

Prepared for:



FDOT District 5
719 South Woodland Boulevard
DeLand, Florida 32720



225 East Robinson Street, Suite 450
Orlando, FL 32801

SR 40 PD&E Study

From Breakaway Trail to Williamson Boulevard

Final Location Hydraulic Report

November 2012

Volusia County, Florida
Financial Project ID: 428947-1-22-01

Professional Engineer Certificate

I hereby certify that I am a registered professional engineer in the State of Florida practicing with Inwood Consulting Engineers, Inc., a corporation authorized to operate as an engineering business, FEID No. 59-3216593, by the State of Florida, Department of Professional Regulation, and Board of Professional Engineers. I have reviewed or approved the evaluation, findings, opinions and conclusions as reported in this Location Hydraulic Report.

The Location Hydraulic Report includes a summary of data collection efforts and design analysis for the floodplain impacts associated with the SR 40 PD&E Study from Breakaway Trail to Williamson Boulevard. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of civil engineering as applied through design standards and criteria set forth by the federal, state, and local regulatory agencies as well as professional judgment and experience.



Prepared by:



3000 Dovera Drive, Suite 200
Oviedo, Florida 32765
Phone: (407) 971-8850
Fax: (407) 971-8955

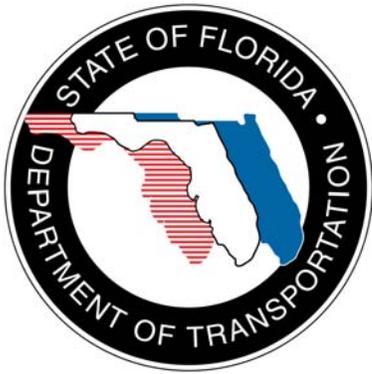
Signature: _____

Name: Renato Chuw, P. E.

P.E. Number: 56050

Date: November 16, 2012

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Phone: (407) 971-8850
Fax: (407) 971-8955

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EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT), District Five, is conducting a Project Development and Environment (PD&E) Study to evaluate alternative roadway concepts for the four lane to six lane widening of the segment of State Road (SR) 40 from Breakaway Trail to Williamson Boulevard, a distance of approximately two (2) miles. The study is being conducted as a State Environmental Impact Report (SEIR), as no federal funds are being sought for the improvements to this section of the corridor.

The need for the project is based on accommodating future traffic demand within the corridor, partly involving planned development. The study will develop and evaluate concepts that address traffic operations, intersection improvements, safety and provisions for bicycles and pedestrians. The study will also evaluate the anticipated impacts and costs for each concept. This project has been identified in the City of Ormond Beach, City of Daytona Beach, and Volusia County Comprehensive Plans, and is also part of the Volusia Transportation Planning Organization's 2035 Long Range Transportation Plan (LRTP).

State Road 40 is a regionally significant, east-west arterial that originates on the west coast of Florida and terminates in Ormond Beach, a distance of over 90 miles. This section of SR 40 is part of the Florida Scenic Highway network as well as a designated hurricane evacuation route. This two (2) mile segment is composed of residential land use (west of I-95) transitioning to commercial land use in the eastern portion. Improvements to the corridor will address the implementation of bicycle/pedestrian features, widening of the bridge over the Tomoka River, configuration of medians and utilization of existing right of way.

The overall purpose of this study is to begin developing a transportation improvement project that satisfies the project purpose and need, minimizes social, economic and environmental impacts, incorporates community input and obtains and maintains project consensus from agency partners and stakeholders.

The purpose of the Location Hydraulic Report is to address base floodplain encroachments resulting from the roadway improvements evaluated in the PD&E study. In accordance with Executive Order 11988 "Floodplain Management," USDOT Order 5650.2, "Floodplain Management Protection," and Federal-Aid Policy Guide 23 CFR 650A, floodplains must be protected. The intent of these regulations is to avoid or minimize highway encroachments within the 100-year (base) floodplains and to avoid supporting land use development incompatible with floodplain values.

Existing Drainage Conditions

The project is located within the Little Tomoka River and Tomoka River watersheds located within the St. Johns River Water Management District (SJRWMD). SR 40 is further divided into five (5) local drainage sub-basins for stormwater management. These basins ultimately discharge to the Little Tomoka River and Tomoka River which are considered Outstanding Florida Waters (OFW) and are also on the Florida Department of Environmental Protection (FDEP) 303(d) list of Impaired Water Bodies.

Basins 1 and 2 are within Water Body Identification Number (WBID) 2646: Little Tomoka River, which is impaired for dissolved oxygen; however there is no causative pollutant for the impairment. Basins 3, 4, and 5 are within WBID 2634: Tomoka River, which was placed on the

planning list for impairment for dissolved oxygen on September 21, 2007. Currently there is no causative pollutant identified for this WBID, but it will remain on the planning list until one is identified. During final design, a review of FDEP's 303(d) List of Impaired Water Bodies should be conducted, as additional information regarding Total Maximum Daily Loads (TMDL's) may become available.

The existing land use within the two (2) mile stretch of SR 40 is predominantly residential west of I-95 and transitions to commercial approaching and east of I-95. It is anticipated that the proposed roadway widening will result in minimal wetland impacts. Pond alternative recommendations will be based on avoidance of wetland impacts whenever possible. The topography surrounding the project vicinity is relatively flat; however, ground elevations along SR 40 rise to around 27 feet and drop as low as 16 feet within the study limits. Portions of the project are located within the Tomoka River recharge area.

There are four (4) existing permitted stormwater treatment ponds to treat and attenuate the runoff from SR 40 between Breakaway Trail and Williamson Boulevard. Currently, the stormwater runoff from SR 40 is collected by roadside swale systems that flow to the existing stormwater ponds and discharged to the Little Tomoka River in Basin 1 or the Tomoka River in Basins 3, 4, and 5. Basin 2, which lies between cross drain CD-1, at approximately station 1320+45, and Tymber Creek Road at station 1346+50, is collected in a roadside swale system which discharges directly to CD-1 and the Little Tomoka River. At the time when SR 40 was widened from two (2) to four (4) lanes, Basin 2 was permitted to flow untreated to the Little Tomoka River. The untreated runoff was compensated for by treating the two (2) existing lanes of SR 40 in Basin 1. There are two (2) cross drains and one (1) bridge that convey stormwater runoff under SR 40 and, with the exception of CD-2, serve as outfall locations for the roadway. Please refer to **Appendix 3 – Preferred Alternative Roadway Plans** for the existing and proposed stormwater treatment ponds, stationing, cross drain locations and bridge location. **Table 1** shows a **Summary of Existing Cross Drains and Bridge**.

Table 1 – Summary of Existing Cross Drains Bridge

Cross Drain	Approximate Location	Description	Outfall
CD – 1	1320+45	(2) – 6' X 6' CBC	Little Tomoka River
Bridge – 1	1365+00	360' wide Bridge	Tomoka River
CD-2	1381+00	(2) – 24" RCP	Roadway Swale

Future Drainage Conditions

The existing drainage boundaries and local drainage basins will be maintained in the proposed condition. The stormwater runoff from SR 40 will be collected by a roadside swale system or a curb & gutter system which will convey stormwater to curb inlets and pipes, depending on the preferred typical section, which will flow to stormwater management ponds. The water quality treatment will be achieved through the utilization of both proposed and existing stormwater ponds.

The existing roadway typical section for SR 40 consists of four 12-foot wide travel lanes (two lanes in each direction), separated by a 40-foot to 46-foot wide grassed median with paved shoulders adjacent to the outside travel lanes. An 8-foot wide concrete sidewalk runs on the

north side of SR 40 between Breakaway Trail and Tymber Creek Road. Typical sections for the widening of SR 40 from 4 to 6 lanes were presented for public comment at the Public Kick-off Meeting in July 2012. The study area was broken into two segments for the PD&E Study; from Breakaway Trail to Tymber Creek Road, and from Tymber Creek Road to I-95. Three typical sections were presented for each segment. For the segment from Breakaway Trail to Tymber Creek Road the alternatives included a rural (maintain existing 60 mph design speed, to be posted at 50 mph), suburban (50 mph), and high-speed urban (50 mph) typical sections. For the segment of SR 40 between Tymber Creek Road and I-95, the alternatives included a suburban (50 mph), high-speed urban (50 mph), and urban (45 mph). The segment of SR 40 between I-95 and Williamson Road was developed as an independent alternative to fit within the constraints of the existing roadway, I-95 overpass bridge, and right-of-way. These typical sections were evaluated to determine the comparative costs, constructability, safety, and fit with the surrounding land use context. Based on this evaluation, the suburban typical section was eliminated from further study.

The future land uses, desired design speed and pedestrian and bicycle mobility are important factors in addition to vehicle capacity and mobility in the selection of a proposed 6-lane roadway typical section. The remaining two typical sections for each study segment have been applied to the roadway alignment in order to assess the right-of-way and environmental impacts of each typical section. Based on the different combinations of typical sections possible for the corridor, the following roadway design alternatives were developed in **Table 2**:

Table 2 – Typical Sections Developed within the Project Corridor

Alternative	Typical Section		
	Breakaway Trail to Tymber Creek Road	Tymber Creek Road to I-95	I-95 to Williamson Boulevard
A	Rural (60 mph design, 50 mph Posted)	High-Speed Urban (30-ft median) (50 mph)	Same for Alternatives A, B, C, D. Includes sidewalk adjacent to Roadway both sides of SR 40
B	Rural (60 mph design, 50 mph Posted)	Urban (45 mph)	
C	High-Speed Urban (40-ft median) (50 mph)	High-Speed Urban (30-ft median) (50 mph)	
D	High-Speed Urban (40-ft median) (50 mph)	Urban (45 mph)	
E	N/A (only applies to Williamson Blvd)		Sidewalk on north side of SR 40 set back behind utility poles

The roadway typical section alternatives outlined above are currently being evaluated to determine how each addresses the purpose and needs of the project. Important factors in this evaluation include compatibility and consistency within the corridor, design speed, right-of-way impacts, utility impacts, environmental impacts, pedestrian and bicycle considerations, drainage needs, and construction cost estimates. Of the alternatives outlined above, alternative B is the preferred alternative.

This project will have no adverse impact to the area’s water quality. Stormwater runoff of the project area will be treated as required by the rules set forth by the Saint John’s River Water Management District (SJRWMD) (Chapter 40C-42 F.A.C., Section 40C-42.026, Specific Design and Performance Criteria) and FDOT. Refer to the **SR 40 PD&E Study Pond Siting Report** for descriptions of the sub-basins and stormwater management facilities.

Floodplain Impacts

The Federal Emergency Management Agency (FEMA) has developed a Flood Insurance Rate Map (FIRM) for Volusia County. SR 40 primarily traverses Zone X of the FEMA designated floodplain, which are areas determined to be outside the 500-year floodplain. However, areas designated as Zone AE, which are areas in which base flood elevations have been determined, are located along the roadway in two (2) locations.

The first location is at cross drain CD-1 and is associated with a tributary to the Little Tomoka River. The base flood elevation was determined to be at elevation 13.00 feet NGVD 29 on the north side of the roadway. The south side of SR 40 at this location is designated as Zone A, which are areas where no base flood elevations are determined.

The second location is associated with the Tomoka River, where the base flood elevation was determined to be at elevation 10.00 feet NGVD 29. The Tomoka River is a federally designated floodway.

The Tomoka River is a regulated floodways within the project limits. There will be floodplain involvement with this federally defined floodway. A FEMA No-Rise Certification will be required for this regulated floodway.

This project will impact the 100-year floodplain in three different ways:

- 1) Longitudinal roadway impacts resulting from filling the floodplain areas associated with the Little Tomoka River and the Tomoka River;
- 2) Transverse impacts resulting from the extension or replacement of the existing cross drain culverts;
- 3) Transverse impacts resulting from widening of the bridge structures.

The longitudinal roadway impacts cannot be avoided since the floodplain associated with the water bodies extend both to the north and south of SR 40. During the PD&E Study, four (4) typical section alternatives were analyzed. It is anticipated that the project will impact approximately 0.343 ac-ft of the 100-year floodplain associated with the roadway improvements and 0.171 ac-ft due to the construction of Pond 3B, if it becomes the preferred alternative for Basin 3. During the final design phase of the project, every effort should be taken to minimize the floodplain impacts. Refer to **Appendix 2** for the Floodplain Impact/Compensation Exhibits for each floodplain location.

The transverse impacts resulting from the extension and/or replacement of the culverts are analyzed in the PD&E phase of the project. It is expected that impacts will occur to the floodplain associated with the extension of CD-1. No additional right-of-way is proposed in this area to compensate for the loss of storage created by the extension. The extension itself provides volume within the box culvert and it is possible to provide compensation within the existing right-of-way through scrape down areas. However, during the final design phase of the project, every necessary action should be taken to minimize upstream impacts. To minimize upstream impacts, FDOT design criteria for conveyance systems (e.g. culverts) allows no significant increase in flood stages at the upstream end of the structures.

The floodplain impacts resulting from the bridge widening are not considered and analyzed during the PD&E phase of the project. Impacts resulting from the widening and construction of the bridges at the Tomoka River should be minimal. As a minimum, the designers should maintain the horizontal and vertical openings at the bridges similar to the existing condition. During the design phase of the project, a Bridge Hydraulic Report (BHR) will be prepared to document the hydraulic impacts of the widening. In addition, because the Tomoka River is a regulated floodway, a FEMA No-Rise Certification will be required demonstrating no significant rise in headwater elevations.

No adverse impacts are anticipated to the floodplain. The SJRWMD and FDOT criteria require replacement of floodplain storage lost as a result of encroachments. There is no change in flood "Risk" associated with this project. The floodplain is located in a low density, urbanized area, and the encroachments are classified as "minimal". Minimal encroachments on a floodplain occur when there is a floodplain involvement but the impacts on human life, transportation facilities, and natural and beneficial floodplain values are not significant and can be resolved with minimal efforts. Normally, these minimal efforts to address the impacts will consist of applying the Department's drainage design standards and following the Water Management District's procedures to achieve the results that will not increase or significantly change the flood elevations and/or limits.

The following floodplain statement is a slightly modified version of statement Number 4 in the FDOT PD&E Manual, tailored for this project:

The proposed cross drain and bridge widening will perform hydraulically in a manner equal to or greater than the existing condition, and backwater surface elevations are not expected to increase. As a result, there will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or in emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.

SECTION 1 INTRODUCTION

The Florida Department of Transportation (FDOT), District Five, is conducting a Project Development and Environment (PD&E) Study to evaluate alternative roadway concepts for the four lane to six lane widening of the segment of State Road (SR) 40 from Breakaway Trail to Williamson Boulevard, a distance of approximately two (2) miles. The study is being conducted as a State Environmental Impact Report (SEIR), as no federal funds are being sought for the improvements to this section of the corridor.

The need for the project is based on accommodating future traffic demand within the corridor, partly involving planned development. The study will develop and evaluate concepts that address traffic operations, intersection improvements, safety and provisions for bicycles and pedestrians. The study will also evaluate the anticipated impacts and costs for each concept. This project has been identified in the City of Ormond Beach, City of Daytona Beach, and Volusia County Comprehensive Plans, and is also part of the Volusia Transportation Planning Organization's 2035 Long Range Transportation Plan (LRTP).

State Road 40 is a regionally significant, east-west arterial that originates on the west coast of Florida and terminates in Ormond Beach, a distance of over 90 miles. This section of SR 40 is part of the Florida Scenic Highway network as well as a designated hurricane evacuation route. This two (2) mile segment is composed of residential land use (west of I-95) transitioning to commercial land use in the eastern portion. Improvements to the corridor will address the implementation of bicycle/pedestrian features, widening of the bridge over the Tomoka River, configuration of medians and utilization of existing right of way.

The overall purpose of this study is to begin developing a transportation improvement project that satisfies the project purpose and need, minimizes social, economic and environmental impacts, incorporates community input and obtains and maintains project consensus from agency partners and stakeholders.

The project is within Sections 25, 26, and 35 of Township 14 South, Range 31 East and Section 30 of Township 14 South, Range 32 East. Refer to the [USGS Quadrangle Map](#) in [Figure 2, Appendix 1](#).

The purpose of this Location Hydraulic Report is to address base floodplain encroachments resulting from the roadway improvements evaluated in the Project Development and Environment (PD&E) study. In accordance with Executive Order 11988 "Floodplain Management", USDOT Order 5650.2, "Floodplain Management Protection", and Federal-Aid Policy Guide 23 CFR 650A, floodplains must be protected. The intent of these regulations is to avoid or minimize highway encroachments within the 100-year (base) floodplains and to avoid supporting land use development incompatible with floodplain values. All project figures for this report are included in [Appendix 1](#). For ease of review, Floodplain Impact data is included in [Appendix 2](#). The datum used for all calculations is 1988 NAVD unless otherwise specified. Other supporting information and data are included in the remaining appendices.

SECTION 2 PROJECT DESCRIPTION

The Florida Department of Transportation (FDOT), District Five, is conducting a Project Development and Environment (PD&E) Study to evaluate alternative roadway concepts for the four lane to six lane widening of the segment of State Road (SR) 40 from Breakaway Trail to Williamson Boulevard, a distance of approximately two (2) miles. The study is being conducted as a State Environmental Impact Report (SEIR), as no federal funds are being sought for the improvements to this section of the corridor.

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SECTION 3 DATA COLLECTION

The study team collected and reviewed data from the following sources:

- FDOT Drainage Manual, March 2012.
- FDOT Drainage Handbook: "Stormwater Management Facility", January 2004
- FDOT Project Development and Environment Manual (PD&E), Part 2, Chapter 24 "Floodplains," January 2008
- SJRWMD Applicant's Handbook: "Management and Storage of Surface Waters", December 2010
- SJRWMD, Chapter 40C-42 F.A.C., Environmental Resource Permit (ERP), "Regulation of Stormwater Management Systems", December 2010
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for Volusia County. Panel # 12127CO194H, 12127CO200H, 12127CO213H, 12127CO350G, 12127CO351G.
- Volusia County Soils maps 2009.
- FDEP 303(d) list of Impaired Water Bodies
- United States Geological Survey (USGS) Quad maps
- Site Visit (March 13, 2012)
- Volusia County Tax maps
- Topographic Survey (1-foot LIDAR Contours)

- Natural Environment Report, Inwood Consulting Engineers, July 2012
- Preliminary Soil Survey Report, Antillian Engineering Associates, June 2012
- Contamination Screening Evaluation Report, Nodarse & Associates (A Terracon Company), January 2012
- Cultural Resource Assessment Survey
- SR 40 Straight Line Diagrams
- SJRWMD Permit #'s 4-127-23005-2, 4-127-23036-5, 4-127-67904-1

SECTION 4 EXISTING SITE CONDITIONS

4.1 TOPOGRAPHY & HYDROLOGIC FEATURES

There are two (2) cross drains and one (1) bridge that convey stormwater runoff under SR 40 and, with the exception of CD-2, serve as outfall locations for the roadway runoff. Stormwater runoff is currently treated in existing stormwater ponds except for the portion of SR 40 between CD-1 and Tymber Creek Road. For Basin 2, runoff is currently untreated and discharged to CD-1 and to the Little Tomoka River. **Table 5** shows a **Summary of Existing Cross Drains and Bridge**.

4.2 SOILS DATA & GEOTECHNICAL INVESTIGATIONS

The Soil Survey of Volusia County, Florida, published by Volusia County (dated 2009) has been reviewed for the project vicinity. The soil survey map for the project vicinity is illustrated in **Figure 4– NRCS Soils Map**, in **Appendix 1**.

Thirty-one (31) types of soils were encountered along the project limits because of the limited project coverage. The soil types vary and range from Hydrologic Soil Group (HSG) 'A' to HSG 'D'. Type 'A' soils are very well drained soils with low water tables and Type 'D' soils are very poorly or poorly drained soils with high water tables. **Table 3 – NRCS Soil Survey Information** summarizes and lists the soil types and relevant information.

Table 3 – NRCS Soil Survey Information

Soil No.	Volusia County USDA Soil Name	Seasonal High Ground Water				HSG	Soil Classification		
		Duration (months)		Depth* (feet)			Depth (inches)	Unified	AASHTO
		BEG	END	HIGH	LOW				
1	Apopka	---	---	>6.0	---	A	0-62	SP, SP-SM	A-3
							62-80	SM-SC, SC	A-2-4, A-2-6, A-4,A-6
3	Arents	---	---	>6.0	---	A	0-95	SP, SP-SM	A-3
4	Astatula	---	---	> 6.0	---	A	0-95	SP, SP-SM	A-3
8	Basinger	JUN	FEB	+2	1.0	A/D	0-90	SP, SP-SM	A-3, A-2-4
13	Cassia	JUL	JAN	1.5	3.5	C	0-28	SP, SP-SM	A-3
							28-36	SP-SM, SM	A-3, A-2-4
							36-80	SP, SP-SM	A-3

Continued on next page.

