



To: Staci Nester
Richard L. Johnson, PE

From: Luis Diaz, PE
Robert Denney, PE

Date: May 19, 2015

Subject: Interstate 4 from East of SR 15/600 (US 17/92) to ½ Mile East of SR 472 Value Engineering Study Recommendation Dispositions

FM: 408464-2

Dear Mr. Johnson,

Please see below for our management action dispositions for the recommendations found on Table 1.4-1 of the Value Engineering Study Report for I-4 from East of SR 15/600 (US 17/92) to ½ Mile East of SR 472.

Recommendation 3: Use concrete for the express lanes

Accepted. The use of concrete pavement will be considered for the construction of the express lanes.

Recommendation 7: Construct a box culvert under the new I-4 off ramp (that connects Eastbound Dirksen Dr.) to provide connectivity of the existing “Spring-to-Spring” multi- use trail

Accepted. A concrete box culvert or prefabricated bridge type structure will be considered at the location of the new ramp.

Recommendation 10: Hold the North side right-of-way line on Saxon Boulevard and take only on the South side (Alternative 5)

Accepted. Alternative 5 will be the preferred alternative carried forward for Saxon between Finland and Normandy should this section of roadway require capacity improvements.

Recommendation 12: Construct a Diverging Diamond or a Single Point Diamond Interchange instead of loops on SR 472

Accepted. A SPDI was evaluated, and it was determined that it functioned better than a loop ramp, and required much less right of way. Since a SPDI works at this location, a DDI is also being evaluated to determine if this concept would provide improved operations over a SPDI.

Recommendation 17: Construct Rhode Island Avenue with wide median and future construction to the inside instead of to the outside

Partially Accepted. Because of the length of Rhode Island (approximately 6500-feet) it has been decided to construct the entire roadway at once.

Recommendation 18: Construct Rhode Island Avenue with median and future construction to the north side instead of to the outside

Partially Accepted. Because of the length of Rhode Island (approximately 6500-feet) it has been decided to construct the entire roadway at once.

Recommendation 20: Eliminate the transit corridor and recommend the next segment to the north includes the transit envelope

Not Accepted. At the request of Volusia County, the I-4 envelope must contain a transit corridor.

Recommendation 22: Leave the transit corridor south of SR 472 but consider using SR 472 to the west to terminate at a transit station that connects with SunRail

Accepted. FDOT is committed to maintaining sufficient room along the SR 472 corridor until such time that a final decision has been reached as to where rail will be located in Volusia County.

Recommendation 24: Use Alternative 1 Interchange with an additional eastbound off ramp auxiliary lane to connect directly to Normandy Boulevard intersection

Not Accepted. The additional eastbound off ramp was evaluated and it provides little to no improvement to the interchange from an operations standpoint.

Recommendation 25: Relocate the Park and Ride and the pond to the property west of the Riverside Condominiums on Dirksen Drive

Accepted. The parcel just west of the Riverside Condominiums is the new location for the Park and Ride lot that was impacted due to the new I-4 eastbound off ramp to eastbound Dirksen Drive.

Thank You,



Luis Diaz, PE
Project Manager

Value Engineering For Transportation Improvements

Interstate 4 from East of State Road 15/600 (US 17/92) to 1/2 Mile East of State Road 472



Value Engineering Study **Draft** Report

FM Number: 408464-2

Fed. Aid Project: Yes

Project Description: Interstate 4 from East of State Road 15/600 (US 17/92) to 1/2 Mile East of State Road 472

Study Dates: June 2 – 6, 2014

Project Development Phase				Study Identification Number						
PD&E	Design	Other					VE Item No.			
HNTB, Inc.								Yr.	Dist.	No.
								14	005	05

This study has been performed in accordance with current applicable FDOT Value Engineering Procedures and Techniques

Richard L. Johnson, CVS No. 20030201, PE No. 38681

Date: August 15, 2014

TABLE OF CONTENTS

<u>SECTIONS</u>	<u>Page</u>
1. EXECUTIVE SUMMARY	1
2. VALUE ENGINEERING METHODOLOGY	6
3. WORKSHOP PARTICIPANTS AND PROJECT INFORMATION	8
4. ECONOMIC DATA, COST MODEL AND ESTIMATES	11
5. FUNCTION ANALYSIS AND FAST DIAGRAM	13
6. EVALUATION	15
7. RECOMMENDATIONS	19
APPENDICES	
• Agenda	51
• Sign In Sheets	52-58
• Resolution Memorandum	59-60
• Slide Presentation	61
LIST OF FIGURES	
• Figure 1.1 – 1 Project Location Map	2
• Figure 5.1 – 1 FAST Diagram	14
LIST OF TABLES	
• 1.1 – 1 Preliminary Cost Estimate	3
• 1.4 – 1 Summary of Highest Rated Recommendation	5
• 4.1 – 1 Preliminary Corridor Cost Estimate	12
• 6.1 – 1 Value Engineering Study Ideas	16-17
• 6.1 – 2 Value Engineering Study Weighted Values	17
• 6.1 – 3 Value Engineering Study Evaluation Scores	18

1.1 INTRODUCTION

A Value Engineering (VE) Study was held, during June 2 – 6, 2014 using the VE methodology to improve the Interstate 4 (I-4) from East of State Road (SR) 15/600 (US 17/92) to ½-Mile East of State Road 472 project. The VE study analyzed value improvements for improving the interchanges, and improving mobility within the region. I-4 serves as the primary corridor in the movement of people and freight between major population, employment and activity centers in the Central Florida region. When the entire Interstate was fully opened in the early 1960's, it was designed to serve intrastate and interstate travel by providing a critical link between the east and west coasts of Central Florida. Although this role continues to be a crucial transportation function of I-4, the highway also serves large volumes of local and commuter traffic with shorter trip distances. Since I-4 is the only north-south limited access facility that is centrally located between the predominant employment centers and the major suburbs to the north, it has become the primary commuting corridor in the Central Florida metropolitan area.

FDOT is proposing to reconstruct and widen I-4 as part of the I-4 Ultimate concept. This involves the build-out of I-4 to its ultimate condition through Central Florida, including segments in Polk, Osceola, Orange, Seminole, and Volusia Counties. The concept design proposes the addition of two new express lanes in each direction, resulting in a total of 10 dedicated lanes. The study area in this section from east of SR 15/600 (US 17/92) to ½-mile east of SR 472 includes the interchanges at Dirksen Drive, Saxon Boulevard, and SR 472 with a proposed overpass and direction ramps to the Express Lanes at Road Island Avenue and provides for the required stormwater treatment with 32 pond sites along the corridor. The typical section attempts to contain the improvements within the existing right-of-way with the exception of the pond sites and interchange improvements.

The project limits are within an approximate 10-mile segment of I-4 which extends from east of US 17/92 to east of SR 472, from Milepost 0.000 to 10.141 in Volusia County (herein referred to as I-4, Segment 4). Although, the interstate is a designated east-west corridor, the alignment follows a southwest to northeast orientation through the limits of Segment 4. The proposed improvements to I-4 include widening the existing six lane divided rural interstate to a ten lane divided highway. The existing typical section for the I-4 mainline consists of three 12-foot travel lanes in each direction. The outside and inside shoulders are 12 feet wide with 10 feet paved. The median width varies from 37 feet to 375 feet and the existing right of way varies from 300-feet to 630-feet. The typical section in the proposed condition will be three 12-foot general use travel lanes with 12-foot inside and outside shoulders and two 12-foot express lanes with 6-foot inside and 10-foot outside shoulders, in each direction. A barrier wall in between the 10-foot and 12-foot shoulders will separate the express lanes from the travel lanes. Additionally, one auxiliary lane in the eastbound direction and up to two auxiliary lanes in the westbound direction will be provided in some areas.

The project location may be found on the **Figure 1.1–1 Project Location Map**. The typical sections and segment drawings for the roadway alternatives were shown on the concept drawings included in the PD&E documents. By building this project, the Florida Department of Transportation (FDOT) will improve mobility in the region and the level of service for the ultimate I-4 Express Lanes design throughout the corridor. The project will provide improved level of service and operations in the area.

Table 1.1–1 Preliminary Cost Estimate on page 3 shows the preliminary estimated construction costs for the improvements for the alternative being studied. The proposed improvements are to enhance regional mobility and level of service in the design year.

1.2 GOALS AND OBJECTIVES

The objective of the study was to identify opportunities and recommend concepts that may improve value in terms of capital cost, constructability, maintenance of traffic, and the basic functional requirements of the project. This report documents the value engineering analysis performed to support decisions related to the planned project alternatives. Additionally, it summarizes existing conditions, documents the purpose and need for the project as well as documents other engineering, environmental, and social data related to preliminary Project Development & Environment

(PD&E) concepts.

Although several issues and pre-existing conditions were stated during the initial briefing at the beginning of the VE study, the VE team had two major project constraints:

1. Indian Burial Ground
2. White Shrimp Habitat

**Figure 1.1 – 1
Project Location Map**

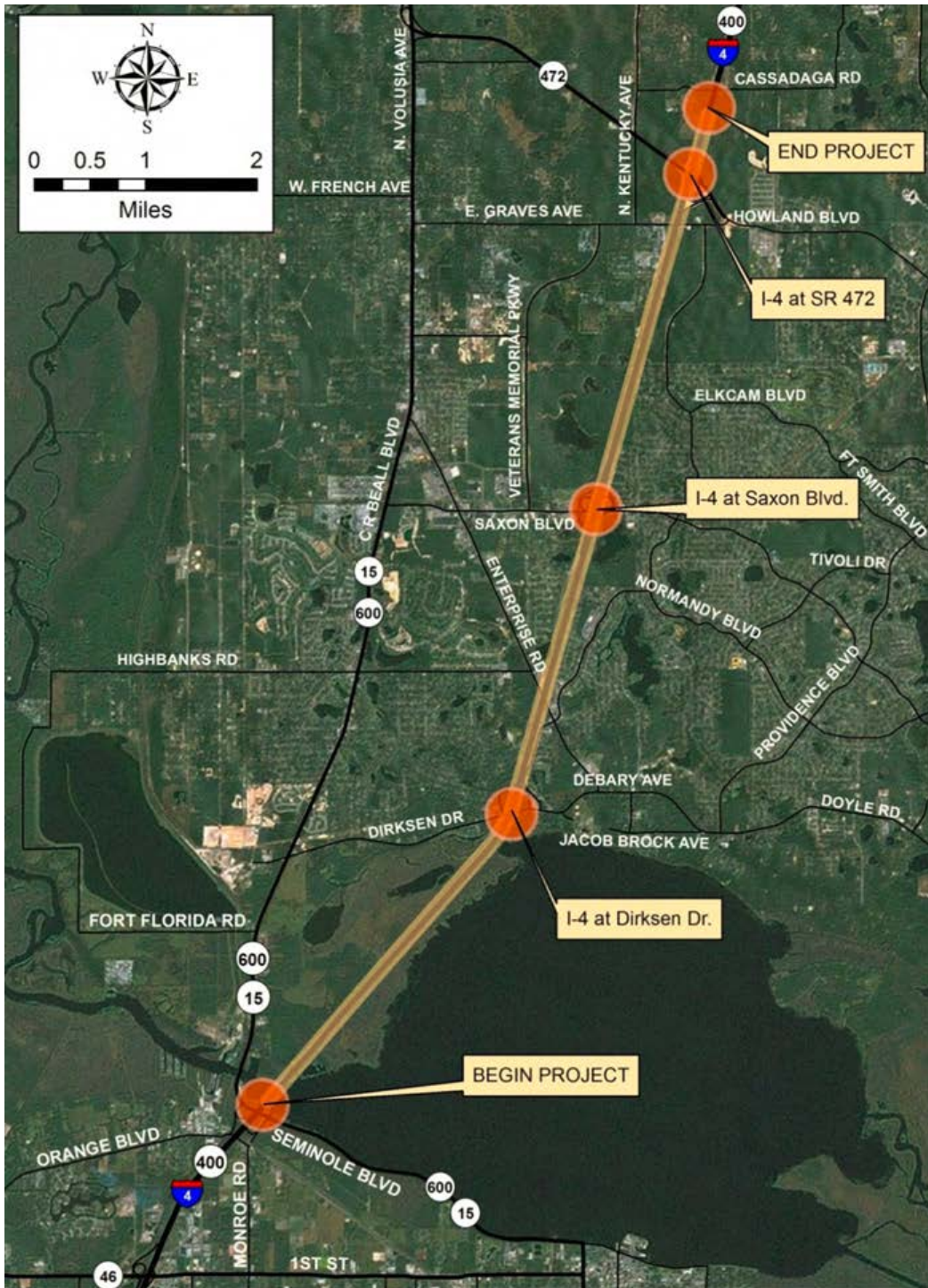


Table 1.1 – 1
Preliminary Cost Estimate
PD&E Alternate 1

I-4 Segment 4					
(Mainline I-4) STA. 2583+00.00 TO 3118+46.00					
Item	Description	Unit	Unit Cost	Quantity	Grand Total
0110 1 1	Clearing & Grubbing	AC	\$ 7,724	548	\$ 4,555,064
0110 3	Removal of Existing Structure	SF	\$ 24	42,671	\$ 3,312,230
160 4	Stabilization Type B LBR 40	SY	\$ 2.90	1,138,097	\$ 3,607,261
285 706	Base optional (base group 6) ML	SY	\$ 13.69	433,889	\$ 6,179,272
285 712	Base optional (base group 12) ML	SY	\$ 14.02	704,208	\$ 11,111,017
334 1 12	Superpave asphaltic concrete (Traff B)	TN	\$ 87.28	47,728	\$ 4,333,525
334 1 14	Superpave asphaltic concrete (Traff D)	TN	\$ 87.21	116,194	\$ 11,403,969
334 1 24	Superpave asphaltic concrete (Traff D-PG 76-22)	TN	\$ 89.64	77,463	\$ 7,814,484
337 7 22	Asphaltic Conc friction course (FC-5) (PG 76-22)	TN	\$ 117.20	29,049	\$ 3,831,399
521 1	Barrier Wall	LF	\$ 113	166,243	\$ 18,853,146
520 1 10	Curb and Gutter	LF	\$ 17.78	17,400	\$ 315,829
520 5 11	Traffic Separator	LF	\$ 34.69	1,579	\$ 58,453
	Thermoplastic, White, Striping	NM	\$ 3,178	142	\$ 548,082
	Vehicle Impact Attenuator	EA	\$ 18,327.63	5	\$ 270,379
	Fencing	LF	\$ 10.00	107,092	\$ 1,183,010
	Embankment	CY	\$ 5.94	1,842,305	\$ 16,400,568
	MSE wall	SF	\$ 34.00	321,276	\$ 11,051,360
	Bridges	SF	\$ 160.00	256,216	\$ 59,776,640
	Utility Pole Relocation	EA	\$ 200,000.00	6	\$ 1,200,000
	Sidewalk	SY	\$ 34.32	6,275	\$ 215,369
	Subtotal Cost	LS			\$ 166,021,056
	Compensable Utility Relocation	LS			\$ 8,301,053
	Mobilization	LS			\$ 16,602,106
	Maintenance of Traffic (MOT)	LS			\$ 24,903,158
	Lighting	LS			\$ 8,301,053
	Signage	LS			\$ 8,301,053
	Drainage	LS			\$ 16,602,106
	ITS	LS			\$ 8,301,053
	Erosion Control	LS			\$ 1,660,211
	Construction Subtotal	LS			\$ 57,727,359
	Contingency	LS			\$ 56,779,201
	Right of Way				
	Grand Total				\$ 382,875,206

Reference: Preliminary Cost Estimate prepared by HNTB, dated May 30, 2014

The basic project functions are to reconstruct the interchange, improve connectivity and improve traffic operations within the regional transportation system. As shown in **Section 5**, the Functional Analysis System Techniques (FAST) Diagram illustrates the functions as determined by the VE team.

1.3 RESULTS OF THE STUDY

The VE team generated 26 ideas and four were determined to be design suggestions during the Creative Ideas phase of the VE Job Plan. The ideas were then evaluated based on the evaluation criteria for this project. The object of this evaluation was to identify ideas with the most promise to achieve savings while preserving functions or improving operations.

The team began the evaluation process of scoring the PD&E documents concept and the individual creative ideas.

During this process it was agreed that we had various ideas, but certain ideas having the greatest potential value improvement were carried forward for further development. The remaining ideas either became design

suggestions (many specific to a particular component within the project) or were eliminated as duplicate, not appropriate or improbable for acceptance. The VE team ultimately categorized 10 ideas as recommendations for the designers to consider. The developed ideas maintain the required functions while improving overall costs, constructability, minimizing time, minimizing utility conflicts and right-of-way issues, minimizing environmental impacts, as well as addressing regional connectivity issues, aesthetics and drainage. The ideas and how they rated on a weighted scoring evaluation are listed in the table in **Section 6**. Those ideas that were eliminated are shown with strikeout font.

The design suggestions identified by the VE team are shown in **Section 6**. The VE team presents design suggestions for FDOT's consideration. No specific action is normally required to accept or not accept the suggestions, though it is often helpful, for documentation purposes, to formally list those suggestions that will be acted upon by FDOT.

1.4 RECOMMENDED ALTERNATIVES

The recommendations for further consideration are shown in **Table 1.4-1, Summary of Highest Rated Recommendations**. Potential cost savings are shown in present day dollars.

The recommendations in the following table indicate the anticipated initial cost, operation and maintenance cost, future cost and Life Cycle Cost (costs shown indicate initial capital costs as the LCC are similar to the original design) of the proposed recommendations. The Present Worth (PW) Life Cycle Cost also includes the initial cost, and the other above mentioned costs over the anticipated useful life of the facility. Acceptance of these recommendations would improve the value and be incorporated in the design of the facility. These recommendations appear to be the most cost effective way to provide the required functions. Some of the recommendations cannot be taken with others, since some are mutually exclusive recommendations

The recommendations developed by the VE study team will directly affect the existing project design. The recommended alternatives have been presented to FDOT, and no fatal flaws with the proposed recommendations were indicated at the presentation. It is understood that further analysis of these recommendations may be needed in order to make a final decision to accept them. FDOT will determine the acceptability of each recommendation. Each recommendation may be implemented individually or partially.

1.5 MANAGEMENT ACCEPTANCE & IMPLEMENTATION

Management action on each of the recommendations taken at the subsequent resolution meeting will be included in **Table 1.4 – 1** in the “Management Action” column. The FDOT Project Manager must ensure that all accepted recommendations are implemented and all pending actions are resolved for inclusion in the project design. Close coordination with the District Value Engineer is encouraged to ensure timely resolution of management action.

