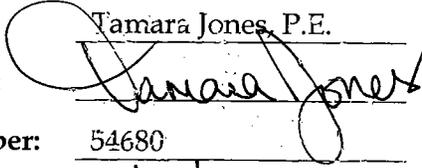


## PROFESSIONAL ENGINEER CERTIFICATE

I hereby certify that I am a registered professional engineer in the State of Florida practicing with CH2M HILL, Inc., a corporation, authorized to operate as an engineering business, FEID No. 59-0918189, by the State of Florida, Department of Professional Regulation, Board of Professional Engineers, and that I have reviewed or approved the evaluation, findings, opinions, conclusions, or technical advice hereby reported for:

**Project:** SR 415 PD&E Study  
**FIN:** 407355-1-22-01, 407355-2-22-01  
**FAP:** 7777 091 A, FL62 045 R  
**Location:** Seminole and Volusia Counties, Florida  
**Client:** FDOT - District 5

This Preliminary Engineering Report includes a summary of data collection efforts and conceptual design analyses for the SR 415 PD&E Study. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering and planning as applied through professional judgement and experience.

**Name:** Tamara Jones, P.E.  
**Signature:**   
**P.E. Number:** 54680  
**Date:** 10/20/2004

Note: Per direction from the Florida Department of Transportation - District Five, this Preliminary Engineering Report was prepared without the District Design Engineer's approval of the Typical Section Package due to a desire to reexamine the typical section(s) during the design phase.

# Table of Contents

---

Chapter	Page
<b>1. SUMMARY</b> .....	<b>1-1</b>
1.1 COMMITMENTS.....	1-1
1.2 RECOMMENDATIONS .....	1-4
<b>2. INTRODUCTION</b> .....	<b>2-1</b>
2.1 PURPOSE.....	2-1
2.2 PROJECT DESCRIPTION.....	2-3
2.2.1 Proposed Multi-Use Trail .....	2-5
2.2.2 SR 415 Land Use Corridor Analysis Study .....	2-5
2.2.3 Study Sections .....	2-5
2.3 TIMING OF CONSTRUCTION.....	2-6
2.4 OTHER RELATED STUDIES.....	2-6
<b>3. NEED FOR IMPROVEMENT</b> .....	<b>3-1</b>
3.1 DEFICIENCIES.....	3-1
3.1.1 Capacity Deficiencies .....	3-1
3.1.2 Evacuation Routes and Emergency Services .....	3-3
3.2 SAFETY .....	3-3
3.3 CONSISTENCY WITH REGIONAL AND LOCAL TRANSPORTATION PLANNING.....	3-3
3.4 SOCIAL DEMANDS OR ECONOMIC DEVELOPMENTS .....	3-9
3.4.1 Population and Employment.....	3-9
3.4.2 Activity Centers.....	3-9
3.4.3 DRIs and other Development Activity .....	3-9
3.4.4 Modal Interrelationships .....	3-11
<b>4. EXISTING CONDITIONS</b> .....	<b>4-1</b>
4.1 EXISTING ROADWAY CHARACTERISTICS .....	4-1
4.1.1 Functional Classification.....	4-1
4.1.2 Typical Section(s).....	4-1
4.1.3 Pedestrian and Sidewalk Facilities .....	4-2
4.1.4 Bicycle, Trail, and Greenway Facilities .....	4-6
4.1.5 Right-of-Way .....	4-7
4.1.6 Horizontal Alignment.....	4-8
4.1.7 Vertical Alignment.....	4-9
4.1.8 Drainage and Hydrology.....	4-12
4.1.9 Floodplains and Regulatory Floodways.....	4-15
4.1.10 Geotechnical Investigation .....	4-19
4.1.11 Accident Data .....	4-19
4.1.12 Intersections and Signalization.....	4-31
4.1.13 Lighting.....	4-31
4.1.14 Utilities .....	4-31

# Table of Contents

---

Chapter	Page
4.1.15	Pavement Conditions .....4-34
4.2	EXISTING BRIDGES .....4-34
4.2.1	Typical Section .....4-34
4.2.2	Type of Structure.....4-36
4.2.3	Current Condition and Year of Construction .....4-36
4.2.4	Channel Dimensions .....4-37
4.2.5	Bridge Openings .....4-37
4.2.6	Ship Impact Data.....4-37
4.3	ENVIRONMENTAL CHARACTERISTICS.....4-38
4.3.1	Land Use .....4-38
4.3.2	Cultural Features and Community Services.....4-44
4.3.3	Natural and Biological Features .....4-54
4.3.4	Physical Environment .....4-60
<b>5.</b>	<b>DESIGN CONTROLS AND STANDARDS .....5-1</b>
5.1	DESIGN CRITERIA .....5-1
5.2	DESIGN EXCEPTIONS AND VARIATIONS .....5-2
<b>6.</b>	<b>TRAFFIC .....6-1</b>
6.1	EXISTING TRAFFIC CONDITIONS.....6-1
6.2	FUTURE TRAFFIC VOLUMES.....6-3
6.3	LEVEL OF SERVICE .....6-4
6.3.1	Roadway Operational Analysis .....6-4
6.3.2	Intersection Operational Analysis .....6-7
<b>7.</b>	<b>ALTERNATIVES ALIGNMENT ANALYSIS .....7-1</b>
7.1	NO PROJECT (NO BUILD) ALTERNATIVE .....7-1
7.2	TRANSPORTATION SYSTEM MANAGEMENT .....7-2
7.3	STUDY (BUILD) ALTERNATIVES.....7-2
7.3.1	Study Sections .....7-3
7.3.2	Initial Typical Section Alternatives .....7-3
7.3.3	Viable Typical Section Alternatives .....7-5
7.3.4	Multi-use Trail Alternatives .....7-15
7.3.5	Access Management Plan .....7-20
7.4	COMPARATIVE ANALYSIS.....7-20
7.5	VIAIBLE ALTERNATIVE REFINEMENTS.....7-37
7.5.1	Revised Typical Section Alternatives in Segment C .....7-37
7.5.2	Exfiltration Options in Segment C.....7-41
7.6	PREFERRED ALTERNATIVE.....7-41

