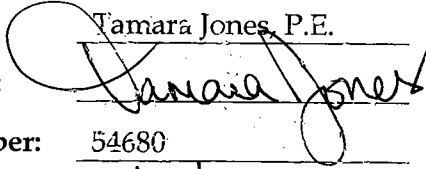


PROFESSIONAL ENGINEER CERTIFICATE

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.

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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.

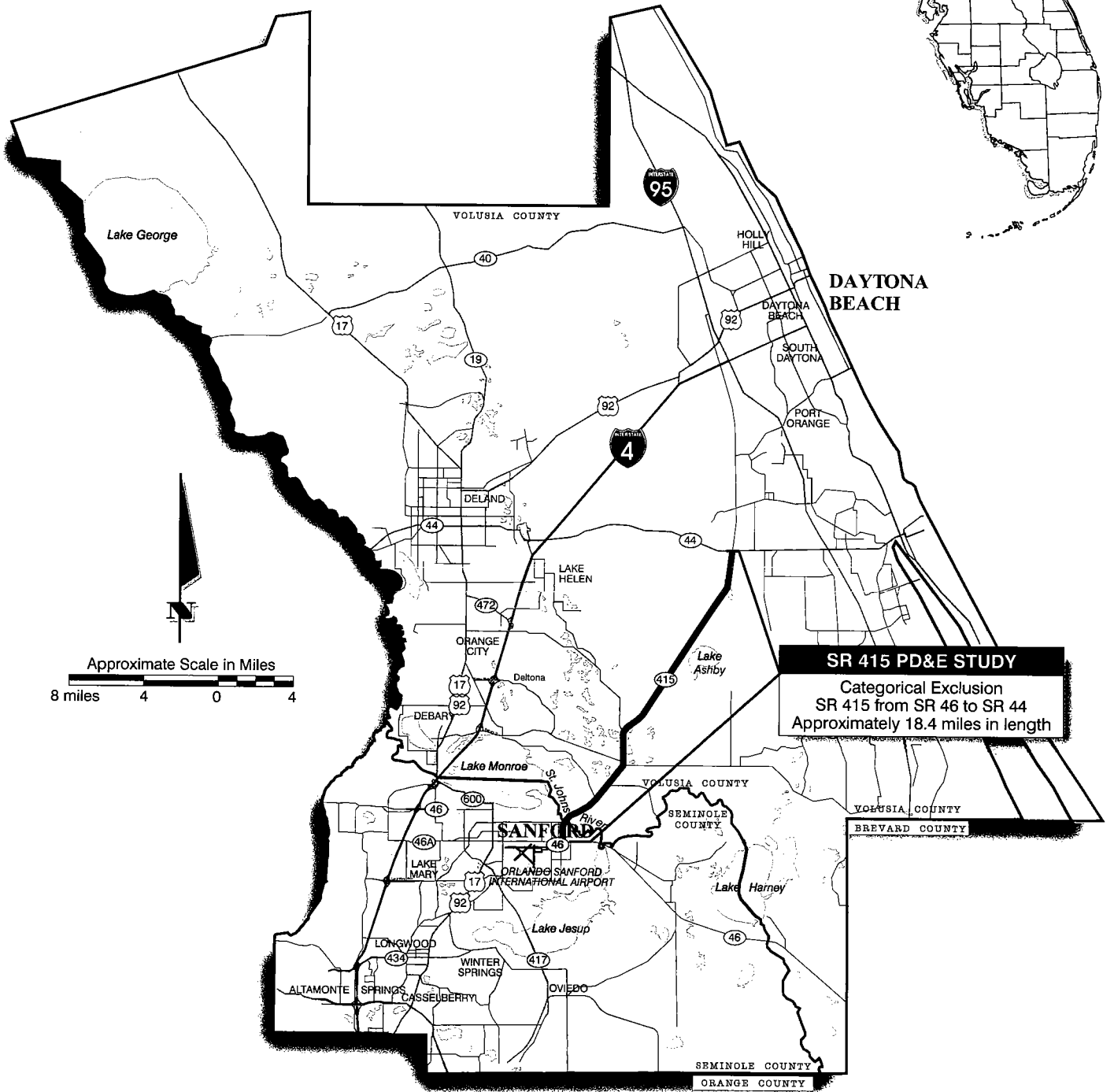
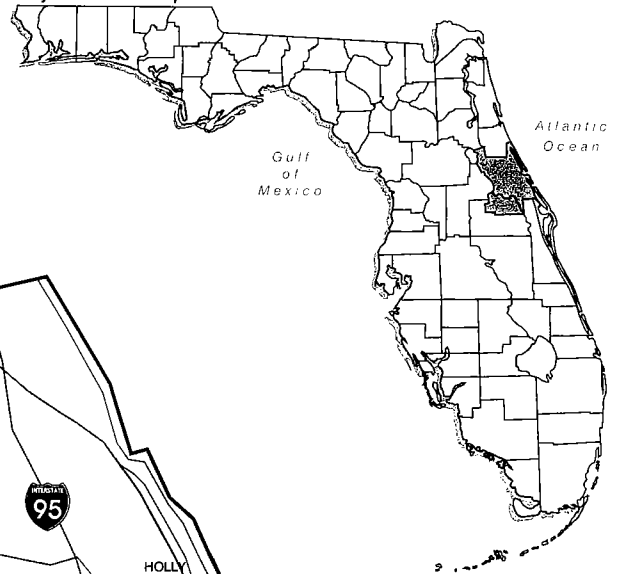
The Federal Highway Administration (FHWA), in consultation with the Florida Department of Transportation (FDOT), proposes to widen and improve sections along the State Road (SR) 415 corridor from SR 46 in Seminole County to SR 44 in Volusia County. The purpose of the project is to enhance the ability 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.