**TABLE 1.4 – 1
SUMMARY OF HIGHEST RATED RECOMMENDATIONS**

		PRESENT WORTH (PW) OF COST (FUTURE COST)		
Rec. No.	Description	Management Action	Comments	Potential Cost Savings (Value Added)
3	Use concrete for the express lanes	A		\$9,458,000
7	Construct a box culvert under the new I-4 off ramp (that connects Eastbound Dirksen Dr.) to provide connectivity of the existing “Spring-to-Spring” multi-use trail	A		\$145,000
10	Hold the North side right-of-way line on Saxon Boulevard and take only on the South side (Alternative 5)	A		\$2,565,000
12	Construct a Diverging Diamond or Single Point Diamond Interchange instead of loops on SR 472	A		(\$6,600,000)
17	Construct Rhode Island Avenue with wide median and future construction to the inside instead of to the outside	NA		TDB
18	Construct Rhode Island Avenue with median and future construction to the north side instead of to the outside	A		TDB
20	Eliminate the transit corridor and recommend the next segment to the north includes the transit envelope	NA		\$47,700,000
22	Leave the transit corridor south of SR 472 and recommend using SR 472 to the west to terminate at a transit station that connects with SunRail	FS		\$3,700,000
24	Use Alternative 1 Interchange with an additional eastbound off ramp auxiliary lane to connect directly to Normandy Boulevard intersection	FS		(\$2,116,000)
25	Relocate the Park ‘n Ride and the pond to the property west of the Riverside Condominiums on Dirksen Drive	FS		(\$1,311,000)

Management Action Legend: A=Accepted, NA=Not Accepted, FS=Further Study

2.1 GENERAL

This section describes the value analysis procedure used during the VE study. A systematic approach was used in the VE study and the key procedures involved were organized into three distinct parts: 1) pre-study preparations, 2) VE workshop study, and 3) post-study.

2.2 PRE-STUDY PREPARATIONS

Pre-study preparations for the VE effort consisted of scheduling study participants and tasks; reviews of documents; gathering necessary background information on the project; and compiling project data into a cost model. Information relating to the design, construction, and operation of the facility is important as it forms the basis of comparison for the study effort. Information relating to funding, project planning, operating needs, systems evaluations, basis of cost, production scheduling, and construction of the facility was also a part of the analysis.

2.3 VE WORKSHOP STUDY

The VE workshop was a five day effort. During the workshop, the VE job plan was followed. The job plan guided the search for high value areas in the project and included procedures for developing alternative solutions for consideration while at the same time considering efficiency. It includes these phases:

- Information Gathering Phase
- Function Identification and Cost Analysis Phase
- Creative Phase
- Evaluation Phase
- Development Phase
- Presentation and Reporting Phase

2.3.1 *Information Phase*

At the beginning of the study, the conditions and decisions that have influenced the development of the project must be reviewed and understood. For this reason, the PD&E consultant project manager provided design information about the project to the VE team. Following the presentation, the VE team discussed the project using the documents listed in **Section 3.3**.

2.3.2 *Function Identification and Cost Analysis Phase*

Based on the preliminary cost estimate, historical and background data, a cost model was developed for this project organized by major construction elements. It was used to distribute costs by project element in order to serve as a basis for alternative functional categorization. The VE team identified the functions of the various project elements and subsystems and created a Function Analysis System Technique Diagram (FAST) to display the relationships of the functions.

2.3.3 *Creative Phase*

This VE study phase involved the creation and listing of ideas. During this phase, the VE team developed as many ideas as possible to provide a creative atmosphere and to help team members to “think outside the box.” Judgment of the ideas was restricted at this point to insure vocal critics did not inhibit creativity. The VE team was looking for a large quantity of ideas and association of ideas.

FDOT and the design team may wish to review the creative design suggestions that are listed in **Section 6**, because they may contain ideas, which can be further evaluated for potential use in the design.

2.3.4 Evaluation Phase

During this phase of the workshop, the VE team judged the ideas generated during the creative phase. Advantages and disadvantages of each idea were discussed and a matrix developed to help determine the highest-ranking ideas.

Ideas found to be irrelevant or not worthy of additional study were discarded. Those that represented the greatest potential for cost savings or improvement to the project were "carried forward" for further development.

The creative listing was re-evaluated frequently during the process of developing ideas. As the relationship between creative ideas became more clearly defined, their importance and ratings may have changed, or they may have been combined into a single idea. For these reasons, some of the originally high-rated ideas may not have been developed.

2.3.5 Development Phase

During the development phase, each highly rated idea was expanded into a workable solution. The development consisted of a description of the idea, life cycle cost comparisons, where applicable, and a descriptive evaluation of the advantages and disadvantages of the proposed ideas. Each idea was written with a brief narrative to compare the original design to the proposed change. Sketches and design calculations, where appropriate, were also prepared in this part of the study. The developed VE ideas are summarized in the section entitled **Section 7 – Recommendations**.

2.4 POST STUDY

The post-study portion of the VE study includes the draft and final preparation of this Value Engineering Study Report and the discussions and resolution meetings with FDOT personnel. The Planning and Environmental Management team should analyze each alternative and prepare a short response, recommending incorporating the idea into the project, offering modifications before implementation, or presenting reasons for rejection. The VE team is available for consultation after the ideas are reviewed. Please do not hesitate to call on us for clarification or further information for considerations to implement any of the presented ideas.

2.4.1 Presentation and Reporting Phase

The final phase of the VE Study began with the presentation of the ideas on the last day of the VE Study. The VE team screened the VE ideas before draft copies of the report were prepared. The initial VE ideas were arranged in the order indicated to facilitate cross-referencing to the final recommendations for revision to the Contract Documents.

2.4.2 Final Report

The acceptance or rejection of ideas described in this report is subject to FDOT's review and approval. The VE team is available to address any final draft report comments for incorporation into the final report.

3.1 PARTICIPANTS

On June 2, 2014, representatives from HNTB Corporation (HNTB) presented an overview of the project in the PD&E Documents for Interstate 4 from east of US 17/92 to ½-mile east of SR 472 in Volusia County. The purpose of this meeting was to acquaint the study team with the overall project and what the main areas the VE team needed to focus on during this VE study.

The VE facilitator also reviewed and explained the Value Engineering improvement study agenda. He acquainted the team with the goals for the study based upon the study methodology that would be applied to improve the project. The study team included the following experts who participated in the study:

Participant Name	Role	Affiliation
Richard W. Bell, PE	Roadway Design	FDOT, District 5
Michael Dollery	Right of Way	FDOT, District 5
Bill Marchese	Right of Way	FDOT, District 5
Greg Lipira	Roadway Design	FDOT, District 5
Tim McGlone	Construction/Operations/Maintenance	FDOT, District 5
Carol Hatfield, EI	Drainage	FDOT, District 5
Mark Trebitz, EI	Structures	FDOT, District 5
Andrew Meisheid, EI	Geotechnical	FDOT, District 5
Naziru Isaac, PE	Project Management	FDOT, District 5
David Schappel, PE	Structures Maintenance	FDOT, District 5
Efren Rivera, PE	Drainage	FDOT, District 5
Ty Garner	District VE Coordinator	FDOT, District 5
Rick Johnson, PE, CVS	VE Team Leader	PMA Consultants LLC

3.2 PROJECT INFORMATION

The purpose of the project orientation meeting, on June 2, 2014, in addition to being an integral part of the Information Gathering Phase of the VE study, was to bring the VE team “up-to-speed” regarding the overall project scope.

3.3 LIST OF VE STUDY MATERIAL REVIEWED

1. Preliminary Engineering Report, Segment 4: East of US 17/92 to East of SR 472 – Volusia County, Florida, prepared by HNTB Corporation, dated April 21, 2014
2. Pond Siting Report, Segment 4: East of US 17/92 to East of SR 472 – Volusia County, Florida, prepared by HNTB Corporation, dated April 2014
3. Wetland Evaluation Report, Segment 4: East of US 17/92 to East of SR 472 Seminole and Volusia County, FL, prepared by 3E Consultants, Inc., dated March 2014
4. Report of Preliminary Geotechnical Engineering Investigation for Ponds – Segment 4 , prepared by Geotechnical and Environmental Consultants, Inc., dated March 31, 2014
5. SR 400 (I-4) Over St. Johns River Structural Evaluation Study, Segment 4: East of US 17/92 to East of SR 472 – Volusia County, Florida, prepared by HNTB Corporation, dated October, 2013
6. Preliminary Cost Estimate, prepared by HNTB Corporation, provided May 30, 2014

7. Technical Memorandum: Cultural Resource Assessment Survey of Proposed Improvements to Interstate 4 from East of US 17/92 to East of SR 472 (Segment 4) in Volusia County, Florida, prepared by Southeastern Archaeological Research, Inc., dated March 2014
8. Location Hydraulic Report, Segment 4: East of US 17/92 to East of SR 472 – Volusia County, Florida, prepared by HNTB Corporation, dated April 2014
9. Contamination Screening Evaluation Report, Segment 4: East of US 17/92 to East of SR 472, prepared by Stantec, dated October, 2013
10. Pavement Type Selection Report, Segment 4: East of US 17/92 to East of SR 472 – Volusia County, Florida, prepared by HNTB Corporation, dated April 7, 2014
11. Endangered Species Biological Assessment, Segment 4: East of US 17/92 to East of SR 472, prepared by Stantec, dated March 2014
12. Aerial Plan Board of Segment 4 Improvements, Project Development & Environment (PD&E) Study, prepared by HNTB Corporation, undated
13. Aerial Plan Board of SR-400 (I-4) Segment 4 Dirksen Drive/I-4 Alternative 2, prepared by HNTB Corporation, undated
14. Aerial Plan Board of SR-400 (I-4) Segment 4, Saxon Blvd./I-4 Alternative 4 (Center), prepared by HNTB Corporation, undated
15. Aerial Plan Board of SR-400 (I-4) Segment 4, Rhode Island/I-4, prepared by HNTB Corporation, undated
16. Aerial Plan Board of SR-400 (I-4) Segment 4, SR 472 / I-4 Alternative 1 (Loop), prepared by HNTB Corporation, undated
17. Track Alignment Design Parameters, First Stage, Final Draft, HSR Tampa-Orlando, prepared by HNTB Corporation, dated July 2010
18. Typical Section with and without Rail Corridor with Auxiliary Lane), prepared by HNTB Corporation, undated

3.4 SUMMARY OF GENERAL PROJECT INPUT - OBJECTIVES, POLICIES, DIRECTIVES, CONSTRAINTS, CONDITIONS & CONSIDERATIONS

The following is a summary of general project input, including the goals, objectives, directives, policies, constraints, conditions and considerations presented to the study team. Any “element” specific input is indicated by parentheses around the elements, disciplines and interests (i.e., right-of-way, roadway, environmental). Representatives from FDOT and the design team provided a project background, on the first day of the study.

3.4.1 Project Functions, Goals & Objectives (what the project should do as determined at the kickoff meeting and subsequent Workshops):

- | | |
|-------------------------------|-----------------------------|
| 1. Increase Mobility | 10. Avoid Conflict |
| 2. Improve Traffic Operations | 11. Permit Project |
| 3. Add Overpass | 12. Remove Water |
| 4. Build Project | 13. Accommodate Pedestrians |
| 5. Raise grade | 14. Separate Traffic |
| 6. Maintain Traffic | 15. Control Traffic |
| 7. Span Obstacles | 16. Inform Public |
| 8. Acquire Right of Way | 17. Follow Standards |
| 9. Provide Space | 18. Design Project |

- | | |
|----------------------------|---------------------------|
| 19. Minimize Maintenance | 25. Evaluate Alternatives |
| 20. Collect Data | 26. Determine Needs |
| 21. Review Plans | 27. Satisfy Public |
| 22. Estimate Costs | 28. Anticipate Growth |
| 23. Calculate Quantities | 29. Ensure Quality |
| 24. Recommend Alternatives | 30. Enhance Aesthetics |

These functions were used by the VE team to create/brainstorm new ideas for potential improvement to the project.

3.4.2 Project Policies & Directives: (documented things the project must or must not do)

1. The project shall meet economic, engineering design, environmental and social/cultural criteria requirements
2. Meet the goals of the Long Range Transportation Plans for future developments

3.4.3 General Project Constraints: (unchangeable project restrictions)

1. Indian Burial Ground
2. White Shrimp Habitat

3.4.4 General Project Conditions & Considerations:

1. Refer to the PD&E documents and backup documentation prepared by HNTB.

3.4.5 Site Review Comments and other observations:

1. Can we use a box culvert as a pedestrian crossing instead of the proposed bridge?
2. Use the park n ride remnant parcel for additional pond.
3. Put the park n ride where we are taking the condos on the west side of I-4 at Dirksen Drive.
4. Consider moving the transit corridor to the outside of the roadway.
5. Consider a pond in the southwest quadrant Dirksen Drive (west of the condos).
6. At Saxon Boulevard hold the north right of way line and take only on the south side.
7. Consider direct connects to the Express Lanes at Graves Avenue instead of Rhode Island.
8. The SR 472 proposed loop ramp may be in a Karst area.
9. Consider a Single Point Diamond Interchange (SPDI) at SR 472.
10. A transit corridor in the median creates some throw-away at the new US 92 flyover.

4.1 ECONOMIC DATA

The study team developed economic criteria used for evaluation with information gathered from the HNTB PD&E documents. To express costs in a meaningful manner, the cost comparisons associated with alternatives are presented on the basis of total Life Cycle Cost and discounted present worth. Project period interest rates are based on the following parameters:

Year of Analysis:	2014
Economic Planning Life:	20 years starting in 2019
Discount Rate/Interest:	5.00%
Inflation/Escalation Rate:	3.00%

The Preliminary PD&E Cost Estimate was used by the team for the major construction elements and right of way costs were developed by HNTB and the FDOT Right of Way Estimating team. The VE team had costs for the mainline improvements and alternative interchanges at Dirksen Drive, Saxon Boulevard, and SR 472, provided by HNTB. The cost for the roadway and interchange improvements is based on Alternative 1 with a 44-ft. transit corridor reserved in the median and is a combined \$340,675,206. The estimated cost to acquire all right of ways for the proposed alternative with the transit corridor concept is \$42,200,000.

**Table 4.1 – 1
Preliminary Cost Estimate
PD&E Alternate 1**

I-4 Segment 4										
(Mainline I-4) STA. 2583+00.00 TO 3118+46.00										
Item	Description	Unit	Unit Cost	Quantity	Total Cost	Dirksen Road Alternate 2 - Ramp	Saxon Blvd. Alternate 4 - CENTER	SR 472 ALT 1 - LOOP	Grand Total	FUNCTION
0110 1 1	Clearing & Grubbing	AC	\$ 7,724	548	\$ 4,235,905	\$ 89,810	\$ 133,439	\$ 95,910	\$ 4,555,064	Prepare Site
0110 3	Removal of Existing Structure	SF	\$ 24	42,671	\$ 1,005,329	\$ 981,557	\$ 808,862	\$ 516,482	\$ 3,312,230	Remove Obstruction
160 4	Stabilization Type B LBR 40	SY	\$ 2.90	1,138,097	\$ 3,300,482	\$ 25,572	\$ 182,926	\$ 98,282	\$ 3,607,261	Provide Foundation
285 706	Base optional (base group 6) ML	SY	\$ 13.69	433,889	\$ 5,939,946	\$ 45,130	\$ 17,348	\$ 176,847	\$ 6,179,272	Support Shoulders
285 712	Base optional (base group 12) ML	SY	\$ 14.02	704,208	\$ 9,872,993	\$ 77,409	\$ 866,584	\$ 294,031	\$ 11,111,017	Support Roadway
334 1 12	Superpave asphaltic concrete (Traff B)	TN	\$ 87.28	47,728	\$ 4,165,686	\$ 31,650	\$ 12,166	\$ 124,023	\$ 4,333,525	Support Refuge
334 1 14	Superpave asphaltic concrete (Traff D)	TN	\$ 87.21	116,194	\$ 10,133,303	\$ 79,450	\$ 889,432	\$ 301,783	\$ 11,403,969	Support Traffic
334 1 24	Superpave asphaltic concrete (Traff D-PG 76-22)	TN	\$ 89.64	77,463	\$ 6,943,770	\$ 54,443	\$ 609,477	\$ 206,795	\$ 7,814,484	Support Traffic
337 7 22	Asphaltic Conc friction course (FC-5) (PG 76-22)	TN	\$ 117.20	29,049	\$ 3,404,493	\$ 26,693	\$ 298,823	\$ 101,390	\$ 3,831,399	Enhance Friction
521 1	Barrier Wall	LF	\$ 113	166,243	\$ 18,785,459	\$ -	\$ -	\$ 67,687	\$ 18,853,146	Separate Traffic
520 1 10	Curb and Gutter	LF	\$ 17.78	17,400	\$ 313,924	\$ -	\$ 313,924	\$ 1,905	\$ 315,829	Convey Runoff
520 5 11	Traffic Separator	LF	\$ 34.69	1,579	\$ 58,453	\$ -	\$ -	\$ -	\$ 58,453	Separate Traffic
	Thermoplastic, White, Striping	NM	\$ 3,178	142	\$ 451,206	\$ 3,410	\$ 14,835	\$ 78,630	\$ 548,082	Define Lanes
	Vehicle Impact Attenuator	EA	\$ 18,327.63	5	\$ 91,638	\$ 18,328	\$ -	\$ 160,414	\$ 270,379	Protect Motorists
	Fencing	LF	\$ 10.00	107,092	\$ 1,070,920	\$ 23,730	\$ 88,360	\$ -	\$ 1,183,010	Limit Access
	Embankment	CY	\$ 5.94	1,842,305	\$ 10,943,292	\$ 52,378	\$ 17,378	\$ 5,387,520	\$ 16,400,568	Raise Grade
	MSE wall	SF	\$ 34.00	321,276	\$ 10,923,384	\$ 127,976	\$ -	\$ -	\$ 11,051,360	Reduce Footprint
	Bridges	SF	\$ 160.00	256,216	\$ 40,994,560	\$ 11,625,440	\$ 7,156,640	\$ -	\$ 59,776,640	Span Obstacles
	Utility Pole Relocation	EA	\$ 200,000.00	6	\$ 1,200,000	\$ -	\$ 1,200,000	\$ -	\$ 1,200,000	Eliminate Conflict
	Sidewalk	SY	\$ 34.32	6,275	\$ 215,369	\$ -	\$ 215,369	\$ -	\$ 215,369	Accommodate Pedestrians
	Subtotal Cost	LS			\$ 132,262,367	\$ 13,262,975	\$ 12,884,017	\$ 7,611,698	\$ 166,021,056	
	Compensable Utility Relocation	LS			\$ 6,613,118	\$ 663,149	\$ 644,201	\$ 380,585	\$ 8,301,053	Avoid Conflict
	Mobilization	LS			\$ 13,226,237	\$ 1,326,297	\$ 1,288,402	\$ 761,170	\$ 16,602,106	Initiate Logistics
	Maintenance of Traffic (MOT)	LS			\$ 26,452,473	\$ 2,652,595	\$ 2,576,803	\$ 1,522,340	\$ 24,903,158	Maintain Traffic
	Lighting	LS			\$ 6,613,118	\$ 663,149	\$ 644,201	\$ 380,585	\$ 8,301,053	Illuminate Roadway
	Signage	LS			\$ 6,613,118	\$ 663,149	\$ 644,201	\$ 380,585	\$ 8,301,053	Inform Public
	Drainage	LS			\$ 26,452,473	\$ 2,652,595	\$ 2,576,803	\$ 1,522,340	\$ 16,602,106	Remove Water
	ITS	LS			\$ 6,613,118	\$ 663,149	\$ 644,201	\$ 380,585	\$ 8,301,053	Communicate Information
	Erosion Control	LS			\$ 1,322,624	\$ 132,630	\$ 128,840	\$ 76,117	\$ 1,660,211	Protect Environment
	Construction Subtotal	LS			\$ 226,168,647	\$ 22,679,687	\$ 22,031,669	\$ 13,016,003	\$ 57,727,359	
	Contingency	LS			\$ 45,233,729	\$ 4,535,937	\$ 4,406,334	\$ 2,603,201	\$ 56,779,201	Address Unknowns
	Right of Way				\$ 42,200,000					Provide Space
	Grand Total				\$ 313,602,376	\$ 27,215,624	\$ 26,438,002	\$ 15,619,204	\$ 382,875,206	

