Opening Year 2025	Opening Year 2025 Rounded	Design Year 2045	Design Year 2045 Rounded
I-4 EB Off-ramp	5,800	6,562	6,600	10,753	11,000
I-4 EB On-ramp	4,400	4,978	5,000	8,157	8,200
I-4 WB Off-ramp	4,500	5,091	5,100	8,343	8,300
I-4 WB On-ramp	6,800	7,694	7,700	12,607	12,500
Branch Forbes Road north of Harvey Tew Road	7,300	8,259	8,300	13,534	13,500
Harvey Tew Road west of Branch Forbes Road	1,000	1,131	1,100	1,854	1,900
Branch Forbes Road north of I-4	8,900	10,070	10,000	16,500	16,500
Branch Forbes Road south of I-4	22,000	24,891	25,000	40,787	41,000
Beauchamp Road east of Branch Forbes Road	1,100	1,245	1,200	2,039	2,000
Glen Harwell Road west of Branch Forbes Road	1,700	1,923	1,900	3,152	3,200
Branch Forbes Road north of US 92	18,500	20,931	21,000	34,298	34,500
Branch Forbes Road south of US 92	8,500	9,617	9,600	15,759	16,000
US 92 east of Branch Forbes Road	16,500	18,668	18,500	30,590	30,500
US 92 west of Branch Forbes Road	11,000	12,445	12,500	20,393	20,500

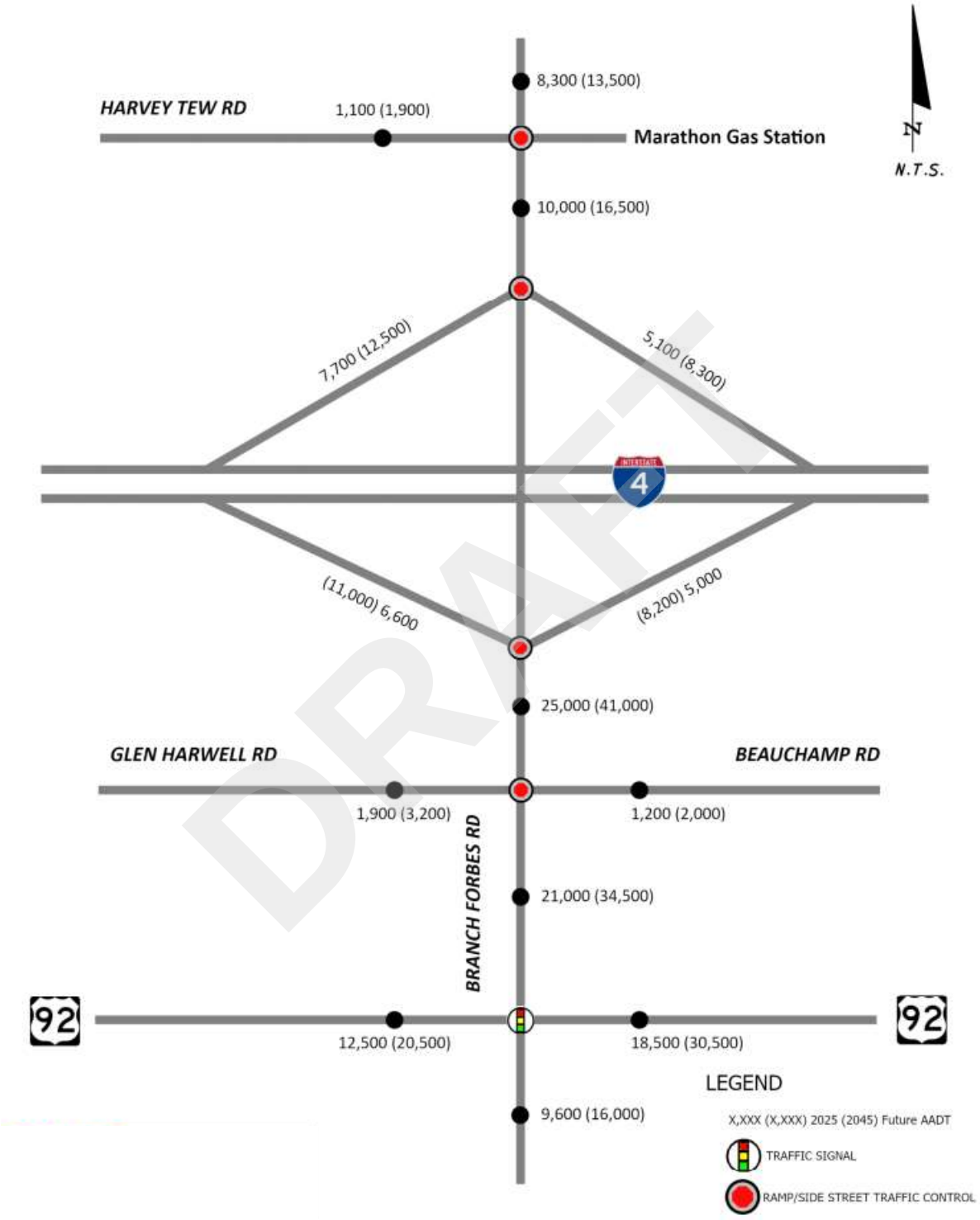


Figure 4-1 Opening Year (2025) and Design Year (2045) AADTs

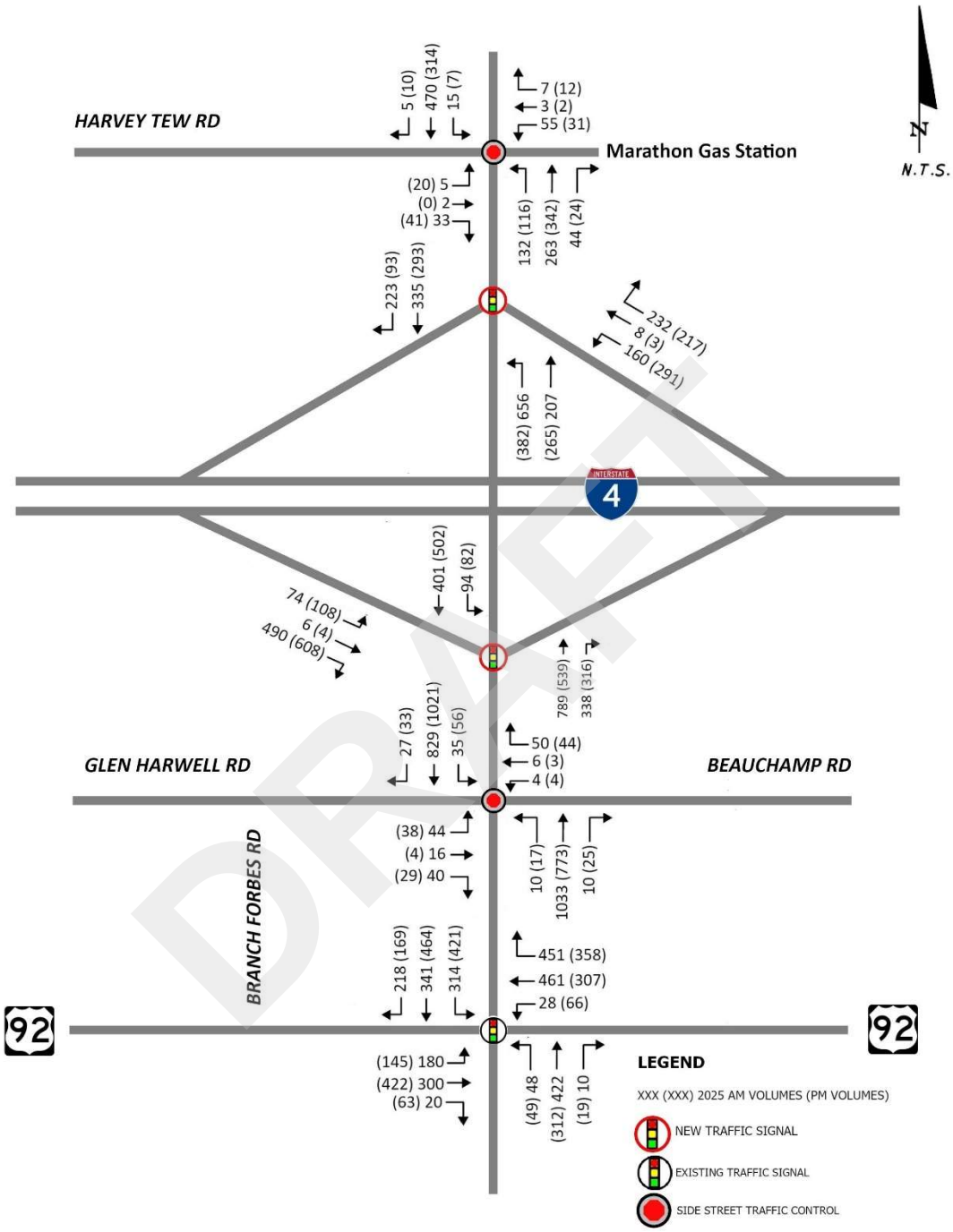


Figure 4-2 Opening Year (2025) Turning Movement Volumes

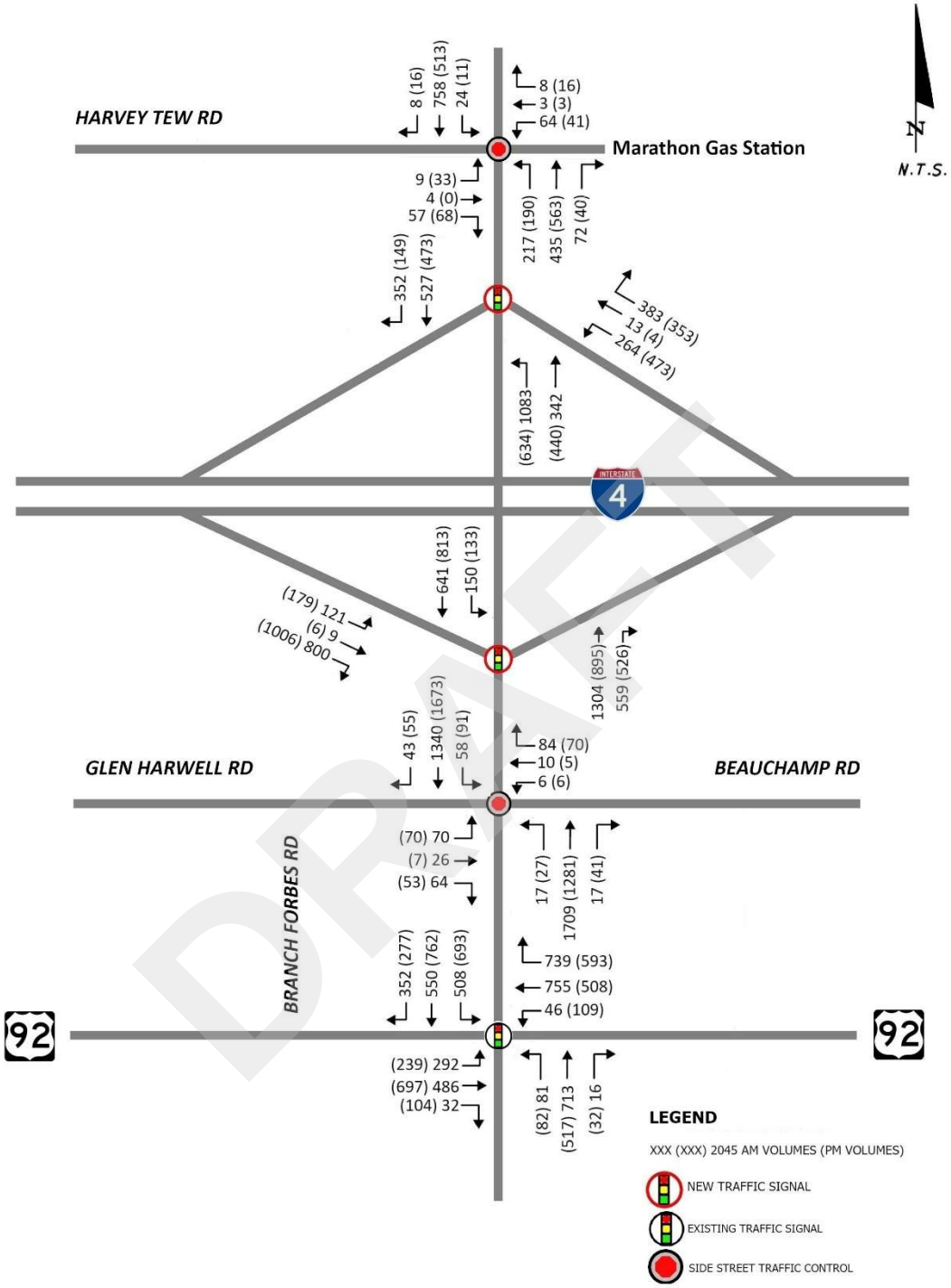


Figure 4-3 Design Year (2045) Turning Movement Volumes

SECTION 5 ALTERNATIVES ANALYSIS

The future traffic analysis was conducted for the following scenarios:

- No-Build Alternative
- Build Alternative

The No-Build Alternative and the Build Alternative were evaluated for Opening Year 2025 and Design Year 2045.

5.1 NO-BUILD ALTERNATIVE

The No-Build Alternative consists of the improvements identified in the I-4 at Branch Forbes IOAR that are currently under design and are schedule for construction in 2024. The No-Build Alternative for Design Year 2045 also includes the improvements identified in the US 92 PD&E Study. The following improvements are included in the No-Build Alternative:

- Opening Year 2025:
    - New Traffic Signals and Mast Arms at each of the I-4 and Branch Forbes Road ramp terminus.
    - Add new 840-foot right turn lane to existing I-4 EB off-ramp. Mill and resurface existing ramp.
    - Widen Branch Forbes Road to the outside between ramp terminals.
    - Extend existing northbound and southbound left turn lanes to provide minimum of 260-ft storage capacity at the I-4 ramp terminal intersections.
    - Add a southbound left turn lane at the intersection of Branch Forbes Road and Glenn Harwell/Beauchamp Road.
- Design Year 2045:
    - All improvements included in Opening Year 2025.
    - At the US 92 intersection:
        - An additional through lane in the eastbound and westbound directions
        - An additional westbound right turn lane
        - An additional southbound left turn lane
        - Extending the eastbound left turn storage length to 475 ft and the westbound left turn storage length to 325 ft.

The No-Build Alternative improvements for Opening Year 2025 are shown in **Figure 5-1** and for Design Year 2045 are shown in **Figure 5-2**.

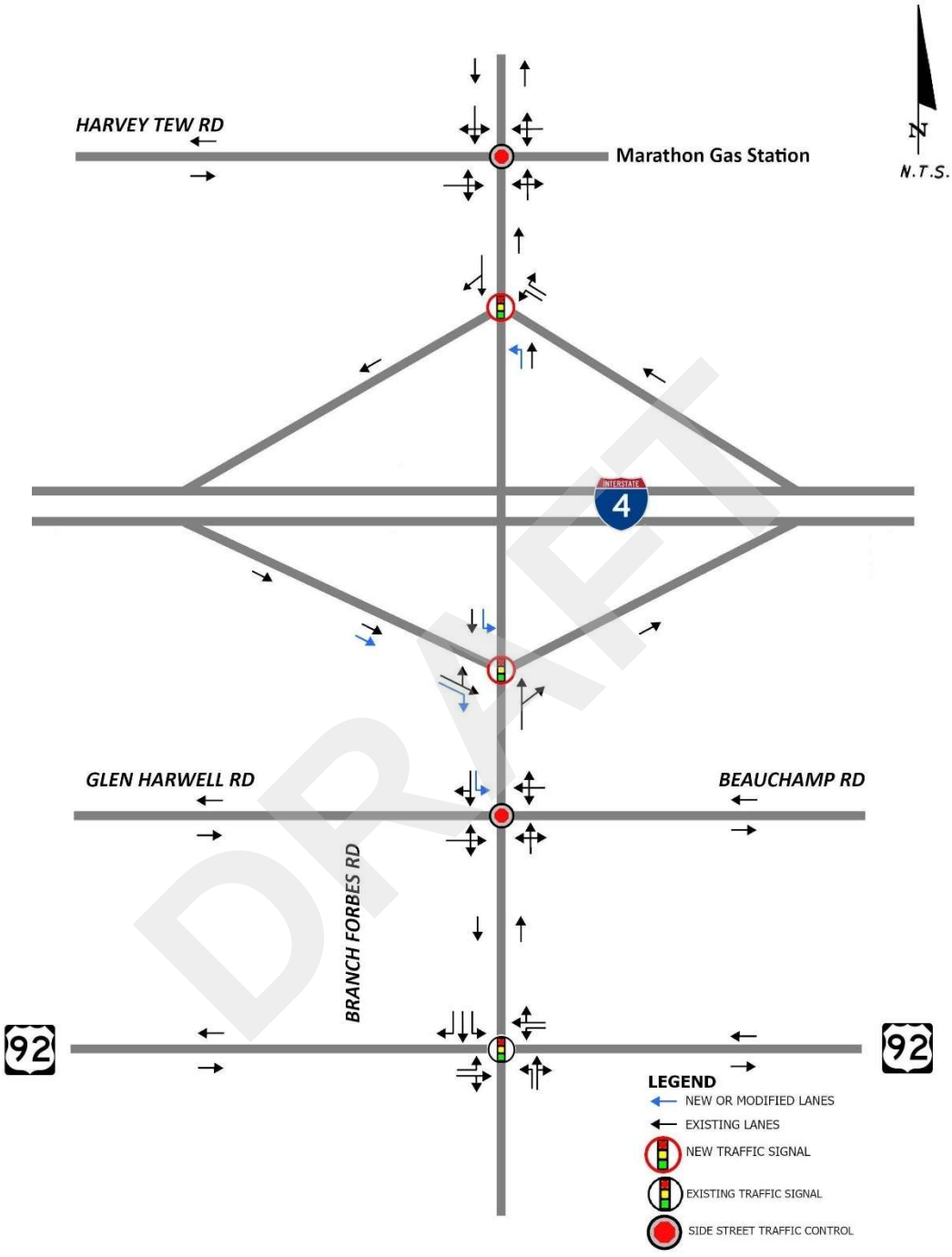


Figure 5-1 Opening Year (2025) No-Build Alternative Geometry

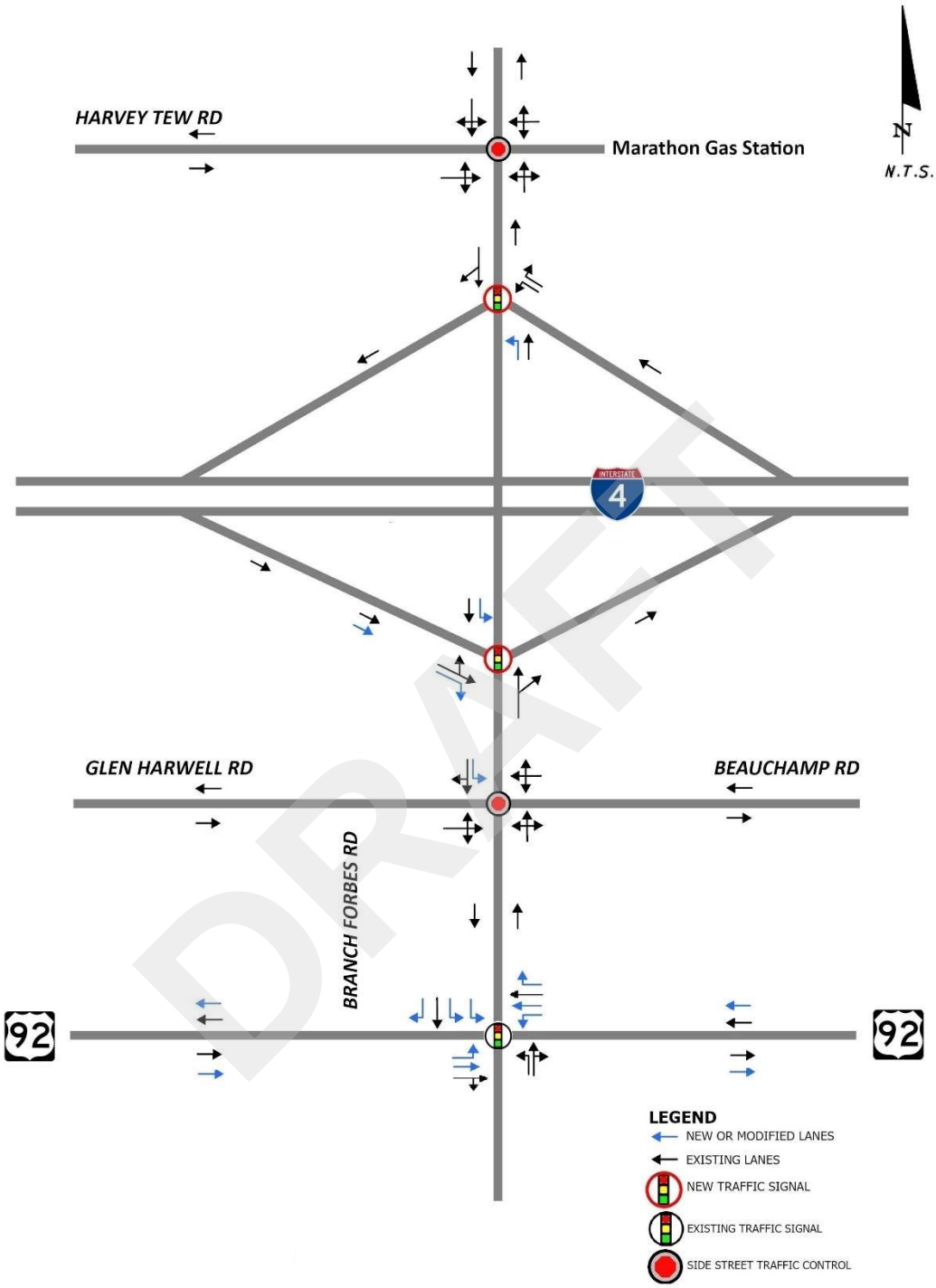


Figure 5-2 Design Year (2045) No-Build Alternative Geometry

5.1.1 Opening Year 2025 No-Build Analysis

The improvements included in **Figure 5-1** and discussed in Section 5.1 are included in the Year 2025 No-Build analysis. **Tables 5-1** and **5-2** summarize the intersections operational analysis results for the Year 2025 No-Build.

Table 5-1 Opening Year (2025) No-Build Intersection Delay and LOS Results

Approach	Movement	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Approach LOS	Delay (sec)	LOS	Approach LOS
Intersection: Branch Forbes Road at Harvey Tew Road*							
Eastbound	Left/Thru/Right	15.4	C	C	16.3	C	C
Westbound	Left/Thru/Right	43.3	E	E	24.4	C	C
Northbound	Left	9.0	A		8.3	A	
Southbound	Left	8.0	A		8.1	A	
Intersection: Branch Forbes Road at I-4 WB Ramps							
Westbound	Left/Thru	54.6	D	D	46.3	D	D
Northbound	Left	11.6	B	A	29.7	C	B
	Through	0.0	A		4.6	A	
Southbound	Thru/Right	33.0	C	C	28.3	C	C
Intersection		**20.3**	**C**		**Intersection**	**27.9**	**C**
Intersection: Branch Forbes Road at I-4 EB Ramps							
Eastbound	Left/Thru	50.7	D	D	36.8	D	D
Northbound	Thru/Right	18.3	B	B	23.9	C	C
Southbound	Left	13.0	B	A	14.5	B	A
	Through	5.5	A		1.1	A	
Intersection		**16.1**	**B**		**Intersection**	**15.2**	**B**
Intersection: Branch Forbes Road at Glen Harwell Road/Beauchamp Road*							
Eastbound	Left/Thru/Right	804.6	F	F	501.3	F	F
Westbound	Left/Thru/Right	65.2	F	E	40.1	E	E
Northbound	Left	9.9	A		11.0	B	
Southbound	Left	11.1	B		10.0	A	
Intersection: Branch Forbes Road at US 92							
Eastbound	Left	56.0	E	C	37.3	D	C
	Thru/Right	17.2	B		20.6	C	
Westbound	Left	23.4	C	F	29.8	C	F
	Thru/Right	379.1	F		171.1	F	
Northbound	Left	33.5	C	E	41.3	D	D
	Thru/Right	108.3	F		53.5	D	
Southbound	Left	296.7	F	F	350.9	F	F
	Through	26.7	C		31.5	C	
	Right	24.5	C		22.6	C	
Intersection		**185.5**	**F**		**Intersection**	**113.5**	**F**

* Per HCM 6th Edition: For Two Way Stop Control (TWSC) intersections only minor movements delay and LOS are reported. HCM 6th Edition does not calculate LOS for major street thru movements and approaches or for the whole intersection as a whole.

Table 5-2 Opening Year (2025) No-Build Alternative Intersection Vehicle Queues

Intersection	Movement	Storage (ft)	AM Peak Hour Queues (95th Percentile)		PM Peak Hour Queues (95th Percentile)	
			Veh	Feet**	Veh	Feet**
Branch Forbes Road at Harvey Tew Road	EB Left/Thru/Right	1,000	0.4	10	0.6	15
	WB Left/Thru/Right	85	1.9	48	0.7	18
	NB Left	330	0.5	13	0.3	8
	SB Left	1,000	0.0	0	0.0	0
Branch Forbes Road at I-4 WB Ramps*	WB Left/Thru	1,800	9.7	243	14.3	358
	WB Right	1,000	0.0	0	0.0	0
	NB Left	260	7.2	180	11.9	**298**
	NB Thru	620	0	0	2.2	55
	SB Thru/Right	330	13.5	**338**	11.1	278
Branch Forbes Road at I-4 EB Ramps*	EB Left/Thru	1,700	4.7	118	5.5	138
	EB Right	840	0.0	0	0.0	0
	NB Thru/Right	380	22.4	**560**	18.0	**450**
	SB Left	260	1.5	25	1.8	45
	SB Thru	620	4.4	3	0.6	15
Branch Forbes Road at Glen Harwell Road/ Beauchamp Road	EB Left/Thru/Right	1,000	11.1	278	7.4	185
	WB Left/Thru/Right	1,000	2.5	63	1.4	35
	NB Left	1,000	0.0	0	0.1	3
	SB Left	100	0.2	5	0.2	5
Branch Forbes Road at US 92	EB Left	285	8.0	200	5.0	125
	EB Thru/Right	1,300	8.2	205	12.8	320
	WB Left	300	0.8	20	2.3	58
	WB Thru/Right	620	101.7	**2,542**	49.3	**1,233**
	NB Left	150	2.0	50	2.3	58
	NB Thru/Right	1,100	26.2	655	14.7	368
	SB Left	225	30.7	**768**	40.0	**1,000**
	SB Thru	650	11.1	278	15.6	390
	SB Right	160	7.4	**185**	5.4	135

*For ramps, the storage was determined as the length of the ramp or as the storage length when provided.
**Queue in feet estimated by multiplying the number of vehicles times 25 feet.

The results on **Tables 5-1 and 5-2** show the No-Build Alternative will improve the operations of the I-4 westbound and eastbound off-ramps and the overall ramp terminal intersections when compared to the existing conditions. The ramp terminal intersections are expected to operate at LOS D or better and the vehicle queues at the off-ramps will be reduced significantly. The US 92 intersection operation will continue to worsen and the southbound left turn queue will impact Branch Forbes Road southbound through movement. The 2025 No-Build Synchro results are included in **Appendix D**.

5.1.2 Design Year 2045 No-Build Alternative

The improvements included in **Figure 5-2** and discussed in Section 5.1 are included in the Year 2045 No-Build Analysis. **Tables 5-3** and **5-4** summarize the intersections operational analysis results for the Year 2045 No-Build Alternative.

Table 5-3 Design Year (2045) No-Build Intersection Delay and LOS Results

Approach	Movement	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Approach LOS	Delay (sec)	LOS	Approach LOS
Intersection: Branch Forbes Road at Harvey Tew Road*							
Eastbound	Left/Thru/Right	54.3	F	F	76.1	F	F
Westbound	Left/Thru/Right	891.7	F	F	186.0	F	F
Northbound	Left	11.2	B		9.5	A	
Southbound	Left	8.6	A		8.9	A	
Intersection: Branch Forbes Road at I-4 WB Ramps							
Westbound	Left/Thru	142.5	F	F	86.1	F	F
Northbound	Left	248.3	F	F	149.1	F	F
	Through	0.0	A		0.1	A	
Southbound	Thru/Right	58.8	E	E	44.7	D	D
Intersection		**152.3**		**F**	**Intersection**	**77.5**	**E**
Intersection: Branch Forbes Road at I-4 EB Ramps							
Eastbound	Left/Thru	68.2	E	E	46.1	D	D
Northbound	Thru/Right	61.9	E	E	53.0	D	D
Southbound	Left	203.8	F	D	100.0	F	C
	Through	18.3	B		22.4	C	
Intersection		**59.3**		**E**	**Intersection**	**43.2**	**D**
Intersection: Branch Forbes Road at Glen Harwell Road/Beauchamp Road*							
Eastbound	Left/Thru/Right	Err**	Err**	**	Err**	Err**	**
Westbound	Left/Thru/Right	Err**	Err**	**	Err**	Err**	**
Northbound	Left	13.2	B		17.0	C	
Southbound	Left	18.4	C		14.3	B	
Intersection: Branch Forbes Road at US 92							
Eastbound	Left	197.4	F	F	165.8	F	E
	Thru/Right	37.5	D		46.5	D	
Westbound	Left	52.3	D	F	93.9	F	F
	Through	93.3	F		53.0	D	
	Right	215.7	F		294.4	F	
Northbound	Left	289.7	F	F	295.4	F	F
	Thru/Right	177.8	F		87.1	F	
Southbound	Left	129.2	F	E	201.7	F	F
	Through	20.5	C		65.5	E	
	Right	5.2	A		17.3	B	
Intersection		**118.4**		**F**	**Intersection**	**120.3**	**F**

* Per HCM 6th Edition: For Two Way Stop Control (TWSC) intersections only minor movements delay and LOS are reported. HCM 6th Edition does not calculate LOS for major street thru movements and approaches or for the whole intersection as a whole.

**No results provided, or computations not completed. Delay threshold is exceeded.

Table 5-4 Design Year (2045) No-Build Alternative Intersection Vehicle Queues

Intersection	Movement	Storage (ft)	AM Peak Hour Queues (95th Percentile)		PM Peak Hour Queues (95th Percentile)	
			Veh	Feet**	Veh	Feet**
Branch Forbes Road at Harvey Tew Road	EB Left/Thru/Right	1,000	2.5	63	4.3	108
	WB Left/Thru/Right	85	9.0	**225**	4.5	**113**
	NB Left	330	1.2	30	0.7	18
	SB Left	1,000	0.0	0	0.0	0
Branch Forbes Road at I-4 WB Ramps*	WB Left/Thru	1,800	24.3	608	32.3	808
	WB Right	1,000	0.0	0	0.0	0
	NB Left	260	75.6	**1,890**	35.6	**890**
	NB Thru	620	0	0	0.1	3
	SB Thru/Right	330	29.7	**743**	23.6	**590**
Branch Forbes Road at I-4 EB Ramps*	EB Left/Thru	1,700	9.4	235	10.6	265
	EB Right	840	0.0	0	0.0	0
	NB Thru/Right	380	34.2	**855**	48.7	**1,218**
	SB Left	260	10.6	**265**	9.0	225
	SB Thru	620	19.6	490	26.2	**655**
Branch Forbes Road at Glen Harwell Road/ Beauchamp Road	EB Left/Thru/Right	1,000	***	***	***	***
	WB Left/Thru/Right	1,000	***	***	***	***
	NB Left	1,000	0.1	3	0.3	8
	SB Left	100	0.7	18	0.7	18
Branch Forbes Road at US 92	EB Left	475	26.1	**653**	17.2	**430**
	EB Thru/Right	1,300	12.8	320	20.7	518
	WB Left	325	3.0	75	9.8	245
	WB Thru	1,000	26.5	663	14.5	363
	WB Right	650	71.3	**1,783**	67.1	**1,678**
	NB Left	150	11.4	**285**	11.5	**288**
	NB Thru/Right	1,100	64.6	**1,615**	36.6	915
	SB Left	525	20.8	520	33.8	**845**
	SB Thru	650	13.9	348	45.3	**1,133**
	SB Right	525	5.1	128	9.4	235

*For ramps, the storage was determined as the length of the ramp or as the storage length when provided.
**Queue in feet estimated by multiplying the number of vehicles times 25 feet.
***No results provided, excessive queue

The results show the operations the improvements included in the No-Build alternative will not be enough by Design Year. The ramp terminal intersections are expected to operate at LOS E or F during the AM peak hour and the westbound ramp terminal intersection is expected to operate at LOS E. The queue from the northbound left at the westbound ramp terminal intersection will impact the eastbound ramp terminal intersection and the Glenn Harwell Road/Beauchamp Road intersection. The 2045 No-Build Synchro results are included in **Appendix D**.

5.2 BUILD ALTERNATIVE

The Build Alternative consists of the improvements identified in the US 92 PD&E Study for the US 92 intersection as discussed in Section 5.1 plus the following improvements:

- Widening of Branch Forbes Road from two lane undivided roadway to a four-lane divided roadway from south of US 92 intersection to north of Harvey Tew intersection.
- TUDI with the following improvements:
    - At the I-4 westbound ramp terminal intersection:
        - Dual northbound left turn lanes extending south to north of the Glen Harwell Road/Beauchamp Road intersection.
        - Adding an additional 500-ft left turn lane creating dual left turn lanes.
    - At the I-4 eastbound ramp terminal intersection:
        - Adding an additional I-4 eastbound right turn lane to create dual right turn lanes.
- Access management improvements at the Glen Harwell Road/Beauchamp Road intersection.

The Build Alternative improvements for Opening Year 2025 and Design Year 2045 are shown in **Figure 5-3.**

With the access management improvements, the vehicles making the left and through movement from Glenn Harwell Road were assumed to make a right turn and make a U-turn movement at Keene Drive. Vehicles making a left and through from Beauchamp Road were assumed to make a right turn and make a U-turn at Harvey Tew Road.

5.2.1 Opening Year 2025 Build Alternative

The improvements included in **Figure 5-3** and discussed in Section 5.2 are included in the Year 2025 Build Analysis. **Tables 5-5 and 5-6** summarize the intersections operational analysis results for the Year 2025 Build Alternative.

The results show all the intersections operating at LOS D or better in Opening Year. The intersection of Keene Road was added to the Synchro analysis to estimate the storage needed for the southbound U-turn movement. None of the intersections movements queues are expected to exceed their storage length.

