



To: Staci Nester  
Richard L. Johnson, PE

From: Luis Diaz, PE  
Robert Denney, PE

Date: August 4, 2016

Subject: Interstate 4 from East of County Road 532 to Central Florida Parkway Value Engineering Study Recommendation Dispositions

FPID: 431456-1 & 242484-8

Dear Mr. Johnson,

Please see below for our dispositions for the I-4 Segment 1 Value Engineering Study recommendations found on Table 1.4-1 of the Value Engineering Study Report.

Recommendation 2: The C-D road between Daryl Carter Parkway and Central Florida Parkway can be brought closer together to shorten the lanes.

Accepted.

Recommendation 3: Use early right of way acquisition of Crossroads and move to design-build-finance concept of delivery.

Accepted.

Recommendation 4: Straighten the express to toll eastbound to northbound ramp at SR 429 to shorten the ramp and expand 106A pond.

Pending further analysis. The design team will analyze this recommendation during the line and grade phase of the project.

Recommendation 5 & 6: Do not realign Bonnet Creek at Osceola Parkway; reconstruct bridges in the current locations.

Accepted. Structures maintenance is OK with this recommendation as long as 30-ft of vertical clearance can be achieved between I-4 and the low member of Osceola Parkway. A profile was developed and the vertical clearance can be achieved without any impacts to the entrance to Gaylord Palms.

Recommendation 7: Continue two lanes of SR 535 on structure for left turn flyover to SR 535 northbound on SR 535 past the Grand Cypress intersection.

Not accepted. From an operational perspective, simply removing that one movement from the at-grade intersection isn't nearly enough to make the signal work.

Recommendation 8: Flip the westbound I-4 exit ramps to SR 535 to shorten the lanes.

Accepted.

Recommendation 9: Put a roundabout at Daryl Carter and Palm Parkway.

Not Accepted. For traffic operational purposes, roundabout at Daryl Carter and Palm Parkway is not recommended. Roundabout fails without the use of bypass lanes on all approaches.

Recommendation 10: Eliminate the right turn movement for the westbound I-4 exit ramp to Daryl Carter and create a new I-4 to Palm Parkway exit and intersection 2,500 feet east of the Daryl Carter bridge.

Not Accepted. While queuing is a potential concern given the close proximity of Palm Parkway to the interchange, our analysis does not indicate any issues with the current PD&E configuration.

Recommendation 12: The exit ramp starting west of Daryl Carter Parkway could be shortened to approximately 1,300 ft. by exiting approximately 5,000 feet east of the Daryl Carter Parkway bridge.

Not Accepted. This is not a viable option as this will create a heavy weave between Daryl Carter Pkwy eastbound on-ramp and Central Florida Parkway eastbound off-ramp.

Thank You,

A handwritten signature in blue ink, appearing to read 'Luis Diaz', with a stylized flourish at the end.

Luis Diaz, P.E.  
Project Manager

# Value Engineering For Transportation Improvements

## Interstate 4 from East of County Road 532 to Central Florida Parkway



### Value Engineering Study Final Report

FM Number: 242526 and 242483

Fed. Aid Project: Yes

Project Description: Interstate 4 from East of County Road 532 to Central Florida Parkway

Study Dates: May 23 – 27, 2016

Project Development Phase			Study Identification Number						
PD&E	Design	Other				VE Item No.			
HNTB, Inc.							Yr.	Dist.	No.
							16	005	0_

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: July \_\_, 2016

# TABLE OF CONTENTS

<b><u>SECTIONS</u></b>	<b><u>Page</u></b>
1. EXECUTIVE SUMMARY	1
2. VALUE ENGINEERING METHODOLOGY	7
3. WORKSHOP PARTICIPANTS AND PROJECT INFORMATION	9
4. ECONOMIC DATA, COST MODEL AND ESTIMATES	12
5. FUNCTIONAL ANALYSIS AND FAST DIAGRAM	15
6. EVALUATION	17
7. RECOMMENDATIONS	20
APPENDICES	
• Agenda	47
• Sign In Sheets	48-51
• Resolution Memorandum	52-53
• Slide Presentation	54
LIST OF FIGURES	
• Figure 1.1 – 1 Project Location Map	3
• Figure 5.1 – 1 FAST Diagram	16
LIST OF TABLES	
• 1.1 – 1 Preliminary Cost Estimate, Segment 1	4
• 1.4 – 1 Summary of Highest Rated Recommendation	6
• 4.1 – 1 Preliminary Cost Estimate Segment 1A	13
• 4.1 – 1 Preliminary Cost Estimate Segment 1B	14
• 6.1 – 1 Value Engineering Study Ideas	18
• 6.1 – 2 Value Engineering Study Weighted Values	18
• 6.1 – 3 Value Engineering Study Evaluation Scores	19

## 1.1 INTRODUCTION

A Value Engineering (VE) Study was held, during May 23 – 27, 2016 using the VE methodology to improve the Interstate 4 (I-4) from County Road (CR) 532 to west of State Road (SR) 528 project. The VE study analyzed value improvements for improving the mainline, 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 east-west 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 ten dedicated lanes. The project limits for the segment analyzed in this report are within an approximate 14-mile segment of I-4 that extends from just west of CR 532 (Polk/Osceola County Line) to west of SR 528 (Beachline Expressway), from Milepost (MP) 31.607 to MP 32.022 in Polk County, MP 0.000 to MP 7.885 in Osceola County (herein referred to as I-4, Segment 1A) and from MP 0.000 to 5.650 in Orange County (herein referred to as I-4, Segment 1B) and as shown in Figure 1.1. Although, the interstate is a designated east-west corridor, the alignment follows a southwest to northeast orientation through the limits of Segment 1. The study area in this section from west of the Polk/Osceola County Line to west of SR 528 includes the following interchanges:

### **1A – Osceola County**

- I-4 and CR 532 (Osceola-Polk Line Road)
- I-4 and SR 429
- I-4 and World Drive
- I-4 and SR 417
- I-4 and US 192/SR 530 (W. Irlo Bronson Memorial Highway)

### **1B – Orange County**

- I-4 and SR 536 (Epcot Center/World Center Drive)
- I-4 and SR 535 (S. Apopka Vineland Road)
- I-4 and Daryl Carter Parkway
- I-4 and Central Florida Parkway

The proposed improvements to I-4 include widening the existing six-lane divided urban interstate to a ten-lane divided highway. Generally speaking, the typical sections will be consistent throughout Segment 1 and will have three 12-foot general use travel lanes with varying inside and outside shoulders and two 12-foot express lanes with varying inside and outside shoulders, in each direction. A portions of the segment will have a reduced shoulder width for the general use and express lanes. A barrier wall in between the adjacent shoulders will separate the express lanes from the general use lanes. Three 12-foot auxiliary lanes will be provided in some areas in the eastbound direction and up to two auxiliary lanes will be provided in some locations in the westbound direction. A collector-distributor system has been added in the eastern portion of the corridor. The typical sections include a 44-foot rail envelope in the median within a minimum 300 foot right of way.

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 Project Development & Environment (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 4 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 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 three major project constraints:

1. 44-ft. wide High Speed Rail corridor must be preserved
2. Wildlife Management Conservation Area
3. OUC, FGT, and TECO utilities

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 12 ideas 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.

Figure 1.1 – 1  
Project Location Map



**Table 1.1 – 1**  
**Preliminary Cost Estimate**  
**Segment 1**

Sequence	1A	1B	
<b>Construction</b>	<b>TOTALS</b>	<b>TOTALS</b>	<b>TOTALS</b>
Earthwork	\$15,230,995.44	\$38,489,924.32	\$53,720,919.76
Roadway	\$90,364,014.83	\$77,610,322.86	\$167,974,337.69
Shoulder	\$10,935,968.86	\$10,327,227.99	\$21,263,196.85
Median	\$23,002,743.74	\$13,552,967.43	\$36,555,711.17
Drainage	\$30,958,128.97	\$21,840,972.50	\$52,799,101.47
Signing	\$2,725,327.77	\$1,674,202.97	\$4,399,530.74
Lighting	\$8,039,721.40	\$3,440,396.00	\$11,480,117.40
Landscaping	\$6,723,996.91	\$9,921,033.82	\$16,645,030.73
Bridges	\$225,174,831.97	\$465,749,954.57	\$690,924,786.54
Retaining Walls	\$37,095,888.66	\$26,931,342.00	\$64,027,230.66
Signalization	\$837,458.28	\$1,436,795.70	\$2,274,253.98
ITS	\$901,380.00	\$622,278.00	\$1,523,658.00
Architectural	\$3,000,000.00	\$2,000,000.00	\$5,000,000.00
<b>Subtotal</b>	<b>\$454,990,456.83</b>	<b>\$673,597,418.16</b>	<b>\$1,128,587,874.99</b>
MOT (10%)	\$45,499,045.68	\$67,359,741.82	\$112,858,787.50
Mobilization (10%)	\$50,048,950.25	\$74,095,716.00	\$124,144,666.25
Contingency	\$150,000.00	\$150,000.00	\$300,000.00
Project Unknowns (15%)	\$82,580,767.91	\$122,257,931.40	\$204,838,699.31
<b>Total Const. Cost</b>	<b>\$633,269,220.68</b>	<b>\$937,460,807.37</b>	<b>\$1,570,730,028.05</b>
<b>Other Costs</b>			
Right of Way	\$36,515,500.00	\$228,617,000.00	\$265,132,500.00
<b>Total Costs</b>	<b>\$669,784,720.68</b>	<b>\$1,166,077,807.37</b>	<b>\$1,835,862,528.05</b>

Reference: Preliminary Cost Estimate prepared by HNTB, dated April 14, 2016

#### 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 insure 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)
2	The C-D road between Daryl Carter Parkway and Central Florida Parkway can be brought closer together to shorten the lanes			\$2,608,000
3	Use early right of way acquisition of Crossroads and move to design-build-finance concept of delivery			\$361,070,000
4	Straighten the express to toll eastbound to northbound ramp at SR 429 to shorten the ramp and expand 106A pond			\$914,000
5	Don't realign Bonnet Creek and reconstruct bridges in the current locations			\$56,044,000
6	Raise the Parkway bridges profile to allow construction of the I-4 bridges with Bonnet Creek at it's current location and lower the high speed rail to grade			\$52,014,000
7	Continue two lanes of SR 535 on structure for left turn flyover to SR 535 northbound on SR 535 past the Grand Cypress intersection			(\$3,283,000)
8	Flip the westbound I-4 exit ramps to SR 535 to shorten the lanes			\$4,433,000
9	Put a roundabout at Daryl Carter and Palm Parkway			(\$5,074,000)
10	Eliminate the right turn movement for the westbound I-4 exit ramp to Daryl Carter and create a new Palm Parkway exit and intersection 2,500 feet east of the Daryl Carter bridge			(\$6,796,000)
12	The exit ramp starting west of Daryl Carter Parkway could be shortened to approximately 1,300 ft. by exiting approximately 5,000 feet east of the Daryl Carter Parkway bridge			\$11,460,000

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 May 23, 2016, representatives from HNTB Corporation (HNTB) presented an overview of the project in the PD&E Documents for Interstate 4 from CR 532 to Central Florida Parkway. 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:

<b>Participant Name</b>	<b>Role</b>	<b>Affiliation</b>
Ed Cashman, PE	Roadway Design	FDOT, District 5
Jay Winter, PE	Roadway Design	Scalar Inc.
Bill Marchese	Right of Way	FDOT, District 5
Ray Gopal, EI	Construction/Operations/Maintenance	FDOT, District 5
Haosu Sun, PE	Structures	FDOT, District 5
Tharwat Hannadawod, EI	Geotechnical	FDOT, District 5
Evan Vanderhoof	Structures Maintenance	FDOT, District 5
Tara Spieler, PE	Drainage	Kisinger Campo & Assoc., Corp
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 May 23, 2016, 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 1: West of CR 532 (Osceola/Polk County Line) to West of SR 528, Beachline Expressway – Osceola County (92130) and Orange County (75280), prepared by HNTB Corporation, dated April 2016
2. Pond Siting Report, Segment 1: West of CR 532 (Osceola/Polk County Line) to West of SR 528, Beachline Expressway – Osceola County (92130) and Orange County (75280), prepared by HNTB Corporation, dated March 2016
3. Wetland Evaluation Report, Segment 1: West of CR 532 (Osceola/Polk County Line) to West of SR 528, Beachline Expressway – Osceola County (92130) and Orange County (75280), prepared by HNTB Corporation, dated April 2016
4. Report of Preliminary Geotechnical Engineering Investigation for Ponds – Segment 1 , prepared by Geotechnical and Environmental Consultants, Inc., dated June 30, 2014
5. FDOT Long Range Estimating System – Production – Osceola County, prepared by HNTB Corporation, provided April 14, 2016
6. FDOT Long Range Estimating System – Production – Orange County, prepared by HNTB Corporation, provided April 14, 2016