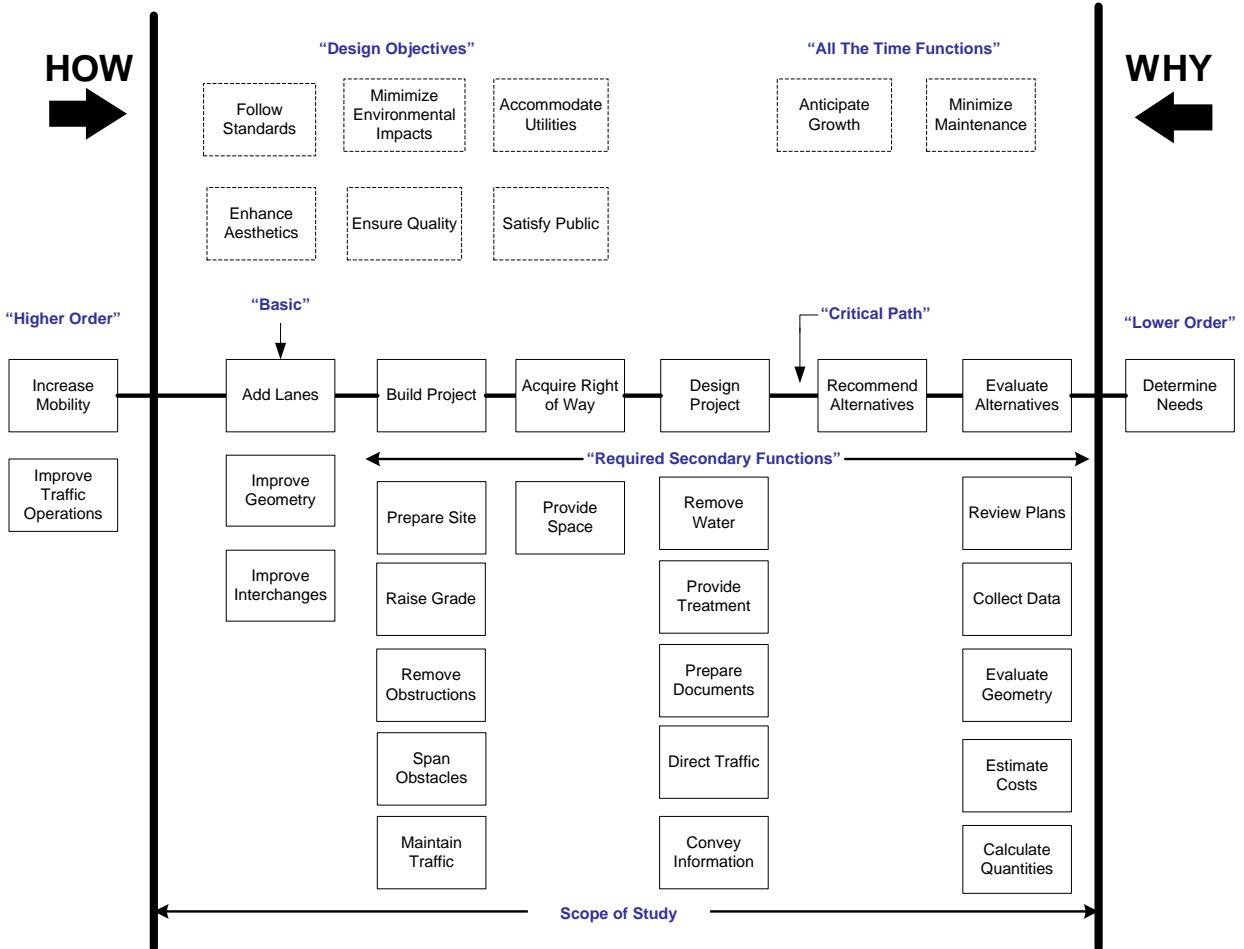
Reference: Preliminary Cost Estimate, prepared by HNTB, provided May 30, 2014

This project's Function Analysis was reviewed and developed by the team to define the requirements for the overall project (and each project element, if required) and to ensure that the VE team had a complete and thorough understanding of the functions (basic and others) needed to satisfy the project requirements. The primary Function Analysis System Technique (FAST) Diagram for the project is included. The development of FAST diagrams help stimulate team members to think in terms of required functions, not just normal solutions, to enhance their creative idea development. The project's primary tasks, the critical path functions, the project's primary basic functions and other required functions that must be satisfied were identified and are indicated in the report.

A Functional Analysis was prepared to determine the basic function of the overall project and each area shown in the cost model. Functional Analysis is a means of evaluating the functions of each element to see if the expenditures for each of those elements actually provide the requirements of the process, or if there are disproportionate amounts of money being proposed to be spent for support functions. These elements add cost to the final product, but have a relatively low worth to the basic function. This creates a high cost-to-worth ratio.

A FAST diagram was developed to identify and display the critical functions path for the overall project. The basic and supporting secondary functions are illustrated on the following FAST Diagram.

Figure 5.1 – FAST Diagram
Interstate 4 from US 17/92 to 1/2-mile East of SR 472



EVALUATION

During the creative phase, numerous ideas, alternative proposals, and/or recommendations were generated for each required function using conventional brainstorming techniques and are recorded on the following pages. These ideas were discussed and evaluation criteria were determined. The VE team identified nine weighted evaluation criteria that included Capital Cost, Right of Way Impacts, Level of Service, Maintenance of Traffic Pedestrian Considerations, Utility Impacts, Environmental Impacts, Future Maintenance and Constructability. The evaluation criteria were assigned a weighted value from 1 to 9 based on a VE team consensus on the importance of each item. Criteria with the most importance received a 9-weight and the least important received a 1-weight. The ideas were then individually discussed and given a score, on a scale of 1 to 5 with 1 being the least beneficial and 5 most beneficial. The score for each item is multiplied by the weighted criteria value and each multiplication product is added to obtain a total score for the idea.

Table 6.1 – 1 includes a list of ideas that were generated during the creative phase and each idea's score. **Table 6.1 – 2** illustrates the weighted values for the evaluation criteria and **Table 6.1 – 3** shows the evaluation matrix for idea ranking total scores for all ideas carried forward. The ideas that scored equal to or greater than the original design concept total score were sufficiently rated for further development. The ideas in the table with strike-throughs were not developed because they were combined with other ideas, not feasible, or were eliminated from consideration for other reasons.

There were a total of 26 creative ideas and 18 that were evaluated and scored. The VE team discussed each of the evaluated ideas with the PD&E project manager during a mid-point review meeting on Wednesday, June 4, 2014. The VE team and the PD&E project manager discussed each idea before developing the final group of ideas for final development and analysis.

The write-ups for the developed ideas are in **Section 7**. The tables that follow show the original 23 ideas and a 24th and 25th idea and an additional design suggestion that emerged during development, with the ideas that survived the evaluation, analysis and development phases of the study becoming viable recommendations for value improvements. During the evaluation process the VE team redefined some of the creative ideas as questions for the designers or design suggestions. Ideas that became design suggestions or design questions for the mid-point review are designated as "DS" on the evaluation worksheets. The major design suggestions identified by the VE team are listed below:

- DS-1 Utilize the remnant parcel from the park n ride on Dirksen Dr. for a pond
- DS-2 Could put a pond on the northwest quadrant at Dirksen Drive if needed
- DS-3 Consider a pond on Dirksen Drive on Parcel No. 2 north of the west off and on ramps in the northwest quadrant
- DS-4 Put the transit corridor on the outside to accommodate future stations, parking, etc.

The VE team presents design suggestions for the design consultant and FDOT's consideration. No specific action is normally required to accept or not accept the suggestions, though it is often helpful, for documentation purposes, to formally list those suggestions that will be acted upon by the FDOT. Readers are encouraged to review the Creative Idea Listing and Evaluation Worksheets that follow, since they may suggest additional ideas that can be applied to the design or construction.

TABLE 6.1 –1
Value Engineering Study Ideas

Idea No.	I d e a s	Capital Costs	R/W Impacts	LOS	Maintenance of Traffic	Pedestrian Considerations	Utility Impacts	Environmental	Future Maintenance	Constructability
Original Concept										
	PD&E Documents for I-4 from Volusia County Line to east of SR 472	3	3	3	3	3	3	3	3	3
Drainage (Remove Water)										
DS-1	Utilize the remnant parcel from the park n ride on Dirksen Dr. for a pond	3	3	3	3	3	3	3	3	3
DS-2	Could put a pond on the northwest quadrant at Dirksen Drive if needed									
DS-4	Consider a pond on Dirksen Drive on Parcel No. 2 north of the west off and on ramps in the northwest quadrant									
25	Relocate the Park 'n Ride and the pond to the property west of the Riverside Condominiums on Dirksen Drive									
Mainline (Access Interstate)										
3	Use concrete for the express lanes	2	3	3	3	3	3	3.25	4	2.75
4	Use the I-4 Ultimate typical section with 4-ft. inside shoulders and 10-ft. outside shoulders for the Express Lanes	3.5	3.5	2.75	3	3	3	3.5	3.5	3.5
5	Move the I-4 construction centerline align to one side or the other for a wider drainage conveyance system	2.5	2.5	3	3.5	3	3	3	2.5	1.5
Right of Way (Provide Space)										
6	Total take of the condos on Dirksen Dr. to provide a park n ride, drainage, and trail head	3	2.5	3	3	3.5	3.25	3.1	3	3
Dirksen Road Interchange (Connect Roadways)										
7	Construct a box culvert under the new I-4 off ramp (that connects Eastbound Dirksen Dr.) to provide connectivity of the existing "Spring-to-Spring" multi-use trail	4.5	3	3	3	2.75	3	3	4	4
8	Move the transit corridor to the west edge of right of way to maintain the current curve geometry	3	2.5	3	3.5	3	2.75	2.5	3	3.25
9	Elevate the transit at the curve and put on piers to maintain roadway align as originally proposed	1	2.5	3	3	3	2	2.5	1	1
Saxon Boulevard Interchange (Connect Roadways)										
10	Hold the North side right-of-way line on Saxon Boulevard and take only on the South side (Alternative 5)	3	3	3	3.5	3	3.5	3	3	3.5
11	Construct a Single Point Diamond Interchange at Saxon Blvd.	4	4.5	3	3.5	4	4.5	4	4	4
SR 472 Interchange (Connect Roadways)										
12	Construct a Single Point Diamond Interchange instead of loops on SR 472	2	4	3.75	3	4	3	4	2.75	2.5
13	Merely extend the westbound turn lane to I-4 westbound to increase queue capacity	4	4	2	3	3	3	3.25	3.5	3.5
14	Flyover eastbound I-4 and flyover to westbound SR 472	2	3.5	3.5	3	3	3	2.5	2	2
15	Flyover westbound SR 472 to westbound I-4									
24	Use Alternative 1 Interchange with an additional eastbound off ramp auxiliary lane to connect directly to Normandy Boulevard intersection									

TABLE 6.1 –1
Value Engineering Study Ideas

Idea No.	I d e a s	Capital Costs	R/W Impacts	LOS	Maintenance of Traffic	Pedestrian Considerations	Utility Impacts	Environmental	Future Maintenance	Constructability
	Original Concept									
	PD&E Documents for I-4 from Volusia County Line to east of SR 472	3	3	3	3	3	3	3	3	3
	Rhode Island Avenue Direct Connect Ramps (Access E-Lanes)									
16	Instead of ramps at this location make the direct Express Lanes connections at Graves Avenue									
17	Construct Rhode Island Avenue with wide median and future construction to the inside instead of to the outside	2.5	3	3	3	3	3	3.25	3.25	3
18	Construct Rhode Island Avenue with median and future construction to the north side instead of to the outside	3.5	3	3	3	3	3	3	3.5	3
19	Provide an inter-modal transit hub at the Rhode Island Avenue location	2	2.5	3	3	3	3	2.5	2	2.5
	Transit Corridor (Reserve Space)									
20	Eliminate the transit corridor and recommend the next segment includes the transit envelope	4	4	3	3	3	3.25	3.5	2	3.5
21	Terminate the transit corridor at the Dirksen Interchange to ultimately connect to the Debarry SunRail Station	3.5	3.5	3	3	3	3	3.5	3	3
22	Eliminate the transit corridor and recommend using SR 472 to the west to terminate at a transit station that connects with SunRail									
DS-3	Put the transit corridor on the outside to accommodate future stations, parking, etc.									

TABLE 6.1 –2
Value Engineering Study Weighted Values

Capital Costs	R/W Impacts	LOS	Maintenance of Traffic	Pedestrian Considerations	Utility Impacts	Future Maintenance	Environmental	Constructability
8	6	9	5	1	2	7	4	3

**TABLE 6.1 –3
Value Engineering Study Evaluation Scores**

Idea No.	Ideas	Capital Costs	R/W Impacts	LOS	Maintenance of Traffic	Pedestrian Considerations	Utility Impacts	Future Maintenance	Constructability	Constructability	TOTAL	FHWA CATEGORIES					
												Safety	Construction	Operations	Environment	Other	
Original Concept																	
	PD&E Documents for I-4 from Volusia County Line to east of SR 472	24	18	27	15	3	6	21	12	6	132						
Drainage (Remove Water)																	
25	Relocate the Park "n Ride and the pond to the property west of the Riverside Condominiums on Dirksen Drive	0	0	0	0	0	0	0	0	0	0						
Mainline (Access Interstate)																	
3	Use concrete for the express lanes	16	18	27	15	3	6	28	11	5.5	129.5	X		X	X		
4	Use the I-4 Ultimate typical section with 4-ft. inside shoulders and 10-ft. outside shoulders for the Express Lanes	28	21	24.75	15	3	6	24.5	14	7	143.25						
5	Move the I-4 construction centerline align to one side or the other for a wider drainage conveyance system	20	15	27	17.5	3	6	17.5	6	3	115						
Right of Way (Provide Space)																	
6	Total take of the condos on Dirksen Dr. to provide a park n ride, drainage, and trail head	24	15	27	15	3.5	6.5	21	12	6	130						
Dirksen Road Interchange (Connect Roadways)																	
7	Dirksen Dr.) to provide connectivity of the existing "Spring-to-Spring" multi-use trail	36	18	27	15	2.75	6	28	16	8	156.75		X				
8	Move the transit corridor to the west edge of right-of-way to maintain the current curve geometry	24	15	27	17.5	3	5.5	21	13	6.5	132.5						
9	Elevate the transit at the curve and put on piers to maintain roadway align as originally proposed	8	15	27	15	3	4	7	4	2	85						
Saxon Boulevard Interchange (Connect Roadways)																	
10	Hold the North side right-of-way line on Saxon Boulevard and take only on the South side (Alternative 5)	24	18	27	17.5	3	7	21	14	7	138.5		X				
11	Construct a Single Point Diamond Interchange at Saxon Blvd.	32	27	27	17.5	4	9	28	16	8	168.5						
SR 472 Interchange (Connect Roadways)																	
12	Construct a Single Point Diamond Interchange instead of loops on SR 472	16	24	33.75	15	4	6	19.25	10	5	133	X	X		X		
13	Merely extend the westbound turn lane to I-4 westbound to increase queue capacity	32	24	18	15	3	6	24.5	14	7	143.5						
14	Flyover eastbound I-4 and flyover to westbound SR 472	16	21	31.5	15	3	6	14	8	4	118.5						
24	Use Alternative 1 Interchange with an additional eastbound off ramp auxiliary lane to connect directly to Normandy Boulevard intersection	0	0	0	0	0	0	0	0	0	0	X		X			
Rhode Island Avenue Direct Connect Ramps (Access E-Lanes)																	
17	Construct Rhode Island Avenue with wide median and future construction to the inside instead of to the outside	20	18	27	15	3	6	22.75	12	6	129.75	X		X	X		
18	Construct Rhode Island Avenue with median and future construction to the north side instead of to the outside	28	18	27	15	3	6	24.5	12	6	139.5				X		
19	Provide an inter-modal transit hub at the Rhode Island Avenue location	16	15	27	15	3	6	14	10	5	111						
Transit Corridor (Reserve Space)																	
20	Eliminate the transit corridor and recommend the next segment includes the transit envelope	32	24	27	15	3	6.5	14	14	7	142.5		X				
21	Terminate the transit corridor at the Dirksen Interchange to ultimately connect to the Debarry SunRail Station	28	21	27	15	3	6	21	12	6	139						
22	Eliminate the transit corridor and recommend using SR 472 to the west to terminate at a transit station that connects with SunRail	0	0	0	0	0	0	0	0	0	0		X		X		

RECOMMENDATIONS

The results of this VE study are shown as individual recommendations developed for each area of the project. These recommendations include a comparison between the VE team's proposal and the designer's original concept. Each proposal consists of a summary of the original design, a description of the proposed change, and a descriptive evaluation of the advantages and disadvantages of the proposed recommendation. Sketches and calculations are shown, if appropriate. The estimated cost comparisons reflect unit prices and quantities on a comparative basis. Value improvement is the primary basis for comparison of competing ideas. To ensure that costs are comparable within the ideas proposed by the VE team, the FDOT Statewide average costs and HNTB's preliminary cost estimates were used as the pricing basis.

7.1 EVALUATION OF RECOMMENDATIONS

Some of the VE recommendations potential savings are interrelated, if one is accepted another one may or may not need to be added, or acceptance of one may mutually exclude another. The VE team identified potential savings as shown on **Table 1.4 – 1, Summary of Highest Rated Recommendations**. The write-ups for the individual developed ideas are included in this section and are shown in numerical order.

The FDOT and the design team should evaluate and determine whether to accept or not accept each recommendation. The recommendations that are accepted should be identified and listed for documentation purposes. For each idea that will not be accepted, the design team normally documents, in writing, the reason or reasons for the non-acceptance. The design suggestions are for consideration by FDOT and the designers. No specific action is normally required to accept or not accept the suggestions, though it is often helpful, for documentation purposes, to formally list those suggestions that will be incorporated by the designers.

7.2 CONSIDERATIONS AND ASSUMPTIONS

In the preparation of this report and the alternatives that follow, the study team made some assumptions with respect to conditions that may occur in the future. In addition, the study team reviewed the listed project documentation, relying solely upon the information provided by the designer and owner, and relying on that information as being true, complete and accurate. This value analysis and report are based on the following considerations, assumptions and conditions:

- The recommendations rendered herein are as of the date of this report. The study team or leaders assume no duty to monitor events after the date, or to advise or incorporate into any of the alternatives, any new, previously unknown technology.
- The study team or leaders assume that there are no material documents affecting the design or construction costs that the team has not seen. The existence of any such documents will necessarily alter the alternatives contained herein.

The study team or leaders do not warrant the feasibility of these recommendations or the advisability of their implementation. It is solely the responsibility of the designer in accordance with the owner, to explore the technical feasibility and make the determination for implementation.