HCM 6th Edition results are not provided for the I-4 westbound ramps intersection under the Build Alternative because the HCM 6th Edition methodology does not support movements with shared and exclusives lanes. Therefore, HCM 2000 results were provided for all signalized intersections under the Build alternative. The 2025 Build Synchro results are included in **Appendix E**.

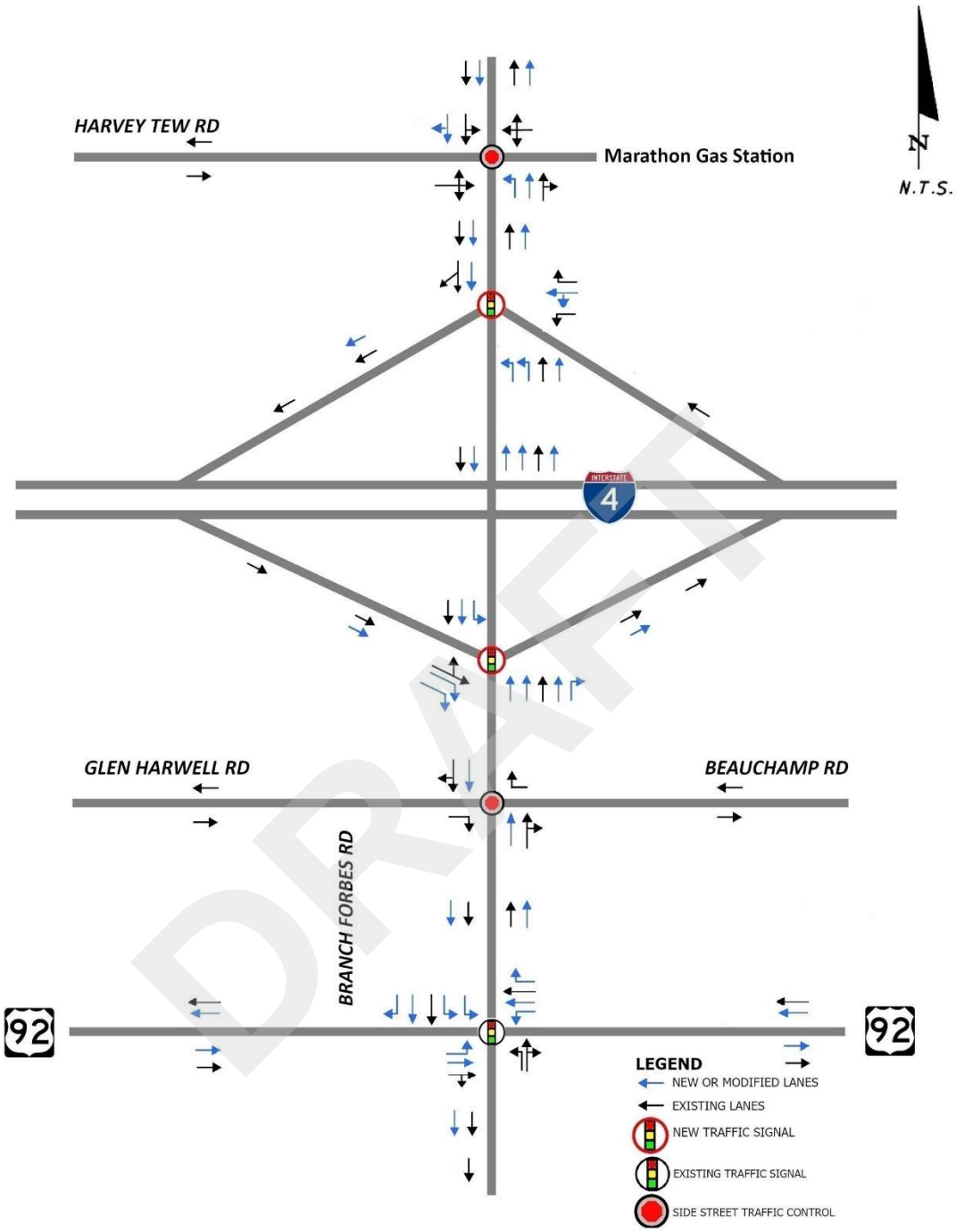


Figure 5-3 Build Alternative Geometry

Table 5-5 Opening Year (2025) Build Intersection Delay and LOS Results

Approach	Movement	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Approach LOS	Delay (sec)	LOS	Approach LOS
Intersection: Branch Forbes Road at Harvey Tew Road*							
Eastbound	Left/Thru/Right	13.5	B	B	14.0	B	B
Westbound	Left/Thru/Right	30.0	D	D	20.3	C	C
Northbound	Left	9.2	A		8.5	A	
Southbound	Left	8.0	A		8.2	A	
	Through	0.1	A		0.0	A	
Intersection: Branch Forbes Road at I-4 WB Ramps							
Westbound	Left	37.7	D	D	36.8	D	D
	Left/Thru	37.8	D		36.9	D	
	Right	36.8	D		34.0	C	
Northbound	Left	39.5	D	C	23.7	C	B
	Through	3.1	A		3.3	A	
Southbound	Thru/Right	30.0	C	C	33.1	C	C
Intersection		**31.8**		**C**	**Intersection**	**26.4**	**C**
Intersection: Branch Forbes Road at I-4 EB Ramps							
Eastbound	Left/Thru	52.7	D	D	56.2	E	D
	Right	49.5	D		52.7	D	
Northbound	Thru	7.7	A	A	15.0	B	A
	Right	0.3	A		0.3	A	
Southbound	Left	21.9	C	A	39.5	D	A
	Through	6.5	A		2.6	A	
Intersection		**17.8**		**B**	**Intersection**	**23.5**	**C**
Intersection: Branch Forbes Road at Glen Harwell Road/Beauchamp Road*							
Eastbound	Right	13.1	B	B	14.3	B	B
Westbound	Right	14.1	B	B	12.0	B	B
Intersection: Branch Forbes Road at Keene Drive*							
Eastbound	Left/Right	52.7	F	F	45.3	E	E
Northbound	Left	10.1	B		11.1	B	
Southbound	U-turn	23.6	C		16.4	C	
Intersection: Branch Forbes Road at US 92							
Eastbound	Left	50.3	D	D	40.8	D	D
	Thru/Right	30.2	C		39.8	D	
Westbound	Left	40.6	D	D	57.8	E	D
	Thru	49.5	D		55.0	D	
	Right	31.3	C		24.9	C	
Northbound	Left	32.3	C	D	39.2	D	D
	Thru/Right	54.0	D		51.9	D	
Southbound	Left	43.7	D	C	30.0	C	C
	Through	12.5	B		11.8	B	
	Right	8.8	A		29.5	C	
Intersection		**36.4**		**D**	**Intersection**	**34.7**	**C**

* Per HCM 6th Edition: For Two Way Stop Control (TWSC) intersections only minor movements delay and LOS are reported. HCM 6th Edition does not calculate LOS for major street thru movements and approaches or for the whole intersection as a whole.

Table 5-6 Opening Year (2025) Build Alternative Intersection Vehicle Queues

Intersection	Movement	Storage (ft)	AM Peak Hour Queues (95th Percentile)		PM Peak Hour Queues (95th Percentile)	
			Veh	Feet	Veh	Feet
Branch Forbes Road at Harvey Tew Road**	EB Left/Thru/Right	1,000	0.3	8	0.5	13
	WB Left/Thru/Right	85	1.3	33	0.6	15
	NB Left	100	0.5	13	0.4	10
	SB Left	1,000	0.0	0	0.0	0
	SB Thru	1,000	0.0	0	0.0	0
Branch Forbes Road at I-4 WB Ramps	WB Left	500	--	105	--	169
	WB Left/ Thru	1,800	--	108	--	172
	WB Right	1,000	--	65	--	60
	NB Left	1,000	--	132	--	44
	NB Thru	620	--	37	--	20
	SB Thru/ Right	330	--	207	--	172
Branch Forbes Road at I-4 EB Ramps	EB Left/ Thru	1,700	--	110	--	150
	EB Right*	1,250	--	53	--	79
	NB Thru	380	--	100	--	113
	NB Right	380	--	m0	--	0
	SB Left	260	--	122	--	56
	SB Thru	620	--	98	--	72
Branch Forbes Road at Glen Harwell Road/ Beauchamp Road**	EB Right	1,000	0.6	15	0.5	13
	WB Right	1,000	0.5	13	0.3	8
Branch Forbes at Keene Drive**	EB Left/ Right	1,000	0.9	23	0.6	15
	NB Left	150	0	0	0.1	3
	SB U-turn	150	1.3	33	0.9	23
Branch Forbes Road at US 92	EB Left	475	--	#180	--	150
	EB Thru/Right	1,300	--	128	--	222
	WB Left	325	--	44	--	102
	WB Thru	1,000	--	231	--	176
	WB Right	650	--	285	--	123
	NB Left	150	--	63	--	72
	NB Thru/Right	1,100	--	#502	--	379
	SB Left	525	--	185	--	196
	SB Thru	1,000	--	130	--	160
	SB Right	500	--	104	--	58

*Average of both right turn lanes

**For unsignalized intersections, queue in feet estimated by multiplying the number of vehicles times 25 ft.

m: Volume for 95th percentile queue is metered by upstream signal

#: 95th percentile volume exceeds capacity, queue may be longer

5.2.2 Design Year 2045 Build Alternative

Tables 5-7 and 5-8 summarize the intersections operational analysis results for the Year 2045 Build Alternative. A different cycle length than the one used for opening year analysis was used to analyze the design year operations.

Table 5-7 Design Year (2045) Build Intersection Delay and LOS Results

Approach	Movement	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Approach LOS	Delay (sec)	LOS	Approach LOS
Intersection: Branch Forbes Road at Harvey Tew Road*							
Eastbound	Left/Thru/Right	36.0	E	E	36.3	E	E
Westbound	Left/Thru/Right	337.5	F	F	82.7	F	F
Northbound	Left	12.2	B		9.9	A	
Southbound	Left	8.7	A		8.9	A	
	Through	0.2	A		0.1	A	
Intersection: Branch Forbes Road at I-4 WB Ramps							
Westbound	Left	54.5	D	D	48.9	D	D
	Left/Thru	54.5	D		49.2	D	
	Right	48.5	D		41.1	D	
Northbound	Left	23.7	C	B	23.5	C	B
	Through	2.7	A		6.5	B	
Southbound	Thru/Right	53.2	D	D	37.3	D	D
Intersection		**36.0**	**D**		**Intersection**	**31.2**	**C**
Intersection: Branch Forbes Road at I-4 EB Ramps							
Eastbound	Left/Thru	40.3	D	D	29.4	C	D
	Right	52.2	D		49.3	D	
Northbound	Thru	20.3	C	B	27.4	C	B
	Right	0.1	A		0.3	A	
Southbound	Left	23.7	C	A	38.9	D	B
	Through	4.7	A		12.1	B	
Intersection		**22.3**	**C**		**Intersection**	**26.6**	**C**
Intersection: Branch Forbes Road at Glen Harwell Road/Beauchamp Road*							
Eastbound	Right	23.7	C	C	32.4	D	D
Westbound	Right	28.0	D	D	17.7	C	C
Intersection: Branch Forbes Road at Keene Drive*							
Eastbound	Left/Right	16.0	C	C	7074.4	F	F
Northbound	Left	13.7	B		17.4	C	
Southbound	U-turn	388.3	F		103.4	F	
Intersection: Branch Forbes Road at US 92							
Eastbound	Left	213.8	F	F	112.0	F	E
	Thru/Right	29.0	C		41.7	D	
Westbound	Left	41.1	D	E	144.1	F	E
	Thru	76.1	E		53.8	D	
	Right	60.1	E		42.4	D	
Northbound	Left	57.7	E	F	167.4	F	F
	Thru/Right	500.0	F		129.2	F	
Southbound	Left	37.4	D	C	74.8	E	D
	Through	26.8	C		31.8	C	
	Right	31.3	C		20.9	A	
Intersection		**130.2**	**F**		**Intersection**	**63.9**	**E**

* Per HCM 6th Edition: For Two Way Stop Control (TWSC) intersections only minor movements delay and LOS are reported. HCM 6th Edition does not calculate LOS for major street thru movements and approaches or for the whole intersection as a whole.

Table 5-8 Design Year (2045) Build Alternative Intersection Vehicle Queues

Intersection	Movement	Storage (ft)	AM Peak Hour Queues (95th Percentile)		PM Peak Hour Queues (95th Percentile)	
			Veh	Feet	Veh	Feet
Branch Forbes Road at Harvey Tew Road**	EB Left	1,000	1.7	43	2.4	60
	WB Left	85	6.8	170	2.9	73
	NB Left	100	1.4	35	0.9	23
	SB Left	1,000	0.1	3	0.0	0
	SB Thru	1,000	0.0	0	0.0	0
Branch Forbes Road at I-4 WB Ramps	WB Left	500	--	191	--	305
	WB Left/ Thru	1,800	--	194	--	309
	WB Right	1,000	--	98	--	82
	NB Left	1,000	--	219	--	371
	NB Thru	620	--	2	--	80
	SB Thru/ Right	330	--	**#502**	--	332
Branch Forbes Road at I-4 EB Ramps	EB Left/ Thru	1,700	--	138	--	174
	EB Right*	1,250	--	276	--	527
	NB Thru	380	--	m229	--	m208
	NB Right	380	--	m0	--	m0
	SB Left	260	--	m118	--	209
	SB Thru	620	--	m186	--	216
Branch Forbes Road at Glen Harwell Road/ Beauchamp Road**	EB Right	1,000	2.3	58	2.6	65
	WB Right	1,000	1.9	48	0.9	23
Branch Forbes at Keene Drive**	EB Left/ Right	1,000	0.2	5	3.9	98
	NB Left	150	0.1	3	0.3	8
	SB U-turn	150	11.7	**293**	7.3	**183**
Branch Forbes Road at US 92	EB Left	475	--	**#474**	--	#322
	EB Thru/Right	1,300	--	222	--	423
	WB Left	325	--	71	--	#241
	WB Thru	1,000	--	#487	--	305
	WB Right	650	--	**#774**	--	532
	NB Left	150	--	126	--	#197
	NB Thru/Right	1,100	--	**#1,261**	--	#843
	SB Left	525	--	259	--	#484
	SB Thru	1,000	--	240	--	393
	SB Right	500	--	230	--	m113

*Average of both right turn lanes

**For unsignalized intersections, queue in feet estimated by multiplying the number of vehicles times 25 ft.

m: Volume for 95th percentile queue is metered by upstream signal

#: 95th percentile volume exceeds capacity, queue may be longer

The results show the ramp terminal intersections operating at LOS D or better in the Design Year and queues from the ramps are not expected to impact the I-4 mainline.

The US 92 intersection is expected to operate at LOS F in the AM peak hour and LOS E in the PM peak hour. The queues for the eastbound left, westbound right, and shared northbound through/right movements are expected to exceed the storage length during the AM peak hour.

The intersection of Keene Road was added to the Synchro analysis as part of the access management improvement at the Glen Harwell Road/Beauchamp Road intersection to estimate the storage needed for the southbound U-turn movement that is re-routed from Glen Harwell Road. Based on the Design Year results, a storage length of 300 feet will be needed for the southbound U-turn movement based on projected future traffic.

The 2045 Build Synchro results are included in **Appendix E**.

An additional evaluation was performed adding a northbound through lane (550 feet) and an additional eastbound left turn lane at the US 92 at Branch Forbes Road intersection to determine if adding the lanes will improve the intersection LOS and queues. **Figure 5-4** shows the Build Alternative geometry with the additional improvements at the US 92 intersection. **Tables 5-9 and 5-10** show the intersection operation results.

As shown in **Table 5-9**, the intersection is expected to operate at LOS E in the AM peak hour, but the intersection delay is reduced by 50%. During the PM peak hour, the intersection LOS improves from E to D. As shown in **Table 5-10**, only the queue for the westbound right turn movement is expected to exceed the storage length during the AM peak hour.

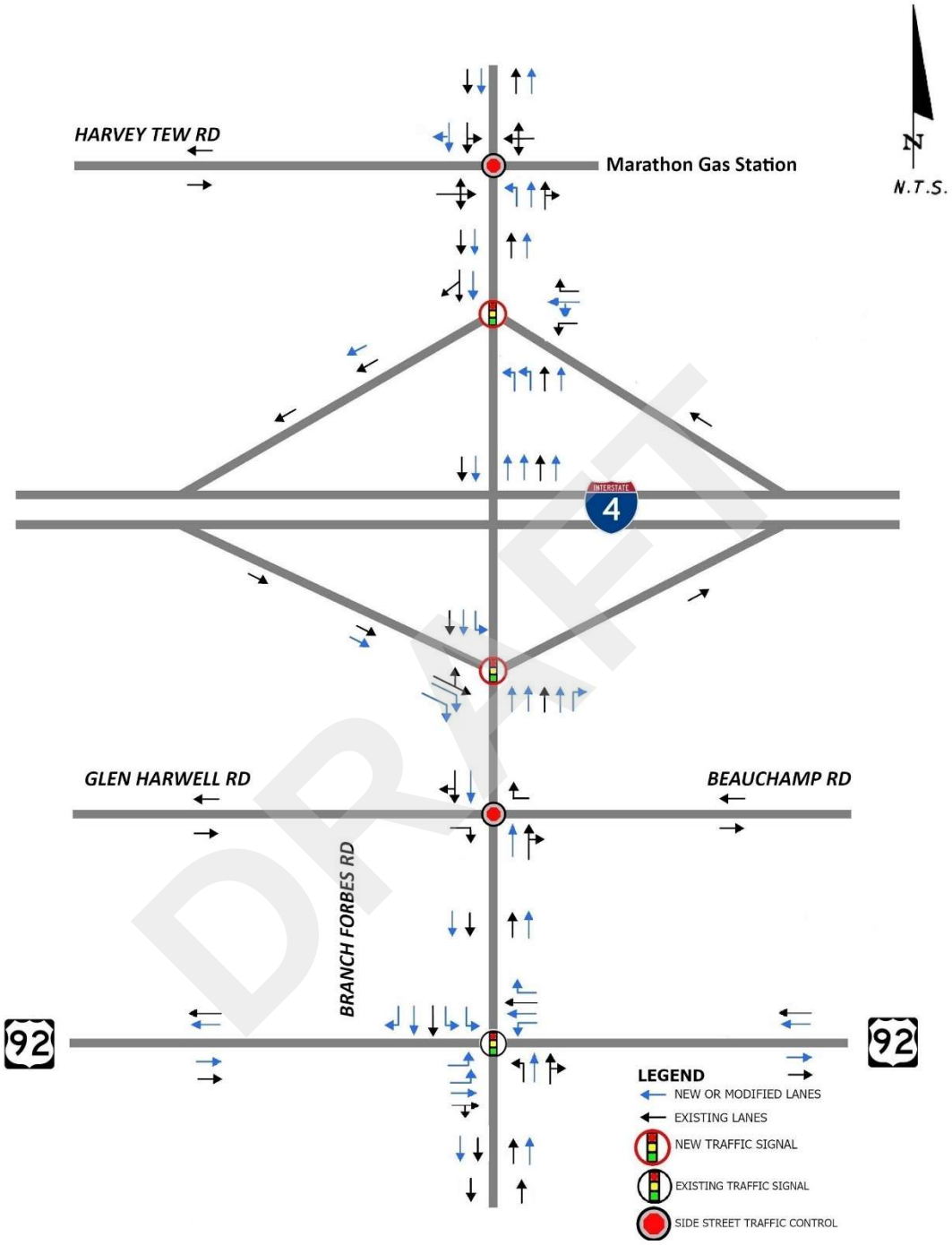


Figure 5-4 Build Alternative Geometry with Additional US 92 Intersection Improvements

Table 5-9 Design Year (2045) Build Intersection Delay and LOS Results with Additional US 92 Intersection Improvements

Approach	Movement	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Approach LOS	Delay (sec)	LOS	Approach LOS
Intersection: Branch Forbes Road at US 92							
Eastbound	Left	74.7	E	D	65.9	E	E
	Thru/Right	38.2	D		66.9	E	
Westbound	Left	65.1	E	E	94.8	F	D
	Thru	64.4	E		49.5	D	
	Right	59.2	E		29.0	C	
Northbound	Left	57.7	E	F	64.4	E	E
	Thru/Right	108.2	F		82.1	F	
Southbound	Left	39.6	D	C	39.1	D	C
	Through	29.1	C		29.1	C	
	Right	31.7	C		28.0	C	
Intersection		**58.6**		**E**	**Intersection**	**49.7**	**D**

Table 5-10 Design Year (2045) Build Alternative Intersection Vehicle Queues with Additional US 92 Intersection Improvements

Intersection	Movement	Storage (ft)	AM Peak Hour Queues (95th Percentile)		PM Peak Hour Queues (95th Percentile)	
			Veh	Feet	Veh	Feet
Branch Forbes Road at US 92	EB Left	475	--	#208	--	161
	EB Thru/Right	1,300	--	268	--	#512
	WB Left	325	--	82	--	#212
	WB Thru	1,000	--	#487	--	299
	WB Right	650	--	**#774**	--	458
	NB Left	150	--	126	--	135
	NB Thru/Right	1,100	--	#508	--	#392
	SB Left	525	--	261	--	m369
	SB Thru	1,000	--	254	--	m352
	SB Right	500	--	229	--	m93

m: Volume for 95th percentile queue is metered by upstream signal
#: 95th percentile volume exceeds capacity, queue may be longer

5.3 FUTURE CONDITIONS SAFETY ANALYSIS

The Build Alternative improvements for Branch Forbes Road include widening Branch Forbes Road from a two-lane undivided roadway to a four-lane divided roadway, access management, and additional left turn and right tun lanes at the I-4 ramp terminal intersections. A crash modification factor (CMF) of 0.341 was obtained from the CMF Clearinghouse. CMF ID 7566 was used in this PTAR because it includes Florida data. The CMF represents a reduction of 66% in total crashes along Branch Forbes Road. Therefore, the improvement is expected to reduce 66% of the 45 applicable crashes that occur along Branch Forbes Road.

The information for CMF 7566 is included in Appendix F.

SECTION 6 SUMMARY OF ANALYSIS RESULTS

The Build Alternative for Branch Forbes Road consists of the following improvements:

- Widening of Branch Forbes Road from two a lane undivided roadway to a four-lane divided roadway from south of US 92 intersection to north of Harvey Tew Road intersection.
- TUDI interchange with the following improvements:
    - At the I-4 westbound ramp terminal intersection:
        - Dual northbound left turn lanes extending south to north of the Glen Harwell Road/Beauchamp Road intersection
        - Adding an additional westbound 500-ft left turn lane creating dual left turn lanes
    - At the I-4 eastbound ramp terminal intersection:
        - Adding an additional I-4 eastbound right turn lane to create dual right turn lanes
- Access management improvements at the Glen Harwell Road/Beauchamp Road intersection
- At US 92 intersection:
    - An additional through lane in the eastbound and westbound directions
    - An additional westbound right turn lane
    - An additional southbound left turn lane
    - Extending the eastbound left turn storage length to 475 ft and the westbound left turn storage length to 325 ft

As shown in **Table 6-1**, the Build Alternative improves the intersection delays compared to the No-Build Alternative. **Table 6-2** shows the arterial LOS results of the No-Build and Build Alternatives. The widening of Branch Forbes Road will improve the capacity, operation, and safety along Branch Forbes Road and improve connectivity between I-4 and US 92.

Table 6-1 Design Year (2045) Intersection Analysis Summary

Intersection	No-Build (2045) Intersection Results				Build (2045) Intersection Results			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Harvey Tew Road*	891.7	F	186.0	F	337.5	F	82.7	F
I-4 WB Ramps	152.3	F	77.5	E	36.0	D	31.2	C
I-4 EB Ramps	59.3	E	43.2	D	22.3	C	26.6	C
Glen Harwell Road/ Beauchamp Road*	Err	**	Err	**	28.0	D	32.4	D
Keene Drive	--	--	--	--	388.3	F	7074.4	F
US 92	118.4	F	120.3	F	130.2	F	63.9	E

*Represents highest delay for the unsignalized intersection

**No results provided, or computations not completed. Delay threshold is exceeded.

Table 6-2 Design Year (2045) Arterial LOS

Cross Street along Branch Forbes Road	No-Build (2045) Arterial Results				Build (2045) Arterial Results			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS
Northbound Direction								
US 92	3.6	F	6.4	F	1.4	F	4.8	F
I-4 EB On-ramp	3.7	F	3.9	F	21.3	D	19.2	D
I-4 WB On-ramp	18.6	D	10.6	F	24.3	C	19.8	D
Total	**4.3**	**F**	**5.1**	**F**	**4.2**	**F**	**10.3**	**F**
Southbound Direction								
I-4 WB On-ramp	3.9	F	11.6	F	14.0	E	16.4	E
I-4 EB On-ramp	26.4	C	20.7	D	21.1	D	15.5	E
US 92	18.0	D	14.2	E	19.6	D	18.2	D
Total	**7.6**	**F**	**13.6**	**E**	**17.1**	**D**	**17.0**	**D**

Additional improvements were evaluated at the US 92 intersection to improve the intersection operations for design year: an additional northbound though lane (550 feet) and an additional eastbound left turn lane. **Tables 6-3** show the intersection operational results with the additional improvements at the US 92 intersection. The US 92 intersection is expected to operate at LOS E in the AM peak hour, but the intersection delay is reduced by 50%. During the PM peak hour, the intersection LOS improves from E to D.

Table 6-3 Design Year (2045) Intersection Analysis Summary with Additional US 92 Intersection Improvements

Intersection	No-Build (2045) Intersection Results				Build (2045) Intersection Results			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Harvey Tew Road*	891.7	F	186.0	F	337.5	F	82.7	F
I-4 WB Ramps	152.3	F	77.5	E	36.8	D	31.8	C
I-4 EB Ramps	59.3	E	43.2	D	22.6	C	28.0	C
Glen Harwell Road/ Beauchamp Road*	Err	**	Err	**	28.0	D	32.4	D
Keene Drive	--	--	--	--	388.3	F	7074.4	F
US 92	118.4	F	120.3	F	58.6	E	49.7	D

*Represents highest delay for the unsignalized intersection

**No results provided, or computations not completed. Delay threshold is exceeded.

Table 6-4 Design Year (2045) Arterial LOS with Additional US 92 Intersection Improvements

Cross Street along Branch Forbes Road	No-Build (2045) Arterial Results				Build (2045) Arterial Results			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS	Arterial Speed (mph)	LOS
Northbound Direction								
US 92	3.6	F	6.4	F	5.6	F	6.8	F
I-4 EB On-ramp	3.7	F	3.9	F	21.0	D	19.3	D
I-4 WB On-ramp	18.6	D	10.6	F	23.5	C	19.0	D
Total	**4.3**	**F**	**5.1**	**F**	**11.8**	**F**	**12.6**	**F**
Southbound Direction								
I-4 WB On-ramp	3.9	F	11.5	F	14.1	E	16.4	E
I-4 EB On-ramp	26.4	C	20.7	D	21.3	D	14.8	E
US 92	23.1	C	19.4	D	19.3	D	18.9	D
Total	**8.0**	**F**	**15.4**	**E**	**17.1**	**D**	**17.2**	**D**

APPENDICES

APPENDIX A Approved PTAR Methodology

Correa, Rosana X.

From: Maass, Peter <Peter.Maass@dot.state.fl.us>
Sent: Friday, July 8, 2022 1:47 PM
To: Correa, Rosana X.; Winkle, David; Matthew G. Wey, PE
Subject: [EXTERNAL] RE: Branch Forbes Road and McIntosh Road - PTAR Methodology

Rosana,
As discussed this morning, please proceed. Methodology looks good.

Peter Maass, PE, PTOE
District Seven Project Development and Analysis
peter.maass@dot.state.fl.us
813-975-6425

From: Correa, Rosana X. <Rosana.Correa@jacobs.com>
Sent: Tuesday, July 5, 2022 3:00 PM
To: Winkle, David <David.Winkle@dot.state.fl.us>; Maass, Peter <Peter.Maass@dot.state.fl.us>; Matthew G. Wey, PE <mwey@weyeng.com>
Subject: Branch Forbes Road and McIntosh Road - PTAR Methodology

Good afternoon,

Below is the PTARs Methodology discussed at the call earlier today:

- Summarize data/improvements at US-92 intersection per scope
- Data collection
  - Traffic data from the Brach Forbes Rd IOAR and McIntosh Non-IAR will be used.
    - Data will be developed for McIntosh at Newsome Road since this intersection is added to the network
- Analysis Years:
  - Year 2020 (Existing Year)
  - Year 2025 (Opening Year)
  - Year 2045 (Design Year)
- Travel Demand Forecasting
  - Travel demand forecasting procedure from Brach Forbes Rd IOAR and McIntosh Non-IAR will be summarized.
- Synchro version 11 will be used for the operation analysis
- No-Build Analysis:
  - 2025: Will include the interchange improvements identified in the Brach Forbes Rd IOAR and McIntosh Non-IAR
  - 2045: Will include the Will include the interchange improvements identified in the Brach Forbes Rd IAOR and McIntosh Non-IAR plus US 92 intersection improvements.
- Build Analysis: For both Years 2025 and 2045

    - Will include the TUDI alternative
    - Widening of Branch Forbes and McIntosh Road
    - US 92 intersection improvements
- Crash Data:
    - Crash data from 2015 – 2019 will be summarized in each PTAR

Let me know if you have any comments or questions.