7. Technical Memorandum: Cultural Resource Assessment Survey of Proposed Improvements to Segment 1: SR 400 (Interstate 4) from West of CR 532 (Polk/Osceola County Line) to West of SR 528/Beachline Expressway, Osceola County (92130) and Orange County (75280), Florida, prepared by Southeastern Archaeological Research, Inc., dated April 2016
8. Location Hydraulic Report, Segment 1: West of CR 532 (Osceola/Polk County Line) to West of SR 528, Beachline Expressway – Osceola County and Orange County, prepared by HNTB Corporation, dated March 2016
9. Contamination Screening Evaluation Report, Segment 1: West of CR 532 (Osceola/Polk County Line) to West of SR 528, Beachline Expressway – Osceola County and Orange County, prepared by HNTB Corporation, dated December 2015
10. Air Quality Analysis, Technical Memorandum Segment 1: from west of CR 532 (Polk/Osceola County Line) to west of SR 528 Beachline Expressway, prepared by HNTB Corporation, dated December 2015
11. Endangered Species Biological Assessment, Segment 4: East of US 17/92 to East of SR 472, prepared by Stantec, dated February 2016
12. Aerial Plan of Segment 1 Improvements, Project Development & Environment (PD&E) Study, prepared by HNTB Corporation, undated
13. Proposed Typical Section Package, Segment 1 SR 400 (I-4), prepared by HNTB Corporation, May 17, 2016
14. Technical Memorandum, Bridge Viaduct vs. Right of Way Impact Comparison, dated April 26, 2016

### **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          | 15. Follow Standards       |
| 2. Improve Traffic Operations | 16. Design Project         |
| 3. Build Project              | 17. Minimize Maintenance   |
| 4. Establish Grade            | 18. Collect Data           |
| 5. Maintain Traffic           | 19. Review Plans           |
| 6. Cross Obstacles            | 20. Estimate Costs         |
| 7. Acquire Right of Way       | 21. Calculate Quantities   |
| 8. Provide Space              | 22. Recommend Alternatives |
| 9. Relocate Utilities         | 23. Evaluate Alternatives  |
| 10. Permit Project            | 24. Determine Needs        |
| 11. Remove Water              | 25. Satisfy Public         |
| 12. Separate Traffic          | 26. Anticipate Growth      |
| 13. Control Traffic           | 27. Ensure Quality         |
| 14. Inform Travelers          | 28. 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. 44-ft. High Speed Rail corridor must be preserved
2. Wildlife Management Conservation Area
3. OUC, FGT, and TECO utilities

*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. Very tight right of way everywhere.
2. Can we keep the existing Bonnet Creek alignment?
3. There is a new existing restaurant and a Wawa is being constructed where the proposed circulation road intersection with SR 535 is planned.
4. Can the overhead power go underground?
5. What can be done with Crossroads and the SR 535 area?

## 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:	2016
Economic Planning Life:	20 years starting in 2025
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 interchanges, provided by HNTB. The cost for the roadway and interchange improvements is based on the current Preferred Alternative with a 44-ft. High Speed Rail corridor reserved in the median and is a Segment 1 combined \$1,570,730,028.05. The estimated cost to acquire all right of ways for the proposed alternative with the transit corridor concept is \$265,132,500 for a total project cost of **\$1,835,862,528.05**.



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

Sequence	1	2	3	4	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	23	TOTALS	Function		
Construction	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost			
Earthwork	\$6,418,795.60	\$2,581,655.60	\$294,950.96	\$187,677.60	\$747,387.04	\$126,135.68	\$867,979.36	\$146,535.12	\$493,661.84	\$193,480.72	\$229,703.28	\$119,643.12	\$100,074.48	\$48,186.48	\$960,188.08	\$46,861.36	\$317,453.84	\$260,278.56	\$608,823.36	\$481,523.36	\$15,230,995.44		Establish Grade	
Roadway	\$49,216,011.72	\$24,320,165.75	\$4,770,890.00	\$365,158.70	\$1,465,150.56	\$356,559.20	\$1,566,767.58	\$287,861.50	\$1,387,581.59	\$731,559.57	\$450,968.21	\$335,220.96	\$381,417.66	\$134,101.83	\$8,631.58	\$1,190,085.52	\$1,559,647.58	\$1,244,484.80	\$591,028.70	\$721.82	\$90,364,014.83		Move Traffic	
Shoulder	\$4,077,848.62	\$3,444,500.06	\$259,373.08	\$94,391.92	\$633,307.60	\$156,360.81	\$170,461.71	\$125,329.11	\$393,650.71	\$216,824.33	\$195,097.66	\$145,307.49	\$85,720.89	\$59,458.91	\$9,942.23	\$41,179.61	\$239,593.31	\$325,787.41	\$257,223.21	\$4,610.19	\$10,935,968.86		Provide Refuge	
Median	\$18,356,246.49	\$4,646,497.25																			\$23,002,743.74		Separate Traffic	
Drainage	\$24,000,751.01	\$2,786,934.40		\$52,591.16	\$1,547,756.47	\$247,918.97	\$160,480.38	\$40,625.93	\$248,857.13	\$44,141.40	\$64,189.33	\$30,074.39	\$220,225.19	\$84,014.89	\$200,717.72		\$50,579.59	\$452,156.29	\$652,107.13	\$74,007.59	\$30,958,128.97		Remove Water	
Signing	\$572,347.60	\$572,347.60		\$24,828.65	\$88,186.26	\$13,995.13	\$364,512.63	\$714,788.12	\$54,926.65	\$22,720.91	\$27,990.26	\$13,995.13	\$12,941.26	\$8,725.78	\$12,941.26	\$123,927.54	\$23,774.78	\$25,882.52	\$38,823.78	\$7,671.91	\$2,725,327.77		Inform Motorists	
Lighting	\$4,661,870.36	\$1,720,666.50			\$83,527.50	\$16,705.50	\$67,214.79	\$112,024.65	\$37,341.55	\$37,341.55	\$200,466.00	\$292,346.25	\$175,407.75	\$25,058.25	\$167,055.00			\$41,763.75	\$200,466.00	\$200,466.00	\$8,039,721.40		Illuminate Roadway	
Landscaping	\$3,697,431.48	\$601,091.51	\$79,878.21	\$23,431.59	\$637,462.86	\$13,765.13	\$106,256.07	\$192,776.89	\$39,240.29	\$18,691.03	\$84,571.85	\$78,868.43	\$583,104.69	\$5,393.19	\$197,435.30	\$21,030.81	\$32,865.74	\$35,255.30	\$171,037.46	\$104,409.08	\$6,723,996.91		Beautify Roadway	
Bridges	\$105,736,936.26				\$35,846,455.64		\$3,071,801.72	\$11,424,627.98					\$3,655,188.29	\$3,407,881.72	\$37,897,858.45					\$7,395,226.11	\$5,327,166.10	\$225,174,831.97		Cross Obstacles
Retaining Walls	\$29,553,244.36				\$2,085,753.00		\$814,520.00						\$814,520.00	\$913,426.00						\$1,658,799.08	\$864,438.44	\$37,095,888.66		Minimize Right of Way
Signalization				\$837,458.28																		\$837,458.28		Control Traffic
ITS	\$901,380.00																					\$901,380.00		Provide Information
Architectural	\$3,000,000.00																					\$3,000,000.00		Enhance Aesthetics
<b>Subtotal</b>	<b>\$250,192,863.50</b>	<b>\$40,673,858.67</b>	<b>\$5,405,092.25</b>	<b>\$1,585,537.90</b>	<b>\$43,134,986.93</b>	<b>\$931,440.42</b>	<b>\$7,189,994.24</b>	<b>\$13,044,569.30</b>	<b>\$2,655,259.76</b>	<b>\$1,264,759.51</b>	<b>\$5,722,694.88</b>	<b>\$5,336,763.49</b>	<b>\$39,456,750.37</b>	<b>\$364,939.33</b>	<b>\$13,359,788.65</b>	<b>\$1,423,084.84</b>	<b>\$2,223,914.84</b>	<b>\$2,385,608.63</b>	<b>\$11,573,534.83</b>	<b>\$7,065,014.49</b>	<b>\$454,990,456.83</b>			
MOT (10%)	\$25,019,286.35	\$4,067,385.87	\$540,509.23	\$158,553.79	\$4,313,498.69	\$93,144.04	\$718,999.42	\$1,304,456.93	\$265,525.98	\$126,475.95	\$572,269.49	\$533,676.35	\$3,945,675.04	\$36,493.93	\$1,335,978.87	\$142,308.48	\$222,391.48	\$238,560.86	\$1,157,353.48	\$706,501.45	\$45,499,045.68		Maintain Traffic	
Mobilization (10%)	\$27,521,214.99	\$4,474,124.45	\$594,560.15	\$174,409.17	\$4,744,848.56	\$102,458.45	\$790,899.37	\$1,434,902.62	\$292,078.57	\$139,123.55	\$629,496.44	\$587,043.98	\$4,340,242.54	\$40,143.33	\$1,469,576.75	\$156,539.33	\$244,630.63	\$262,416.95	\$1,273,088.83	\$777,151.59	\$50,048,950.25		Mobilize Construction	
Contingency	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$7,500.00	\$150,000.00	Address Changes
Project Unknowns (15%)	\$45,410,004.73	\$7,382,305.35	\$981,024.24	\$287,775.13	\$7,829,000.13	\$169,056.44	\$1,304,983.95	\$2,367,589.33	\$481,929.65	\$229,553.85	\$1,038,669.12	\$968,622.57	\$7,161,400.19	\$66,236.49	\$2,424,801.64	\$258,289.90	\$403,640.54	\$432,987.97	\$2,100,596.57	\$1,282,300.13	\$82,580,767.91		Address Unforseen	
<b>Total Const. Cost</b>	<b>\$348,150,869.56</b>	<b>\$56,605,174.34</b>	<b>\$7,528,685.87</b>	<b>\$2,213,775.99</b>	<b>\$52,200,834.19</b>	<b>\$1,134,542.91</b>	<b>\$8,707,393.03</b>	<b>\$15,791,428.85</b>	<b>\$3,220,364.31</b>	<b>\$1,537,859.01</b>	<b>\$6,931,960.80</b>	<b>\$6,464,983.82</b>	<b>\$47,750,167.95</b>	<b>\$449,076.59</b>	<b>\$16,172,844.27</b>	<b>\$1,729,432.66</b>	<b>\$2,698,436.96</b>	<b>\$2,894,086.44</b>	<b>\$14,011,477.14</b>	<b>\$8,556,167.53</b>	<b>\$663,269,220.68</b>			
<b>Other Costs</b>																								
Right of Way																						\$36,515,500.00		Acquire space
<b>Total Costs</b>	<b>\$348,150,869.56</b>	<b>\$56,605,174.34</b>	<b>\$7,528,685.87</b>	<b>\$2,213,775.99</b>	<b>\$52,200,834.19</b>	<b>\$1,134,542.91</b>	<b>\$8,707,393.03</b>	<b>\$15,791,428.85</b>	<b>\$3,220,364.31</b>	<b>\$1,537,859.01</b>	<b>\$6,931,960.80</b>	<b>\$6,464,983.82</b>	<b>\$47,750,167.95</b>	<b>\$449,076.59</b>	<b>\$16,172,844.27</b>	<b>\$1,729,432.66</b>	<b>\$2,698,436.96</b>	<b>\$2,894,086.44</b>	<b>\$14,011,477.14</b>	<b>\$8,556,167.53</b>	<b>\$669,784,720.68</b>			