Soil No.	Volusia County USDA Soil Name	Seasonal High Ground Water				HSG	Soil Classification		
		Duration (months)		Depth* (feet)			Depth (Inches)	Unified	AASHTO
		BEG	END	HIGH	LOW				
17	Daytona	JUL	NOV	3.5	5.0	B	0-36	SP, SP-SM	A-3
							36-47	SP, SP-SM	A-3
							47-80	SP, SP-SM, SM	A-3, A-2-4
19	Deland	---	---	> 6.0	---	A	0-4	SP, SP-SM	A-3
							4-55	SP, SP-SM	A-3
							55-67	SP-SM, SM	A-3, A-2-4
							67-94	SP-SM, SM	A-3, A-2-4
22	Electra	JUL	OCT	2.0	3.5	C	0-35	SP, SP-SM	A-3
							35-52	SP-SM, SM	A-3, A-2-4
							52-57	SP-SM	A-3, A-2-4
							57-70	SC, SC-SM	A-2, A-4, A-6
23	Farmton	JUN	OCT	0	1.0	D	0-7	SP, SP-SM	A-3
							7-34	SP, SP-SM	A-3
							34-50	SP-SM, SM	A-3, A-2-4
							50-80	SM, SM-SC, SC	A-2-4
24	Fluvaquents	---	---	---	---	D	---	---	---
30	Immokalee	JUN	SEP	+2.0	1.0	A/D	0-8	SP, SP-SM	A-3
							8-36	SP, SP-SM	A-3
							36-50	SP-SM, SM	A-3, A-2-4
							50-80	SP, SP-SM	A-3
31	Malabar	JUN	SEP	0	1.0	B/D	0-15	SP, SP-SM	A-3
							15-32	SP, SP-SM	A-3, A-2-4
							32-42	SP, SP-SM	A-3
							42-80	SC, SM-SC	A-2, A-4, A-6
32	Myakka	JUN	FEB	0	1.0	A/D	0-27	SP, SP-SM	A-3
							27-43	SM, SP-SM	A-3, A-2-4
							43-78	SP, SP-SM	A-3
34	Myakka	JUN	FEB	+2.0	1.0	A/D	0-27	SP, SP-SM	A-3
							27-43	SM, SP-SM	A-3, A-2-4
							43-78	SP, SP-SM	A-3
37	Orsino	JUN	DEC	3.5	5.0	A	0-30	SP	A-3
							30-80	SP, SP-SM	A-3
40	Palm Beach	---	---	>6.0	---	A	0-80	SP, SW	A-3
45	Pineda	JUN	NOV	0	1.0	B/D	0-40	SP, SP-SM	A-3
							40-96	SC, SM-SC	A-2-4, A-2-6
47	Pits	---	---	---	---	---	---	---	---
49	Pomona	JUL	SEP	0	1.0	B/D	0-5	SP, SP-SM	A-3, A-2-4
							5-18	SP, SP-SM	A-3, A-2-4
							18-45	SP, SP-SM	A-3, A-2-4
							45-50	SP, SP-SM	A-3, A-2-4
							50-60	SC, SM-SC	A-2, A-4, A-6
50	Pomona	JUL	SEP	+2.0	1.0	B/D	0-7	SP, SP-SM	A-3, A-2-4
							7-14	SP, SP-SM	A-3, A-2-4
							14-33	SP-SM, SM	A-3, A-2-4
							33-53	SP, SP-SM	A-3, A-2-4
							53-70	SC-SM-SC	A-2, A-4, A-6
51	Pomona	JUL	SEP	+2.0	1.0	B/D	0-7	SP, SP-SM	A-3, A-2-4
							7-14	SP, SP-SM	A-3, A-2-4
							14-33	SP-SM, SM	A-3, A-2-4
							33-53	SP, SP-SM	A-3, A-2-4
							53-70	SC, SM-SC	A-2, A-4, A-6

Soil No.	Volusia County USDA Soil Name	Seasonal High Ground Water				HSG	Soil Classification		
		Duration (months)		Depth* (feet)			Depth (Inches)	Unified	AASHTO
		BEG	END	HIGH	LOW				
52	Pompano	JUN	NOV	0	1.0	A/D	0-80	SP, SP-SM	A-3, A-2-4
53	Pompano	JUN	NOV	+2.0	1.0	A/D	0-80	SP, SP-SM	A-3, A-2-4
54	Quartzipsamments	---	---	---	---	A	---	---	---
58	Satellite	JUN	NOV	1.0	3.5	C	0-80	SP	A-3
59	Scoggin	JUN	FEB	+1.0	1.0	D	4-0	Pt	A-8
							0-7	SP-SM, SM	A-3, A-2-4
							7-36	SP, SP-SM	A-3, A-2-4
							36-49	SC, SM-SC	A-2-4, A-2-6
							49-54	SC, SM-SC	A-2-4
63	Tavares	JUN	DEC	3.5	6.0	A	0-80	SP, SP-SM	A-3
65	Terra Ceia	JUN	APR	+1.0	1.0	A/D	0-64	Pt	---
75	Wauchula	JUN	FEB	0	1.0	B/D	0-7	SP-SM	A-3, A-2-4
							7-20	SP-SM	A-3, A-2-4
							20-29	SP-SM, SM	A-3, A-2-4
							29-34	SP-SM, SM	A-3, A-2-4
							34-80	SM, SM-SC, SC	A-2-4, A-2-6, A-4, A-6
76	Wauchula	JUN	SEP	+1.0	1.0	D	0-7	SP-SM	A-3, A-2-4
							7-22	SP-SM	A-3, A-2-4
							22-31	SP-SM, SM	A-3, A-2-4
							31-37	SP-SM, SM	A-3, A-2-4
							37-60	SM, SM-SC, SC	A-2-4, A-2-6, A-4, A-6
99	Water	---	---	---	---	---	---	---	---

* Depth is referenced below existing grade.

4.3 ENVIRONMENTAL CHARACTERISTICS

4.3.1 Land Use Data

Existing land use is predominantly residential to the west of I-95 and transitions into commercial approaching and east of I-95. The future land uses in the project area will not be altered. Please see **Figure 5, Existing Land Use Map**, and **Figure 6, Future Land Map**, in **Appendix 1**.

4.3.2 Cultural Features

Cultural features preserve and enhance the cultural nature of a community and include parks, schools, churches and other religious institutions. Also included are historic sites, archaeologically significant sites and neighborhood gathering places. Community services include facilities that provide necessary services such as fire stations, police stations, public and private schools, hospitals, cemeteries, public buildings, and civic facilities. The following is a list of sites in or near the project area:

- Riverbend Community Church
- Faith Lutheran Church
- Calvary Christian Center

- Oasis Christ Fellowship Church
- Coquina Presbyterian Church

Additional information regarding cultural features can be found in the **SR 40 PD&E Study, Pond Siting Report, Appendix 6 – Cultural Resource Assessment Report**.

4.3.3 Natural and Biological Features

The project corridor was evaluated for the presence of potentially-occurring species. Due to the fact that the project is located within a developed corridor, much of the quality of the habitat has been reduced or otherwise diminished due to its proximity to surrounding development.

There are two (2) federally-protected plant species with the potential to occur in Volusia County. In addition to species receiving federal protection, there are 22 plant species listed as either threatened or endangered by the State of Florida that have the potential to occur in Volusia County. No State or Federally listed plant species were observed within the proposed project corridor.

The proposed project has potential to involve several State and/or Federally listed wildlife species. Those species and their anticipated involvement are identified in the **SR 40 PD&E Study, Natural Environment Report**.

Nine (9) wetlands were identified within the 'Build' alternative limits based on project area topography, soils, land use and habitat types, and site verification. A list of wetlands, along with the U.S. Fish and Wildlife Service and Florida Land Use, Cover and Forms Classification System classifications, and a habitat description, is included in the **SR 40 PD&E Study, Natural Environment Report**. It is likely that this project will impact wetlands regulated by the State and Federal Governments. Pond alternative recommendations will be based on avoidance of wetland impacts whenever possible.

The project corridor traverses the Tomoka River, which is listed as an Outstanding Florida Water by the Florida Department of Environmental Protection, and is designated as Essential Fish Habitat by the National Marine Fisheries Service. Additionally, the entire project corridor falls within the Tomoka River Mitigation Basin (as defined by the St. Johns River Water Management District), within which, wetlands and uplands abutting the Tomoka River are afforded additional protection through the Riparian Wildlife Habitat Standard. The potential effects of the project on the Tomoka River, and wetland habitats are detailed in the **SR 40 PD&E Study, Natural Environment Report**.

4.4 EXISTING DRAINAGE CONDITIONS

The project is located within the Little Tomoka River and Tomoka River watersheds of the Northern Coastal Basin as defined by the St. Johns River Water Management District (SJRWMD). SR 40 is further divided into five (5) local drainage sub-basins for stormwater management. These basins ultimately discharge to the Little Tomoka River and Tomoka River which are considered Outstanding Florida Waters (OFW) and are also on the Florida Department of Environmental Protection (FDEP) 303(d) list of Impaired Water Bodies. The limits of the basins are shown in **Table 4 for Summary of Existing and Proposed Drainage Basins**.

Table 4 – Summary of Existing and Proposed Drainage Basins

Basin Name	From	To	Outfall Location
1	1282+00	1320+50	CD-1: Little Tomoka River Tributary
2	1320+50	1347+00	CD-1: Little Tomoka River Tributary
3	1347+00	1365+20	Tomoka River
4	1365+20	1375+00	Tomoka River
5	1375+00	1398+13	Tomoka River

Basins 1 and 2 are within WBID 2646: Little Tomoka River, which is impaired for dissolved oxygen; however there is no causative pollutant for the impairment. Basins 3, 4, and 5 are within WBID 2634: Tomoka River, which was placed on the planning list for impairment for dissolved oxygen on September 21, 2007. Currently there is no causative pollutant identified for this WBID, but it will remain on the planning list until one is identified. During final design, a review of FDEP's 303(d) List of Impaired Water Bodies should be conducted, as additional information regarding TMDL's may become available.

There are four (4) existing permitted stormwater ponds to treat and attenuate the runoff from SR 40 between Breakaway Trail and Williamson Boulevard. Currently, the stormwater runoff from SR 40 is collected by roadside swale systems that flow to the existing stormwater ponds and discharged to the Little Tomoka River in Basin 1 or the Tomoka River in Basins 3, 4, and 5. Basin 2, which lies between cross drain CD-1, at approximately station 1320+50, and Tymber Creek Road at station 1347+00, is collected in a roadside swale system which discharges directly to CD-1 and the Little Tomoka River. At the time when SR 40 was widened from two (2) to four (4) lanes, Basin 2 was permitted to flow untreated to the Little Tomoka River. The untreated runoff was compensated for by treating the two (2) existing lanes of SR 40 in Basin 1. There are two (2) cross drains and one (1) bridge that convey stormwater runoff under SR 40 and, with the exception of CD-2, serve as outfall locations for the roadway.

4.5 CROSS DRAINS & BRIDGES

The first crossing, CD-1 connects a tributary to the Little Tomoka River underneath the roadway and flows north, the second crossing is Bridge-1 which allows SR 40 to cross over the Tomoka River, and the third crossing CD-2 allows stormwater runoff to cross SR 40 to the south. CD-1 and Bridge-1 serve as discharge points for SR 40 and offsite runoff contributing areas along the project corridor. **Table 5** shows a **Summary of Existing Cross Drains and Bridge**.

Table 5 – Summary of Existing Cross Drains and Bridge

Cross Drain	Approximate Location	Description	Outfall
CD – 1	1320+45	(2) – 6' X 6' CBC	Little Tomoka River
Bridge – 1	1365+00	360' wide Bridge	Tomoka River
CD-2	1381+00	(2) – 24" RCP	Roadway Swale

Much of the area surrounding SR 40 is either developed and provides its own stormwater management, or flows north away from the roadway to the Little Tomoka River and east or

west to the Tomoka River. In instances where offsite runoff flows toward the roadway, proper conveyance of the runoff across SR 40 towards its historical path can be provided in the onsite drainage conveyance systems.

A 2.46 acre offsite area drains to the roadway in Basin 2 located on the southeast corner of Old Tomoka Road and SR 40 between station 1335+00 and station 1340+70. The existing land use appears to be woods that are in good condition and are protected from grazing. This area has low runoff potential and it is expected that the proposed pond sites can accommodate it. For more information on pond sites please refer to the **SR 40 PD&E Study Pond Siting Report**. All other areas flow away from SR 40.

During final design, a detailed Culvert Hydraulic Analysis should be performed to ensure that the proposed cross drain extensions or replacements do not result in a significant rise in the design high water (DHW) elevations for the Design Storm (50-year), Base Flood (100-year), and Greatest Flood (500-Year).

4.6 FLOODPLAINS/FLOODWAYS

The Federal Emergency Management Agency (FEMA) has developed a Flood Insurance Rate Map (FIRM) for Volusia County. SR 40 primarily traverses Zone X of the FEMA designated floodplain, which are areas determined to be outside the 500-year floodplain. However, areas designated as Zone AE, which are areas in which the base flood elevations have been determined, are located along the roadway in two (2) locations. The first location is at cross drain CD-1 and is associated with a tributary to the Little Tomoka River. The base flood elevation was determined to be at elevation 13.00 feet NGVD 29 (11.89 feet NAVD) on the north side of the roadway. The south side of SR 40 at this location is designated as Zone A, which are areas where no base flood elevations are determined. The second location is associated with the Tomoka River, where the base flood elevation was determined to be at elevation 10.00 feet NGVD 29 (8.89 feet NAVD). The Tomoka River is a federally designated floodway. If the effective base flood elevations (BFE) are proposed to be modified by determination of hydraulic and hydrologic analysis, the designer should proceed with the Letter of Map Revision (LOMR) process with FEMA. A Conditional Letter of Map Revision (CLOMR) may be appropriate as well. For regulated floodway areas where there will be no change proposed to effective base flood elevations (BFE), a No-Rise Certification will be required for work in FEMA Floodways.

Please see the **FEMA Flood Insurance Rate Maps in Appendix 1, Figure 7**. Minimal impacts to the 100-year floodplain are expected to occur with the SR 40 widening.

4.6.1 Establishing Floodplain Impacts

The FEMA floodplain areas were digitized and overlaid upon the roadway design in Microstation along with 1-foot LIDAR contours. Through inspection, the FEMA floodplain boundaries do not align with the LIDAR contours at the respective 100-year floodplain elevations, so a more quantifiable approach was used.

At CD-1, the floodplain is designated as Zone AE with a 100-year flood elevation at elevation 13.00 feet NGVD (11.89 feet NAVD). The south side of SR 40 is designated as Zone A, and since it is hydraulically connected to Zone AE on the north side of the roadway, it was assumed that the flood elevation along the south side of the roadway was also at elevation 13.00 feet

NGVD (11.89 feet NAVD). Stage-Impact calculations were performed to determine the impact volume. As an estimate, the floodplain volume within the back of the proposed headwall was measured to be the impacted volume. It was also determined that the headwall extension itself would not be considered impacts because the barrels provide storage volume within themselves. The Stage-Impact calculations show a total impact volume of 0.017 ac-ft on both sides of the headwall. There is a possibility to compensate for these impacts along the north side of the roadway, through scrape down areas within the right-of-way. For a visual representation of floodplain impacts and compensation areas for this location please refer to **Appendix 2 – Floodplain Impact/Compensation Calculations & Exhibits**.

At Bridge – 1, the FEMA 100-year flood elevation is at elevation 10.00 feet NGVD (8.89 feet NAVD) in Basins 3 and 4. The FEMA floodplain boundary is shown to extend over the roadway and bridge at this location, however, since the roadway and bridge are much higher (19.00 feet NAVD) than the FEMA 100-year flood elevation, the impact area was determined to be the area between the floodplain elevation per the LIDAR contour and the right-of-way. Stage-Impact calculations were performed to determine the impact volume at this location. The total floodplain impact volume at Bridge – 1 is 0.326 ac-ft.

Only one (1) pond alternative falls within the 100-year floodplain boundary. Pond 3B is located on the northwest side of the SR 40 Bridge over the Tomoka River. At Bridge – 1 the FEMA 100-year flood elevation is at elevation 10.00 feet NGVD (8.89 feet NAVD). Portions of the pond alternative are within a fill area while other portions are in cut. The proposed pond berm is at elevation 7.00 NAVD. The impacts were determined by calculating the fill area between the proposed pond berm and the 1-foot LIDAR contours. It was determined that Pond 3B would impact a total of 0.171 ac-ft of the 100-year floodplain. However, this pond site could also provide a total of 1.71 ac-ft of floodplain compensation volume. This pond would be hydraulically connected to the Tomoka River via an emergency overflow weir.

The Tomoka River is a federally designated floodway. If the effective base flood elevations (BFE) are proposed to be modified by determination of hydraulic and hydrologic analysis, the designer should proceed with the letter of map revision (LOMR) process with FEMA. A conditional letter of map revision (CLOMR) may be appropriate as well. For regulated floodway areas where there will be no change proposed to effective base flood elevations (BFE), a No-Rise Certification will be required for work in FEMA Floodways.

Table 6 – Summary of 100-Year Floodplain Impacts by Typical Section provides a summary of impact acreage for each typical section alternative.

Table 6 – Summary of 100-Year Floodplain Impacts by Typical Section

Typical Section Alternative	Approximate Location	100-Year Floodplain Elevation (ft, NGVD - NAVD)	Impact (ac-ft)
1	CD – 1 1320+45	13.00 – 11.89	0.017
3A	CD – 1 1320+45	13.00 – 11.89	0.017
3B	Bridge – 1 1365+00	10.00 – 8.89	0.326
4	Bridge – 1 1365+00	10.00 – 8.89	0.326

SECTION 5 PROPOSED DRAINAGE CONDITIONS

The stormwater runoff from SR 40 will be collected by a roadside swale system or a curb & gutter system which will convey stormwater to curb inlets and pipes, depending on the preferred typical section, which will flow to stormwater management ponds. The water quality treatment will be achieved through the utilization of both proposed and existing stormwater ponds. The existing drainage patterns will be maintained in the future condition. The project will have no adverse impacts to the area's water quality. Water quality treatment will be provided as required by the rules set forth by the SJRWMD and FDOT. For more information regarding the proposed drainage conditions, please refer to the [SR 40 PD&E Study Pond Siting Report](#).

5.1 Longitudinal & Transverse Floodplain Impacts

This project will impact the 100-year floodplain in three different ways:

- 1) Longitudinal roadway impacts resulting from filling the floodplain areas associated with the Little Tomoka River and the Tomoka River;
- 2) Transverse impacts resulting from the extension or replacement of the existing cross drain culverts;
- 3) Transverse impacts resulting from widening of the bridge structures.

The longitudinal roadway impacts cannot be avoided since the floodplain associated with the water bodies extend both to the north and south of SR 40. During the PD&E Study, four (4) typical section alternatives were analyzed. It is anticipated that the project will impact approximately 0.343 ac-ft of the 100-year floodplain associated with the roadway improvements and 0.171 ac-ft due to the construction of Pond 3B, if it becomes the preferred alternative for Basin 3. Although the FEMA 100-year floodplain boundary traverses Pond 1, Pond 1-2, Pond 2A and Pond 2B-1 at elevation 13.00 feet NGVD, LiDAR data containing 1-foot contours obtained for this area indicates that these ponds do not traverse the 100-year FEMA floodplain boundary. During the final design phase of the project, every effort should be taken to minimize the floodplain impacts. Refer to [Appendix 2](#) for the Floodplain Impact/Compensation Exhibits for each floodplain location.

The transverse impacts resulting from the extension and/or replacement of the culverts are analyzed in the PD&E phase of the project. It is expected that impacts will occur to the floodplain associated with the extension of CD-1. No additional right-of-way is proposed in this area to compensate for the loss of storage created by the extension. The extension itself provides volume within the box culvert and it is possible to provide compensation within the existing right-of-way through scrape down areas. However, during the final design phase of the project, necessary action should be taken to minimize upstream impacts. To minimize upstream impacts, FDOT design criteria for conveyance systems (e.g. culverts) allows no significant increase in flood stages at the upstream end of the structures.

The floodplain impacts resulting from the bridge widening are not considered and analyzed during the PD&E phase of the project. Impacts resulting from the widening and construction of the bridges at the Tomoka River should be minimal. As a minimum, the designers should maintain the horizontal and vertical openings at the bridges similar to the existing condition.

During the design phase of the project, a Bridge Hydraulic Report (BHR) will be prepared to document the hydraulic impacts of the widening. In addition, because the Tomoka River is a regulated floodway, a FEMA No-Rise Certification will be required demonstrating no significant rise in headwater elevations.

5.2 Project Classification

The floodplain is located in a low density, urbanized area, and the encroachments are classified as "minimal". Minimal encroachments on a floodplain occur when there is a floodplain involvement but the impacts on human life, transportation facilities, and natural and beneficial floodplain values are not significant and can be resolved with minimal efforts. Normally, these minimal efforts to address the impacts will consist of applying the Department's drainage design standards and following the Water Management District's procedures to achieve the results that will not increase or significantly change the flood elevations and/or limits.

5.3 Risk Evaluation

There is no change in flood "Risk" associated with this project. The proposed floodplain encroachments are classified as "minimal". The encroachments will not have a significant potential for interruption or termination of transportation facilities needed for emergency vehicles or used as an evacuation route. In addition, no significant adverse impacts on natural and beneficial floodplain values are anticipated and no significant impacts to highway users are expected.

5.4 PD&E Manual Requirements with Minimal Encroachments

Chapter 24 Floodplains of the FDOT's PD&E Manual, Part 2, defines four categories of encroachments as they pertain to base floodplain involvement; significant, minimal, none and no involvement, and also lists the report criteria corresponding to these encroachment categories. The FDOT has different requirements based on the category of the encroachment. The proposed SR 40 widening project was determined to have minimal encroachments and as a result the requirements for this category are listed as follows:

1. The history of flooding of the existing facilities and/or measures to minimize any impacts due to the proposed project improvements.

Response: According to the FDOT-5 and Volusia County maintenance staff, there are no areas of flooding concern along SR 40 within the project study area. Compensating areas will be constructed to mitigate loss of storage in the floodplain due to the project improvements. The project will have no adverse impact on the existing condition.

2. Determination of whether the encroachment is longitudinal or transverse, and if it is a longitudinal encroachment an evaluation and discussion of practicable avoidance alternatives.

Response: With the increase in the number of travel lanes proposed, there will be longitudinal and transverse impacts to the floodplain. Longitudinal impacts will be minimized by utilizing the maximum allowable roadway embankment slope.