RECOMMENDATION No. 3: Use concrete for the express lanes

Proposed Alternative:

The PD&E Documents show the Typical Section with two express lanes in each direction with 10-ft. outside shoulders against barrier walls and a 6-ft. inside shoulder against the barrier wall using asphalt pavement.

VE Alternative:

Construct the 10.1 mile project's Express Lanes and shoulders in concrete pavement instead of asphalt pavement.

Advantages :

- Less maintenance over time
- Improved life cycle cost
- Lessens the loss of revenue for tolls during resurfacing
- Reduces the inconvenience to the traveling public when resurfacing

Disadvantages:

- Increased initial capital cost to construct

FHWA CATEGORIES

Safety Operations Environment Construction Other

Life Cycle Cost Savings: **\$9,458,000**

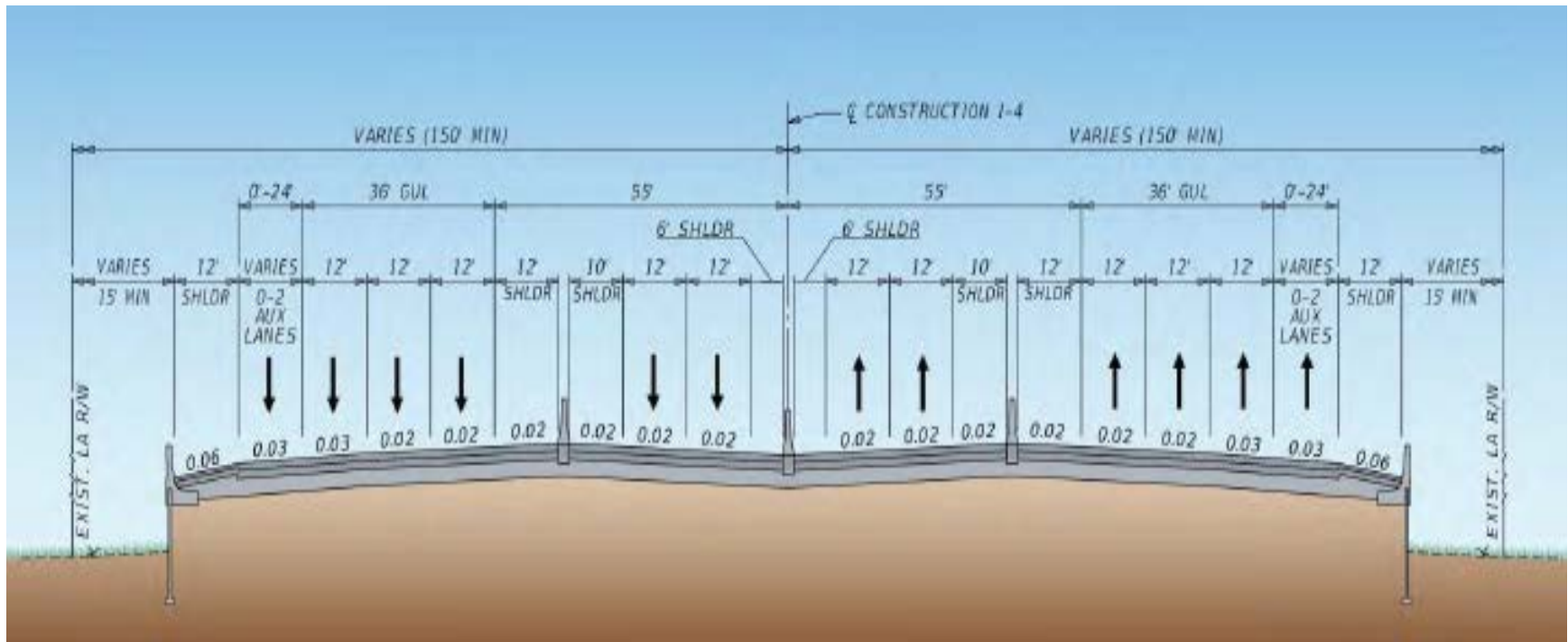
RECOMMENDATION No. 3: Use concrete for the express lanes

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Concrete Pavement	382,342	SY	\$60.00	\$22,940,520
Base Group 1	382,342	SF	\$10.00	\$3,823,420
Edgedrain	114,702	LF	\$26.75	\$3,068,279
FC-5	-15,206	TN	\$117.00	(\$1,779,102)
Superpave	-84,723	TN	\$88.50	(\$7,497,986)
Base Group 12	-305,873	SY	\$15.00	(\$4,588,095)
Base Group 8	-76,468	SY	\$14.64	(\$1,119,492)
Subtotal				\$14,847,544
Compensable Utility Relocation (5%)	1	LS		\$742,377
Mobilization (10%)	1	LS		\$1,484,754
Maintenance of Traffic (20%)	1	LS		\$2,969,509
Lighting (5%)	1	LS		\$742,377
Signage (5%)	1	LS		\$742,377
Drainage (20%)	1	LS		\$2,969,509
ITS (5%)	1	LS		\$742,377
Erosion Control (1%)	1	LS		\$148,475
Subtotal				\$25,389,301
Contingency (20%)		LS		\$5,077,860
			CONSTRUCTION TOTAL	\$30,467,161

RECOMMENDATION No. 3: Use concrete for the express lanes

PROPOSED TYPICAL SECTION



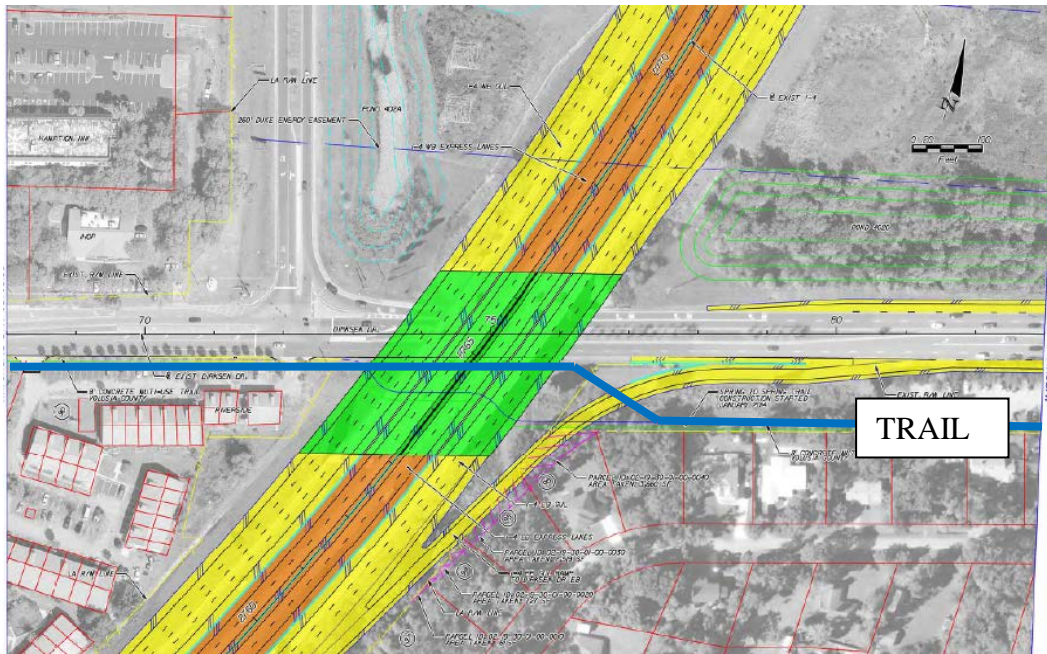
RECOMMENDATION No. 3: Use concrete for the express lanes

LIFE CYCLE COST				VE Rec. No. 3	
(PRESENT WORTH METHOD)					
Project		ORIGINAL		VE ALTERNATE	
Location		-		-	
PROJECT LIFE CYCLE (YEARS)		-		-	
DISCOUNT RATE (% in decimals)		-		-	
		40		5%	
		5%			
Construction Costs		Est.	PW	Est.	PW
A)	Asphalt Pavement	\$20,963,048	\$20,963,048	-	-
B)	Concrete	-	-	\$22,940,520	\$22,940,520
C)	_____	-	-	-	-
D)	_____	-	-	-	-
E)	_____	-	-	-	-
F)	_____	-	-	-	-
Other Initial Costs					
A)	_____	-	-	-	-
B)	_____	-	-	-	-
Total Initial Cost Impact (IC)					
Initial Cost PW Savings				\$20,963,048	\$22,940,520 (\$1,977,472)
Replacement/Salvage Costs		Year	Factor		
A)	Resurfacing	12	0.5568	\$11,000,000	\$6,125,211
B)	Resurfacing	24	0.3101	\$11,000,000	\$3,410,747
C)	Resurfacing	36	0.1727	\$11,000,000	\$1,899,231
D)	_____	-	-	-	-
E)	_____	-	-	-	-
F)	_____	-	-	-	-
G)	_____	-	-	-	-
H)	_____	-	-	-	-
Total Replacement/Salvage PW Costs				\$11,435,189	
Operation/Maintenance Cost		Escl..00'	PWA		
A)	_____	-	-	-	-
B)	_____	-	-	-	-
C)	_____	-	-	-	-
D)	_____	-	-	-	-
E)	_____	-	-	-	-
F)	_____	-	-	-	-
G)	_____	-	-	-	-
Total Operation/Maintenance (PW) Costs					
Total Present Worth Life Cycle Costs				\$32,398,237	\$22,940,520
Life Cycle (PW) Savings				\$9,457,717	
PW - Present Worth PWA - Present Worth of Annuity					

RECOMMENDATION No. 7: Construct a box culvert under the new I-4 off ramp (that connects Eastbound Dirksen Dr.) to provide connectivity of the existing “Spring-to-Spring” multi-use trail

Proposed Alternative:

The PD&E Documents propose to span the existing “Spring to Spring” multi-use trail with a bridge structure. Currently the “Spring-to-Spring” trail runs east-west along the southern side of Dirksen Dr. under the existing I-4 bridge overpass. The I-4 bridge overpass will be replaced due to I-4 widening. Also, a new off ramp to Eastbound Dirksen Dr. will be added to the interchange which passes over the existing alignment of the multi-use trail. To provide continued connectivity for the multi-use trail the new off ramp will span the multi-use trail with a bridge structure.



VE Alternative:

Construct a box culvert, 10-ft. high by 19-ft. wide, under the new I-4 off ramp (that connects eastbound Dirksen Dr.) to provide continued connectivity to the existing “Spring-to-Spring” multi-use trail.

Advantages:

- Less cost
- Easier and cheaper to maintain
- Does not require bi-annual inspection
- Easier and quicker to construct

Disadvantages:

- Decreases the perception of safety for pedestrians

FHWA CATEGORIES

 Safety Operations Environment X Construction X Other

Potential Cost Savings: \$145,000

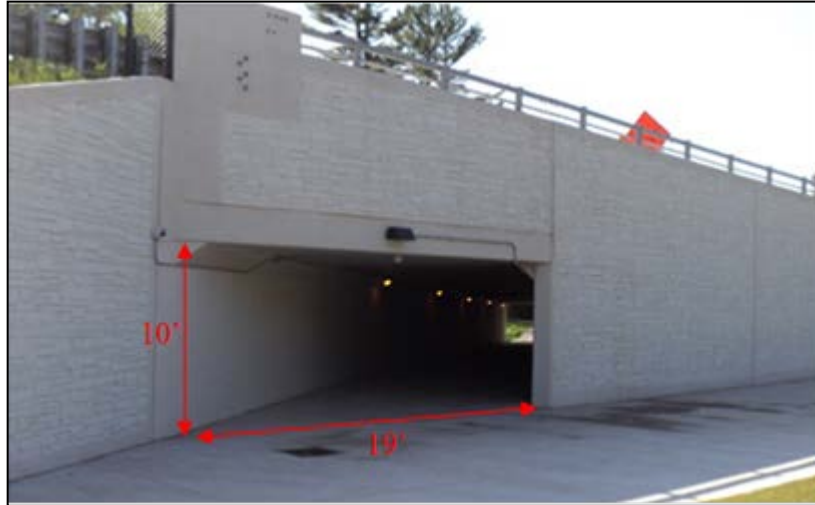
RECOMMENDATION No. 7: Construct a box culvert under the new off I-4 ramp (that connects Eastbound Dirksen Dr.) to provide connectivity of the existing “Spring-to-Spring” multi-use trail

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
BRIDGE COSTS				
Class II Concrete (Bridge Superstructure)	-53.7	CY	\$600	(\$32,220)
Reinforcing Steel (Bridge Superstructure)	-11815	LB	\$0.60	(\$7,089)
Bridge Deck Grooving	-773	SY	\$8.00	(\$6,184)
Class IV Copncrete (Bridge Substructure)	-20	CY	\$675.00	(\$13,500)
Reinforcing Steel (Bridge Substructure)	-29000	LB	\$0.90	(\$26,100)
Prestressed Concrete Test Piling (18" square)	-120	LF	\$159.00	(\$19,080)
Prestressed Concrete Piling (18" square)	-480	LF	\$65.00	(\$31,200)
Approach Slab Concrete	-34	CY	\$350.00	(\$11,900)
Approach Slab Reinforcing Steel	-4833	LB	\$0.83	(\$4,011)
Concrete Slope Pavement	-7	SY	\$58.45	(\$409)
Mechanically Stabilized Earth Retaing Wall	-480	SF	\$22.50	(\$10,800)
CONCRETE 10' x 19' BOX CULVERT COSTS				
Class IV Concrete (Culvert Substructure)	95	CY	\$750.00	\$71,250
Reinforcing Steel (Culvert Substructure)	16783	LB	\$1.15	\$19,300
Embankment Fill	166	CY	\$8.92	\$1,481
Subtotal				(\$70,462)
Compensable Utility Relocation (5%)	1	LS		(\$3,523)
Mobilization (10%)	1	LS		(\$7,046)
Maintenance of Traffic (20%)	1	LS		(\$14,092)
Lighting (5%)	1	LS		(\$3,523)
Signage (5%)	1	LS		(\$3,523)
Drainage (20%)	1	LS		(\$14,092)
ITS (5%)	1	LS		(\$3,523)
Erosion Control (1%)	1	LS		(\$705)
Subtotal				(\$120,491)
Contingency (20%)		LS		(\$24,098)
CONSTRUCTION TOTAL				(\$144,589)

RECOMMENDATION No. 7: Construct a box culvert under the new off I-4 ramp (that connects Eastbound Dirksen Dr.) to provide connectivity of the existing “Spring-to-Spring” multi-use trail

SAMPLE UNDERPASSES



RECOMMENDATION No. 7: Construct a box culvert under the new off I-4 ramp (that connects Eastbound Dirksen Dr.) to provide connectivity of the existing “Spring-to-Spring” multi-use trail

DIRKSEN AVENUE RENDERINGS



RECOMMENDATION No. 7: Construct a box culvert under the new off I-4 ramp (that connects Eastbound Dirksen Dr.) to provide connectivity of the existing “Spring-to-Spring” multi-use trail



RECOMMENDATION No. 10: Hold the North side right-of-way line on Saxon Boulevard and take only on the South side (Alternative 5)

Proposed Alternative:

The PD&E Documents show right-of-way takings on the north and south sides of Saxon Boulevard from I-4 to east of Normandy Boulevard. The taking is for widening Saxon Boulevard outward from the centerline and also for ponds needed for the widening. The centerline widening requires the relocation of seven existing high voltage transmission poles.

VE Alternative:

Utilize Alternative 5. Hold the north side right-of-way line of Saxon Boulevard fixed and build the widening of the road to the south side and expand the taking for the ponds on the south side in order to eliminate all pond takings on the north side. Widening to the south avoids the need to relocate five of the existing high voltage transmission poles. Another recommendation for design is to evaluate placing a pond in the southeast quadrant of the interchange, adjacent to Trout Lake. Placing a pond in this location could eliminate or minimize the right-of-way needed from the Saxon Plaza or several residences.

Advantages:

- Less cost due to less pole relocates
- Less construction time needed for utility relocates
- Potentially can also eliminate Pond 408F which contains five residences
- Only three pond locations to maintain versus seven (if Pond 408F is eliminated)
- The “Coming Soon” RaceTrac gas station will remain untouched

Disadvantages:

- Unknown drainage pond capacity

FHWA CATEGORIES

Safety Operations Environment Construction Other

Potential Cost Savings: \$2,565,000

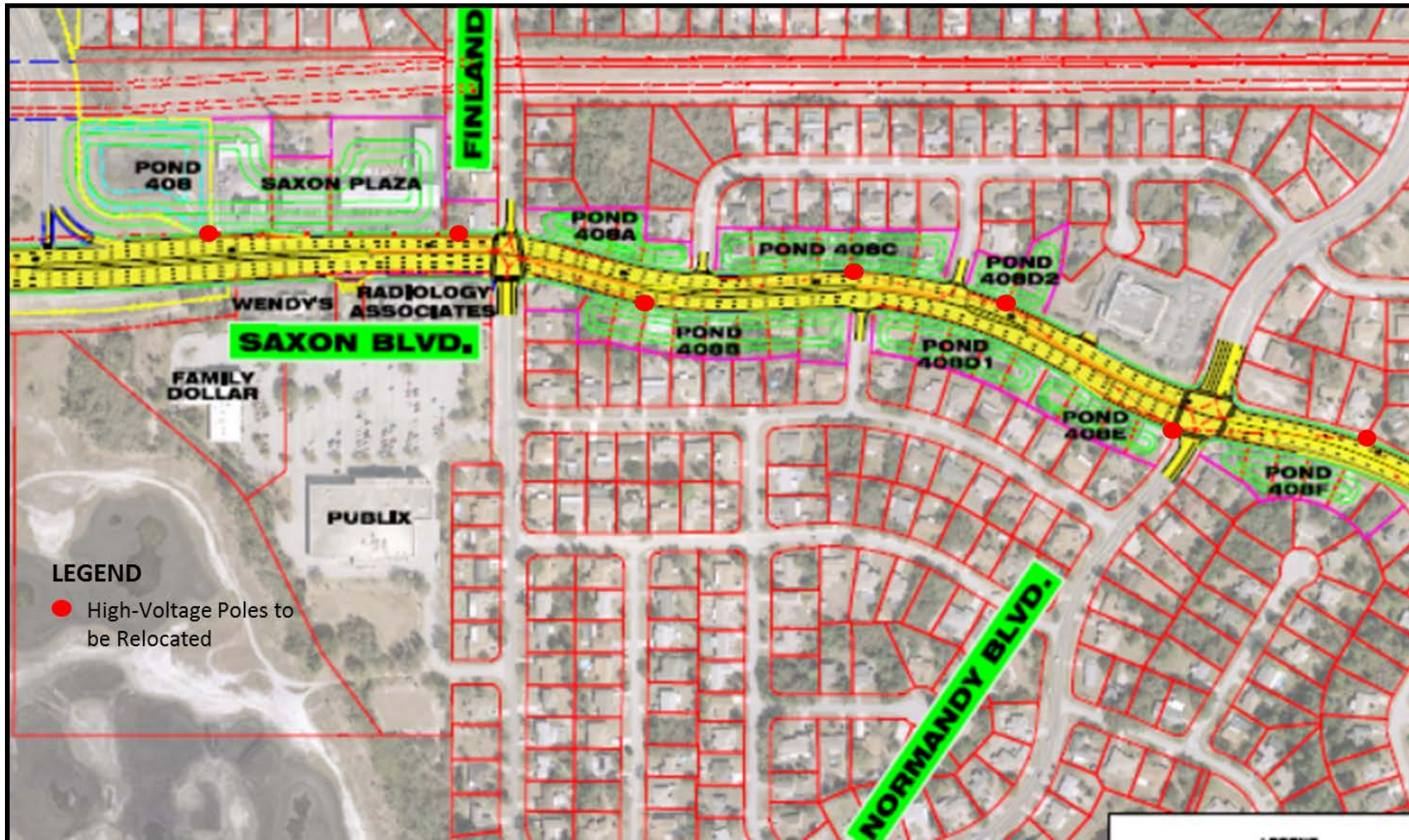
RECOMMENDATION No. 10: Hold the North side right-of-way line on Saxon Boulevard and take only on the South side (Alternative 5)