Reference: Preliminary Cost Estimate prepared by HNTB, dated April 14, 2016

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

Sequence	1	2	3	4	5	6	7	8	9	10	TOTALS	Function
Construction	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost		
Earthwork	\$29,891,227.76	\$1,913,153.76	\$279,978.00	\$60,915.68	\$2,050,683.84	\$2,752,123.60	\$953,041.68	\$546,400.00		\$42,400.00	\$38,489,924.32	Establish Grade
Roadway	\$31,949,185.20	\$17,562,557.52	\$4,591,086.48	\$1,109,672.54	\$8,329,580.92	\$4,134,589.58	\$5,059,740.81	\$2,913,480.73	\$1,024,317.14	\$936,111.94	\$77,610,322.86	Move Traffic
Shoulder	\$2,896,125.10	\$2,445,679.21			\$1,580,897.34	\$1,661,060.65	\$756,886.31	\$800,613.33	\$21,532.32	\$164,433.73	\$10,327,227.99	Provide Refuge
Median	\$9,179,566.13	\$1,501,465.81			\$1,622,464.36	\$1,249,471.13					\$13,552,967.43	Separate Traffic
Drainage	\$17,489,403.03	\$1,571,819.91			\$517,500.00	\$853,298.40	\$595,227.76	\$618,203.12	\$141,141.95	\$54,378.33	\$21,840,972.50	Remove Water
Signing	\$398,986.61	\$398,986.61			\$354,822.51	\$271,897.46	\$102,181.39	\$105,343.00	\$29,044.13	\$12,941.26	\$1,674,202.97	Inform Motorists
Lighting	\$1,552,800.20	\$299,887.70				\$299,887.70	\$1,287,820.40				\$3,440,396.00	Illuminate Roadway
Landscaping	\$8,230,793.08	\$385,403.26	\$73,065.97	\$17,558.82	\$247,820.08	\$620,882.85	\$161,108.83	\$112,162.78	\$72,238.15		\$9,921,033.82	Beautify Roadway
Bridges	\$432,910,890.17					\$28,440,984.86	\$1,171,170.00		\$3,193,301.72	\$33,607.82	\$465,749,954.57	Cross Obstacles
Retaining Walls	\$19,829,076.68				\$2,065,390.00	\$1,728,876.88	\$814,520.00	\$2,493,478.44			\$26,931,342.00	Minimize Right of Way
Signalization									\$406,539.38	\$1,030,256.32	\$1,436,795.70	Control Traffic
ITS	\$622,278.00										\$622,278.00	Provide Information
Architectural	\$2,000,000.00										\$2,000,000.00	Enhance Aesthetics
<b>Subtotal</b>	<b>\$556,950,331.96</b>	<b>\$26,078,953.78</b>	<b>\$4,944,130.45</b>	<b>\$1,188,147.04</b>	<b>\$16,769,159.05</b>	<b>\$42,013,073.11</b>	<b>\$10,901,697.18</b>	<b>\$7,589,681.40</b>	<b>\$4,888,114.79</b>	<b>\$2,274,129.40</b>	<b>\$673,597,418.16</b>	
MOT (10%)	\$55,695,033.20	\$2,607,895.38	\$494,413.05	\$118,814.70	\$1,676,915.91	\$4,201,307.31	\$1,090,169.72	\$758,968.14	\$488,811.48	\$227,412.94	\$67,359,741.82	Maintain Traffic
Mobilization (10%)	\$61,264,536.52	\$2,868,684.92	\$543,854.35	\$130,696.17	\$1,844,607.50	\$4,621,438.04	\$1,199,186.69	\$834,864.95	\$537,692.63	\$250,154.23	\$74,095,716.00	Mobilize Construction
Contingency	\$15,000.00	\$15,000.00	\$15,000.00	\$15,000.00	\$15,000.00	\$15,000.00	\$15,000.00	\$15,000.00	\$15,000.00	\$15,000.00	\$150,000.00	Address Changes
Project Unknowns (15%)	\$101,086,485.25	\$4,733,330.11	\$897,359.68	\$215,648.69	\$3,043,602.37	\$7,625,372.77	\$1,978,658.04	\$1,377,527.17	\$887,192.83	\$412,754.49	\$122,257,931.40	Address Unforeseen
<b>Total Const. Cost</b>	<b>\$775,011,386.92</b>	<b>\$36,303,864.18</b>	<b>\$6,894,757.52</b>	<b>\$1,668,306.61</b>	<b>\$20,305,682.45</b>	<b>\$50,850,818.46</b>	<b>\$13,206,053.59</b>	<b>\$9,198,514.49</b>	<b>\$5,929,618.90</b>	<b>\$2,766,696.57</b>	<b>\$937,460,807.37</b>	
<b>Other Costs</b>												
Right of Way											\$228,617,000.00	Acquire space
<b>Total Costs</b>	<b>\$775,011,386.92</b>	<b>\$36,303,864.18</b>	<b>\$6,894,757.52</b>	<b>\$1,668,306.61</b>	<b>\$20,305,682.45</b>	<b>\$50,850,818.46</b>	<b>\$13,206,053.59</b>	<b>\$9,198,514.49</b>	<b>\$5,929,618.90</b>	<b>\$2,766,696.57</b>	<b>\$1,166,077,807.37</b>	

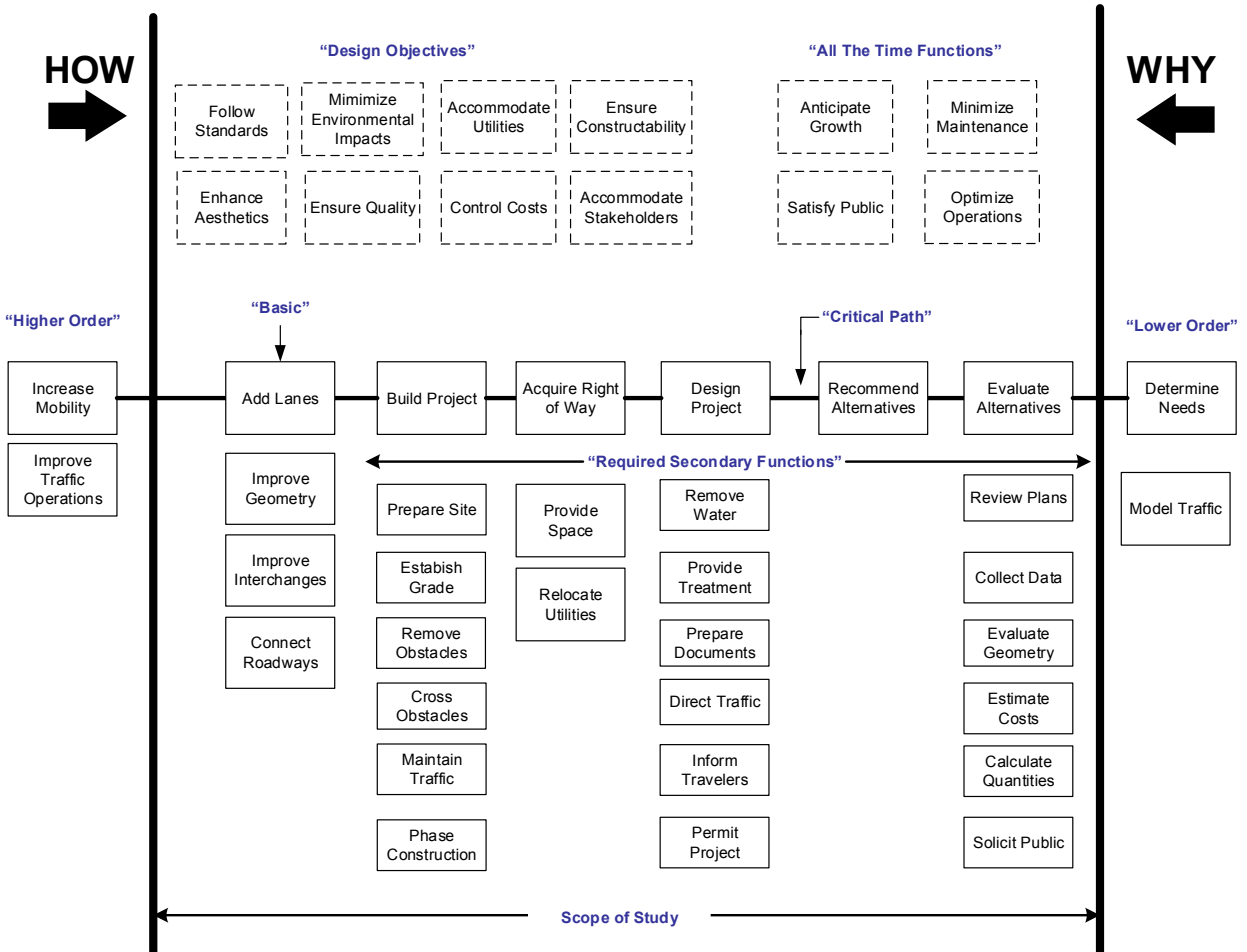
Reference: Preliminary Cost Estimate, prepared by HNTB, provided April 14, 2016

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 CR 532 to Central Florida Parkway**



## 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 Schedule Impacts, 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 12 creative ideas and 11 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, May 25, 2016. 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 12 ideas and the 10 ideas that emerged during mid-point review and development, with the ideas that survived the evaluation, analysis and development phases of the study becoming viable recommendations for value improvements.

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	Schedule Impacts	Utility Impacts	Environmental	Future Maintenance	Constructability
<b>Original Concept</b>										
	PD&E Documents for I-4 from Polk County Line to east of Central Florida Parkway	3	3	3	3	3	3	3	3	3
<b>Mainline (Access Interstate)</b>										
1	From SR 429 to World Drive leave the express lanes at ground level and elevate the GULs on centric columns	3	3	3	4	3.5	3	3	4.5	4
2	The C-D road between Daryl Carter Parkway and Central Florida Parkway can be brought closer together to shorten the lanes	3.25	3.25	3	3	3	3	3	3	3
<b>Right of Way (Provide Space)</b>										
3	Use early right of way acquisition of Crossroads and move to design-build-finance concept of delivery	3.75	4	3	3	4.5	3	3	3	3
<b>SR429 Interchange (Connect Roadways)</b>										
4	Straighten the express to toll eastbound to northbound ramp at SR 429 to shorten the ramp and expand 106A pond	3.25	3	3	3	3.1	3	3.25	3.25	3.25
<b>Osceola Parkway Interchange (Connect Roadways)</b>										
5	Don't realign Bonnet Creek and reconstruct bridges in the current locations	4.5	4	3	4	4	3	4	5	4
6	Raise the Parkway bridges profile to allow construction of the I-4 bridges with Bonnet Creek at it's current location and lower the high speed rail to grade	4	4	3	4	4	3	4	4	4
<b>SR 535 Interchange (Connect Roadways)</b>										
7	Continue two lanes of SR 535 on structure for left turn flyover to SR 535 northbound on SR 535 past the Grand Cypress intersection	2.75	4	3.5	2.5	3.1	3	4	2.75	2.5
8	Flip the westbound I-4 exit ramps to SR 535 to shorten the lanes	3.5	3	3	3	3.25	3	3	3.5	3.5
<b>Daryl Carter Parkway Interchange (Connect Roadways)</b>										
9	Put a roundabout at Daryl Carter and Palm Parkway	3	3	3.5	3	3	3	3	3	2.75
10	Eliminate the right turn movement for the westbound I-4 exit ramp to Daryl Carter and create a new Palm Parkway exit and intersection 2,500 feet east of the Daryl Carter bridge	2.75	3	3.5	3	3	3	2.9	2.75	2.75
11	Consider a flyover for the westbound off ramp to Palm Parkway southbound									
<b>Central Florida Parkway Interchange (Connect Roadways)</b>										
12	The exit ramp starting west of Daryl Carter Parkway could be shortened to approximately 1,300 ft by exiting approximately 5,000 feet east of the Daryl Carter Parkway bridge	4	4	2.75	3.25	3.5	3	3.5	3.5	4

**TABLE 6.1 –2  
Value Engineering Study Weighted Values**

Capital Costs	R/W Impacts	LOS	Maintenance of Traffic	Schedule Impacts	Utility Impacts	Environmental	Future Maintenance	Constructability
<b>7</b>	<b>6</b>	<b>9</b>	<b>5</b>	<b>2</b>	<b>8</b>	<b>1</b>	<b>4</b>	<b>3</b>

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

Idea No.	Ideas	Capital Costs	R/W Impacts	LOS	Maintenance of Traffic	Schedule Impacts	Utility Impacts	Environmental	Future Maintenance	Constructability	TOTAL	FHWA CATEGORIES				
												Safety	Construction	Operations	Environment	Other
<b>Original Concept</b>																
	PD&E Documents for I-4 from Polk County Line to east of Central Florida Parkway	21	18	27	15	6	24	3	12	9	<b>135</b>					
<b>Mainline (Access Interstate)</b>																
1	From SR 429 to World Drive leave the express lanes at ground level and elevate the GULs on centric columns	21	18	27	20	7	24	3	18	12	<b>150</b>		X	X		
2	The C-D road between Daryl Carter Parkway and Central Florida Parkway can be brought closer together to shorten the lanes	22.75	19.5	27	15	6	24	3	12	9	<b>138.25</b>	X	X		X	
<b>Right of Way (Provide Space)</b>																
3	Use early right of way acquisition of Crossroads and move to design-build-finance concept of delivery	26.25	24	27	15	9	24	3	12	9	<b>149.25</b>		X			X
<b>SR429 Interchange (Connect Roadways)</b>																
4	Straighten the express to toll eastbound to northbound ramp at SR 429 to shorten the ramp and expand 106A pond	22.75	18	27	15	6.2	24	3.25	13	9.75	<b>138.95</b>	X	X		X	
<b>Osceola Parkway Interchange (Connect Roadways)</b>																
5	Don't realign Bonnet Creek and reconstruct bridges in the current locations	31.5	24	27	20	8	24	4	20	12	<b>170.5</b>		X		X	X
6	Raise the Parkway bridges profile to allow construction of the I-4 bridges with Bonnet Creek at it's current location and lower the high speed rail to grade	28	24	27	20	8	24	4	16	12	<b>163</b>	X	X		X	X
<b>SR 535 Interchange (Connect Roadways)</b>																
7	Continue two lanes of SR 535 on structure for left turn flyover to SR 535 northbound on SR 535 past the Grand Cypress intersection	19.25	24	31.5	12.5	6.2	24	4	11	7.5	<b>139.95</b>	X		X	X	
8	Flip the westbound I-4 exit ramps to SR 535 to shorten the lanes	24.5	18	27	15	6.5	24	3	14	10.5	<b>142.5</b>	X	X			
<b>Daryl Carter Parkway Interchange (Connect Roadways)</b>																
9	Put a roundabout at Daryl Carter and Palm Parkway	21	18	31.5	15	6	24	3	12	8.25	<b>138.75</b>	X		X		
10	Eliminate the right turn movement for the westbound I-4 exit ramp to Daryl Carter and create a new Palm Parkway exit and intersection 2,500 feet east of the Daryl Carter bridge	19.25	18	31.5	15	6	24	2.9	11	8.25	<b>135.9</b>	X		X		
11	Consider a flyover for the westbound off ramp to Palm Parkway southbound	0	0	0	0	0	0	0	0	0	<b>0</b>					
<b>Central Florida Parkway Interchange (Connect Roadways)</b>																
12	The exit ramp starting west of Daryl Carter Parkway could be shortened to approximately 1,300 ft by exiting approximately 5,000 feet east of the Daryl Carter Parkway bridge	28	24	24.75	16.25	7	24	3.5	14	12	<b>153.5</b>		X		X	X

## RECOMMENDATIONS

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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 Long Range Estimating (LRE) System cost estimates prepared by HNTB 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.