The transverse floodplain impacts from the project occur due to the extension or replacement of the existing cross drains and widening of the bridge structures. These impacts are not analyzed during this study and will need to be addressed during the design phase.

The existing roadway bisects the floodplain. There are no economically feasible avoidance alternatives.

3. The practicability of avoidance alternatives and/or measures to minimize impacts.

Response: This project will take every effort to minimize the floodplain impacts resulting from the roadway fill. The maximum allowable roadway embankment slope will be used within the floodplain area to minimize the floodplain impacts. The floodplain impacts will be compensated by constructing floodplain mitigation areas.

4. Impact of the proposed improvements on emergency services and evacuation.

Response: The proposed cross drains and bridge widening will perform hydraulically in a manner equal to or greater than the existing condition, and backwater surface elevations are not expected to increase. As a result, there will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or in emergency evacuation routes.

5. Impacts of the proposed improvement on the base flood, likelihood of flood risk, overtopping, location of overtopping, backwater, etc.

Response: The proposed cross drains and bridge widening will perform hydraulically in a manner equal to or greater than the existing condition, and backwater surface elevations are not expected to increase. As a result, there will be no significant change in flood risk or overtopping.

6. Determination of the impact of the proposed improvements on regulatory floodways, if any, and documentation of coordination with FEMA and local agencies to determine the project's consistency with the regulatory floodway.

Response: If the effective base flood elevations (BFE) are proposed to be modified by determination of hydraulic and hydrologic analysis, the designer should proceed in the letter of map revision (LOMR) process with FEMA. A conditional letter of map revision (CLOMR) may be appropriate as well. For regulated floodway areas where there will be no change proposed to effective base flood elevations (BFE), a No-Rise Certification will be required for work in FEMA Floodways.

7. The impacts on natural and beneficial floodplain values, and measures to restore and preserve these values (this information may also be addressed as part of the wetland impact evaluation and recommendations).

Response: See the Natural Environment Report.

8. Consistency of the proposed improvements with the local floodplain development plan or the land use elements in the Comprehensive Plan, and the potential impacts of encouraging development within the 100year base floodplain.

Response: The project will remain consistent with local floodplain development plans. The project will not support base floodplain development that is incompatible with existing floodplain management programs.

9. A map showing project, location and impacted floodplains. Provide copies of all applicable FIRM maps should be included within the final LHR report appendix.

Response: See SR 40 PD&E Location Hydraulic Report; Figure 7.

10. Results of any and all project risk assessments performed.

Response: The proposed cross drains and bridge widening will perform hydraulically in a manner equal to or greater than the existing condition, and backwater surface elevations are not expected to increase. As a result, there will be no significant change in flood risk.

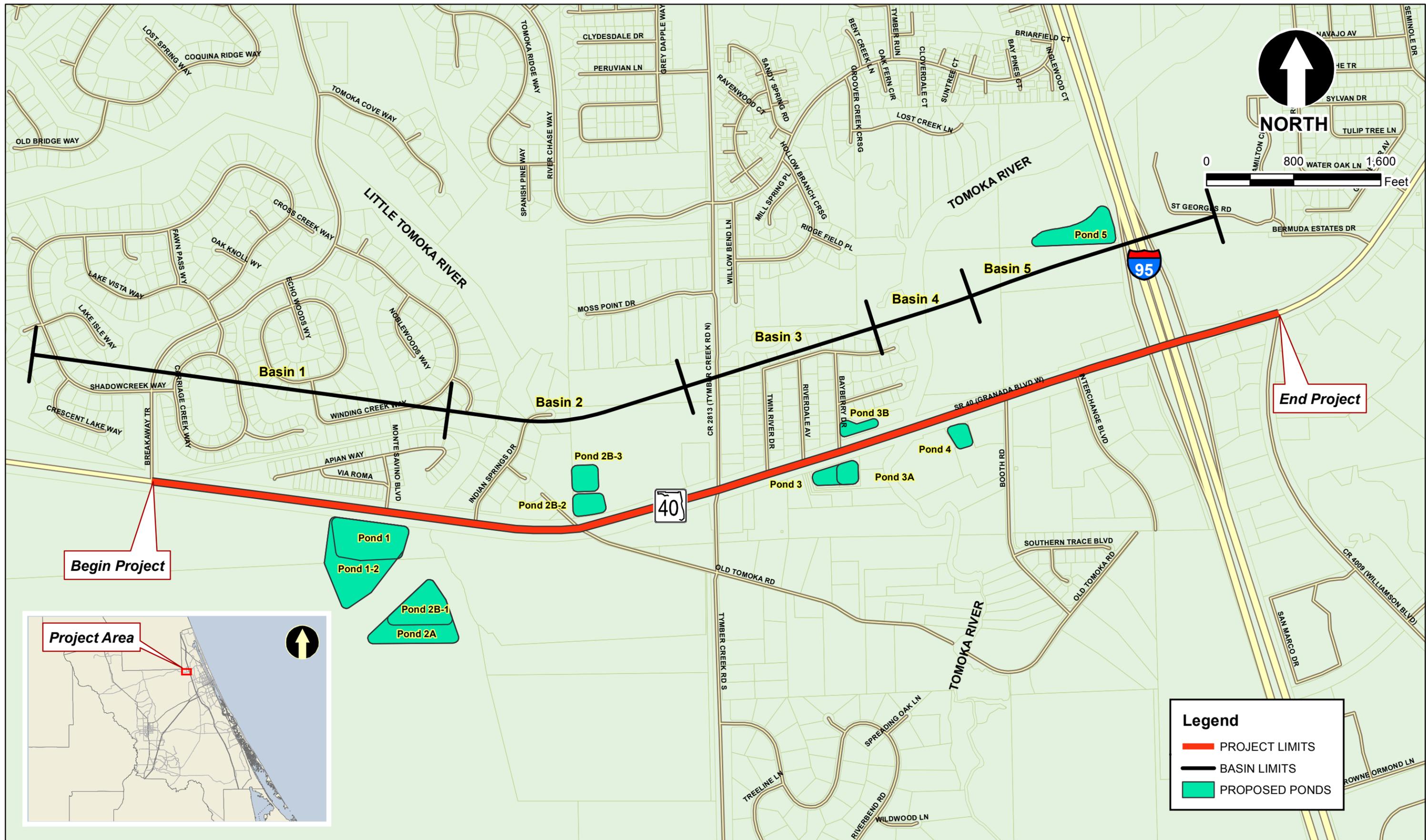
SECTION 6 CONCLUSION

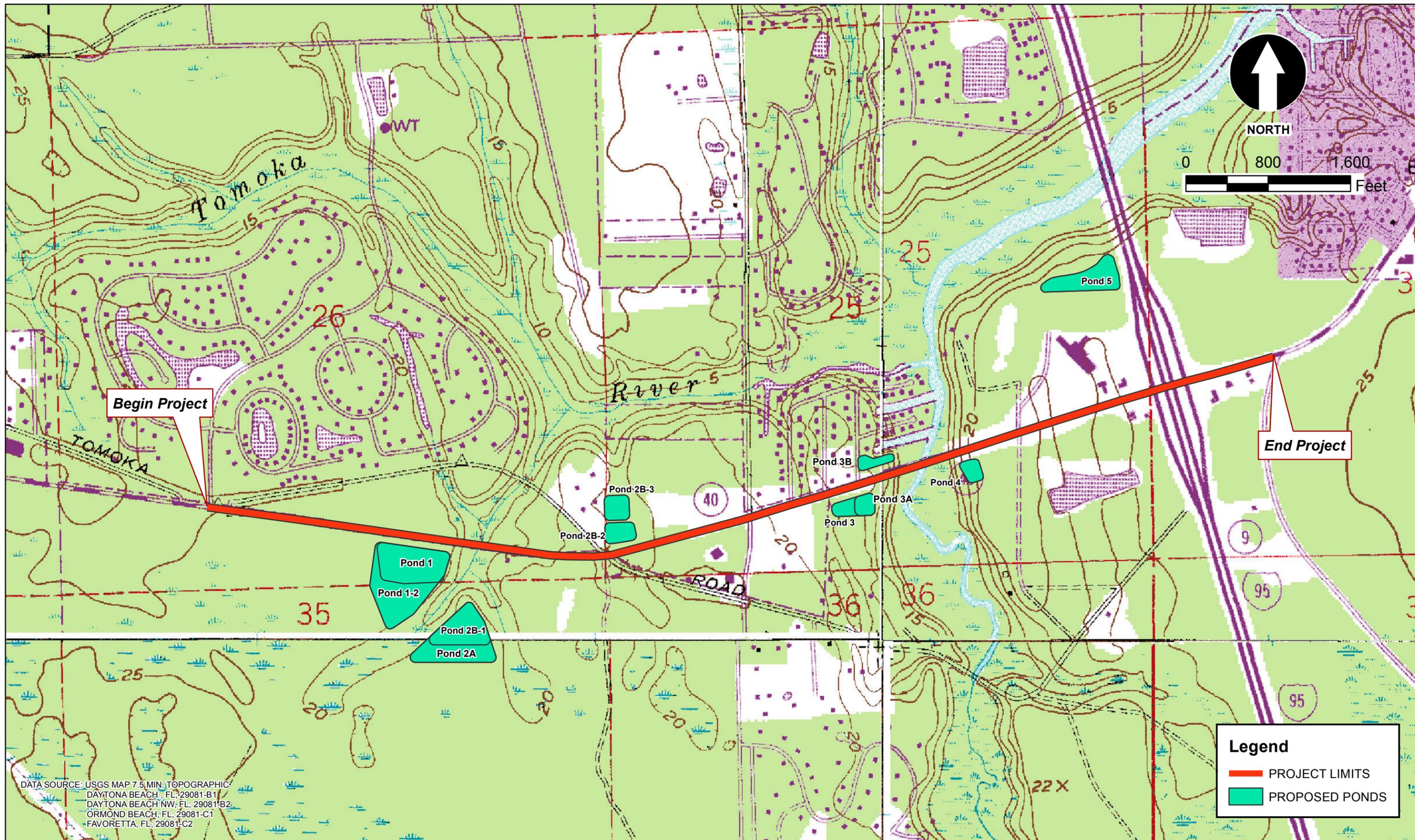
During final design, the modifications to drainage structures included in the project should result in an insignificant change in their capacity to carry floodwater. This change will cause minimal increases in flood heights and flood limits. The proposed cross drain and bridge widening will perform hydraulically in a manner equal to or greater than the existing condition, and backwater surface elevations are not expected to increase. As a result, there will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or in emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.

- Figure 1 – Location Map*
- Figure 2 – USGS Quadrangle Map*
- Figure 3 – Proposed Typical Section*
- Figure 4 – Soils Map*
- Figure 5 – Existing Land Use Map*
- Figure 6 – Future Land Use Map*
- Figure 7 – FEMA FIRM Map*
- Figure 8 – SJRWMD Watershed Map*

APPENDIX 1

Figures

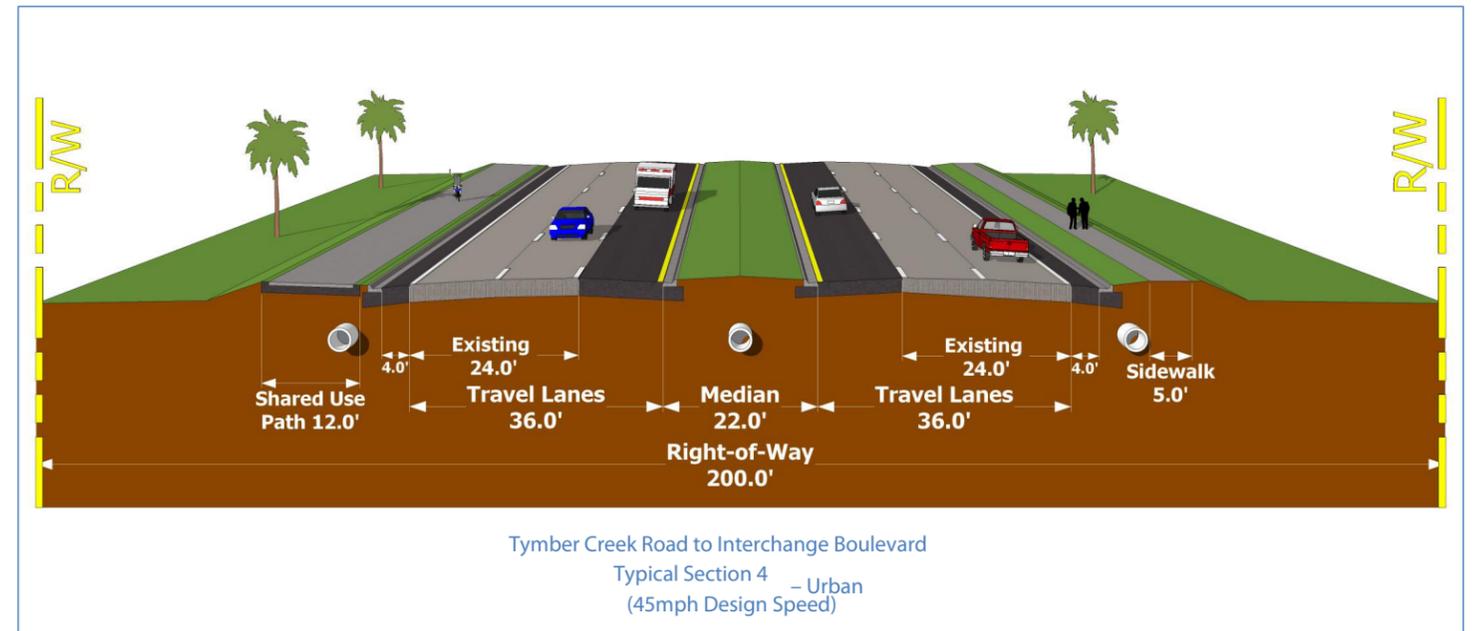
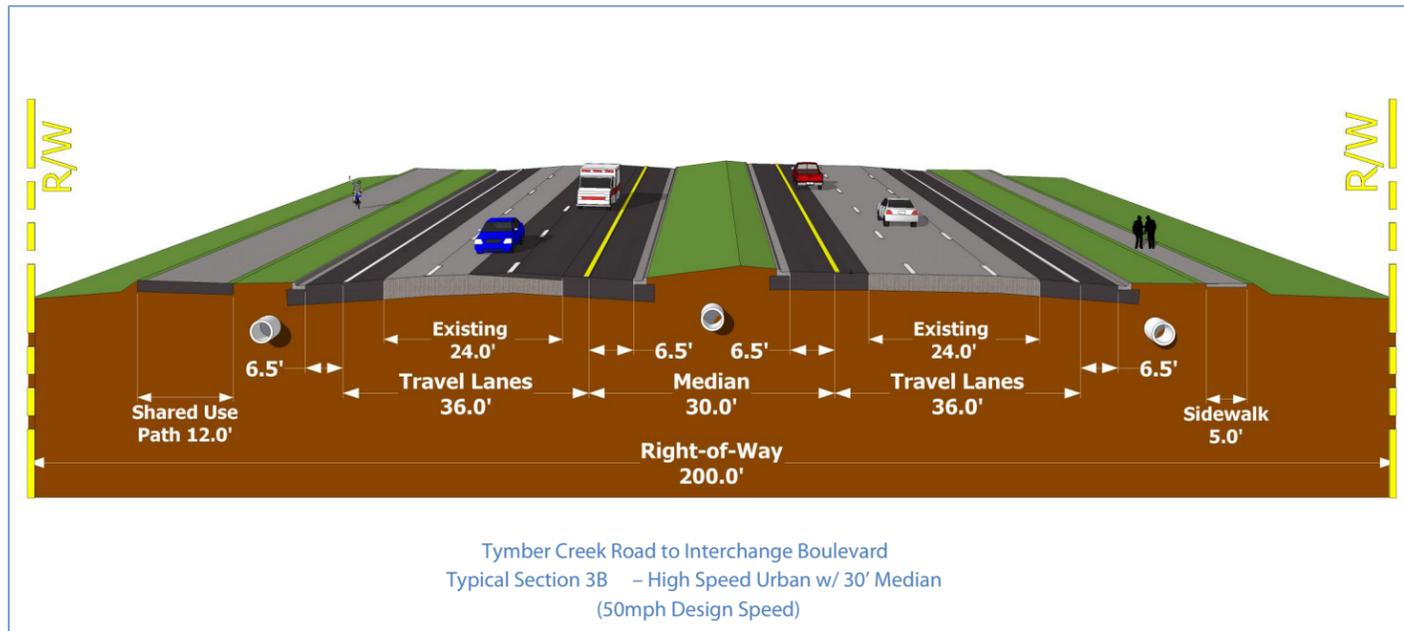
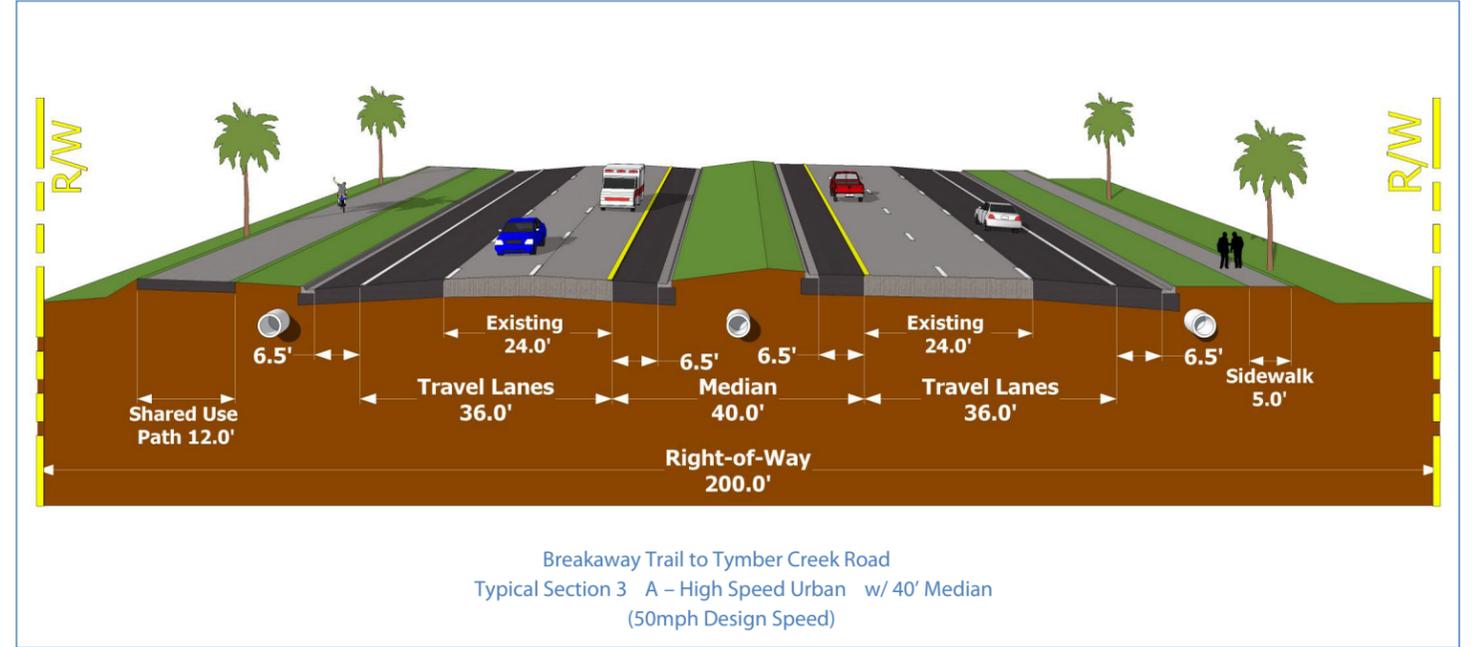
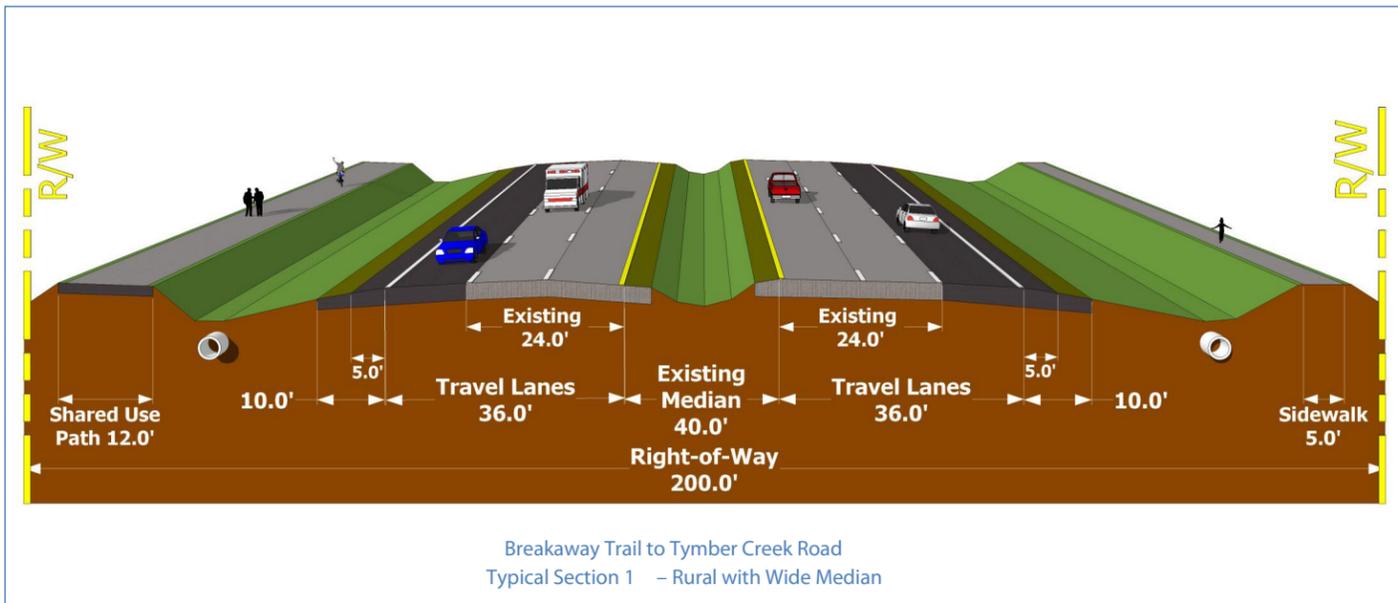




