

US 41 (SR 45)

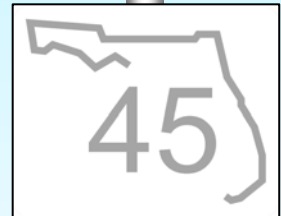
Project Development and Environment (PD&E) Study

From 12th Street to Kracker Avenue

Final Location Hydraulics Report

WPI Segment No: 421140 8; ETDM # 9511
Hillsborough County

Prepared for the
Florida Department of Transportation
District Seven



September 2009



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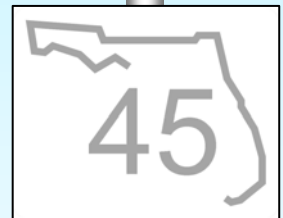


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Section 1 – EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) conducted a Project Development and Environment (PD&E) Study to evaluate alternative improvements for US 41/SR 45 from 12th Street North to Kracker Avenue in southern Hillsborough County (**Figure 2-1**). The total project length is approximately 6.2 miles. Study objectives included the following: 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. Improvement alternatives were identified which will improve safety and meet future transportation demand.

In accordance with the FDOT's PD&E Manual, a Location Hydraulics Report (LHR) was prepared for this PD&E Study. The information presented in this document is subject to change until the final Phase of the project. This LHR is preliminary and used as an engineering tool to identify potential floodplain encroachments as a result of the conceptual improvements. The calculations presented in this report are preliminary and help in estimating the preliminary size of the Floodplain Compensation (FPC) sites for each basin. The FPC site locations are screened using preliminary information based upon many assumptions and judgments. The FPC sizes and locations included in the documentation are subject to change throughout the preliminary engineering and project design phases (1 thru final).

This is a developer driven project being conducted for Hillsborough County with oversight by the Florida Department of Transportation (FDOT) District 7. This project was previously evaluated in the Planning Screen of the ETDM No. 5180 process. The study limits extend from 12th Street NE to Kracker Avenue, a distance of approximately 5.85 miles. US Highway 41 is a major north-south regional arterial that connects Hillsborough County to Pasco and Manatee Counties and is a designated hurricane emergency evacuation route. The conceptual improvements are to expand US Highway 41 from a four-lane divided arterial to a six-lane divided arterial to accommodate existing and future traffic. A project location map illustrating

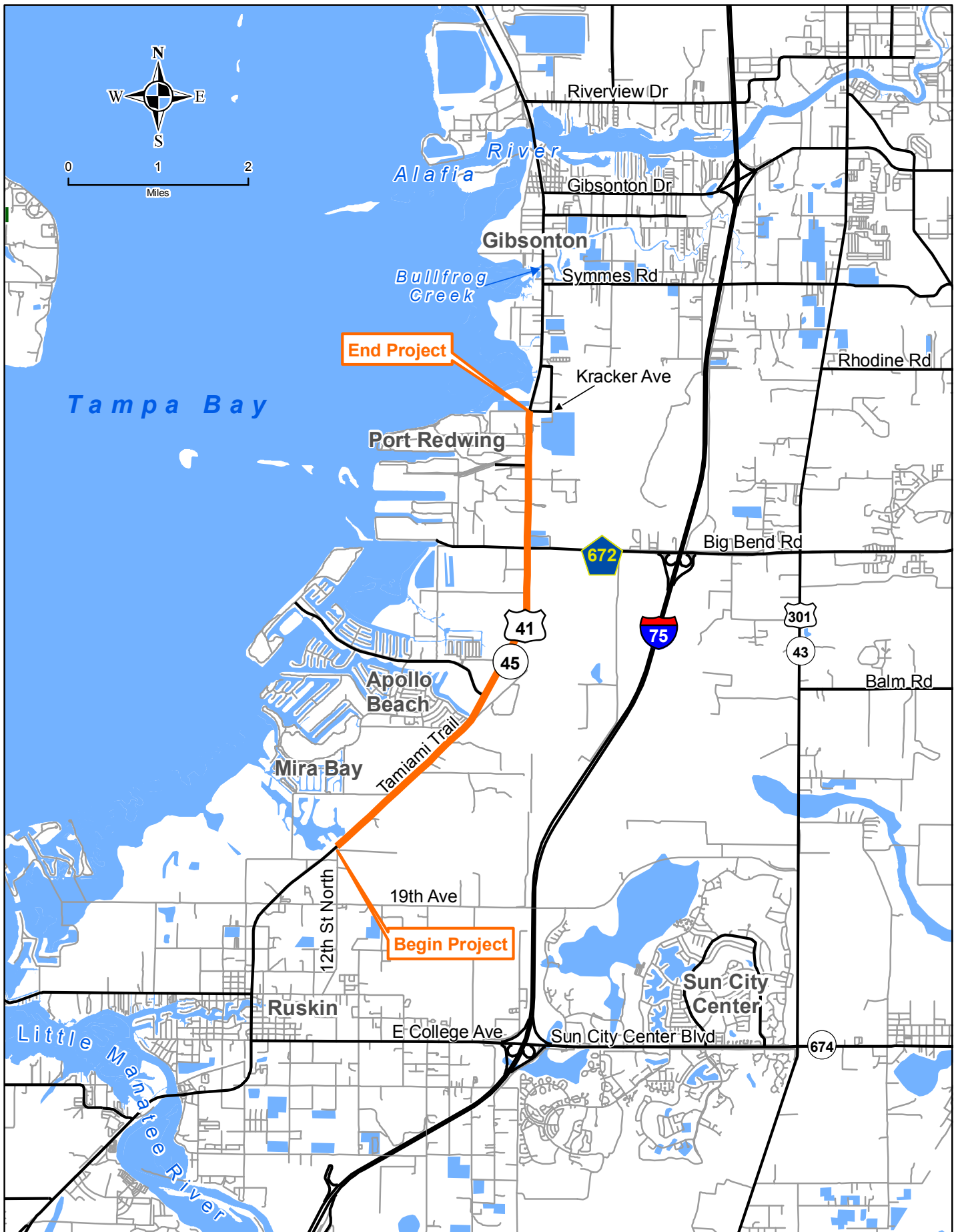
the PD&E study limits is shown in **Figure 2-1** and the existing and proposed typical sections are shown in **Figure 2-2**.