### 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. 2: The C-D road between Daryl Carter Parkway and Central Florida Parkway can be brought closer together to shorten the lanes**

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**Proposed Alternative:**

The PD&E Documents show the westbound Collector-Distributor road on the north side of the mainline jogging away from the mainline and into a curve between Daryl Carter Parkway and Central Florida Parkway.

**VE Alternative:**

Construct the westbound Collector-Distributor road closer to the mainline and eliminate the jog.

**Advantages :**

- Slightly less construction cost
- Eliminates a horizontal curve
- Less right-of-way
- Less environmental impact

**Disadvantages:**

- None apparent

**FHWA CATEGORIES**

X  Safety     X  Construction    \_\_\_ Operations     X  Environment    \_\_\_ Other

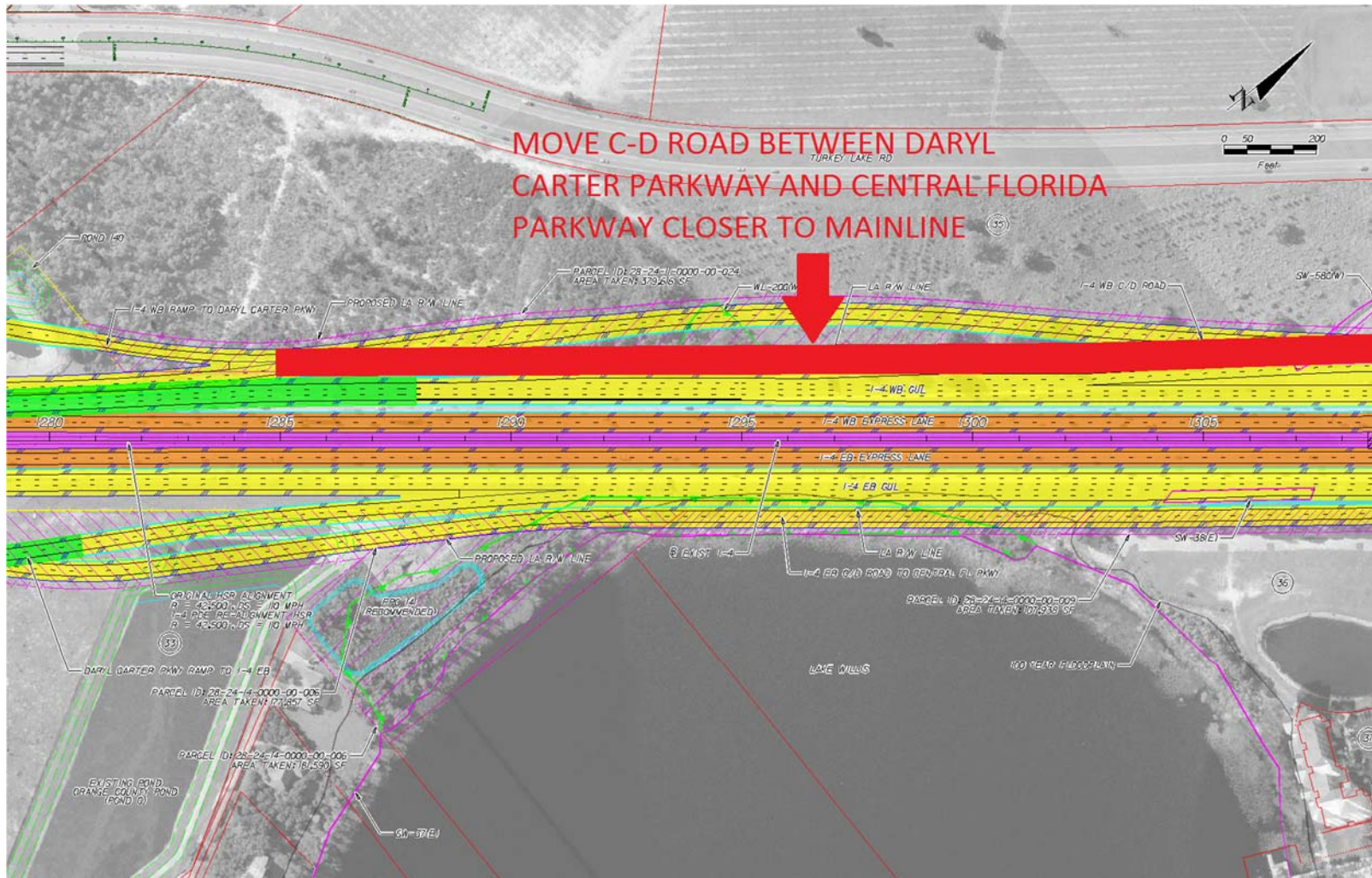
**Potential Cost Savings: \$2,608,000**

**Calculations:**

Description	Quantity	Unit	Unit Price	Extended Amount
Earthwork Component	-1	LS	\$1,200.00	(\$1,200)
Roadway Component	-1	LS	\$6,200.00	(\$6,200)
Shoulder Component	-1	LS	\$1,700.00	(\$1,700)
Drainage Component	-1	LS	\$1,300.00	(\$1,300)
<b>Subtotal</b>				(\$10,400)
MOT (10%)				(\$1,040)
Mobilization (10%)				(\$1,144)
<b>Subtotal</b>				(\$12,584)
Project Unknowns (15%)				(\$1,560)
			<b>CONSTRUCTION TOTAL</b>	<b>(\$14,144)</b>

**Potential Right of Way Savings: -\$2,594,000**

**RECOMMENDATION No. 2: The C-D road between Daryl Carter Parkway and Central Florida Parkway can be brought closer together to shorten the lanes**



**RECOMMENDATION No. 3: Use early right of way acquisition of Crossroads and move to design-build-finance concept of delivery**

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**Proposed Alternative:**

The PD&E Documents show the Crossroads commercial area right of way acquisition in 2024 and construction letting in 2025. The proposed delivery method is Design-Build.

**VE Alternative:**

Implement early acquisition of right of way for the Crossroads commercial area and convert to Design-Build-Finance delivery of the project. Construction can be moved up to 2018. This concept builds the project with current pricing and avoids escalation costs into 2025 dollars.

Right of way cost is considered to remain the same and is not escalated to provide a conservative approach to the recommendation.

**Advantages:**

- Less capital cost
- Potentially less future right of way cost
- Minimizes change orders

**Disadvantages:**

- None apparent

**FHWA CATEGORIES**

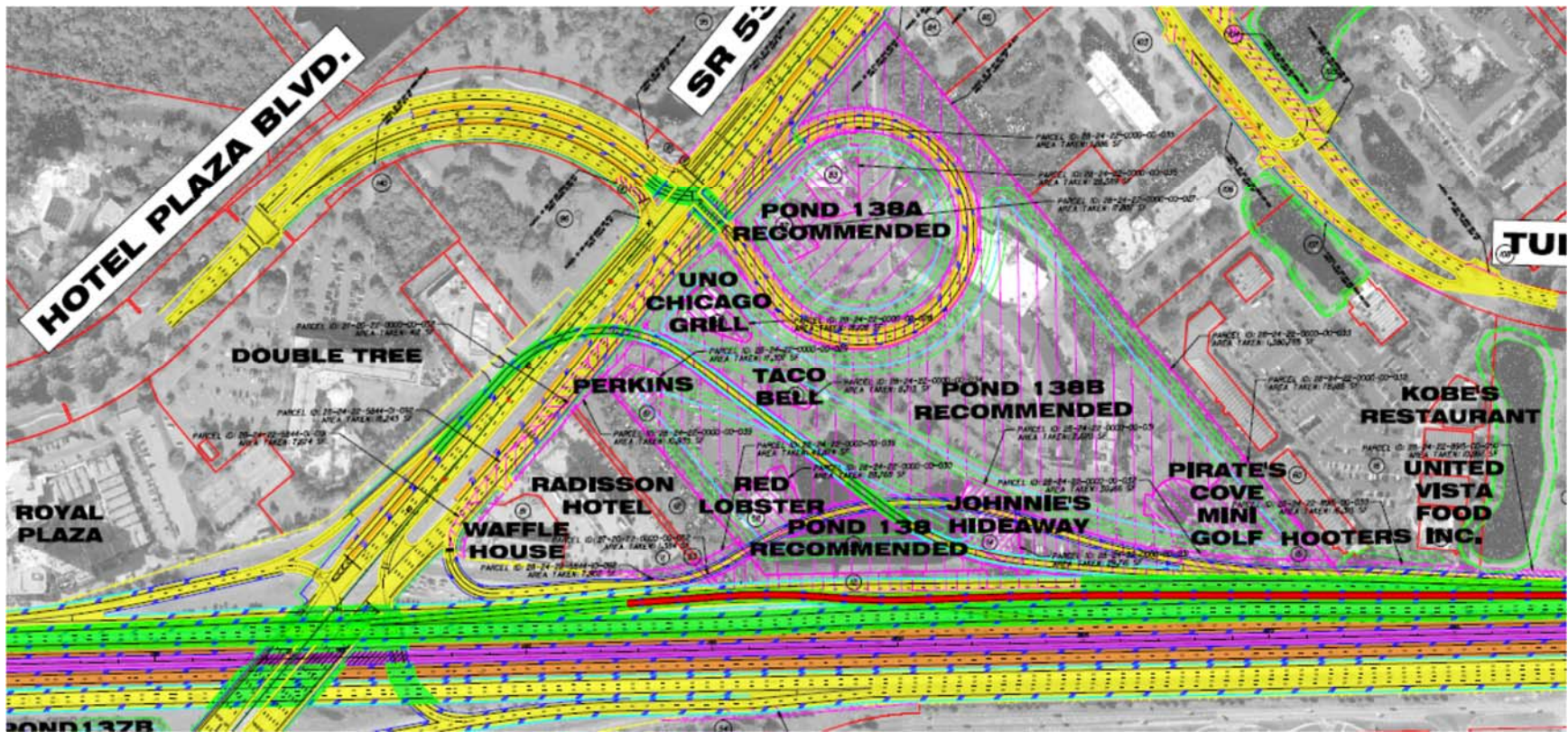
   Safety      X   Construction       Operations       Environment      X   Schedule

**Potential Cost Savings: \$233,545,000 to \$361,070,000**

**Calculations:**

<b>Escalation</b>	<b>3%</b>			<b>2%</b>	
<b>Year</b>	<b>Cost</b>		<b>Year</b>	<b>Cost</b>	
2018	\$1,570,730,000		2018	\$1,570,730,000	
2019	\$1,617,851,900		2019	\$1,602,144,600	
2020	\$1,666,387,457		2020	\$1,634,187,492	
2021	\$1,716,379,081		2021	\$1,666,871,242	
2022	\$1,767,870,453		2022	\$1,700,208,667	
2023	\$1,820,906,567		2023	\$1,734,212,840	
2024	\$1,875,533,764		2024	\$1,768,897,097	
2025	\$1,931,799,777		2025	\$1,804,275,039	
<b>Added Cost</b>	<b>\$361,069,777</b>	<b>23.0%</b>		<b>\$233,545,039</b>	<b>14.9%</b>

**RECOMMENDATION No. 3: Use early right of way acquisition of Crossroads and move to design-build-finance concept of delivery**



**RECOMMENDATION No. 4: Straighten the express to toll eastbound to northbound ramp at SR 429 to shorten the ramp and expand 106A pond**

---

**Proposed Alternative:**

The PD&E Documents show the eastbound express lane going over the general use eastbound lanes (around Station 716+00 to Station 720+50) and circumventing around the outside (south side around 720+50 to 730+00) of the Pond 106A to connect to the northbound SR 429 toll road.