DATA SOURCE: USGS MAP 7.5 MIN. TOPOGRAPHIC
 DAYTONA BEACH, FL; 29081-B1
 DAYTONA BEACH NW, FL; 29081-B2
 ORMOND BEACH, FL; 29081-C1
 FAVORETTA, FL; 29081-C2

Legend

- PROJECT LIMITS
- PROPOSED PONDS

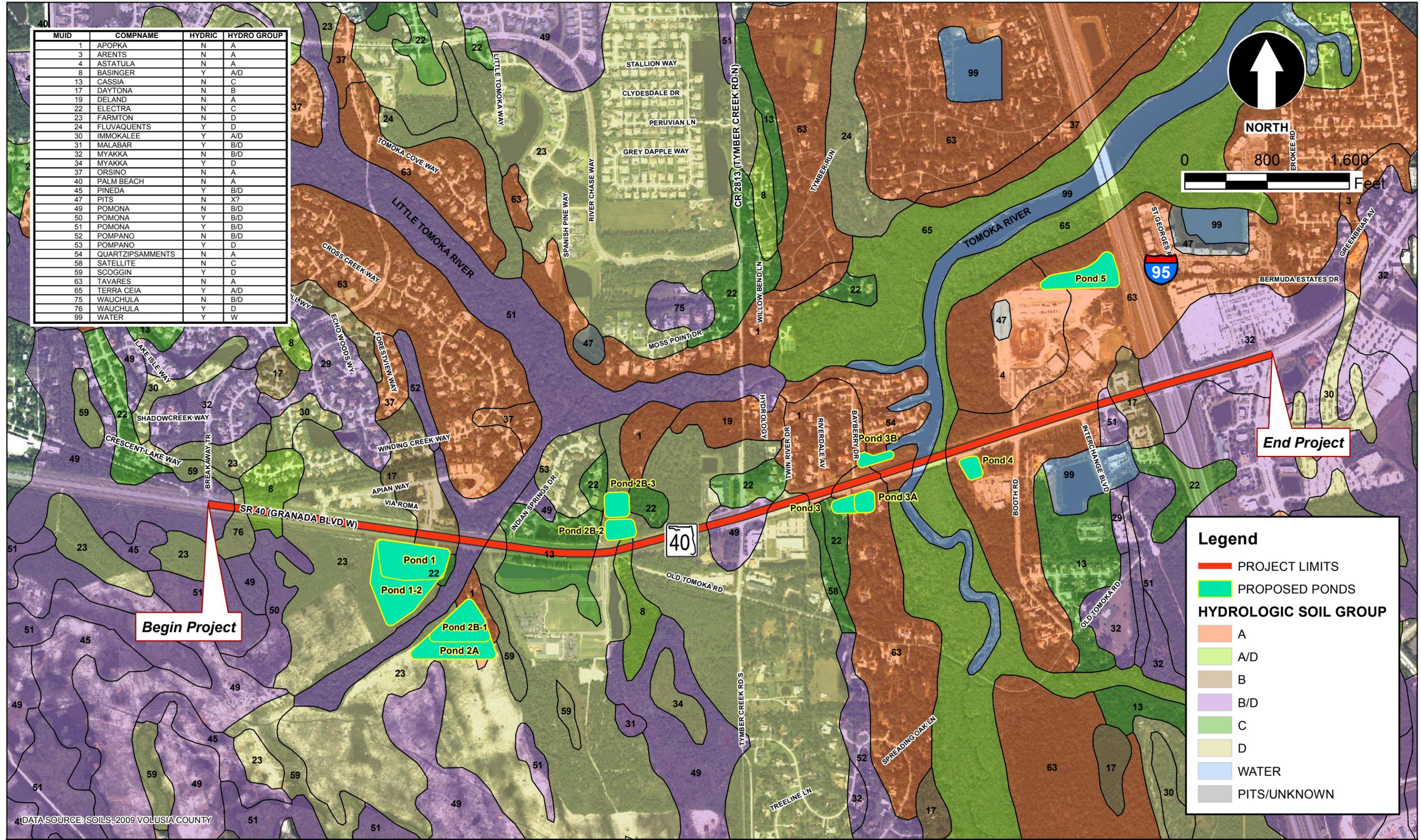


FLORIDA DEPARTMENT
 OF TRANSPORTATION
 DISTRICT 5

SR 40 State Environmental Impact Report
 from Breakaway Trail to Williamson Blvd
 Volusia County, Florida
 FPID: 428947-1-22-01

PROPOSED TYPICAL SECTION

MUID	COMPNAME	HYDRIC	HYDRO GROUP
1	APOPKA	N	A
3	ARENTS	N	A
4	ASTATULA	N	A
8	BASINGER	Y	A/D
13	CASSIA	N	C
17	DAYTONA	N	B
19	DELAND	N	A
22	ELECTRA	N	C
23	FARMTON	N	D
24	FLUVAQUENTS	Y	D
30	IMMOKALEE	Y	A/D
31	MALABAR	Y	B/D
32	MYAKKA	N	B/D
34	MYAKKA	Y	D
37	ORSINO	N	A
40	PALM BEACH	N	A
45	PINEDA	Y	B/D
47	PITS	N	X?
49	POMONA	N	B/D
50	POMONA	Y	B/D
51	POMONA	Y	B/D
52	POMPANO	N	B/D
53	POMPANO	Y	D
54	QUARTZIPSAMMENTS	N	A
58	SATELLITE	N	C
59	SCOGGIN	Y	D
63	TAVARES	N	A
65	TERRA CEIA	Y	A/D
75	WAUCHULA	N	B/D
76	WAUCHULA	Y	D
99	WATER	Y	W



4 DATA SOURCE: SOILS, 2009 VOLUSIA COUNTY



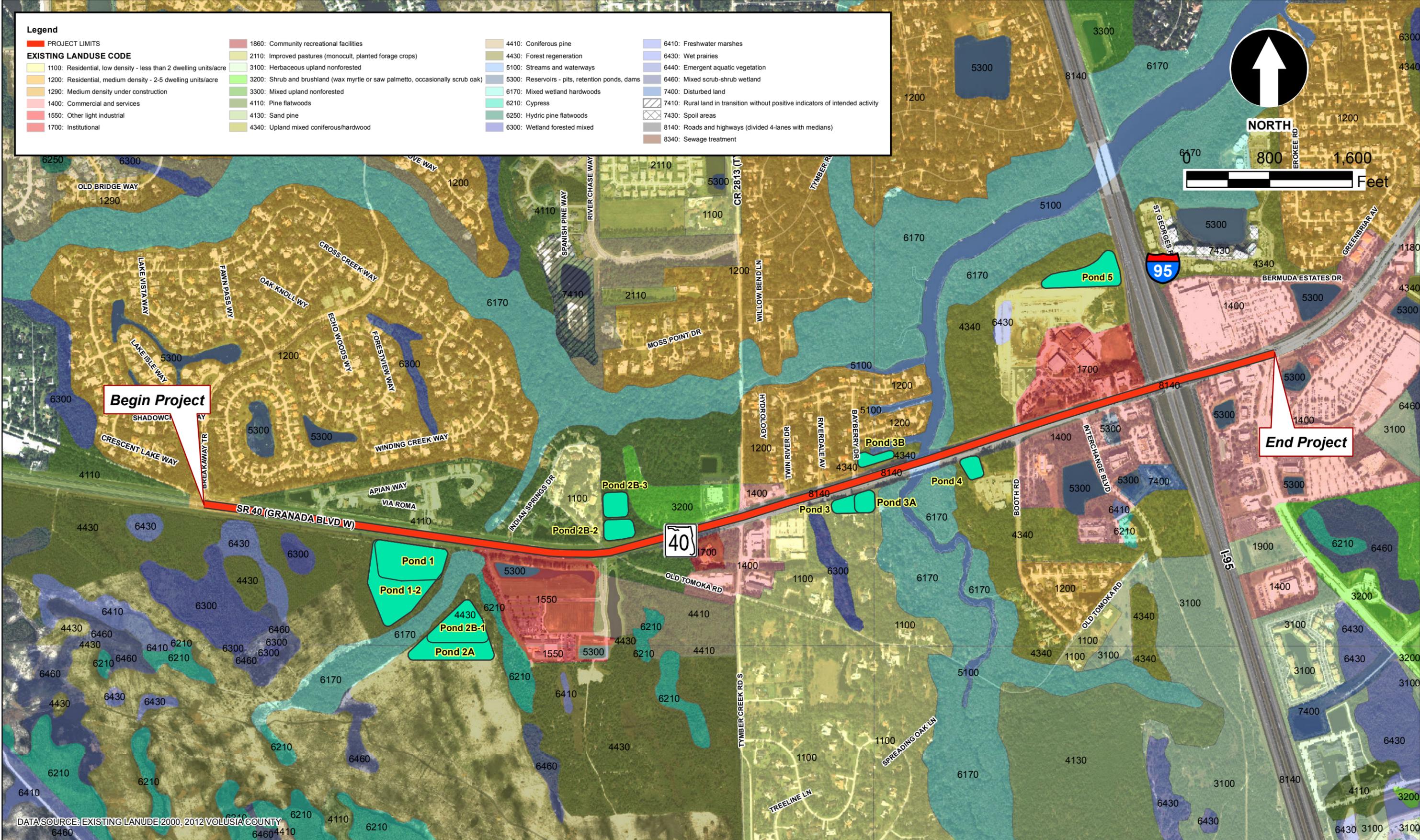
FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT 5

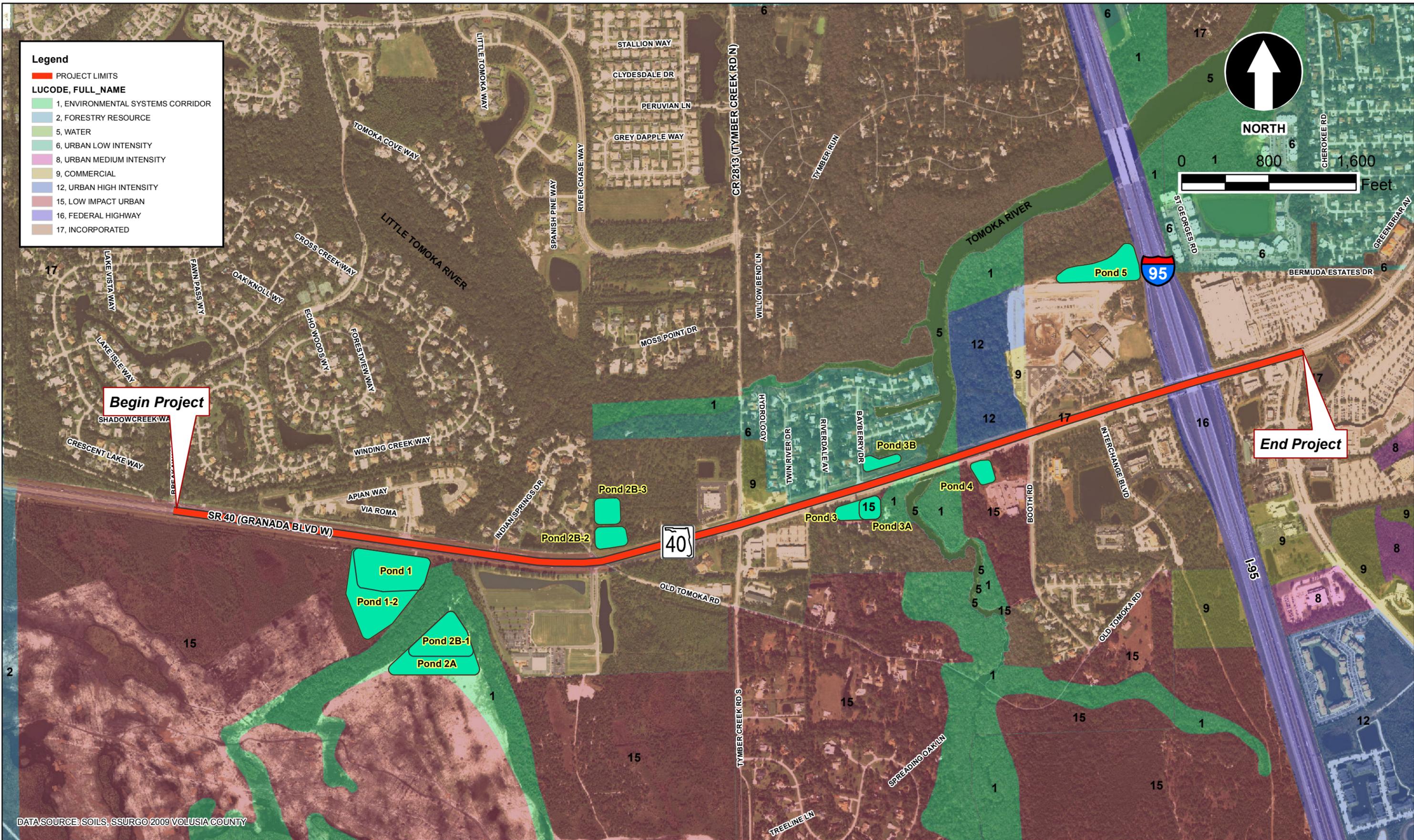
SR 40 State Environmental Impact Report
from Breakaway Trail to Williamson Blvd
Volusia County, Florida
FPID: 428947-1-22-01

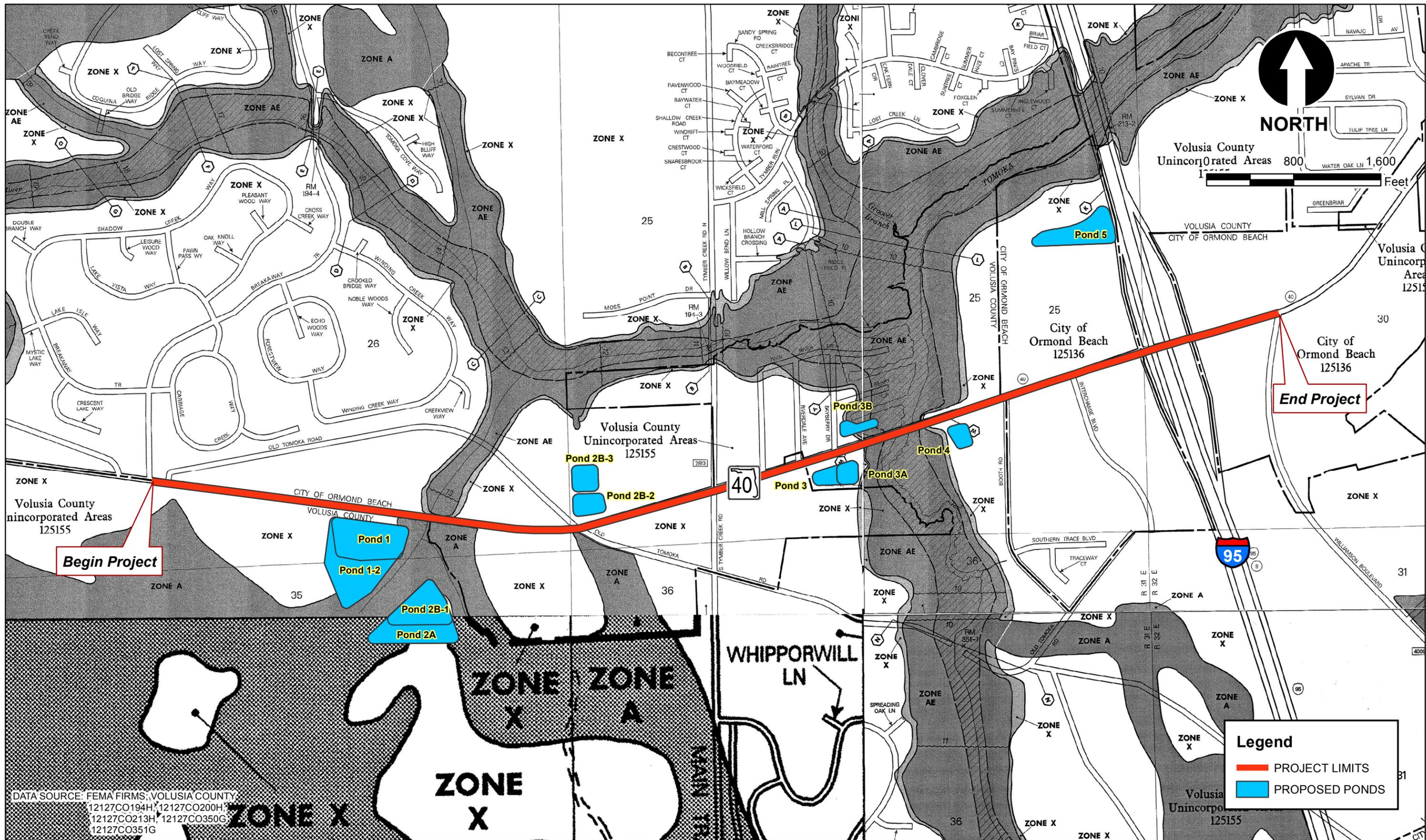
NRCS SOILS MAP

FIGURE 4

Legend			
	PROJECT LIMITS		1860: Community recreational facilities
EXISTING LANDUSE CODE			
	1100: Residential, low density - less than 2 dwelling units/acre		2110: Improved pastures (monocult, planted forage crops)
	1200: Residential, medium density - 2-5 dwelling units/acre		3100: Herbaceous upland nonforested
	1290: Medium density under construction		3200: Shrub and brushland (wax myrtle or saw palmetto, occasionally scrub oak)
	1400: Commercial and services		3300: Mixed upland nonforested
	1550: Other light industrial		4110: Pine flatwoods
	1700: Institutional		4130: Sand pine
			4340: Upland mixed coniferous/hardwood
			4410: Coniferous pine
			4430: Forest regeneration
			5100: Streams and waterways
			5300: Reservoirs - pits, retention ponds, dams
			6170: Mixed wetland hardwoods
			6210: Cypress
			6250: Hydric pine flatwoods
			6300: Wetland forested mixed
			6410: Freshwater marshes
			6430: Wet prairies
			6440: Emergent aquatic vegetation
			6460: Mixed scrub-shrub wetland
			7400: Disturbed land
			7410: Rural land in transition without positive indicators of intended activity
			7430: Spoil areas
			8140: Roads and highways (divided 4-lanes with medians)
			8340: Sewage treatment



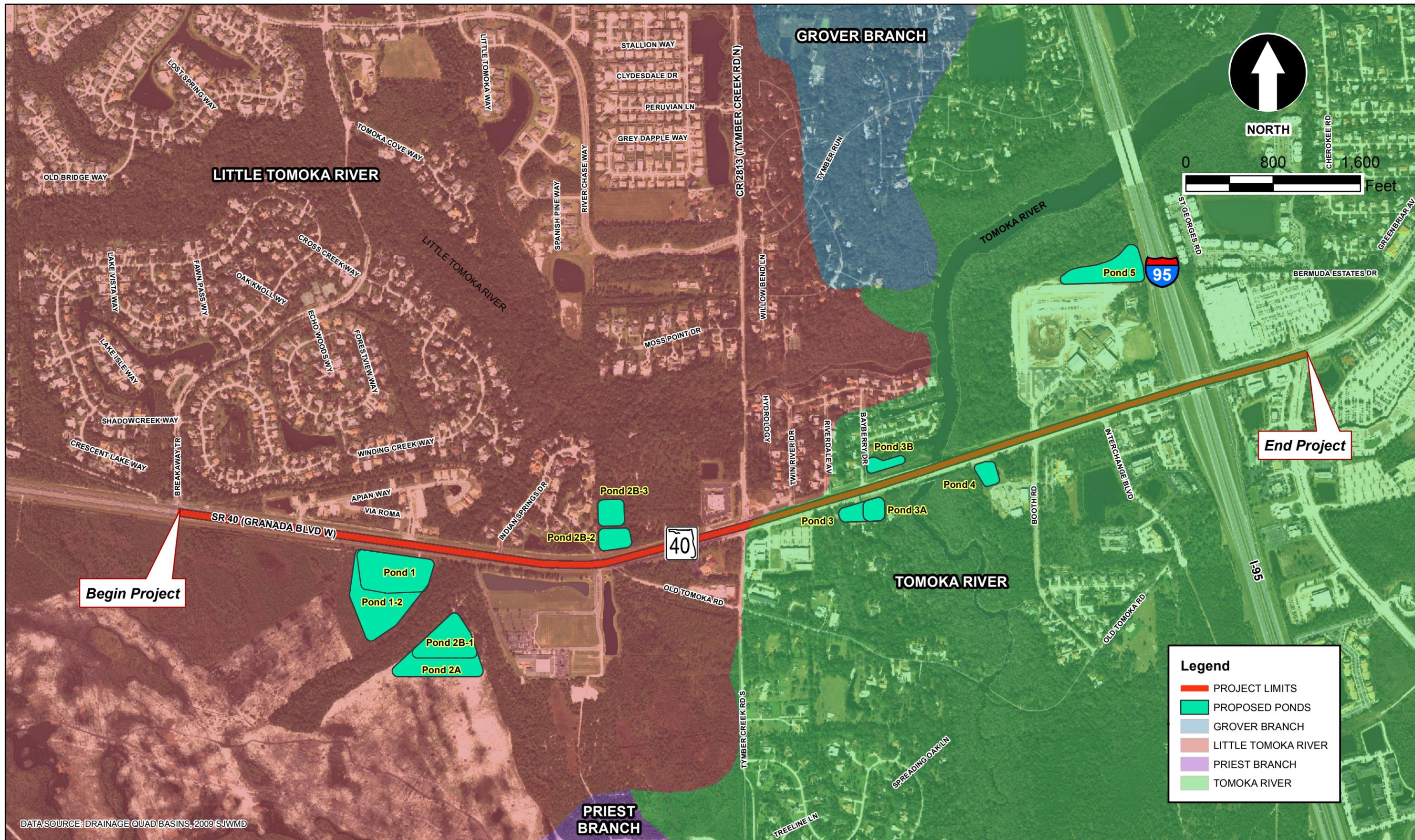




DATA SOURCE: FEMA FIRMS, VOLUSIA COUNTY:
 12127CO194H, 12127CO200H,
 12127CO213H, 12127CO350G,
 12127CO351G

Legend

- PROJECT LIMITS
- PROPOSED PONDS



APPENDIX 2

Floodplain Impact/Compensation Calculations & Exhibits



Made by: **SVC**
Ck. by: _____

Date: **9/24/2012**
Time: **8:36 AM**
Project Number: **KIT-004-01**

PROJECT: **SR 40 PD&E STUDY - FROM BREAKAWAY TRAIL TO WILLIAMSON BLVD**
BASIN: **1**

Floodplain Impact Calculations North of SR 40	
Floodplain Elevation based upon FEMA FIRM, Panel Numbers: 12127CO194H, 12127CO200H, 12127CO213H, 12127CO350G, 12127CO351G	100 yr. Floodplain Elev. - 11.89 ft NAVD Wet Seasonal High Elev. - 11.00 ft NAVD