This Location Hydraulic Report has been prepared to address each base floodplain encroachment and to evaluate the impacts of the conceptual improvements on each base floodplain in accordance with the regulations listed in Chapter 24 (rev. 01-07-08) of the FDOT PD&E Manual. The study limits of the US 41 corridor traverses seven regional sub basins within the Alafia River Regional Basin and there are 15 cross drains in place to allow each regional sub basin to drain, see **Tables 3-1 & 3-2** for basin and cross drain locations.

Section 2 – INTRODUCTION

2.1 Project Description

The Florida Department of Transportation (FDOT) conducted a Project Development and Environment (PD&E) Study to evaluate alternative improvements to US 41 (SR 45). This project involves a 6.2 mile segment of US 41 from 12th Street extending north to Kracker Avenue in Hillsborough County (**Figure 2-1**). The highway is to be improved from an existing, four-lane rural facility to an urban and suburban six-lane divided facility. There are no bridge structures located within this segment of US 41; however, bridge culvert widening or replacement is anticipated over Wildcat Creek and Newmans Branch. The proposed improvements will include construction of stormwater management facilities and various intersection improvements, in addition to bicycle and pedestrian facilities. The study area is located in Township 31, Range 19, and Sections 2, 3, 10, 11, 14, 15, 22, 27, 28, 32 and 33.



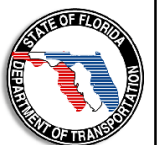
US 41 (SR 45) PD&E Study

from 12th Street to Cracker Avenue
 Hillsborough County, FL
 WPI Segment No. 421140-8

Project Location Map

Source: FGDL

Figure X-X



Purpose and Need

The purpose of the proposed project is to provide a higher capacity and safer facility to better meet future transportation demand in this rapidly developing area of Hillsborough County. US 41 runs parallel to and west of I-75. US 41 is a major north-south urban principal arterial that connects numerous communities along the west coast of Florida, including Ruskin, Apollo Beach and Gibsonton. This anticipated traffic growth and existing high levels of congestion create a need to analyze the corridor for necessary improvements to ensure this facility does not continue to deteriorate resulting in unacceptable levels of service. The PD&E Study will also include the consideration of a No-Build Alternative.

US 41 is functionally classified as an “urban principal arterial – other”. While US 41 is not on the Strategic Intermodal System (SIS), a short (0.92 miles) segment of US 41 between Pembroke Road and Big Bend Road (CR 672) is part of a SIS connector, which connects the Port of Tampa to I-75, both of which are SIS facilities. The Strategic Intermodal System (SIS) is a statewide network of highways, railways, waterways and transportation hubs that handle the bulk of Florida’s passenger and freight traffic. This project is included in the Hillsborough County Metropolitan Planning Organization’s (MPO) Year 2025 Long-Range Transportation Plan (LRTP) as an unfunded need. The West Central Florida MPO Chair’s Coordinating Committee (CCC) has classified US 41 as a “regional road” and as an “unfunded need” on the “regionally significant road network” in west central Florida. This corridor is also designated as an emergency evacuation route.