# Table of Contents

---

Chapter	Page
<b>8. PRELIMINARY DESIGN ANALYSIS</b> .....	<b>8-1</b>
8.1 DESIGN TRAFFIC VOLUMES .....	8-1
8.2 TYPICAL SECTIONS .....	8-1
8.2.1 Roadway .....	8-1
8.2.2 Multi-Use Trail .....	8-9
8.3 INTERSECTION CONCEPTS AND SIGNAL ANALYSIS .....	8-10
8.4 ALIGNMENT AND RIGHT-OF-WAY NEEDS .....	8-12
8.4.1 Horizontal Alignment .....	8-12
8.4.2 Vertical Alignment .....	8-12
8.5 RELOCATION .....	8-15
8.5.1 Roadway .....	8-15
8.5.2 Multi-Use Trail .....	8-15
8.6 RIGHT-OF-WAY, CONSTRUCTION, AND PRELIMINARY COSTS .....	8-15
8.7 USER BENEFITS .....	8-17
8.8 PEDESTRIAN AND BICYCLE FACILITIES .....	8-17
8.9 SAFETY .....	8-18
8.10 ECONOMIC AND COMMUNITY DEVELOPMENT .....	8-18
8.11 ENVIRONMENTAL IMPACTS .....	8-19
8.11.1 Community Impacts and Cohesion .....	8-19
8.11.2 Cultural Resources .....	8-26
8.11.3 Parks and Recreation .....	8-27
8.11.4 Wetlands .....	8-28
8.11.5 Threatened and Endangered Species .....	8-33
8.11.6 Air Quality .....	8-34
8.11.7 Noise .....	8-35
8.11.8 Contamination .....	8-40
8.11.9 Construction .....	8-43
8.12 UTILITY IMPACTS .....	8-45
8.13 TRAFFIC CONTROL PLAN .....	8-45
8.14 PUBLIC INVOLVEMENT PROGRAM .....	8-46
8.14.1 Advance Notification .....	8-46
8.14.2 Advisory Groups .....	8-47
8.14.3 Public Information Workshop .....	8-47
8.14.4 Public Hearing .....	8-48
8.15 VALUE ENGINEERING .....	8-50
8.16 DRAINAGE .....	8-53
8.16.1 Stormwater Management Facilities .....	8-53
8.16.2 Floodplains and Regulatory Floodways .....	8-56

# Table of Contents

---

Chapter	Page
8.17 BRIDGE ANALYSIS .....	8-64
8.17.1 SR 415/St. Johns River Bridge Replacement.....	8-64
8.17.2 Other Bridge Structures .....	8-68
8.18 SPECIAL FEATURES.....	8-70
8.19 ACCESS MANAGEMENT .....	8-70
8.20 AESTHETICS AND LANDSCAPING.....	8-73
8.21 LIGHTING.....	8-73

## Appendixes

A	Agency Correspondence
B	Typical Section Package
C	Type II, Categorical Exclusion
D	Preferred Alternative Preliminary Concept Plans and Profiles, dated September 2004 ( <i>provided under separate cover</i> )
E	Manatee Watch Program