**VE Alternative:**

Construct a linear connection from the eastbound express lane to northbound SR 429 toll road. The recommendation to straighten the express lane to toll road will decrease the roadway length and have the roadway passing around the north side of Pond 106A. By proposing the straightened connection there will be larger area to construct a larger pond if needed.

**Advantages :**

- Less material cost, given ideal situation
- Easier concept to construct
- Adds storage volume of the pond adjacent to the roadway
- Easier accessibility and maintenance
- Promotes direct connection between express lane to toll road
- Use pond excavation for multiple phases of construction (i.e., embankment)

**Disadvantages:**

- None apparent

**FHWA CATEGORIES**

Safety     Construction     Operations     Environment     Other

**Potential Cost Savings: \$914,000**

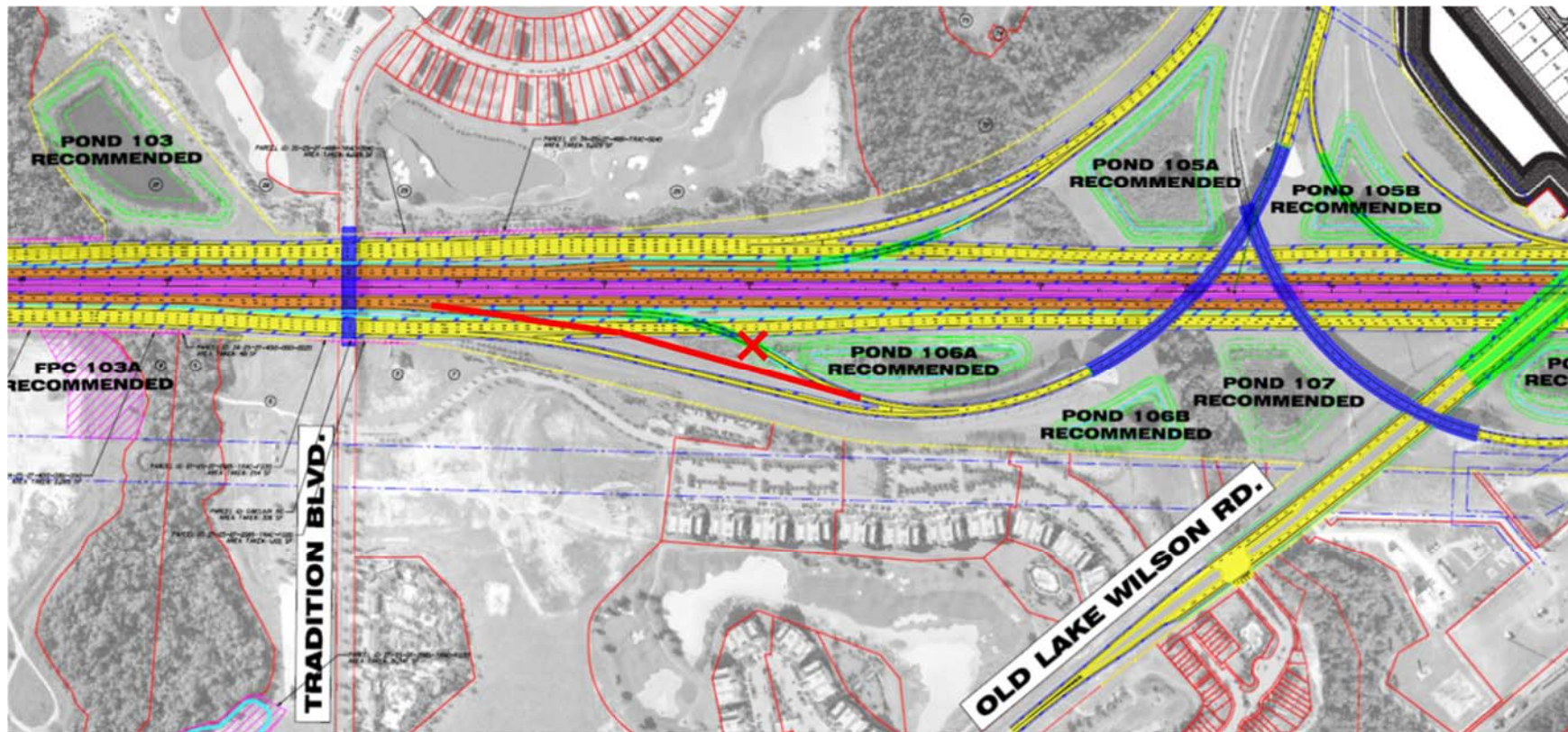
**RECOMMENDATION No. 4: Straighten the express to toll eastbound to northbound ramp at SR 429 to shorten the ramp and expand 106A pond**

**Calculations:**

Description	Quantity	Unit	Unit Price	Extended Amount
Bridge Section	2,880	SF	\$204.22	\$588,154
Clearing and Grubbing	1	AC	\$10,000.00	\$7,000
Type B Stabilization	3,311	SY	\$3.25	\$10,761
Optional Base Group 12	3,311	SY	\$20.00	\$66,220
Superpave TL-E	820	TN	\$97.88	\$80,262
Friction FC-5	133	TN	\$249.61	\$33,198
Pavement Marking	0	NM	\$908.42	\$273
Thermoplastic	0	NM	\$3,138.35	\$942
Embankment	2,264	CY	\$8.00	\$18,109
Clearing and Grubbing	-1	AC	\$10,000.00	(\$5,500)
Type B Stabilization	-2,580	SY	\$3.25	(\$8,385)
Optional Base Group 12	-2,580	SY	\$20.00	(\$51,600)
Superpave TL-E	-639	TN	\$97.88	(\$62,501)
Friction FC-5	-103	TN	\$249.61	(\$25,760)
Pavement Marking	0	NM	\$908.42	(\$73)
Thermoplastic	0	NM	\$3,138.35	(\$251)
<b>Subtotal</b>				\$672,134
MOT (10%)				\$67,213
Mobilization (10%)				\$73,935
<b>Subtotal</b>				\$813,283
Project Unknowns (15%)				\$100,820
			<b>CONSTRUCTION TOTAL</b>	<b>\$914,103</b>

**RECOMMENDATION No. 4: Straighten the express to toll eastbound to northbound ramp at SR 429 to shorten the ramp and expand 106A pond**

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**RECOMMENDATION No. 5: Do not realign Bonnet Creek at Osceola Parkway, reconstruct bridges in the current locations**

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**Proposed Alternative:**

The PD&E Documents show realignment of Bonnet Creek with new larger skewed I-4 bridges crossing the Bonnet Creek realignment and additional bridges on Osceola Parkway also to span realigned Bonnet Creek.

**VE Alternative:**

Replace I-4 bridges in current location without Bonnet Creek realignment.

**Advantages :**

- Less cost, shorter I-4 bridges due to orientation and agreements that take affect with Bonnet Creek realignment.
- Less cost due to elimination of at least two bridges on Osceola Parkway
- Less time, removes need to excavate for realignment of Bonnet Creek
- Eliminates filling abandoned areas of Bonnet Creek
- Eliminates pond 130A with no right of way acquisition needed
- Drastically reduces impact to ponds 130 and SMA-M

**Disadvantages:**

- Increased complexity in phasing construction
- Construction is confined by vertical clearance
- Foundation options are reduced

**FHWA CATEGORIES**

Safety     Construction     Operations     Environment     Right of Way

**Potential Cost Savings: \$56,044,000**

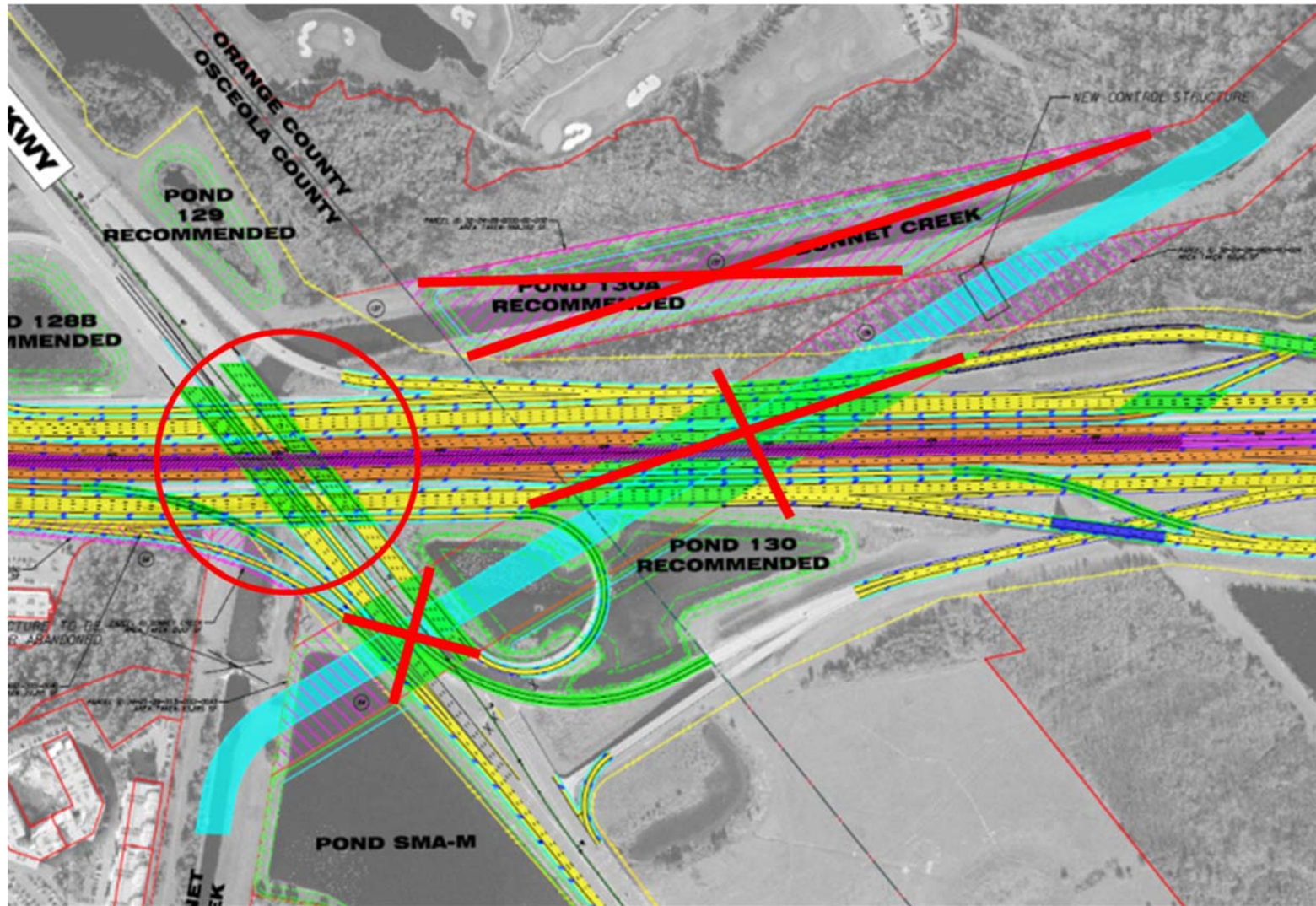
**Calculations:**

Description	Quantity	Unit	Unit Price	Extended Amount
Shorter bridges over Bonnet Cr.	-134,400	SF	\$170.66	(\$22,936,704)
Delete 2 Bridges, Oceaola Parkway	-75,000	SF	\$120.00	(\$9,000,000)
Embankment	-78,361	CY	\$8.00	(\$626,889)
Excavation	-139,028	CY	\$4.50	(\$625,625)
MSE wall	12,000	SF	\$29.09	\$349,080
<b>Subtotal</b>				(\$32,840,138)
MOT (10%)				(\$3,284,014)
Mobilization (10%)				(\$3,612,415)
<b>Subtotal</b>				(\$39,736,567)
Project Unknowns (15%)				(\$4,926,021)
			<b>CONSTRUCTION TOTAL</b>	<b>(\$44,662,588)</b>