A longer segment of US 41 was evaluated in the Programming Screen of the Efficient Transportation Decision Making (ETDM) process (project #5180) in 2008, for a larger area along US 41 from 19th Avenue NE to Gibsonton Drive. This process established the Class of Action as a State Environmental Impact Report (SEIR).

2.2 Purpose of Report

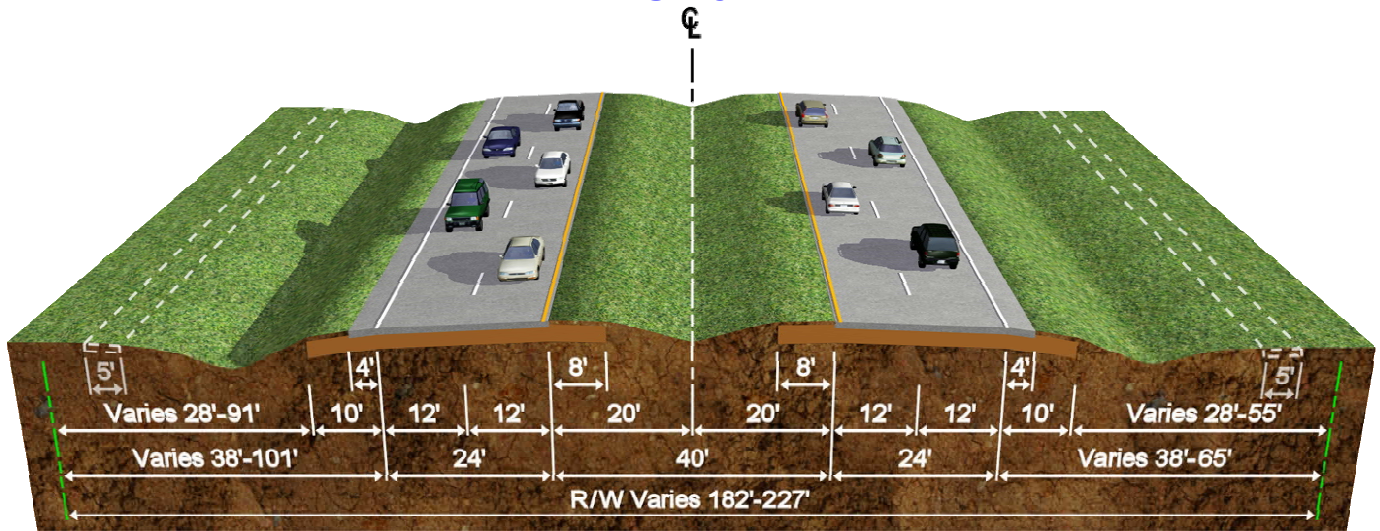
The purpose of this Location Hydraulic Report was to address each base floodplain encroachment and to evaluate the impacts of the conceptual improvements on each base floodplain in accordance with the regulations listed in Chapter 24 (rev. 01-07-08) of the FDOT PD&E Manual. The study limits of the US 41 corridor traverses seven regional sub basins within the Alafia River Regional Basin and there are 15 cross drains in place to allow each regional sub basin to drain, see **Tables 3-1 & 3-2** for basin and cross drain locations.

2.3 Existing Facility and Proposed Improvements

US 41 currently has a 4-lane divided rural typical section (**Figure 2-2**). The existing roadway has 11.5 to 12.0 ft travel lanes, 4-ft paved inside and outside shoulders, and a 40-ft grassed median. The posted speed limit is 55 miles per hour (mph) except for a short segment on either side of Big Bend Road, which is posted at 45 mph. The existing right-of-way typically varies from 182 ft to 227 ft.