# Table of Contents

---

<b>List of Figures</b>	<b>Page</b>
2-1 Regional Location Map .....	2-2
2-2 Project Study Limits .....	2-4
3-1 METROPLAN ORLANDO and Volusia County MPO's Long Range Transportation Plans .....	3-6
3-2 METROPLAN ORLANDO and Volusia County MPO's Transportation Improvement Programs.....	3-8
3-3 Intermodal Services.....	3-10
4-1 Existing SR 415 Typical Section.....	4-3
4-2 Sidewalk and Trail Facilities .....	4-4
4-3 Existing Drainage Characteristics .....	4-13
4-4 Existing Floodplains and Floodways.....	4-17
4-5 Soil Survey .....	4-20
4-6 Existing Bridge Typical Section .....	4-35
4-7 Generalized Existing Land Use .....	4-39
4-8 Generalized Future Land Use.....	4-42
4-9 Neighborhoods and Community Facilities.....	4-45
4-10 Cultural and Historic Resources .....	4-49
4-11 Parks, Recreational Facilities, and Public Lands.....	4-52
4-12 Existing Wetlands.....	4-55
4-13 Threatened and Endangered Species Observed .....	4-58
4-14 Noise Monitoring Locations .....	4-62
4-15 Potential Contamination Sites .....	4-67
6-1 2002 Existing Traffic Conditions .....	6-2
6-2 No Build AADT .....	6-5
6-3 Build AADT.....	6-6
6-4 2030 No Build Traffic Conditions.....	6-8
6-5 2030 Build Traffic Conditions .....	6-9
7-1 Initial Typical Section Alternatives.....	7-4
7-2 Roadway Typical Section Viable Alternatives .....	7-6
7-3 Segment A SR 415/SR 46 Intersection Geometry Options.....	7-7
7-4 Segment A Celery Avenue Realignment Options .....	7-8
7-5 Segment B Bridge Alternatives - B1 Single East and B2 Single West .....	7-10
7-6 Segment B Bridge Alternatives - B3 Dual East and B4 Dual West.....	7-11
7-7 Segment B Bridge Alternatives - B5 Single Overlay East and B6 Single Overlay West.....	7-12
7-8 Roadway Typical Section Alternatives with Trail .....	7-16

# Table of Contents

---

<b>Figure</b>		<b>Page</b>
7-9	Segment B Bridge Alternatives with Trail - B1 Single East and B2 Single West.....	7-17
7-10	Segment B Bridge Alternatives with Trail - B3 Dual East and B4 Dual West .....	7-18
7-11	Segment B Bridge Alternatives with Trail - B5 Single Overlay East and B6 Single Overlay West.....	7-19
7-12	Typical Sections 1 and 2.....	7-39
7-13	Typical Sections 3 and 4.....	7-40
7-14	Typical Section 5.....	7-42
8-1	Proposed Roadway Typical Sections for the Preferred Alternative with Trail .....	8-2
8-2	Roadway Typical Sections for the Preferred Alternative without Trail .....	8-5
8-3	Northern Section Multi-Use Trail.....	8-11
8-4	Potentially Impacted Wetlands .....	8-31
8-5	Modeled Receiver Locations and Noise Barrier 1.....	8-37
8-6	Potentially Impacted Contamination Sites .....	8-41
8-7	Proposed Onsite Basins .....	8-54
8-8	Potentially Affected Floodplains.....	8-61
8-9	Proposed St. Johns River Bridge Typical Section for the Preferred Alternative.....	8-66

# Table of Contents

---

<b>List of Tables</b>	<b>Page</b>
3-1 METROPLAN ORLANDO and Volusia County MPO's 2020 Long Range Transportation Plans.....	3-5
3-2 METROPLAN ORLANDO and Volusia County MPO's Transportation Improvement Programs FY 2003/04 - 2007/08.....	3-7
4-1 Functional Classification of Cross Streets.....	4-2
4-2 Pedestrian and Sidewalk Facilities.....	4-6
4-3 Existing SR 415 Right-of-Way.....	4-8
4-4 Existing SR 415 Horizontal Alignment.....	4-9
4-5 Existing SR 415 Vertical Alignment.....	4-10
4-6 Summary of Existing Cross Culvert.....	4-16
4-7 FDOT Summary of Crashes.....	4-26
4-8 Project Area Overall Crash Type Summary.....	4-27
4-9 Seminole and Volusia Counties Summary of Crashes.....	4-28
4-10 Seminole and Volusia Counties Intersection Crash Summary.....	4-29
4-11 Project Area Overall Crash Type Summary.....	4-30
4-12 Existing Intersections and Signalization.....	4-31
4-13 Summary of Utility Contacts.....	4-32
4-14 Major Utilities Located along SR 415.....	4-33
4-15 Pavement Conditions.....	4-34
4-16 Existing Bridge Structures.....	4-36
4-17 Current Structure Condition and Year of Construction.....	4-37
4-18 Summary of Corridor Community Facilities.....	4-47
4-19 Parks, Recreational Facilities, and Public Lands.....	4-51
4-20 Observed Listed Wildlife and Vegetative Species within, or adjacent to, the SR 415 Project Corridor.....	4-57
4-21 National Ambient Air Quality Standards (NAAQS).....	4-61
4-22 Noise Abatement Criteria.....	4-63
4-23 Ambient Noise Monitoring Results.....	4-64
4-24 Potential Contamination Sites.....	4-66
5-1 Roadway Design Criteria.....	5-1
5-2 Design Exceptions and Variations.....	5-3
6-1 Recommended Design Characteristics.....	6-1
6-2 Future Roadway Segment LOS.....	6-4
6-3 Future Intersection LOS.....	6-7
7-1A Segment A SR 415/SR 46 Intersection Geometry - Initial and Ultimate Options Estimated Impact Evaluation Summary for Build Alternatives without Trail, Based on July 2003 Viable Alternatives Conceptual Plans.....	7-21