Calculations:

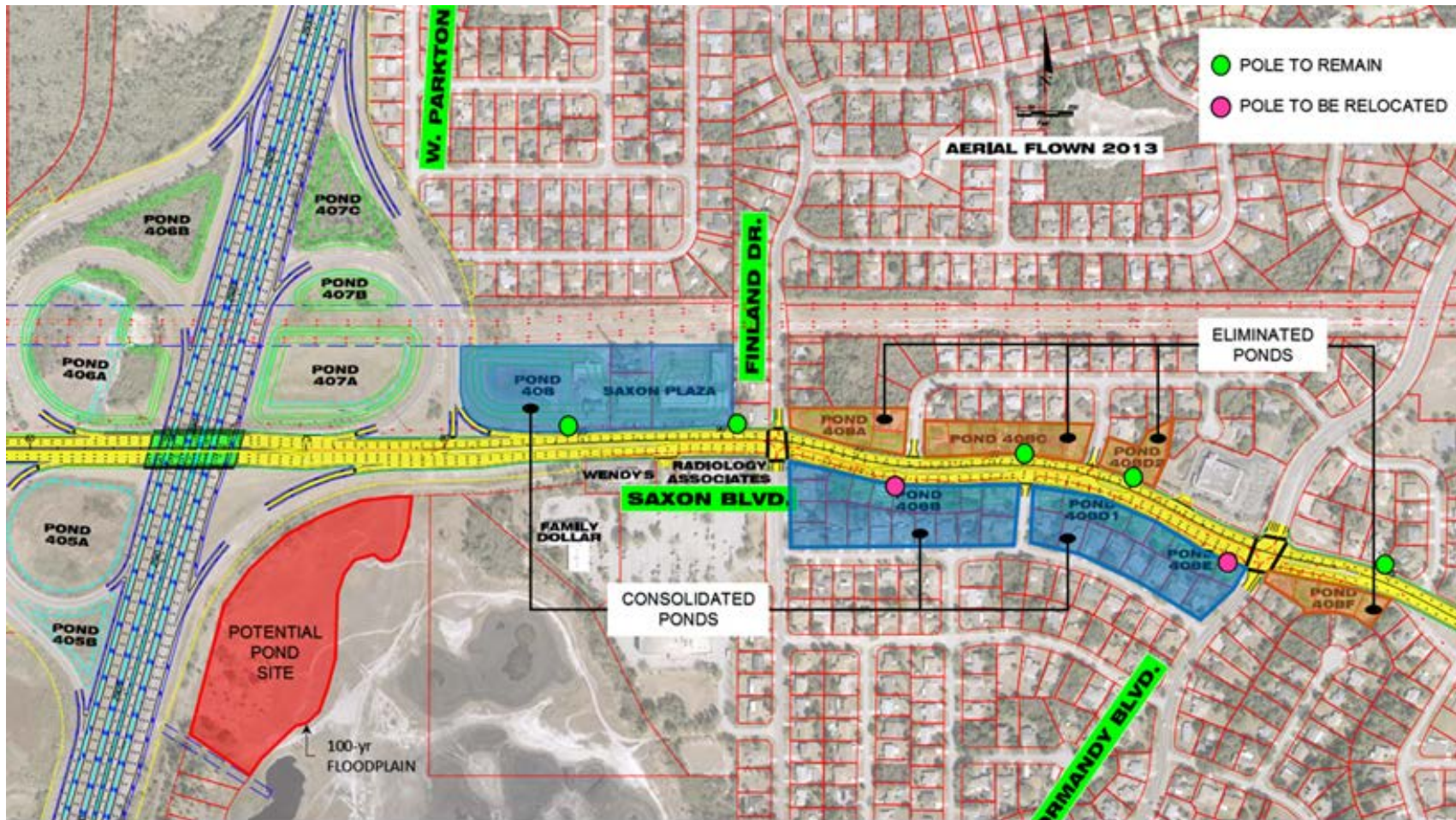
Description	Quantity	Unit	Unit Price	Extended Amount
High-Voltage Pole Relocation	-5	EA	\$250,000.00	(\$1,250,000)
				\$0
				\$0
Subtotal				(\$1,250,000)
Compensable Utility Relocation (5%)	1	LS		(\$62,500)
Mobilization (10%)	1	LS		(\$125,000)
Maintenance of Traffic (20%)	1	LS		(\$250,000)
Lighting (5%)	1	LS		(\$62,500)
Signage (5%)	1	LS		(\$62,500)
Drainage (20%)	1	LS		(\$250,000)
ITS (5%)	1	LS		(\$62,500)
Erosion Control (1%)	1	LS		(\$12,500)
Subtotal				(\$2,137,500)
Contingency (20%)		LS		(\$427,500)
			CONSTRUCTION TOTAL	(\$2,565,000)

RECOMMENDATION No. 10: Hold the North side right-of-way line on Saxon Boulevard and take only on the South side (Alternative 5)

ELECTRICAL TRANSMISSION POLE LOCATIONS



RECOMMENDATION No. 10: Hold the North side right-of-way line on Saxon Boulevard and take only on the South side (Alternative 5)



RECOMMENDATION No. 12: Construct a Diverging Diamond or Single Point Diamond Interchange instead of loops at SR 472

Proposed Alternative (1): Construct in the northwest quadrant a loop ramp from westbound SR 472 to westbound I-4 and an off ramp from westbound I-4 to SR 472. Reconstruct three existing ramps and SR 472 Bridge over I-4.

VE Alternative:

Construct either a Diverging Diamond Interchange (DDI) or a Single Point Diamond Interchange (SPDI) instead of additional loops at SR 472 and develop the present infields as larger stormwater ponds.

VE Alternative Enhanced:

Construct an exit from I-4 eastbound exit ramp to the extension of Normandy Blvd.

Advantages :

- Less right of way required
- Less environmental impact
- Better pedestrian considerations
- Better bicycle considerations

Disadvantages:

- Bridge size doubles and longer spans
- Increased cost
- More difficult constructability
- Added maintenance costs
- *Right of way acquisition costly at \$1,700,000*

FHWA CATEGORIES

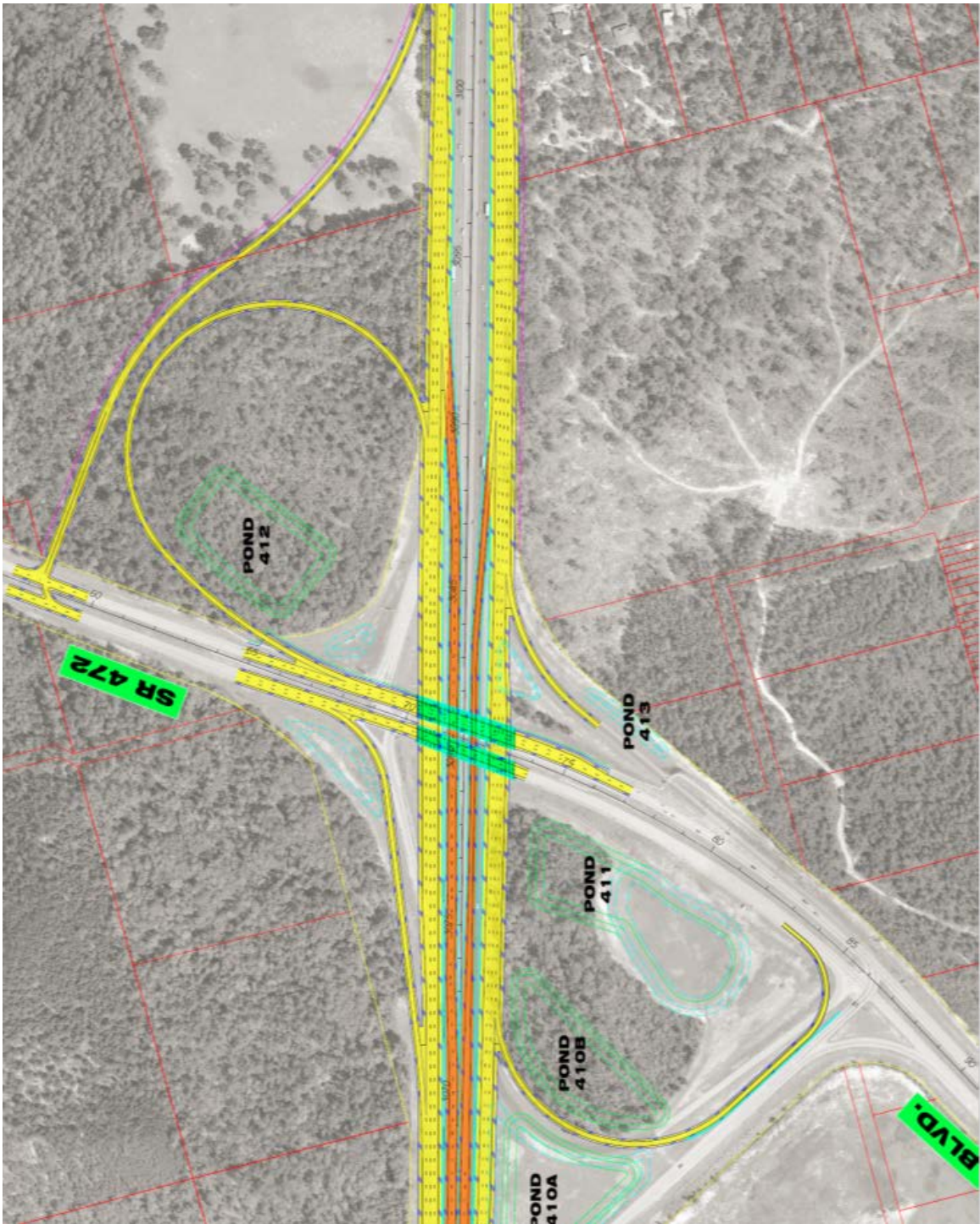
X Safety X Operations X Environment ___ Construction ___ Other

Potential Added Value: (\$6,600,000)

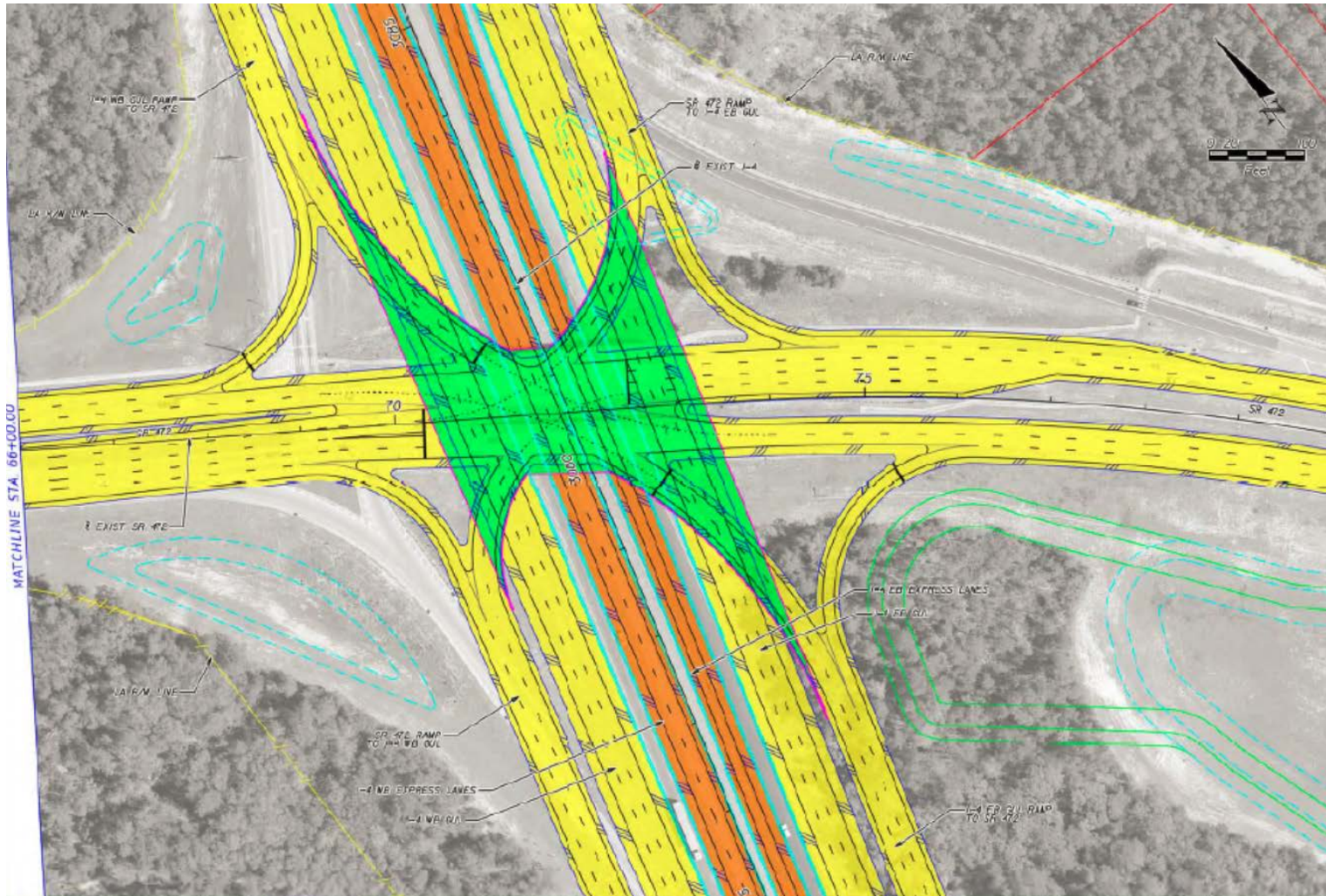
Alt 1 construction cost est.:	\$15,600,000	(Loops and ramps)
Additional right of way	\$7,200,000	
Drainage credit	<u>-\$760,000</u>	
Total	\$22,000,000	
Alt 2 construction cost est.:	\$30,000,000	(DDI/SPDI)
Additional right of way	\$100,000	
Drainage credit	<u>-\$1,460,000</u>	
Total	\$28,600,000	

Note: “Drainage” amount is same as mobilization in the HNTB estimate, or 20% of construction costs. For this location with the excessively drained soils, the drainage amount can be reduced to 10% of the construction costs due to land availability and proximity to roadway, or a reduction of \$760,000 for Alt 1 and \$1,460,000 for Alt 2.

RECOMMENDATION No. 12: Construct a Diverging Diamond or Single Point Diamond Interchange instead of loops at SR 472



RECOMMENDATION No. 12: Construct a Diverging Diamond or Single Point Diamond Interchange instead of loops at SR 472



RECOMMENDATION No. 17: Construct Rhode Island Avenue with wide median and future construction to the inside instead of to the outside.

Proposed Alternative:

The PD&E Documents show the Volusia County concept plans for Rhode Island Avenue. The County typical for Rhode Island Avenue shows constructing the median, one through lane in each direction with sidewalks and drainage swale between the shoulder and sidewalk. The length of the Rhode Island Avenue project is approximately 1.415 miles.

VE Alternative:

The VE Alternative is to construct the project to the outside and widen in the future to the inside. Construct a full 4-lane divided typical from Veterans Memorial Parkway Intersection to Kentucky Ave. and from the bridge approach to Normandy Blvd.

Advantages :

- Less cost for future widening.
- Less environmental impact for future widening.
- Less impact to the scrub jay habitat that was acquired for Rhode Island Ave.
- Tie-ins for the side street connections will not be impacted in the future widening.

Disadvantages:

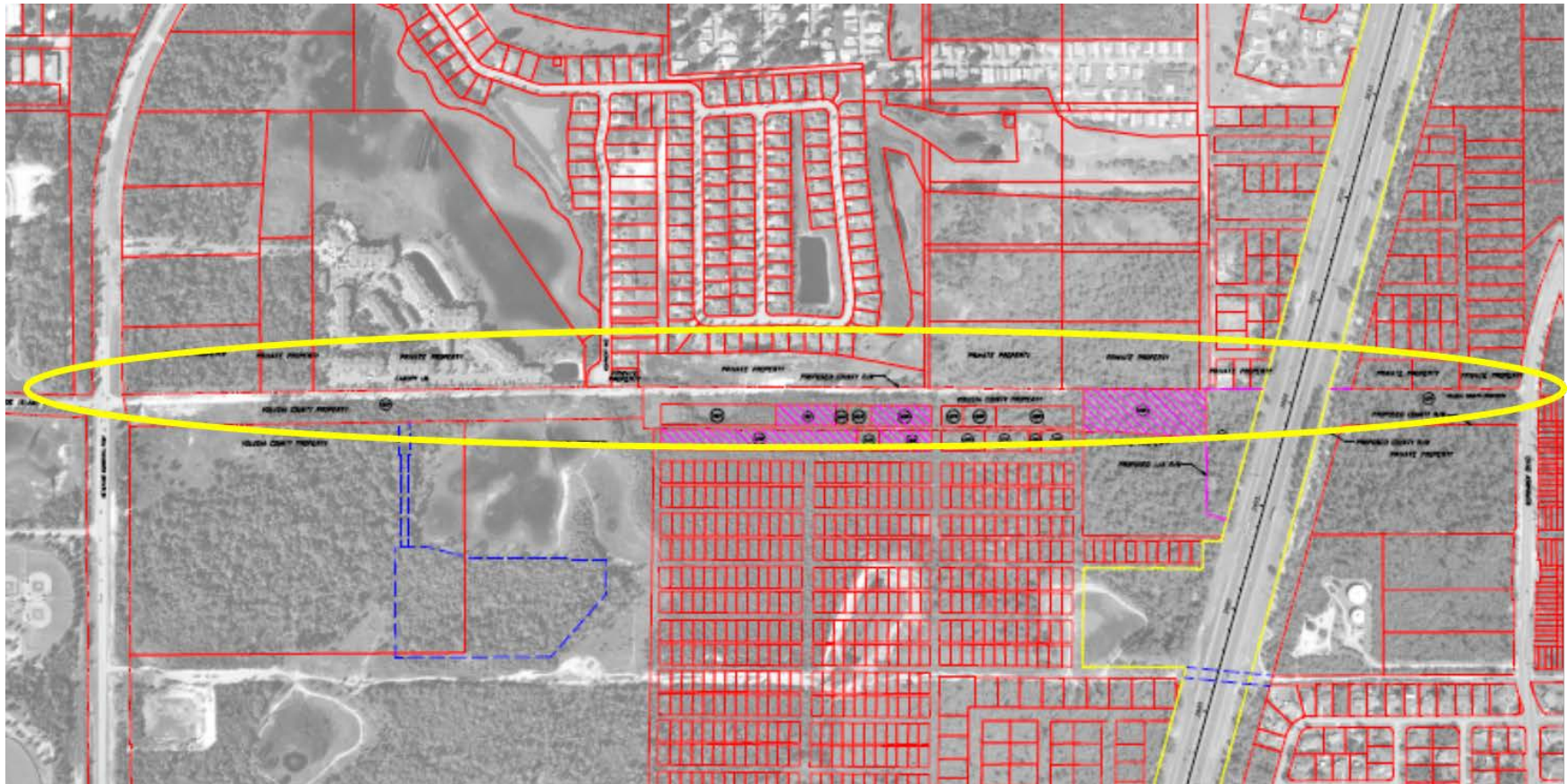
- Increased cost for construction for the initial project.

