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.

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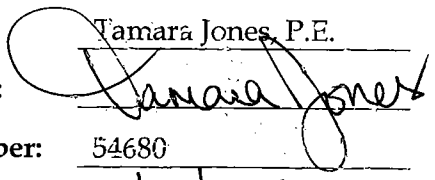
Signature:	
P.E. Number:	54680
Date:	10/20/2004

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

Table of Contents

Table of Contents

Table of Contents

Chapter — Page

Appendixes

Table of Contents

List of Figures

Table of Contents

Figure **Page**

Table of Contents

List of Tables

Table of Contents

Tables

Table of Contents

Tables

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)

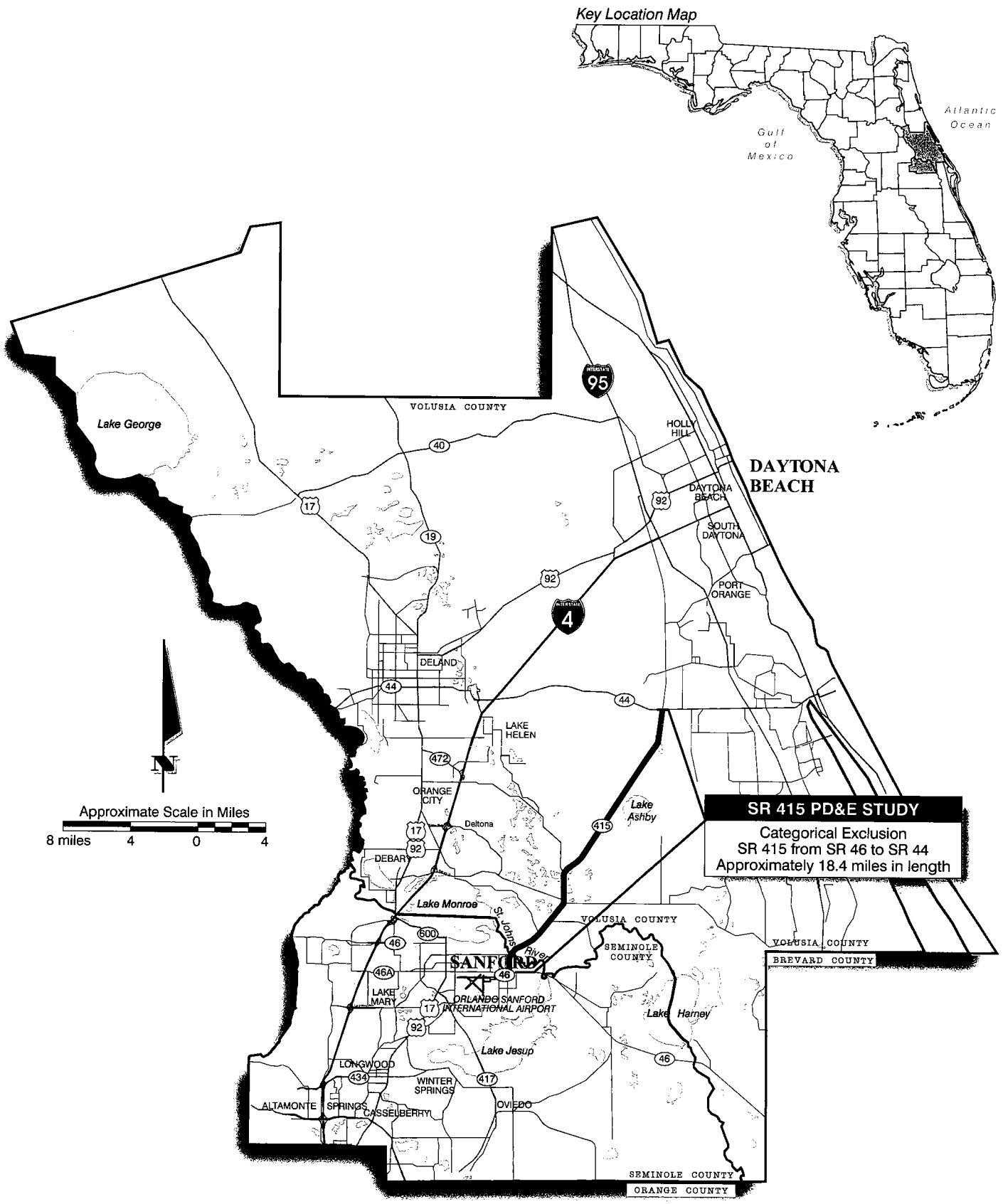


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Figure 2-1
Regional Location Map

SR 415 PD&E Study

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.