# Table of Contents

---

<b>Tables</b>	<b>Page</b>
7-1B Segment A Celery Avenue Realignment - Options 1 and 2 Estimated Impact Evaluation Summary for Build Alternatives without Trail, Based on July 2003 Viable Alternatives Conceptual Plans .....	7-22
7-2A Segment B Single High Level Bridge Build Alternatives without Trail Estimated Impact Evaluation Summary for Build Alternatives without Trail, Based on July 2003 Viable Alternatives Conceptual Plans .....	7-23
7-2B Segment B Dual High Level Bridge Build Alternatives without Trail Estimated Impact Evaluation Summary for Build Alternatives without Trail, Based on July 2003 Viable Alternatives Conceptual Plans .....	7-24
7-2C Segment B Single High Level Bridge Build Alternatives without Trail Estimated Impact Evaluation Summary for Build Alternatives without Trail, Based on July 2003 Viable Alternatives Conceptual Plans .....	7-25
7-3 Segment C Suburban and Hybrid Build Alternatives without Trail Estimated Impact Evaluation Summary for Build Alternatives without Trail, Based on July 2003 Viable Alternatives Conceptual Plans .....	7-26
7-4 Segment D Transition Build Alternatives without Trail Estimated Impact Evaluation Summary for Build Alternatives without Trail, Based on July 2003 Viable Alternatives Conceptual Plans .....	7-27
7-5 Segment E Four-Lane Urban Build Alternatives without Trail Estimated Impact Evaluation Summary for Build Alternatives without Trail, Based on July 2003 Viable Alternatives Conceptual Plans .....	7-28
7-6 Segments F and G Four-Lane and Five-Lane Urban Build Alternatives without Trail Estimated Impact Evaluation Summary for Build Alternatives without Trail, Based on July 2003 Viable Alternatives Conceptual Plans .....	7-29
7-7A Segments B and C for Multi-use Trail Estimated Impact Evaluation Summary for Trail Only, Based on July 2003 Viable Alternatives Conceptual Plans .....	7-30
7-7B Segments D and E for Multi-use Trail Estimated Impact Evaluation Summary for Trail Only, Based on July 2003 Viable Alternatives Conceptual Plans .....	7-31
7-7C Segments F, G and Northern Section for Multi-use Trail Estimated Impact Evaluation Summary for Trail Only, Based on July 2003 Viable Alternatives Conceptual Plans .....	7-32
7-8A Segments B and C Build Alternatives with Trail Estimated Impact Evaluation Summary for Build Alternatives with Trail, Based on July 2003 Viable Alternatives Conceptual Plans .....	7-33
7-8B Segments D and E Build Alternatives with Trail Estimated Impact Evaluation Summary for Build Alternatives with Trail, Based on July 2003 Viable Alternatives Conceptual Plans .....	7-34
7-8C Segments F and G Build Alternatives with Trail Estimated Impact Evaluation Summary for Build Alternatives with Trail, Based on July 2003 Viable Alternatives Conceptual Plans .....	7-35

# Table of Contents

---

<b>Tables</b>	<b>Page</b>
7-9 Total Project Estimated Impact Evaluation Summary for Build Alternatives Based on July 2003 Viable Alternatives Conceptual Plans .....	7-36
8-1 Proposed SR 415 Horizontal Alignment .....	8-13
8-2 Proposed SR 415 Vertical Alignment .....	8-14
8-3 Preliminary Project Cost Estimates for the Preferred Alternative .....	8-16
8-4 Estimated Impact Evaluation for the Preferred Alternative for Roadway and Ponds .....	8-20
8-5 Estimated Impact Evaluation for the Preferred Alternative for Trail .....	8-22
8-6 Estimated Impact Evaluation for the Preferred Alternative for Roadway, Pond and Trail .....	8-23
8-7 Wetland Impacts .....	8-29
8-8 COSCREEN98 Results .....	8-34
8-9 Predicted Peak-Hour Noise Levels - Leq (Dba) .....	8-36
8-10 Noise Barrier 1 Evaluation Matrix .....	8-39
8-11 Noise Barrier 1 Calculations .....	8-39
8-12 Potentially Impacted Contamination Sites .....	8-40
8-13 Recommended Stormwater Management Systems .....	8-56
8-14 Summary of Cross Culvert Extension Analysis - without Future Trail .....	8-58
8-15 Summary of Cross Culvert Extension Analysis - with Future Trail .....	8-59
8-16 Summary of Potential Floodplain Impacts for the Preferred Alternative and Recommended Stormwater Option in Southern Section .....	8-60
8-17 Summary of Potential Floodplain Impacts for the Trail in Northern Section .....	8-63
8-18 Estimated Probable Cost for Bridges .....	8-68
8-19 Access Management Re-Classifications .....	8-71

# 1. Summary

---

## 1.1 Commitments

In order to minimize the impacts of this project to the human environment, the Florida Department of Transportation (FDOT) is committed to the following measures for the SR 415 project.

### **Access**

The Department is committed to the following issues related to access management. Refer to the *Preliminary Concept Plans* provided in Appendix D for an illustration of these access modifications. An access management plan was prepared for this study and is discussed further in Section 8.19 of this report.

SR 415/SR 46 Intersection Geometry - The Initial interim intersection improvement option was determined to be the Preferred Option for this intersection. This option ties to the existing SR 46 and assumes the SR 415 four-laning improvements would occur prior to capacity or turning lanes improvements along SR 46. The proposed right-of-way for the intersection as shown on the *Preliminary Concept Plans* can accommodate the intersection geometry for the Ultimate Option. The right-of-way requirements for the Initial Interim intersection improvement are less than the limits shown.