FHWA CATEGORIES

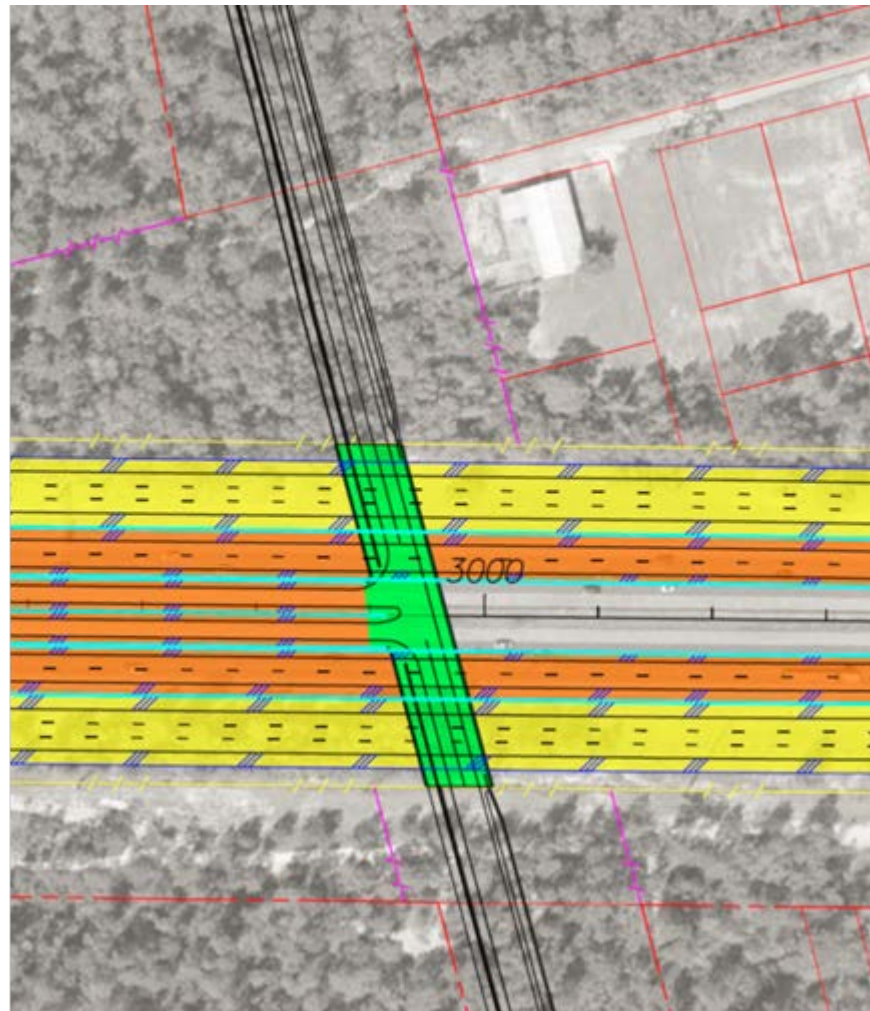
Safety Operations Environment Construction Other

Potential Cost Savings: \$ TBD

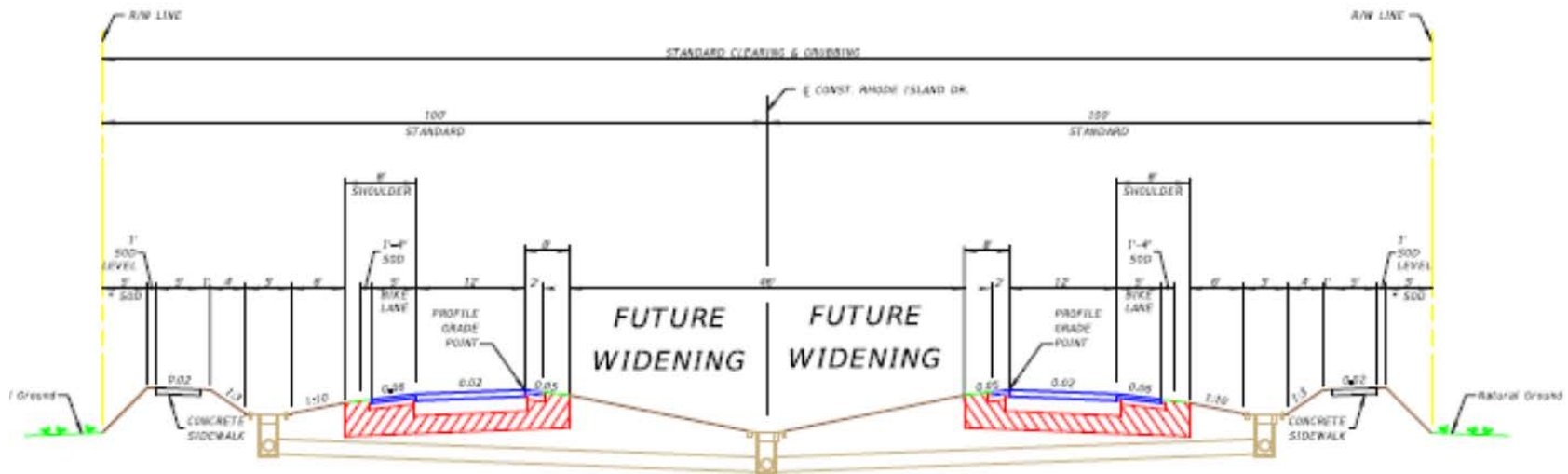
RECOMMENDATION No. 17: Construct Rhode Island Avenue with wide median and future construction to the inside instead of to the outside.



RECOMMENDATION No. 17: Construct Rhode Island Avenue with wide median and future construction to the inside instead of to the outside.



RECOMMENDATION No. 17: Construct Rhode Island Avenue with wide median and future construction to the inside instead of to the outside.



RHODE ISLAND AVE
TO ACCOMODATE FUTURE WIDENING (TO INSIDE)
TO 4 LANE DIVIDED WITH RAISED MEDIAN

RECOMMENDATION No. 18: Construct Rhode Island Avenue with median and future construction to the north side instead of to the outside.

Proposed Alternative:

The PD&E Documents show the Volusia County concept plans for Rhode Island Avenue. The County typical for Rhode Island Avenue shows constructing the median, one through lane in each direction with sidewalks and drainage swale between the shoulder and sidewalk.

VE Alternative:

The VE Alternative is to construct the project to the south of the centerline and widen in the future to the north. Construct a full 4-lane typical at Veterans Memorial Parkway Intersection to Kentucky Ave and from the bridge approach to Normandy Blvd.

Advantages :

- Less environmental impact for future widening.
- Less impact to the scrub jay habitat that was acquired for Rhode Island.

Disadvantages:

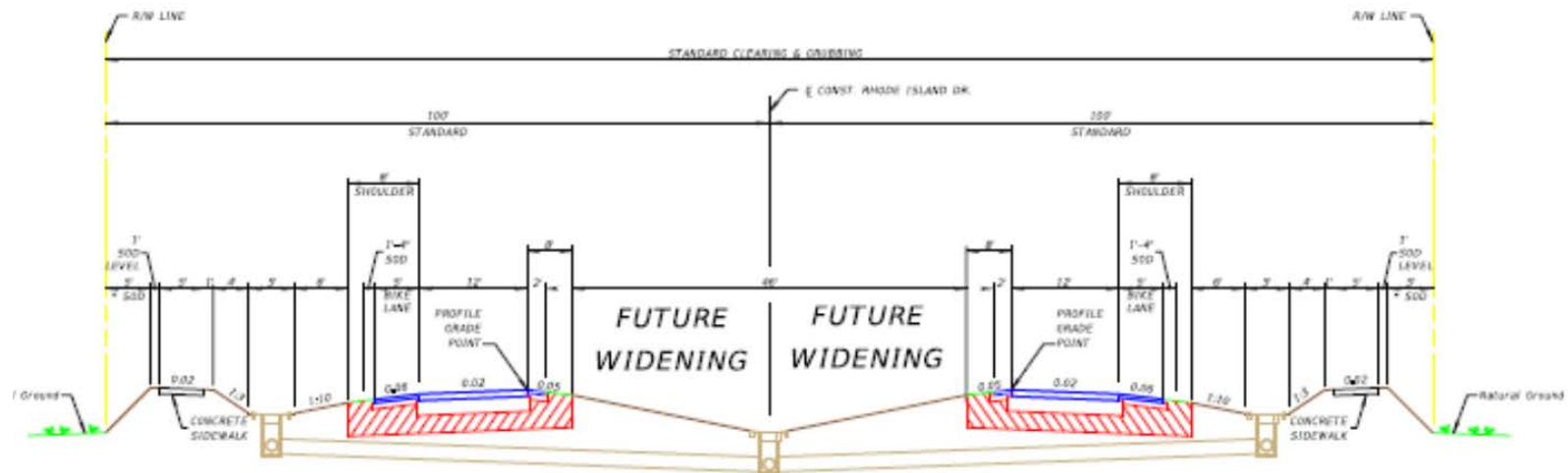
- Increased construction cost for the future widening.
- Tie-ins for the side street connections will be impacted in the future widening.

FHWA CATEGORIES

Safety Operations Environment Construction Other

Potential Cost Savings: \$ TBD

RECOMMENDATION No. 18: Construct Rhode Island Avenue with median and future construction to the north side instead of to the outside.



RHODE ISLAND AVE

*TO ACCOMODATE FUTURE WIDENING (TO INSIDE)
TO 4 LANE DIVIDED WITH RAISED MEDIAN*

RECOMMENDATION No. 20: Eliminate the transit corridor and recommend the next segment to the north includes the transit envelope

Proposed Alternative:

The PD&E Documents show a 44-ft. transit envelope located in the proposed 64-ft. median.

VE Alternative:

The VE team recommends eliminating the transit corridor and recommends the next segment to the north should include the transit envelope. The envelope does not function south of this project. Segment 3 in Seminole County and Segment 2 in Orange County do not currently include an envelope. Introducing a transit envelope north of SR 472, makes sense for connection to Sun Rail in Debarry/Deland and Daytona Beach.

Advantages :

- Eliminates 37.5 million dollars for construction costs
- Additional outside border width available for treatment swales.
- Eliminates difficulty accessing median for maintenance.

Disadvantages:

- Volusia County wants Transit Envelope.

FHWA CATEGORIES

Safety Operations Environment Construction Other

Potential Cost Savings: \$47,700,000

RECOMMENDATION No. 20: Eliminate the transit corridor and recommend the next segment to the north includes the transit envelope

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Barrier Wall	-53,328	LF	\$113.00	(\$6,026,064)
6 Bridges with reduced spans	-1	LS	\$9,000,000.00	(\$9,000,000)
Existing Sound Barrier to remain	-1	LS	\$3,249,000.00	(\$3,249,000)
Subtotal				(\$18,275,064)
Compensable Utility Relocation (5%)	1	LS		(\$913,753)
Mobilization (10%)	1	LS		(\$1,827,506)
Maintenance of Traffic (20%)	1	LS		(\$3,655,013)
Lighting (5%)	1	LS		(\$913,753)
Signage (5%)	1	LS		(\$913,753)
Drainage (20%)	1	LS		(\$3,655,013)
ITS (5%)	1	LS		(\$913,753)
Erosion Control (1%)	1	LS		(\$182,751)
Subtotal				(\$31,250,359)
Contingency (20%)		LS		(\$6,250,072)
		CONSTRUCTION TOTAL		(\$37,500,431)

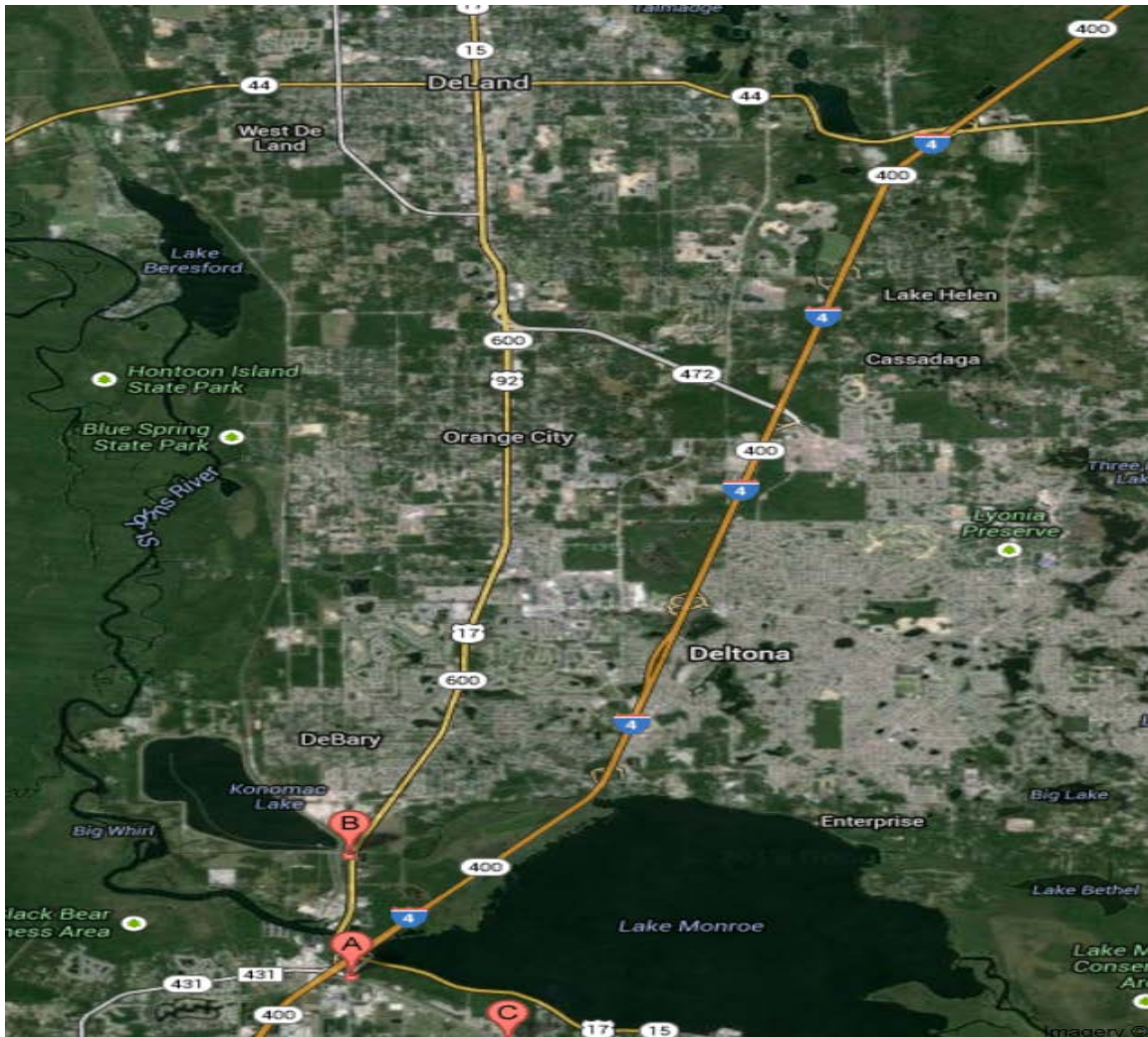
Right of way savings:

\$10,200,000

RECOMMENDATION No. 22: Leave the transit corridor south of SR 472 and recommend using SR 472 to the west to terminate at a transit station that connects with SunRail

Proposed Alternative:

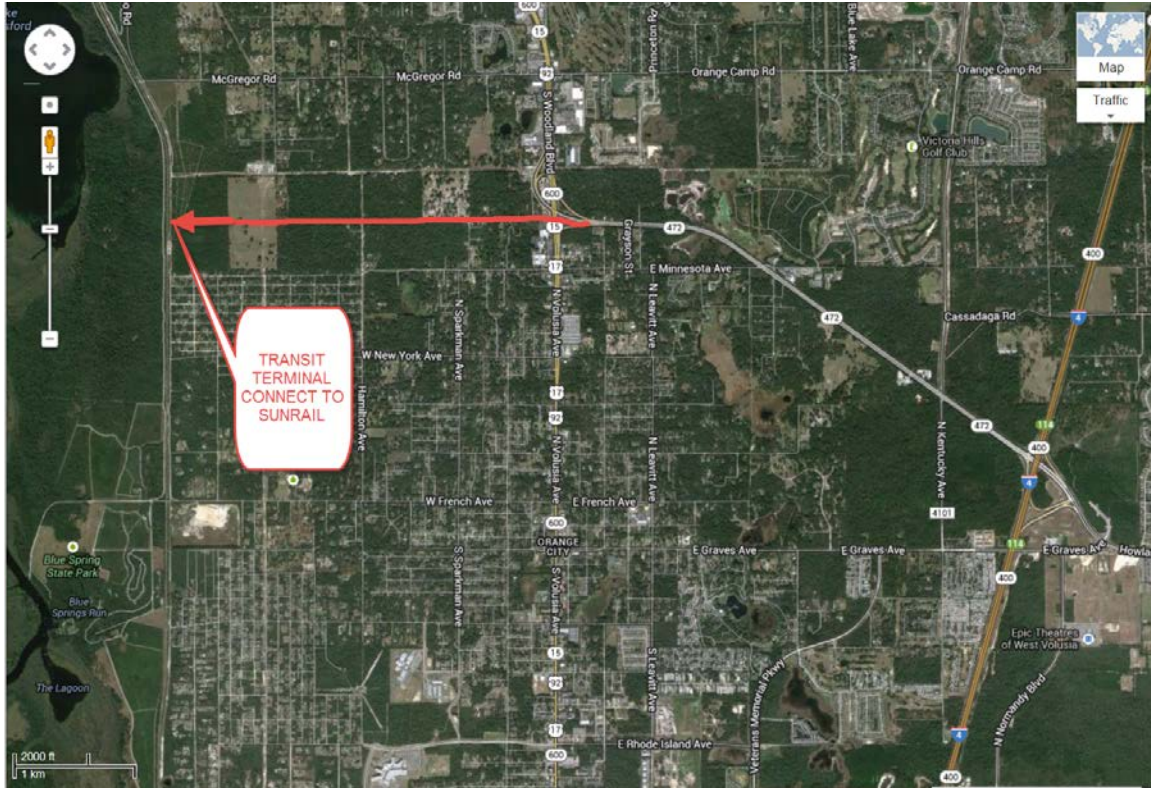
It is currently recommended to include a 44-ft. wide transit envelope on the median of I-4 mainline typical section for the purpose of accommodating the future transportation mode. The transit envelope proposed will run along I-4 within the limits of the project and connect to the currently preserved transit corridor on a project from SR 472 to I-95 in Volusia County. The main objective is to eventually have a transit corridor running through Volusia County from the south to the Daytona Beach Area. It should be noted that in the south the preserved envelope will end at the Saint Johns River and there are no similar transit envelopes preserved along I-4 in Seminole and Orange Counties. In order to accommodate the transit corridor along the I-4 median, the mainline alignment has to be adjusted especially the horizontal curve around the intersection of Dirksen Drive since the design of other transportation modes such as train corridor would require a flatter radius. The design to include a transit envelope along I-4 would require mainline realignment and additional right of way acquisitions.