ELEVATION	DESCRIPTION	FILL AREA	Difference Fill Area (ac)	Delta D (ft)	Delta Storage Loss (ac-ft)	Sum Impact (ac-ft)
11.89	100 yr. Flood El.	0.017 ac	0.004	0.89	0.004	0.004
11.00	WSHW	0.013 ac				0.00

Floodplain Impact Calculations South of SR 40	
Floodplain Elevation based upon FEMA FIRM, Panel Numbers: 12127CO194H, 12127CO200H, 12127CO213H, 12127CO350G, 12127CO351G	100 yr. Floodplain Elev. - 11.89 ft NAVD Wet Seasonal High Elev. - 11.00 ft NAVD

ELEVATION	DESCRIPTION	AREA	Difference Fill Area (ac)	Delta D (ft)	Delta Storage Loss (ac-ft)	Sum Impact (ac-ft)
11.89	100 yr. Flood El.	0.044 ac	0.015	0.89	0.013	0.013
11.00	WSHW	0.029 ac				0.00

Total Volume of Impacts (ac-ft) = **0.017 ac-ft**



Made by: **SVC**
 Ck. by: _____

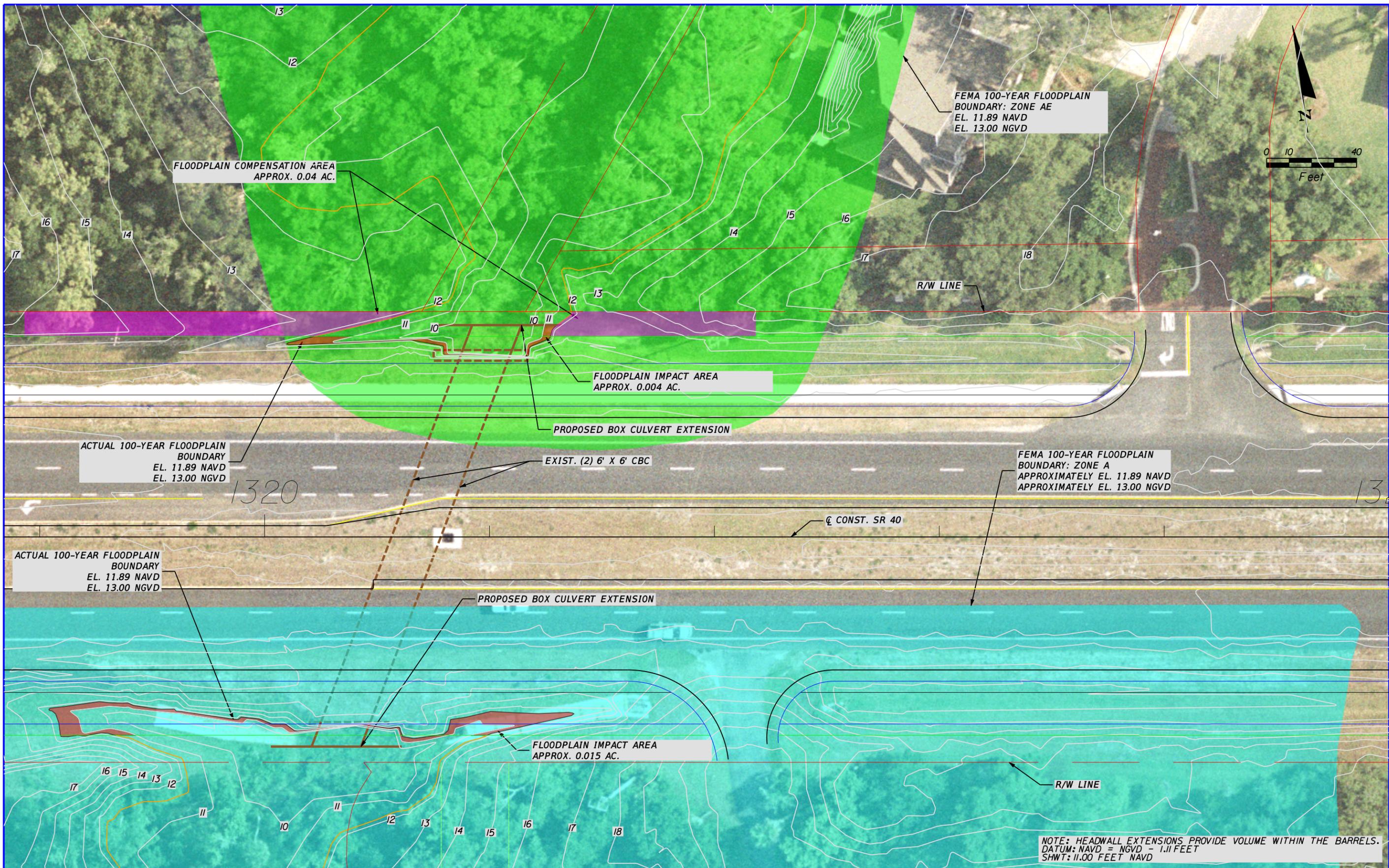
Date: **9/24/2012**
 Time: **8:36 AM**
 Project Number: **KIT-004-01**

PROJECT: **SR 40 PD&E STUDY - FROM BREAKAWAY TRAIL TO WILLIAMSON BLVD**
 BASIN: **1**

Floodplain Compensation Calculations North of SR 40	
Floodplain Elevation based upon FEMA FIRM, Panel Numbers: 12127CO194H, 12127CO200H, 12127CO213H, 12127CO350G, 12127CO351G	100 yr. Floodplain Elev. - 11.89 ft NAVD Wet Seasonal High Elev. - 11.00 ft NAVD

ELEVATION	DESCRIPTION	AREA	Average Excavated Area (ac)	Delta D (ft)	Delta Storage Gain (ac-ft)	Sum Compensation (ac-ft)
11.89	100 yr. Flood El.	0.040 ac				0.030
			0.034	0.89	0.030	
11.00	WSHW	0.029 ac				0.000

Compensation Volume (ac-ft) = **0.030 ac-ft**



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

Inwood
consulting engineers

Renato E. Chuw, PE
PE No. 58050
Certificate of Authorization No. 7074

3000 Dovers Drive, Suite 200
Oviedo, Florida 32765
p 407.971.8850

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
40	VOLUSIA	428947-1-22-01

**FLOODPLAIN IMPACT/
COMPENSATION EXHIBIT**

SHEET NO.



Made by: **SVC**
Ck. by: _____

Date: **9/24/2012**
Time: **8:36 AM**
Project Number: **KIT-004-01**

PROJECT: **SR 40 PD&E STUDY - FROM BREAKAWAY TRAIL TO WILLIAMSON BLVD**
BASIN: **3**

Floodplain Impact Calculations North of SR 40	
Floodplain Elevation based upon FEMA FIRM, Panel Numbers: 12127CO194H, 12127CO200H, 12127CO213H, 12127CO350G, 12127CO351G	100 yr. Floodplain Elev.: 8.89 ft Wet Seasonal High Elev.: - 0.37 ft

ELEVATION	DESCRIPTION	FILL AREA	Difference Fill Area (ac)	Delta D (ft)	Delta Storage Loss (ac-ft)	Sum Impact (ac ft)
8.89	100 yr. Flood El.	0.152 ac				0.150
			0.020	0.89	0.018	
8.00		0.132 ac				0.132
			0.021	1.00	0.021	
7.00		0.111 ac				0.111
			0.023	1.00	0.023	
6.00		0.088 ac				0.088
			0.017	1.00	0.017	
5.00		0.071 ac				0.071
			0.029	1.00	0.029	
4.00		0.042 ac				0.042
			0.042	1.00	0.042	
3.00	Existing Ground	0.000 ac				0.00

Floodplain Impact Calculations South of SR 40	
Floodplain Elevation based upon FEMA FIRM, Panel Numbers: 12127CO194H, 12127CO200H, 12127CO213H, 12127CO350G, 12127CO351G	100 yr. Floodplain Elev.: 8.89 ft Wet Seasonal High Elev.: - 0.37 ft

ELEVATION	DESCRIPTION	FILL AREA	Difference Fill Area (ac)	Delta D (ft)	Delta Storage Loss (ac-ft)	Sum Impact (ac ft)
8.89	100 yr. Flood El.	0.048 ac				0.046
			0.016	0.89	0.014	
8.00		0.032 ac				0.032
			0.015	1.00	0.015	
7.00		0.017 ac				0.017
			0.005	1.00	0.005	
6.00		0.012 ac				0.012
			0.003	1.00	0.003	
5.00		0.008 ac				0.008
			0.003	1.00	0.003	
4.00		0.005 ac				0.005
			0.005	1.00	0.005	
3.00	Existing Ground	0.000 ac				0.00

Floodplain Impact Calculations Pond 3B	
Floodplain Elevation based upon FEMA FIRM, Panel Numbers: 12127CO194H, 12127CO200H, 12127CO213H, 12127CO350G, 12127CO351G	100 yr. Floodplain Elev.: 8.89 ft Wet Seasonal High Elev.: - 0.37 ft

ELEVATION	DESCRIPTION	FILL AREA	Difference Fill Area (ac)	Delta D (ft)	Delta Storage Loss (ac-ft)	Sum Impact (ac ft)
7.00	Top of Berm	0.176 ac				0.171
			0.102	1.00	0.102	
6.00		0.074 ac				0.069
			0.019	1.00	0.019	
5.00		0.055 ac				0.050
			0.028	1.00	0.028	
4.00		0.027 ac				0.022
			0.022	1.00	0.022	
3.00	Existing Ground	0.005 ac				0.00

Total Volume of Impacts (ac-ft) = **0.367 ac-ft**



Made by: **SVC**
Ck. by: _____

Date: **9/24/2012**
Time: **8:36 AM**
Project Number: **KIT-004-01**

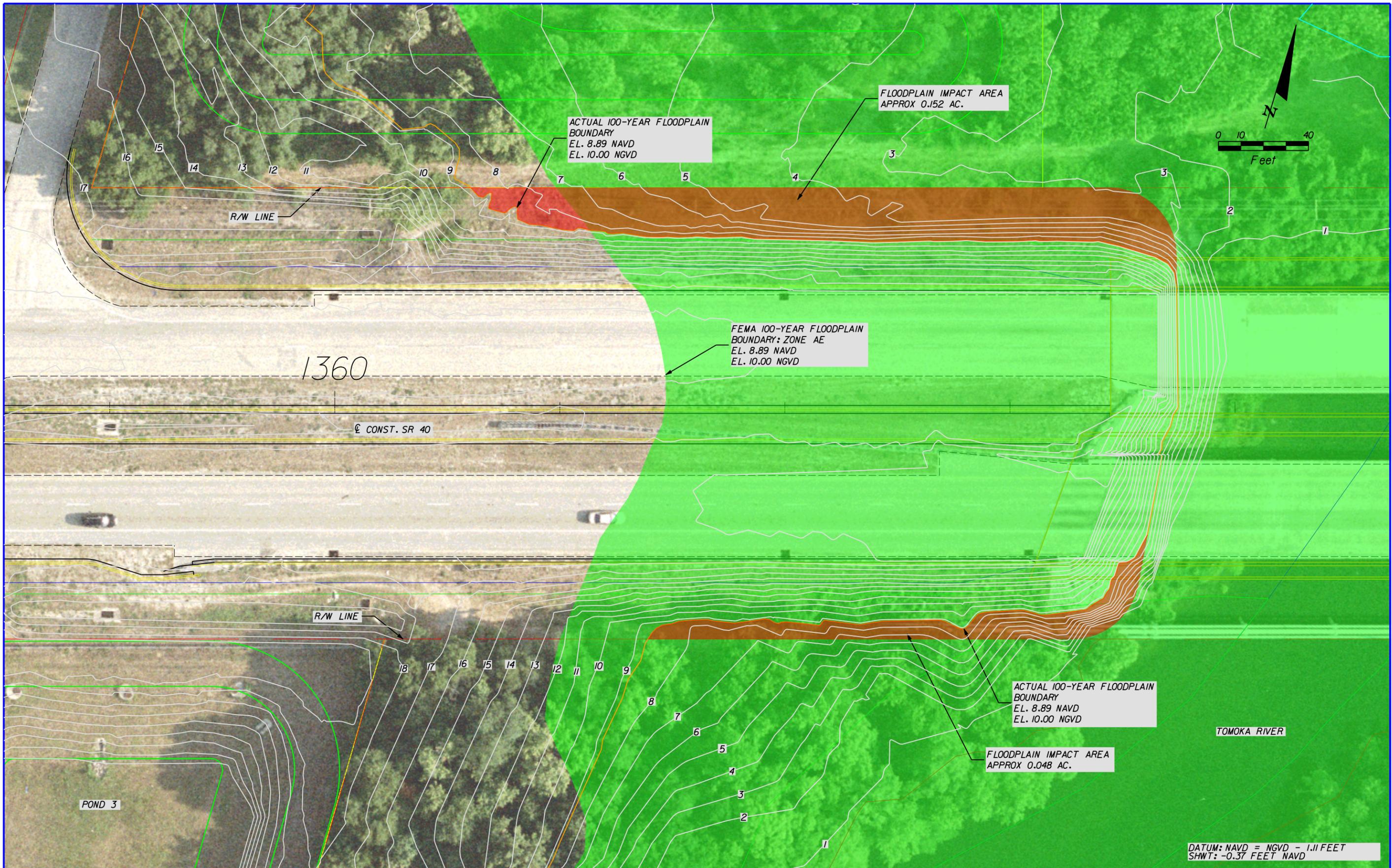
PROJECT: **SR 40 PD&E STUDY - FROM BREAKAWAY TRAIL TO WILLIAMSON BLVD**

BASIN: **3**

Floodplain Impact Compensation Pond 3B	
Floodplain Elevation based upon FEMA FIRM, Panel Numbers: 12127CO194H, 12127CO200H, 12127CO213H, 12127CO350G, 12127CO351G	100 yr. Floodplain Elev.: 8.89 ft Wet Seasonal High Elev.: - 0.37 ft

ELEVATION	DESCRIPTION	AREA	Average Area (ac)	Delta D (ft)	Delta Storage (ac-ft)	Sum Storage (ac-ft)
13.00	Pond R/W	1.17 ac				7.60
			0.98	6.00	5.89	
7.00	Back of Main. Berm	0.79 ac				1.71
			0.72	0.00	0.00	
7.00		0.65 ac				1.71
			0.58	0.00	0.00	
7.00	Front of Main. Berm	0.51 ac				1.71
			0.48	1.00	0.48	
6.00	rovided Attenuation V	0.44 ac				1.23
			0.43	0.25	0.11	
5.75	Req'd Attenuation Vc	0.43 ac				1.12
			0.37	1.75	0.64	
4.00		0.31 ac				0.48
			0.27	1.00	0.27	
3.00		0.24 ac				0.21
			0.21	1.00	0.21	
2.00	Pond Bottom	0.17 ac				

Compensation Volume (ac-ft) = **1.71 ac-ft**



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

Inwood
consulting engineers

Renato E. Chuw, PE
PE No. 58050
Certificate of Authorization No. 7074

3000 Dovera Drive, Suite 200
Oviedo, Florida 32765
p 407.971.8850

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
40	VOLUSIA	428947-1-22-01

**FLOODPLAIN IMPACT
EXHIBIT**

SHEET NO.



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

Inwood
consulting engineers

Renato E. Chuw, PE
PE No. 58050
Certificate of Authorization No. 7074

3000 Dovers Drive, Suite 200
Oviedo, Florida 32765
p 407.971.8850

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
40	VOLUSIA	428947-1-22-01

**FLOODPLAIN IMPACT
EXHIBIT - POND 3B**

SHEET NO.



Made by: **SVC**
Ck. by: _____

Date: **9/24/2012**
Time: **8:36 AM**
Project Number: **KIT-004-01**

PROJECT: **SR 40 PD&E STUDY - FROM BREAKAWAY TRAIL TO WILLIAMSON BLVD**
BASIN: **4**

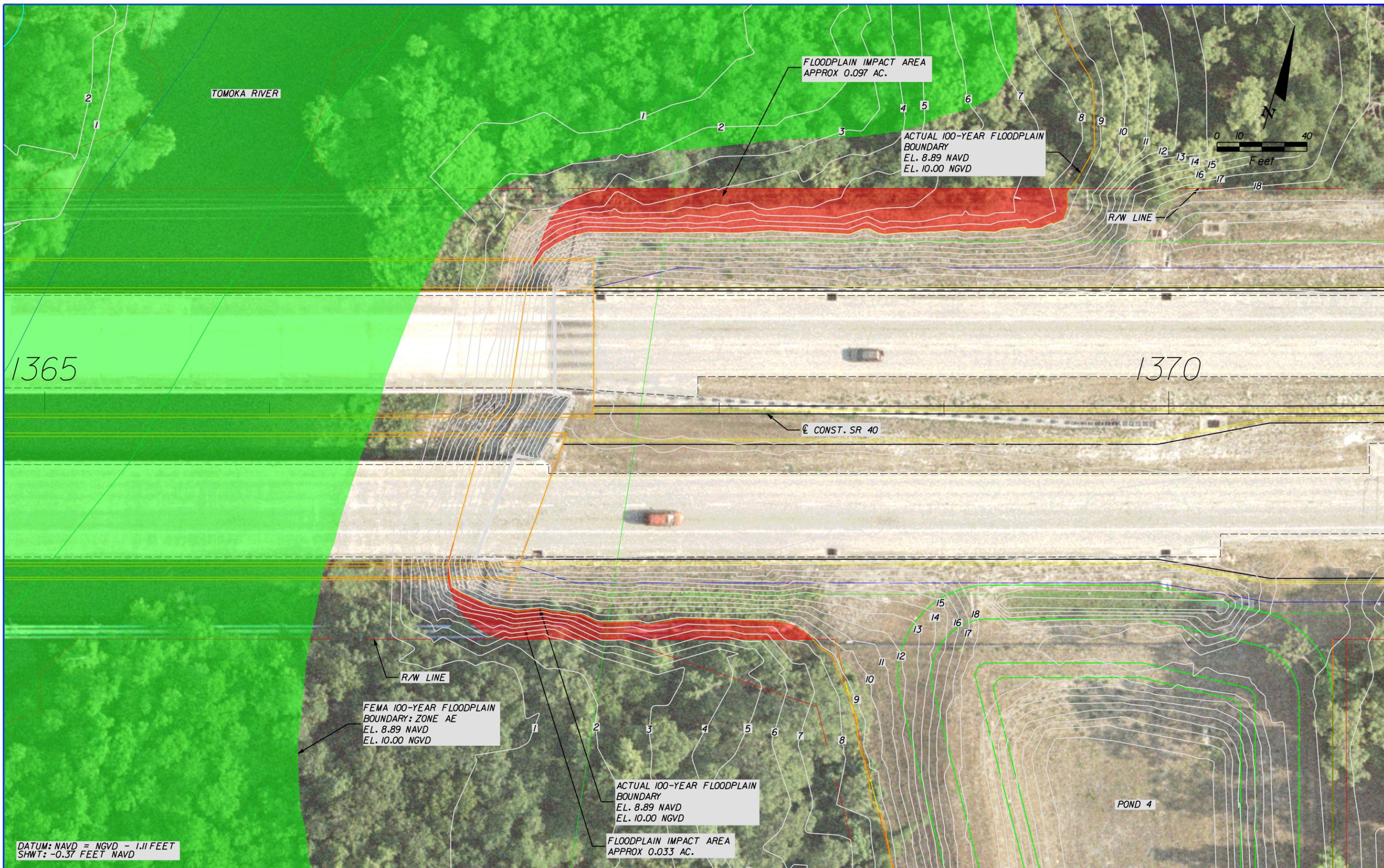
Floodplain Impact Calculations North of SR 40	
Floodplain Elevation based upon FEMA FIRM, Panel Numbers: 12127CO194H, 12127CO200H, 12127CO213H, 12127CO350G, 12127CO351G	100 yr. Floodplain Elev.: 8.89 ft Wet Seasonal High Elev.: - 0.37 ft

ELEVATION	DESCRIPTION	FILL AREA	Difference Fill Area (ac)	Delta D (ft)	Delta Storage Loss (ac-ft)	Sum Impact (ac-ft)
8.89	100 yr. Flood El.	0.098 ac				0.097
			0.014	0.89	0.012	0.085
8.00		0.085 ac				
			0.018	1.00	0.018	0.066
7.00		0.066 ac				
			0.023	1.00	0.023	0.043
6.00		0.043 ac				
			0.018	1.00	0.018	0.025
5.00		0.025 ac				
			0.017	1.00	0.017	0.007
4.00		0.007 ac				
			0.007	1.00	0.007	0.00
3.00	Existing Ground	0.000 ac				

Floodplain Impact Calculations South of SR 40	
Floodplain Elevation based upon FEMA FIRM, Panel Numbers: 12127CO194H, 12127CO200H, 12127CO213H, 12127CO350G, 12127CO351G	100 yr. Floodplain Elev.: 8.89 ft Wet Seasonal High Elev.: - 0.37 ft

ELEVATION	DESCRIPTION	FILL AREA	Difference Fill Area (ac)	Delta D (ft)	Delta Storage Loss (ac-ft)	Sum Impact (ac-ft)
8.89	100 yr. Flood El.	0.034 ac				0.033
			0.009	0.89	0.008	0.026
8.00		0.025 ac				
			0.009	1.00	0.009	0.017
7.00		0.016 ac				
			0.007	1.00	0.007	0.010
6.00		0.009 ac				
			0.004	1.00	0.004	0.006
5.00		0.005 ac				
			0.003	1.00	0.003	0.003
4.00		0.003 ac				
			0.003	1.00	0.003	0.001
3.00		0.001 ac				
			0.001	1.00	0.001	0.00
2.00	Existing Ground	0.000 ac				

Total Volume of Impacts (ac-ft) = **0.130 ac-ft**



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

Inwood
consulting engineers

Renato E. Chuw, PE
PE No. 58050
Certificate of Authorization No. 7074

3000 Dovera Drive, Suite 200
Oviedo, Florida 32765
p 407.971.8850

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
40	VOLUSIA	428947-1-22-01

**FLOODPLAIN IMPACT
EXHIBIT**

SHEET NO.