Celery Avenue Realignment - Alignment modifications for the proposed improvements require the relocation of the SR 415/Celery Avenue Intersection. The existing intersection will be relocated approximately 950 feet south of its existing location due to the need to raise the profile of SR 415 over the St. Johns River to meet the United States Coast Guard (USCG) vertical clearance criteria of 45 feet. Preferred Option 1 provides for a full median opening. Seminole County is currently studying potential improvements to Celery Avenue. Coordination with Seminole County during the design phase of SR 415 will be required to ensure compatibility with final decisions related to Celery Avenue.

### **Stormwater Management Systems**

FHWA and FDOT will continue to coordinate with SJRWMD to address the final recommended stormwater pond locations and any additional drainage concerns or issues during the design phase of project development. The only location where stormwater ponds is not required, is in Segment C (from north of the St. Johns River Bridge to Reed Ellis Road in Volusia County). FDOT is committed to using exfiltration systems for stormwater treatment in this area. Exfiltration is the preferred method of treatment within this segment as opposed to dry detention ditches.

### **St. Johns River Floodplain**

Backwater calculations for the existing and proposed bridge configurations will be performed during final design to determine scour depths for the bridge structures. Models may be used to demonstrate zero rise for the St. Johns River, which is an acceptable method of mitigation for addressing floodplain fill. Based on a meeting with SJRWMD staff (January 21, 2004 meeting minutes as attached in the *Pond Siting Report*), it was determined that this "no rise" calculation approach could be utilized in lieu of volume compensation during the permitting phase of this project.

### **Location of Right-of-Way Fence through Segment C**

The Department has committed to placing the right-of-way fence in Segment C at the top of the slope in an effort to minimize wildlife impacts. Through discussions with SJRWMD staff, the SJRWMD has expressed interest in providing maintenance on the down side of the embankment slope. As a result, appropriate agreements between SJRWMD and FDOT would need to be developed that would allow FDOT personnel to access the slope area for inspection of culverts and any other structures within this segment. The final placement of the right-of-way fence and maintenance issue will be coordinated further with SJRWMD as part of the final design and right-of-way acquisition phases of this project.

### **Multi-Use Trail**

FDOT is committed to assessing the feasibility of a multi-use trail facility within the SR 415 corridor. The study limits for the proposed trail extend from Celery Avenue in Seminole County to SR 44 in Volusia County. The facility will cross over the St. Johns River, which is a navigable waterway. Coordination with Seminole County and Volusia County will be needed to review their overall Multi-Use Trail Master plans. Potential funding partnership with Volusia County and Seminole County may be required.

FDOT is recommending that during the design phase, an alignment shift of the roadway be evaluated through Volusia County property located on the east side of SR 415 (just north of Reed Ellis Road and south of Lemon Bluff Road). The purpose of the realignment is to minimize additional right-of-way impacts to private property and maximize right-of-way impacts to the Volusia County property.

It is also recommended that the width of the trail be reevaluated during the design phase to reduce the width from 14 feet to 12 feet in order to accommodate future links to other proposed trails in the area.

### **Threatened and Endangered Species**

During preparation of permit applications, all suitable habitat for scrub jays and gopher tortoises to be impacted by the roadway or the ponds will be identified and surveyed. If these species are found, coordination will be initiated with the appropriate resource agencies and required permits will be obtained.

FDOT is committed to implementing the USFWS-approved *Standard Protection Measures for the Eastern Indigo Snake* during design and construction, for the protection of the indigo snake.

The St. Johns River is federally designated as an area of Critical Habitat for the West Indian manatee. Manatees are known to be present and were observed within the St. Johns River at the SR 415/St. Johns River Bridge. Therefore, special precautions and best management practices will be employed during construction activities to avoid disturbance to this protected species. The *Manatee Watch Program* is included in Appendix E of this *Preliminary Engineering Report*.

If threatened, endangered species, or species of special concern are identified within the construction area during final design or construction, coordination will be initiated with the appropriate resource agencies to avoid or mitigate impacts.

### **Wildlife Crossings**

Wildlife crossing ledges, will be provided at the St. Johns River Bridge and at the St. Johns River Relief Bridge over Mud Creek to accommodate small wildlife creatures. In discussions with SJRWMD, it was suggested that four to six crossings (36-inch culverts) be placed through ecotonal or transitional areas appropriately spaced between the St. Johns River and Mud Creek. Generally, recommendations are for spacing the wildlife crossings about 500 feet in wet areas and 1000 feet in drier upland or transitional areas. Specific locations and type of crossing will be determined and evaluated further during the final design phase of this project.

### **Noise Barrier**

FDOT is committed to the construction of a noise barrier at the location just north of Rabbit Run near Kove Estates (Sta. 237+88 to Sta. 255+45) contingent upon the following:

1. Detailed noise analyses during the final design process supports the need for abatement.
2. Reasonable cost analysis indicates that the economic cost of the barrier will not exceed the FDOT guidelines.
3. Community input regarding desires, types, heights and locations of barriers has been solicited by the District Office.
4. Local officials have addressed preferences regarding compatibility with adjacent land uses.
5. Safety and engineering aspects as related to the roadway user and the adjacent property owner have been reviewed.