Thanks,
Rosana

Rosana Correa, P.E. (FL, PR), PTOE, FITE | **Jacobs** | 813.676.2041 direct | rosana.correa@jacobs.com | www.jacobs.com

APPENDIX B Traffic Data from Approved I-4 at Branch Forbes Road IOAR

Station Name: Beauchamp Rd East of Branch Forbes Rd
Description: 72Hr Volume Counts ADR #326
City: Plant City
County: Hillsborough
Start Date/Time: 03/03/2020 00:00
End Date/Time: 03/04/2020 00:00

Date:03/03/2020	Station Name: Beauchamp Rd East of Branch Forbes Rd - Eastbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	1	0	2	0	0	1	8	45	55	30	6	12
30	0	0	1	0	0	0	17	37	73	12	15	12
45	1	1	1	0	1	4	23	22	46	17	3	9
0	1	0	1	1	0	5	43	27	42	6	5	19
Hr Total	**3**	**1**	**5**	**1**	**1**	**10**	**91**	**131**	**216**	**65**	**29**	**52**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	6	13	11	12	24	13	11	10	8	5	3	4
30	14	16	15	13	15	20	18	15	8	5	2	1
45	12	16	14	11	13	17	21	7	13	8	3	4
0	13	12	12	15	25	9	10	5	6	8	3	0
Hr Total	**45**	**57**	**52**	**51**	**77**	**59**	**60**	**37**	**35**	**26**	**11**	**9**
24 Hour Total :			**1124**									
AM Peak Hour Begins :			8:00	**AM Peak Volume :**			216	**AM Peak Hour Factor :**				0.74
PM Peak Hour Begins :			16:00	**PM Peak Volume :**			77	**PM Peak Hour Factor :**				0.77

Date:03/03/2020	Station Name: Beauchamp Rd East of Branch Forbes Rd - Westbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	2	0	0	0	0	5	13	33	31	9	12	10
30	0	4	0	3	0	5	15	63	28	13	8	9
45	1	3	0	2	4	7	26	81	13	15	15	12
0	0	1	0	1	0	19	29	50	12	15	7	8
Hr Total	**3**	**8**	**0**	**6**	**4**	**36**	**83**	**227**	**84**	**52**	**42**	**39**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	11	12	10	25	24	32	17	9	10	5	5	6
30	8	16	20	20	13	43	14	11	5	9	6	2
45	11	4	18	23	20	25	13	8	2	7	4	2
0	10	20	14	16	31	19	8	6	5	5	0	1
Hr Total	**40**	**52**	**62**	**84**	**88**	**119**	**52**	**34**	**22**	**26**	**15**	**11**
24 Hour Total :			**1189**									
AM Peak Hour Begins :			7:00	**AM Peak Volume :**			227	**AM Peak Hour Factor :**				0.70
PM Peak Hour Begins :			16:45	**PM Peak Volume :**			131	**PM Peak Hour Factor :**				0.76

Station Name: Beauchamp Rd East of Branch Forbes Rd
Description: 72Hr Volume Counts ADR #326
City: Plant City
County: Hillsborough
Start Date/Time: 03/04/2020 00:00
End Date/Time: 03/05/2020 00:00

Date:03/04/2020	Station Name: Beauchamp Rd East of Branch Forbes Rd - Eastbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	1	0	0	0	0	0	5	9	7	4	12	8
30	0	1	0	2	0	0	3	11	9	5	5	10
45	3	0	0	1	0	2	9	11	11	9	3	7
0	2	0	0	0	1	8	16	8	4	9	16	16
Hr Total	**6**	**1**	**0**	**3**	**1**	**10**	**33**	**39**	**31**	**27**	**36**	**41**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	10	12	18	13	16	18	12	20	8	3	8	3
30	8	15	13	22	17	16	14	13	2	8	4	5
45	9	9	16	14	12	20	20	7	5	4	3	0
0	34	7	16	11	13	20	10	9	0	8	3	1
Hr Total	**61**	**43**	**63**	**60**	**58**	**74**	**56**	**49**	**15**	**23**	**18**	**9**
24 Hour Total :			**757**									
AM Peak Hour Begins :			6:45	**AM Peak Volume :**			47	**AM Peak Hour Factor :**				0.73
PM Peak Hour Begins :			17:00	**PM Peak Volume :**			74	**PM Peak Hour Factor :**				0.54

Date:03/04/2020	Station Name: Beauchamp Rd East of Branch Forbes Rd - Westbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	1	0	0	0	0	7	14	28	15	12	6	7
30	0	0	0	1	1	7	15	35	9	9	7	11
45	0	0	0	0	5	14	25	28	11	3	10	14
0	1	1	1	2	4	9	35	15	8	8	15	10
Hr Total	**2**	**1**	**1**	**3**	**10**	**37**	**89**	**106**	**43**	**32**	**38**	**42**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	8	11	18	28	30	22	20	13	2	10	3	1
30	14	17	23	15	16	29	18	8	7	4	7	3
45	8	12	28	21	38	23	6	3	4	22	4	1
0	10	17	17	23	28	13	9	6	2	16	1	0
Hr Total	**40**	**57**	**86**	**87**	**112**	**87**	**53**	**30**	**15**	**52**	**15**	**5**
24 Hour Total :			**1043**									
AM Peak Hour Begins :			6:45	**AM Peak Volume :**			126	**AM Peak Hour Factor :**				0.90
PM Peak Hour Begins :			16:30	**PM Peak Volume :**			117	**PM Peak Hour Factor :**				0.77

Station Name: Beauchamp Rd East of Branch Forbes Rd
Description: 72Hr Volume Counts ADR #326
City: Plant City
County: Hillsborough
Start Date/Time: 03/05/2020 00:00
End Date/Time: 03/06/2020 00:00

Date: 03/05/2020	Station Name: Beauchamp Rd East of Branch Forbes Rd - Eastbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	3	0	0	2	0	2	8	7	4	6	8	13
30	0	2	0	2	1	0	4	12	9	12	4	14
45	2	2	2	0	1	3	5	16	4	6	11	9
0	2	1	0	0	0	5	18	8	4	6	8	10
Hr Total	**7**	**5**	**2**	**4**	**2**	**10**	**35**	**43**	**21**	**30**	**31**	**46**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	15	16	14	8	16	16	15	10	7	7	5	6
30	7	13	17	17	26	25	21	11	8	7	2	0
45	10	18	10	10	23	19	25	9	9	5	3	1
0	14	13	13	15	28	8	9	7	4	3	4	2
Hr Total	**46**	**60**	**54**	**50**	**93**	**68**	**70**	**37**	**28**	**22**	**14**	**9**
24 Hour Total :			**787**									
AM Peak Hour Begins :			6:45	**AM Peak Volume :**			53	**AM Peak Hour Factor :**				0.74
PM Peak Hour Begins :			16:00	**PM Peak Volume :**			93	**PM Peak Hour Factor :**				0.83

Date: 03/05/2020	Station Name: Beauchamp Rd East of Branch Forbes Rd - Westbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	0	1	1	0	0	11	13	31	13	6	16	7
30	1	2	1	1	2	4	15	38	11	11	6	7
45	2	2	1	0	2	6	16	28	11	13	13	9
0	0	1	1	0	3	18	34	19	8	7	4	14
Hr Total	**3**	**6**	**4**	**1**	**7**	**39**	**78**	**116**	**43**	**37**	**39**	**37**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	12	12	16	25	26	33	18	13	7	9	3	0
30	12	7	23	16	20	38	30	8	3	9	2	1
45	14	15	26	27	37	29	15	6	3	7	4	4
0	11	21	21	30	43	23	16	4	12	5	2	2
Hr Total	**49**	**55**	**86**	**98**	**126**	**123**	**79**	**31**	**25**	**30**	**11**	**7**
24 Hour Total :			**1130**									
AM Peak Hour Begins :			6:45	**AM Peak Volume :**			131	**AM Peak Hour Factor :**				0.86
PM Peak Hour Begins :			16:30	**PM Peak Volume :**			151	**PM Peak Hour Factor :**				0.88

Station Name: Branch Forbes Rd North of US 92
Description: 72Hr Volume Counts ADR #113
City: Plant City
County: Hillsborough
Start Date/Time: 03/03/2020 00:00
End Date/Time: 03/04/2020 00:00

Date: 03/03/2020	Station Name: Branch Forbes Rd North of US 92 - Northbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
24 Hour Total :			**0**									
AM Peak Hour Begins :			0:00	**AM Peak Volume :**			0	**AM Peak Hour Factor :**				
PM Peak Hour Begins :			12:00	**PM Peak Volume :**			0	**PM Peak Hour Factor :**				

Date: 03/03/2020	Station Name: Branch Forbes Rd North of US 92 - Southbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	35	20	10	29	30	77	310	321	307	318	219	261
30	31	31	25	23	40	137	294	338	337	355	261	232
45	26	9	14	39	75	159	342	351	312	285	247	254
0	24	20	18	36	71	203	344	325	318	260	255	245
Hr Total	**116**	**80**	**67**	**127**	**216**	**576**	**1290**	**1335**	**1274**	**1218**	**982**	**992**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	284	237	322	336	364	367	327	260	178	123	134	51
30	260	301	340	318	372	422	333	263	195	176	107	51
45	243	332	308	332	305	390	267	225	183	176	78	51
0	273	293	328	333	319	324	236	201	129	128	82	29
Hr Total	**1060**	**1163**	**1298**	**1319**	**1360**	**1503**	**1163**	**949**	**685**	**603**	**401**	**182**
24 Hour Total :			**19959**									
AM Peak Hour Begins :			6:45	**AM Peak Volume :**			1354	**AM Peak Hour Factor :**				0.95
PM Peak Hour Begins :			17:00	**PM Peak Volume :**			1503	**PM Peak Hour Factor :**				0.89

Station Name: Branch Forbes Rd North of US 92
Description: 72Hr Volume Counts ADR #113
City: Plant City
County: Hillsborough
Start Date/Time: 03/04/2020 00:00
End Date/Time: 03/05/2020 00:00

Date: 03/04/2020	Station Name: Branch Forbes Rd North of US 92 - Northbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	0	0	0	0	0	58	188	185	183	146	115	158
30	0	0	0	0	0	86	208	226	187	123	118	116
45	0	0	0	0	0	117	227	207	171	158	139	131
0	0	0	0	0	0	138	192	181	148	123	124	153
Hr Total	**0**	**0**	**0**	**0**	**0**	**399**	**815**	**799**	**689**	**550**	**496**	**558**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	136	172	167	163	164	175	165	121	81	124	85	23
30	135	153	168	187	172	207	118	116	82	111	57	20
45	146	154	162	186	163	197	140	90	69	69	34	17
0	136	186	179	176	195	180	118	93	72	103	26	14
Hr Total	**553**	**665**	**676**	**712**	**694**	**759**	**541**	**420**	**304**	**407**	**202**	**74**
24 Hour Total :			**10313**									
AM Peak Hour Begins :			6:30	**AM Peak Volume :**			830	**AM Peak Hour Factor :**				0.91
PM Peak Hour Begins :			16:45	**PM Peak Volume :**			774	**PM Peak Hour Factor :**				0.93

Date: 03/04/2020	Station Name: Branch Forbes Rd North of US 92 - Southbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	34	20	15	24	35	32	87	111	130	95	149	149
30	33	24	18	30	49	31	109	110	92	112	135	202
45	36	22	24	35	64	46	141	122	104	128	133	156
0	29	16	20	29	74	51	146	138	108	119	148	149
Hr Total	**132**	**82**	**77**	**118**	**222**	**160**	**483**	**481**	**434**	**454**	**565**	**656**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	150	140	135	0	0	0	0	0	0	0	0	0
30	166	172	134	0	0	0	0	0	0	0	0	0
45	171	139	0	0	0	0	0	0	0	0	0	0
0	144	105	0	0	0	0	0	0	0	0	0	0
Hr Total	**631**	**556**	**269**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
24 Hour Total :			**5320**									
AM Peak Hour Begins :			10:45	**AM Peak Volume :**			655	**AM Peak Hour Factor :**				0.81
PM Peak Hour Begins :			12:00	**PM Peak Volume :**			631	**PM Peak Hour Factor :**				0.92

Station Name: Branch Forbes Rd North of US 92
Description: 72Hr Volume Counts ADR #113
City: Plant City
County: Hillsborough
Start Date/Time: 03/05/2020 00:00
End Date/Time: 03/06/2020 00:00

Date: 03/05/2020	Station Name: Branch Forbes Rd North of US 92 - Northbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	10	8	11	9	18	35	180	166	171	108	102	91
30	12	8	7	16	24	76	194	196	145	118	102	119
45	11	12	10	15	38	105	178	192	130	110	122	136
0	13	6	5	20	36	111	186	184	123	128	103	113
Hr Total	**46**	**34**	**33**	**60**	**116**	**327**	**738**	**738**	**569**	**464**	**429**	**459**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	112	155	143	163	156	165	159	132	91	94	75	35
30	129	134	150	171	119	215	182	129	76	142	42	26
45	123	154	139	178	125	214	133	98	76	102	37	21
0	144	155	149	189	180	205	124	79	81	109	20	17
Hr Total	**508**	**598**	**581**	**701**	**580**	**799**	**598**	**438**	**324**	**447**	**174**	**99**
24 Hour Total :			**9860**									
AM Peak Hour Begins :			7:15	**AM Peak Volume :**			743	**AM Peak Hour Factor :**				0.95
PM Peak Hour Begins :			17:00	**PM Peak Volume :**			799	**PM Peak Hour Factor :**				0.93

Date: 03/05/2020	Station Name: Branch Forbes Rd North of US 92 - Southbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
24 Hour Total :			**0**									
AM Peak Hour Begins :			0:00	**AM Peak Volume :**			0	**AM Peak Hour Factor :**				
PM Peak Hour Begins :			12:00	**PM Peak Volume :**			0	**PM Peak Hour Factor :**				

Station Name: Branch Forbes Rd North of I-4 Ramps
Description: 72Hr Volume Counts ADR #126
City: Plant City
County: Hillsborough
Start Date/Time: 03/03/2020 00:00
End Date/Time: 03/04/2020 00:00

Date: 03/03/2020	Station Name: Branch Forbes Rd North of I-4 Ramps - Northbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	7	2	1	1	3	9	98	131	173	139	43	38
30	7	8	3	6	4	19	78	111	101	72	63	55
45	6	3	4	5	5	19	116	124	100	46	62	62
00	3	1	6	5	5	56	133	153	123	48	49	44
Hr Total	**23**	**14**	**14**	**17**	**17**	**103**	**425**	**519**	**497**	**305**	**217**	**199**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	36	36	61	78	95	97	82	49	33	28	25	19
30	48	53	61	69	86	123	73	59	36	37	25	10
45	50	67	73	72	73	105	62	57	57	33	17	15
00	51	49	58	78	70	78	57	47	43	23	11	1
Hr Total	**185**	**205**	**253**	**297**	**324**	**403**	**274**	**212**	**169**	**121**	**78**	**45**
24 Hour Total :			**4916**									
AM Peak Hour Begins :			7:15	**AM Peak Volume :**			561	**AM Peak Hour Factor :**				0.81
PM Peak Hour Begins :			17:00	**PM Peak Volume :**			403	**PM Peak Hour Factor :**				0.82

Date: 03/03/2020	Station Name: Branch Forbes Rd North of I-4 Ramps - Southbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	9	8	0	9	13	25	78	125	112	72	41	56
30	4	4	2	7	9	33	101	151	150	96	49	46
45	4	1	6	9	12	62	116	152	139	66	50	49
00	6	3	5	9	24	67	138	137	92	43	55	56
Hr Total	**23**	**16**	**13**	**34**	**58**	**187**	**433**	**565**	**493**	**277**	**195**	**207**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	63	71	66	64	90	92	92	63	38	27	21	9
30	52	66	77	70	81	100	91	44	33	25	18	5
45	44	57	64	58	79	82	73	48	39	20	12	6
00	69	49	62	75	85	94	48	36	28	21	8	2
Hr Total	**228**	**243**	**269**	**267**	**335**	**368**	**304**	**191**	**138**	**93**	**59**	**22**
24 Hour Total :			**5018**									
AM Peak Hour Begins :			6:45	**AM Peak Volume :**			566	**AM Peak Hour Factor :**				0.93
PM Peak Hour Begins :			17:00	**PM Peak Volume :**			368	**PM Peak Hour Factor :**				0.92

Station Name: Branch Forbes Rd North of I-4 Ramps
Description: 72Hr Volume Counts ADR #126
City: Plant City
County: Hillsborough
Start Date/Time: 03/04/2020 00:00
End Date/Time: 03/05/2020 00:00

Date: 03/04/2020	Station Name: Branch Forbes Rd North of I-4 Ramps - Northbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	7	6	2	3	2	16	58	108	77	37	45	50
30	7	4	5	3	3	19	79	120	44	47	43	48
45	2	2	3	1	12	23	123	88	47	68	47	45
00	4	1	6	3	4	43	111	88	43	50	34	51
Hr Total	**20**	**13**	**16**	**10**	**21**	**101**	**371**	**404**	**211**	**202**	**169**	**194**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	54	50	66	95	138	119	86	54	35	30	31	10
30	59	54	58	118	127	131	75	63	44	44	22	14
45	67	58	96	129	170	132	67	43	33	42	13	8
00	39	74	101	116	175	101	63	68	38	47	10	8
Hr Total	**219**	**236**	**321**	**458**	**610**	**483**	**291**	**228**	**150**	**163**	**76**	**40**
24 Hour Total :			**5007**									
AM Peak Hour Begins :			6:30	**AM Peak Volume :**			462	**AM Peak Hour Factor :**				0.94
PM Peak Hour Begins :			16:00	**PM Peak Volume :**			610	**PM Peak Hour Factor :**				0.87

Date: 03/04/2020	Station Name: Branch Forbes Rd North of I-4 Ramps - Southbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	6	3	3	3	7	32	81	134	88	61	57	52
30	10	4	8	4	9	33	98	189	74	64	54	62
45	6	4	2	5	14	52	157	161	62	64	35	49
00	2	4	4	3	21	54	159	102	59	50	53	57
Hr Total	**24**	**15**	**17**	**15**	**51**	**171**	**495**	**586**	**283**	**239**	**199**	**220**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	81	87	75	80	84	103	84	59	39	20	22	7
30	78	57	67	94	90	113	74	53	20	33	19	5
45	73	47	75	78	115	116	69	44	29	24	11	8
00	78	57	84	97	88	83	80	34	27	15	7	5
Hr Total	**310**	**248**	**301**	**349**	**377**	**415**	**307**	**190**	**115**	**92**	**59**	**25**
24 Hour Total :			**5103**									
AM Peak Hour Begins :			6:45	**AM Peak Volume :**			643	**AM Peak Hour Factor :**				0.85
PM Peak Hour Begins :			16:45	**PM Peak Volume :**			420	**PM Peak Hour Factor :**				0.91

Station Name: Branch Forbes Rd North of I-4 Ramps
Description: 72Hr Volume Counts ADR #126
City: Plant City
County: Hillsborough
Start Date/Time: 03/05/2020 00:00
End Date/Time: 03/06/2020 00:00

Date: 03/05/2020	Station Name: Branch Forbes Rd North of I-4 Ramps - Northbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15	6	2	4	2	1	9	40	165	69	44	42	25
30	9	6	2	3	6	12	96	107	30	45	36	47
45	6	3	3	1	6	19	87	163	47	53	21	67
00	3	3	5	4	10	31	126	95	58	41	33	52
Hr Total	**24**	**14**	**14**	**10**	**23**	**71**	**349**	**530**	**204**	**183**	**132**	**191**
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15	33	60	57	107	97	127	92	59	41	29	25	20
30	51	55	54	92	101	117	63	62	30	22	19	6
45	56	52	95	105	94	152	63	52	34	35	20	14
00	64	69	112	88	120	133	51	50	40	33	12	13
Hr Total	**204**	**236**	**318**	**392**	**412**	**529**	**269**	**223**	**145**	**119**	**76**	**53**
24 Hour Total :			**4721**									
AM Peak Hour Begins :			6:45	AM Peak Volume :			561	AM Peak Hour Factor :				0.85
PM Peak Hour Begins :			17:00	PM Peak Volume :			529	PM Peak Hour Factor :				0.87

Date: 03/05/2020	Station Name: Branch Forbes Rd North of I-4 Ramps - Southbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15	5	7	3	3	10	33	77	158	65	51	37	50
30	3	7	6	4	11	36	101	188	57	45	66	42
45	8	4	5	9	12	69	154	150	74	48	55	67
00	3	3	1	4	20	45	141	134	57	55	57	48
Hr Total	**19**	**21**	**15**	**20**	**53**	**183**	**473**	**630**	**253**	**199**	**215**	**207**
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15	67	65	74	96	96	126	82	61	41	26	20	15
30	55	68	74	96	109	110	103	39	29	29	21	12
45	65	61	75	83	124	134	80	55	20	19	21	7
00	68	51	86	87	118	129	68	47	31	20	14	7
Hr Total	**255**	**245**	**309**	**362**	**447**	**499**	**333**	**202**	**121**	**94**	**76**	**41**
24 Hour Total :			**5272**									
AM Peak Hour Begins :			6:30	AM Peak Volume :			641	AM Peak Hour Factor :				0.85
PM Peak Hour Begins :			17:00	PM Peak Volume :			499	PM Peak Hour Factor :				0.93

Station Name: Branch Forbes Rd South of Glen Harwell Rd
Description: 72Hr Volume Counts ADR #121
City: Plant City
County: Hillsborough
Start Date/Time: 03/03/2020 00:00
End Date/Time: 03/04/2020 00:00

Date: 03/03/2020	Station Name: Branch Forbes Rd South of Glen Harwell Rd - Northbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
24 Hour Total :			**0**									
AM Peak Hour Begins :			0:00	AM Peak Volume :			0	AM Peak Hour Factor :				
PM Peak Hour Begins :			12:00	PM Peak Volume :			0	PM Peak Hour Factor :				

Date: 03/03/2020	Station Name: Branch Forbes Rd South of Glen Harwell Rd - Southbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15	33	22	12	29	30	77	300	313	303	310	219	264
30	31	29	23	24	39	138	296	329	331	362	261	235
45	26	9	13	39	76	159	347	348	311	281	252	245
0	24	20	19	36	71	212	346	334	318	256	247	249
Hr Total	**114**	**80**	**67**	**128**	**216**	**586**	**1289**	**1324**	**1263**	**1209**	**979**	**993**
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15	284	241	322	335	363	370	325	258	175	124	132	50
30	254	294	337	320	377	424	336	264	196	178	106	55
45	250	334	301	327	298	383	258	219	182	173	78	46
0	270	293	331	333	319	326	242	204	131	127	83	30
Hr Total	**1058**	**1162**	**1291**	**1315**	**1357**	**1503**	**1161**	**945**	**684**	**602**	**399**	**181**
24 Hour Total :			**19906**									
AM Peak Hour Begins :			6:45	AM Peak Volume :			1336	AM Peak Hour Factor :				0.92
PM Peak Hour Begins :			17:00	PM Peak Volume :			1503	PM Peak Hour Factor :				0.89

Station Name: Branch Forbes Rd South of Glen Harwell Rd
Description: 72Hr Volume Counts ADR #121
City: Plant City
County: Hillsborough
Start Date/Time: 03/04/2020 00:00
End Date/Time: 03/05/2020 00:00

Date: 03/04/2020	Station Name: Branch Forbes Rd South of Glen Harwell Rd - Northbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	0	0	0	0	0	59	192	185	191	148	121	161
30	0	0	0	0	0	88	211	223	184	125	111	115
45	0	0	0	0	0	115	225	214	171	158	139	132
0	0	0	0	0	0	138	190	174	142	122	125	150
Hr Total	**0**	**0**	**0**	**0**	**0**	**400**	**818**	**796**	**688**	**553**	**496**	**558**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	138	176	168	160	161	176	162	124	81	120	87	22
30	133	155	169	185	172	205	121	111	83	113	57	20
45	144	151	164	189	168	204	139	90	70	71	35	18
0	136	184	181	175	192	172	117	94	74	97	24	15
Hr Total	**551**	**666**	**682**	**709**	**693**	**757**	**539**	**419**	**308**	**401**	**203**	**75**
24 Hour Total :			**10312**									
AM Peak Hour Begins :			6:30	**AM Peak Volume :**			823	**AM Peak Hour Factor :**				0.91
PM Peak Hour Begins :			16:45	**PM Peak Volume :**			777	**PM Peak Hour Factor :**				0.95

Date: 03/04/2020	Station Name: Branch Forbes Rd South of Glen Harwell Rd - Southbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	34	19	15	24	35	27	87	113	127	94	150	150
30	36	24	17	29	49	34	109	111	93	118	134	200
45	32	22	24	36	63	45	140	119	110	124	133	157
0	30	17	21	29	79	52	146	137	102	120	149	149
Hr Total	**132**	**82**	**77**	**118**	**226**	**158**	**482**	**480**	**432**	**456**	**566**	**656**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	147	143	135	0	0	0	0	0	0	0	0	0
30	163	171	131	0	0	0	0	0	0	0	0	0
45	170	138	0	0	0	0	0	0	0	0	0	0
0	142	104	0	0	0	0	0	0	0	0	0	0
Hr Total	**622**	**556**	**266**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
24 Hour Total :			**5309**									
AM Peak Hour Begins :			10:45	**AM Peak Volume :**			656	**AM Peak Hour Factor :**				0.82
PM Peak Hour Begins :			12:30	**PM Peak Volume :**			626	**PM Peak Hour Factor :**				0.92

Station Name: Branch Forbes Rd South of Glen Harwell Rd
Description: 72Hr Volume Counts ADR #121
City: Plant City
County: Hillsborough
Start Date/Time: 03/05/2020 00:00
End Date/Time: 03/06/2020 00:00

Date: 03/05/2020	Station Name: Branch Forbes Rd South of Glen Harwell Rd - Northbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	9	8	10	8	17	35	185	163	161	106	104	93
30	12	9	8	17	24	81	191	198	146	122	101	121
45	11	11	10	14	40	102	175	196	132	108	122	134
0	13	7	5	21	34	111	191	187	123	124	103	115
Hr Total	**45**	**35**	**33**	**60**	**115**	**329**	**742**	**744**	**562**	**460**	**430**	**463**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	113	155	139	163	148	164	162	131	92	95	74	37
30	128	134	152	172	111	216	176	130	74	143	42	26
45	120	151	145	180	126	214	130	95	75	99	35	19
0	145	160	143	192	182	204	126	79	82	111	19	18
Hr Total	**506**	**600**	**579**	**707**	**567**	**798**	**594**	**435**	**323**	**448**	**170**	**100**
24 Hour Total :			**9845**									
AM Peak Hour Begins :			6:45	**AM Peak Volume :**			748	**AM Peak Hour Factor :**				0.94
PM Peak Hour Begins :			17:00	**PM Peak Volume :**			798	**PM Peak Hour Factor :**				0.92

Date: 03/05/2020	Station Name: Branch Forbes Rd South of Glen Harwell Rd - Southbound ***Hoses ripped up***											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
24 Hour Total :			**0**									
AM Peak Hour Begins :			0:00	**AM Peak Volume :**			0	**AM Peak Hour Factor :**				
PM Peak Hour Begins :			12:00	**PM Peak Volume :**			0	**PM Peak Hour Factor :**				

Station Name: Branch Forbes Rd South of I-4 Ramps
Description: 72Hr Volume Counts ADR #114
City: Plant City
County: Hillsborough
Start Date/Time: 03/03/2020 00:00
End Date/Time: 03/04/2020 00:00

Date: 03/03/2020	Station Name: Branch Forbes Rd South of I-4 Ramps - Northbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15	19	8	11	24	26	79	194	210	189	158	125	149
30	17	19	12	17	31	111	203	278	164	250	145	122
45	13	13	7	26	63	137	223	302	161	211	140	128
0	12	8	14	24	44	160	221	233	152	174	140	119
Hr Total	**61**	**48**	**44**	**91**	**164**	**487**	**841**	**1023**	**666**	**793**	**550**	**518**
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15	151	128	195	231	216	230	186	159	97	88	88	41
30	132	173	213	201	184	267	192	157	118	117	71	32
45	152	194	206	204	169	208	162	110	107	119	51	23
0	150	168	189	212	219	192	129	99	74	76	40	19
Hr Total	**585**	**663**	**803**	**848**	**788**	**897**	**669**	**525**	**396**	**400**	**250**	**115**
24 Hour Total :			**12225**									
AM Peak Hour Begins :			7:00	AM Peak Volume :			1023	AM Peak Hour Factor :				0.85
PM Peak Hour Begins :			16:45	PM Peak Volume :			924	PM Peak Hour Factor :				0.87

Date: 03/03/2020	Station Name: Branch Forbes Rd South of I-4 Ramps - Southbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15	25	14	7	17	12	36	204	299	297	251	143	168
30	19	10	17	9	25	43	224	206	316	229	175	165
45	14	1	9	21	26	68	226	182	289	122	165	146
0	13	7	10	16	36	86	228	183	281	123	163	199
Hr Total	**71**	**32**	**43**	**63**	**99**	**233**	**882**	**870**	**1183**	**725**	**646**	**678**
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15	167	181	201	178	242	240	211	161	116	78	60	35
30	182	195	221	216	277	296	222	173	114	78	55	33
45	139	188	164	208	185	223	181	146	100	84	39	25
0	183	197	224	242	223	227	159	130	72	64	44	20
Hr Total	**671**	**761**	**810**	**844**	**927**	**986**	**773**	**610**	**402**	**304**	**198**	**113**
24 Hour Total :			**12924**									
AM Peak Hour Begins :			8:00	AM Peak Volume :			1183	AM Peak Hour Factor :				0.94
PM Peak Hour Begins :			17:00	PM Peak Volume :			986	PM Peak Hour Factor :				0.83

Station Name: Branch Forbes Rd South of I-4 Ramps
Description: 72Hr Volume Counts ADR #114
City: Plant City
County: Hillsborough
Start Date/Time: 03/04/2020 00:00
End Date/Time: 03/05/2020 00:00

Date: 03/04/2020	Station Name: Branch Forbes Rd South of I-4 Ramps - Northbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	15	12	5	15	19	86	213	214	225	165	131	169
30	16	16	10	24	41	110	234	274	199	144	117	134
45	26	11	15	23	60	141	255	241	187	152	159	159
00	11	8	14	26	50	151	236	186	162	136	143	152
Hr Total	**68**	**47**	**44**	**88**	**170**	**488**	**938**	**915**	**773**	**597**	**550**	**614**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	154	206	186	221	208	211	197	150	99	152	102	29
30	143	173	198	215	198	227	171	126	113	124	75	28
45	166	170	215	223	223	240	171	107	86	104	42	22
00	159	204	215	201	249	213	152	116	85	127	33	22
Hr Total	**622**	**753**	**814**	**860**	**878**	**891**	**691**	**499**	**383**	**507**	**252**	**101**
24 Hour Total :			**12543**									
AM Peak Hour Begins :			6:30	**AM Peak Volume :**			979	**AM Peak Hour Factor :**				0.89
PM Peak Hour Begins :			16:45	**PM Peak Volume :**			927	**PM Peak Hour Factor :**				0.93

Date: 03/04/2020	Station Name: Branch Forbes Rd South of I-4 Ramps - Southbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	26	13	13	10	11	30	117	141	155	138	172	210
30	18	16	10	12	23	49	149	144	126	139	167	217
45	20	13	11	16	21	62	173	169	146	155	146	174
00	22	11	7	15	40	73	166	183	107	161	197	188
Hr Total	**86**	**53**	**41**	**53**	**95**	**214**	**605**	**637**	**534**	**593**	**682**	**789**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	174	227	169	225	251	272	188	176	110	75	76	31
30	222	190	207	225	301	225	198	176	98	67	56	40
45	195	168	230	213	261	236	201	150	73	81	55	33
00	193	152	240	224	243	221	209	145	93	63	40	19
Hr Total	**784**	**737**	**846**	**887**	**1056**	**954**	**796**	**647**	**374**	**286**	**227**	**123**
24 Hour Total :			**12099**									
AM Peak Hour Begins :			10:45	**AM Peak Volume :**			798	**AM Peak Hour Factor :**				0.92
PM Peak Hour Begins :			16:15	**PM Peak Volume :**			1077	**PM Peak Hour Factor :**				0.89

Station Name: Branch Forbes Rd South of I-4 Ramps
Description: 72Hr Volume Counts ADR #114
City: Plant City
County: Hillsborough
Start Date/Time: 03/05/2020 00:00
End Date/Time: 03/06/2020 00:00

Date: 03/05/2020	Station Name: Branch Forbes Rd South of I-4 Ramps - Northbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15	18	15	8	13	27	62	215	231	201	148	141	120
30	20	12	12	24	31	106	235	260	181	147	122	150
45	13	13	14	16	60	132	215	243	155	141	150	154
0	17	14	6	27	42	155	223	214	151	150	120	154
Hr Total	**68**	**54**	**40**	**80**	**160**	**455**	**888**	**948**	**688**	**586**	**533**	**578**
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15	143	187	189	207	199	221	194	146	121	115	96	49
30	159	159	192	219	155	263	218	137	91	169	52	33
45	163	200	188	231	179	255	180	117	89	123	46	22
0	168	190	182	232	230	237	159	99	99	130	29	28
Hr Total	**633**	**736**	**751**	**889**	**763**	**976**	**751**	**499**	**400**	**537**	**223**	**132**
24 Hour Total :			**12368**									
AM Peak Hour Begins :			6:45	AM Peak Volume :			957	AM Peak Hour Factor :				0.92
PM Peak Hour Begins :			17:00	PM Peak Volume :			976	PM Peak Hour Factor :				0.93

Date: 03/05/2020	Station Name: Branch Forbes Rd South of I-4 Ramps - Southbound ***Hose ripped up after 5:30pm***											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15	29	18	3	8	17	42	119	188	159	135	147	172
30	25	15	14	12	17	43	132	146	136	182	146	162
45	22	21	19	15	23	76	181	172	143	176	164	188
00	22	9	11	17	38	82	199	172	138	187	169	184
Hr Total	**98**	**63**	**47**	**52**	**95**	**243**	**631**	**678**	**576**	**680**	**626**	**706**
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15	184	177	204	251	226	294	2	0	4	1	1	1
30	158	166	175	228	228	221	4	1	0	2	3	2
45	185	167	235	236	254	268	3	3	2	2	0	1
00	167	177	232	202	297	61	3	4	1	3	2	2
Hr Total	**694**	**687**	**846**	**917**	**1005**	**844**	**12**	**8**	**7**	**8**	**6**	**6**
24 Hour Total :			**9535**									
AM Peak Hour Begins :			6:30	AM Peak Volume :			714	AM Peak Hour Factor :				0.90
PM Peak Hour Begins :			16:45	PM Peak Volume :			1080	PM Peak Hour Factor :				0.91

Station Name: Glen Harwell Rd West of Branch Forbes Rd
Description: 72Hr Volume Counts ADR #342
City: Plant City
County: Hillsborough
Start Date/Time: 03/03/2020 00:00
End Date/Time: 03/04/2020 00:00

Date: 03/03/2020	Station Name: Glen Harwell Rd West of Branch Forbes Rd - Eastbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15	2	0	0	3	2	1	6	10	9	11	4	5
30	4	2	1	1	1	3	7	10	8	31	6	2
45	0	1	2	2	4	5	7	11	13	18	5	2
0	2	2	1	1	4	3	8	9	14	8	6	14
Hr Total	**8**	**5**	**4**	**7**	**11**	**12**	**28**	**40**	**44**	**68**	**21**	**23**
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15	12	10	8	8	9	11	9	9	9	6	3	4
30	7	6	11	8	11	14	15	5	8	8	2	2
45	8	10	10	8	7	9	8	14	11	7	3	1
0	7	4	12	19	11	9	7	9	4	5	3	0
Hr Total	**34**	**30**	**41**	**43**	**38**	**43**	**39**	**37**	**32**	**26**	**11**	**7**
24 Hour Total :			**652**									
AM Peak Hour Begins :			8:45	AM Peak Volume :			74	AM Peak Hour Factor :				0.6
PM Peak Hour Begins :			15:30	PM Peak Volume :			47	PM Peak Hour Factor :				0.62

Date: 03/03/2020	Station Name: Glen Harwell Rd West of Branch Forbes Rd - Westbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15	1	0	1	0	0	0	3	12	9	11	10	8
30	3	2	1	1	0	2	11	9	11	16	8	3
45	1	1	1	1	2	2	11	14	9	8	9	9
0	0	1	0	0	0	3	8	15	7	5	12	4
Hr Total	**5**	**4**	**3**	**2**	**2**	**7**	**33**	**50**	**36**	**40**	**39**	**24**
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15	10	13	9	8	24	10	9	10	7	1	2	1
30	8	6	6	10	14	11	11	3	6	2	0	3
45	6	6	8	6	11	12	5	3	3	4	4	2
0	7	4	8	21	19	20	9	8	2	0	1	1
Hr Total	**31**	**29**	**31**	**45**	**68**	**53**	**34**	**24**	**18**	**7**	**7**	**7**
24 Hour Total :			**599**									
AM Peak Hour Begins :			7:00	AM Peak Volume :			50	AM Peak Hour Factor :				0.78
PM Peak Hour Begins :			15:45	PM Peak Volume :			70	PM Peak Hour Factor :				0.73

Station Name: Glen Harwell Rd West of Branch Forbes Rd
Description: 72Hr Volume Counts ADR #342
City: Plant City
County: Hillsborough
Start Date/Time: 03/04/2020 00:00
End Date/Time: 03/05/2020 00:00

Date: 03/04/2020	Station Name: Glen Harwell Rd West of Branch Forbes Rd - Eastbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	2	1	0	3	1	3	7	3	3	4	8	11
30	2	2	1	2	1	3	6	7	8	6	9	10
45	5	3	4	1	4	6	4	10	21	2	7	4
0	2	4	0	2	4	6	10	7	2	10	9	6
Hr Total	**11**	**10**	**5**	**8**	**10**	**18**	**27**	**27**	**34**	**22**	**33**	**31**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	7	6	8	5	9	8	9	5	9	11	2	4
30	8	4	3	8	10	8	9	8	7	7	3	9
45	12	5	4	7	8	14	5	11	16	6	5	2
0	8	5	10	9	14	13	11	7	5	2	4	1
Hr Total	**35**	**20**	**25**	**29**	**41**	**43**	**34**	**31**	**37**	**26**	**14**	**16**
24 Hour Total :			**587**									
AM Peak Hour Begins :			7:45	**AM Peak Volume :**			39	**AM Peak Hour Factor :**				0.46
PM Peak Hour Begins :			17:30	**PM Peak Volume :**			45	**PM Peak Hour Factor :**				0.7

Date: 03/04/2020	Station Name: Glen Harwell Rd West of Branch Forbes Rd - Westbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	0	2	0	0	0	0	2	5	9	1	6	9
30	1	0	0	1	0	0	8	8	8	10	6	4
45	0	2	1	5	0	6	2	10	2	6	4	6
0	1	1	1	0	3	2	6	3	6	8	8	11
Hr Total	**2**	**5**	**2**	**6**	**3**	**8**	**18**	**26**	**25**	**25**	**24**	**30**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	9	10	7	9	11	15	14	7	4	6	3	5
30	12	3	12	4	20	19	9	4	5	5	1	4
45	6	7	8	13	14	11	9	6	14	6	5	0
0	5	8	17	8	11	11	13	12	8	5	0	0
Hr Total	**32**	**28**	**44**	**34**	**56**	**56**	**45**	**29**	**31**	**22**	**9**	**9**
24 Hour Total :			**569**									
AM Peak Hour Begins :			7:15	**AM Peak Volume :**			30	**AM Peak Hour Factor :**				0.68
PM Peak Hour Begins :			16:15	**PM Peak Volume :**			60	**PM Peak Hour Factor :**				0.75