RECOMMENDATION No. 22: Leave the transit corridor south of SR 472 and recommend using SR 472 to the west to terminate at a transit station that connects with SunRail

VE Alternative:

Leave the transit corridor as proposed along I-4 within these project limits and recommend accommodating the transit envelope along SR 472 median to the west to terminate at a transit station that connects with SunRail. The transit corridor along SR 472 will connect to the currently preserved envelope from I-95 to SunRail and provide the required transit corridor running through Volusia County from the south to the Daytona Beach Area.



The transit corridor along SR 472 can be considered and planned as part of the future improvements along SR 472 and adjacent intersections. According to the FDOT work program and 2035 adopted River to Sea Transportation Planning Organization’s Long Range Transportation Plan, so far there are planned and programmed future improvements as shown on the following table:

RECOMMENDATION No. 22: Leave the transit corridor south of SR 472 and recommend using SR 472 to the west to terminate at a transit station that connects with SunRail

Roadway	From	To	Improvement	Programmed or Planned	Year	Jurisdiction	Source
SR 472	Dr. MLK Jr. Beltway/ Kentucky Ave	Graves Avenue	Widen 4 to 6 Lanes (including I-4 Overpass)	Planned	2021-2025	FDOT	Volusia TPO 2035 LRTP
SR 472	Dr. MLK Jr. Beltway/ Kentucky Ave	Graves Avenue	Resurfacing (432441-2)	Programmed	2014 - 2016	FDOT	FDOT Work Program
Graves Ave.	Veterans Memorial Parkway	SR 472	Widen 2 to 4 Lanes	Planned	2016-2020	Volusia	Volusia TPO 2035 LRTP
Westside Beltway/ Kentucky Ave.	Graves Avenue	SR 472	Widen 2 to 4 Lanes	Planned	2021-2025	Volusia	Volusia TPO 2035 LRTP
Dr. MLK Jr. Beltway	SR 472	Orange Camp Road	Widen 2 to 4 Lanes	Planned	2026-2030	Volusia	Volusia TPO 2035 LRTP

Advantages :

- Less construction cost since accommodating the transit corridor would require reconstructing all bridges along I-4
- Less right of way impacts and cost. Preserving the transit corridor along I-4 would require acquiring additional right of way for a wider typical section and larger drainage ponds.
- Direct connection to SunRail (Direct connection to Seminole, Orange and Osceola Counties).
- Easier transit terminal access
- Less environmental impacts

Disadvantages:

- None Apparent

FHWA CATEGORIES

Safety Operations Environment Construction Other

Potential Cost Savings: \$3,700,000

Potential right of way savings: **\$3,700,000**

RECOMMENDATION No. 24: Use Alternative 1 Interchange with an additional eastbound off ramp auxiliary lane to connect directly to Normandy Boulevard intersection

Proposed Alternative:

The PD&E Documents show a partial cloverleaf interchange with loop ramps in the northwest and southeast quadrants. The existing single lane I-4 eastbound off ramp will continue to connect from the I-4 general use lanes to SR 472. The existing single lane loop on ramp will continue to connect eastbound SR 472 to the I-4 eastbound general use lanes. The existing single lane on ramp will continue to connect westbound SR 472 to the I-4 eastbound general use lanes. A new single lane off ramp will be constructed to provide access from the I-4 westbound general use lanes to SR 472. A new single lane loop ramp will be constructed to provide access from westbound SR 472 to the I-4 westbound general use lanes. A new single lane ramp will be constructed to provide access from SR 472 eastbound to the I-4 westbound general use lanes. Pedestrian access will be maintained along the northern side of SR 472 and an additional sidewalk will be added to the south side of the eastbound bridge. Additional right of way will need to be purchased in order to construct the new loop ramp and the new off ramp from the westbound general use lanes. Additional right of way will also be needed to build the new on ramp from westbound SR 472 to the I-4 eastbound general use lanes.

VE Alternative:

Construct Alternative One as described in the PD&E while adding two additional design features. The first feature is to construct an additional off ramp auxiliary lane on the I-4 eastbound off ramp that will connect directly to Normandy Boulevard at the intersection with Graves Avenue. The second feature is to create a dedicated lane to the I-4 westbound on ramp from SR 472 eastbound. This dedicated lane would extend west through the relocated intersection of SR 472 and I-4 westbound off ramp with a concrete median separating this off ramp lane with SR 472 eastbound through lanes to allow the off ramp traffic to bypass the signal at that intersection.

Advantages :

- Improved level of service for SR 472/Howland Boulevard through the interchange.

Disadvantages:

- Increased cost associated with added ramp lane to Normandy Boulevard and extension of I-4 westbound on ramp lane.
- Requires right of way acquisition for the added I-4 eastbound off ramp lane to Normandy Boulevard.

FHWA CATEGORIES

Safety Operations Environment Construction Other

Potential Value Added: (\$2,516,000)

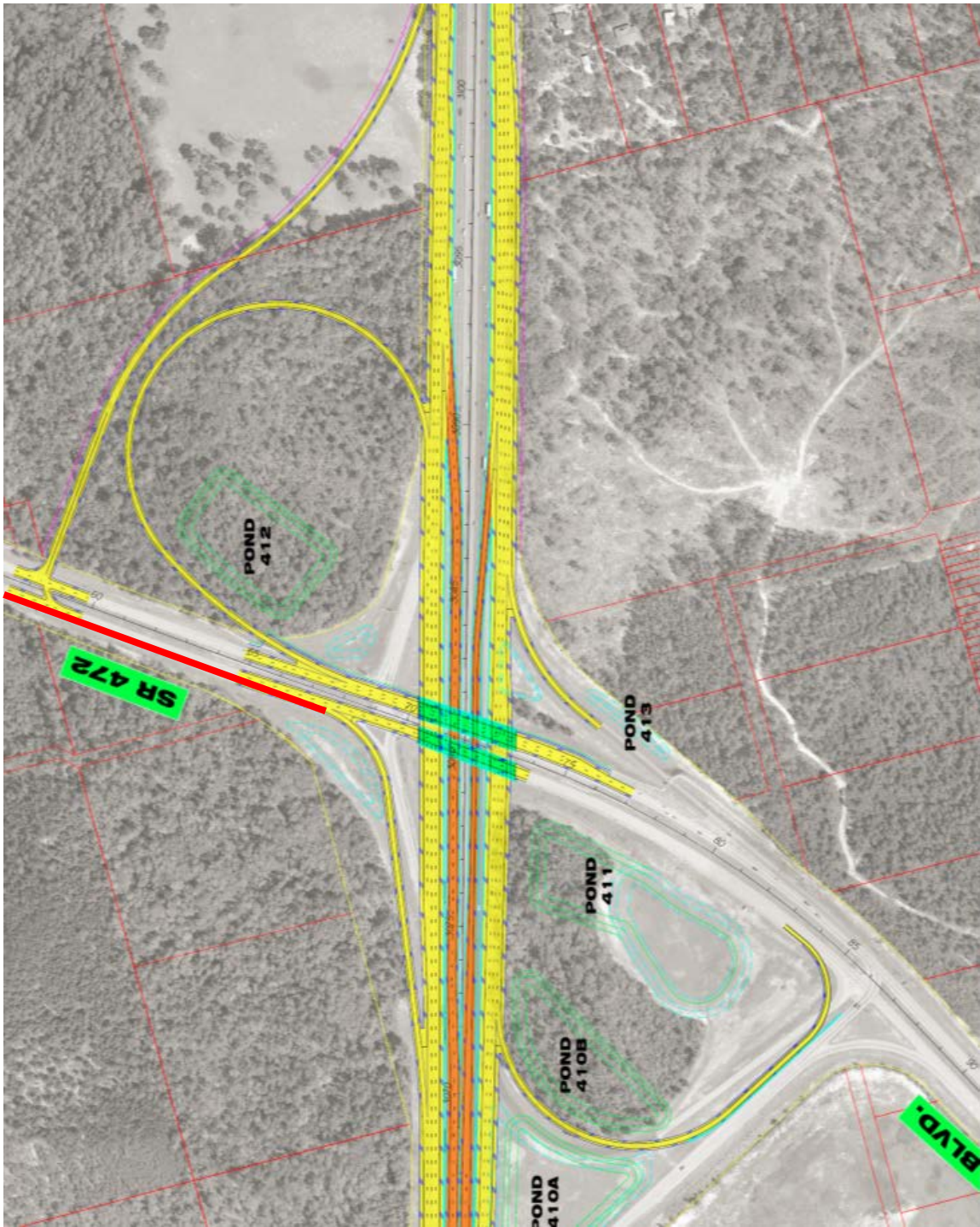
RECOMMENDATION No. 24: Use Alternative 1 Interchange with an additional eastbound off ramp auxiliary lane to connect directly to Normandy Boulevard intersection

Calculations:

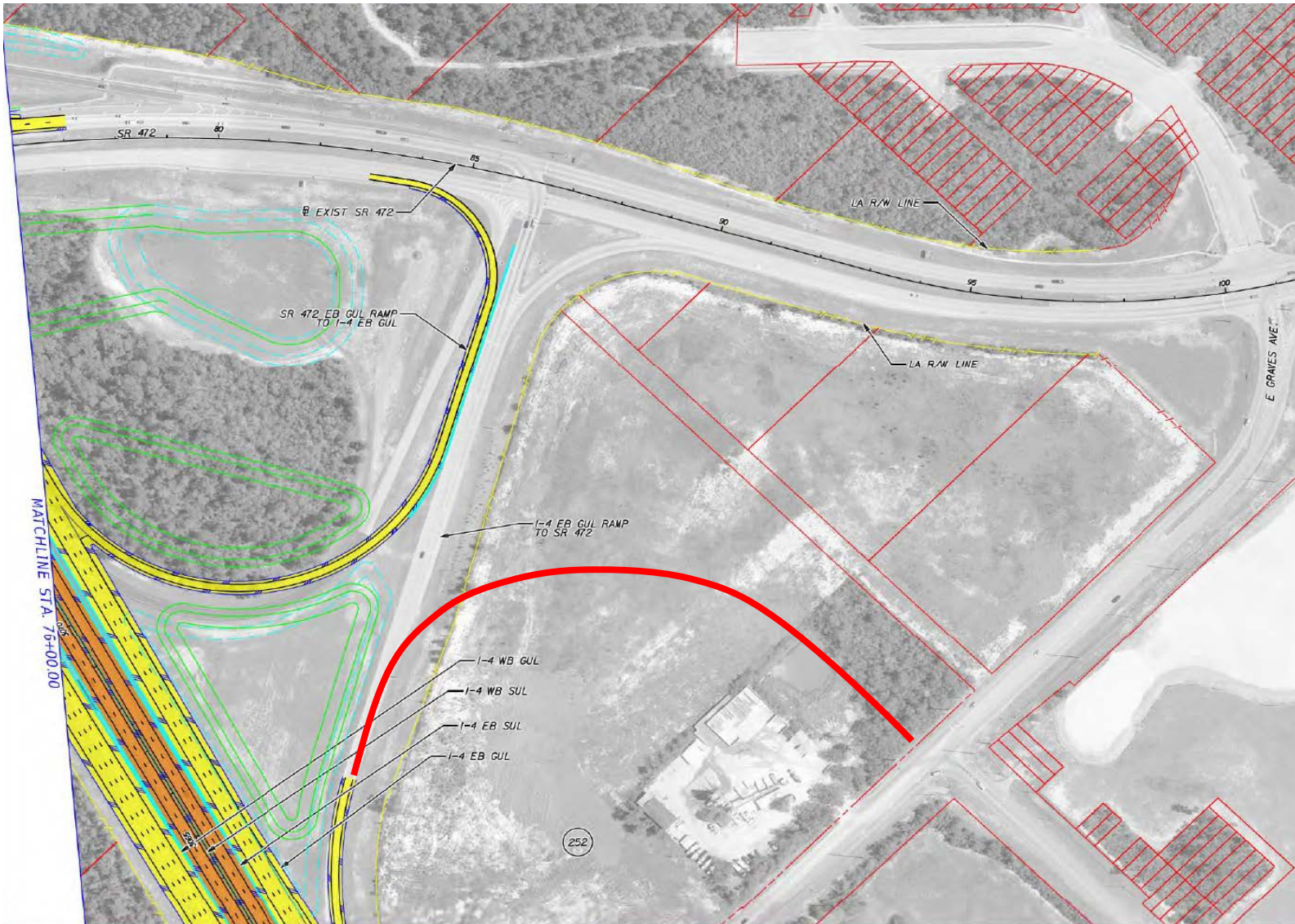
Description	Quantity	Unit	Unit Price	Extended Amount
Clearing & Grubbing	4	AC	\$7,724.00	\$28,347
Embankment	6,000	CY	\$5.94	\$35,640
Stabilization Type B LBR 40	6,402	SY	\$2.90	\$18,566
Base optional (base group 6) ML	2,223	SY	\$13.69	\$30,433
Base optional (base group 12) ML	4,179	SY	\$14.02	\$58,590
Superpave asphaltic concrete (Traff B)	112	TN	\$87.28	\$9,775
Superpave asphaltic concrete (Traff D)	67	TN	\$87.21	\$5,843
Superpave asphaltic concrete (Traff D-PG 76-22)	143	TN	\$89.64	\$12,819
Asphaltic conc friction course (FC-5) (PG 76-22)	229	TN	\$117.20	\$26,839
Traffic separator conc type I, 4ft wide	1,000	LF	\$24.53	\$24,530
Subtotal				\$251,381
Compensable Utility Relocation (5%)	1	LS		\$12,569
Mobilization (10%)	1	LS		\$25,138
Maintenance of Traffic (20%)	1	LS		\$50,276
Lighting (5%)	1	LS		\$12,569
Signage (5%)	1	LS		\$12,569
Drainage (20%)	1	LS		\$50,276
ITS (5%)	1	LS		\$12,569
Erosion Control (1%)	1	LS		\$2,514
Subtotal				\$429,862
Contingency (20%)		LS		\$85,972
			CONSTRUCTION TOTAL	\$515,834

Construction Cost: \$515,834
 Potential Right of Way Cost: \$1,600,000
 Total Cost \$2,115,834

RECOMMENDATION No. 24: Use Alternative 1 Interchange with an additional eastbound off ramp auxiliary lane to connect directly to Normandy Boulevard intersection



RECOMMENDATION No. 24: Use Alternative 1 Interchange with an additional eastbound off ramp auxiliary lane to connect directly to Normandy Boulevard intersection



RECOMMENDATION No. 25: Relocate the Park ‘n Ride and the pond to the property west of the Riverside Condominiums on Dirksen Drive

Proposed Alternative:

The PD&E Documents show a proposed I-4 eastbound exit ramp to eastbound Dirksen Drive that causes the existing Park ‘n Ride in the southeast quadrant of this interchange to be eliminated. It also encroaches on the existing pond that is adjacent to the Park ‘n Ride. There is currently no proposed relocation for the Park ‘n Ride or the FDOT pond at the condos.

VE Alternative:

Consider buying the property west of the Riverside Condominiums to provide the space that is needed for the relocation of the Park ‘n Ride and since this Park ‘n Ride would be adjacent to a trail, it could also serve as a Trail Head. This property could also be used for the additional pond area that is needed.

Advantages:

- Provides a relocation for the Park ‘n Ride
- Mitigates the impact to the existing pond by providing a new storage area
- Environmental impacts are likely avoidable
- Park ‘n Ride could be used as Trail Head

Disadvantages:

- Increased cost since no other property has been identified for the Park ‘n Ride relocation yet

FHWA CATEGORIES

Safety Operations Environment Construction Other

Potential Value Added: (\$1,311,000)

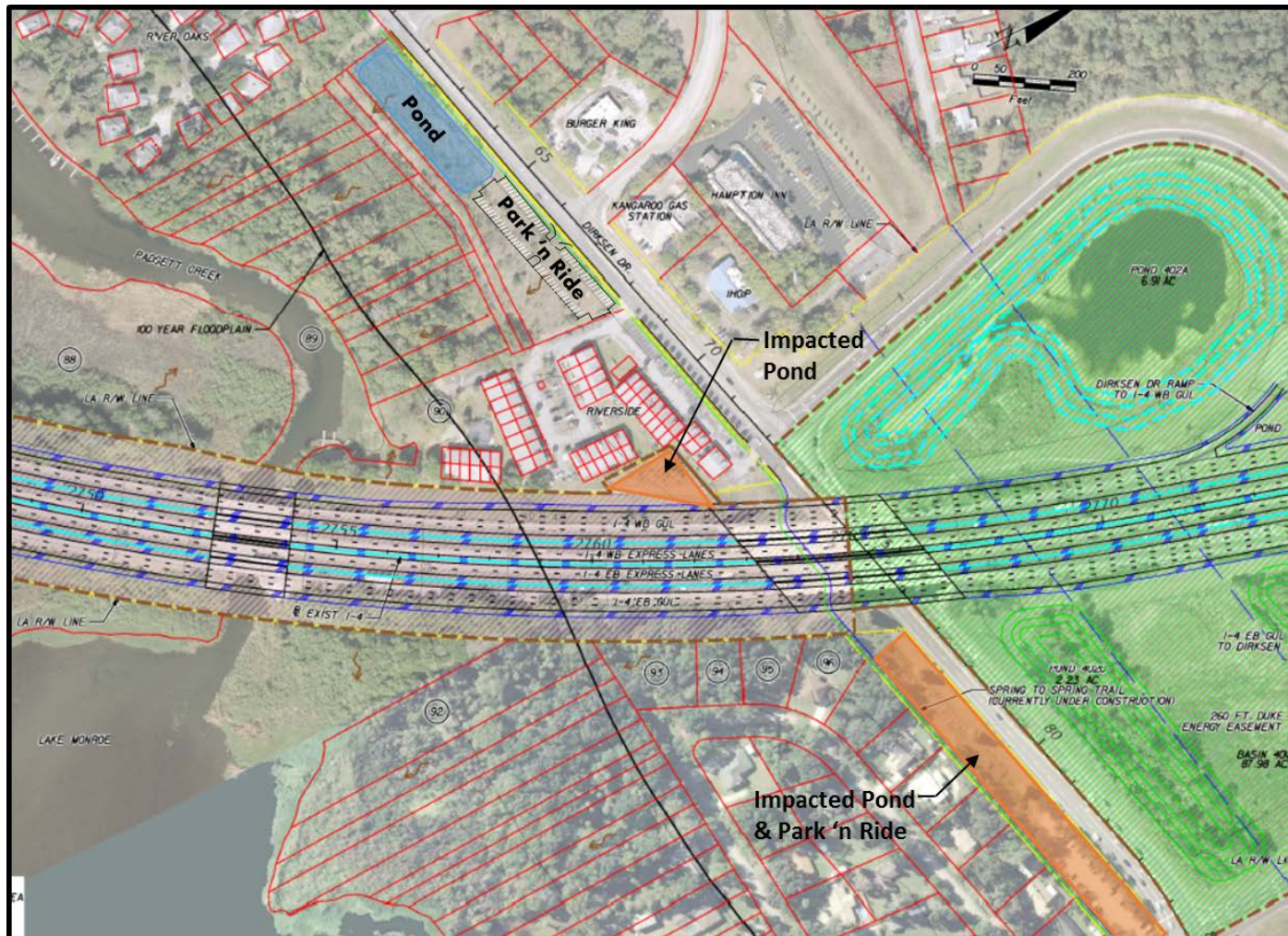
RECOMMENDATION No. 25: Relocate the Park ‘n Ride and the pond to the property west of the Riverside Condominiums on Dirksen Drive