**Potential Right of Way Savings: \$11,381,000**



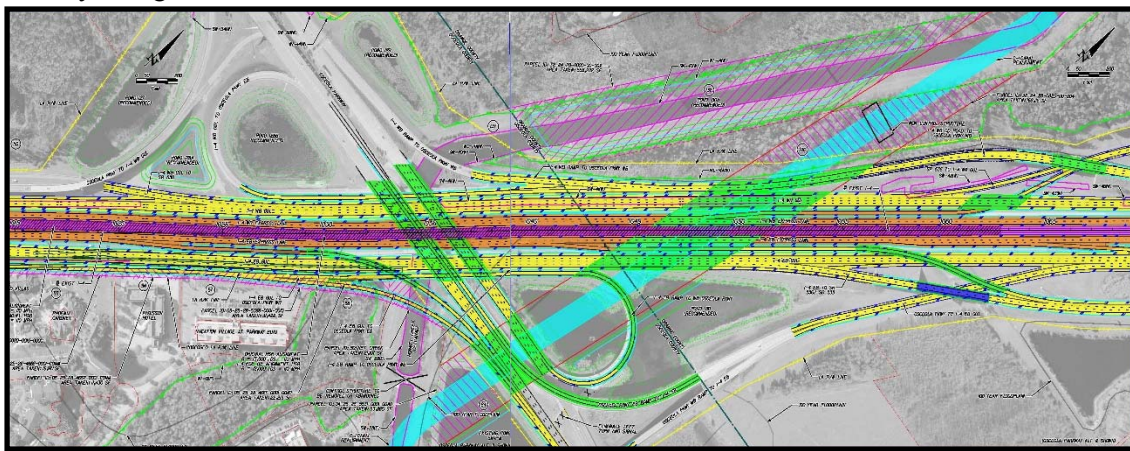
**RECOMMENDATION No. 5: Do not realign Bonnet Creek at Osceola Parkway, reconstruct bridges in the current locations**



**RECOMMENDATION No. 6: Raise the Parkway bridges profile to allow construction of the I-4 bridges with Bonnet Creek at its current location and lower the high speed rail to grade**

**Proposed Alternative:**

The PD&E Documents show the re-alignment of Bonnet Creek east of the interchange of I-4 and the Osceola Parkway. Bonnet Creek is skewed across I-4 and the ramps for Osceola Parkway where it reconnects to the existing Bonnet Creek. The location of the re-alignment of Bonnet Creek was coordinated with the Reedy Creek Improvement District (RCID) and only the concept shown below was approved. The bridges on I-4 are proposed to span right of way to right of way (300 feet). A control structure within the Creek will be relocated to the north side of I-4. The PD&E requires the construction of new skewed bridges over I-4, the loop ramp of Osceola Parkway and two new bridges on Osceola Parkway east of I-4. Due to the widening of I-4, the Osceola bridges will need to be reconstructed and lengthened. The proposed current clearance between I-4 and the Osceola Parkway Bridges is 23'-5".



**VE Alternative:**

Leave Bonnet Creek in its current configuration where it flows under I-4 and the Osceola Parkway. This will require widening or reconstruction of the two I-4 bridges and the ramp bridges under the Osceola Parkway. However, this alternative also eliminates the need for the re-aligned channel, two skewed bridges on I-4 and two new bridges on the Osceola Parkway located east of I-4. The impacts to the existing stormwater ponds will be minimized and Pond 130A could be eliminated. This will eliminate the long skewed bridges along I-4 which are difficult to maintain. Parcels 136 and 137 in Orange County and parcel 84 in Osceola County will not need to be acquired for the re-located channel saving \$11,381,000 in right of way costs. See photos of the I-4 bridges over Bonnet Creek below:

**I-4 Bridge #920100**



**I-4 Bridge #920101**



**RECOMMENDATION No. 6: Raise the Parkway bridges profile to allow construction of the I-4 bridges with Bonnet Creek at its current location and lower the high speed rail to grade**

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This alternative differs from Alternative No. 5 by also raising the profile of the bridges over the Osceola Parkway to add more vertical clearance for construction and maintenance of the I-4 bridges over Bonnet Creek. This will also allow the future high speed rail to be constructed at grade instead of over the Osceola Parkway. This alternative will also require reconstruction and lengthening of the two Osceola Parkway Bridges and some changes along Osceola Parkway to tie down due to the increased profile.

**Advantages:**

- Less costly construction
- Reduces right of way costs
- Less maintenance due to the skewed bridges and loop ramp bridge
- Easier Maintenance of Traffic
- Reduced impact to the existing stormwater ponds
- Less permitting effort
- Less future cost for the high speed rail

**Disadvantages:**

- More complicated construction due to the I-4 bridges under Osceola Parkway
- Reduced bridge foundation options for Osceola Parkway bridges

**FHWA CATEGORIES**

X Safety    X Construction       Operations    X Environment    X Right of Way

**Potential Cost Savings: \$52,014,000\***

**\*Future Rail Savings not included**

**Calculations:**

Description	Quantity	Unit	Unit Price	Extended Amount
Shorter bridges over Bonnet Ck	-134,400	SF	\$170.66	(\$22,936,704)
Delete 2 bridges Osceola Pkwy	-75,000	SF	\$120.00	(\$9,000,000)
Lengthen Osceola Bridges	16,000	SF	\$170.66	\$2,730,560
MSE wall Osceola Parkway	20,000	SF	\$29.09	\$581,800
Embankment	-78,361	CY	\$8.00	(\$626,889)
Excavation	-139,028	CY	\$4.50	(\$625,625)
<b>Subtotal</b>				(\$29,876,858)
MOT (10%)				(\$2,987,686)
Mobilization (10%)				(\$3,286,454)
<b>Subtotal</b>				(\$36,150,998)
Project Unknowns (15%)				(\$4,481,529)
			<b>CONSTRUCTION TOTAL</b>	<b>(\$40,632,527)</b>

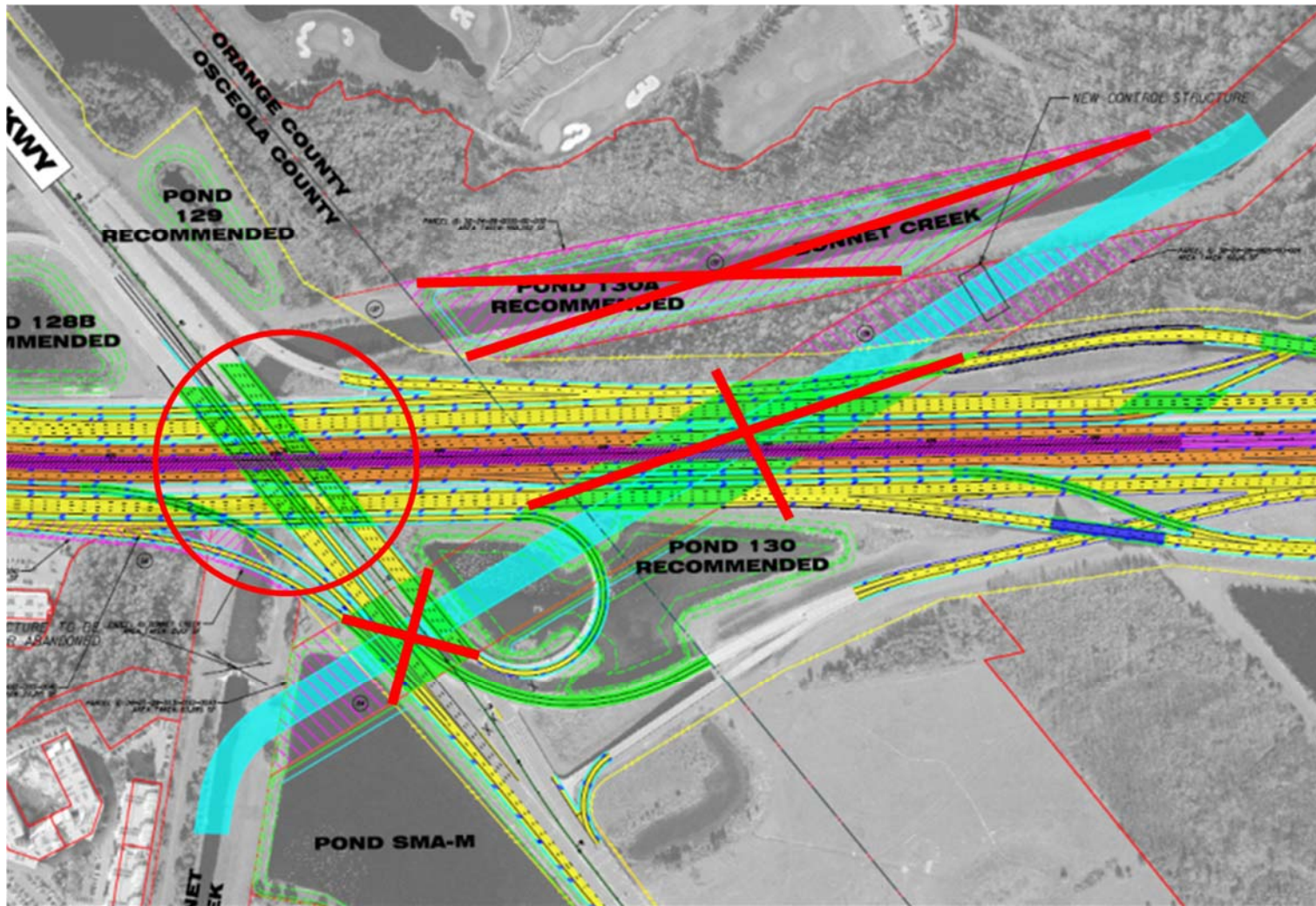
**RECOMMENDATION No. 6: Raise the Parkway bridges profile to allow construction of the I-4 bridges with Bonnet Creek at its current location and lower the high speed rail to grade**

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Potential Right of Way Savings:

Parcel 136 (Orange County) =	\$1,754,000
Parcel 137 (Orange County) =	\$6,985,000
Parcel 84 (Osceola County) =	<u>\$2,642,000</u>
<b>Total Potential Right of Way Savings:</b>	<b>\$11,381,000</b>

**RECOMMENDATION No. 6: Raise the Parkway bridges profile to allow construction of the I-4 bridges with Bonnet Creek at its current location and lower the high speed rail to grade**



**RECOMMENDATION No. 7: Continue two lanes of SR 535 on structure for left turn flyover to SR 535 northbound on SR 535 past the Grand Cypress intersection**

**Proposed Alternative:**

The PD&E Documents show that all left turn movements at the SR 535 and Palm Parkway intersection will be prohibited. In order to make left turns, a new roadway was constructed at the Vinings Way Boulevard intersection connecting CR 435 with SR 535.



**VE Alternative:**

Construct a flyover for the SR 535 northbound to westbound left turn movement. Include left turn lanes at the SR 535/Palm Parkway intersection.

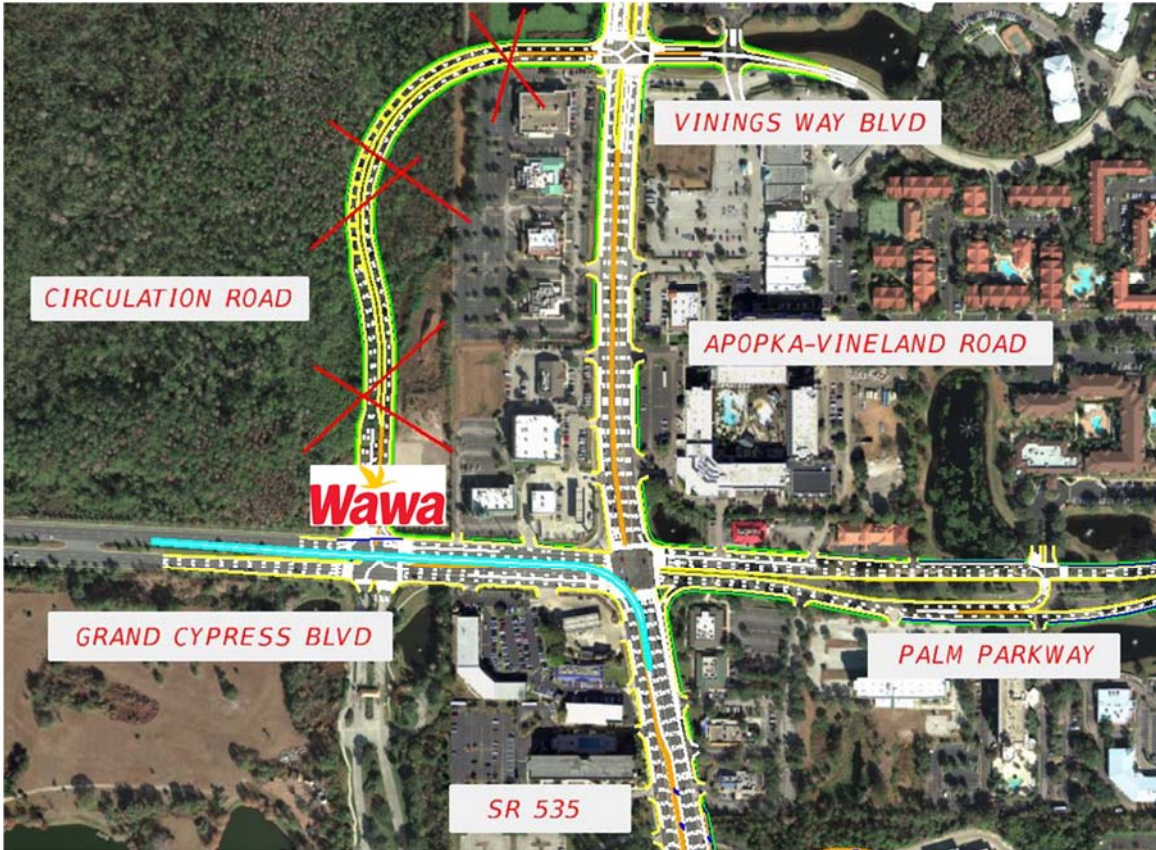
**Advantages**

- Eliminate the new circulation roadway connecting CR 435 with SR 535.
- Avoid impacting the recent construction of a WaWa gas station and a restaurant.
- Provide free flow movement for SR 535 northbound traffic.
- Eliminates all environmental impacts associated with the circulation road including floodplain compensation.