However, a final decision on the location and height of the barrier will be determined upon gaining sufficient information during the final design, completion of the public involvement program, and the input of the benefited residents.

A land use review will also be implemented during the design phase to identify noise sensitive sites that may have received a building permit subsequent to the noise study but prior to the date of public knowledge (i.e., date that the environmental document has been approved by the Federal Highway Administration (FHWA)). If the review identifies noise sensitive sites that have been permitted prior to the date of public knowledge, then those noise sensitive sites will be evaluated for traffic noise and abatement considerations.

### **Bridge Replacements**

As part of the proposed widening and reconstruction of SR 415, two bridges will be replaced, the St. Johns River Bridge (Douglas Stenstrom Bridge No. 790124) and the St. Johns River Relief Bridge (Bridge No. 790198) over Mud Creek. The proposed bridge replacement over the St. Johns River is required to meet the USCG's navigational clearance for a 45-foot vertical bridge clearance. North of the St. Johns River, the proposed roadway and the St. Johns River Relief Bridge profile will be raised to meet stormwater runoff requirements.

### **Aesthetics and Landscaping**

The Department is committed to offsetting visual impacts that may be incurred by evaluating aesthetics and landscaping along the project corridor as part of the final design phase of this project.

## **1.2 Recommendations**

FDOT recommends the proposed improvements to widen and improve sections along SR 415 from SR 46 in Seminole County to SR 44 in Volusia County. The project study limits on SR 415 extend from SR 46 in Seminole County to SR 44 in Volusia County; a total distance of approximately 18.4 miles in length. The project study area includes the jurisdictions of City of Deltona, and unincorporated areas of Seminole and Volusia Counties. In addition, the study corridor traverses the towns of Osteen, Alamana, and Samsula located in Volusia County.

FDOT recommends reconstruction of the existing two-lane facility to a four-lane roadway (two lanes in each direction). Initially, the study limits for the proposed widening of the existing two-lane roadway were from SR 46 to SR 44. However, early in the study, it was determined that the future (2030) projected traffic demand did not support the need for a four-lane widening north of the City of Deltona. Therefore, the study limits for the roadway improvements were revised. The revised study limits for the proposed roadway widening extend from SR 46 to Acorn Lake Road, just north of Fort Smith Boulevard in Deltona; a total distance of approximately 8.3 miles.

As a result of the input from the community, interagency coordination, and engineering and environmental studies conducted as part of the PD&E study, the alternative recommended for location and design concept acceptance is a combination of the Urban Alternative and the Refined Rural Hybrid Alternative with Exfiltration option. The proposed improvements are intended to enhance the ability of the roadway to meet anticipated traffic demands, improve safety, and serve existing and future land uses along the SR 415 corridor.

The recommended Preferred Alternative involves:

- **Four-Lane Urban Alternative:** The typical section consists of four 12-foot travel lanes (two in each direction) with a four-foot bike lane and curb and gutter. The median separation varies between 22 and 40 feet in width depending on the segment. Five-foot sidewalks are provided on both sides between SR 46 and Celery Avenue. From Lemon Bluff Road to north of Kove Estates, sidewalks are provided on the west side and a 14-foot trail is provided on the east side of SR 415. Stormdrains and stormwater ponds would be required.

- Refined Rural Hybrid Alternative (North of St. Johns River Bridge to Reed Ellis Road): The roadway typical section (widening to the west) consists of four 12-foot travel lanes (two in each direction) with 12-foot outside shoulders and 8-foot inside shoulders. The median separation is 40 feet in width. Exfiltration systems are provided for stormwater treatment; therefore, stormwater ponds are not required for this area. In addition, 1:1 fill slopes are provided with geo-fabric slope protection. Sidewalks are not provided. A 14-foot trail is provided on the west side of SR 415 on the berm outside the exfiltration system.
- Five-Lane Urban Alternative (North of Kove Estates to Doyle Road, Volusia County): This proposed roadway typical section consists of four 12-foot travel lanes (two in each direction) with a four-foot bike lane and curb and gutter. A 12-foot bi-directional center turn lane is provided. A five-foot sidewalk is provided on the west side of SR 415 and a 14-foot trail is provided on the east side of SR 415. Stormdrains and stormwater ponds would be required.
- Multi-Use Trail: Additional right-of-way is required to accommodate the trail along the entire project corridor. With the exception of bridge crossings, the trail is proposed as a paved 14-foot asphalt trail. For the bridge section over the St. Johns River, a 12-foot trail width is proposed. For the St. Johns River Relief bridge cross section, a 14-foot trail width is proposed.
- Bridge Replacement: The proposed concept includes the construction of two new bridges: the St. Johns River Bridge and the St. Johns River Relief Bridge over Mud Creek. Refer to Section 8.17 of this report for more detailed information.
- Drainage and stormwater management facility improvements will be required for the roadway improvements to comply with local jurisdictions and SJRWMD criteria.