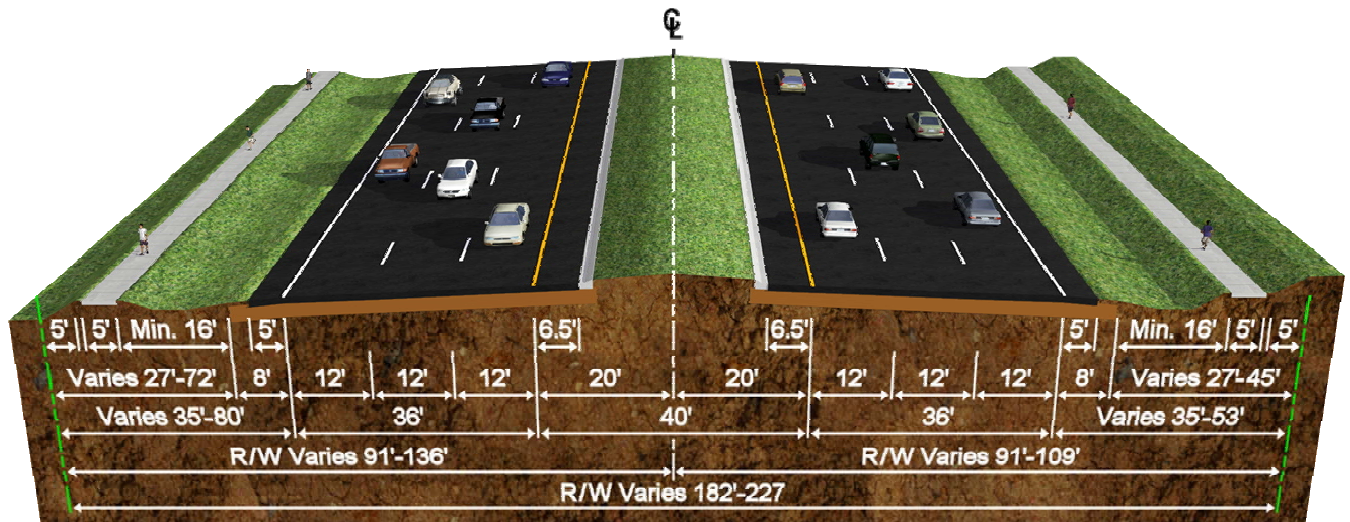
Expected improvements include widening to six lanes as well as intersection improvements and construction of stormwater management facilities and bicycle and pedestrian facilities. In addition to six basic lanes, auxiliary lanes are also proposed in the vicinity of Apollo Beach Boulevard and Big Bend Road (CR 672). Preliminary recommended roadway typical sections are shown in **Figure 2-2**. A “No-Build” Alternative will also be considered. The proposed project is not funded in FDOT’s current 5-year work program.

US 41 Existing Typical Section



(Existing 5-ft sidewalks are intermittent)