Station Name: Glen Harwell Rd West of Branch Forbes Rd
Description: 72Hr Volume Counts ADR #342
City: Plant City
County: Hillsborough
Start Date/Time: 03/05/2020 00:00
End Date/Time: 03/06/2020 00:00

Date: 03/05/2020	Station Name: Glen Harwell Rd West of Branch Forbes Rd - Eastbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	1	2	2	0	1	1	6	10	7	1	3	5
30	4	0	1	1	1	0	8	5	5	10	9	10
45	2	1	0	1	7	4	6	7	13	8	4	10
0	2	0	0	3	1	4	9	8	7	8	5	9
Hr Total	**9**	**3**	**3**	**5**	**10**	**9**	**29**	**30**	**32**	**27**	**21**	**34**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	8	7	7	6	8	12	10	8	12	7	7	3
30	8	8	8	4	17	11	18	4	4	10	5	1
45	6	10	5	6	10	10	11	5	6	1	9	2
0	7	6	4	5	11	11	17	4	8	6	1	4
Hr Total	**29**	**31**	**24**	**21**	**46**	**44**	**56**	**21**	**30**	**24**	**22**	**10**
24 Hour Total :			**570**									
AM Peak Hour Begins :			6:15	**AM Peak Volume :**			33	**AM Peak Hour Factor :**				0.63
PM Peak Hour Begins :			18:00	**PM Peak Volume :**			56	**PM Peak Hour Factor :**				0.78

Date: 03/05/2020	Station Name: Glen Harwell Rd West of Branch Forbes Rd - Westbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	0	3	1	1	2	0	4	9	9	4	4	12
30	1	1	0	0	2	2	6	5	6	7	5	8
45	2	1	0	1	1	4	7	10	6	6	6	4
0	0	2	1	1	0	1	9	5	2	11	5	6
Hr Total	**3**	**7**	**2**	**3**	**5**	**7**	**26**	**29**	**23**	**28**	**20**	**30**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	8	7	5	11	13	13	14	8	4	3	2	1
30	5	6	8	10	25	12	12	5	6	5	5	2
45	9	6	10	11	27	18	12	9	3	2	4	0
0	6	3	15	9	23	16	18	3	5	3	2	0
Hr Total	**28**	**22**	**38**	**41**	**88**	**59**	**56**	**25**	**18**	**13**	**13**	**3**
24 Hour Total :			**587**									
AM Peak Hour Begins :			6:45	**AM Peak Volume :**			33	**AM Peak Hour Factor :**				0.69
PM Peak Hour Begins :			16:00	**PM Peak Volume :**			88	**PM Peak Hour Factor :**				0.81

Station Name: I-4 EB -Off- Ramp to Branch Forbes Rd
Description: 72Hr Volume Counts ADR #324
City: Plant City
County: Hillsborough
Start Date/Time: 03/03/2020 00:00
End Date/Time: 03/04/2020 00:00

Date: 03/03/2020	Station Name: I-4 EB -Off- Ramp to Branch Forbes Rd - Eastbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	14	10	6	10	6	18	184	159	172	198	86	101
30	14	5	10	5	14	25	135	153	189	75	80	103
45	5	7	4	9	20	47	181	205	207	67	93	99
0	6	8	4	6	11	147	238	191	238	76	88	117
Hr Total	**39**	**30**	**24**	**30**	**51**	**237**	**738**	**708**	**806**	**416**	**347**	**420**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	92	97	106	117	122	134	92	98	64	45	31	14
30	98	124	96	102	118	103	100	94	67	53	32	25
45	97	98	95	121	107	105	87	74	40	40	23	14
0	78	123	109	115	112	101	99	53	36	37	22	16
Hr Total	**365**	**442**	**406**	**455**	**459**	**443**	**378**	**319**	**207**	**175**	**108**	**69**
24 Hour Total :			**7672**									
AM Peak Hour Begins :			8:15	**AM Peak Volume :**			832	**AM Peak Hour Factor :**				0.87
PM Peak Hour Begins :			15:30	**PM Peak Volume :**			476	**PM Peak Hour Factor :**				0.89

Station Name: I-4 EB -Off- Ramp to Branch Forbes Rd
Description: 72Hr Volume Counts ADR #324
City: Plant City
County: Hillsborough
Start Date/Time: 03/04/2020 00:00
End Date/Time: 03/05/2020 00:00

Date: 03/04/2020	Station Name: I-4 EB -Off- Ramp to Branch Forbes Rd - Eastbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	20	13	11	4	10	15	62	45	61	81	97	111
30	12	7	4	6	17	27	68	60	58	108	95	132
45	15	3	4	9	19	34	82	70	75	90	109	98
0	8	4	3	5	19	42	55	67	47	89	106	92
Hr Total	**55**	**27**	**22**	**24**	**65**	**118**	**267**	**242**	**241**	**368**	**407**	**433**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	105	105	98	105	126	86	87	81	61	36	33	27
30	112	98	99	96	115	89	101	102	48	44	30	24
45	93	74	99	74	109	108	106	77	40	41	30	11
0	98	70	97	96	114	85	97	56	44	36	13	21
Hr Total	**408**	**347**	**393**	**371**	**464**	**368**	**391**	**316**	**193**	**157**	**106**	**83**
24 Hour Total :			**5866**									
AM Peak Hour Begins :			10:30	**AM Peak Volume :**			458	**AM Peak Hour Factor :**				0.87
PM Peak Hour Begins :			16:00	**PM Peak Volume :**			464	**PM Peak Hour Factor :**				0.92

Station Name: I-4 EB -Off- Ramp to Branch Forbes Rd
Description: 72Hr Volume Counts ADR #324
City: Plant City
County: Hillsborough
Start Date/Time: 03/05/2020 00:00
End Date/Time: 03/06/2020 00:00

Date: 03/05/2020	Station Name: I-4 EB -Off- Ramp to Branch Forbes Rd - Eastbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	21	8	3	4	7	20	62	55	63	82	89	99
30	16	6	9	7	8	19	60	58	60	124	95	85
45	12	7	8	4	17	35	95	68	82	115	97	98
0	12	5	8	9	13	33	66	54	86	108	77	121
Hr Total	**61**	**26**	**28**	**24**	**45**	**107**	**283**	**235**	**291**	**429**	**358**	**403**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	91	104	109	91	96	90	94	56	59	31	46	24
30	105	85	83	104	96	116	92	77	44	45	37	24
45	83	82	99	98	98	100	81	78	53	39	29	18
0	94	82	102	97	105	97	83	65	40	46	17	20
Hr Total	**373**	**353**	**393**	**390**	**395**	**403**	**350**	**276**	**196**	**161**	**129**	**86**
24 Hour Total :			**5795**									
AM Peak Hour Begins :			9:15	**AM Peak Volume :**			436	**AM Peak Hour Factor :**				0.88
PM Peak Hour Begins :			16:45	**PM Peak Volume :**			411	**PM Peak Hour Factor :**				0.89

Station Name: I-4 EB -On- Ramp from Branch Forbes
Description: 72Hr Volume Counts ADR #27
City: Plant City
County: Hillsborough
Start Date/Time: 03/03/2020 00:00
End Date/Time: 03/04/2020 00:00

Date: 03/03/2020	Station Name: I-4 EB -On- Ramp from Branch Forbes - Eastbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
24 Hour Total :			0									
AM Peak Hour Begins :				AM Peak Volume :				AM Peak Hour Factor :				
PM Peak Hour Begins :				PM Peak Volume :				PM Peak Hour Factor :				

Station Name: I-4 EB -On- Ramp from Branch Forbes
Description: 72Hr Volume Counts ADR #27
City: Plant City
County: Hillsborough
Start Date/Time: 03/04/2020 00:00
End Date/Time: 03/05/2020 00:00

Date: 03/04/2020	Station Name: I-4 EB -On- Ramp from Branch Forbes - Eastbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
24 Hour Total :			0									
AM Peak Hour Begins :				AM Peak Volume :				AM Peak Hour Factor :				
PM Peak Hour Begins :				PM Peak Volume :				PM Peak Hour Factor :				

Station Name: I-4 EB -On- Ramp from Branch Forbes
Description: 72Hr Volume Counts ADR #27
City: Plant City
County: Hillsborough
Start Date/Time: 03/05/2020 00:00
End Date/Time: 03/06/2020 00:00

Date: 03/05/2020	Station Name: I-4 EB -On- Ramp from Branch Forbes - Eastbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
24 Hour Total :			0									
AM Peak Hour Begins :				AM Peak Volume :				AM Peak Hour Factor :				
PM Peak Hour Begins :				PM Peak Volume :				PM Peak Hour Factor :				

Station Name: I-4 WB - Off- Ramp to Branch Forbes Rd
Description: 72Hr Volume Counts ADR # 105
City: Plant City
County: Hillsborough
Start Date/Time: 03/03/2020 00:00
End Date/Time: 03/04/2020 00:00

Date: 03/03/2020	Station Name: I-4 WB -Off- Ramp to Branch Forbes Rd - Westbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	8	8	2	3	8	14	25	31	97	51	62	49
30	9	5	8	2	8	18	26	24	64	46	74	52
45	8	1	4	10	9	36	38	25	55	49	97	55
0	8	1	5	9	11	39	30	26	27	49	64	61
Hr Total	**33**	**15**	**19**	**24**	**36**	**107**	**119**	**106**	**243**	**195**	**297**	**217**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	52	79	59	72	75	106	91	64	49	29	30	24
30	68	63	68	78	91	116	83	76	57	42	18	16
45	54	69	73	89	93	100	63	60	56	30	19	8
0	68	63	87	68	86	100	53	61	41	27	17	7
Hr Total	**242**	**274**	**287**	**307**	**345**	**422**	**290**	**261**	**203**	**128**	**84**	**55**
24 Hour Total :			**4309**									
AM Peak Hour Begins :			10:00	**AM Peak Volume :**			297	**AM Peak Hour Factor :**				0.77
PM Peak Hour Begins :			17:00	**PM Peak Volume :**			422	**PM Peak Hour Factor :**				0.91

Station Name: I-4 WB - Off- Ramp to Branch Forbes Rd
Description: 72Hr Volume Counts ADR # 105
City: Plant City
County: Hillsborough
Start Date/Time: 03/04/2020 00:00
End Date/Time: 03/05/2020 00:00

Date: 03/04/2020	Station Name: I-4 WB -Off- Ramp to Branch Forbes Rd - Westbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	13	5	9	6	6	12	66	112	93	51	53	62
30	4	5	5	3	3	15	77	106	46	49	50	79
45	2	4	5	10	5	28	110	89	46	55	47	52
00	10	4	2	3	15	44	103	122	40	64	56	65
Hr Total	**29**	**18**	**21**	**22**	**29**	**99**	**356**	**429**	**225**	**219**	**206**	**258**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	59	75	82	125	145	117	80	60	50	39	29	14
30	61	65	81	107	154	125	106	68	35	35	31	15
45	68	70	122	147	146	116	85	64	45	40	27	11
00	64	69	108	145	179	88	61	69	53	36	17	10
Hr Total	**252**	**279**	**393**	**524**	**624**	**446**	**332**	**261**	**183**	**150**	**104**	**50**
24 Hour Total :			**5509**									
AM Peak Hour Begins :			6:30	**AM Peak Volume :**			431	**AM Peak Hour Factor :**				0.88
PM Peak Hour Begins :			16:00	**PM Peak Volume :**			624	**PM Peak Hour Factor :**				0.87

Station Name: I-4 WB - Off- Ramp to Branch Forbes Rd
Description: 72Hr Volume Counts ADR # 105
City: Plant City
County: Hillsborough
Start Date/Time: 03/05/2020 00:00
End Date/Time: 03/06/2020 00:00

Date: 03/05/2020	Station Name: I-4 WB -Off- Ramp to Branch Forbes Rd - Westbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	10	6	5	5	7	13	68	175	86	38	44	56
30	12	5	5	4	8	16	86	87	44	55	39	68
45	14	15	3	5	7	39	87	166	50	52	57	65
00	7	5	3	10	11	45	112	115	42	51	53	56
Hr Total	**43**	**31**	**16**	**24**	**33**	**113**	**353**	**543**	**222**	**196**	**193**	**245**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	43	62	67	154	99	122	108	55	46	34	30	23
30	41	63	84	111	117	132	77	71	44	38	18	14
45	71	65	141	116	109	116	69	65	59	47	29	8
00	75	75	146	93	114	114	66	69	55	34	27	10
Hr Total	**230**	**265**	**438**	**474**	**439**	**484**	**320**	**260**	**204**	**153**	**104**	**55**
24 Hour Total :			**5438**									
AM Peak Hour Begins :			7:00	**AM Peak Volume :**			543	**AM Peak Hour Factor :**				0.78
PM Peak Hour Begins :			14:30	**PM Peak Volume :**			552	**PM Peak Hour Factor :**				0.90

Station Name: I-4 WB -On- Ramp from Branch Forbes Rd
Description: 72Hr Volume Counts ADR #65
City: P;ant City
County: Hillsborough
Start Date/Time: 03/03/2020 00:00
End Date/Time: 03/04/2020 00:00

Date: 03/03/2020	Station Name: I-4 WB -On- Ramp from Branch Forbes Rd - Westbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	12	1	6	9	19	52	167	219	186	105	73	90
30	12	8	10	8	15	88	188	259	178	97	79	66
45	6	7	3	15	41	106	202	305	179	69	87	83
00	9	9	7	18	34	142	212	230	122	97	84	62
Hr Total	**39**	**25**	**26**	**50**	**109**	**388**	**769**	**1013**	**665**	**368**	**323**	**301**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	83	99	102	127	100	100	76	81	49	39	62	20
30	60	96	110	122	80	131	84	72	51	70	46	19
45	75	112	103	139	91	98	89	53	57	82	24	12
00	96	97	112	103	103	93	47	56	41	59	26	13
Hr Total	**314**	**404**	**427**	**491**	**374**	**422**	**296**	**262**	**198**	**250**	**158**	**64**
24 Hour Total :			**7736**									
AM Peak Hour Begins :			7:00	**AM Peak Volume :**			1013	**AM Peak Hour Factor :**				0.83
PM Peak Hour Begins :			14:45	**PM Peak Volume :**			500	**PM Peak Hour Factor :**				0.9

Station Name: I-4 WB -On- Ramp from Branch Forbes Rd
Description: 72Hr Volume Counts ADR #65
City: P;ant City
County: Hillsborough
Start Date/Time: 03/04/2020 00:00
End Date/Time: 03/05/2020 00:00

Date: 03/04/2020	Station Name: I-4 WB -On- Ramp from Branch Forbes Rd - Westbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	16	6	4	9	12	58	169	224	127	84	88	74
30	7	6	10	12	23	91	192	257	107	89	79	82
45	18	7	8	8	30	101	212	241	90	93	74	79
0	3	4	3	10	35	124	206	148	109	76	68	86
Hr Total	**44**	**23**	**25**	**39**	**100**	**374**	**779**	**870**	**433**	**342**	**309**	**321**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	80	138	112	125	103	95	71	57	49	83	74	21
30	93	96	113	131	97	104	74	54	44	79	47	12
45	81	86	110	122	99	113	66	48	42	64	32	18
0	89	120	131	105	111	83	63	43	47	74	23	11
Hr Total	**343**	**440**	**466**	**483**	**410**	**395**	**274**	**202**	**182**	**300**	**176**	**62**
24 Hour Total :			**7392**									
AM Peak Hour Begins :			6:45	**AM Peak Volume :**			928	**AM Peak Hour Factor :**				0.9
PM Peak Hour Begins :			14:45	**PM Peak Volume :**			509	**PM Peak Hour Factor :**				0.92

Station Name: I-4 WB -On- Ramp from Branch Forbes Rd
Description: 72Hr Volume Counts ADR #65
City: P;ant City
County: Hillsborough
Start Date/Time: 03/05/2020 00:00
End Date/Time: 03/06/2020 00:00

Date: 03/05/2020	Station Name: I-4 WB -On- Ramp from Branch Forbes Rd - Westbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	13	6	6	12	16	51	171	231	109	83	76	59
30	7	7	10	10	21	81	185	269	81	82	66	61
45	9	11	8	10	35	111	196	242	90	78	96	75
0	10	4	5	16	35	135	199	162	81	93	64	91
Hr Total	**39**	**28**	**29**	**48**	**107**	**378**	**751**	**904**	**361**	**336**	**302**	**286**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	84	104	105	133	124	108	97	59	55	70	65	19
30	95	103	116	133	111	154	98	68	52	111	34	16
45	79	116	108	133	106	138	81	62	52	101	30	13
0	107	114	113	136	120	127	70	51	49	82	15	8
Hr Total	**365**	**437**	**442**	**535**	**461**	**527**	**346**	**240**	**208**	**364**	**144**	**56**
24 Hour Total :			**7694**									
AM Peak Hour Begins :			6:45	**AM Peak Volume :**			941	**AM Peak Hour Factor :**				0.87
PM Peak Hour Begins :			15:00	**PM Peak Volume :**			535	**PM Peak Hour Factor :**				0.87

Station Name: N Branch Forbes Rd South of US 92
Description: 72Hr Volume Counts ADR #358
City: Plant City
County: Hillsborough
Start Date/Time: 03/03/2020 00:00
End Date/Time: 03/04/2020 00:00

Date: 03/03/2020	Station Name: Branch Forbes Rd South of US 92 - Northbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	11	5	3	5	16	36	73	117	116	62	16	2
30	5	1	1	7	16	50	89	142	90	42	3	0
45	2	3	4	5	15	67	108	107	80	24	0	0
0	3	2	4	12	17	79	116	100	60	15	0	1
Hr Total	**21**	**11**	**12**	**29**	**64**	**232**	**386**	**466**	**346**	**143**	**19**	**3**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	0	6	0	1	1	1	1	0	0	0	0	0
30	0	3	3	0	3	0	0	1	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	0	0	0	0	0	0
Hr Total	**0**	**9**	**3**	**1**	**4**	**2**	**1**	**1**	**0**	**0**	**0**	**0**
24 Hour Total :			**1753**									
AM Peak Hour Begins :			6:30	**AM Peak Volume :**			483	**AM Peak Hour Factor :**				0.85
PM Peak Hour Begins :			12:30	**PM Peak Volume :**			9	**PM Peak Hour Factor :**				0.38

Date: 03/03/2020	Station Name: Branch Forbes Rd South of US 92 - Southbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	9	4	3	2	3	9	27	61	70	127	102	120
30	6	5	4	2	5	13	41	55	70	129	109	90
45	5	0	1	4	6	22	74	74	52	121	117	93
0	5	1	8	3	11	27	73	53	72	84	116	109
Hr Total	**25**	**10**	**16**	**11**	**25**	**71**	**215**	**243**	**264**	**461**	**444**	**412**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	104	122	135	190	199	211	166	116	87	69	44	16
30	93	119	175	168	164	228	173	96	95	59	35	21
45	124	117	138	196	164	165	117	102	69	46	47	15
0	100	134	147	172	209	182	139	79	56	55	27	11
Hr Total	**421**	**492**	**595**	**726**	**736**	**786**	**595**	**393**	**307**	**229**	**153**	**63**
24 Hour Total :			**7693**									
AM Peak Hour Begins :			10:15	**AM Peak Volume :**			462	**AM Peak Hour Factor :**				0.9
PM Peak Hour Begins :			16:45	**PM Peak Volume :**			813	**PM Peak Hour Factor :**				0.89

Station Name: N Branch Forbes Rd South of US 92
Description: 72Hr Volume Counts ADR #358
City: Plant City
County: Hillsborough
Start Date/Time: 03/04/2020 00:00
End Date/Time: 03/05/2020 00:00

Date: 03/04/2020	Station Name: Branch Forbes Rd South of US 92 - Northbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	0	0	0	0	0	37	88	118	118	51	43	55
30	0	0	0	0	0	51	114	124	104	77	64	58
45	0	0	0	0	0	56	103	94	79	61	73	54
0	0	0	0	0	25	71	115	112	68	73	73	77
Hr Total	**0**	**0**	**0**	**0**	**25**	**215**	**420**	**448**	**369**	**262**	**253**	**244**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	57	73	72	92	97	94	74	52	41	44	22	6
30	58	81	97	100	66	98	59	40	28	17	18	9
45	69	67	69	94	102	80	46	51	22	34	11	9
0	50	71	72	76	105	85	60	31	30	24	9	8
Hr Total	**234**	**292**	**310**	**362**	**370**	**357**	**239**	**174**	**121**	**119**	**60**	**32**
24 Hour Total :			**4906**									
AM Peak Hour Begins :			6:30	**AM Peak Volume :**			460	**AM Peak Hour Factor :**				0.93
PM Peak Hour Begins :			16:30	**PM Peak Volume :**			399	**PM Peak Hour Factor :**				0.95

Date: 03/04/2020	Station Name: Branch Forbes Rd South of US 92 - Southbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	15	10	9	11	16	13	40	56	43	50	78	76
30	14	11	6	12	18	16	45	62	56	48	49	81
45	13	8	10	8	25	14	67	59	72	68	55	50
0	7	8	5	13	17	29	61	75	68	58	80	66
Hr Total	**49**	**37**	**30**	**44**	**76**	**72**	**213**	**252**	**239**	**224**	**262**	**273**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	59	90	81	83	87	118	86	52	48	36	35	16
30	75	87	69	79	109	112	80	83	34	32	22	15
45	70	78	77	105	87	114	84	57	26	34	23	6
0	65	64	73	113	111	104	68	53	36	24	15	6
Hr Total	**269**	**319**	**300**	**380**	**394**	**448**	**318**	**245**	**144**	**126**	**95**	**43**
24 Hour Total :			**4852**									
AM Peak Hour Begins :			10:30	**AM Peak Volume :**			292	**AM Peak Hour Factor :**				0.9
PM Peak Hour Begins :			16:45	**PM Peak Volume :**			455	**PM Peak Hour Factor :**				0.96

Station Name: N Branch Forbes Rd South of US 92
Description: 72Hr Volume Counts ADR #358
City: Plant City
County: Hillsborough
Start Date/Time: 03/05/2020 00:00
End Date/Time: 03/06/2020 00:00

Date: 03/05/2020	Station Name: Branch Forbes Rd South of US 92 - Northbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	8	4	4	9	10	30	94	132	128	63	49	63
30	3	4	1	7	16	51	104	131	70	63	51	52
45	7	5	5	10	18	68	120	112	69	62	64	49
0	4	2	1	15	14	68	116	113	64	55	45	63
Hr Total	**22**	**15**	**11**	**41**	**58**	**217**	**434**	**488**	**331**	**243**	**209**	**227**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	57	55	63	99	130	104	82	56	30	35	24	14
30	69	58	70	85	80	122	58	51	39	22	17	11
45	71	84	63	74	109	100	69	37	34	24	6	8
0	55	72	80	96	98	66	64	41	28	20	22	7
Hr Total	**252**	**269**	**276**	**354**	**417**	**392**	**273**	**185**	**131**	**101**	**69**	**40**
24 Hour Total :			**5055**									
AM Peak Hour Begins :			6:30	**AM Peak Volume :**			499	**AM Peak Hour Factor :**				0.95
PM Peak Hour Begins :			16:30	**PM Peak Volume :**			433	**PM Peak Hour Factor :**				0.83

Date: 03/05/2020	Station Name: Branch Forbes Rd South of US 92 - Southbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	13	7	3	1	6	12	38	68	70	46	39	61
30	13	8	4	2	4	7	49	53	57	77	63	53
45	4	6	4	5	7	32	72	60	59	64	62	72
0	5	0	5	2	11	36	62	68	41	71	56	64
Hr Total	**35**	**21**	**16**	**10**	**28**	**87**	**221**	**249**	**227**	**258**	**220**	**250**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	54	68	65	93	61	105	93	57	39	27	29	19
30	70	49	66	81	45	96	94	59	37	36	15	16
45	59	65	95	93	85	96	57	52	58	34	21	12
0	72	76	96	78	104	103	57	65	38	39	20	15
Hr Total	**255**	**258**	**322**	**345**	**295**	**400**	**301**	**233**	**172**	**136**	**85**	**62**
24 Hour Total :			**4486**									
AM Peak Hour Begins :			9:00	**AM Peak Volume :**			258	**AM Peak Hour Factor :**				0.84
PM Peak Hour Begins :			16:45	**PM Peak Volume :**			401	**PM Peak Hour Factor :**				0.95

Station Name: US 92 East of Branch Forbes Rd
Description: 72Hr Volume Counts ADR #112
City: Plant City
County: Hillsborough
Start Date/Time: 03/03/2020 00:00
End Date/Time: 03/04/2020 00:00

Date: 03/03/2020	Station Name: US 92 East of Branch Forbes Rd - Eastbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
24 Hour Total :			0									
AM Peak Hour Begins :			AM Peak Volume :					AM Peak Hour Factor :				
PM Peak Hour Begins :			PM Peak Volume :					PM Peak Hour Factor :				

Date: 03/03/2020	Station Name: US 92 East of Branch Forbes Rd -Westbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
24 Hour Total :			0									
AM Peak Hour Begins :			AM Peak Volume :					AM Peak Hour Factor :				
PM Peak Hour Begins :			PM Peak Volume :					PM Peak Hour Factor :				

Station Name: US 92 East of Branch Forbes Rd
Description: 72Hr Volume Counts ADR #112
City: Plant City
County: Hillsborough
Start Date/Time: 03/04/2020 00:00
End Date/Time: 03/05/2020 00:00

Date: 03/04/2020	Station Name: US 92 East of Branch Forbes Rd - Eastbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
24 Hour Total :			0									
AM Peak Hour Begins :				AM Peak Volume :				AM Peak Hour Factor :				
PM Peak Hour Begins :				PM Peak Volume :				PM Peak Hour Factor :				

Date: 03/04/2020	Station Name: US 92 East of Branch Forbes Rd -Westbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
24 Hour Total :			0									
AM Peak Hour Begins :				AM Peak Volume :				AM Peak Hour Factor :				
PM Peak Hour Begins :				PM Peak Volume :				PM Peak Hour Factor :				

Station Name: US 92 East of Branch Forbes Rd
Description: 72Hr Volume Counts ADR #112
City: Plant City
County: Hillsborough
Start Date/Time: 03/05/2020 00:00
End Date/Time: 03/06/2020 00:00

Date: 03/05/2020	Station Name: US 92 East of Branch Forbes Rd - Eastbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
24 Hour Total :			0									
AM Peak Hour Begins :			AM Peak Volume :					AM Peak Hour Factor :				
PM Peak Hour Begins :			PM Peak Volume :					PM Peak Hour Factor :				

Date: 03/05/2020	Station Name: US 92 East of Branch Forbes Rd -Westbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15												
30												
45												
00												
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0
24 Hour Total :			0									
AM Peak Hour Begins :			AM Peak Volume :					AM Peak Hour Factor :				
PM Peak Hour Begins :			PM Peak Volume :					PM Peak Hour Factor :				

Station Name: US 92 West of Branch Forbes Rd
Description: 72Hr Volume Counts ADR #74
City: Plant City
County: Hillsborough
Start Date/Time: 03/03/2020 00:00
End Date/Time: 03/04/2020 00:00

Date: 03/03/2020	Station Name: US 92 West of Branch Forbes Rd - Eastbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	8	10	3	11	7	17	68	191	176	203	84	79
30	4	3	9	2	8	22	146	157	197	205	81	70
45	4	3	5	7	12	27	178	147	195	130	84	76
0	5	8	5	3	15	47	159	176	179	85	87	79
Hr Total	**21**	**24**	**22**	**23**	**42**	**113**	**551**	**671**	**747**	**623**	**336**	**304**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	101	73	128	86	141	166	162	96	47	34	17	7
30	117	99	93	111	108	125	118	57	69	35	9	9
45	91	70	86	121	126	140	102	61	72	33	19	8
0	64	84	119	152	128	153	137	50	42	21	13	6
Hr Total	**373**	**326**	**426**	**470**	**503**	**584**	**519**	**264**	**230**	**123**	**58**	**30**
24 Hour Total :			**7383**									
AM Peak Hour Begins :			8:30	**AM Peak Volume :**			782	**AM Peak Hour Factor :**				0.95
PM Peak Hour Begins :			17:00	**PM Peak Volume :**			584	**PM Peak Hour Factor :**				0.88

Date: 03/03/2020	Station Name: US 92 West of Branch Forbes Rd - Westbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	4	6	3	5	4	17	73	109	121	118	86	67
30	8	9	6	5	6	22	88	118	132	137	80	65
45	5	4	5	6	6	38	106	93	106	70	85	77
0	5	6	4	6	16	55	120	118	95	70	69	80
Hr Total	**22**	**25**	**18**	**22**	**32**	**132**	**387**	**438**	**454**	**395**	**320**	**289**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	77	82	78	71	89	73	95	64	61	55	39	18
30	89	87	72	85	101	92	67	56	44	35	33	23
45	56	58	107	87	99	88	57	59	47	44	12	9
0	74	80	78	89	82	85	63	56	53	47	17	8
Hr Total	**296**	**307**	**335**	**332**	**371**	**338**	**282**	**235**	**205**	**181**	**101**	**58**
24 Hour Total :			**5575**									
AM Peak Hour Begins :			7:45	**AM Peak Volume :**			477	**AM Peak Hour Factor :**				0.87
PM Peak Hour Begins :			15:45	**PM Peak Volume :**			378	**PM Peak Hour Factor :**				0.88

Station Name: US 92 West of Branch Forbes Rd
Description: 72Hr Volume Counts ADR #74
City: Plant City
County: Hillsborough
Start Date/Time: 03/04/2020 00:00
End Date/Time: 03/05/2020 00:00

Date: 03/04/2020	Station Name: US 92 West of Branch Forbes Rd - Eastbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	5	5	2	4	11	16	47	70	95	85	83	91
30	7	6	2	2	6	17	47	84	89	76	72	97
45	7	3	3	9	13	32	55	93	96	99	83	70
0	2	5	3	12	10	42	52	89	85	96	85	81
Hr Total	**21**	**19**	**10**	**27**	**40**	**107**	**201**	**336**	**365**	**356**	**323**	**339**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	71	135	93	96	150	165	153	99	42	35	17	7
30	81	83	91	127	146	161	169	67	62	37	14	13
45	86	76	97	109	137	142	137	63	43	28	17	10
0	102	74	87	144	108	169	121	49	36	32	14	7
Hr Total	**340**	**368**	**368**	**476**	**541**	**637**	**580**	**278**	**183**	**132**	**62**	**37**
24 Hour Total :			**6146**									
AM Peak Hour Begins :			7:45	**AM Peak Volume :**			369	**AM Peak Hour Factor :**				0.93
PM Peak Hour Begins :			17:00	**PM Peak Volume :**			637	**PM Peak Hour Factor :**				0.94

Date: 03/04/2020	Station Name: US 92 West of Branch Forbes Rd - Westbound											
End Time	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
15	8	10	2	2	9	20	69	112	96	75	52	69
30	3	3	3	3	6	24	86	113	72	65	72	66
45	4	6	4	7	4	40	92	98	78	77	58	67
0	9	4	4	5	16	51	107	124	45	69	57	95
Hr Total	**24**	**23**	**13**	**17**	**35**	**135**	**354**	**447**	**291**	**286**	**239**	**297**
End Time	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
15	94	83	90	94	101	93	64	62	56	47	77	8
30	85	81	77	108	97	82	81	66	56	48	46	12
45	86	88	98	111	88	60	73	48	44	28	27	9
0	86	89	110	103	106	100	68	59	48	60	20	9
Hr Total	**351**	**341**	**375**	**416**	**392**	**335**	**286**	**235**	**204**	**183**	**170**	**38**
24 Hour Total :			**5487**									
AM Peak Hour Begins :			7:00	**AM Peak Volume :**			447	**AM Peak Hour Factor :**				0.9
PM Peak Hour Begins :			14:45	**PM Peak Volume :**			423	**PM Peak Hour Factor :**				0.95

Station Name: US 92 West of Branch Forbes Rd
Description: 72Hr Volume Counts ADR #74
City: Plant City
County: Hillsborough
Start Date/Time: 03/05/2020 00:00
End Date/Time: 03/06/2020 00:00

Date: 03/05/2020	Station Name: US 92 West of Branch Forbes Rd - Eastbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15	2	4	2	6	9	12	49	75	89	68	79	62
30	8	2	4	4	5	20	55	90	118	78	91	95
45	7	5	3	3	14	20	62	102	98	90	78	90
0	5	6	4	4	14	36	56	114	90	105	99	89
Hr Total	**22**	**17**	**13**	**17**	**42**	**88**	**222**	**381**	**395**	**341**	**347**	**336**
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15	68	80	92	112	177	171	151	86	47	42	21	14
30	64	81	91	95	139	165	148	90	39	39	22	12
45	78	61	88	128	142	168	123	90	34	34	18	9
0	64	89	107	168	123	150	137	31	38	26	10	9
Hr Total	**274**	**311**	**378**	**503**	**581**	**654**	**559**	**297**	**158**	**141**	**71**	**44**
24 Hour Total :			**6192**									
AM Peak Hour Begins :			7:30	AM Peak Volume :			423	AM Peak Hour Factor :				0.9
PM Peak Hour Begins :			17:00	PM Peak Volume :			654	PM Peak Hour Factor :				0.92

Date: 03/05/2020	Station Name: US 92 West of Branch Forbes Rd - Westbound											
End Time	00	01	02	03	04	05	06	07	08	09	10	11
15	10	3	6	1	7	20	81	138	122	68	72	73
30	8	6	2	4	5	23	99	111	96	57	71	77
45	8	2	4	5	5	30	94	100	72	57	80	73
0	7	4	5	11	18	55	117	121	74	49	67	88
Hr Total	**33**	**15**	**17**	**21**	**35**	**128**	**391**	**470**	**364**	**231**	**290**	**311**
End Time	12	13	14	15	16	17	18	19	20	21	22	23
15	75	80	82	108	102	108	105	58	45	53	41	20
30	79	86	90	97	131	104	93	44	35	69	44	10
45	81	69	91	102	126	88	69	58	34	47	24	14
0	76	63	121	107	92	93	67	58	50	48	15	4
Hr Total	**311**	**298**	**384**	**414**	**451**	**393**	**334**	**218**	**164**	**217**	**124**	**48**
24 Hour Total :			**5662**									
AM Peak Hour Begins :			7:00	AM Peak Volume :			470	AM Peak Hour Factor :				0.85
PM Peak Hour Begins :			15:45	PM Peak Volume :			466	PM Peak Hour Factor :				0.89

72-hour counts

Branch Forbes Road

Location	Dates 3/3/2020	3/4/2020	3/5/2020	Average	SF	ACF	2020 AADT	Rounded* 2020 AADT	FDOT 2019 AADT		From I-4 Interchange Needs Study 2015 AADT	From HNTB Counts 2020 AADT	% Growth / Year	Applying % growth to 2015 AADTs Calculated 2020 AADTs	Rounded AADTs
I-4 EB off-ramp to Branch Forbes Road	7,672	5,866	5,795	6,444	0.95	0.94	5,755	5,800	5,100	F					
I-4 EB on-ramp from Branch Forbes Road	**N/A**	**N/A**	**N/A**	**N/A**					4,100	F	3,600			4,449	4,400
I-4 WB off-ramp to Branch Forbes Road	4,309	5,509	5,438	5,085	0.95	0.94	4,541	4,500	4,100	F					
I-4 WB on-ramp from Branch Forbes Road	7,736	7,392	7,694	7,607	0.95	0.94	6,793	6,800	5,100	F					
Branch Forbes Road north of Harvey Tew Road		**no counts taken**									5,900			7,291	7,300
Harvey Tew Road west of Branch Forbes Road		**no counts taken**									800			989	1,000
Branch Forbes Road north of I-4	9,934	10,110	9,993	10,012	0.95	0.94	8,941	8,900			7,100	8,900	5.07%		
Branch Forbes Road south of I-4	25,149	24,642	**N/A**	24,896	0.95	0.94	22,232	22,000			16,200	22,000	7.16%		
Beauchamp Road east of Branch Forbes Road	2,313	1,800	1,917	2,010	0.95	0.94	1,795	1,800			900	1,800			
Glen Harwell Road west of Branch Forbes Road	1,251	1,156	1,157	1,188	0.95	0.94	1,061	1,100			1,400	1,100			
Branch Forbes Road south of Glen Harwell Road	**N/A**	**N/A**	**N/A**	**N/A**	0.95	0.94					14,700			18,165	18,000
Branch Forbes Road north of US 92	N/A	N/A	N/A	N/A							15,100			18,660	18,500
Branch Forbes Road south of US 92	N/A	N/A	9,541	9,541	0.95	0.94	8,520	8,500			7,400	8,500	2.97%		
US 92 east of Branch Forbes Road	**N/A**	**N/A**	**N/A**	**N/A**					14,400		14,100			16,434	16,500
US 92 west of Branch Forbes Road	12,958	11,633	11,854	12,148	0.95	0.94	10,848	11,000	10,000		9,300	11,000	3.66%		

*Rounding based on guidelines on 2019 FDOT Project Traffic Forecasting Handbook Section 1.6.