Specific components of the recommended Preferred Alternative are described in Chapter 8 of this Preliminary Engineering Report and in the Typical Section Package included as Appendix B. Note: Per direction from the Florida Department of Transportation - District Five, this *Preliminary Engineering Report* was prepared without the District Design Engineer's approval of the Typical Section Package due to a desire to reexamine the typical section(s) during the design phase. Conceptual design plans for the recommended Preferred Alternative are also included as Appendix D.

## 2. Introduction

---

This Preliminary Engineering (PE) Report has been prepared in accordance with the Florida Department of Transportation's (FDOT's) *Project Development and Environment (PD&E) Manual*.

### 2.1 Purpose

The general objective of this PD&E study is to provide documented information necessary for FDOT to reach a decision on the type, design, and location of improvements to SR 415 in Seminole and Volusia Counties, Florida. A regional location map, which identifies the project study area, is presented in Figure 2-1.

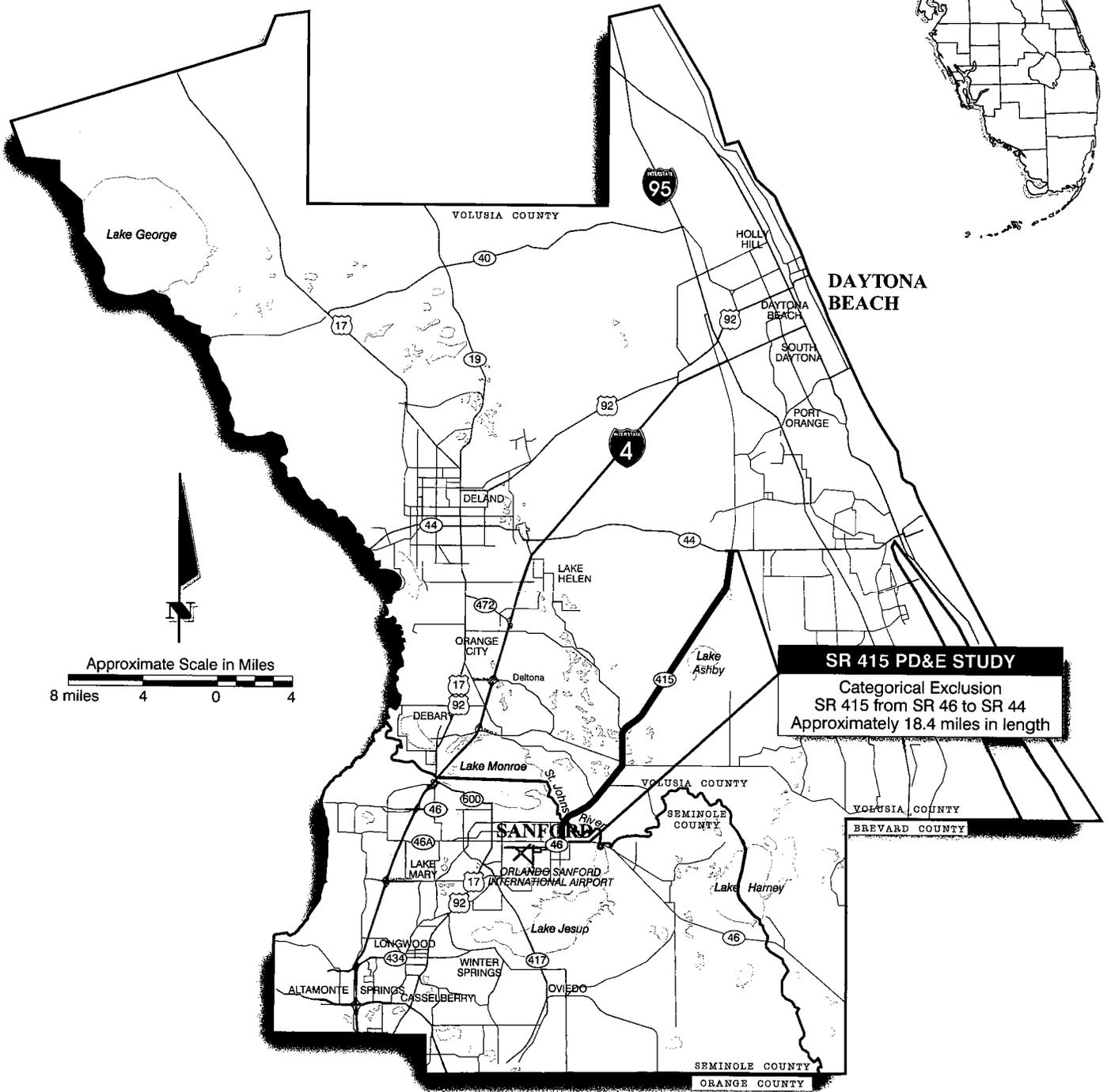
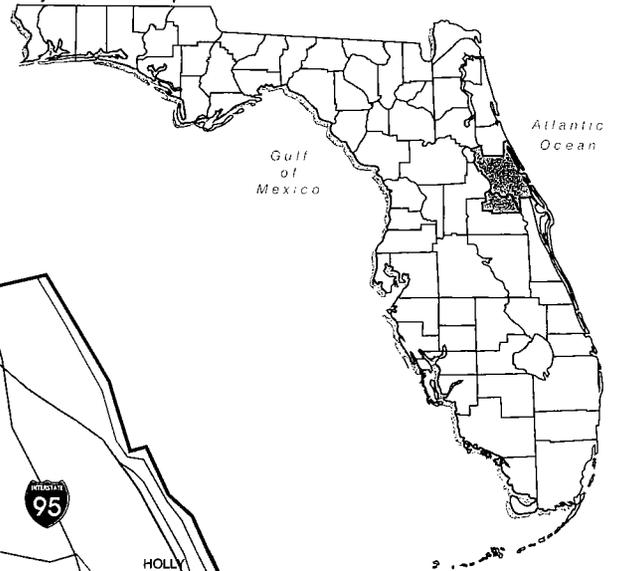
The Federal Highway Administration (FHWA), in consultation with the Florida Department of Transportation (FDOT), proposes to widen and improve sections along the State Road (SR) 415 corridor from SR 46 in Seminole County to SR 44 in Volusia County. The purpose of the project is to enhance the ability of the roadway to meet anticipated traffic demands, improve safety, and serve existing and future land uses along the SR 415 corridor. In addition, the objective of this study is to meet the requirements of the National Environmental Policy Act (NEPA) and to gain Location and Design Concept Acceptance (LDCA) from FHWA. The study includes consideration of social, economic, and environmental impacts and mitigation of those impacts as required by FHWA and FDOT's *PD&E Manual*, and summarize the findings in the required environmental documents, preliminary plans, and public involvement process. A Preliminary Engineering (PE) Report and a Type II, Categorical Exclusion (CatEx) are being prepared for this study. This project is commonly referred to as the SR 415 PD&E Study.