Made by: **SVC**
Ck. by: _____

Date: **9/24/2012**
Time: **8:36 AM**
Project Number: **KIT-004-01**

PROJECT: **SR 40 PD&E STUDY - FROM BREAKAWAY TRAIL TO WILLIAMSON BLVD**
BASIN: **All**

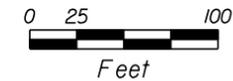
Basin Impact/Compensation Summary Table

BASIN	IMPACTS (ac-ft)	COMPENSATION (ac-ft)	NET IMPACT (ac-ft)
1	0.017	0.03	-0.01
3	0.367	1.71	-1.21
4	0.130		

In Basin 1 there is a net increase in the floodplain volume of 0.01 ac-ft.
In Basin 3 and Basin 4 there is a net increase in the floodplain volume of 1.21 ac-ft.

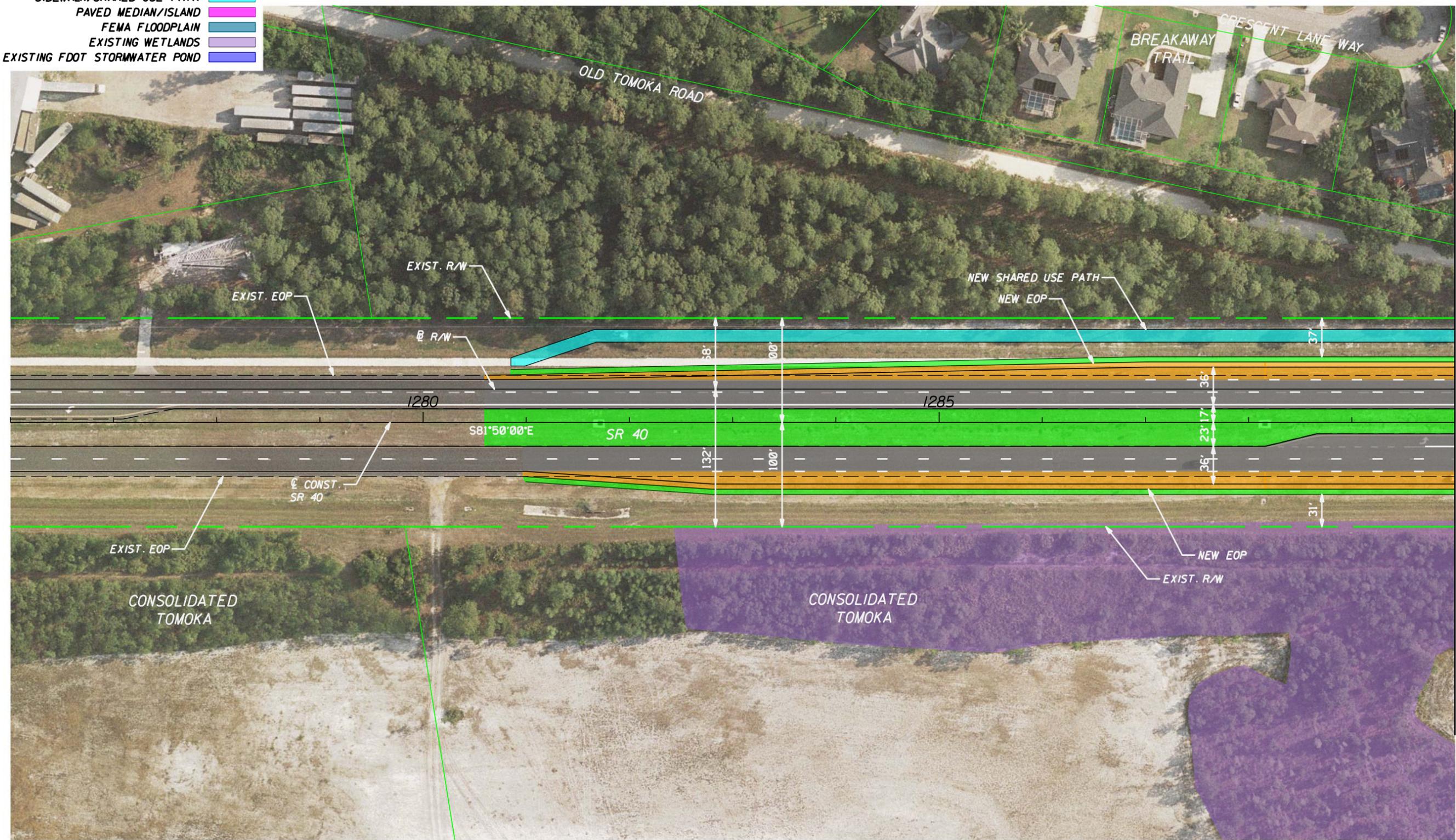
APPENDIX 3

Preferred Alternative Roadway Plans



LEGEND

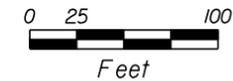
NEW PAVEMENT	
MILL AND RESURFACE EXISTING PAVEMENT	
TURF MEDIAN/SHOULDER	
SIDEWALK/SHARED USE PATH	
PAVED MEDIAN/ISLAND	
FEMA FLOODPLAIN	
EXISTING WETLANDS	
EXISTING FDOT STORMWATER POND	



Match Line 1290+00.00

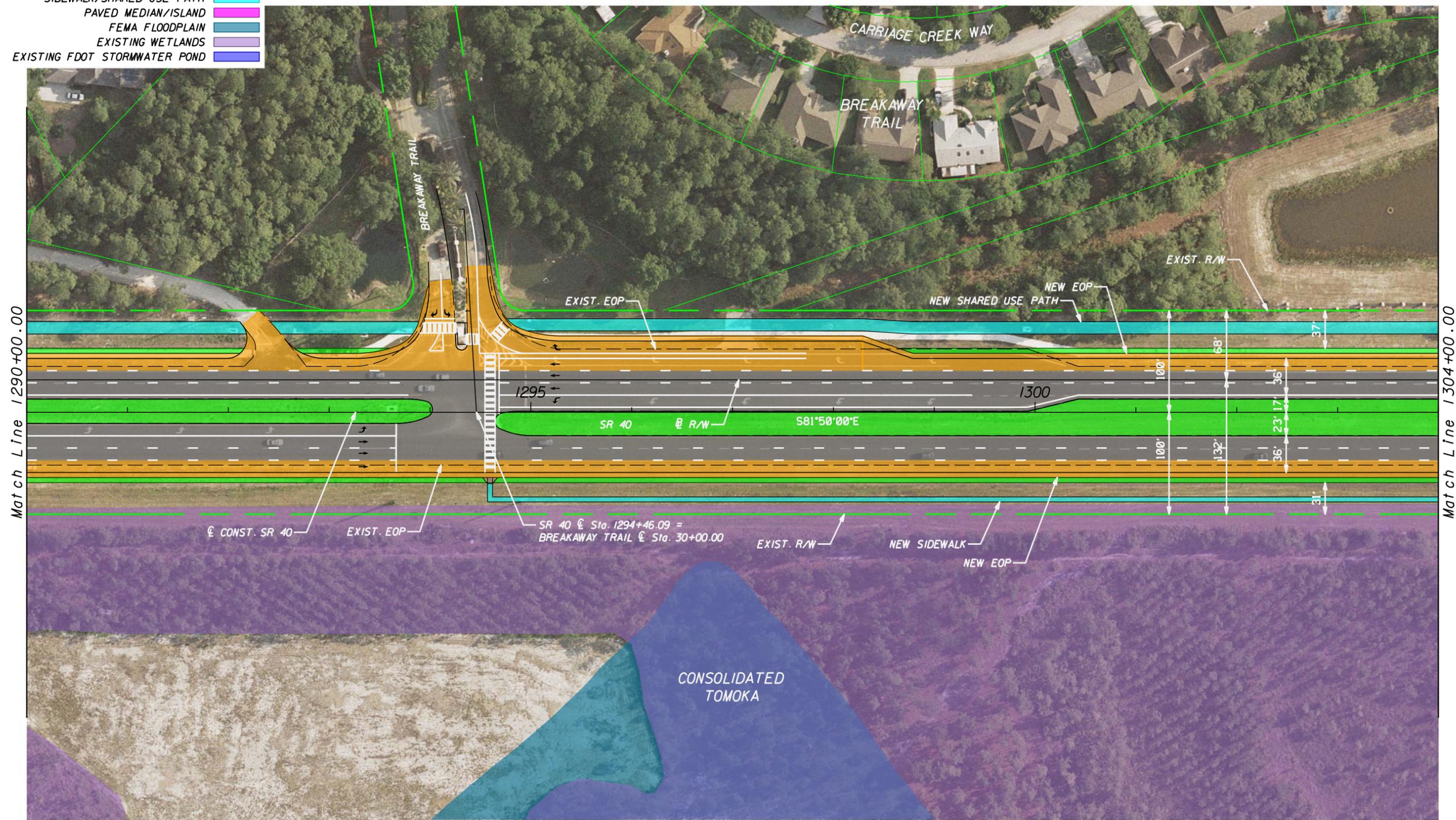
ALTERNATIVE B
TYPICAL SECTION 1 (WEST)
TO TYPICAL SECTION 4 (EAST)

REVISIONS				Engineer of Record: JOHN R. FREEMAN, JR., P.E., PTOE P.E. License No.: 25730 KITTELSON & ASSOCIATES, INC. TRANSPORTATION ENGINEERING / PLANNING 225 E. Robinson St, Suite 450, ORLANDO FL 32801 CERTIFICATE OF AUTHORIZATION NO. 007524	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO. 1
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
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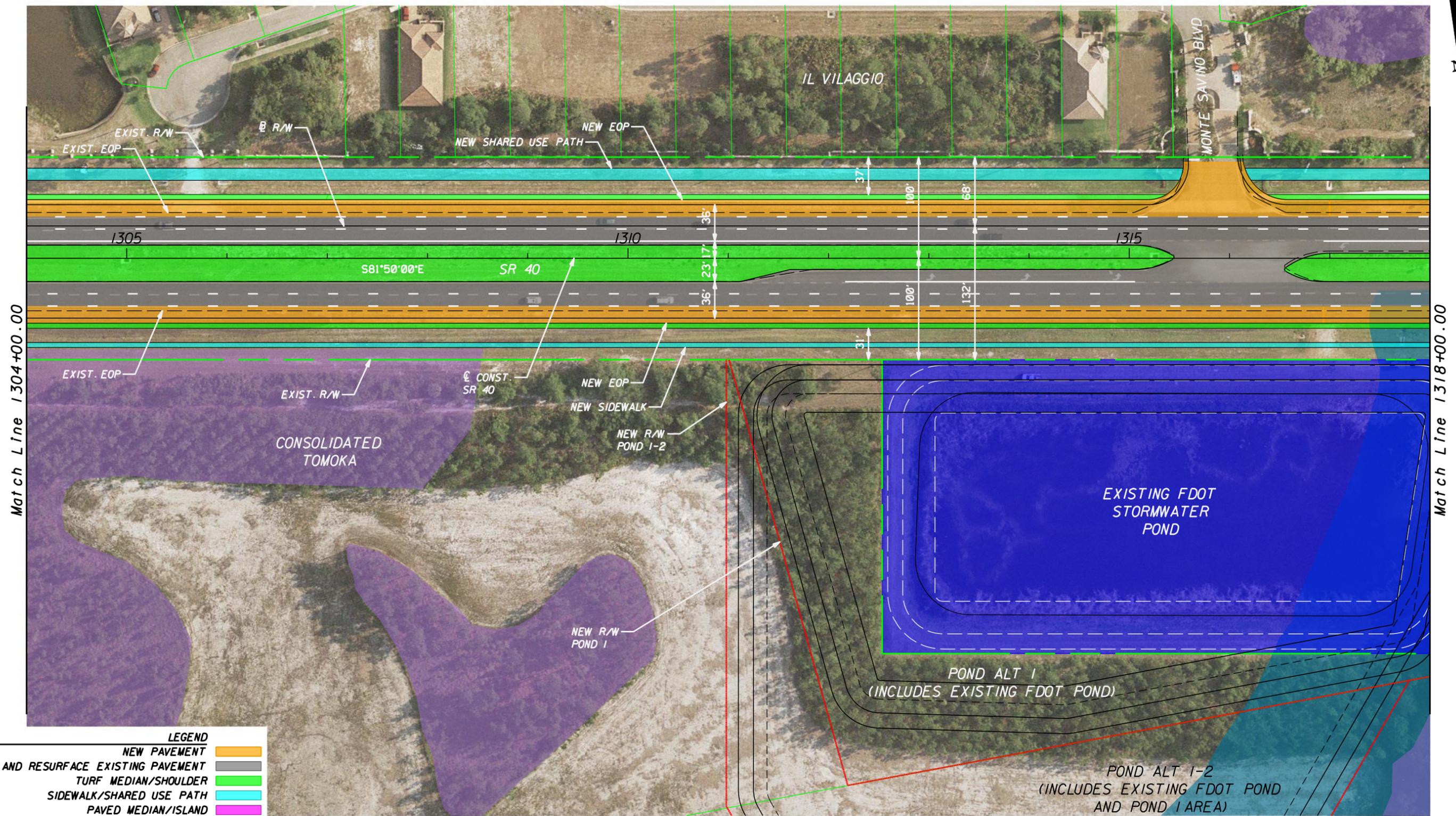
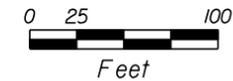
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NEW PAVEMENT	
MILL AND RESURFACE EXISTING PAVEMENT	
TURF MEDIAN/SHOULDER	
SIDEWALK/SHARED USE PATH	
PAVED MEDIAN/ISLAND	
FEMA FLOODPLAIN	
EXISTING WETLANDS	
EXISTING FDOT STORMWATER POND	



ALTERNATIVE B
TYPICAL SECTION 1 (WEST)
TO TYPICAL SECTION 4 (EAST)

REVISIONS		DESCRIPTION		Engineer of Record: JOHN R. FREEMAN, JR., P.E., PTOE P.E. License No.: 25730 KITTELSON & ASSOCIATES, INC. TRANSPORTATION ENGINEERING / PLANNING 225 E. Robinson St, Suite 450, ORLANDO FL 32801 CERTIFICATE OF AUTHORIZATION NO. 007524	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 40 PD&E Study Sta 1290+00 to Sta 1304+00	SHEET NO. 2
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
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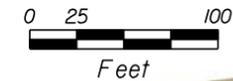


LEGEND

NEW PAVEMENT	
MILL AND RESURFACE EXISTING PAVEMENT	
TURF MEDIAN/SHOULDER	
SIDEWALK/SHARED USE PATH	
PAVED MEDIAN/ISLAND	
FEMA FLOODPLAIN	
EXISTING WETLANDS	
EXISTING FDOT STORMWATER POND	

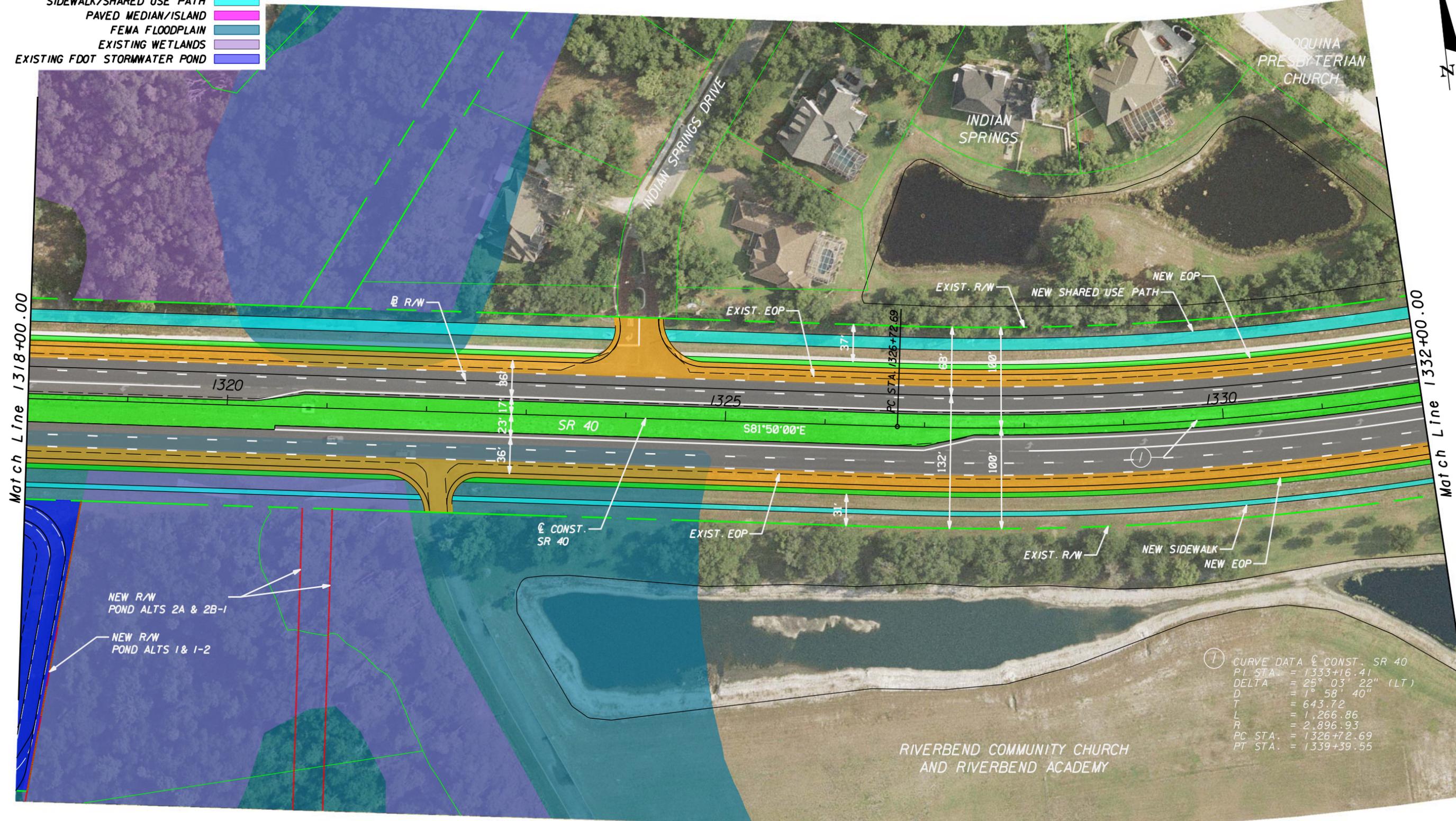
**ALTERNATIVE B
TYPICAL SECTION 1 (WEST)
TO TYPICAL SECTION 4 (EAST)**