Average **4.71%**

Applying the percentage to the 2015 AADTs for the segments without 2020 ADT count

3.31% Applied to US 92 east of Branch Forbes: average of 2.97% and 3.66% (closer to the location)

Location	Final 2020 AADTs
I-4 EB off-ramp to Branch Forbes Road	5,800
I-4 EB on-ramp from Branch Forbes Road	4,400
I-4 WB off-ramp to Branch Forbes Road	4,500
I-4 WB on-ramp from Branch Forbes Road	6,800
Branch Forbes Road north of Harvey Tew Road	7,300
Harvey Tew Road west of Branch Forbes Road	1,000
Branch Forbes Road north of I-4	8,900
Branch Forbes Road south of I-4	22,000
Beauchamp Road east of Branch Forbes Road	1,800
Glen Harwell Road west of Branch Forbes Road	1,100
Branch Forbes Road south of Glen Harwell Road	18,000
Branch Forbes Road north of US 92	18,500
Branch Forbes Road south of US 92	8,500
US 92 east of Branch Forbes Road	16,500
US 92 west of Branch Forbes Road	11,000

APPENDIX C Existing (2020) Operational Analysis

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	2	33	55	3	7	116	232	39	13	413	4
Future Vol, veh/h	5	2	33	55	3	7	116	232	39	13	413	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	5	2	35	58	3	7	122	244	41	14	435	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	979	994	437	993	976	265	439	0	0	285	0	0
Stage 1	465	465	-	509	509	-	-	-	-	-	-	-
Stage 2	514	529	-	484	467	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	226	242	613	221	248	766	1105	-	-	1260	-	-
Stage 1	572	558	-	541	533	-	-	-	-	-	-	-
Stage 2	538	522	-	558	557	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	197	207	613	184	212	766	1105	-	-	1260	-	-
Mov Cap-2 Maneuver	197	207	-	184	212	-	-	-	-	-	-	-
Stage 1	496	550	-	470	463	-	-	-	-	-	-	-
Stage 2	459	453	-	516	549	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.8	31.7	2.6	0.2
HCM LOS	B	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1105	-	-	450	202	1260	-	-
HCM Lane V/C Ratio	0.111	-	-	0.094	0.339	0.011	-	-
HCM Control Delay (s)	8.7	0	-	13.8	31.7	7.9	0	-
HCM Lane LOS	A	A	-	B	D	A	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0.3	1.4	0	-	-

Intersection	
Int Delay, s/veh	115.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	140	7	203	582	184	0	0	301	200
Future Vol, veh/h	0	0	0	140	7	203	582	184	0	0	301	200
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	1000	80	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	0	0	147	7	214	613	194	0	0	317	211

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	1737	1737	194	317	0	-	-	-	0	
Stage 1	1420	1420	-	-	-	-	-	-	-	
Stage 2	317	317	-	-	-	-	-	-	-	
Critical Hdwy	6.45	6.55	6.25	4.15	-	-	-	-	-	
Critical Hdwy Stg 1	5.45	5.55	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	5.45	5.55	-	-	-	-	-	-	-	
Follow-up Hdwy	3.545	4.045	3.345	2.245	-	-	-	-	-	
Pot Cap-1 Maneuver	~ 94	86	840	1226	-	0	0	-	-	
Stage 1	220	200	-	-	-	0	0	-	-	
Stage 2	732	649	-	-	-	0	0	-	-	
Platoon blocked, %					-			-	-	
Mov Cap-1 Maneuver	~ 47	0	840	1226	-	-	-	-	-	
Mov Cap-2 Maneuver	~ 47	0	-	-	-	-	-	-	-	
Stage 1	~ 110	0	-	-	-	-	-	-	-	
Stage 2	732	0	-	-	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	$ 515.8	8.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1226	-	47	840	-	-
HCM Lane V/C Ratio	0.5	-	3.292	0.254	-	-
HCM Control Delay (s)	10.8	-	$ 1213.4	10.7	-	-
HCM Lane LOS	B	-	F	B	-	-
HCM 95th %tile Q(veh)	2.9	-	16.9	1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	65	5	430	0	0	0	0	701	300	84	357	0
Future Vol, veh/h	65	5	430	0	0	0	0	701	300	84	357	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	68	5	453	0	0	0	0	738	316	88	376	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1290	1290	376	-	0	0	738	0	0
Stage 1	552	552	-	-	-	-	-	-	-
Stage 2	738	738	-	-	-	-	-	-	-
Critical Hdwy	6.45	6.55	6.25	-	-	-	4.15	-	-
Critical Hdwy Stg 1	5.45	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.45	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	-	-	-	2.245	-	-
Pot Cap-1 Maneuver	178	161	664	0	-	-	855	-	0
Stage 1	571	510	-	0	-	-	-	-	0
Stage 2	467	420	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	160	0	664	-	-	-	855	-	-
Mov Cap-2 Maneuver	160	0	-	-	-	-	-	-	-
Stage 1	571	0	-	-	-	-	-	-	-
Stage 2	419	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19	0	1.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	772	855	-
HCM Lane V/C Ratio	-	-	0.682	0.103	-
HCM Control Delay (s)	-	-	19	9.7	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	5.5	0.3	-

Intersection	
Int Delay, s/veh	14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	35	13	32	4	6	50	9	916	9	31	732	24
Future Vol, veh/h	35	13	32	4	6	50	9	916	9	31	732	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	5	5	5
Mvmt Flow	37	14	34	4	6	53	9	964	9	33	771	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1866	1841	784	1861	1849	969	796	0	0	973	0	0
Stage 1	850	850	-	987	987	-	-	-	-	-	-	-
Stage 2	1016	991	-	874	862	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	56	75	393	55	73	304	813	-	-	697	-	-
Stage 1	355	377	-	294	322	-	-	-	-	-	-	-
Stage 2	287	324	-	340	368	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	39	67	393	39	65	304	813	-	-	697	-	-
Mov Cap-2 Maneuver	39	67	-	39	65	-	-	-	-	-	-	-
Stage 1	346	345	-	287	314	-	-	-	-	-	-	-
Stage 2	227	316	-	273	337	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	291.5	39.1	0.1	0.4
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	813	-	-	68	167	697	-	-
HCM Lane V/C Ratio	0.012	-	-	1.238	0.378	0.047	-	-
HCM Control Delay (s)	9.5	0	-	291.5	39.1	10.4	0	-
HCM Lane LOS	A	A	-	F	E	B	A	-
HCM 95th %tile Q(veh)	0	-	-	6.7	1.6	0.1	-	-

HCM 6th Signalized Intersection Summary
14: N Forbes Rd/Branch Forbes Rd & US 92

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	158	264	18	25	407	398	43	378	9	276	300	192
Future Volume (veh/h)	158	264	18	25	407	398	43	378	9	276	300	192
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	166	278	19	26	428	419	45	398	9	291	316	202
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	211	804	55	419	278	272	271	410	9	223	696	589
Arrive On Green	0.08	0.48	0.48	0.33	0.33	0.33	0.23	0.23	0.23	0.08	0.38	0.38
Sat Flow, veh/h	1739	1690	115	1057	847	829	862	1778	40	1739	1826	1547
Grp Volume(v), veh/h	166	0	297	26	0	847	45	0	407	291	316	202
Grp Sat Flow(s),veh/h/ln	1739	0	1805	1057	0	1677	862	0	1819	1739	1826	1547
Q Serve(g_s), s	6.0	0.0	10.3	1.7	0.0	32.7	4.2	0.0	22.1	8.2	12.9	9.3
Cycle Q Clear(g_c), s	6.0	0.0	10.3	1.7	0.0	32.7	4.2	0.0	22.1	8.2	12.9	9.3
Prop In Lane	1.00		0.06	1.00		0.49	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	211	0	859	419	0	550	271	0	419	223	696	589
V/C Ratio(X)	0.79	0.00	0.35	0.06	0.00	1.54	0.17	0.00	0.97	1.30	0.45	0.34
Avail Cap(c_a), veh/h	215	0	863	419	0	550	271	0	419	223	696	589
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.1	0.0	16.4	23.1	0.0	33.5	31.2	0.0	38.0	31.2	23.1	22.0
Incr Delay (d2), s/veh	17.2	0.0	0.3	0.1	0.0	252.5	1.3	0.0	37.2	164.7	2.1	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.9	0.0	7.1	0.7	0.0	78.3	1.7	0.0	19.7	22.3	9.7	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.3	0.0	16.7	23.2	0.0	286.0	32.5	0.0	75.2	195.9	25.3	23.6
LnGrp LOS	D	A	B	C	A	F	C	A	E	F	C	C
Approach Vol, veh/h		463			873			452			809	
Approach Delay, s/veh		25.5			278.2			71.0			86.2	
Approach LOS		C			F			E			F	

Timer - Assigned Phs	1	2	3	4		6		8				
Phs Duration (G+Y+Rc), s	14.8	40.0	15.0	30.0		54.8		45.0				
Change Period (Y+Rc), s	6.8	7.3	6.8	7.0		7.3		7.0				
Max Green Setting (Gmax), s	8.2	32.7	8.2	23.0		47.7		38.0				
Max Q Clear Time (g_c+I1), s	8.0	34.7	10.2	24.1		12.3		14.9				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0		2.1		2.5				

Intersection Summary	
HCM 6th Ctrl Delay	137.3
HCM 6th LOS	F

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	16	0	34	31	2	12	103	304	21	6	276	9
Future Vol, veh/h	16	0	34	31	2	12	103	304	21	6	276	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	17	0	36	33	2	13	108	320	22	6	291	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	863	866	296	873	859	331	300	0	0	342	0	0
Stage 1	308	308	-	547	547	-	-	-	-	-	-	-
Stage 2	555	558	-	326	312	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	272	288	736	267	291	704	1244	-	-	1200	-	-
Stage 1	696	655	-	516	513	-	-	-	-	-	-	-
Stage 2	511	507	-	680	652	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	242	255	736	232	258	704	1244	-	-	1200	-	-
Mov Cap-2 Maneuver	242	255	-	232	258	-	-	-	-	-	-	-
Stage 1	621	651	-	460	458	-	-	-	-	-	-	-
Stage 2	446	452	-	643	648	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.2	20.2	2	0.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1244	-	-	445	284	1200	-	-
HCM Lane V/C Ratio	0.087	-	-	0.118	0.167	0.005	-	-
HCM Control Delay (s)	8.2	0	-	14.2	20.2	8	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.4	0.6	0	-	-

Intersection	
Int Delay, s/veh	103.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	257	2	191	340	237	0	0	259	82
Future Vol, veh/h	0	0	0	257	2	191	340	237	0	0	259	82
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	1000	80	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	0	0	271	2	201	358	249	0	0	273	86

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	1238	1238	249	273	0	-	-	-	0	
Stage 1	965	965	-	-	-	-	-	-	-	
Stage 2	273	273	-	-	-	-	-	-	-	
Critical Hdwy	6.45	6.55	6.25	4.15	-	-	-	-	-	
Critical Hdwy Stg 1	5.45	5.55	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	5.45	5.55	-	-	-	-	-	-	-	
Follow-up Hdwy	3.545	4.045	3.345	2.245	-	-	-	-	-	
Pot Cap-1 Maneuver	~ 191	173	782	1273	-	0	0	-	-	
Stage 1	365	329	-	-	-	0	0	-	-	
Stage 2	766	678	-	-	-	0	0	-	-	
Platoon blocked, %					-			-	-	
Mov Cap-1 Maneuver	~ 137	0	782	1273	-	-	-	-	-	
Mov Cap-2 Maneuver	~ 137	0	-	-	-	-	-	-	-	
Stage 1	~ 262	0	-	-	-	-	-	-	-	
Stage 2	766	0	-	-	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	$ 306.6	5.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	1273	-	137	782	-	-
HCM Lane V/C Ratio	0.281	-	1.99	0.257	-	-
HCM Control Delay (s)	8.9	-	$ 524.5	11.2	-	-
HCM Lane LOS	A	-	F	B	-	-
HCM 95th %tile Q(veh)	1.2	-	21.7	1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	39.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	95	3	532	0	0	0	0	482	283	73	443	0
Future Vol, veh/h	95	3	532	0	0	0	0	482	283	73	443	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	100	3	560	0	0	0	0	507	298	77	466	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1127	1127	466	-	0	0	507	0	0
Stage 1	620	620	-	-	-	-	-	-	-
Stage 2	507	507	-	-	-	-	-	-	-
Critical Hdwy	6.45	6.55	6.25	-	-	-	4.15	-	-
Critical Hdwy Stg 1	5.45	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.45	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	-	-	-	2.245	-	-
Pot Cap-1 Maneuver	223	202	590	0	-	-	1043	-	0
Stage 1	531	475	-	0	-	-	-	-	0
Stage 2	599	534	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	206	0	590	-	-	-	1043	-	-
Mov Cap-2 Maneuver	206	0	-	-	-	-	-	-	-
Stage 1	531	0	-	-	-	-	-	-	-
Stage 2	555	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	119.6	0	1.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	566	1043	-
HCM Lane V/C Ratio	-	-	1.172	0.074	-
HCM Control Delay (s)	-	-	119.6	8.7	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q(veh)	-	-	23	0.2	-

Intersection	
Int Delay, s/veh	9.9

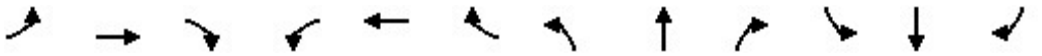
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	38	4	29	3	2	35	15	692	22	49	897	29
Future Vol, veh/h	38	4	29	3	2	35	15	692	22	49	897	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	5	5	5
Mvmt Flow	40	4	31	3	2	37	16	728	23	52	944	31

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1855	1847	960	1853	1851	740	975	0	0	751	0	0
Stage 1	1064	1064	-	772	772	-	-	-	-	-	-	-
Stage 2	791	783	-	1081	1079	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	57	75	311	56	73	412	696	-	-	845	-	-
Stage 1	270	300	-	388	405	-	-	-	-	-	-	-
Stage 2	383	404	-	260	291	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	44	62	311	42	61	412	696	-	-	845	-	-
Mov Cap-2 Maneuver	44	62	-	42	61	-	-	-	-	-	-	-
Stage 1	259	260	-	372	389	-	-	-	-	-	-	-
Stage 2	333	388	-	200	252	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	229.6	26.3	0.2	0.5
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	696	-	-	70	211	845	-	-
HCM Lane V/C Ratio	0.023	-	-	1.068	0.2	0.061	-	-
HCM Control Delay (s)	10.3	0	-	229.6	26.3	9.5	0	-
HCM Lane LOS	B	A	-	F	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	5.6	0.7	0.2	-	-

HCM 6th Signalized Intersection Summary
14: N Forbes Rd/Branch Forbes Rd & US 92



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	369	55	59	277	323	44	279	17	372	408	149
Future Volume (veh/h)	127	369	55	59	277	323	44	279	17	372	408	149
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	134	388	58	62	292	340	46	294	18	392	429	157
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	190	727	109	342	256	298	233	398	24	295	705	597
Arrive On Green	0.07	0.47	0.47	0.33	0.33	0.33	0.23	0.23	0.23	0.08	0.39	0.39
Sat Flow, veh/h	1739	1552	232	921	769	896	810	1703	104	1739	1826	1547
Grp Volume(v), veh/h	134	0	446	62	0	632	46	0	312	392	429	157
Grp Sat Flow(s),veh/h/ln	1739	0	1784	921	0	1665	810	0	1807	1739	1826	1547
Q Serve(g_s), s	4.8	0.0	17.4	5.0	0.0	32.7	4.8	0.0	15.7	8.2	18.6	6.8
Cycle Q Clear(g_c), s	4.8	0.0	17.4	9.0	0.0	32.7	8.3	0.0	15.7	8.2	18.6	6.8
Prop In Lane	1.00		0.13	1.00		0.54	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	190	0	836	342	0	553	233	0	422	295	705	597
V/C Ratio(X)	0.70	0.00	0.53	0.18	0.00	1.14	0.20	0.00	0.74	1.33	0.61	0.26
Avail Cap(c_a), veh/h	218	0	865	342	0	553	233	0	422	295	705	597
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.1	0.0	18.5	26.5	0.0	32.9	33.6	0.0	34.9	34.0	24.2	20.6
Incr Delay (d2), s/veh	8.4	0.0	0.7	0.3	0.0	84.2	1.9	0.0	11.0	169.8	3.9	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.0	0.0	10.9	1.9	0.0	36.2	1.8	0.0	12.4	26.3	13.2	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.4	0.0	19.2	26.8	0.0	117.0	35.5	0.0	46.0	203.7	28.1	21.7
LnGrp LOS	C	A	B	C	A	F	D	A	D	F	C	C
Approach Vol, veh/h		580			694			358			978	
Approach Delay, s/veh		22.3			109.0			44.6			97.5	
Approach LOS		C			F			D			F	

Timer - Assigned Phs	1	2	3	4		6		8				
Phs Duration (G+Y+Rc), s	13.4	40.0	15.0	30.0		53.4		45.0				
Change Period (Y+Rc), s	6.8	7.3	6.8	7.0		7.3		7.0				
Max Green Setting (Gmax), s	8.2	32.7	8.2	23.0		47.7		38.0				
Max Q Clear Time (g_c+I1), s	6.8	34.7	10.2	17.7		19.4		20.6				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.9		3.3		2.9				

Intersection Summary												
HCM 6th Ctrl Delay			76.6									
HCM 6th LOS			E									

APPENDIX D No-Build Alternative Operational Analysis

Intersection	
Int Delay, s/veh	4.6

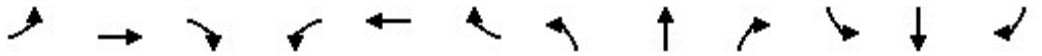
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	2	33	55	3	7	132	263	44	15	470	5
Future Vol, veh/h	5	2	33	55	3	7	132	263	44	15	470	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	5	2	35	58	3	7	139	277	46	16	495	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1113	1131	498	1126	1110	300	500	0	0	323	0	0
Stage 1	530	530	-	578	578	-	-	-	-	-	-	-
Stage 2	583	601	-	548	532	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	183	201	566	180	207	733	1049	-	-	1220	-	-
Stage 1	527	522	-	496	496	-	-	-	-	-	-	-
Stage 2	493	485	-	515	521	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	154	165	566	145	170	733	1049	-	-	1220	-	-
Mov Cap-2 Maneuver	154	165	-	145	170	-	-	-	-	-	-	-
Stage 1	441	513	-	415	415	-	-	-	-	-	-	-
Stage 2	405	406	-	473	512	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.4	43.3	2.7	0.2
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1049	-	-	389	160	1220	-	-
HCM Lane V/C Ratio	0.132	-	-	0.108	0.428	0.013	-	-
HCM Control Delay (s)	9	0	-	15.4	43.3	8	0	-
HCM Lane LOS	A	A	-	C	E	A	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0.4	1.9	0	-	-

HCM 6th Signalized Intersection Summary
1: Branch Forbes Rd & I-4 WB on-ramp/I-4 WB off-ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	160	8	232	656	207	0	0	335	223
Future Volume (veh/h)	0	0	0	160	8	232	656	207	0	0	335	223
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1826	1826	1826	1826	1826	0	0	1826	1826
Adj Flow Rate, veh/h				168	8	0	691	218	0	0	353	0
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				5	5	5	5	5	0	0	5	5
Cap, veh/h				307	15		801	1320	0	0	704	
Arrive On Green				0.18	0.18	0.00	0.49	1.00	0.00	0.00	0.39	0.00
Sat Flow, veh/h				1664	79	1547	1739	1826	0	0	1826	0
Grp Volume(v), veh/h				176	0	0	691	218	0	0	353	0
Grp Sat Flow(s),veh/h/ln				1743	0	1547	1739	1826	0	0	1826	0
Q Serve(g_s), s				11.9	0.0	0.0	34.2	0.0	0.0	0.0	19.1	0.0
Cycle Q Clear(g_c), s				11.9	0.0	0.0	34.2	0.0	0.0	0.0	19.1	0.0
Prop In Lane				0.95		1.00	1.00		0.00	0.00		0.00
Lane Grp Cap(c), veh/h				322	0		801	1320	0	0	704	
V/C Ratio(X)				0.55	0.00		0.86	0.17	0.00	0.00	0.50	
Avail Cap(c_a), veh/h				322	0		883	1320	0	0	704	
HCM Platoon Ratio				1.00	1.00	1.00	1.67	1.67	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.09	0.09	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				48.1	0.0	0.0	10.8	0.0	0.0	0.0	30.4	0.0
Incr Delay (d2), s/veh				6.5	0.0	0.0	0.8	0.0	0.0	0.0	2.5	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				9.7	0.0	0.0	7.2	0.0	0.0	0.0	13.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				54.6	0.0	0.0	11.6	0.0	0.0	0.0	33.0	0.0
LnGrp LOS				D	A		B	A	A	A	C	
Approach Vol, veh/h					176			909			353	
Approach Delay, s/veh					54.6			8.8			33.0	
Approach LOS					D			A			C	

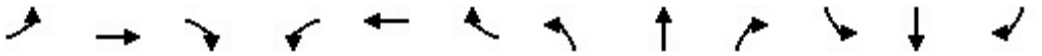
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		100.0			43.9	56.1		30.0				
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s		94.0			44.0	44.0		24.0				
Max Q Clear Time (g_c+I1), s		2.0			36.2	21.1		13.9				
Green Ext Time (p_c), s		1.3			1.7	1.9		0.6				

Intersection Summary		
HCM 6th Ctrl Delay	20.3	
HCM 6th LOS	C	

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
8: Branch Forbes Rd & I-4 EB off-ramp/I-4 EB on-ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	6	490	0	0	0	0	789	338	94	401	0
Future Volume (veh/h)	74	6	490	0	0	0	0	789	338	94	401	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826				0	1826	1826	1826	1826	0
Adj Flow Rate, veh/h	78	6	0				0	831	0	99	422	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5				0	5	5	5	5	0
Cap, veh/h	262	20					0	1183		374	1362	0
Arrive On Green	0.16	0.16	0.00				0.00	0.65	0.00	0.05	0.75	0.00
Sat Flow, veh/h	1620	125	1547				0	1826	0	1739	1826	0
Grp Volume(v), veh/h	84	0	0				0	831	0	99	422	0
Grp Sat Flow(s),veh/h/ln	1745	0	1547				0	1826	0	1739	1826	0
Q Serve(g_s), s	5.5	0.0	0.0				0.0	38.3	0.0	2.2	9.9	0.0
Cycle Q Clear(g_c), s	5.5	0.0	0.0				0.0	38.3	0.0	2.2	9.9	0.0
Prop In Lane	0.93		1.00				0.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	282	0					0	1183		374	1362	0
V/C Ratio(X)	0.30	0.00					0.00	0.70		0.26	0.31	0.00
Avail Cap(c_a), veh/h	282	0					0	1183		377	1362	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.13	0.13	0.00
Uniform Delay (d), s/veh	48.0	0.0	0.0				0.0	14.8	0.0	12.9	5.4	0.0
Incr Delay (d2), s/veh	2.7	0.0	0.0				0.0	3.5	0.0	0.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	0.0	0.0				0.0	22.4	0.0	1.5	4.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.7	0.0	0.0				0.0	18.3	0.0	13.0	5.5	0.0
LnGrp LOS	D	A					A	B		B	A	A
Approach Vol, veh/h		84						831			521	
Approach Delay, s/veh		50.7						18.3			6.9	
Approach LOS		D						B			A	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	12.8	90.2	27.0	103.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	84.0	21.0	97.0
Max Q Clear Time (g_c+I1), s	4.2	40.3	7.5	11.9
Green Ext Time (p_c), s	0.0	7.4	0.3	2.8

Intersection Summary	
HCM 6th Ctrl Delay	16.1
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	40.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↕	
Traffic Vol, veh/h	44	16	40	4	6	50	10	1033	10	35	829	27
Future Vol, veh/h	44	16	40	4	6	50	10	1033	10	35	829	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	5	5	5
Mvmt Flow	46	17	42	4	6	53	11	1087	11	37	873	28

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2105	2081	887	2106	2090	1093	901	0	0	1098	0	0
Stage 1	961	961	-	1115	1115	-	-	-	-	-	-	-
Stage 2	1144	1120	-	991	975	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	~ 38	53	343	37	52	257	742	-	-	625	-	-
Stage 1	308	335	-	249	280	-	-	-	-	-	-	-
Stage 2	243	282	-	293	326	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 25	48	343	22	47	257	742	-	-	625	-	-
Mov Cap-2 Maneuver	~ 25	48	-	22	47	-	-	-	-	-	-	-
Stage 1	296	315	-	240	269	-	-	-	-	-	-	-
Stage 2	182	271	-	229	307	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 804.6	65.2	0.1	0.4
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	742	-	-	45	119	625	-	-
HCM Lane V/C Ratio	0.014	-	-	2.339	0.531	0.059	-	-
HCM Control Delay (s)	9.9	0	-	$ 804.6	65.2	11.1	-	-
HCM Lane LOS	A	A	-	F	F	B	-	-
HCM 95th %tile Q(veh)	0	-	-	11.1	2.5	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary
14: Branch Forbes Rd & US 92

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	300	20	28	461	451	48	422	10	314	341	218
Future Volume (veh/h)	180	300	20	28	461	451	48	422	10	314	341	218
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	189	316	21	29	485	475	51	444	11	331	359	229
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	215	808	54	405	277	271	256	408	10	215	694	588
Arrive On Green	0.08	0.48	0.48	0.33	0.33	0.33	0.23	0.23	0.23	0.08	0.38	0.38
Sat Flow, veh/h	1739	1693	113	1019	847	830	808	1774	44	1739	1826	1547
Grp Volume(v), veh/h	189	0	337	29	0	960	51	0	455	331	359	229
Grp Sat Flow(s),veh/h/ln	1739	0	1806	1019	0	1677	808	0	1818	1739	1826	1547
Q Serve(g_s), s	7.0	0.0	12.0	2.0	0.0	32.7	5.2	0.0	23.0	8.2	15.2	10.8
Cycle Q Clear(g_c), s	7.0	0.0	12.0	2.0	0.0	32.7	5.4	0.0	23.0	8.2	15.2	10.8
Prop In Lane	1.00		0.06	1.00		0.49	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	215	0	861	405	0	548	256	0	418	215	694	588
V/C Ratio(X)	0.88	0.00	0.39	0.07	0.00	1.75	0.20	0.00	1.09	1.54	0.52	0.39
Avail Cap(c_a), veh/h	215	0	861	405	0	548	256	0	418	215	694	588
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.3	0.0	16.8	23.3	0.0	33.7	31.8	0.0	38.5	30.7	23.9	22.6
Incr Delay (d2), s/veh	31.7	0.0	0.3	0.1	0.0	345.5	1.7	0.0	69.8	266.0	2.7	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.0	0.0	8.2	0.8	0.0	101.7	2.0	0.0	26.2	30.7	11.1	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.0	0.0	17.2	23.4	0.0	379.1	33.5	0.0	108.3	296.7	26.7	24.5
LnGrp LOS	E	A	B	C	A	F	C	A	F	F	C	C
Approach Vol, veh/h		526			989			506			919	
Approach Delay, s/veh		31.1			368.7			100.8			123.4	
Approach LOS		C			F			F			F	

Timer - Assigned Phs	1	2	3	4		6		8				
Phs Duration (G+Y+Rc), s	15.0	40.0	15.0	30.0		55.0		45.0				
Change Period (Y+Rc), s	6.8	7.3	6.8	7.0		7.3		7.0				
Max Green Setting (Gmax), s	8.2	32.7	8.2	23.0		47.7		38.0				
Max Q Clear Time (g_c+I1), s	9.0	34.7	10.2	25.0		14.0		17.2				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0		2.4		2.8				

Intersection Summary												
HCM 6th Ctrl Delay			185.5									
HCM 6th LOS			F									

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	0	41	31	2	12	116	342	24	7	314	10
Future Vol, veh/h	20	0	41	31	2	12	116	342	24	7	314	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	21	0	43	33	2	13	122	360	25	7	331	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	975	980	337	989	973	373	342	0	0	385	0	0
Stage 1	351	351	-	617	617	-	-	-	-	-	-	-
Stage 2	624	629	-	372	356	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	228	247	698	223	249	666	1200	-	-	1157	-	-
Stage 1	659	627	-	472	477	-	-	-	-	-	-	-
Stage 2	468	471	-	642	624	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	199	213	698	187	215	666	1200	-	-	1157	-	-
Mov Cap-2 Maneuver	199	213	-	187	215	-	-	-	-	-	-	-
Stage 1	573	623	-	411	415	-	-	-	-	-	-	-
Stage 2	397	410	-	598	620	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.3	24.4	2	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1200	-	-	383	233	1157	-	-
HCM Lane V/C Ratio	0.102	-	-	0.168	0.203	0.006	-	-
HCM Control Delay (s)	8.3	0	-	16.3	24.4	8.1	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.6	0.7	0	-	-

HCM 6th Signalized Intersection Summary
1: Branch Forbes Rd & I-4 WB on-ramp/I-4 WB off-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	291	3	217	382	265	0	0	293	93
Future Volume (veh/h)	0	0	0	291	3	217	382	265	0	0	293	93
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1826	1826	1826	1826	1826	0	0	1826	1826
Adj Flow Rate, veh/h				306	3	0	402	279	0	0	308	0
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				5	5	5	5	5	0	0	5	5
Cap, veh/h				490	5		631	1138	0	0	758	
Arrive On Green				0.28	0.28	0.00	0.21	0.83	0.00	0.00	0.42	0.00
Sat Flow, veh/h				1723	17	1547	1739	1826	0	0	1826	0
Grp Volume(v), veh/h				309	0	0	402	279	0	0	308	0
Grp Sat Flow(s),veh/h/ln				1740	0	1547	1739	1826	0	0	1826	0
Q Serve(g_s), s				20.1	0.0	0.0	0.0	4.3	0.0	0.0	15.4	0.0
Cycle Q Clear(g_c), s				20.1	0.0	0.0	0.0	4.3	0.0	0.0	15.4	0.0
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.00
Lane Grp Cap(c), veh/h				495	0		631	1138	0	0	758	
V/C Ratio(X)				0.62	0.00		0.64	0.25	0.00	0.00	0.41	
Avail Cap(c_a), veh/h				495	0		631	1138	0	0	758	
HCM Platoon Ratio				1.00	1.00	1.00	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.13	0.13	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				40.4	0.0	0.0	29.4	4.6	0.0	0.0	26.7	0.0
Incr Delay (d2), s/veh				5.8	0.0	0.0	0.3	0.1	0.0	0.0	1.6	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				14.3	0.0	0.0	11.9	2.2	0.0	0.0	11.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				46.3	0.0	0.0	29.7	4.6	0.0	0.0	28.3	0.0
LnGrp LOS				D	A		C	A	A	A	C	
Approach Vol, veh/h					309			681			308	
Approach Delay, s/veh					46.3			19.4			28.3	
Approach LOS					D			B			C	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		87.0			27.0	60.0		43.0				
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s		81.0			21.0	54.0		37.0				
Max Q Clear Time (g_c+I1), s		6.3			2.0	17.4		22.1				
Green Ext Time (p_c), s		1.7			1.2	1.7		1.5				