Northern Section

The Northern Section extends from north of Acorn Lake Road to the end of the project study limits at SR 44 in Volusia County. Only the multi-use trail is being studied throughout this section.

2.3 Timing of Construction

To keep up with the tremendous growth in Seminole and Volusia Counties, METROPLAN Orlando and the Volusia County Metropolitan Planning Organization (MPO) have identified the need to widen and improve SR 415 through the project study limits as a top priority. Design for the four-lane widening is planned through Fiscal Year 2004/2005 for the portion from SR 46 to the Seminole County Line and is planned through Fiscal Year 2006/2007 for the portion through Volusia County. Right-of-way acquisition is funded in Fiscal Year 2008/2009. However, no funding for construction has been allocated.

2.4 Other Related Studies

Other related transportation studies are currently planned within the project study area. Some of the related studies include the following:

- **East Lake Mary Boulevard (Silver Lake Drive) Widening** – This project involves four-laning approximately 3.2 miles of East Lake Mary Boulevard from US 17/92 to the Orlando Sanford International Airport entrance (FM No. 410521). This is a County Incentive Grant Program project.
- **East Lake Mary Boulevard (Silver Lake Drive) Extension** – This project involves the construction of a new four-lane roadway that would extend from the Orlando Sanford International Airport entrance to the intersection of SR 46/SR 415 in Seminole County (FM No. 410522). The total length of this project is approximately 3.8 miles in length. This is a County Incentive Grant Program project.
- **Celery Avenue Roadway Retrofitting/Drainage Improvements** – This project involves drainage improvements and/or retrofitting a segment of Celery Avenue from Mellonville Avenue to Chickasaw Drive in Seminole County.
- **SR 415 Resurfacing (completed)** – This project involves resurfacing 5 miles of SR 415 from the north end of the St. Johns River Bridge to north of Doyle Road (FM No. 404131).
- **SR 415 Turn lane Additions (completed)** – This project involves the addition of bi-directional turn lanes between Doyle Road and Enterprise-Osteen Road, and the addition of a northbound right turn lane at Reed Ellis Road just east of Deltona (FM No. 404312).
- **Low-Level Relief Bridge Replacement (completed)** – This project involves the replacement of Bridge No. 790032, which is located approximately 2 miles south of Osteen (FM No. 240921).
- **Doyle Road Signal Warrant Study**