REVISIONS		DESCRIPTION		Engineer of Record: JOHN R. FREEMAN, JR., P.E., PTOE P.E. License No.: 25730 KITTELSON & ASSOCIATES, INC. TRANSPORTATION ENGINEERING / PLANNING 225 E. Robinson St, Suite 450, ORLANDO FL 32801 CERTIFICATE OF AUTHORIZATION NO. 007524	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 40 PD&E Study Sta 1304+00 to Sta 1318+00	SHEET NO. 3
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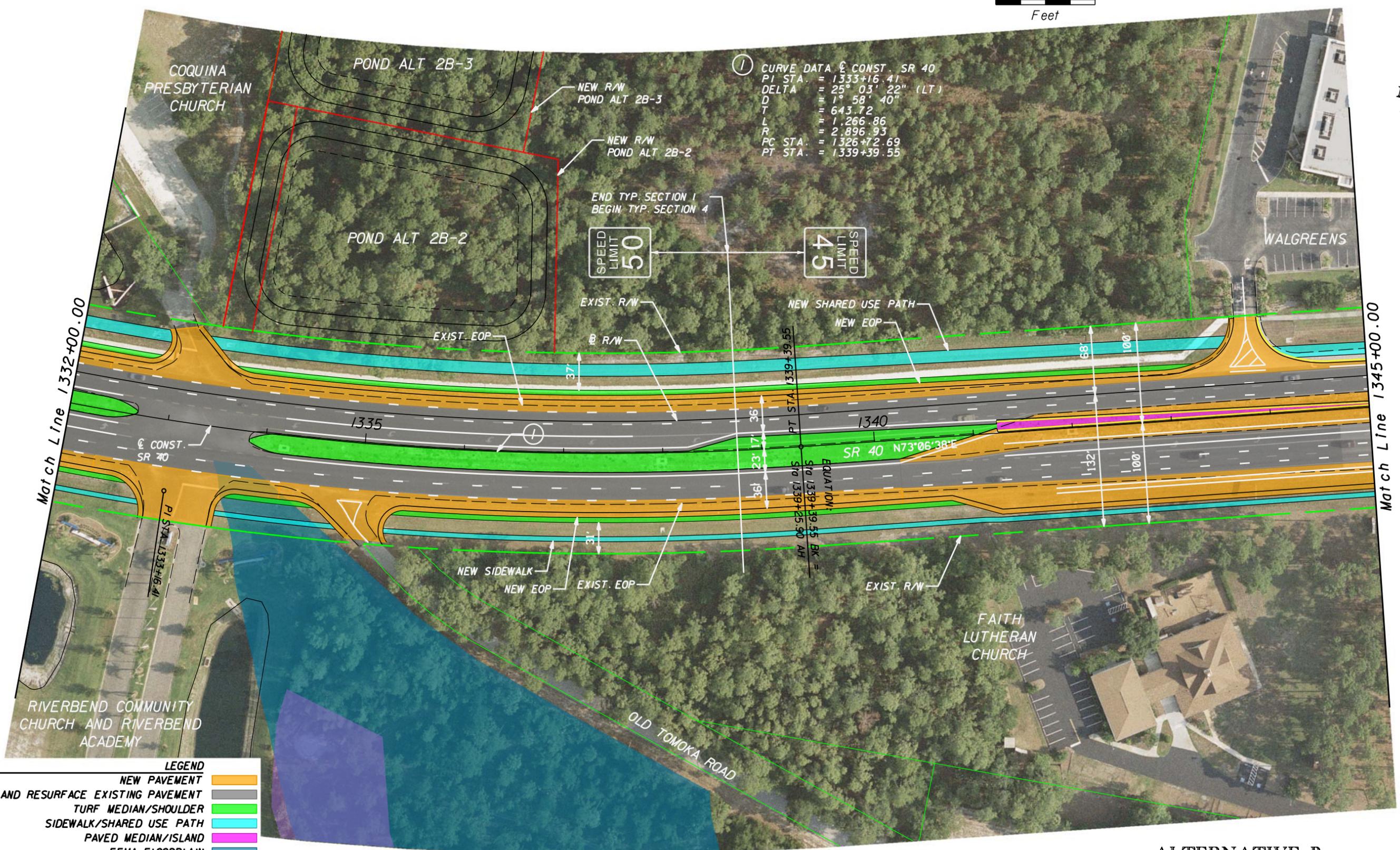
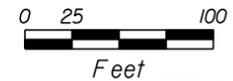
NEW PAVEMENT	
MILL AND RESURFACE EXISTING PAVEMENT	
TURF MEDIAN/SHOULDER	
SIDEWALK/SHARED USE PATH	
PAVED MEDIAN/ISLAND	
FEMA FLOODPLAIN	
EXISTING WETLANDS	
EXISTING FDOT STORMWATER POND	



**ALTERNATIVE B
TYPICAL SECTION 1 (WEST)
TO TYPICAL SECTION 4 (EAST)**

REVISIONS		DATE		DESCRIPTION	

Engineer of Record: JOHN R. FREEMAN, JR., P.E., PTOE P.E. License No.: 25730 KITTELSON & ASSOCIATES, INC. TRANSPORTATION ENGINEERING / PLANNING 225 E. Robinson St, Suite 450, ORLANDO FL 32801 CERTIFICATE OF AUTHORIZATION NO. 007524			STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		SR 40 PD&E Study Sta 1318+00 to Sta 1332+00	SHEET NO. 4
ROAD NO.	COUNTY	FINANCIAL PROJECT ID				
40	VOLUSIA	428947-1-22-01				



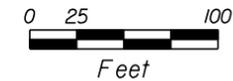
LEGEND

NEW PAVEMENT	
MILL AND RESURFACE EXISTING PAVEMENT	
TURF MEDIAN/SHOULDER	
SIDEWALK/SHARED USE PATH	
PAVED MEDIAN/ISLAND	
FEMA FLOODPLAIN	
EXISTING WETLANDS	
EXISTING FDOT STORMWATER POND	

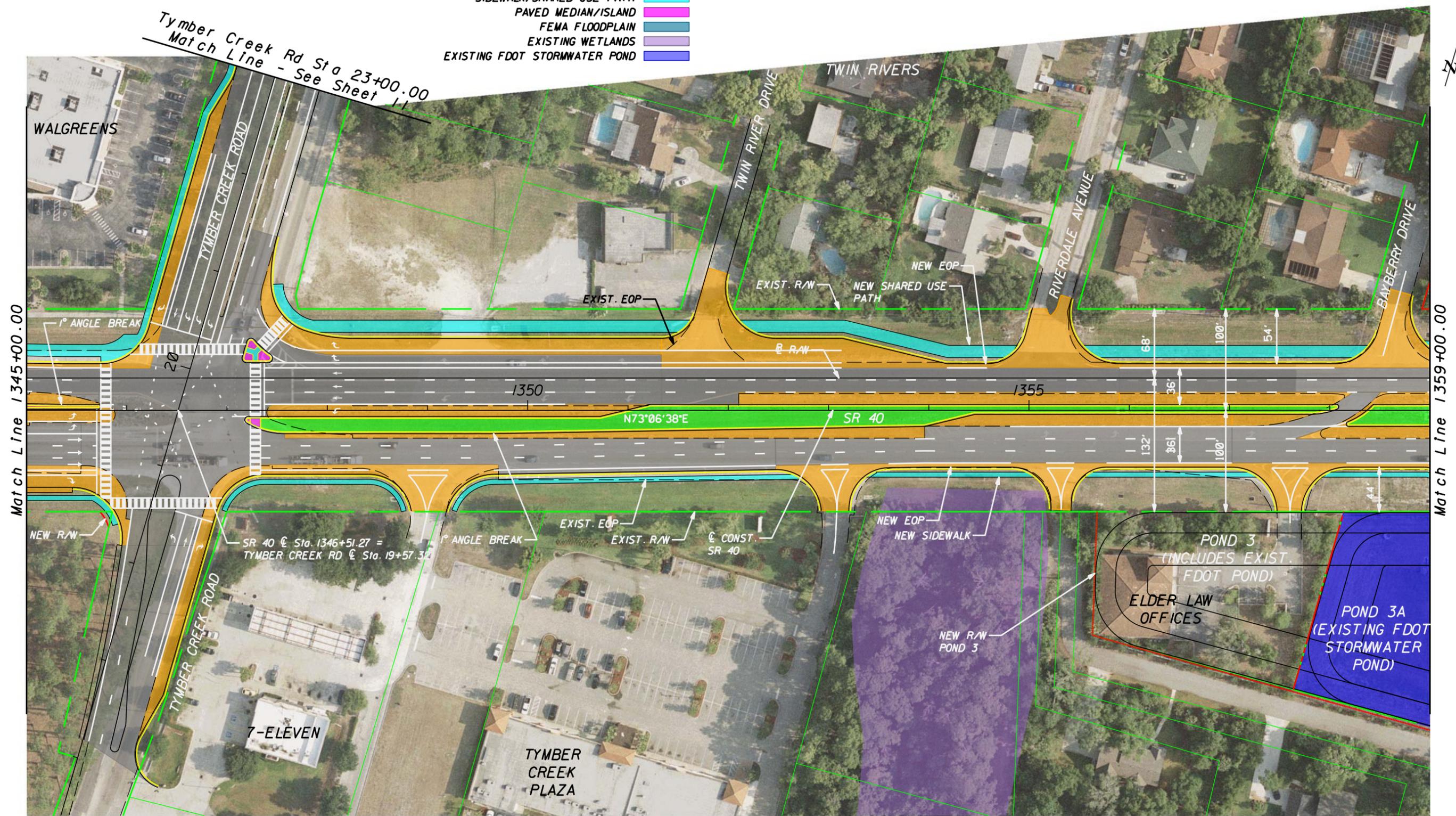
ALTERNATIVE B
TYPICAL SECTION 1 (WEST)
TO TYPICAL SECTION 4 (EAST)

PRELIMINARY PLANS NOT FOR CONSTRUCTION

REVISIONS		Engineer of Record: JOHN R. FREEMAN, JR., P.E., PTOE P.E. License No.: 25730 KITTELSON & ASSOCIATES, INC. TRANSPORTATION ENGINEERING / PLANNING 225 E. Robinson St, Suite 450, ORLANDO FL 32801 CERTIFICATE OF AUTHORIZATION NO. 007524	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 40 PD&E Study Sta 1332+00 to Sta 1345+00	SHEET NO. 5
DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
			40	VOLUSIA	428947-1-22-01		



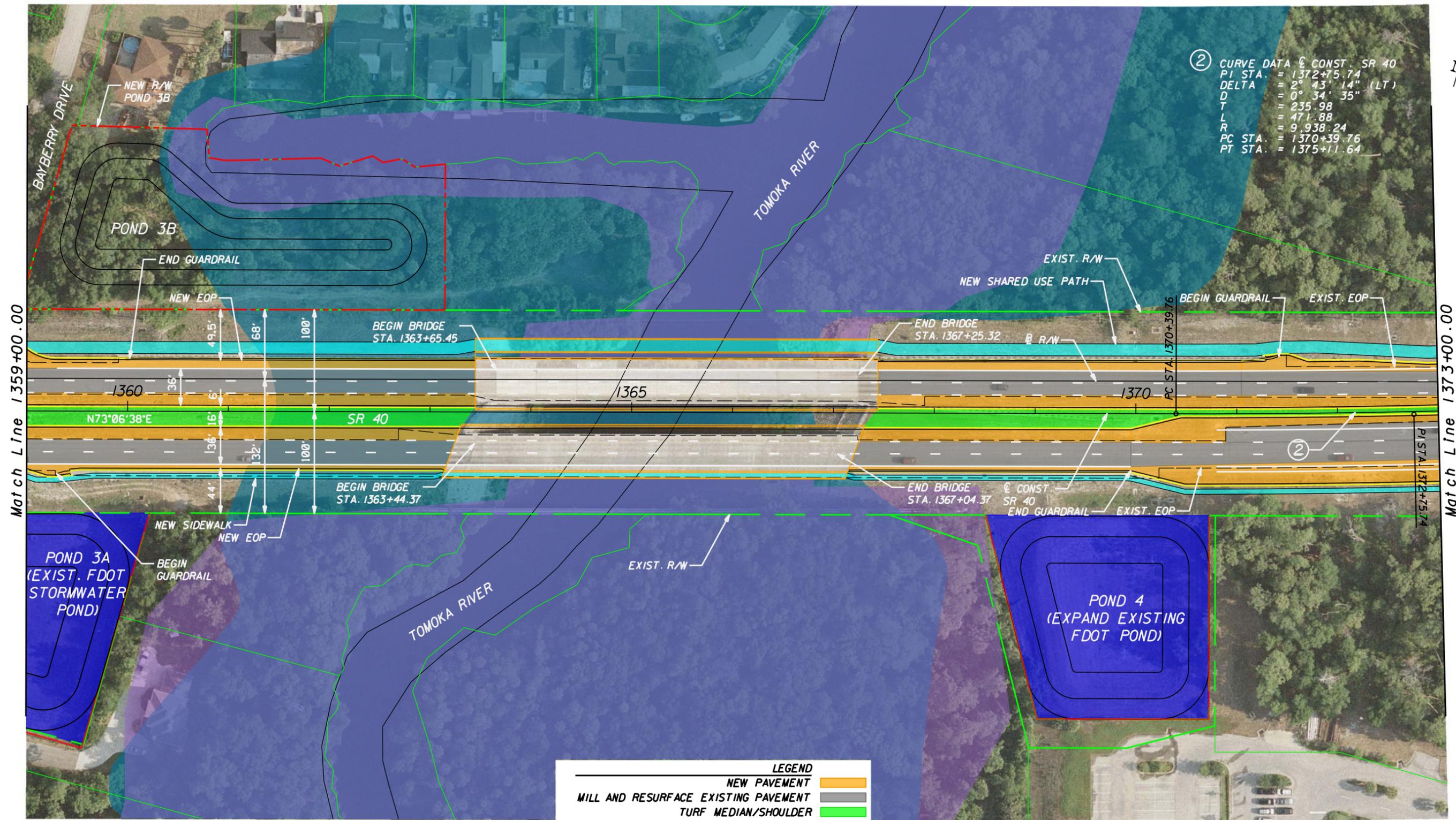
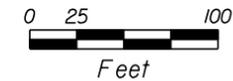
- LEGEND**
- NEW PAVEMENT
 - MILL AND RESURFACE EXISTING PAVEMENT
 - TURF MEDIAN/SHOULDER
 - SIDEWALK/SHARED USE PATH
 - PAVED MEDIAN/ISLAND
 - FEMA FLOODPLAIN
 - EXISTING WETLANDS
 - EXISTING FDOT STORMWATER POND



ALTERNATIVE B
TYPICAL SECTION 1 (WEST)
TO TYPICAL SECTION 4 (EAST)

PRELIMINARY PLANS NOT FOR CONSTRUCTION

REVISIONS		DESCRIPTION		Engineer of Record: JOHN R. FREEMAN, JR., P.E., PTOE P.E. License No.: 25730 KITTELSON & ASSOCIATES, INC. TRANSPORTATION ENGINEERING / PLANNING 225 E. Robinson St, Suite 450, ORLANDO FL 32801 CERTIFICATE OF AUTHORIZATION NO. 007524	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 40 PD&E Study Sta 1345+00 to Sta 1359+00	SHEET NO. 6
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					40	VOLUSIA	428947-1-22-01		



② CURVE DATA & CONST. SR 40
 PI STA. = 1372+75.74
 DELTA = 2° 43' 14" (LT)
 D = 0° 34' 35"
 T = 235.98
 L = 471.88
 R = 9,938.24
 PC STA. = 1370+39.76
 PT STA. = 1375+11.64

Match Line 1359+00.00

Match Line 1373+00.00

LEGEND

NEW PAVEMENT	
MILL AND RESURFACE EXISTING PAVEMENT	
TURF MEDIAN/SHOULDER	
SIDEWALK/SHARED USE PATH	
PAVED MEDIAN/ISLAND	
FEMA FLOODPLAIN	
EXISTING WETLANDS	
EXISTING FDOT STORMWATER POND	

ALTERNATIVE B
 TYPICAL SECTION 1 (WEST)
 TO TYPICAL SECTION 4 (EAST)

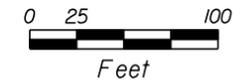
REVISIONS	
DATE	DESCRIPTION

Engineer of Record: JOHN R. FREEMAN, JR., P.E., PTOE
 P.E. License No.: 25730
KITTELSON & ASSOCIATES, INC.
 TRANSPORTATION ENGINEERING / PLANNING
 225 E. Robinson St, Suite 450, ORLANDO FL 32801
 CERTIFICATE OF AUTHORIZATION NO. 007524

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
40	VOLUSIA	428947-1-22-01

SR 40 PD&E Study
 Sta 1359+00 to Sta 1373+00

SHEET NO.
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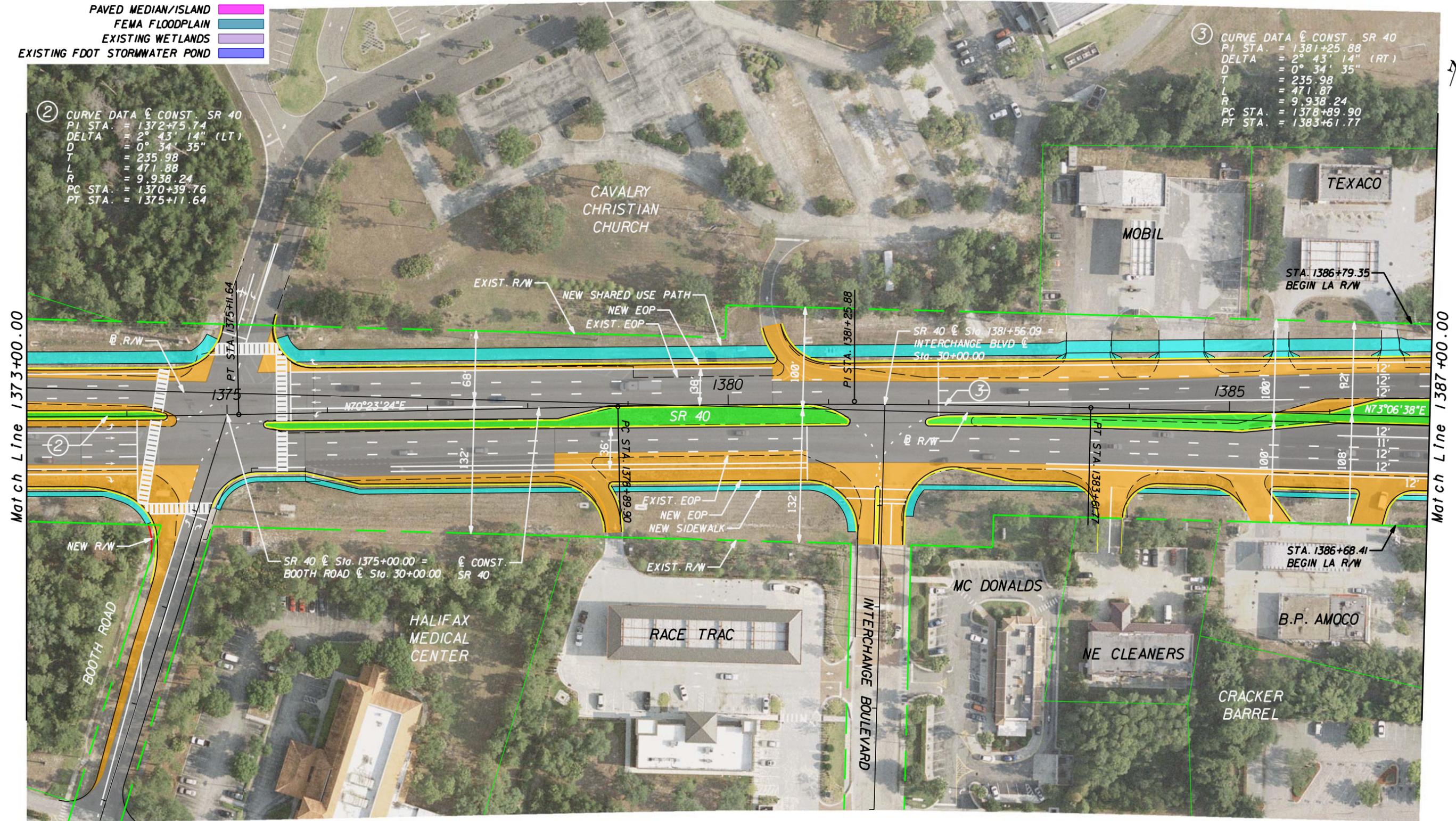


LEGEND

NEW PAVEMENT	
MILL AND RESURFACE EXISTING PAVEMENT	
TURF MEDIAN/SHOULDER	
SIDEWALK/SHARED USE PATH	
PAVED MEDIAN/ISLAND	
FEMA FLOODPLAIN	
EXISTING WETLANDS	
EXISTING FDOT STORMWATER POND	

② CURVE DATA & CONST. SR 40
 PI STA. = 1372+75.74
 DELTA = 2° 43' 14" (LT)
 D = 0° 34' 35"
 T = 235.98
 L = 471.88
 R = 9,938.24
 PC STA. = 1370+39.76
 PT STA. = 1375+11.64

③ CURVE DATA & CONST. SR 40
 PI STA. = 1381+25.88
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 D = 0° 34' 35"
 T = 235.98
 L = 471.87
 R = 9,938.24
 PC STA. = 1378+89.90
 PT STA. = 1383+61.77



ALTERNATIVE B
 TYPICAL SECTION 1 (WEST)
 TO TYPICAL SECTION 4 (EAST)