US 41 Proposed Suburban Typical Section

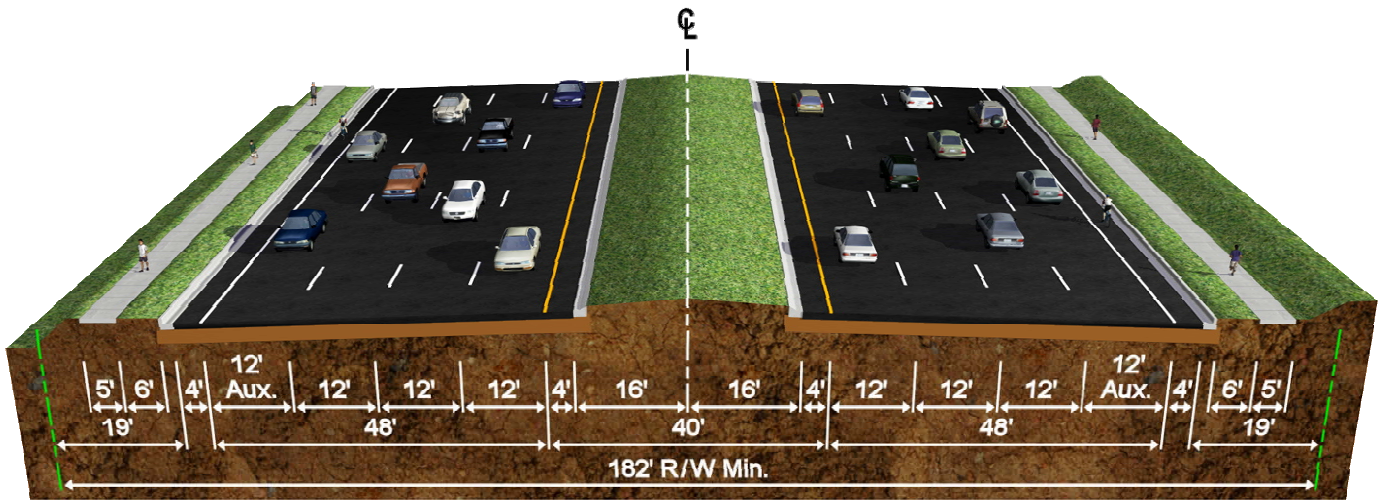


6-Lane Suburban

Design Speed = 50 MPH

Rev. 7/30/09



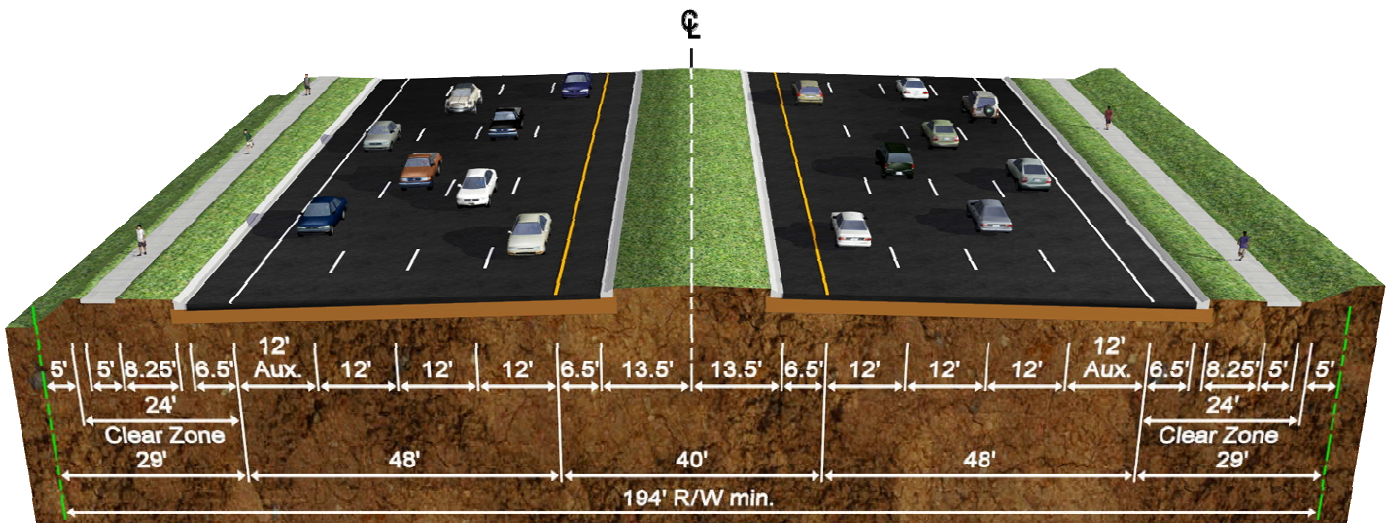


6-Lane Urban with Auxiliary Lanes*

Design Speed = 45 MPH

*This typical section applies to two segments:

1. From Flamingo Drive to approximately 1000 ft north of Apollo Beach Blvd
2. Approximately 1000 ft south of Big Bend Road to Big Bend Road



6-Lane High-Speed Urban with Auxiliary Lanes**

Design Speed = 50 MPH

**This typical section applies to US 41 from Big Bend Road to Pembroke Road, which is part of a Strategic Intermodal System (SIS) connector route which connects the Port of Tampa to I-75.

Rev. 2/27/09



Section 3.0 – HYDRAULIC ANALYSIS

The information presented in this document is subject to change until the final Phase of the project. This Location Hydraulic Report (LHR) is preliminary and used as an engineering tool to identify potential floodplain encroachments as a result of the conceptual improvements. The calculations presented in this report are preliminary and help in estimating the preliminary size of the Floodplain Compensation (FPC) sites for each basin. The FPC site locations are screened using preliminary information based upon many assumptions and judgements. The FPC sizes and locations included in the documentation are subject to change throughout the preliminary engineering and project design phases (1 thru final).

This Location Hydraulic Report has been prepared to address each base floodplain encroachment and to evaluate the impacts of the conceptual improvements on each base floodplain in accordance with the regulations listed in Chapter 24 (rev. 01-07-08) of the FDOT PD&E Manual. The study limits of the US 41 corridor traverses seven regional sub basins within the Alafia River Regional Basin and there are 15 cross drains in place to allow each regional sub basin to drain, see **Tables 3-1 & 3-2** for basin and cross drain locations. The following 10 items have been addressed to document that the floodplain encroachments will not cause significant changes in base flood elevations or limits.