**Disadvantages:**

- Adds cost.

**RECOMMENDATION No. 7: Continue two lanes of SR 535 on structure for left turn flyover to SR 535 northbound on SR 535 past the Grand Cypress intersection**



**FHWA CATEGORIES**

Safety     Construction     Operations     Environment     Other

Potential Value Added: **(\$3,283,000)**

**Calculations:**

Description	Quantity	Unit	Unit Price	Extended Amount
Embankment	28,000	CY	\$8.00	\$224,000
MSE Wall	26,500	SF	\$29.09	\$770,885
Bridge	39,000	SF	\$185.00	\$7,215,000
Roadway	-10,133	SY	\$225.00	<b>(\$2,279,925)</b>
<b>Subtotal</b>				\$5,929,960
MOT (10%)				\$592,996
Mobilization (10%)				\$652,296
<b>Subtotal</b>				\$7,175,252
Project Unknowns (15%)				\$889,494
			<b>CONSTRUCTION TOTAL</b>	<b>\$8,064,746</b>

Potential right of way savings: \$4,782,000

**RECOMMENDATION No. 8: Flip the westbound I-4 exit ramps to SR 535 to shorten the lanes**

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**Proposed Alternative:**

The PD&E Documents show I-4 westbound General Use Lane-Ramp to the new Collector-Distributor Road to access SR 535 northbound and southbound. The exit ramp to SR 535 has the northbound traffic under a bridge braid that carries traffic southbound.

**VE Alternative:** Shift the exit ramp to SR 535 southbound [Flyover] slightly to the north quadrant using the furthest right exit lane from I-4. I-4 westbound Collector-Distributor Ramp to SR 535 northbound will travel parallel to I-4 westbound General Use Lane Ramp to SR 535 northbound.

**Advantages :**

- Less cost by eliminating the bridge
- Less maintenance
- Less construction phase
- Less impact on schedule

**Disadvantages:**

- Needs proper signs to direct drivers
- Continuous concrete barrier wall

**FHWA CATEGORIES**

X Safety    X Construction    X Operation    X Environment    \_\_\_ Other

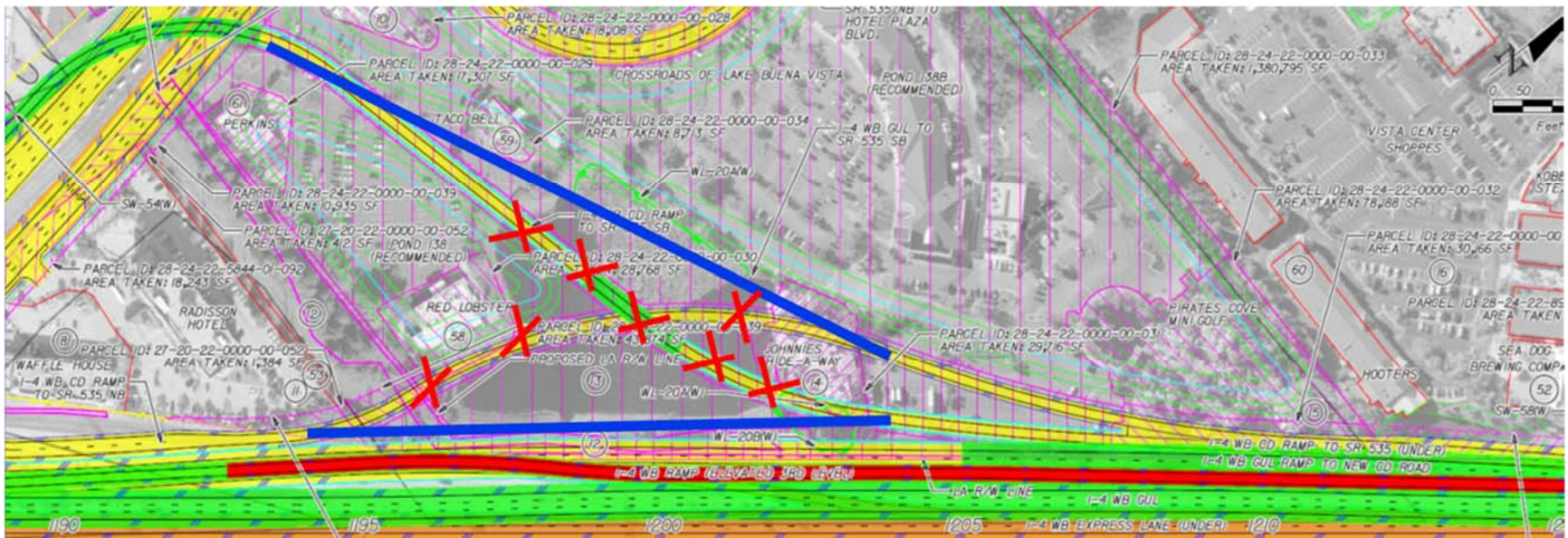
**Potential Cost Savings: \$4,433,000**

**Calculations:**

Description	Quantity	Unit	Unit Price	Extended Amount
Embankment	-2,400	CY	\$8.00	(\$19,200)
Type B Stabilization	-800	SF	\$3.25	(\$2,600)
Op. Base Group 12	-800	SF	\$20.00	(\$16,000)
SUPER pav. Asph Conc.	-265	TN	\$97.88	(\$25,938)
Asph Conc FC	-70	TN	\$142.31	(\$9,962)
Eliminate 600 Ft Bridge [Flyover]	-15,600	SF	\$204.22	(\$3,185,832)
<b>Subtotal</b>				(\$3,259,532)
MOT (10%)				(\$325,953)
Mobilization (10%)				(\$358,549)
<b>Subtotal</b>				(\$3,944,034)
Project Unknowns (15%)				(\$488,930)
			<b>CONSTRUCTION TOTAL</b>	<b>(\$4,432,963)</b>



**RECOMMENDATION No. 8: Flip the westbound I-4 exit ramps to SR 535 to shorten the lanes**



**RECOMMENDATION No. 9: Put a roundabout at Daryl Carter and Palm Parkway**

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**Proposed Alternative:**

The PD&E Documents show an existing signalized intersection for the above roadways. However, there is not a lot of queue length for the left-turning vehicles from westbound Daryl Carter Parkway to southbound Palm Parkway.

**VE Alternative:**

Construct a roundabout in lieu of a signalized intersection at the above roadways. This will improve the interchange operation for traffic exiting westbound I-4 turning right onto Daryl Carter and wanting to turn southbound onto Palm Parkway.

**Advantages :**

- Increased Level of Service

**Disadvantages:**

- Increased construction cost
- Increased right-of-way

**FHWA CATEGORIES**

Safety     Construction     Operations     Environment     Other

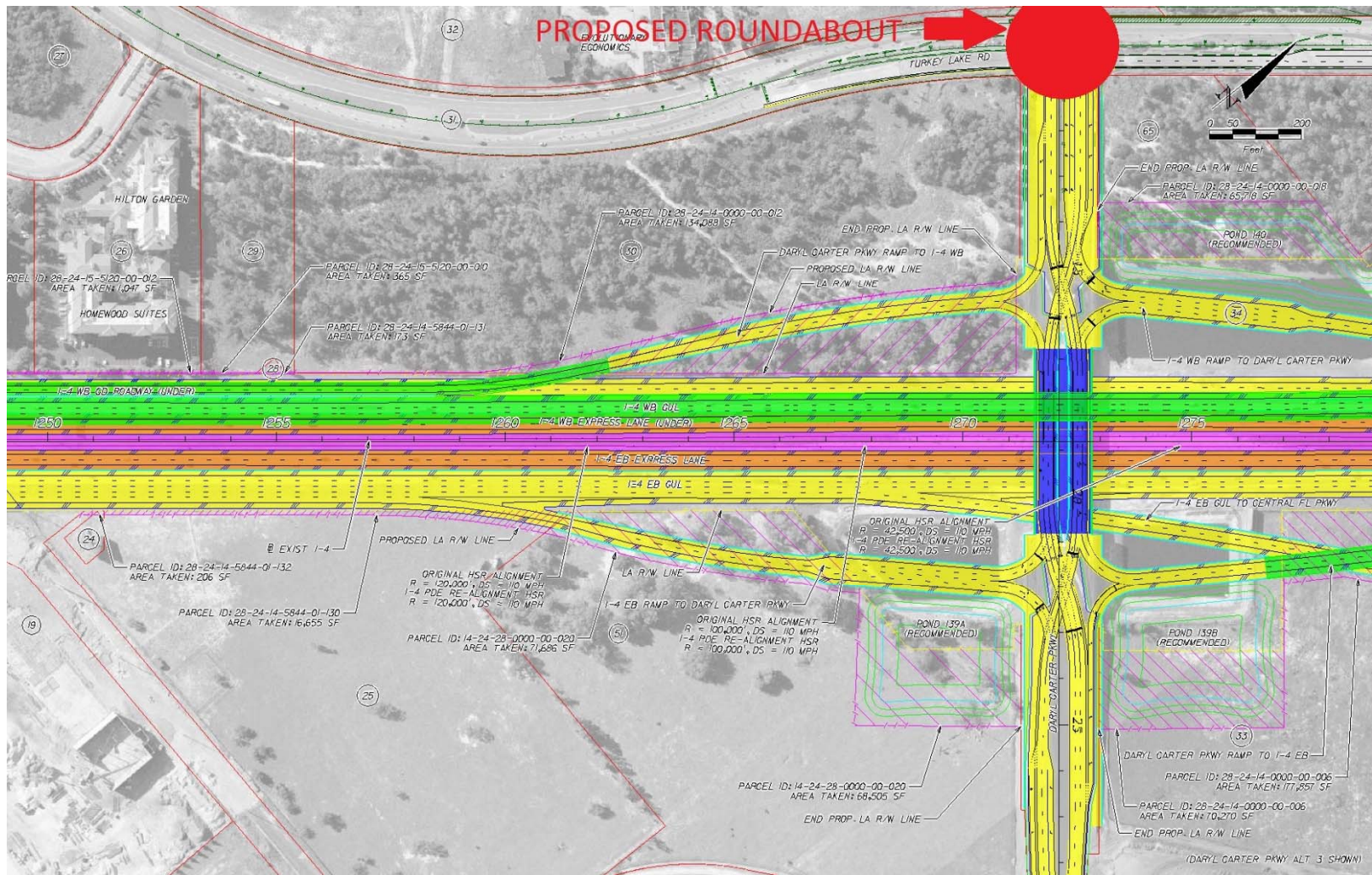
**Potential Value Added: (\$5,074,000)**

**Calculations:**

Description	Quantity	Unit	Unit Price	Extended Amount
Roadway Component	1	LS	\$1,931,134.69	\$1,931,135
Drainage Component	1	LS	\$265,778.42	\$265,778
Signing Component	1	LS	\$54,852.00	\$54,852
<b>Subtotal</b>				\$2,251,765
MOT (10%)				\$225,177
Mobilization (10%)				\$247,694
<b>Subtotal</b>				\$2,724,636
Project Unknowns (15%)				\$337,765
			<b>CONSTRUCTION TOTAL</b>	<b>\$3,062,401</b>