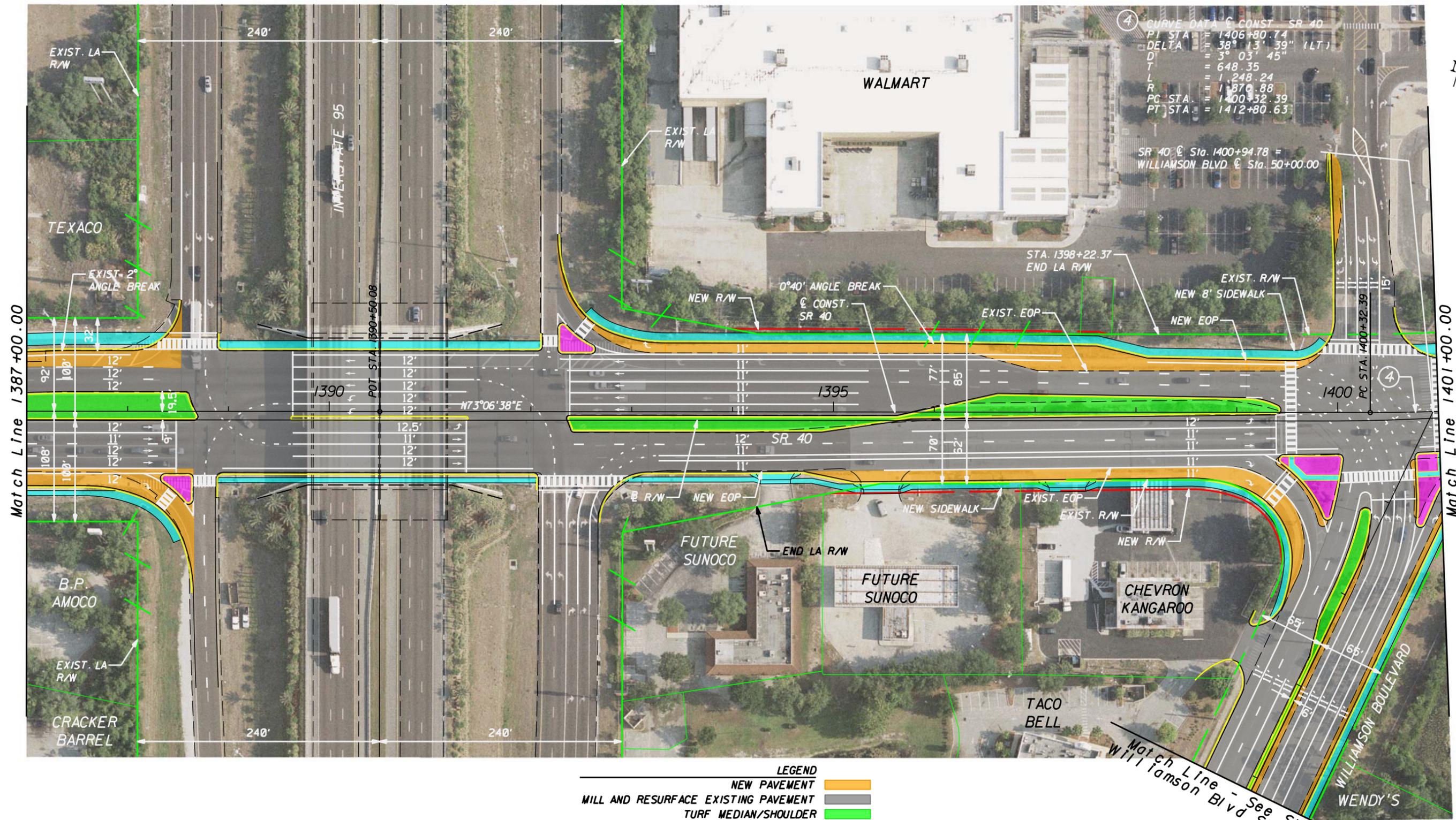
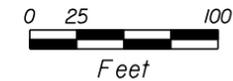
REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

Engineer of Record: JOHN R. FREEMAN, JR., P.E., PTOE
 P.E. License No.: 25730
KITTELSON & ASSOCIATES, INC.
 TRANSPORTATION ENGINEERING / PLANNING
 225 E. Robinson St, Suite 450, ORLANDO FL 32801
 CERTIFICATE OF AUTHORIZATION NO. 007524

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
40	VOLUSIA	428947-1-22-01

SR 40 PD&E Study
 Sta 1373+00 to Sta 1387+00

SHEET NO.
 8



LEGEND

NEW PAVEMENT	
MILL AND RESURFACE EXISTING PAVEMENT	
TURF MEDIAN/SHOULDER	
SIDWALK/SHARED USE PATH	
PAVED MEDIAN/ISLAND	
FEMA FLOODPLAIN	
EXISTING WETLANDS	
EXISTING FDOT STORMWATER POND	

ALTERNATIVE B
TYPICAL SECTION 1 (WEST)
TO TYPICAL SECTION 4 (EAST)

PRELIMINARY PLANS NOT FOR CONSTRUCTION

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

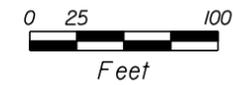
Engineer of Record: JOHN R. FREEMAN, JR., P.E., PTOE
P.E. License No.: 25730

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
225 E. Robinson St, Suite 450, ORLANDO FL 32801
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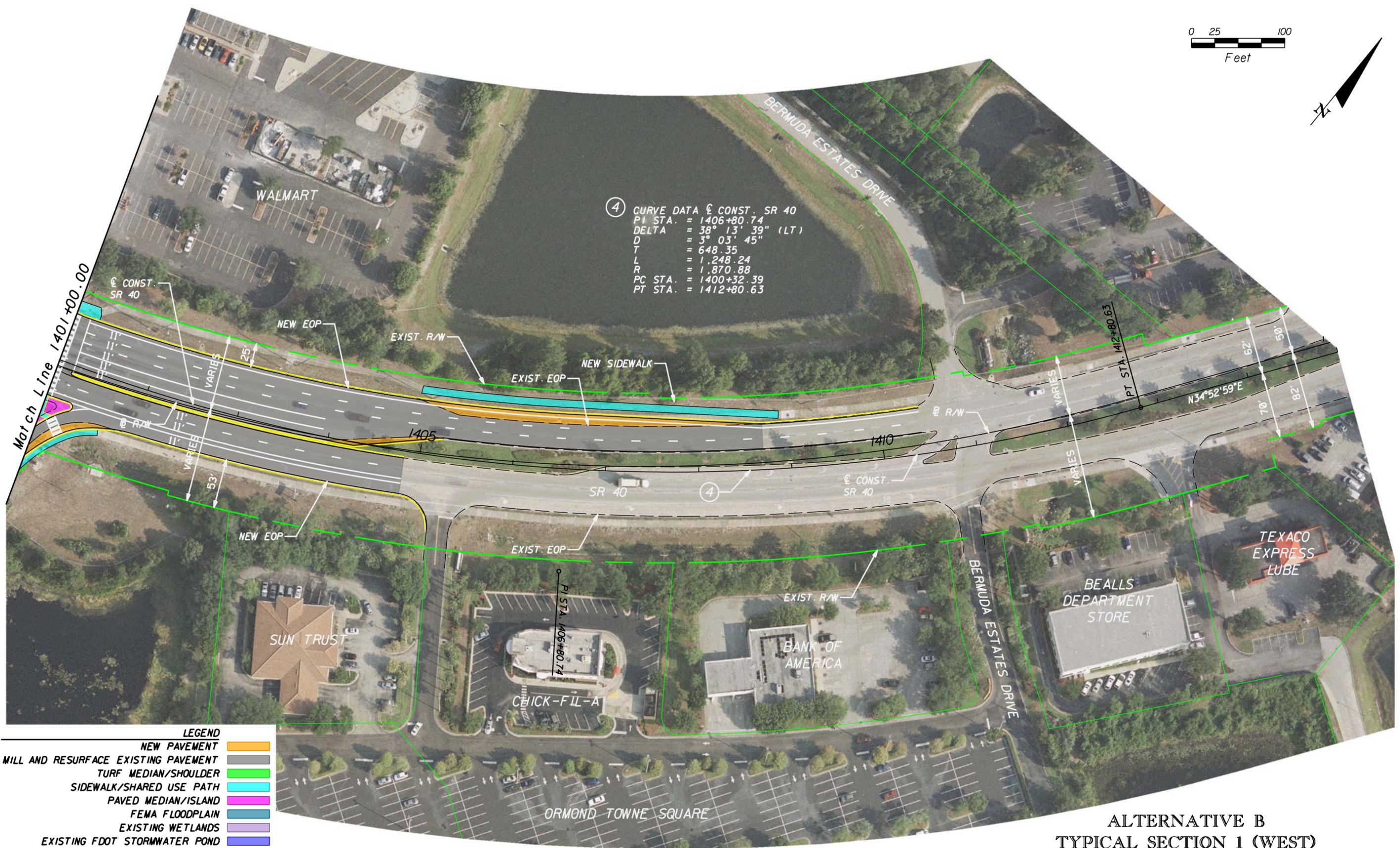
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
40	VOLUSIA	428947-1-22-01

SR 40 PD&E Study
Sta 1387+00 to Sta 1401+00

SHEET NO.
9



④ CURVE DATA @ CONST. SR 40
 PI STA. = 1406+80.74
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 R = 1,870.88
 PC STA. = 1400+32.39
 PT STA. = 1412+80.63



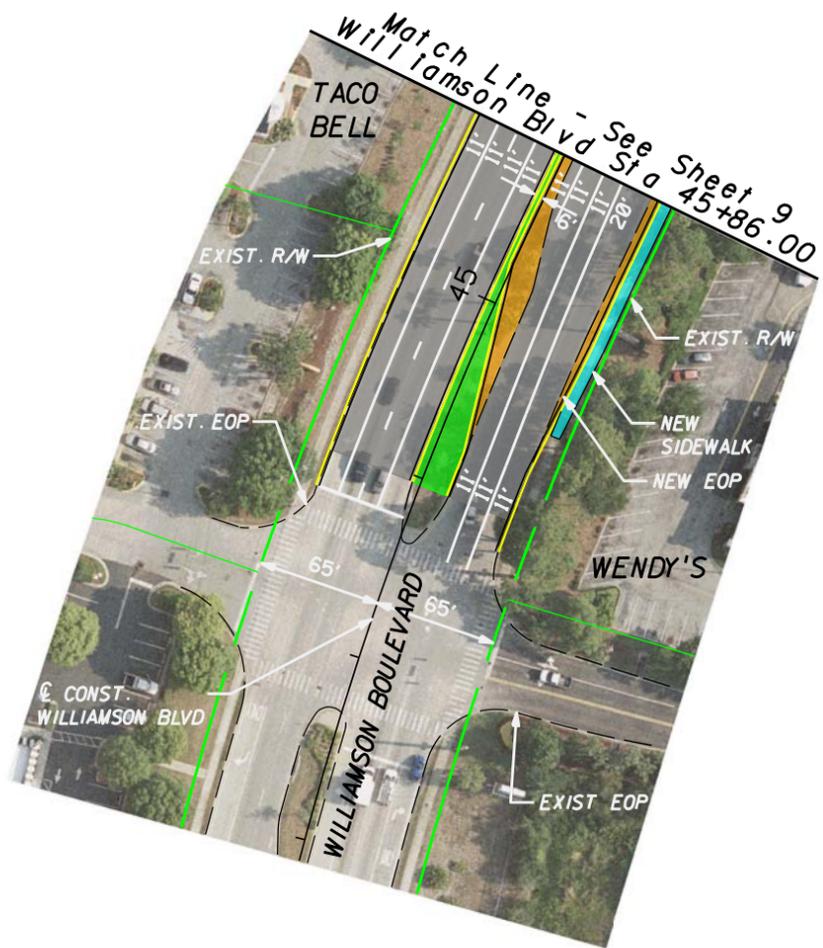
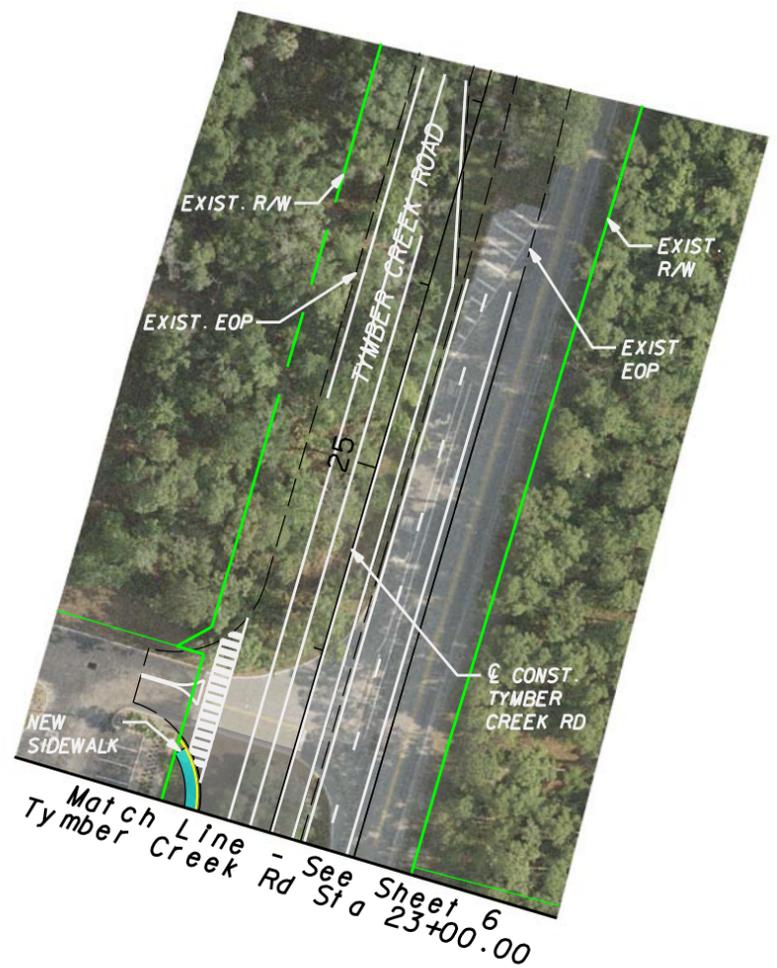
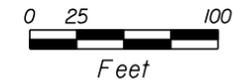
LEGEND

NEW PAVEMENT	
MILL AND RESURFACE EXISTING PAVEMENT	
TURF MEDIAN/SHOULDER	
SIDEWALK/SHARED USE PATH	
PAVED MEDIAN/ISLAND	
FEMA FLOODPLAIN	
EXISTING WETLANDS	
EXISTING FDOT STORMWATER POND	

ALTERNATIVE B
 TYPICAL SECTION 1 (WEST)
 TO TYPICAL SECTION 4 (EAST)

PRELIMINARY PLANS NOT FOR CONSTRUCTION

REVISIONS		DESCRIPTION	Engineer of Record: JOHN R. FREEMAN, JR., P.E., PTOE P.E. License No.: 25730 KITTELSON & ASSOCIATES, INC. TRANSPORTATION ENGINEERING / PLANNING 225 E. Robinson St, Suite 450, ORLANDO FL 32801 CERTIFICATE OF AUTHORIZATION NO. 007524	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 40 PD&E Study Sta 1401+00 to Sta 1415+00	SHEET NO. 10
DATE	DESCRIPTION			ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
			40	VOLUSIA	428947-1-22-01			



LEGEND

NEW PAVEMENT	
MILL AND RESURFACE EXISTING PAVEMENT	
TURF MEDIAN/SHOULDER	
SIDEWALK/SHARED USE PATH	
PAVED MEDIAN/ISLAND	
FEMA FLOODPLAIN	
EXISTING WETLANDS	
EXISTING FDOT STORMWATER POND	

ALTERNATIVE B
TYPICAL SECTION 1 (WEST)
TO TYPICAL SECTION 4 (EAST)

PRELIMINARY PLANS NOT FOR CONSTRUCTION

REVISIONS				Engineer of Record: JOHN R. FREEMAN, JR., P.E., PTOE P.E. License No.: 25730 KITTELSON & ASSOCIATES, INC. TRANSPORTATION ENGINEERING / PLANNING 225 E. Robinson St, Suite 450, ORLANDO FL 32801 CERTIFICATE OF AUTHORIZATION NO. 007524	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 40 PD&E Study Sta 1387+00 to Sta 1401+00	SHEET NO. 11
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					40	VOLUSIA	428947-1-22-01		

APPENDIX 4

Correspondence



Meeting Notes

Design Concept Review Meeting

SR 40, from Breakaway Trail to Williamson Boulevard, PD&E Study

Financial Project No. 428947-1-22-01

Meeting Date: March 2, 2012

Project #: 11508

Location: FDOT District 5; Manatee Conference Room

Time: 10:00 a.m.

Attendees:

George Borchik – FDOT Design Office

Chris Cairns – FDOT Traffic Operations Office

Mary McGehee – FDOT Environment Management Office

Chris Rizzolo – URS/FDOT

Jack Freeman – Kittelson & Associates, Inc.

Discussion Items

Mr. Freeman provided all attendees the following information:

- Typical sections being considered
- Bridge typical sections at Tomoka River
- 2035 design traffic – turning movement projections and lane requirements
- 1"=100' design concepts for:
 - Typical Section #1 (west) to Typical Section #3 (east)
 - Typical Section #1 (west) to Typical Section #4 (east)
 - Typical Section #3 (west) to Typical Section #3 (east)
 - Typical Section #3 (west) to Typical Section #4 (east)

Typical Sections

As a project update, Mr. Freeman stated that the analysis of the alternative typical sections selected three different typicals to be evaluated in two segments of SR 40 with Tymber Creek Road being the dividing point. These are:

Breakaway Trail to Tymber Creek Road

- Rural with outside widening (Typical Section #1)
- High Speed Urban with outside widening (Typical Section #3)

Tymber Creek Road to I-95

- High Speed Urban with outside widening (Typical Section #3)
- Urban with inside widening (Typical Section #4)

Comments provided regarding the typical sections were as follows:

- Typical #1 – The typical section shows the existing median to vary in width between 40' and 46'. Please confirm that the median varies from 40' between Breakaway Trail and Tymber Creek Road.
- Typical #3 – The typical section shows the proposed median to be 40'. This is to match the 40' median between Breakaway Trail and Tymber Creek Road. The high speed typical generally has a 30' median. East of Tymber Creek Road, consider narrowing the median to 30' to avoid right-of-way takings.
- Typical #4 – The typical section shows inside widening with the lanes sloped to the median. This would cause a center drainage system. Consider sloping the lanes to the outside to avoid the cost of this drainage system.

Design Concepts

The initial review of design concepts was for Typical Section #1 (west) to Typical Section #3 (east). The following comments were provided:

Sheet #1 – Change the callout of New Sidewalk on north side of SR 40 to be Multi-use Path. This is thought-out the plans.

Sheet #2 – Consider stopping the sidewalk on the south side of SR 40 at the Breakaway Trail intersection. A pedestrian crossing of SR 40 can be provided as part of the signalized intersection.

Sheet # 5 – Do not provide the right turn lane into the Walgreens on the north side near Sta. 1344. Also, if the same median width is provided between Typical Section #1 (west) and #3 (east), why are there angle breaks near Sta. 1341 and 1342? If Typical Section #3 (east) has the median reduced to 30', then the angle breaks would likely increase or change to horizontal curves.

Sheet #6 – Provide 5' of set back from the back of curb to the multi-use path. Improve the graphics to show the Volusia County improvement to the Tymber Creek Road intersection better so that any further enhancement from this project can be easily seen. Show a stop bar at the dual right turn lanes for the WB to NB movement as this movement will need to be under signal control. This will also aid with patrons of the multi-use path crossing the two lanes. The office in the northwest corner of the Twin River Drive and SR 40 should be labeled.

Sheet #7 – It was discussed that the property in the northwest side of the Tomoka River bridge is currently used for a canoe launch. During project meetings, questions have been asked whether a park can be provided at this location for public access to the river. This property is shown on the Volusia County Property Appraiser's website to be privately owned.

Sheet #8 – We had extensive discussion of the SR 40 and Interchange Boulevard intersection. This intersection is currently being evaluated by FDOT Traffic Operations to be modified from full access to WB directional access. FDOT has received a public inquiry to Secretary Prasad about the intersection modifications. The discussion at the meeting was to keep the directional access but increase the length of the WB left turn lane for additional storage should the intersection become signalized in the future. The design should also be modified to delete the concrete traffic separator and place the left turn lane adjacent to the thru lane. It was also noted that the left turn radius should be checked to accommodate a WB-67 truck for Race Trac. Following the meeting and review of the e-mail exchange from the inquiry to Secretary Prasad, a request has been sent to FDOT to show full intersection access at this location for upcoming public meetings. It also requested that the plans identify where the existing posted speed limit changes from 45 mph to the east to 50 mph to the west. The EB right turn lane to the I-95 SB entrance ramp should be shortened to begin just after the southeast radius return at Interchange Boulevard.

Sheet #9 – It was noted that this plan sheet is the same for both alternatives since there are six lanes on SR 40 under I-95 and there is limited right-of-way between I-95 and Williamson Boulevard. The input received was to show a pedestrian crosswalk for the multi-use path across the WB right turn lane to I-95 NB entrance ramp. We also discussed the potential for modifying the recommended intersection lane geometry at the SR 40 and Williamson Boulevard intersection to have the third NB left turn lane be a shared left turn and thru movement. We have requested additional traffic analysis at this intersection to see if this is possible as it can avoid expensive right-of-way in the southeast intersection quadrant if possible.

Sheet #10 – It was noted that in the ongoing 3R project east of Williamson Road, the lanes will be 11' and a 4' bike lane will be provided.

In the review of design concept for Typical Section #3 (west) to Typical Section #4 (east). The following comments were provided:

Sheet #2 – There are existing access points on the north side near Sta. 1293 and 1297 with no access provided. The access at Sta. 1293 is a frequently used and right-in/right-out access will be added. The access at Sta. 1297 would be across a right turn lane and appears to be into private property. This will be field checked to see what is served by the driveway.

Sheet #5 – Note on plans where the transition from one typical section to the other begins and ends. Also, the plans should include the location where the 45 mph speed limit associated with Typical Section #4 ends and the 50 mph speed limit begins.

Sheets #6 thru #10 – Same comments as previously stated.

Due to time limitations, there was no review of the other two plan sets. It was noted that the only difference from previously reviewed plans were the transitions between typical sections at Tymber Creek Road.

This memorandum provides Jack Freeman's understanding of the discussions during this meeting. Any comments, corrections or additions should be addressed to him at 407-373-1103 or by e-mail at jfreeman@kittelsohn.com.

Copies to:

All attendees

Joey Bansen – KAI

Ralph Bove – DRMP

Amanda Woods – DRMP

Jason Houck – Inwood

Renato Chew - Inwood

File 11508