1. **History of Flooding:** USGS Quadrangle maps, SWFWMD 1-foot contour aerial maps and Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) were used to identify flood-prone areas within the I-75 study area. Field inspections were conducted in June 2008 to identify obvious drainage problems. Additionally, local maintenance offices having jurisdiction within the study area were contacted to determine any history of flooding problems within the study area. As a result of this evaluation and coordination, no flooding problems associated with existing drainage conditions have been identified for the length of the study limits.

Table 3-1 Drainage Basin Data

Regional Drainage Basin	Regional Sub Basins	Project Basin No.	Project Basin Boundaries	Project Basin Acreage (ac)	Outfall Location & Side
Alafia River	Wolf Branch Cutoff Canal	1A	Sta 162+50 to Sta 173+72	5.07	Sta 169+50 LT
		1	Sta 173+72 to Sta 189+03	6.32	Sta 180+60 LT
		2	Sta 189+03 to Sta 230+00	17.15	Sta 199+33 LT
	Golf Course Drain	3	Sta 230+00 to Sta 253+08	9.66	Sta 237+09 LT
	Apollo Beach Canal	4	Sta 253+08 to Sta 275+41	9.33	Sta 260+81 LT
	Newman Branch	5	Sta 275+41 to Sta 321+87	19.47	Sta 284+03 LT
	Big Bend Bayou	6	Sta 321+87 to Sta 340+33	7.69	Sta 324+50 LT
		7	Sta 340+33 to Sta 372+72	14.62	Sta 365+19 LT
		8	Sta 372+72 to Sta 391+30	6.76	Sta 382+64 LT
		9	Sta 391+30 to Sta 402+23	4.52	Sta 395+95 LT
		10	Sta 402+23 to Sta 411+94	4.10	Sta 407+04 LT
		11	Sta 411+94 to Sta 439+78	11.61	Sta 418+32 LT
		12	Sta 439+78 to Sta 444+27	1.88	Sta 442+57 LT
	Kitchen Branch	13	Sta 444+27 to Sta 458+13 (west of centerline)	2.90	Sta 451+34 LT
	Direct Runoff to Bay	14	Sta 444+27 to Sta 471+26 (east of centerline)	5.64	Sta 471+26 RT
15		Sta 458+13 to Sta 471+26 (west of centerline)	2.73	Sta 471+26 LT	
			Total	129.45	

Table 3-2 Existing Cross Drains

Cross Drain No.	Station	Pipe Size and Type
1A	169+50	(2) 6' x 4' CBC
1	180+60	36" RCP
2	199+33	8' x 4' CBC
3	237+09	10' X 5' CBC
4	260+81	(3) 12' x 8' CBC (Wildcat Creek)
5	284+03	54" RCP
6	302+48	36" RCP
7	324+50	(2) 10' x 6' CBC (Newman's Branch)
8	355+71	36" RCP
9	365+19	8' x 5' CBC
10	382+64	10' x 4' CBC
11	395+95	34" x 53" ERCP
12	407+04	36" RCP
13	422+90	36" RCP
14	442+57	(2) 10' x 4' CBC

2. Longitudinal or Transverse Encroachments: All of the encroachments are longitudinal. **Table 3-3** is a tabulated summary of floodplain encroachments and impacts within each project basin. FPC sites will be provided for volume compensation (cup for cup) for all floodplain impacts as a result of the floodplain encroachments.

3. Avoidance Alternatives: The floodplain encroachments resulting from the proposed improvements may be reduced during the design phase by adjusting the typical sections within the encroachment areas and steepening the side slopes or possibly adding retaining walls. Additionally, the stormwater management facilities (SMF) serving the project will be located to avoid or minimize impacts to floodplain resources and functions where reasonable and feasible.

4. Emergency Services and Evacuations: US 41 (SR 45) has no history of stormwater overtopping due to the existing floodplain; therefore, no emergency services or evacuation opportunities will be adversely affected.

5. Base Flood Impacts: The FEMA FIRMs indicate that the entire US 41 (SR 45) right-of-way is within Zone AE (EL 9.0 ft) from Station 162+50 to Station 251+50 and Zone AE (EL 10 ft & 11 ft) from Station 395+00 to Station 470+00. The roadway elevations within these station ranges are below the Zone AE elevations. Since this roadway is a designated hurricane evacuation route, the PGL elevations within these station ranges may be raised during the subsequent design phase. The estimated floodplain encroachment areas and impacts shown in **Table 3-3** account for any PGL elevation increases by including the entire right-of-way within those station ranges as encroachments. The project's drainage design will be consistent with local (FEMA), FDOT, and Southwest Florida Water Management District's (SWFWMD) design guidelines which state that no net encroachment, up to that encompassed by the 100-year event, will be allowed, and that compensating storage shall be equivalently provided; therefore, no significant changes in base flood elevations or limits will occur.