This PE Report presents information on the need for the project and existing conditions, develops and evaluates alternatives, and provides engineering details of the proposed improvements.

Several additional documents and studies were prepared for this study and serve as support documentation to this PE Report. The following documents include:

- *Type II, Categorical Exclusion* (September 2004)
- *Air Quality Technical Memorandum* (October 2003)
- *Comments and Coordination Report* (October 2004)
- *Contamination Screening Evaluation Report* (December 2003)
- *Cultural Resource Assessment Corridor* (November 2002)
- *Cultural Resource Assessment Survey* (October 2003)
- *Endangered Species Biological Assessment* (June 2004)
- *Final Technical Memorandum: Design Traffic Phase I – Existing Conditions* (August 2003)
- *Final Technical Memorandum: Design Traffic Phase II – Future Conditions* (August 2003)
- *Initial Alternatives Public Workshop Summary* (March 2003)

Key Location Map



## 2.2.1 Proposed Multi-Use Trail

As part of the PD&E Study, FDOT has committed to assess the feasibility of a multi-use trail facility within the SR 415 corridor for non-motorized modes, including bikeways and pedestrian walkways. The study limits for the proposed trail extend from SR 46 in Seminole County to SR 44 in Volusia County. The facility will cross over the St. Johns River, which is a navigable waterway. In addition, the facility will cross over Mud Creek, Deep Creek, the Lake Ashby Canal, and the Alamana Canal. The potential for connections to the other existing/planned multi-use trail facilities and crossing locations along SR 415 are also being considered. The proposed multi-use trail is independent of the proposed roadway improvements to SR 415 and is being studied at the request of Volusia County.

## 2.2.2 SR 415 Land Use Corridor Analysis Study

In coordination with the PD&E Study, FDOT initiated *the SR 415 Land Use Corridor Analysis Study* to address concerns related to growth and potential sprawl in southeast Volusia County. The purpose of the land use study is to coordinate with Volusia County and the surrounding communities to better define a land use character and vision that will allow FDOT to develop transportation improvements for the area that complement and respond to the desired land use plan.

This is an independent study that was performed at the request of Volusia County that focuses on methods to promote and preserve the rural character of the SR 415 corridor. The study has identified a desire on the part of the community to develop roadway designs that protect scenic views and environmentally sensitive areas, while enhancing development within rural development clusters, such as Osteen.

## 2.2.3 Study Sections

To facilitate the engineering and environmental analyses and document preparation, the project study area has been divided into two sections, the Southern and Northern Sections. The Southern Section is further divided into seven segments.

### ***Southern Section***

- **Segment A** – Extends from SR 46 in Seminole County to just south of the St. Johns River Bridge in Volusia County.
- **Segment B** – The SR 415/St. Johns River Bridge at the Seminole/Volusia County line.
- **Segment C** – Extends from just north of the St. Johns River Bridge in Volusia County to Reed Ellis Road.
- **Segment D** – Extends from Reed Ellis Road to Lemon Bluff Road.
- **Segment E** – Extends from Lemon Bluff Road to north of Kove Estates.
- **Segment F** – Extends from north of Kove Estates to Doyle Road.
- **Segment G** – Extends from Doyle Road to Acorn Lake Road.

Capacity improvements are being evaluated only for this section (Segments A through G) of the project. In addition, a multi-use trail is being studied throughout this section.