Intersection Summary		
HCM 6th Ctrl Delay	27.9	
HCM 6th LOS	C	

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
8: Branch Forbes Rd & I-4 EB Off-ramp/I-4 EB On-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	4	608	0	0	0	0	539	316	82	502	0
Future Volume (veh/h)	108	4	608	0	0	0	0	539	316	82	502	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826				0	1826	1826	1826	1826	0
Adj Flow Rate, veh/h	114	4	0				0	567	0	86	528	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5				0	5	5	5	5	0
Cap, veh/h	479	17					0	959		402	1138	0
Arrive On Green	0.28	0.28	0.00				0.00	0.53	0.00	0.10	1.00	0.00
Sat Flow, veh/h	1683	59	1547				0	1826	0	1739	1826	0
Grp Volume(v), veh/h	118	0	0				0	567	0	86	528	0
Grp Sat Flow(s),veh/h/ln	1742	0	1547				0	1826	0	1739	1826	0
Q Serve(g_s), s	6.8	0.0	0.0				0.0	27.8	0.0	2.8	0.0	0.0
Cycle Q Clear(g_c), s	6.8	0.0	0.0				0.0	27.8	0.0	2.8	0.0	0.0
Prop In Lane	0.97		1.00				0.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	496	0					0	959		402	1138	0
V/C Ratio(X)	0.24	0.00					0.00	0.59		0.21	0.46	0.00
Avail Cap(c_a), veh/h	496	0					0	959		406	1138	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.81	0.81	0.00
Uniform Delay (d), s/veh	35.7	0.0	0.0				0.0	21.2	0.0	14.3	0.0	0.0
Incr Delay (d2), s/veh	1.1	0.0	0.0				0.0	2.7	0.0	0.2	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.5	0.0	0.0				0.0	18.0	0.0	1.8	0.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.8	0.0	0.0				0.0	23.9	0.0	14.5	1.1	0.0
LnGrp LOS	D	A					A	C		B	A	A
Approach Vol, veh/h		118						567			614	
Approach Delay, s/veh		36.8						23.9			3.0	
Approach LOS		D						C			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	12.7	74.3		43.0		87.0
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	7.0	68.0		37.0		81.0
Max Q Clear Time (g_c+I1), s	4.8	29.8		8.8		2.0
Green Ext Time (p_c), s	0.0	4.1		0.6		3.8

Intersection Summary	
HCM 6th Ctrl Delay	15.2
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	18.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	4	29	4	3	44	17	773	25	56	1021	33
Future Vol, veh/h	38	4	29	4	3	44	17	773	25	56	1021	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	5	5	5
Mvmt Flow	40	4	31	4	3	46	18	814	26	59	1075	35

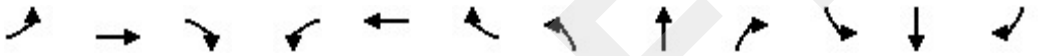
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2099	2087	1093	2091	2091	827	1110	0	0	840	0	0
Stage 1	1211	1211	-	863	863	-	-	-	-	-	-	-
Stage 2	888	876	-	1228	1228	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	~ 38	53	261	38	51	367	618	-	-	782	-	-
Stage 1	223	255	-	345	367	-	-	-	-	-	-	-
Stage 2	338	367	-	215	247	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 28	46	261	28	45	367	618	-	-	782	-	-
Mov Cap-2 Maneuver	~ 28	46	-	28	45	-	-	-	-	-	-	-
Stage 1	211	236	-	326	347	-	-	-	-	-	-	-
Stage 2	277	347	-	172	228	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 501.3	40.1	0.2	0.5
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	618	-	-	46	155	782	-	-
HCM Lane V/C Ratio	0.029	-	-	1.625	0.346	0.075	-	-
HCM Control Delay (s)	11	0	-	$ 501.3	40.1	10	-	-
HCM Lane LOS	B	A	-	F	E	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	7.4	1.4	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary
14: Branch Forbes Rd & US 92



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	422	63	66	307	358	49	312	19	421	464	169
Future Volume (veh/h)	145	422	63	66	307	358	49	312	19	421	464	169
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	153	444	66	69	323	377	52	328	20	443	488	178
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	203	735	109	300	253	295	191	395	24	265	699	593
Arrive On Green	0.07	0.47	0.47	0.33	0.33	0.33	0.23	0.23	0.23	0.08	0.38	0.38
Sat Flow, veh/h	1739	1553	231	869	768	896	752	1703	104	1739	1826	1547
Grp Volume(v), veh/h	153	0	510	69	0	700	52	0	348	443	488	178
Grp Sat Flow(s),veh/h/ln	1739	0	1784	869	0	1665	752	0	1807	1739	1826	1547
Q Serve(g_s), s	5.5	0.0	20.9	6.3	0.0	32.7	6.2	0.0	18.2	8.2	22.3	8.0
Cycle Q Clear(g_c), s	5.5	0.0	20.9	13.0	0.0	32.7	13.5	0.0	18.2	8.2	22.3	8.0
Prop In Lane	1.00		0.13	1.00		0.54	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	203	0	844	300	0	549	191	0	419	265	699	593
V/C Ratio(X)	0.75	0.00	0.60	0.23	0.00	1.28	0.27	0.00	0.83	1.67	0.70	0.30
Avail Cap(c_a), veh/h	216	0	858	300	0	549	191	0	419	265	699	593
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.1	0.0	19.3	29.4	0.0	33.3	37.8	0.0	36.3	33.4	25.8	21.3
Incr Delay (d2), s/veh	13.2	0.0	1.3	0.5	0.0	137.9	3.5	0.0	17.2	317.5	5.7	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.0	0.0	12.8	2.3	0.0	49.3	2.3	0.0	14.7	40.0	15.6	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.3	0.0	20.6	29.8	0.0	171.1	41.3	0.0	53.5	350.9	31.5	22.6
LnGrp LOS	D	A	C	C	A	F	D	A	D	F	C	C
Approach Vol, veh/h		663			769			400			1109	
Approach Delay, s/veh		24.5			158.5			51.9			157.7	
Approach LOS		C			F			D			F	

Timer - Assigned Phs	1	2	3	4		6		8				
Phs Duration (G+Y+Rc), s	14.2	40.0	15.0	30.0		54.2		45.0				
Change Period (Y+Rc), s	6.8	7.3	6.8	7.0		7.3		7.0				
Max Green Setting (Gmax), s	8.2	32.7	8.2	23.0		47.7		38.0				
Max Q Clear Time (g_c+I1), s	7.5	34.7	10.2	20.2		22.9		24.3				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.6		3.8		3.1				

Intersection Summary												
HCM 6th Ctrl Delay			113.5									
HCM 6th LOS			F									

Intersection	
Int Delay, s/veh	44.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	4	57	64	3	8	217	435	72	24	758	8
Future Vol, veh/h	9	4	57	64	3	8	217	435	72	24	758	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	9	4	60	67	3	8	228	458	76	25	798	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1810	1842	802	1836	1808	496	806	0	0	534	0	0
Stage 1	852	852	-	952	952	-	-	-	-	-	-	-
Stage 2	958	990	-	884	856	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	60	74	379	~ 57	78	568	806	-	-	1019	-	-
Stage 1	350	372	-	308	334	-	-	-	-	-	-	-
Stage 2	305	321	-	336	370	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	37	42	379	~ 29	44	568	806	-	-	1019	-	-
Mov Cap-2 Maneuver	37	42	-	~ 29	44	-	-	-	-	-	-	-
Stage 1	208	355	-	183	198	-	-	-	-	-	-	-
Stage 2	175	190	-	267	353	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	54.3	$ 891.7	3.4	0.3
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	806	-	-	143	33	1019	-	-
HCM Lane V/C Ratio	0.283	-	-	0.515	2.392	0.025	-	-
HCM Control Delay (s)	11.2	0	-	54.3	$ 891.7	8.6	0	-
HCM Lane LOS	B	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	1.2	-	-	2.5	9	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary
1: Branch Forbes Rd & I-4 WB on-ramp/I-4 WB off-ramp

11/16/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	264	13	383	1083	342	0	0	527	352
Future Volume (veh/h)	0	0	0	264	13	383	1083	342	0	0	527	352
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1826	1826	1826	1826	1826	0	0	1826	1826
Adj Flow Rate, veh/h				278	14	0	1140	360	0	0	555	0
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				5	5	5	5	5	0	0	5	5
Cap, veh/h				259	13		756	1404	0	0	662	
Arrive On Green				0.16	0.16	0.00	0.62	1.00	0.00	0.00	0.36	0.00
Sat Flow, veh/h				1659	84	1547	1739	1826	0	0	1826	0
Grp Volume(v), veh/h				292	0	0	1140	360	0	0	555	0
Grp Sat Flow(s),veh/h/ln				1743	0	1547	1739	1826	0	0	1826	0
Q Serve(g_s), s				25.0	0.0	0.0	59.0	0.0	0.0	0.0	44.5	0.0
Cycle Q Clear(g_c), s				25.0	0.0	0.0	59.0	0.0	0.0	0.0	44.5	0.0
Prop In Lane				0.95		1.00	1.00		0.00	0.00		0.00
Lane Grp Cap(c), veh/h				272	0		756	1404	0	0	662	
V/C Ratio(X)				1.07	0.00		1.51	0.26	0.00	0.00	0.84	
Avail Cap(c_a), veh/h				272	0		756	1404	0	0	662	
HCM Platoon Ratio				1.00	1.00	1.00	1.67	1.67	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.09	0.09	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				67.5	0.0	0.0	19.4	0.0	0.0	0.0	46.7	0.0
Incr Delay (d2), s/veh				75.0	0.0	0.0	228.9	0.0	0.0	0.0	12.1	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				24.3	0.0	0.0	75.6	0.0	0.0	0.0	29.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				142.5	0.0	0.0	248.3	0.0	0.0	0.0	58.8	0.0
LnGrp LOS				F	A		F	A	A	A	E	
Approach Vol, veh/h					292			1500			555	
Approach Delay, s/veh					142.5			188.7			58.8	
Approach LOS					F			F			E	

Timer - Assigned Phs	2		5	6		8						
Phs Duration (G+Y+Rc), s	129.0		65.0	64.0		31.0						
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0						
Max Green Setting (Gmax), s	123.0		59.0	58.0		25.0						
Max Q Clear Time (g_c+I1), s	2.0		61.0	46.5		27.0						
Green Ext Time (p_c), s	2.3		0.0	2.5		0.0						

Intersection Summary		
HCM 6th Ctrl Delay	152.3	
HCM 6th LOS	F	

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
8: Branch Forbes Rd & I-4 EB Off-ramp/I-4 EB On-ramp

11/16/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	9	800	0	0	0	0	1304	559	150	641	0
Future Volume (veh/h)	121	9	800	0	0	0	0	1304	559	150	641	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826				0	1826	1826	1826	1826	0
Adj Flow Rate, veh/h	127	9	0				0	1373	0	158	675	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5				0	5	5	5	5	0
Cap, veh/h	255	18					0	1255		121	1404	0
Arrive On Green	0.16	0.16	0.00				0.00	0.91	0.00	0.03	0.52	0.00
Sat Flow, veh/h	1629	115	1547				0	1826	0	1739	1826	0
Grp Volume(v), veh/h	136	0	0				0	1373	0	158	675	0
Grp Sat Flow(s),veh/h/ln	1744	0	1547				0	1826	0	1739	1826	0
Q Serve(g_s), s	11.4	0.0	0.0				0.0	110.0	0.0	7.0	38.1	0.0
Cycle Q Clear(g_c), s	11.4	0.0	0.0				0.0	110.0	0.0	7.0	38.1	0.0
Prop In Lane	0.93		1.00				0.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	273	0					0	1255		121	1404	0
V/C Ratio(X)	0.50	0.00					0.00	1.09		1.30	0.48	0.00
Avail Cap(c_a), veh/h	273	0					0	1255		121	1404	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.33	1.33	0.67	0.67	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	61.8	0.0	0.0				0.0	6.8	0.0	61.1	18.2	0.0
Incr Delay (d2), s/veh	6.4	0.0	0.0				0.0	55.0	0.0	142.7	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.4	0.0	0.0				0.0	34.2	0.0	10.6	19.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.2	0.0	0.0				0.0	61.9	0.0	203.8	18.3	0.0
LnGrp LOS	E	A					A	F		F	B	A
Approach Vol, veh/h		136						1373			833	
Approach Delay, s/veh		68.2						61.9			53.5	
Approach LOS		E						E			D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	13.0	116.0		31.0		129.0
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	7.0	110.0		25.0		123.0
Max Q Clear Time (g_c+I1), s	9.0	112.0		13.4		40.1
Green Ext Time (p_c), s	0.0	0.0		0.5		5.4

Intersection Summary	
HCM 6th Ctrl Delay	59.3
HCM 6th LOS	E

Notes

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	70	26	64	6	10	84	17	1709	17	58	1340	43
Future Vol, veh/h	70	26	64	6	10	84	17	1709	17	58	1340	43
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	5	5	5
Mvmt Flow	74	27	67	6	11	88	18	1799	18	61	1411	45

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	3450	3409	1434	3447	3422	1808	1456	0	0	1817	0	0
Stage 1	1556	1556	-	1844	1844	-	-	-	-	-	-	-
Stage 2	1894	1853	-	1603	1578	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	~ 4	~ 7	164	~ 4	~ 7	96	456	-	-	330	-	-
Stage 1	141	174	-	94	123	-	-	-	-	-	-	-
Stage 2	90	124	-	131	167	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	~ 6	164	-	~ 6	96	456	-	-	330	-	-
Mov Cap-2 Maneuver	-	~ 6	-	-	~ 6	-	-	-	-	-	-	-
Stage 1	141	142	-	94	123	-	-	-	-	-	-	-
Stage 2	~ 6	124	-	51	136	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0.1	0.7
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	456	-	-	-	-	330	-	-
HCM Lane V/C Ratio	0.039	-	-	-	-	0.185	-	-
HCM Control Delay (s)	13.2	0	-	-	-	18.4	-	-
HCM Lane LOS	B	A	-	-	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-	-	0.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary
14: Branch Forbes Rd & US 92

11/16/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	292	486	32	46	755	739	81	712	16	508	550	352
Future Volume (veh/h)	292	486	32	46	755	739	81	712	16	508	550	352
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	307	512	34	48	795	778	85	749	17	535	579	371
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	243	1273	84	238	796	579	65	600	14	489	810	863
Arrive On Green	0.11	0.39	0.39	0.23	0.23	0.23	0.04	0.34	0.34	0.24	0.74	0.74
Sat Flow, veh/h	1739	3302	219	840	3469	1547	1739	1778	40	3374	1826	1547
Grp Volume(v), veh/h	307	268	278	48	795	778	85	0	766	535	579	371
Grp Sat Flow(s),veh/h/ln	1739	1735	1787	840	1735	1547	1739	0	1819	1687	1826	1547
Q Serve(g_s), s	18.2	18.0	18.1	7.5	36.7	36.7	6.0	0.0	54.0	23.2	27.9	8.2
Cycle Q Clear(g_c), s	18.2	18.0	18.1	7.5	36.7	36.7	6.0	0.0	54.0	23.2	27.9	8.2
Prop In Lane	1.00		0.12	1.00		1.00	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	243	669	689	238	796	579	65	0	614	489	810	863
V/C Ratio(X)	1.26	0.40	0.40	0.20	1.00	1.34	1.30	0.00	1.25	1.09	0.71	0.43
Avail Cap(c_a), veh/h	243	669	689	238	796	579	65	0	614	489	810	863
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.1	35.7	35.8	50.4	61.6	50.1	77.0	0.0	53.0	60.6	15.1	3.6
Incr Delay (d2), s/veh	147.4	1.8	1.8	1.9	31.7	165.7	212.7	0.0	124.8	68.6	5.3	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	26.1	12.5	12.8	3.0	26.5	71.3	11.4	0.0	64.6	20.8	13.9	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	197.4	37.5	37.5	52.3	93.3	215.7	289.7	0.0	177.8	129.2	20.5	5.2
LnGrp LOS	F	D	D	D	F	F	F	A	F	F	C	A
Approach Vol, veh/h		853			1621			851			1485	
Approach Delay, s/veh		95.1			150.9			189.0			55.8	
Approach LOS		F			F			F			E	

Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	25.0	44.0	30.0	61.0		69.0	13.0	78.0				
Change Period (Y+Rc), s	6.8	7.3	6.8	7.0		7.3	7.0	7.0				
Max Green Setting (Gmax), s	18.2	36.7	23.2	54.0		61.7	6.0	71.0				
Max Q Clear Time (g_c+I1), s	20.2	38.7	25.2	56.0		20.1	8.0	29.9				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0		4.0	0.0	5.8				

Intersection Summary												
HCM 6th Ctrl Delay			118.4									
HCM 6th LOS			F									

Arterial Level of Service: NB Branch Forbes Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
US 92	II	45	21.2	172.1	193.3	0.19	3.6	F
I-4 EB On-ramp	II	35	38.9	308.3	347.2	0.36	3.7	F
I-4 WB off-ramp	II	35	14.5	7.9	22.4	0.12	18.6	D
Total	II		74.6	488.3	562.9	0.67	4.3	F

Arterial Level of Service: SB Branch Forbes Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
I-4 WB on-ramp	II	45	30.3	250.9	281.2	0.31	3.9	F
I-4 EB Off-ramp	II	35	14.5	1.3	15.8	0.12	26.4	C
US 92	II	35	38.9	33.3	72.2	0.36	18.0	D
Total	II		83.7	285.5	369.2	0.78	7.6	F

Intersection	
Int Delay, s/veh	44.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	4	57	64	3	8	217	435	72	24	758	8
Future Vol, veh/h	9	4	57	64	3	8	217	435	72	24	758	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	9	4	60	67	3	8	228	458	76	25	798	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1810	1842	802	1836	1808	496	806	0	0	534	0	0
Stage 1	852	852	-	952	952	-	-	-	-	-	-	-
Stage 2	958	990	-	884	856	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	60	74	379	~ 57	78	568	806	-	-	1019	-	-
Stage 1	350	372	-	308	334	-	-	-	-	-	-	-
Stage 2	305	321	-	336	370	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	37	42	379	~ 29	44	568	806	-	-	1019	-	-
Mov Cap-2 Maneuver	37	42	-	~ 29	44	-	-	-	-	-	-	-
Stage 1	208	355	-	183	198	-	-	-	-	-	-	-
Stage 2	175	190	-	267	353	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	54.3	$ 891.7	3.4	0.3
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	806	-	-	143	33	1019	-	-
HCM Lane V/C Ratio	0.283	-	-	0.515	2.392	0.025	-	-
HCM Control Delay (s)	11.2	0	-	54.3	$ 891.7	8.6	0	-
HCM Lane LOS	B	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	1.2	-	-	2.5	9	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary
1: Branch Forbes Rd & I-4 WB on-ramp/I-4 WB off-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	473	4	353	634	440	0	0	473	149
Future Volume (veh/h)	0	0	0	473	4	353	634	440	0	0	473	149
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1826	1826	1826	1826	1826	0	0	1826	1826
Adj Flow Rate, veh/h				498	4	0	667	463	0	0	498	0
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				5	5	5	5	5	0	0	5	5
Cap, veh/h				518	4		525	1141	0	0	730	
Arrive On Green				0.30	0.30	0.00	0.31	1.00	0.00	0.00	0.40	0.00
Sat Flow, veh/h				1726	14	1547	1739	1826	0	0	1826	0
Grp Volume(v), veh/h				502	0	0	667	463	0	0	498	0
Grp Sat Flow(s),veh/h/ln				1740	0	1547	1739	1826	0	0	1826	0
Q Serve(g_s), s				45.4	0.0	0.0	30.0	0.0	0.0	0.0	36.0	0.0
Cycle Q Clear(g_c), s				45.4	0.0	0.0	30.0	0.0	0.0	0.0	36.0	0.0
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.00
Lane Grp Cap(c), veh/h				522	0		525	1141	0	0	730	
V/C Ratio(X)				0.96	0.00		1.27	0.41	0.00	0.00	0.68	
Avail Cap(c_a), veh/h				522	0		525	1141	0	0	730	
HCM Platoon Ratio				1.00	1.00	1.00	1.67	1.67	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.09	0.09	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				55.1	0.0	0.0	25.7	0.0	0.0	0.0	39.6	0.0
Incr Delay (d2), s/veh				31.0	0.0	0.0	123.4	0.1	0.0	0.0	5.1	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				32.3	0.0	0.0	35.6	0.1	0.0	0.0	23.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				86.1	0.0	0.0	149.1	0.1	0.0	0.0	44.7	0.0
LnGrp LOS				F	A		F	A	A	A	D	
Approach Vol, veh/h					502			1130			498	
Approach Delay, s/veh					86.1			88.1			44.7	
Approach LOS					F			F			D	

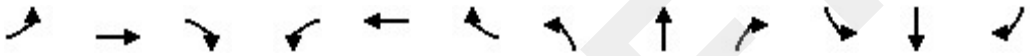
Timer - Assigned Phs	2		5	6		8						
Phs Duration (G+Y+Rc), s	106.0		36.0	70.0		54.0						
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0						
Max Green Setting (Gmax), s	88.0		30.0	64.0		48.0						
Max Q Clear Time (g_c+I1), s	2.0		32.0	38.0		47.4						
Green Ext Time (p_c), s	3.2		0.0	2.9		0.2						

Intersection Summary		
HCM 6th Ctrl Delay	77.5	
HCM 6th LOS	E	

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
8: Branch Forbes Rd & I-4 EB Off-ramp/I-4 EB On-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	179	6	1006	0	0	0	0	895	526	133	813	0
Future Volume (veh/h)	179	6	1006	0	0	0	0	895	526	133	813	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826				0	1826	1826	1826	1826	0
Adj Flow Rate, veh/h	188	6	0				0	942	0	140	856	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5				0	5	5	5	5	0
Cap, veh/h	506	16					0	993		147	1141	0
Arrive On Green	0.30	0.30	0.00				0.00	0.54	0.00	0.04	0.63	0.00
Sat Flow, veh/h	1688	54	1547				0	1826	0	1739	1826	0
Grp Volume(v), veh/h	194	0	0				0	942	0	140	856	0
Grp Sat Flow(s),veh/h/ln	1742	0	1547				0	1826	0	1739	1826	0
Q Serve(g_s), s	14.0	0.0	0.0				0.0	77.8	0.0	6.3	53.0	0.0
Cycle Q Clear(g_c), s	14.0	0.0	0.0				0.0	77.8	0.0	6.3	53.0	0.0
Prop In Lane	0.97		1.00				0.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	522	0					0	993		147	1141	0
V/C Ratio(X)	0.37	0.00					0.00	0.95		0.95	0.75	0.00
Avail Cap(c_a), veh/h	522	0					0	993		147	1141	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.26	0.26	0.00
Uniform Delay (d), s/veh	44.1	0.0	0.0				0.0	34.4	0.0	73.9	21.2	0.0
Incr Delay (d2), s/veh	2.0	0.0	0.0				0.0	18.6	0.0	26.1	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.6	0.0	0.0				0.0	48.7	0.0	9.0	26.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.1	0.0	0.0				0.0	53.0	0.0	100.0	22.4	0.0
LnGrp LOS	D	A					A	D		F	C	A
Approach Vol, veh/h		194						942			996	
Approach Delay, s/veh		46.1						53.0			33.3	
Approach LOS		D						D			C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	13.0	93.0		54.0		106.0
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	7.0	87.0		48.0		100.0
Max Q Clear Time (g_c+I1), s	8.3	79.8		16.0		55.0
Green Ext Time (p_c), s	0.0	3.8		1.1		7.8

Intersection Summary	
HCM 6th Ctrl Delay	43.2
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	70	26	64	6	10	84	17	1709	17	58	1340	43
Future Vol, veh/h	70	26	64	6	10	84	17	1709	17	58	1340	43
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	5	5	5
Mvmt Flow	74	27	67	6	11	88	18	1799	18	61	1411	45

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	3450	3409	1434	3447	3422	1808	1456	0	0	1817	0	0
Stage 1	1556	1556	-	1844	1844	-	-	-	-	-	-	-
Stage 2	1894	1853	-	1603	1578	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	~ 4	~ 7	164	~ 4	~ 7	96	456	-	-	330	-	-
Stage 1	141	174	-	94	123	-	-	-	-	-	-	-
Stage 2	90	124	-	131	167	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	~ 6	164	-	~ 6	96	456	-	-	330	-	-
Mov Cap-2 Maneuver	-	~ 6	-	-	~ 6	-	-	-	-	-	-	-
Stage 1	141	142	-	94	123	-	-	-	-	-	-	-
Stage 2	~ 6	124	-	51	136	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0.1	0.7
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	456	-	-	-	-	330	-	-
HCM Lane V/C Ratio	0.039	-	-	-	-	0.185	-	-
HCM Control Delay (s)	13.2	0	-	-	-	18.4	-	-
HCM Lane LOS	B	A	-	-	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-	-	0.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary
14: Branch Forbes Rd & US 92

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	239	697	104	109	508	593	82	517	32	693	762	277
Future Volume (veh/h)	239	697	104	109	508	593	82	517	32	693	762	277
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	252	734	109	115	535	624	86	544	34	729	802	292
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	216	1131	168	155	935	417	65	553	35	574	833	706
Arrive On Green	0.06	0.37	0.37	0.27	0.27	0.27	0.04	0.32	0.32	0.17	0.46	0.46
Sat Flow, veh/h	1739	3030	450	637	3469	1547	1739	1700	106	3374	1826	1547
Grp Volume(v), veh/h	252	420	423	115	535	624	86	0	578	729	802	292
Grp Sat Flow(s),veh/h/ln	1739	1735	1745	637	1735	1547	1739	0	1807	1687	1826	1547
Q Serve(g_s), s	9.8	32.1	32.1	27.6	21.3	43.1	6.0	0.0	50.8	27.2	68.1	14.7
Cycle Q Clear(g_c), s	9.8	32.1	32.1	43.1	21.3	43.1	6.0	0.0	50.8	27.2	68.1	14.7
Prop In Lane	1.00		0.26	1.00		1.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	216	647	651	155	935	417	65	0	587	574	833	706
V/C Ratio(X)	1.17	0.65	0.65	0.74	0.57	1.50	1.32	0.00	0.98	1.27	0.96	0.41
Avail Cap(c_a), veh/h	216	647	651	155	935	417	65	0	587	574	833	706
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.1	41.5	41.5	66.8	50.5	58.4	77.0	0.0	53.6	66.4	42.2	15.5
Incr Delay (d2), s/veh	113.7	5.0	5.0	27.1	2.5	236.0	218.4	0.0	33.5	135.3	23.3	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	17.2	20.6	20.7	9.8	14.5	67.1	11.5	0.0	36.6	33.8	45.3	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	165.8	46.5	46.5	93.9	53.0	294.4	295.4	0.0	87.1	201.7	65.5	17.3
LnGrp LOS	F	D	D	F	D	F	F	A	F	F	E	B
Approach Vol, veh/h		1095			1274			664			1823	
Approach Delay, s/veh		73.9			175.0			114.1			112.2	
Approach LOS		E			F			F			F	

Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	16.6	50.4	34.0	59.0		67.0	13.0	80.0				
Change Period (Y+Rc), s	6.8	7.3	6.8	7.0		7.3	7.0	7.0				
Max Green Setting (Gmax), s	9.8	43.1	27.2	52.0		59.7	6.0	73.0				
Max Q Clear Time (g_c+I1), s	11.8	45.1	29.2	52.8		34.1	8.0	70.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0		6.3	0.0	1.7				

Intersection Summary			
HCM 6th Ctrl Delay		120.3	
HCM 6th LOS		F	

Arterial Level of Service: NB Branch Forbes Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
US 92	II	45	21.2	87.6	108.8	0.19	6.4	F
I-4 EB On-Ramp	II	35	38.7	289.1	327.8	0.36	3.9	F
I-4 WB off-ramp	II	35	14.7	25.2	39.9	0.12	10.6	F
Total	II		74.6	401.9	476.5	0.67	5.1	F

Arterial Level of Service: SB Branch Forbes Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
I-4 WB on-ramp	II	45	30.3	64.8	95.1	0.31	11.6	F
I-4 EB Off-ramp	II	35	14.7	5.8	20.5	0.12	20.7	D
US 92	II	35	38.7	52.3	91.0	0.36	14.2	E
Total	II		83.7	122.9	206.6	0.78	13.6	E

APPENDIX E Build Alternative Operational Analysis

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Vol, veh/h	5	2	33	55	3	7	10	132	263	44	15	470	5
Future Vol, veh/h	5	2	33	55	3	7	10	132	263	44	15	470	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	5	2	35	58	3	7	11	139	277	46	16	495	5

Major/Minor	Minor2			Minor1			Major1				Major2		
Conflicting Flow All	970	1153	250	881	1132	162	500	500	0	0	323	0	0
Stage 1	530	530	-	600	600	-	-	-	-	-	-	-	-
Stage 2	440	623	-	281	532	-	-	-	-	-	-	-	-
Critical Hdwy	7.6	6.6	7	7.6	6.6	7	6.5	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.6	5.6	-	6.6	5.6	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.6	5.6	-	6.6	5.6	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.55	4.05	3.35	3.55	4.05	3.35	2.55	2.25	-	-	2.25	-	-
Pot Cap-1 Maneuver	203	192	741	236	197	845	680	1040	-	-	1212	-	-
Stage 1	493	517	-	447	481	-	-	-	-	-	-	-	-
Stage 2	558	469	-	694	516	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-		-	-
Mov Cap-1 Maneuver	173	161	741	195	165	845	998	998	-	-	1212	-	-
Mov Cap-2 Maneuver	173	161	-	195	165	-	-	-	-	-	-	-	-
Stage 1	420	508	-	380	409	-	-	-	-	-	-	-	-
Stage 2	467	399	-	647	507	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.5	30	2.9	0.3
HCM LOS	B	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	998	-	-	466	211	1212	-	-
HCM Lane V/C Ratio	0.15	-	-	0.09	0.324	0.013	-	-
HCM Control Delay (s)	9.2	-	-	13.5	30	8	0.1	-
HCM Lane LOS	A	-	-	B	D	A	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0.3	1.3	0	-	-

HCM Signalized Intersection Capacity Analysis
1: Branch Forbes Rd & I-4 WB on-ramp/I-4 WB off-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	160	8	232	656	217	0	0	345	223
Future Volume (vph)	0	0	0	160	8	232	656	217	0	0	345	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Lane Util. Factor				0.95	0.95	1.00	0.97	0.95			0.95	
Frt				1.00	1.00	0.85	1.00	1.00			0.94	
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1633	1644	1538	3335	3438			3235	
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	
Satd. Flow (perm)				1633	1644	1538	3335	3438			3235	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	168	8	244	691	228	0	0	363	235
RTOR Reduction (vph)	0	0	0	0	0	185	0	0	0	0	84	0
Lane Group Flow (vph)	0	0	0	87	89	59	691	228	0	0	514	0
Turn Type				Perm	NA	Perm	Prot	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases				8		8						
Actuated Green, G (s)				29.0	29.0	29.0	29.3	79.0			43.7	
Effective Green, g (s)				29.0	29.0	29.0	29.3	79.0			43.7	
Actuated g/C Ratio				0.24	0.24	0.24	0.24	0.66			0.36	
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				394	397	371	814	2263			1178	
v/s Ratio Prot							c0.21	0.07			c0.16	
v/s Ratio Perm				0.05	0.05	0.04						
v/c Ratio				0.22	0.22	0.16	0.85	0.10			0.44	
Uniform Delay, d1				36.4	36.5	35.9	43.2	7.5			28.8	
Progression Factor				1.00	1.00	1.00	0.73	0.40			1.00	
Incremental Delay, d2				1.3	1.3	0.9	8.1	0.1			1.2	
Delay (s)				37.7	37.8	36.8	39.5	3.1			30.0	
Level of Service				D	D	D	D	A			C	
Approach Delay (s)		0.0			37.2			30.5			30.0	
Approach LOS		A			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	6	490	0	0	0	0	799	338	94	411	0
Future Volume (vph)	74	6	490	0	0	0	0	799	338	94	411	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0	4.0	6.0	6.0	
Lane Util. Factor		1.00	0.88					0.86	1.00	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1729	2707					6225	1538	1719	3438	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1729	2707					6225	1538	1719	3438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	78	6	516	0	0	0	0	841	356	99	433	0
RTOR Reduction (vph)	0	0	463	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	84	53	0	0	0	0	841	356	99	433	0
Turn Type	Perm	NA	Prot					NA	Free	Prot	NA	
Protected Phases		4	4					2		1	6	
Permitted Phases	4								Free			
Actuated Green, G (s)		12.4	12.4					70.6	120.0	19.0	95.6	
Effective Green, g (s)		12.4	12.4					70.6	120.0	19.0	95.6	
Actuated g/C Ratio		0.10	0.10					0.59	1.00	0.16	0.80	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		178	279					3662	1538	272	2738	
v/s Ratio Prot			0.02					0.14		c0.06	0.13	
v/s Ratio Perm		0.05							c0.23			
v/c Ratio		0.47	0.19					0.23	0.23	0.36	0.16	
Uniform Delay, d1		50.7	49.2					11.8	0.0	45.1	2.8	
Progression Factor		1.00	1.00					0.65	1.00	0.47	2.23	
Incremental Delay, d2		2.0	0.3					0.1	0.3	0.7	0.1	
Delay (s)		52.7	49.5					7.7	0.3	21.9	6.5	
Level of Service		D	D					A	A	C	A	
Approach Delay (s)		50.0			0.0			5.5			9.3	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	88	0	0	60	0	1077	61	0	868	33
Future Vol, veh/h	0	0	88	0	0	60	0	1077	61	0	868	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	0	93	0	0	63	0	1134	64	0	914	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	475	-	-	567	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	7	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.35	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	536	0	0	459	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	536	-	-	459	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.1	14.1	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	536	459	-	-
HCM Lane V/C Ratio	-	-	0.173	0.138	-	-
HCM Control Delay (s)	-	-	13.1	14.1	-	-
HCM Lane LOS	-	-	B	B	-	-
HCM 95th %tile Q(veh)	-	-	0.6	0.5	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	12	10	10	1043	83	863	10
Future Vol, veh/h	12	10	10	1043	83	863	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	150	-	150	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5
Mvmt Flow	13	11	11	1098	87	908	11

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1659	460	919	0	1098	-	0
Stage 1	1088	-	-	-	-	-	-
Stage 2	571	-	-	-	-	-	-
Critical Hdwy	6.9	7	4.2	-	6.5	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.25	-	2.55	-	-
Pot Cap-1 Maneuver	86	540	720	-	280	-	-
Stage 1	278	-	-	-	-	-	-
Stage 2	520	-	-	-	-	-	-
Platoon blocked, %				-		-	-
Mov Cap-1 Maneuver	58	540	720	-	280	-	-
Mov Cap-2 Maneuver	58	-	-	-	-	-	-
Stage 1	274	-	-	-	-	-	-
Stage 2	358	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	52.7	0.1	2
HCM LOS	F		