6. Regulatory Floodway: The FEMA FIRMs do not designate any areas within the study limits as Zone AE Floodway Areas.

Table 3-3 Preliminary Floodplain Encroachment Summary

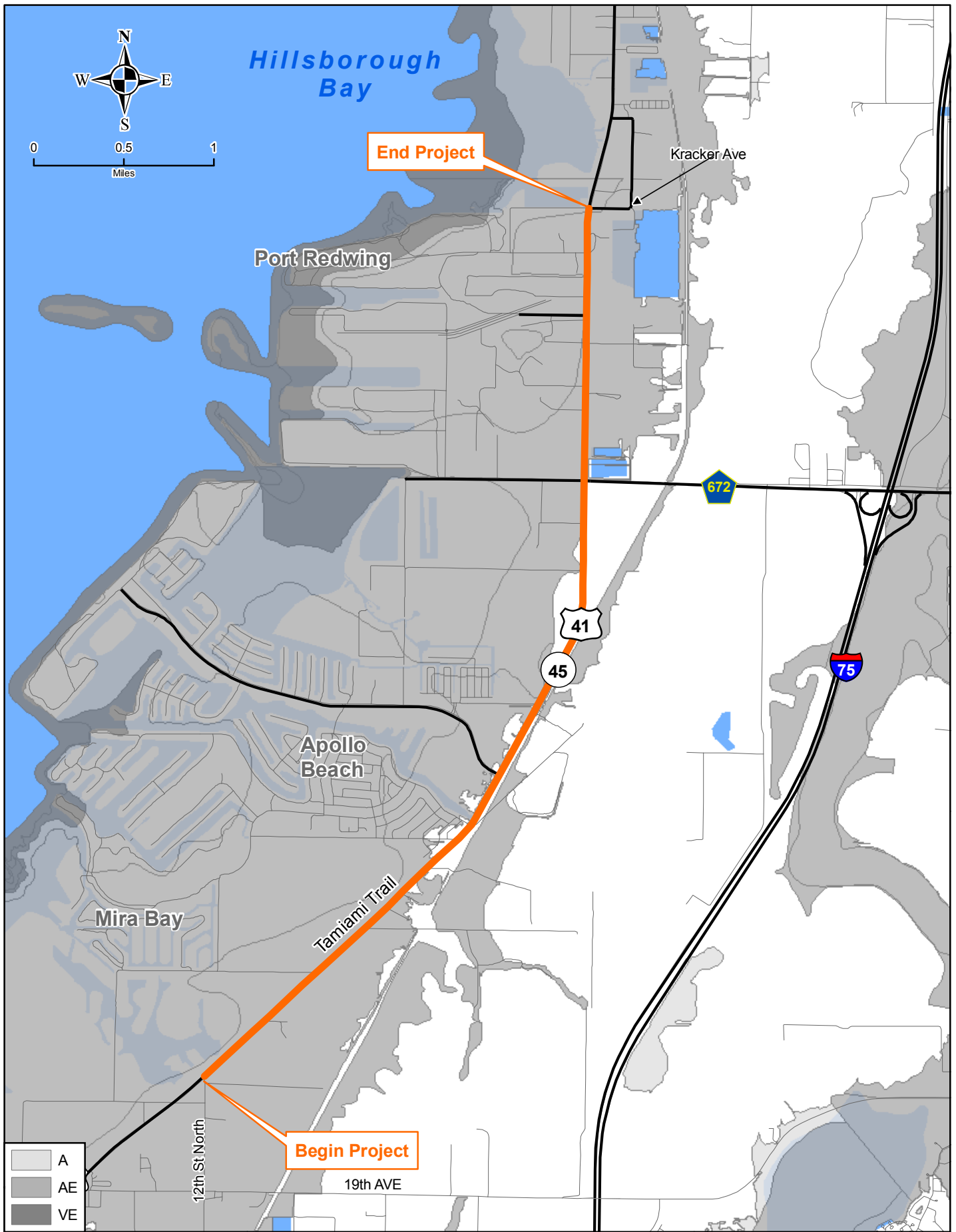
Regional Drainage Basin	Regional Sub Basins	Project Basin No.	Project Basin Boundaries	Zone AE 1% annual chance flood EL (ft -NAVD 88)	Estimated Floodplain Encroachment Area (ac)
Alafia River	Wolf Branch Cutoff Canal	1A	Sta 162+50 to Sta 173+72	9.0	4.63
		1	Sta 173+72 to Sta 189+03	9.0	6.32
		2	Sta 189+03 to Sta 230+00	9.0	17.15
	Golf Course Drain	3	Sta 230+00 to Sta 253+08	9.0	6.99
	Apollo Beach Canal	4	Sta 253+08 to Sta 275+41	9.0	1.80
	Newman Branch	5	Sta 275+41 to Sta 321+87	9.0	2.43
	Big Bend Bayou	6	Sta 321+87 to Sta 340+33	9.0	0.83
		7	Sta 340+33 to Sta 372+72	10.0	0.04
		8	Sta 372+72 to Sta 391+30	10.0	1.61
		9	Sta 391+30 to Sta 402+23	10.0	3.09
		10	Sta 402+23 to Sta 411+94	10.0	4.10
		11	Sta 411+94 to Sta 439+78	10.0-11.0	11.61
		12	Sta 439+78 to Sta 444+27	10.0-11.0	1.88
	Kitchen Branch	13	Sta 444+27 to Sta 458+13 (west of centerline)	10.0-11.0	2.90
	Direct Runoff to Bay	14	Sta 444+27 to Sta 471+26 (east of centerline)	10.0-11.0	5.64
15		Sta 458+13 to Sta 471+26 (west of centerline)	10.0-11.0	2.73	
			Total		73.75