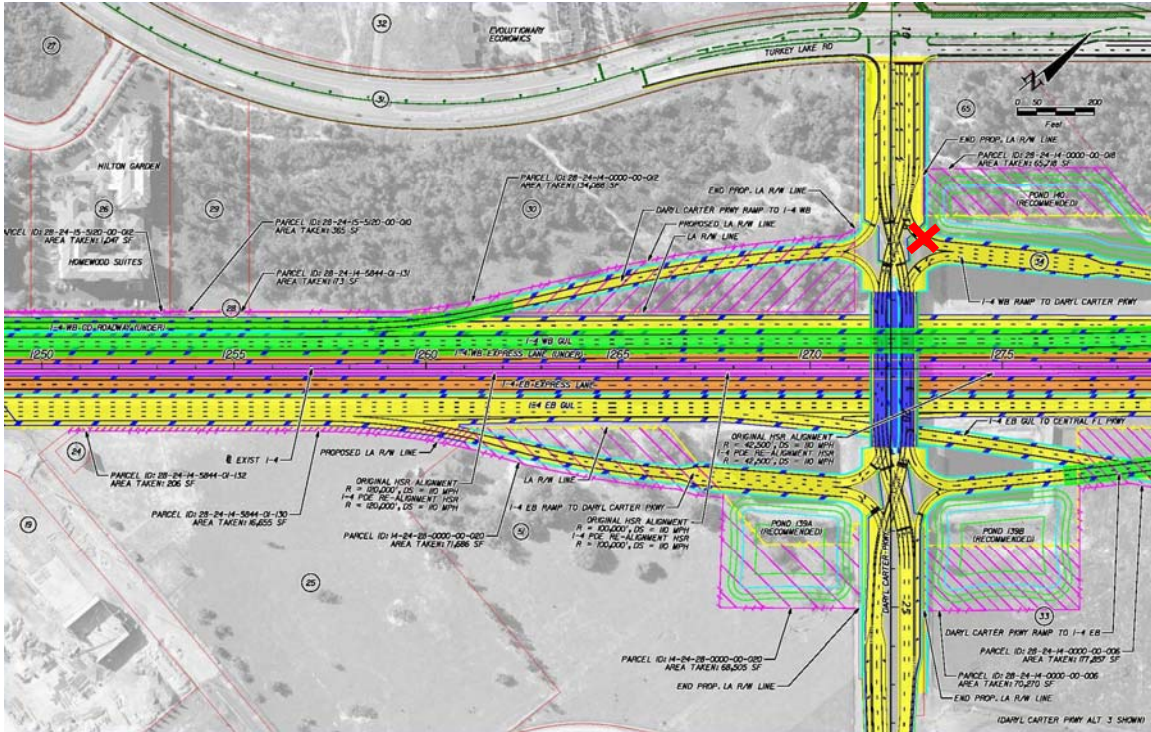
**Potential Right of Way Cost: \$2,012,000.00**

**RECOMMENDATION No. 9: Put a roundabout at Daryl Carter and Palm Parkway**



**RECOMMENDATION No. 10: Eliminate the right turn movement for the westbound I-4 exit ramp to Daryl Carter and create a new I-4 to Palm Parkway exit and intersection 2,500 feet east of the Daryl Carter bridge**

**Proposed Alternative:** The PD&E Documents show traffic pattern extending to the Diverging Diamond at Daryl Carter Parkway



**VE Alternative:** Eliminate the right turn movement for the westbound I-4 exit ramp to Daryl Carter and create a new Palm Parkway exit and intersection 2,500 feet east of the Daryl Carter bridge to eliminate the traffic back-up from left turn to Palm Parkway.

**Advantages:**

- Less congestion at Daryl Carter Parkway, especially left turn onto Palm Parkway
- Possible commercial property increases

**Disadvantages:**

- Increased cost
- More roadway and signalization

**FHWA CATEGORIES**

Safety     Construction     Operations     Environment     Other

**Potential Value Added: (\$6,796,000)**

**RECOMMENDATION No. 10: Eliminate the right turn movement for the westbound I-4 exit ramp to Daryl Carter and create a new I-4 to Palm Parkway exit and intersection 2,500 feet east of the Daryl Carter bridge**

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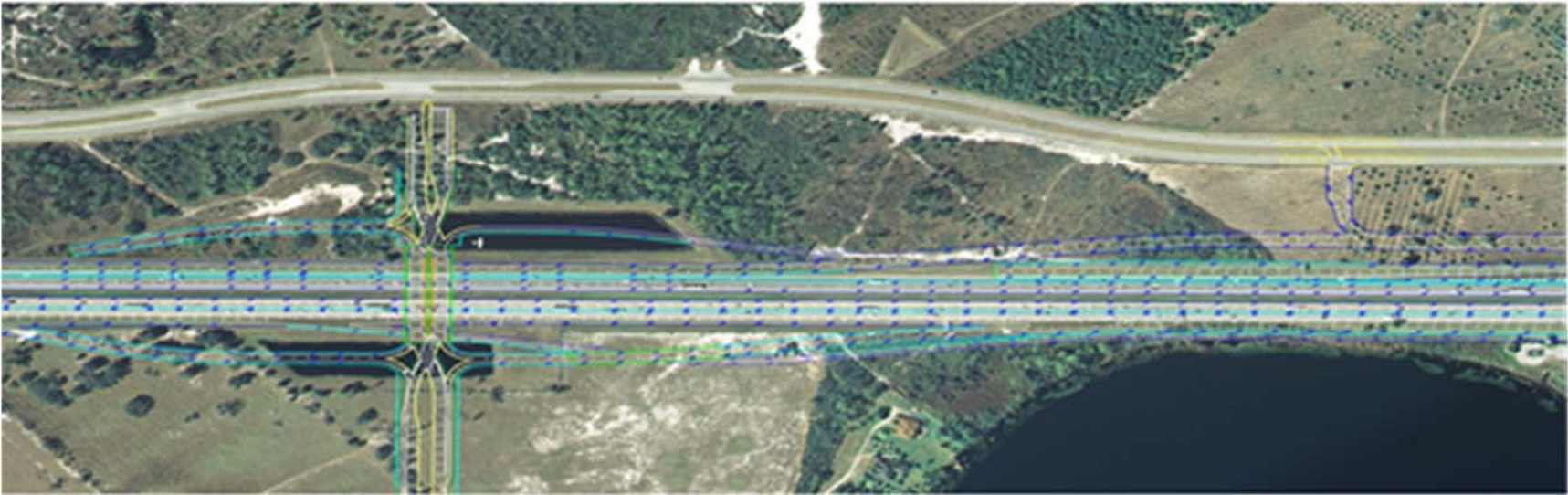
**Calculations:**

Description	Quantity	Unit	Unit Price	Extended Amount
Clearing, Grubbing	1.58	AC	\$10,000.00	\$15,801
Embankment	2,549	CY	\$8.00	\$20,394
Signalization	3	EA	\$200,000.00	\$600,000
pavement	509	TN	\$240.19	\$122,341
Drainage	1	LS	\$30,000.00	\$30,000
Base, Stabilization	7,648	SY	\$23.25	\$177,811
Sediment barrier	820	LF	\$1.15	\$943
Signage	1	LS	\$500.00	\$500
<b>Subtotal</b>				\$967,790
MOT (10%)				\$96,779
Mobilization (10%)				\$106,457
<b>Subtotal</b>				\$1,171,026
Project Unknowns (15%)				\$145,169
			<b>CONSTRUCTION TOTAL</b>	<b>\$1,316,195</b>

**Potential Right of Way Cost: \$5,480,000**

**RECOMMENDATION No. 10: Eliminate the right turn movement for the westbound I-4 exit ramp to Daryl Carter and create a new I-4 to Palm Parkway exit and intersection 2,500 feet east of the Daryl Carter bridge**

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**RECOMMENDATION No. 10: Eliminate the right turn movement for the westbound I-4 exit ramp to Daryl Carter and create a new I-4 to Palm Parkway exit and intersection 2,500 feet east of the Daryl Carter bridge**

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**RECOMMENDATION No. 12: The exit ramp starting west of Daryl Carter Parkway could be shortened to approximately 1,300 ft. by exiting approximately 5,000 feet east of the Daryl Carter Parkway bridge**

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**Proposed Alternative:**

The PD&E Documents show an I-4 eastbound Collector-Distributor road was added for the traffic to Central Florida Parkway. The Collector-Distributor road exits I-4 eastbound General Use Lanes at south of Daryl Carter Parkway Bridge, goes under the ramp bridge of Daryl Carter Parkway to I-4 eastbound and keeps parallel to I-4 eastbound General Use Lanes.

**VE Alternative:**

Construct a regular exit ramp from I-4 eastbound General Use Lanes to Central Florida Parkway and eliminate the Collector-Distributor road and the ramp bridge of Daryl Carter Parkway to I-4 eastbound.

**Advantages:**

- Less cost
- Less right of way impact
- Better MOT
- Less schedule impact
- Less Environmental Impact
- Easier future maintenance
- Better constructability

**Disadvantages:**

- Lower LOS

**FHWA CATEGORIES**

   Safety      X   Construction       Operations      X   Environment      X   Other

**Potential Cost Savings: \$11,460,000**

**Calculations:**

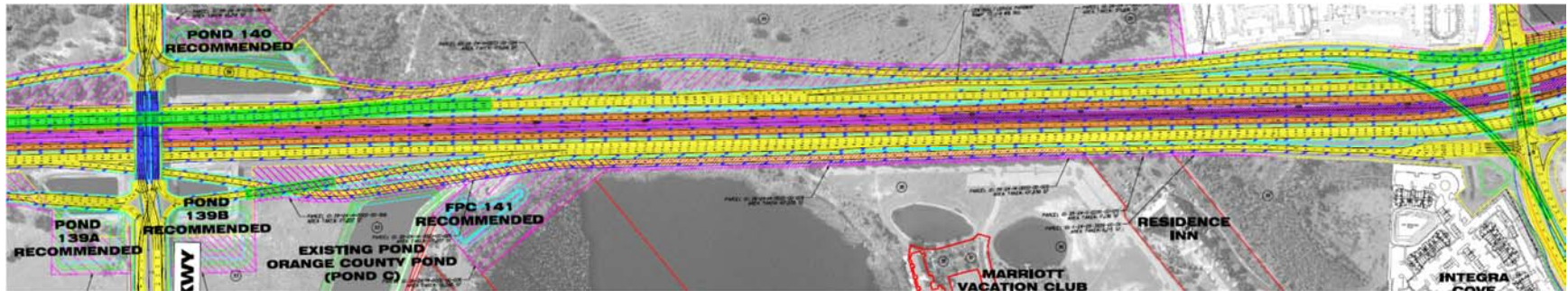
Description	Quantity	Unit	Unit Price	Extended Amount
MSE Wall	-10,752	SF	\$28.00	(\$301,056)
Bridge	-14,400	SF	\$120.00	(\$1,728,000)
<b>Subtotal</b>				(\$2,029,056)
MOT (10%)				(\$202,906)
Mobilization (10%)				(\$223,196)
<b>Subtotal</b>				(\$2,455,158)
Project Unknowns (15%)				(\$304,358)
			<b>CONSTRUCTION TOTAL</b>	<b>(\$2,759,516)</b>

Potential Right of Way savings: \$8,700,000



**RECOMMENDATION No. 12: Eliminate the I-4 EB C/D road to Central FL PKWY and create a regular exit ramp**

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# APPENDICES

Agenda  
Sign In Sheets  
Resolution Memorandum  
Presentation Slides

**Agenda**  
**May 23 – 27, 2016**

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 – 10:00 am
	Mid-point review and determine economic factors	10:00 am – 12:00 pm
	Lunch	12:00 pm – 1:00 pm
	Begin Development Phase	1:00 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	9:00 am – 12:00 pm
	Begin Draft Value Engineering Report	12:00 pm – 5:00 pm

**Presentation to FDOT at the District Office in the Cypress Conference Room**

# FLORIDA DEPARTMENT OF TRANSPORTATION

## VALUE ENGINEERING KICKOFF

Interstate 4 from East of County Road 532 to Central Florida Parkway

May 23, 2016

### SIGN IN SHEET

Name	Representing	Phone Number	Email Address
Tara Spicker	KCA	813-871-5331	tspicker@kcaeng.com
Ray Goren	FDOT	407-432-7838	wendra.gopal@dot.state.fl.us
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ED CASHMAN	FDOT ROADWAY	386 943 5158	edward.cashman@dot.state.fl.us
Bill Marchese	FDOT RLW	386-943-5097	William.Marchese@dot.state.fl.us
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Beata Palasz	FDOT	386-943-5418	beata.palasz@dot.state.fl.us

# FLORIDA DEPARTMENT OF TRANSPORTATION

## VALUE ENGINEERING MID-POINT REVIEW

### Interstate 4 from East of County Road 532 to Central Florida Parkway

May 25, 2016

#### SIGN IN SHEET

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Bill Marchese	FDOT RLW	386-943-5097	william.MARCHESE@dot.state.fl.us
RICK JOHNSON	PMA	321-217-5182	rjohnson@pmaconsultants.com

# FLORIDA DEPARTMENT OF TRANSPORTATION

## VALUE ENGINEERING STUDY PRESENTATION

### Interstate 4 from East of County Road 532 to Central Florida Parkway

May 27, 2016

#### SIGN IN SHEET

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Brian Stanger	FDOT-PLEMO	386 943 5391	brian.stanger@dot.state.fl.us
Amy Sirmans	FDOT-PLEMO	" " 5404	amy.sirmans = ...

**FLORIDA DEPARTMENT OF TRANSPORTATION**

**VALUE ENGINEERING STUDY PRESENTATION**

**Interstate 4 from East of County Road 532 to Central Florida Parkway**

**May 27, 2016**

**SIGN IN SHEET**

Name	Representing	Phone Number	Email Address
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FRANK J DREA	FDOT	5476	
Catalina Chacon	FDOT	5039	
Alan Hyman	"	5477	
Ashraf Elmaghraby	PMA	5645	ashraf.elmaghraby@---
Rick Johnson	PMA	321-217-5182	rjohnson@pmaconsultants.com







# SLIDE PRESENTATION