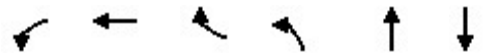
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	720	-	98	280	-	-
HCM Lane V/C Ratio	0.015	-	0.236	0.312	-	-
HCM Control Delay (s)	10.1	-	52.7	23.6	-	-
HCM Lane LOS	B	-	F	C	-	-
HCM 95th %tile Q(veh)	0	-	0.9	1.3	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	300	20	28	461	451	48	422	10	314	341	218
Future Volume (vph)	180	300	20	28	461	451	48	422	10	314	341	218
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	7.3		7.3	7.3	6.8	7.0	7.0		6.8	7.0	6.8
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	3406		1719	3438	1538	1719	1803		3335	3438	1538
Flt Permitted	0.23	1.00		0.55	1.00	1.00	0.54	1.00		0.95	1.00	1.00
Satd. Flow (perm)	418	3406		993	3438	1538	972	1803		3335	3438	1538
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	316	21	29	485	475	51	444	11	331	359	229
RTOR Reduction (vph)	0	5	0	0	0	104	0	1	0	0	0	38
Lane Group Flow (vph)	189	332	0	29	485	371	51	454	0	331	359	191
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	pm+ov
Protected Phases	1	6			2	3		4		3	8	1
Permitted Phases	6			2		2	4					8
Actuated Green, G (s)	39.3	39.3		23.3	23.3	46.9	36.0	36.0		23.6	66.4	75.6
Effective Green, g (s)	39.3	39.3		23.3	23.3	46.9	36.0	36.0		23.6	66.4	75.6
Actuated g/C Ratio	0.33	0.33		0.19	0.19	0.39	0.30	0.30		0.20	0.55	0.63
Clearance Time (s)	6.8	7.3		7.3	7.3	6.8	7.0	7.0		6.8	7.0	6.8
Vehicle Extension (s)	3.0	3.5		3.5	3.5	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	236	1115		192	667	601	291	540		655	1902	968
v/s Ratio Prot	c0.06	0.10			0.14	c0.12		c0.25		0.10	0.10	0.02
v/s Ratio Perm	c0.20			0.03		0.12	0.05					0.11
v/c Ratio	0.80	0.30		0.15	0.73	0.62	0.18	0.84		0.51	0.19	0.20
Uniform Delay, d1	32.8	30.1		40.1	45.4	29.4	31.0	39.3		43.0	13.4	9.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.95	0.92	0.93
Incremental Delay, d2	17.5	0.2		0.4	4.1	2.0	1.3	14.7		2.7	0.2	0.1
Delay (s)	50.3	30.2		40.6	49.5	31.3	32.3	54.0		43.7	12.5	8.8
Level of Service	D	C		D	D	C	C	D		D	B	A
Approach Delay (s)		37.4			40.5			51.8			22.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	27.9
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues
1: Branch Forbes Rd & I-4 WB on-ramp/I-4 WB off-ramp



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	87	89	244	691	228	598
v/c Ratio	0.22	0.22	0.44	0.85	0.10	0.47
Control Delay	38.3	38.3	7.2	41.7	3.1	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	38.3	7.2	41.7	3.1	24.5
Queue Length 50th (ft)	56	58	0	247	32	144
Queue Length 95th (ft)	105	108	65	132	37	207
Internal Link Dist (ft)		1859			540	265
Turn Bay Length (ft)	500		1000			
Base Capacity (vph)	394	397	556	917	2263	1260
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.22	0.44	0.75	0.10	0.47

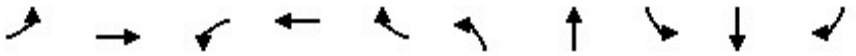
Intersection Summary

Queues
8: Branch Forbes Rd & I-4 EB off-ramp/I-4 EB on-ramp

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	84	516	841	356	99	433
v/c Ratio	0.47	0.70	0.23	0.23	0.36	0.16
Control Delay	58.4	9.5	8.0	0.3	24.8	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	9.5	8.0	0.3	24.8	7.1
Queue Length 50th (ft)	63	0	55	0	69	72
Queue Length 95th (ft)	110	53	100	m0	122	98
Internal Link Dist (ft)	1782		300			540
Turn Bay Length (ft)		840			260	
Base Capacity (vph)	519	1173	3663	1538	272	2739
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.44	0.23	0.23	0.36	0.16

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	189	337	29	485	475	51	455	331	359	229
v/c Ratio	0.79	0.30	0.15	0.73	0.60	0.18	0.84	0.50	0.19	0.21
Control Delay	54.8	29.5	40.0	51.7	19.0	33.1	54.6	45.1	13.2	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.8	29.5	40.0	51.7	19.0	33.1	54.6	45.1	13.2	4.3
Queue Length 50th (ft)	109	99	19	186	173	29	329	127	75	22
Queue Length 95th (ft)	#180	128	44	231	285	63	#502	185	130	104
Internal Link Dist (ft)		2145		2346			476		1019	
Turn Bay Length (ft)	475		325		650	150		525		500
Base Capacity (vph)	238	1386	270	936	787	291	541	656	1902	1091
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.24	0.11	0.52	0.60	0.18	0.84	0.50	0.19	0.21

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Vol, veh/h	20	0	41	31	2	12	7	116	342	24	7	314	10
Future Vol, veh/h	20	0	41	31	2	12	7	116	342	24	7	314	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	21	0	43	33	2	13	7	122	360	25	7	331	11

Major/Minor	Minor2			Minor1			Major1				Major2		
Conflicting Flow All	790	994	171	811	987	193	341	342	0	0	385	0	0
Stage 1	351	351	-	631	631	-	-	-	-	-	-	-	-
Stage 2	439	643	-	180	356	-	-	-	-	-	-	-	-
Critical Hdwy	7.6	6.6	7	7.6	6.6	7	6.5	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.6	5.6	-	6.6	5.6	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.6	5.6	-	6.6	5.6	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.55	4.05	3.35	3.55	4.05	3.35	2.55	2.25	-	-	2.25	-	-
Pot Cap-1 Maneuver	275	239	834	266	241	807	859	1192	-	-	1149	-	-
Stage 1	630	623	-	428	465	-	-	-	-	-	-	-	-
Stage 2	559	459	-	796	620	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-		-	-
Mov Cap-1 Maneuver	244	211	834	229	213	807	1162	1162	-	-	1149	-	-
Mov Cap-2 Maneuver	244	211	-	229	213	-	-	-	-	-	-	-	-
Stage 1	560	618	-	380	413	-	-	-	-	-	-	-	-
Stage 2	487	408	-	749	615	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14	20.3	2.1	0.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1162	-	-	465	282	1149	-	-
HCM Lane V/C Ratio	0.111	-	-	0.138	0.168	0.006	-	-
HCM Control Delay (s)	8.5	-	-	14	20.3	8.2	0	-
HCM Lane LOS	A	-	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0.5	0.6	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	291	3	217	382	272	0	0	300	93
Future Volume (vph)	0	0	0	291	3	217	382	272	0	0	300	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Lane Util. Factor				0.95	0.95	1.00	0.97	0.95			0.95	
Frt				1.00	1.00	0.85	1.00	1.00			0.96	
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1633	1639	1538	3335	3438			3316	
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	
Satd. Flow (perm)				1633	1639	1538	3335	3438			3316	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	306	3	228	402	286	0	0	316	98
RTOR Reduction (vph)	0	0	0	0	0	160	0	0	0	0	22	0
Lane Group Flow (vph)	0	0	0	153	156	68	402	286	0	0	392	0
Turn Type				Perm	NA	Perm	Prot	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases				8		8						
Actuated Green, G (s)				39.0	39.0	39.0	29.0	79.0			44.0	
Effective Green, g (s)				39.0	39.0	39.0	29.0	79.0			44.0	
Actuated g/C Ratio				0.30	0.30	0.30	0.22	0.61			0.34	
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				489	491	461	743	2089			1122	
v/s Ratio Prot							c0.12	0.08			c0.12	
v/s Ratio Perm				0.09	0.10	0.04						
v/c Ratio				0.31	0.32	0.15	0.54	0.14			0.35	
Uniform Delay, d1				35.1	35.2	33.3	44.6	10.9			32.3	
Progression Factor				1.00	1.00	1.00	0.51	0.29			1.00	
Incremental Delay, d2				1.7	1.7	0.7	0.8	0.1			0.9	
Delay (s)				36.8	36.9	34.0	23.7	3.3			33.1	
Level of Service				D	D	C	C	A			C	
Approach Delay (s)		0.0			35.7			15.2			33.1	
Approach LOS		A			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	4	608	0	0	0	0	546	316	82	509	0
Future Volume (vph)	108	4	608	0	0	0	0	546	316	82	509	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0	4.0	6.0	6.0	
Lane Util. Factor		1.00	0.88					0.86	1.00	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1726	2707					6225	1538	1719	3438	
Flt Permitted		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1726	2707					6225	1538	1719	3438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	114	4	640	0	0	0	0	575	333	86	536	0
RTOR Reduction (vph)	0	0	520	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	118	120	0	0	0	0	575	333	86	536	0
Turn Type	Perm	NA	Prot					NA	Free	Prot	NA	
Protected Phases		4	4					2		1	6	
Permitted Phases	4								Free			
Actuated Green, G (s)		16.3	16.3					83.9	130.0	11.8	101.7	
Effective Green, g (s)		16.3	16.3					83.9	130.0	11.8	101.7	
Actuated g/C Ratio		0.13	0.13					0.65	1.00	0.09	0.78	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		216	339					4017	1538	156	2689	
v/s Ratio Prot			0.04					0.09		c0.05	0.16	
v/s Ratio Perm		0.07							c0.22			
v/c Ratio		0.55	0.35					0.14	0.22	0.55	0.20	
Uniform Delay, d1		53.4	52.0					9.0	0.0	56.6	3.6	
Progression Factor		1.00	1.00					1.66	1.00	0.63	0.66	
Incremental Delay, d2		2.8	0.6					0.1	0.3	4.0	0.2	
Delay (s)		56.2	52.7					15.0	0.3	39.5	2.6	
Level of Service		E	D					B	A	D	A	
Approach Delay (s)		53.2			0.0			9.6			7.7	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	63	0	0	51	0	811	85	0	1081	36
Future Vol, veh/h	0	0	63	0	0	51	0	811	85	0	1081	36
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	0	66	0	0	54	0	854	89	0	1138	38

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	588	-	-	427	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	7	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.35	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	452	0	0	568	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	452	-	-	568	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.3	12	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	452	568	-	-
HCM Lane V/C Ratio	-	-	0.147	0.095	-	-
HCM Control Delay (s)	-	-	14.3	12	-	-
HCM Lane LOS	-	-	B	B	-	-
HCM 95th %tile Q(veh)	-	-	0.5	0.3	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	8	10	17	798	90	1044	10
Future Vol, veh/h	8	10	17	798	90	1044	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	150	-	150	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5
Mvmt Flow	8	11	18	840	95	1099	11

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1751	555	1110	0	840	-	0
Stage 1	1295	-	-	-	-	-	-
Stage 2	456	-	-	-	-	-	-
Critical Hdwy	6.9	7	4.2	-	6.5	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.25	-	2.55	-	-
Pot Cap-1 Maneuver	74	468	608	-	411	-	-
Stage 1	215	-	-	-	-	-	-
Stage 2	596	-	-	-	-	-	-
Platoon blocked, %				-		-	-
Mov Cap-1 Maneuver	55	468	608	-	411	-	-
Mov Cap-2 Maneuver	55	-	-	-	-	-	-
Stage 1	209	-	-	-	-	-	-
Stage 2	458	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	45.3	0.2	1.3
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	608	-	108	411	-	-
HCM Lane V/C Ratio	0.029	-	0.175	0.231	-	-
HCM Control Delay (s)	11.1	-	45.3	16.4	-	-
HCM Lane LOS	B	-	E	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	0.9	-	-

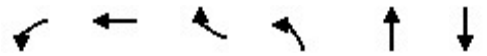
HCM Signalized Intersection Capacity Analysis
14: Branch Forbes Rd & US 92

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	422	63	66	307	358	49	312	19	421	464	169
Future Volume (vph)	145	422	63	66	307	358	49	312	19	421	464	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	7.3		7.3	7.3	6.8	7.0	7.0		6.8	7.0	6.8
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	3371		1719	3438	1538	1719	1794		3335	3438	1538
Flt Permitted	0.32	1.00		0.46	1.00	1.00	0.47	1.00		0.95	1.00	1.00
Satd. Flow (perm)	577	3371		840	3438	1538	858	1794		3335	3438	1538
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	153	444	66	69	323	377	52	328	20	443	488	178
RTOR Reduction (vph)	0	11	0	0	0	152	0	1	0	0	0	55
Lane Group Flow (vph)	153	499	0	69	323	225	52	347	0	443	488	123
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	pm+ov
Protected Phases	1	6			2	3		4		3	8	1
Permitted Phases	6			2		2	4					8
Actuated Green, G (s)	36.8	36.8		19.1	19.1	56.2	35.0	35.0		37.1	78.9	89.8
Effective Green, g (s)	36.8	36.8		19.1	19.1	56.2	35.0	35.0		37.1	78.9	89.8
Actuated g/C Ratio	0.28	0.28		0.15	0.15	0.43	0.27	0.27		0.29	0.61	0.69
Clearance Time (s)	6.8	7.3		7.3	7.3	6.8	7.0	7.0		6.8	7.0	6.8
Vehicle Extension (s)	3.0	3.5		3.5	3.5	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	259	954		123	505	664	231	483		951	2086	1062
v/s Ratio Prot	0.05	c0.15			0.09	0.10		c0.19		c0.13	0.14	0.01
v/s Ratio Perm	c0.12			0.08		0.05	0.06					0.07
v/c Ratio	0.59	0.52		0.56	0.64	0.34	0.23	0.72		0.47	0.23	0.12
Uniform Delay, d1	37.2	39.2		51.6	52.2	24.6	37.0	43.0		38.3	11.7	6.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.74	0.99	4.36
Incremental Delay, d2	3.6	0.6		6.2	2.8	0.4	2.2	8.8		1.6	0.3	0.0
Delay (s)	40.8	39.8		57.8	55.0	24.9	39.2	51.9		30.0	11.8	29.5
Level of Service	D	D		E	D	C	D	D		C	B	C
Approach Delay (s)		40.0			40.5			50.2			21.9	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	34.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	27.9
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues
1: Branch Forbes Rd & I-4 WB on-ramp/I-4 WB off-ramp



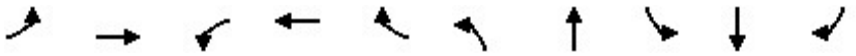
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	153	156	228	402	286	414
v/c Ratio	0.31	0.32	0.37	0.54	0.14	0.36
Control Delay	37.3	37.4	6.0	25.8	3.3	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.3	37.4	6.0	25.8	3.3	30.7
Queue Length 50th (ft)	105	107	0	165	16	126
Queue Length 95th (ft)	169	172	60	44	20	172
Internal Link Dist (ft)		1859			540	265
Turn Bay Length (ft)	500		1000			
Base Capacity (vph)	489	491	621	743	2089	1144
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.32	0.37	0.54	0.14	0.36

Intersection Summary

Queues
8: Branch Forbes Rd & I-4 EB off-ramp/I-4 EB on-ramp

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	118	640	575	333	86	536
v/c Ratio	0.55	0.75	0.14	0.22	0.55	0.20
Control Delay	61.8	11.6	16.6	0.3	47.7	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.8	11.6	16.6	0.3	47.7	2.8
Queue Length 50th (ft)	95	19	80	0	25	27
Queue Length 95th (ft)	150	79	113	0	56	72
Internal Link Dist (ft)	1782		300			540
Turn Bay Length (ft)		840			260	
Base Capacity (vph)	544	1261	4016	1538	212	2689
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.51	0.14	0.22	0.41	0.20

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	153	510	69	323	377	52	348	443	488	178
v/c Ratio	0.59	0.53	0.56	0.64	0.43	0.23	0.72	0.47	0.23	0.15
Control Delay	45.1	39.6	68.4	57.9	7.5	40.2	52.4	30.9	12.4	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.1	39.6	68.4	57.9	7.5	40.2	52.4	30.9	12.4	4.0
Queue Length 50th (ft)	102	186	55	137	50	34	265	140	105	12
Queue Length 95th (ft)	150	222	102	176	123	72	379	196	160	58
Internal Link Dist (ft)		2145		2346			476		1019	
Turn Bay Length (ft)	475		325		650	150		525		500
Base Capacity (vph)	263	1454	243	997	887	231	484	952	2087	1194
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.35	0.28	0.32	0.43	0.23	0.72	0.47	0.23	0.15

Intersection Summary

Intersection	
Int Delay, s/veh	18.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Vol, veh/h	9	4	57	64	3	8	16	217	436	72	24	758	8
Future Vol, veh/h	9	4	57	64	3	8	16	217	436	72	24	758	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	9	4	60	67	3	8	17	228	459	76	25	798	8

Major/Minor	Minor2			Minor1			Major1				Major2		
Conflicting Flow All	1573	1877	403	1438	1843	268	806	806	0	0	535	0	0
Stage 1	852	852	-	987	987	-	-	-	-	-	-	-	-
Stage 2	721	1025	-	451	856	-	-	-	-	-	-	-	-
Critical Hdwy	7.6	6.6	7	7.6	6.6	7	6.5	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.6	5.6	-	6.6	5.6	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.6	5.6	-	6.6	5.6	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.55	4.05	3.35	3.55	4.05	3.35	2.55	2.25	-	-	2.25	-	-
Pot Cap-1 Maneuver	72	68	589	91	72	721	432	795	-	-	1008	-	-
Stage 1	314	367	-	260	317	-	-	-	-	-	-	-	-
Stage 2	378	304	-	550	366	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-		-	-
Mov Cap-1 Maneuver	49	44	589	~ 55	46	721	742	742	-	-	1008	-	-
Mov Cap-2 Maneuver	49	44	-	~ 55	46	-	-	-	-	-	-	-	-
Stage 1	210	350	-	174	212	-	-	-	-	-	-	-	-
Stage 2	247	204	-	466	350	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	36	$ 337.5	3.8	0.5
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	742	-	-	188	60	1008	-	-
HCM Lane V/C Ratio	0.331	-	-	0.392	1.316	0.025	-	-
HCM Control Delay (s)	12.2	-	-	36	$ 337.5	8.7	0.2	-
HCM Lane LOS	B	-	-	E	F	A	A	-
HCM 95th %tile Q(veh)	1.4	-	-	1.7	6.8	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	264	13	383	1083	358	0	0	543	352
Future Volume (vph)	0	0	0	264	13	383	1083	358	0	0	543	352
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Lane Util. Factor				0.95	0.95	1.00	0.97	0.95			0.95	
Frt				1.00	1.00	0.85	1.00	1.00			0.94	
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1633	1645	1538	3335	3438			3235	
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	
Satd. Flow (perm)				1633	1645	1538	3335	3438			3235	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	278	14	403	1140	377	0	0	572	371
RTOR Reduction (vph)	0	0	0	0	0	332	0	0	0	0	80	0
Lane Group Flow (vph)	0	0	0	145	147	71	1140	377	0	0	863	0
Turn Type				Perm	NA	Perm	Prot	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases				8		8						
Actuated Green, G (s)				23.0	23.0	23.0	49.2	95.0			39.8	
Effective Green, g (s)				23.0	23.0	23.0	49.2	95.0			39.8	
Actuated g/C Ratio				0.18	0.18	0.18	0.38	0.73			0.31	
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				288	291	272	1262	2512			990	
v/s Ratio Prot							c0.34	0.11			c0.27	
v/s Ratio Perm				0.09	0.09	0.05						
v/c Ratio				0.50	0.51	0.26	0.90	0.15			0.87	
Uniform Delay, d1				48.3	48.4	46.2	38.2	5.3			42.7	
Progression Factor				1.00	1.00	1.00	0.40	0.49			1.00	
Incremental Delay, d2				6.2	6.1	2.3	8.5	0.1			10.5	
Delay (s)				54.5	54.5	48.5	23.7	2.7			53.2	
Level of Service				D	D	D	C	A			D	
Approach Delay (s)		0.0			51.0			18.5			53.2	
Approach LOS		A			D			B			D	

Intersection Summary			
HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	9	800	0	0	0	0	1320	559	150	657	0
Future Volume (vph)	121	9	800	0	0	0	0	1320	559	150	657	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0	4.0	6.0	6.0	
Lane Util. Factor		1.00	0.88					0.86	1.00	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1729	2707					6225	1538	1719	3438	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1729	2707					6225	1538	1719	3438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	127	9	842	0	0	0	0	1389	588	158	692	0
RTOR Reduction (vph)	0	0	308	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	136	534	0	0	0	0	1389	588	158	692	0
Turn Type	Perm	NA	Prot					NA	Free	Prot	NA	
Protected Phases		4	4					2		1	6	
Permitted Phases	4								Free			
Actuated Green, G (s)		32.3	32.3					63.0	130.0	16.7	85.7	
Effective Green, g (s)		32.3	32.3					63.0	130.0	16.7	85.7	
Actuated g/C Ratio		0.25	0.25					0.48	1.00	0.13	0.66	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		429	672					3016	1538	220	2266	
v/s Ratio Prot			c0.20					c0.22		c0.09	0.20	
v/s Ratio Perm		0.08							0.38			
v/c Ratio		0.32	0.79					0.46	0.38	0.72	0.31	
Uniform Delay, d1		39.9	45.7					22.2	0.0	54.4	9.5	
Progression Factor		1.00	1.00					0.91	1.00	0.34	0.48	
Incremental Delay, d2		0.4	6.4					0.0	0.1	5.1	0.2	
Delay (s)		40.3	52.2					20.3	0.1	23.7	4.7	
Level of Service		D	D					C	A	C	A	
Approach Delay (s)		50.5			0.0			14.3			8.3	
Approach LOS		D			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	148	0	0	100	0	1779	102	0	1404	53
Future Vol, veh/h	0	0	148	0	0	100	0	1779	102	0	1404	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	0	156	0	0	105	0	1873	107	0	1478	56

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	767	-	-	937	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	7	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.35	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	345	0	0	260	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	345	-	-	260	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.7	28	0	0
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	345	260	-	-
HCM Lane V/C Ratio	-	-	0.452	0.405	-	-
HCM Control Delay (s)	-	-	23.7	28	-	-
HCM Lane LOS	-	-	C	D	-	-
HCM 95th %tile Q(veh)	-	-	2.3	1.9	-	-

Intersection	
Int Delay, s/veh	16.8

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	12	10	17	1727	142	1400	10
Future Vol, veh/h	12	10	17	1727	142	1400	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	150	-	150	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5
Mvmt Flow	13	11	18	1818	149	1474	11

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	2723	743	1485	0	1818	-	0
Stage 1	1778	-	-	-	-	-	-
Stage 2	945	-	-	-	-	-	-
Critical Hdwy	6.9	7	4.2	-	6.5	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.25	-	2.55	-	-
Pot Cap-1 Maneuver	16	351	434	-	~ 94	-	-
Stage 1	117	-	-	-	-	-	-
Stage 2	331	-	-	-	-	-	-
Platoon blocked, %				-		-	-
Mov Cap-1 Maneuver	0	351	434	-	~ 94	-	-
Mov Cap-2 Maneuver	0	-	-	-	-	-	-
Stage 1	112	-	-	-	-	-	-
Stage 2	0	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16	0.1	35.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	434	-	351	~ 94	-	-
HCM Lane V/C Ratio	0.041	-	0.066	1.59	-	-
HCM Control Delay (s)	13.7	-	16$	388.3	-	-
HCM Lane LOS	B	-	C	F	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	11.7	-	-

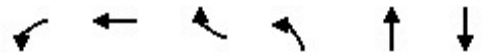
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	292	486	32	46	755	739	81	713	16	508	550	352
Future Volume (vph)	292	486	32	46	755	739	81	713	16	508	550	352
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	7.3		7.3	7.3	6.8	7.0	7.0		6.8	7.0	6.8
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	3406		1719	3438	1538	1719	1804		3335	3438	1538
Flt Permitted	0.11	1.00		0.45	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	193	3406		811	3438	1538	1719	1804		3335	3438	1538
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	307	512	34	48	795	778	85	751	17	535	579	371
RTOR Reduction (vph)	0	4	0	0	0	79	0	1	0	0	0	64
Lane Group Flow (vph)	307	542	0	48	795	699	85	767	0	535	579	307
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6			2	3	7	4		3	8	1
Permitted Phases	6			2		2						8
Actuated Green, G (s)	50.7	50.7		30.7	30.7	60.9	13.0	28.0		30.2	45.0	58.2
Effective Green, g (s)	50.7	50.7		30.7	30.7	60.9	13.0	28.0		30.2	45.0	58.2
Actuated g/C Ratio	0.39	0.39		0.24	0.24	0.47	0.10	0.22		0.23	0.35	0.45
Clearance Time (s)	6.8	7.3		7.3	7.3	6.8	7.0	7.0		6.8	7.0	6.8
Vehicle Extension (s)	3.0	3.5		3.5	3.5	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	230	1328		191	811	720	171	388		774	1190	688
v/s Ratio Prot	c0.14	0.16			0.23	c0.23	0.05	c0.43		0.16	0.17	0.05
v/s Ratio Perm	c0.38			0.06		0.23						0.15
v/c Ratio	1.33	0.41		0.25	0.98	0.97	0.50	1.98		0.69	0.49	0.45
Uniform Delay, d1	36.6	28.8		40.3	49.3	33.7	55.4	51.0		45.6	33.4	24.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.72	0.76	1.25
Incremental Delay, d2	177.2	0.2		0.8	26.7	26.4	2.3	449.0		4.5	1.3	0.4
Delay (s)	213.8	29.0		41.1	76.1	60.1	57.7	500.0		37.4	26.8	31.3
Level of Service	F	C		D	E	E	E	F		D	C	C
Approach Delay (s)		95.5			67.4			455.9			31.7	
Approach LOS		F			E			F			C	

Intersection Summary			
HCM 2000 Control Delay	130.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.44		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	28.1
Intersection Capacity Utilization	117.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Queues
1: Branch Forbes Rd & I-4 WB on-ramp/I-4 WB off-ramp



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	145	147	403	1140	377	943
v/c Ratio	0.50	0.51	0.67	0.90	0.15	0.88
Control Delay	55.2	55.2	10.4	25.3	2.7	48.6
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	55.2	55.2	10.4	25.4	2.7	48.6
Queue Length 50th (ft)	117	118	0	460	28	363
Queue Length 95th (ft)	191	194	98	219	2	#502
Internal Link Dist (ft)		1859			540	265
Turn Bay Length (ft)	500		1000			
Base Capacity (vph)	288	291	603	1334	2512	1071
Starvation Cap Reductn	0	0	0	7	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.51	0.67	0.86	0.15	0.88

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

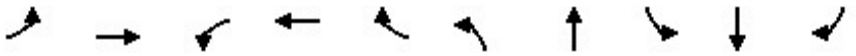
Queues
8: Branch Forbes Rd & I-4 EB off-ramp/I-4 EB on-ramp

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	136	842	1389	588	158	692
v/c Ratio	0.32	0.86	0.46	0.38	0.72	0.31
Control Delay	39.9	32.3	22.0	0.1	27.3	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.9	32.3	22.0	0.1	27.3	5.3
Queue Length 50th (ft)	93	210	242	0	80	91
Queue Length 95th (ft)	138	276	m229	m0	m118	m186
Internal Link Dist (ft)	1782		300			540
Turn Bay Length (ft)		840			260	
Base Capacity (vph)	558	1152	3016	1538	277	2265
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.73	0.46	0.38	0.57	0.31

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues
14: Branch Forbes Rd & US 92



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	307	546	48	795	778	85	768	535	579	371
v/c Ratio	1.33	0.41	0.25	0.98	0.89	0.50	1.97	0.69	0.49	0.49
Control Delay	204.4	29.6	44.6	76.5	35.7	66.1	475.7	37.6	27.0	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	204.4	29.6	44.6	76.5	35.7	66.1	475.7	37.6	27.0	13.4
Queue Length 50th (ft)	~286	172	33	352	482	69	~1013	197	201	152
Queue Length 95th (ft)	#474	222	71	#487	#774	126	#1261	259	240	230
Internal Link Dist (ft)		2145		2346			476		1019	
Turn Bay Length (ft)	475		325		650	150		525		500
Base Capacity (vph)	231	1332	191	811	877	171	389	774	1190	754
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.33	0.41	0.25	0.98	0.89	0.50	1.97	0.69	0.49	0.49

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Arterial Level of Service: NB Branch Forbes Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
US 92	II	45	21.1	475.7	496.8	0.19	1.4	F
I-4 EB on-ramp	II	35	38.8	22.0	60.8	0.36	21.3	D
I-4 WB off-ramp	II	35	14.7	2.7	17.4	0.12	24.3	C
Total	II		74.6	500.4	575.0	0.67	4.2	F

Arterial Level of Service: SB Branch Forbes Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
I-4 WB on-ramp	II	45	30.3	48.6	78.9	0.31	14.0	E
I-4 EB off-ramp	II	35	14.7	5.3	20.0	0.12	21.1	D
US 92	II	35	38.8	27.0	65.8	0.36	19.6	D
Total	II		83.8	80.9	164.7	0.78	17.1	D

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Vol, veh/h	33	0	68	41	3	16	11	190	563	40	11	513	16
Future Vol, veh/h	33	0	68	41	3	16	11	190	563	40	11	513	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	35	0	72	43	3	17	12	200	593	42	12	540	17

Major/Minor	Minor2			Minor1			Major1				Major2		
Conflicting Flow All	1295	1632	279	1332	1619	318	557	557	0	0	635	0	0
Stage 1	573	573	-	1038	1038	-	-	-	-	-	-	-	-
Stage 2	722	1059	-	294	581	-	-	-	-	-	-	-	-
Critical Hdwy	7.6	6.6	7	7.6	6.6	7	6.5	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.6	5.6	-	6.6	5.6	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.6	5.6	-	6.6	5.6	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.55	4.05	3.35	3.55	4.05	3.35	2.55	2.25	-	-	2.25	-	-
Pot Cap-1 Maneuver	117	97	709	109	99	669	625	989	-	-	924	-	-
Stage 1	464	495	-	242	300	-	-	-	-	-	-	-	-
Stage 2	377	293	-	681	490	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-		-	-
Mov Cap-1 Maneuver	90	74	709	80	75	669	950	950	-	-	924	-	-
Mov Cap-2 Maneuver	90	74	-	80	75	-	-	-	-	-	-	-	-
Stage 1	361	486	-	188	233	-	-	-	-	-	-	-	-
Stage 2	282	228	-	601	481	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	36.3	82.7	2.5	0.3
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	950	-	-	218	104	924	-	-
HCM Lane V/C Ratio	0.223	-	-	0.488	0.607	0.013	-	-
HCM Control Delay (s)	9.9	-	-	36.3	82.7	8.9	0.1	-
HCM Lane LOS	A	-	-	E	F	A	A	-
HCM 95th %tile Q(veh)	0.9	-	-	2.4	2.9	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	473	4	353	634	451	0	0	484	149
Future Volume (vph)	0	0	0	473	4	353	634	451	0	0	484	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Lane Util. Factor				0.95	0.95	1.00	0.97	0.95			0.95	
Frt				1.00	1.00	0.85	1.00	1.00			0.96	
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1633	1638	1538	3335	3438			3317	
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	
Satd. Flow (perm)				1633	1638	1538	3335	3438			3317	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	498	4	372	667	475	0	0	509	157
RTOR Reduction (vph)	0	0	0	0	0	271	0	0	0	0	19	0
Lane Group Flow (vph)	0	0	0	249	253	101	667	475	0	0	647	0
Turn Type				Perm	NA	Perm	Prot	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases				8		8						
Actuated Green, G (s)				38.0	38.0	38.0	33.6	90.0			50.4	
Effective Green, g (s)				38.0	38.0	38.0	33.6	90.0			50.4	
Actuated g/C Ratio				0.27	0.27	0.27	0.24	0.64			0.36	
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				443	444	417	800	2210			1194	
v/s Ratio Prot							c0.20	0.14			c0.20	
v/s Ratio Perm				0.15	0.15	0.07						
v/c Ratio				0.56	0.57	0.24	0.83	0.21			0.54	
Uniform Delay, d1				43.8	44.0	39.8	50.5	10.4			35.6	
Progression Factor				1.00	1.00	1.00	0.33	0.61			1.00	
Incremental Delay, d2				5.1	5.2	1.4	6.9	0.2			1.8	
Delay (s)				48.9	49.2	41.1	23.5	6.5			37.3	
Level of Service				D	D	D	C	A			D	
Approach Delay (s)		0.0			45.7			16.5			37.3	
Approach LOS		A			D			B			D	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	6	1006	0	0	0	0	906	526	133	824	0
Future Volume (vph)	179	6	1006	0	0	0	0	906	526	133	824	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0	4.0	6.0	6.0	
Lane Util. Factor		1.00	0.88					0.86	1.00	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1726	2707					6225	1538	1719	3438	
Flt Permitted		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1726	2707					6225	1538	1719	3438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	188	6	1059	0	0	0	0	954	554	140	867	0
RTOR Reduction (vph)	0	0	114	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	194	945	0	0	0	0	954	554	140	867	0
Turn Type	Perm	NA	Perm					NA	Free	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						Free			
Actuated Green, G (s)		54.9	54.9					51.0	140.0	16.1	73.1	
Effective Green, g (s)		54.9	54.9					51.0	140.0	16.1	73.1	
Actuated g/C Ratio		0.39	0.39					0.36	1.00	0.12	0.52	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		676	1061					2267	1538	197	1795	
v/s Ratio Prot								0.15		c0.08	c0.25	
v/s Ratio Perm		0.11	c0.35						0.36			
v/c Ratio		0.29	0.89					0.42	0.36	0.71	0.48	
Uniform Delay, d1		29.1	39.8					33.4	0.0	59.7	21.4	
Progression Factor		1.00	1.00					0.81	1.00	0.49	0.53	
Incremental Delay, d2		0.2	9.6					0.3	0.3	9.8	0.8	
Delay (s)		29.4	49.3					27.4	0.3	38.9	12.1	
Level of Service		C	D					C	A	D	B	
Approach Delay (s)		46.2			0.0			17.5			15.8	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	122	0	0	81	0	1351	139	0	1770	60
Future Vol, veh/h	0	0	122	0	0	81	0	1351	139	0	1770	60
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	0	128	0	0	85	0	1422	146	0	1863	63

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	963	-	-	711	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	7	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.35	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	256	0	0	369	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	256	-	-	369	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32.4	17.7	0	0
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	256	369	-	-
HCM Lane V/C Ratio	-	-	0.502	0.231	-	-
HCM Control Delay (s)	-	-	32.4	17.7	-	-
HCM Lane LOS	-	-	D	C	-	-
HCM 95th %tile Q(veh)	-	-	2.6	0.9	-	-