1. The estimated 100-year floodplain elevations are taken from the Revised Preliminary FIRMs for Hillsborough County, panel numbers 0656H, 0493H, 0494H, 0492H and 0484H. It is anticipated that the Revised Preliminary FIRMs will supersede the Current Effective FIRMs on August 28, 2008.

7. Natural and Beneficial Floodplain Values: The proposed roadway will follow the same general alignment as the existing roadway and compensating storage will be provided equivalent to any proposed encroachments; therefore, no natural and beneficial floodplain values will be significantly affected.

8. Floodplain Consistency and Development: The proposed improvements are designed to accommodate increased future traffic volumes within the region as a result of the region's anticipated population growth. The proposed improvements are designed to allow an increased volume of traffic to pass through the region which could directly increase commercial development within the vicinity of the improvements and lead to an increase in floodplain development. All future development within the vicinity of the proposed improvements must comply with the National Flood Insurance Program, which stipulates that all floodplain impacts will be compensated for by an equivalent volume. The proposed improvements are consistent with the Future of Hillsborough Transportation Element, which is the Comprehensive Plan for Unincorporated Hillsborough County. The proposed improvements are also included within the Hillsborough County Metropolitan Planning Organization 2025 Long Range Transportation Plan. Any future development will be in accordance with designated land uses according to the Hillsborough County adopted comprehensive plan and land development regulations; therefore, no significant changes in base flood elevations or limits will occur.

9. Floodplain/FIRM: A GIS drawing of the FEMA FIRM panels illustrating the project limits are shown in **Figure 3-1**. The FIRMs for Hillsborough County (dated November 15, 2006 and September 28, 2007) are referenced to NAVD 1988. FEMA designates special flood hazard areas as areas subject to inundation by the 1% annual chance flood. **Table 3-3** is a tabulated summary of the potential maximum floodplain encroachment areas and impacts. The estimated 100-year floodplain elevations were used with SWFWMD 1-ft contour topographic maps, 2-ft LIDAR electronic data points, and the proposed alignment to estimate the preliminary encroachment areas. The refined encroachment areas will be determined during the subsequent design phase when more detailed survey and SMF sizing information is available.



US 41 (SR 45) PD&E Study
 from 12th Street to Kracker Avenue
 Hillsborough County, FL
 WPI Segment No. 421140-8

FEMA Flood Zones Map

Source: FGDL, FEMA

Figure X-X



10. **Risk Assessment:** Based on the FDOT’s floodplain categories, this project falls under Category 3: “projects involving modification to existing drainage structures.” Floodplain encroachments do not vary significantly with any of the alternatives and FPC sites will be provided for volume compensation (cup for cup) for all floodplain impacts as a result of the floodplain encroachments. The modifications to drainage structures included in this project will result in an insignificant change in their capacity to carry floodwater. This change will cause minimal increases in flood heights and flood limits. These minimal increases 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 not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.