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Clearing & Grubbing	0.85	AC	\$7,724.00	\$6,561
Embankment	12,202	CY	\$5.94	\$72,483
Stabilization Type B LBR 40	3,111	SY	\$2.90	\$9,022
Base optional (base group 6) ML	3,111	SY	\$13.69	\$42,591
Superpave asphaltic concrete (Traff B)	311	TN	\$87.28	\$27,154
Thermoplastic, White, Striping	0.03	NM	\$3,178.00	\$90
Subtotal				\$151,340
Compensable Utility Relocation (5%)	1	LS		\$7,567
Mobilization (10%)	1	LS		\$15,134
Maintenance of Traffic (20%)	1	LS		\$30,268
Lighting (5%)	1	LS		\$7,567
Signage (5%)	1	LS		\$7,567
Drainage (20%)	1	LS		\$30,268
ITS (5%)	1	LS		\$7,567
Erosion Control (1%)	1	LS		\$1,513
Subtotal				\$258,792
Contingency (20%)		LS		\$51,758
		CONSTRUCTION TOTAL		\$310,550

Additional Right-of-Way Cost: \$ 1,000,000

RECOMMENDATION No. 25: Relocate the Park 'n Ride and the pond to the property west of the Riverside Condominiums on Dirksen Drive



APPENDICES

Agenda
Sign In Sheets
Resolution Memorandum
Slide Presentation

Agenda
June 2 – 6, 2014

Day One	Kickoff Intro by VE Team Leader	8:00 am – 8:15 am
	Team Review and Discussions of Documents	8:15 am – 9:30 am
	Designer Orientation	9:30 am – 10:00 am
	Questions for Designers	10:00 am – 11:00 am
	Travel to Site	11:00 am – 12:00 pm
	Lunch	12:00 pm – 1:00 pm
	Site Review	1:00 pm – 3:30 pm
	Return to Lake Mary	3:30 pm – 4:30 pm
	Summarize Site Review & Constraints	4:30 pm – 5:00 pm
Day Two	Cost Model & Function Analysis	8:00 am – 9:00 am
	FAST Diagram	9:00 am – 9:30 am
	Intro to Creative Thinking	10:00 am – 10:15 am
	Creative Idea Listing/Function	10:15 am – 12:00 pm
	Lunch	12:00 pm – 1:00 pm
	Creative/Evaluation/Function	1:00 pm – 5:00 pm
Day Three	Evaluation Phase	8:00 am – 12:00 pm
	Lunch	12:00 pm – 1:00 pm
	Mid-point review and determine economic factors	1:00 pm – 2:00 pm
	Begin Development Phase	2:00 pm – 5:00 pm
Day Four	Continue Development	8:00 am – 5:00 pm
Day Five	Finish Development/Prepare Oral Presentation	8:00 am – 10:00 am
	Oral Presentation to FDOT/others	10:00 am – 12:00 pm
	Begin Draft Value Engineering Report	12:00 pm – 5:00 pm

FLORIDA DEPARTMENT OF TRANSPORTATION

VALUE ENGINEERING KICKOFF

Interstate 4 from East of State Road 15/600 (US 17/92)
to 1/2 Mile East of State Road 472

June 2, 2014

SIGN IN SHEET

Name	Representing	Phone Number	Email Address
Andrew Meisheid	FDOT Geotech	386-740-3504	andrew.meisheid@dot.state.fl.us
MARK TREBITZ	FDOT STRUCTURES	386-943-5157	mark.trebitz@dot.state.fl.us
Tim McGlone	FDOT Construction	386-740-3531	tim.mcglone@dot.state.fl.us
Michael Dallery	FDOT R/W	386-943-5093	michael.dallery@dot.state.fl.us
Richard W. Bell	FDOT Design	386-943-5548	richardw.bell@dot.state.fl.us
Bill Marchese	FDOT R/W	386-943-5097	william.marchese@dot.state.fl.us
Naziru ISAAC	FDOT Project Manager	386 943 4489	Naziru.Isaac@dot.state.fl.us
David Scheppe	FDOT Str Maint	386 740 3410	david.scheppe@dot.state.fl.us
EFREN RIVERA	FDOT DRAINAGE	787-593-5445	efren.rivera@dot.state.fl.us
CAROL HATFIELD	FDOT-DRAINAGE	386-943-5435	carol.hatfield@dot.state.fl.us
Ty Garner	FDOT VE	386-943-5254	ty.garner@dot.state.fl.us
Sam Moss	HNTB	407-805-0355	Sam Moss smoss@hntb.com
Katherine Wetzow	HNTB	407-805-0355	k.wetzow@hntb.com
Luís Diaz	HNTB	407-805-0355	LDIAZ@HNTB.COM

FLORIDA DEPARTMENT OF TRANSPORTATION

VALUE ENGINEERING KICKOFF

**Interstate 4 from East of State Road 15/600 (US 17/92)
to 1/2 Mile East of State Road 472**

June 2, 2014

SIGN IN SHEET

Name	Representing	Phone Number	Email Address
GREG LIPIRA	FDOT RDWY	386-943-5188	GREG.LIPIRA@DOT.STATE.FL.US
RICK JOHNSON	PMA	321-418-8187	rjohnson@pmaconsultants.com

FLORIDA DEPARTMENT OF TRANSPORTATION

VALUE ENGINEERING MID-POINT REVIEW

**Interstate 4 from East of State Road 15/600 (US 17/92)
to 1/2 Mile East of State Road 472**

June 4, 2014

SIGN IN SHEET

Name	Representing	Phone Number	Email Address
GREG LIPIRA	FDOT RDWY	386 943 5188	GREG.LIPIRA@DOT.STATE.FL.US
Richard W. Bell	" "	386-943-5548	richardw.bell@dot.state.fl.us
Tim McGlone	FDOT Const.	386-740-3531	tim.mcglone@dot.state.fl.us
CAROL HATFIELD	FDOT-DRAINAGE	386-943-5435	carol.hatfield@dot.state.fl.us
EFREN RIVERA	FDOT-DRAINAGE	787-593-5445	efren.rivera@dot.state.fl.us
Nazim ISEAC	FDOT - Project Management	386 943 5547	Nazim.ISEAC@dot.state.fl.us
David Schappel	FDOT - ^{St. & Main} Key	386 740 3410	David.Schappel@dot.state.fl.us
MARK TREBITZ	FDOT - STRUCTURES DESIGN	(386)943-5157	mark.trebitz@dot.state.fl.us
Andrew Meisheid	FDOT - Geotech	386-740-3504	andrew.meisheid@dot.state.fl.us
Ty Garner	FDOT - VE	386-943-5251	ty.garner " " " "
Katherine Luetzow	HNTB	407-547-2086	kluetzow@hntb.com
Sam Moss	HNTB	407-547-0355	smoss@hntb.com
Heather Johnstone	FDOT	386-943-5540	heather.johnstone@dot.state.fl.us
Beata Palasz	FDOT	386-943-5418	

FLORIDA DEPARTMENT OF TRANSPORTATION

VALUE ENGINEERING MID-POINT REVIEW

**Interstate 4 from East of State Road 15/600 (US 17/92)
to 1/2 Mile East of State Road 472**

June 4, 2014

SIGN IN SHEET

Name	Representing	Phone Number	Email Address
Rick Johnson	PMA	321-418-8187	rjohnson@pmaconsultants.com

FLORIDA DEPARTMENT OF TRANSPORTATION
VALUE ENGINEERING STUDY PRESENTATION
Interstate 4 from East of State Road 15/600 (US 17/92)
to 1/2 Mile East of State Road 472

June 6, 2014

SIGN IN SHEET

Name	Representing	Phone Number	Email Address
MARK TREBITZ	FDOT - STRUCTURES DESIGN	386-943-5157	mark.trebitz@dot.state.fl.us
ANDREW MEISHEID	FDOT - GEOTECH	386-740-3504	andrew.meisheid@dot.state.fl.us
Tim McGlone	FDOT - Const.	386-740-3531	tim.mcglone@dot.state.fl.us
Michael Dolley	FDOT - R/W	386-943-5093	michael.dolley@dot.state.fl.us
EFREN RIVERA	FDOT - DRAINAGE	- 5430	EFREN.RIVERA@DOT.STATE.FL.US
Richard W. Bell	FDOT - Design	386-943-5548	richardw.bell@dot.state.fl.us
NAZIM ISRAEL	FDOT - Project Management	386 943 5547	NAZIM.ISRAEL@dot.state.fl.us
GREG LIPIRA	FDOT - RDWY	5188	GREG.LIPIRA@DOT.STATE.FL.US
David Schappel	FDOT - Maint	386 740 3410	David.Schappel@dot.state.fl.us
Ty Garner	FDOT - VE	386-943-5254	Ty.garner@dot.state.fl.us
JACK CRAHAN	FPC - Group/R/W	386-738-1105	JACK@FPC-Group.com
MICHAEL MARSHALL	FDOT - ROW	386 943 5071	MICHAEL.MARSHALL@DOT.STATE.FL.US
Bill Marchese	FDOT - R/W	386-943-5097	william.marchese@dot.state.fl.us
Sam Moss	HNTB	407-547-0355	SMOSS@hntb.com

FLORIDA DEPARTMENT OF TRANSPORTATION

VALUE ENGINEERING STUDY PRESENTATION

**Interstate 4 from East of State Road 15/600 (US 17/92)
to ½ Mile East of State Road 472**

June 6, 2014

SIGN IN SHEET

Name	Representing	Phone Number	Email Address
JOHN CLAPHAM	FDOT DESIGN	386 943 5555	JOHN.CLAPHAM@DOT.STATE.FL.US
DAVID STOKES	FDOT	386 943 5166	DAVID.STOKES@DOT.STATE.FL.US
CHRIS DABSON	" "	" " 5227	CHRIS.DABSON@DOT.STATE.FL.US
Marianne Saunders	" "	5440	marianne.saunders@ " "
GARY SKOFRONICK	" "	5424	GARY.SKOFRONICK@ " "
Mark Robinson	FDOT Design	5727	mark.robinson@ " "
Mina McAmmon	FDOT-OCMA	352 620 3000	Mina.McAmmon@ " "
Paul Wabi	FDOT Construction	386 740 3534	paul.wabi@ " "
FERRILL HICKSON	FDOT-Drainage	" 943 5433	ferrill.hickson@ _____
MARK GARCIA	FDOT-Maint.	" " 5277	mark.garcia@ _____
Heather Johnstone	FDOT	386-943-5590	heather.johnstone@dot.state.fl.us
Katherine Luetzow	HNTB	407-547-3056	kluetzow@hntb.com
CAROL HATFIELD	FDOT DRAINAGE VE	386 943 5435	carol.hatfield@dot.state.fl.us
Beata Palasz	FDOT 7DFPM	386-943-5418	beata.stys-palasz@dot.state.fl.us

FLORIDA DEPARTMENT OF TRANSPORTATION

VALUE ENGINEERING STUDY PRESENTATION

**Interstate 4 from East of State Road 15/600 (US 17/92)
to 1/2 Mile East of State Road 472**

June 6, 2014

SIGN IN SHEET

Name	Representing	Phone Number	Email Address
George A. Berchik	Foot Design	386.943.5163	George.Berchik@DOT...
STEVEN Buck	Foot Design	386 943 5423	STEVEN.Buck@DOT...
Susan Sadighi	FDOT- ^{Operations} DSE	" " - 5168	Susan.Sadighi@...
Frank O'Dea	FDOT Development	5476	frank.odea@...
Alan Hyman	FDOT Operations	5477	alan.hyman@...
Rick Johnson	PMA	321-418-8187	rjohnson@pmaconsultants.com



Florida Department of Transportation

RICK SCOTT
GOVERNOR

719 S. Woodland Blvd.
DeLand, FL 32720

ANANTH PRASAD, P.E.
SECRETARY

Value Engineering Final Resolution Memorandum

Date: July 16, 2014

To: Beata Stys-Palasz, Project Manager

From: Ty Garner, D5 Utilities Value Administrator

Copies: Noranne Downs, Alan Hyman, Frank O'Dea, Mark Robinson, Annette Brennan, Suzanne Phillips, John Hatfield, Ron Meade, Kathy Gray, Jack Adkins, Mike McPhail, George Borchik, Ferrell Hickson, Neil Kenis, Jeff Cicerello, John Tyler, Mark Garcia, Rick Morrow, Brian Stanger, Paul Wabi, Todd Womick

Value Engineering Study

Financial Project Id#: 242592 4

County: Seminole

State Road: I-4 (SR 400)

Limits: From 1 mile East of SR 434 to East of SR 15/600 (US 17/92)

Responses to the Draft VE Report and a resolution meeting held Thursday June 26, 2014 @ 9:00 a.m. have produced the following resolutions to the VE proposals presented.

Recommendation 1: Provide an additional floodplain compensation alternative in Basin 300 as FPC 300-A is impacted by a billboard

Further Study required. An additional site for floodplain compensation (FPC 300-C) will be added to the pond siting report and cleared environmentally similar to the other ponds. Some survey is required to determine whether or not this location meets the needed elevation requirements for a Flood Plain Compensation pond. Survey will be performed as part of the PD&E and the pond site will be cleared from an environmental and contamination standpoint.

Recommendation 2: Increase the size of the Pond 303-A1 and incorporate the entire lot that is for sale

Rejected. This pond site can be shown to take the entire property that is for sale, which would result in a joint use pond or two ponds under FDOT control. This pond alternative (Pond 303-A1) could be the preferred option if the billboard cannot be relocated on the other pond alternative site (Pond 303-B2).

Recommendation 3: Make Pond 303-B2 the preferred pond by relocating the billboard within the site

Accepted. Currently, central office is evaluating the billboard on this site for relocation. If the billboard can be relocated on this site, this pond will be the preferred alternative (Pond 303-B2).

Recommendation 4: Maintain the design variation in the Ultimate section though the entire corridor

Accepted. The design variation will be used throughout the section.

Recommendation 5: Consider concrete express lanes

Accepted. The use of concrete pavement will be considered for the construction of the express lanes.



Florida Department of Transportation

RICK SCOTT
GOVERNOR

719 S. Woodland Blvd.
DeLand, FL 32720

ANANTH PRASAD, P.E.
SECRETARY

Recommendation 6: Relocate the sidewalk off of back of curb at the BB&T Bank on Lake Mary Blvd. by purchasing an easement or right of way to avoid utility relocations

Accepted. Costly utility relocation could be avoided by moving the sidewalk back outside of the right of way.

Recommendation 7: Don't build the 6-ft. sidewalk on the south side of the bridge at EE Williamson Road

Rejected. The EE Williamson Road Bridge will be replaced and sidewalks will be provided on both sides to maintain consistency with the approaches on each side of the bridge.

Recommendation 8: Add direct connect ramps to the express lanes at EE Williamson

Further study required. A presentation was given to the Alaquá HOA and the majority of the residents in the area do not want the express lanes accessing EE Williamson. The traffic volumes at the location are being reviewed to determine the impacts to the local network.

Recommendation 9: Modify the eastbound Lake Mary Blvd. to eastbound I-4 ramp to begin before the interchange signal on the west side of I-4

Rejected. Concerned that everyone heading for I-4 will have limited room or distance to get to the ramp.

Recommendation 11: Provide a grade separated intersection at Lake Mary Blvd & Primera Blvd/Lake Emma Rd.

Rejected. A grade separated intersection at this location would cause numerous access issues to the east of the intersection. In the current year and the future design year, traffic does not back up onto the I-4 mainline.

Recommendation 12: Corridor improvements on Lake Mary Blvd. from the I-4 interchange to Rinchart Rd.

Accepted. The traffic modelers are looking at what kind of improvements can be made throughout the corridor.

Recommendation 14: Construct a pedestrian tunnel under ramps and bridge over the mainline on the north side of Lake Mary Blvd.

Further study required. It may be possible to tunnel under the ramps, but then the sidewalk would need to get up and over I-4 all while still meeting ADA requirements.

Recommendation 17: Eliminate the right turn lane at International Parkway and CR 46A because the outside lane becomes a right turn lane at the intersection

Accepted. The additional right turn lane at International Parkway will be removed.

Recommendation 18: Start the second eastbound left to eastbound I-4 after the westbound I-4 on ramp so the shift is under and before the overpass

Accepted. We will revise the amount of turn lane storage and model it to make sure there are no issues.



Florida Department of Transportation

RICK SCOTT
GOVERNOR

719 S. Woodland Blvd.
DeLand, FL 32720

ANANTH PRASAD, P.E.
SECRETARY

Recommendation 21: Modify the 17-92 Alternative 1 to better accommodate traffic

Further study required. Modifying Alt 1 to taper the US 17-92 SB to I-4 WB to eliminate the hard right. Further study. Add a third lane to Monroe Blvd and to add dual rights with stop control.

Recommendation 22: Consider a skewed 4-leg Orange Ave. intersection that eliminates the left turn off of Monroe Road as a straight movement through the skewed intersection.

Further study required by the traffic modelers. Further study required for being able to leave the EB off ramp as is because a TUDI is being proposed at this location.

Recommendation 30: Modify the US 17/92 Alternative 5 interchange

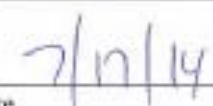
Further study required. The US 17-92 interchange will be modified to be a TUDI. Further study required to evaluate the effectiveness of a dedicated right turn lane.

In summary, the design team accepts 7 recommendations, does not accept 4 recommendations and has identified 6 for further study.

Value Engineering Team:

Rick Johnson	Team Leader
Steven Buck	Constructability
Lori Stanfill/Balmoral Group	Drainage
Andrew Meisheid	Geotechnical
Kim Navarro	Oviedo Construction/Operations/Structures Maintenance
Gene Varano	Project Management
Michael Dollery	Right of Way
Jack Crahan	
Bagher P.	Roadway Design
Marianne Saunders	Structure Design
Jay Williams	Traffic Operations
N/A	Utilities


Frank O'Dea
District Director of Transportation Development


Date

SLIDE PRESENTATION