Intersection	
Int Delay, s/veh	44.2

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	8	10	27	1322	160	1722	10
Future Vol, veh/h	8	10	27	1322	160	1722	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	150	-	150	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5
Mvmt Flow	8	11	28	1392	168	1813	11

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	2907	912	1824	0	1392	-	0
Stage 1	2155	-	-	-	-	-	-
Stage 2	752	-	-	-	-	-	-
Critical Hdwy	6.9	7	4.2	-	6.5	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.25	-	2.55	-	-
Pot Cap-1 Maneuver	12	271	319	-	180	-	-
Stage 1	72	-	-	-	-	-	-
Stage 2	419	-	-	-	-	-	-
Platoon blocked, %				-		-	-
Mov Cap-1 Maneuver	~ 1	271	319	-	180	-	-
Mov Cap-2 Maneuver	~ 1	-	-	-	-	-	-
Stage 1	66	-	-	-	-	-	-
Stage 2	28	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, $	7074.4	0.3	8.7
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	319	-	2	180	-	-
HCM Lane V/C Ratio	0.089	-	9.474	0.936	-	-
HCM Control Delay (s)	17.4	-	$ 7074.4	103.4	-	-
HCM Lane LOS	C	-	F	F	-	-
HCM 95th %tile Q(veh)	0.3	-	3.9	7.3	-	-

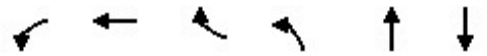
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	697	104	109	508	593	82	517	32	693	762	277
Future Volume (vph)	239	697	104	109	508	593	82	517	32	693	762	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	7.3		7.3	7.3	6.8	7.0	7.0		6.8	7.0	6.8
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	3371		1719	3438	1538	1719	1794		3335	3438	1538
Flt Permitted	0.21	1.00		0.29	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	388	3371		516	3438	1538	1719	1794		3335	3438	1538
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	252	734	109	115	535	624	86	544	34	729	802	292
RTOR Reduction (vph)	0	8	0	0	0	79	0	1	0	0	0	41
Lane Group Flow (vph)	252	835	0	115	535	545	86	577	0	729	802	251
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6			2	3	7	4		3	8	1
Permitted Phases	6			2		2						8
Actuated Green, G (s)	48.7	48.7		30.7	30.7	60.9	7.0	40.0		30.2	63.0	74.2
Effective Green, g (s)	48.7	48.7		30.7	30.7	60.9	7.0	40.0		30.2	63.0	74.2
Actuated g/C Ratio	0.35	0.35		0.22	0.22	0.43	0.05	0.29		0.22	0.45	0.53
Clearance Time (s)	6.8	7.3		7.3	7.3	6.8	7.0	7.0		6.8	7.0	6.8
Vehicle Extension (s)	3.0	3.5		3.5	3.5	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	241	1172		113	753	669	85	512		719	1547	815
v/s Ratio Prot	c0.08	0.25			0.16	0.18	0.05	c0.32		c0.22	0.23	0.02
v/s Ratio Perm	c0.28			0.22		0.18						0.14
v/c Ratio	1.05	0.71		1.02	0.71	0.82	1.01	1.13		1.01	0.52	0.31
Uniform Delay, d1	41.6	39.6		54.6	50.5	34.6	66.5	50.0		54.9	27.6	18.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.76	1.11	1.12
Incremental Delay, d2	70.4	2.1		89.5	3.3	7.8	100.9	79.2		32.9	1.0	0.2
Delay (s)	112.0	41.7		144.1	53.8	42.4	167.4	129.2		74.8	31.8	20.9
Level of Service	F	D		F	D	D	F	F		E	C	C
Approach Delay (s)		57.9			56.4			134.2			47.2	
Approach LOS		E			E			F			D	

Intersection Summary			
HCM 2000 Control Delay	63.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.1
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Queues
1: Branch Forbes Rd & I-4 WB on-ramp/I-4 WB off-ramp



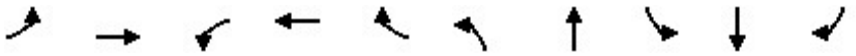
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	249	253	372	667	475	666
v/c Ratio	0.56	0.57	0.54	0.83	0.21	0.55
Control Delay	49.7	49.9	6.9	25.7	6.6	36.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.7	49.9	6.9	25.7	6.6	36.9
Queue Length 50th (ft)	206	210	0	285	110	241
Queue Length 95th (ft)	305	309	82	371	80	332
Internal Link Dist (ft)		1859			540	265
Turn Bay Length (ft)	500		1000			
Base Capacity (vph)	443	444	688	1000	2210	1213
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.57	0.54	0.67	0.21	0.55

Intersection Summary

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	194	1059	954	554	140	867
v/c Ratio	0.29	0.90	0.42	0.36	0.71	0.48
Control Delay	29.6	43.6	28.6	0.3	45.8	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.3
Total Delay	29.6	43.6	28.6	0.3	45.8	12.9
Queue Length 50th (ft)	116	424	176	0	129	182
Queue Length 95th (ft)	174	527	m208	m0	209	216
Internal Link Dist (ft)	1782		300			540
Turn Bay Length (ft)		840			260	
Base Capacity (vph)	727	1249	2266	1538	245	1794
Starvation Cap Reductn	0	0	0	0	0	389
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.85	0.42	0.36	0.57	0.62

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	252	843	115	535	624	86	578	729	802	292
v/c Ratio	1.04	0.71	1.02	0.71	0.76	1.01	1.13	1.01	0.52	0.34
Control Delay	106.6	43.0	143.0	56.5	29.4	165.0	124.5	75.0	32.0	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	106.6	43.0	143.0	56.5	29.4	165.0	124.5	75.0	32.0	9.0
Queue Length 50th (ft)	~184	344	~108	239	363	~80	~607	~332	326	66
Queue Length 95th (ft)	#322	423	#241	305	532	#197	#843	#484	393	m113
Internal Link Dist (ft)		2145		2346			476		1019	
Turn Bay Length (ft)	475		325		650	150		525		500
Base Capacity (vph)	242	1181	113	753	820	85	513	719	1547	858
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.04	0.71	1.02	0.71	0.76	1.01	1.13	1.01	0.52	0.34

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Arterial Level of Service: NB Branch Forbes Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
US 92	II	45	21.1	124.5	145.6	0.19	4.8	F
I-4 EB on-ramp	II	35	38.8	28.6	67.4	0.36	19.2	D
I-4 WB off-ramp	II	35	14.7	6.6	21.3	0.12	19.8	D
Total	II		74.6	159.7	234.3	0.67	10.3	F

Arterial Level of Service: SB Branch Forbes Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
I-4 WB on-ramp	II	45	30.3	36.9	67.2	0.31	16.4	E
I-4 EB off-ramp	II	35	14.7	12.6	27.3	0.12	15.5	E
US 92	II	35	38.8	32.0	70.8	0.36	18.2	D
Total	II		83.8	81.5	165.3	0.78	17.0	D

With Additional US 92 Intersection Improvements

Intersection	
Int Delay, s/veh	18.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Vol, veh/h	9	4	57	64	3	8	16	217	436	72	24	758	8
Future Vol, veh/h	9	4	57	64	3	8	16	217	436	72	24	758	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	9	4	60	67	3	8	17	228	459	76	25	798	8

Major/Minor	Minor2			Minor1			Major1				Major2		
Conflicting Flow All	1573	1877	403	1438	1843	268	806	806	0	0	535	0	0
Stage 1	852	852	-	987	987	-	-	-	-	-	-	-	-
Stage 2	721	1025	-	451	856	-	-	-	-	-	-	-	-
Critical Hdwy	7.6	6.6	7	7.6	6.6	7	6.5	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.6	5.6	-	6.6	5.6	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.6	5.6	-	6.6	5.6	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.55	4.05	3.35	3.55	4.05	3.35	2.55	2.25	-	-	2.25	-	-
Pot Cap-1 Maneuver	72	68	589	91	72	721	432	795	-	-	1008	-	-
Stage 1	314	367	-	260	317	-	-	-	-	-	-	-	-
Stage 2	378	304	-	550	366	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-		-	-
Mov Cap-1 Maneuver	49	44	589	~ 55	46	721	742	742	-	-	1008	-	-
Mov Cap-2 Maneuver	49	44	-	~ 55	46	-	-	-	-	-	-	-	-
Stage 1	210	350	-	174	212	-	-	-	-	-	-	-	-
Stage 2	247	204	-	466	350	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	36	$ 337.5	3.8	0.5
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	742	-	-	188	60	1008	-	-
HCM Lane V/C Ratio	0.331	-	-	0.392	1.316	0.025	-	-
HCM Control Delay (s)	12.2	-	-	36	$ 337.5	8.7	0.2	-
HCM Lane LOS	B	-	-	E	F	A	A	-
HCM 95th %tile Q(veh)	1.4	-	-	1.7	6.8	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	264	13	383	1083	358	0	0	543	352
Future Volume (vph)	0	0	0	264	13	383	1083	358	0	0	543	352
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Lane Util. Factor				0.95	0.95	1.00	0.97	0.95			0.95	
Frt				1.00	1.00	0.85	1.00	1.00			0.94	
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1633	1645	1538	3335	3438			3235	
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	
Satd. Flow (perm)				1633	1645	1538	3335	3438			3235	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	278	14	403	1140	377	0	0	572	371
RTOR Reduction (vph)	0	0	0	0	0	329	0	0	0	0	81	0
Lane Group Flow (vph)	0	0	0	145	147	74	1140	377	0	0	862	0
Turn Type				Perm	NA	Perm	Prot	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases				8		8						
Actuated Green, G (s)				24.0	24.0	24.0	47.6	94.0			40.4	
Effective Green, g (s)				24.0	24.0	24.0	47.6	94.0			40.4	
Actuated g/C Ratio				0.18	0.18	0.18	0.37	0.72			0.31	
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				301	303	283	1221	2485			1005	
v/s Ratio Prot							c0.34	0.11			c0.27	
v/s Ratio Perm				0.09	0.09	0.05						
v/c Ratio				0.48	0.49	0.26	0.93	0.15			0.86	
Uniform Delay, d1				47.4	47.5	45.4	39.7	5.6			42.1	
Progression Factor				1.00	1.00	1.00	0.40	0.57			1.00	
Incremental Delay, d2				5.4	5.5	2.3	11.9	0.1			9.4	
Delay (s)				52.9	52.9	47.7	27.8	3.3			51.5	
Level of Service				D	D	D	C	A			D	
Approach Delay (s)		0.0			49.9			21.7			51.5	
Approach LOS		A			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	36.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	9	800	0	0	0	0	1320	559	150	657	0
Future Volume (vph)	121	9	800	0	0	0	0	1320	559	150	657	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0	4.0	6.0	6.0	
Lane Util. Factor		1.00	0.88					0.86	1.00	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1729	2707					6225	1538	1719	3438	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1729	2707					6225	1538	1719	3438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	127	9	842	0	0	0	0	1389	588	158	692	0
RTOR Reduction (vph)	0	0	308	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	136	534	0	0	0	0	1389	588	158	692	0
Turn Type	Perm	NA	Prot					NA	Free	Prot	NA	
Protected Phases		4	4					2		1	6	
Permitted Phases	4								Free			
Actuated Green, G (s)		32.3	32.3					63.0	130.0	16.7	85.7	
Effective Green, g (s)		32.3	32.3					63.0	130.0	16.7	85.7	
Actuated g/C Ratio		0.25	0.25					0.48	1.00	0.13	0.66	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		429	672					3016	1538	220	2266	
v/s Ratio Prot			c0.20					c0.22		c0.09	0.20	
v/s Ratio Perm		0.08							0.38			
v/c Ratio		0.32	0.79					0.46	0.38	0.72	0.31	
Uniform Delay, d1		39.9	45.7					22.2	0.0	54.4	9.5	
Progression Factor		1.00	1.00					0.93	1.00	0.37	0.46	
Incremental Delay, d2		0.4	6.4					0.2	0.3	5.3	0.2	
Delay (s)		40.3	52.2					21.0	0.3	25.4	4.6	
Level of Service		D	D					C	A	C	A	
Approach Delay (s)		50.5			0.0			14.8			8.5	
Approach LOS		D			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	148	0	0	100	0	1779	102	0	1404	53
Future Vol, veh/h	0	0	148	0	0	100	0	1779	102	0	1404	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	0	156	0	0	105	0	1873	107	0	1478	56

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	767	-	-	937	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	7	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.35	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	345	0	0	260	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	345	-	-	260	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.7	28	0	0
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	345	260	-	-
HCM Lane V/C Ratio	-	-	0.452	0.405	-	-
HCM Control Delay (s)	-	-	23.7	28	-	-
HCM Lane LOS	-	-	C	D	-	-
HCM 95th %tile Q(veh)	-	-	2.3	1.9	-	-

Intersection	
Int Delay, s/veh	16.8

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	12	10	17	1727	142	1400	10
Future Vol, veh/h	12	10	17	1727	142	1400	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	150	-	150	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5
Mvmt Flow	13	11	18	1818	149	1474	11

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	2723	743	1485	0	1818	-	0
Stage 1	1778	-	-	-	-	-	-
Stage 2	945	-	-	-	-	-	-
Critical Hdwy	6.9	7	4.2	-	6.5	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.25	-	2.55	-	-
Pot Cap-1 Maneuver	16	351	434	-	~ 94	-	-
Stage 1	117	-	-	-	-	-	-
Stage 2	331	-	-	-	-	-	-
Platoon blocked, %				-		-	-
Mov Cap-1 Maneuver	0	351	434	-	~ 94	-	-
Mov Cap-2 Maneuver	0	-	-	-	-	-	-
Stage 1	112	-	-	-	-	-	-
Stage 2	0	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16	0.1	35.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	434	-	351	~ 94	-	-
HCM Lane V/C Ratio	0.041	-	0.066	1.59	-	-
HCM Control Delay (s)	13.7	-	16$	388.3	-	-
HCM Lane LOS	B	-	C	F	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	11.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

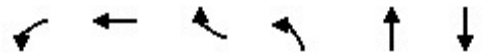
HCM Signalized Intersection Capacity Analysis
14: Branch Forbes Rd & US 92

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	292	486	32	46	755	739	81	713	16	508	550	352
Future Volume (vph)	292	486	32	46	755	739	81	713	16	508	550	352
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	7.3		6.8	7.3	6.8	7.0	7.0		6.8	7.0	6.8
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	3406		1719	3438	1538	1719	3427		3335	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	3406		1719	3438	1538	1719	3427		3335	3438	1538
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	307	512	34	48	795	778	85	751	17	535	579	371
RTOR Reduction (vph)	0	3	0	0	0	79	0	2	0	0	0	65
Lane Group Flow (vph)	307	543	0	48	795	699	85	766	0	535	579	306
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6		5	2	3	7	4		3	8	1
Permitted Phases						2						8
Actuated Green, G (s)	14.0	39.3		7.0	32.3	61.1	13.0	27.0		28.8	42.6	56.6
Effective Green, g (s)	14.0	39.3		7.0	32.3	61.1	13.0	27.0		28.8	42.6	56.6
Actuated g/C Ratio	0.11	0.30		0.05	0.25	0.47	0.10	0.21		0.22	0.33	0.44
Clearance Time (s)	6.8	7.3		6.8	7.3	6.8	7.0	7.0		6.8	7.0	6.8
Vehicle Extension (s)	3.0	3.5		3.0	3.5	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	359	1029		92	854	722	171	711		738	1126	669
v/s Ratio Prot	c0.09	c0.16		0.03	0.23	c0.21	0.05	c0.22		0.16	0.17	0.05
v/s Ratio Perm						0.24						0.15
v/c Ratio	0.86	0.53		0.52	0.93	0.97	0.50	1.08		0.72	0.51	0.46
Uniform Delay, d1	57.0	37.6		59.9	47.8	33.5	55.4	51.5		46.9	35.3	25.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.73	0.78	1.21
Incremental Delay, d2	17.7	0.6		5.3	16.7	25.7	2.3	56.7		5.5	1.5	0.4
Delay (s)	74.7	38.2		65.1	64.4	59.2	57.7	108.2		39.6	29.1	31.7
Level of Service	E	D		E	E	E	E	F		D	C	C
Approach Delay (s)		51.3			61.9			103.2			33.5	
Approach LOS		D			E			F			C	

Intersection Summary			
HCM 2000 Control Delay	58.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	28.1
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Queues
1: Branch Forbes Rd & I-4 WB on-ramp/I-4 WB off-ramp



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	145	147	403	1140	377	943
v/c Ratio	0.48	0.49	0.66	0.93	0.15	0.87
Control Delay	53.6	53.6	10.0	29.6	3.3	47.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	53.6	10.0	29.6	3.3	47.0
Queue Length 50th (ft)	116	117	0	478	40	358
Queue Length 95th (ft)	189	192	96	#598	2	#479
Internal Link Dist (ft)		1859			540	265
Turn Bay Length (ft)	500		1000			
Base Capacity (vph)	301	303	612	1257	2485	1085
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.49	0.66	0.91	0.15	0.87

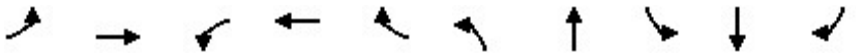
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	136	842	1389	588	158	692
v/c Ratio	0.32	0.86	0.46	0.38	0.72	0.31
Control Delay	39.9	32.3	22.7	0.3	29.1	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.9	32.3	22.7	0.3	29.1	5.1
Queue Length 50th (ft)	93	210	263	0	80	90
Queue Length 95th (ft)	138	276	m311	m0	m119	m184
Internal Link Dist (ft)	1782		300			540
Turn Bay Length (ft)		840			260	
Base Capacity (vph)	558	1152	3016	1538	277	2265
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.73	0.46	0.38	0.57	0.31

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	307	546	48	795	778	85	768	535	579	371
v/c Ratio	0.86	0.53	0.43	0.97	0.89	0.50	1.08	0.69	0.50	0.49
Control Delay	79.0	40.6	70.6	75.1	35.4	66.1	104.5	38.0	28.3	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.0	40.6	70.6	75.1	35.4	66.1	104.5	38.0	28.3	13.1
Queue Length 50th (ft)	132	207	39	352	482	69	~378	197	203	145
Queue Length 95th (ft)	#208	268	82	#487	#774	126	#508	261	254	229
Internal Link Dist (ft)		2145		2346			476		1019	
Turn Bay Length (ft)	475		325		650	150		525		500
Base Capacity (vph)	364	1032	121	816	879	171	713	774	1163	754
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.53	0.40	0.97	0.89	0.50	1.08	0.69	0.50	0.49

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Arterial Level of Service: NB Branch Forbes Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
US 92	II	45	21.1	104.5	125.6	0.19	5.6	F
I-4 EB on-ramp	II	35	38.8	22.7	61.5	0.36	21.0	D
I-4 WB off-ramp	II	35	14.7	3.3	18.0	0.12	23.5	C
Total	II		74.6	130.5	205.1	0.67	11.8	F

Arterial Level of Service: SB Branch Forbes Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
I-4 WB on-ramp	II	42	31.2	47.0	78.2	0.31	14.1	E
I-4 EB off-ramp	II	35	14.7	5.1	19.8	0.12	21.3	D
US 92	II	35	38.8	28.3	67.1	0.36	19.3	D
Total	II		84.7	80.4	165.1	0.78	17.1	D

Intersection	
Int Delay, s/veh	18.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Vol, veh/h	9	4	57	64	3	8	16	217	436	72	24	758	8
Future Vol, veh/h	9	4	57	64	3	8	16	217	436	72	24	758	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	9	4	60	67	3	8	17	228	459	76	25	798	8

Major/Minor	Minor2			Minor1			Major1				Major2		
Conflicting Flow All	1573	1877	403	1438	1843	268	806	806	0	0	535	0	0
Stage 1	852	852	-	987	987	-	-	-	-	-	-	-	-
Stage 2	721	1025	-	451	856	-	-	-	-	-	-	-	-
Critical Hdwy	7.6	6.6	7	7.6	6.6	7	6.5	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.6	5.6	-	6.6	5.6	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.6	5.6	-	6.6	5.6	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.55	4.05	3.35	3.55	4.05	3.35	2.55	2.25	-	-	2.25	-	-
Pot Cap-1 Maneuver	72	68	589	91	72	721	432	795	-	-	1008	-	-
Stage 1	314	367	-	260	317	-	-	-	-	-	-	-	-
Stage 2	378	304	-	550	366	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-		-	-
Mov Cap-1 Maneuver	49	44	589	~ 55	46	721	742	742	-	-	1008	-	-
Mov Cap-2 Maneuver	49	44	-	~ 55	46	-	-	-	-	-	-	-	-
Stage 1	210	350	-	174	212	-	-	-	-	-	-	-	-
Stage 2	247	204	-	466	350	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	36	$ 337.5	3.8	0.5
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	742	-	-	188	60	1008	-	-
HCM Lane V/C Ratio	0.331	-	-	0.392	1.316	0.025	-	-
HCM Control Delay (s)	12.2	-	-	36	$ 337.5	8.7	0.2	-
HCM Lane LOS	B	-	-	E	F	A	A	-
HCM 95th %tile Q(veh)	1.4	-	-	1.7	6.8	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	473	4	353	634	451	0	0	484	149
Future Volume (vph)	0	0	0	473	4	353	634	451	0	0	484	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Lane Util. Factor				0.95	0.95	1.00	0.97	0.95			0.95	
Frt				1.00	1.00	0.85	1.00	1.00			0.96	
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1633	1638	1538	3335	3438			3317	
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	
Satd. Flow (perm)				1633	1638	1538	3335	3438			3317	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	498	4	372	667	475	0	0	509	157
RTOR Reduction (vph)	0	0	0	0	0	271	0	0	0	0	19	0
Lane Group Flow (vph)	0	0	0	249	253	101	667	475	0	0	647	0
Turn Type				Perm	NA	Perm	Prot	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases				8		8						
Actuated Green, G (s)				38.0	38.0	38.0	33.6	90.0			50.4	
Effective Green, g (s)				38.0	38.0	38.0	33.6	90.0			50.4	
Actuated g/C Ratio				0.27	0.27	0.27	0.24	0.64			0.36	
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				443	444	417	800	2210			1194	
v/s Ratio Prot							c0.20	0.14			c0.20	
v/s Ratio Perm				0.15	0.15	0.07						
v/c Ratio				0.56	0.57	0.24	0.83	0.21			0.54	
Uniform Delay, d1				43.8	44.0	39.8	50.5	10.4			35.6	
Progression Factor				1.00	1.00	1.00	0.36	0.69			1.00	
Incremental Delay, d2				5.1	5.2	1.4	7.0	0.2			1.8	
Delay (s)				48.9	49.2	41.1	25.4	7.4			37.3	
Level of Service				D	D	D	C	A			D	
Approach Delay (s)		0.0			45.7			17.9			37.3	
Approach LOS		A			D			B			D	

Intersection Summary			
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	6	1006	0	0	0	0	906	526	133	824	0
Future Volume (vph)	179	6	1006	0	0	0	0	906	526	133	824	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0	4.0	6.0	6.0	
Lane Util. Factor		1.00	0.88					0.86	1.00	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1726	2707					6225	1538	1719	3438	
Flt Permitted		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1726	2707					6225	1538	1719	3438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	188	6	1059	0	0	0	0	954	554	140	867	0
RTOR Reduction (vph)	0	0	123	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	194	936	0	0	0	0	954	554	140	867	0
Turn Type	Perm	NA	Perm					NA	Free	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						Free			
Actuated Green, G (s)		53.8	53.8					54.4	140.0	13.8	74.2	
Effective Green, g (s)		53.8	53.8					54.4	140.0	13.8	74.2	
Actuated g/C Ratio		0.38	0.38					0.39	1.00	0.10	0.53	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		663	1040					2418	1538	169	1822	
v/s Ratio Prot								0.15		c0.08	c0.25	
v/s Ratio Perm		0.11	c0.35						0.36			
v/c Ratio		0.29	0.90					0.39	0.36	0.83	0.48	
Uniform Delay, d1		29.9	40.6					30.9	0.0	61.9	20.7	
Progression Factor		1.00	1.00					0.88	1.00	0.50	0.61	
Incremental Delay, d2		0.2	10.4					0.3	0.5	23.7	0.7	
Delay (s)		30.1	51.0					27.6	0.5	54.4	13.4	
Level of Service		C	D					C	A	D	B	
Approach Delay (s)		47.8			0.0			17.6			19.1	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	148	0	0	100	0	1779	102	0	1404	53
Future Vol, veh/h	0	0	148	0	0	100	0	1779	102	0	1404	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	0	156	0	0	105	0	1873	107	0	1478	56

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	767	-	-	937	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	7	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.35	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	345	0	0	260	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	345	-	-	260	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.7	28	0	0
HCM LOS	C	D		

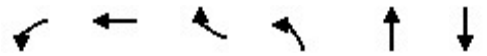
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	345	260	-	-
HCM Lane V/C Ratio	-	-	0.452	0.405	-	-
HCM Control Delay (s)	-	-	23.7	28	-	-
HCM Lane LOS	-	-	C	D	-	-
HCM 95th %tile Q(veh)	-	-	2.3	1.9	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	697	104	109	508	593	82	517	32	693	762	277
Future Volume (vph)	239	697	104	109	508	593	82	517	32	693	762	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	7.3		7.3	7.3	6.8	7.0	7.0		6.8	7.0	6.8
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3335	3371		1719	3438	1538	1719	3408		3335	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3335	3371		1719	3438	1538	1719	3408		3335	3438	1538
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	252	734	109	115	535	624	86	544	34	729	802	292
RTOR Reduction (vph)	0	8	0	0	0	68	0	3	0	0	0	78
Lane Group Flow (vph)	252	835	0	115	535	556	86	575	0	729	802	214
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6		5	2	3	7	4		3	8	1
Permitted Phases						2						8
Actuated Green, G (s)	15.2	37.1		11.4	33.8	71.9	13.0	25.0		38.1	49.9	65.1
Effective Green, g (s)	15.2	37.1		11.4	33.8	71.9	13.0	25.0		38.1	49.9	65.1
Actuated g/C Ratio	0.11	0.27		0.08	0.24	0.51	0.09	0.18		0.27	0.36	0.46
Clearance Time (s)	6.8	7.3		7.3	7.3	6.8	7.0	7.0		6.8	7.0	6.8
Vehicle Extension (s)	3.0	3.5		3.0	3.5	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	362	893		139	830	789	159	608		907	1225	715
v/s Ratio Prot	0.08	c0.25		0.07	0.16	c0.19	0.05	c0.17		c0.22	0.23	0.03
v/s Ratio Perm						0.17						0.11
v/c Ratio	0.70	0.93		0.83	0.64	0.71	0.54	0.95		0.80	0.65	0.30
Uniform Delay, d1	60.2	50.3		63.3	47.7	26.0	60.6	56.8		47.5	37.8	23.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.70	0.71	1.19
Incremental Delay, d2	5.7	16.7		31.4	1.8	3.0	3.7	25.2		5.8	2.1	0.2
Delay (s)	65.9	66.9		94.8	49.5	29.0	64.4	82.1		39.1	29.1	28.0
Level of Service	E	E		F	D	C	E	F		D	C	C
Approach Delay (s)		66.7			43.5			79.8			32.9	
Approach LOS		E			D			E			C	

Intersection Summary			
HCM 2000 Control Delay	49.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.6
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queues
1: Branch Forbes Rd & I-4 WB on-ramp/I-4 WB off-ramp



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	145	147	403	1140	377	943
v/c Ratio	0.48	0.49	0.66	0.93	0.15	0.87
Control Delay	53.6	53.6	10.0	29.6	3.3	47.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	53.6	10.0	29.6	3.3	47.0
Queue Length 50th (ft)	116	117	0	478	40	358
Queue Length 95th (ft)	189	192	96	#598	2	#479
Internal Link Dist (ft)		1859			540	265
Turn Bay Length (ft)	500		1000			
Base Capacity (vph)	301	303	612	1257	2485	1085
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.49	0.66	0.91	0.15	0.87

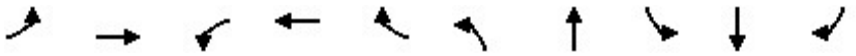
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	136	842	1389	588	158	692
v/c Ratio	0.32	0.86	0.46	0.38	0.72	0.31
Control Delay	39.9	32.3	22.7	0.3	29.1	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.9	32.3	22.7	0.3	29.1	5.1
Queue Length 50th (ft)	93	210	263	0	80	90
Queue Length 95th (ft)	138	276	m311	m0	m119	m184
Internal Link Dist (ft)	1782		300			540
Turn Bay Length (ft)		840			260	
Base Capacity (vph)	558	1152	3016	1538	277	2265
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.73	0.46	0.38	0.57	0.31

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	307	546	48	795	778	85	768	535	579	371
v/c Ratio	0.86	0.53	0.43	0.97	0.89	0.50	1.08	0.69	0.50	0.49
Control Delay	79.0	40.6	70.6	75.1	35.4	66.1	104.5	38.0	28.3	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.0	40.6	70.6	75.1	35.4	66.1	104.5	38.0	28.3	13.1
Queue Length 50th (ft)	132	207	39	352	482	69	~378	197	203	145
Queue Length 95th (ft)	#208	268	82	#487	#774	126	#508	261	254	229
Internal Link Dist (ft)		2145		2346			476		1019	
Turn Bay Length (ft)	475		325		650	150		525		500
Base Capacity (vph)	364	1032	121	816	879	171	713	774	1163	754
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.53	0.40	0.97	0.89	0.50	1.08	0.69	0.50	0.49

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Arterial Level of Service: NB Branch Forbes Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
US 92	II	45	21.1	104.5	125.6	0.19	5.6	F
I-4 EB on-ramp	II	35	38.8	22.7	61.5	0.36	21.0	D
I-4 WB off-ramp	II	35	14.7	3.3	18.0	0.12	23.5	C
Total	II		74.6	130.5	205.1	0.67	11.8	F

Arterial Level of Service: SB Branch Forbes Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
I-4 WB on-ramp	II	42	31.2	47.0	78.2	0.31	14.1	E
I-4 EB off-ramp	II	35	14.7	5.1	19.8	0.12	21.3	D
US 92	II	35	38.8	28.3	67.1	0.36	19.3	D
Total	II		84.7	80.4	165.1	0.78	17.1	D

APPENDIX F CMF 7566

CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF DETAILS

CMF ID: 7566

CONVERT 2 LANE ROADWAY TO 4 LANE DIVIDED ROADWAY

DESCRIPTION: CONVERSION OF URBAN AND RURAL TWO-LANE ROADWAYS TO FOUR-LANE DIVIDED ROADWAYS

PRIOR CONDITION: 2 LANE ROADWAY

CATEGORY: ROADWAY

STUDY: *EVALUATION OF THE SAFETY EFFECTIVENESS OF THE CONVERSION OF TWO-LANE ROADWAYS TO FOUR-LANE DIVIDED ROADWAYS: BAYESIAN VS. EMPIRICAL BAYES*, AHMED ET AL., 2015

Star Quality Rating:	★★★★☆ [VIEW SCORE DETAILS]
Rating Points Total:	120

Crash Modification Factor (CMF)

Value:	0.341
Adjusted Standard Error:	
Unadjusted Standard Error:	0.091

Crash Reduction Factor (CRF)

Value:	65.88 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	
Unadjusted Standard Error:	9.05

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not specified
Street Type:	
Minimum Number of Lanes:	2
Maximum Number of Lanes:	2
Number of Lanes Direction:	
Number of Lanes Comment:	
Crash Weather:	Not specified
Road Division Type:	Undivided
Minimum Speed Limit:	
Maximum Speed Limit:	

Speed Unit:	
Speed Limit Comment:	
Area Type:	Urban
Traffic Volume:	
Average Traffic Volume:	18544 Annual Average Daily Traffic (AADT)
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	
Intersection Geometry:	
Traffic Control:	
Major Road Traffic Volume:	
Minor Road Traffic Volume:	
Average Major Road Volume :	
Average Minor Road Volume :	

Development Details

Date Range of Data Used:	2002 to 2012
Municipality:	
State:	FL
Country:	USA
Type of Methodology Used:	Before/after using empirical Bayes or full Bayes
Sample Size (crashes):	69 crashes before, 30 crashes after
Sample Size (sites):	41 sites before, 41 sites after
Sample Size (miles):	8.578 miles before, 8.578 miles after

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Nov-01-2015
Comments:	

VIEW THE FULL STUDY DETAILS

EXPORT DETAIL PAGE AS A PDF

This site is funded by the **U.S. Department of Transportation Federal Highway Administration** and maintained by the **University of North Carolina Highway Safety Research Center**

For more information, contact Karen Scurry at **karen.scurry@dot.gov**

Appendix C
Context Classification Determination Memorandums

MEMORANDUM

DATE: 8/25/2020

TO: Elizabeth Winters

FROM: Brian L Shroyer, Multimodal Project Manager

COPIES: PLEMO File

SUBJECT: Context Classification Determination for Item Segment 447157-1 McIntosh Rd From S of US 92 To N of I-4

The District Seven Planning & Environmental Management Office has reviewed the subject project location and has made the following determination.

Context Classification Summary Table	
Item Segment	447157-1
Primary Work Mix	Intersection Improvement
Roadway Name	McIntosh
Roadway Limits	From S of US 92 To N of I-4
Section No. & Milepost Limits	10000622; 0.00 to 0.633
Context Classification (existing)	C3C; Suburban Commercial
Comments	Off system roadway going over I-4. Ramps to and from I-4 are classified as C3C.

Additional documentation is provided below to support this determination. This context classification determination shall apply to the design phase of the subject project only and only information available at the time of this analysis was used to support this determination. Changes to the project scope, location and roadway limits may trigger a change in this determination. Any changes should be coordinated with the PLEMO Office.

Primary Measures

Context Classification	Segment	Land Use	Roadway Connectivity		
			Intersection Density	Block Perimeter	Block Length
		Description	Intersections/ square mile	Feet	Feet
C3C		Mostly non-residential uses with large building footprints and large parking lots within large blocks and a disconnected or sparse roadway network.			

2020 FDOT Design Manual Design Criteria

DESIGN CONTROL	C3C/C3R
Allowable Design Speed Range (mph)	35-55
SIS Minimum Design Speed (mph)	50
Minimum Travel & Auxiliary Lane Width	35 mph: 10 ft 40-45 mph: 11 ft ≥ 50 mph: 12 ft
Two-Way Left Turn Lane	25-35 mph: 11 ft 40 mph: 12 ft
Median Width	Curbed & Flush 25-35 mph: 22 ft 40-45 mph: 22 ft High Speed Curbed 50-55, 30 ft
Sidewalk Width	6

Project Location