- **Deltona Road Widening Projects** – These Volusia County projects involve widening (from two to four lanes) Fort Smith Boulevard between Courtland Boulevard and SR 415; Normandy Boulevard between Saxon Boulevard and Firwood Drive; and Courtland Boulevard between Fort Smith Boulevard and Howland Boulevard (FM No. 410984, 410985, and 410987). These are Transportation Outreach projects.
- **Elkcam Boulevard Extension** – It should be noted, that this project was removed from the Volusia County's 5-Year Work Program. The decision to remove this project from the list took place at the January 23, 2003 Council Meeting.
- **SR 417 Extension Study (Turnpike's Feasibility Study)** - Florida's Turnpike Enterprise conducted a Volusia County Corridor Study to investigate the feasibility of a new toll road in Seminole and Volusia Counties. This road would extend from SR 417 (Central Florida GreeneWay) in Seminole County north to connect with Interstate 95 in Volusia County. The Florida's Turnpike Enterprise presented their findings to the Volusia County Council in June 2003 in which the project was found not to be feasible due to high environmental impacts and mitigation costs. Estimated revenues fell significantly short of project costs, and therefore, due to State Statute, the Florida's Turnpike Enterprise cannot advance the project concept without identifying potential funding partners.
- **SR 44 Widening** – This project involves four-laning 6.4 miles of SR 44 from I-4 to Pioneer Trail and add two eastbound lanes to the new alignment along the 1 mile stretch west of I-4 (FM No. 2408052 and 2409982). In addition, SR 44 is planned to be four-laned from Pioneer Trail to SR 415 (FM No. 2408053); a total distance of approximately 3.7 miles.
- **LPGA Boulevard Extension** – An environmental study is planned to investigate the feasibility of extending LPGA Boulevard as a new two-lane roadway from US 92 south to Tomoka Farms Road (CR 415) (FM No. 4102521).
- **LPGA/Madeline Avenue Extension** – An alignment study being conducted by Volusia County is planned to investigate the feasibility of a new two-lane roadway that would extend Madeline Avenue from Tomoka Farms Road (CR 415) to Williamson Boulevard (FM No. 5010). This westward connection would ultimately link to a proposed southward extension of LPGA Boulevard (FM No. 4102521).

The above-mentioned projects are all independent and not associated with this PD&E study.

3. Need for Improvement

SR 415 is a key component of East Central Florida's transportation roadway network. It provides system linkage between Seminole and Volusia Counties and serves as an alternate route to both Interstate 4 (I-4) to the west and Interstate 95 (I-95) to the east. Traffic congestion along SR 415 adversely affects the transportation and the needs of the region's travelers. In recent years, accidents have increased in frequency on SR 415, resulting in injuries, fatalities, and economic damage. Safety issues and delays on SR 415 are considered to be a transportation problem facing this area.

To keep up with the tremendous growth in Seminole and Volusia Counties, METROPLAN ORLANDO and the Volusia County Metropolitan Planning Organization (MPO) have identified the need to widen and improve SR 415 through the project study limits as a top priority. Potential widening improvements to the SR 415 corridor are also recognized by local and regional long range plans and are consistent with the METROPLAN ORLANDO *2020 Long Range Transportation Plan Update* and the Volusia County MPO *2020 Long Range Transportation Plan Refinement*. In addition, the improvements are also consistent with the METROPLAN ORLANDO *Transportation Improvement Program FY 2003/04-2007/08*, the Volusia County MPO *Transportation Improvement Program FY 2003/04-2007/08*, and the Volusia County Comprehensive Plan.

3.1 Deficiencies

As the residential population of the study area and travel demands increase, it is anticipated that many of the existing arterial and collector roadways within the project study area will be operating at unacceptable levels of service by the year 2030.

The existing SR 415 facility within the project study area was compared against current minimum roadway design criteria and was found to have several deficiencies, including traffic capacity from SR 46 to Deltona, bridge vertical and horizontal clearances at the SR 415/St. Johns River crossing, horizontal curves lengths through Osteen, and shoulder widths throughout the study limits. These are discussed further in Chapter 4. Additional information on current minimum design criteria is provided in Chapter 5 of this report.

The proposed improvement for SR 415 consists of the four-lane widening of the existing facility; however, in order to minimize right-of-way impacts, this improvement is a reconstruction of the existing facility. Therefore, the existing deficiencies on SR 415 within the study limits from SR 46 to Acorn Lake Road will be corrected by the proposed improvements.

3.1.1 Capacity Deficiencies

The concept of levels of service (LOS) is defined as a qualitative measure describing operational conditions within a traffic stream, and the perception by motorists and/or passengers. Six LOS are defined for each type of facility for which analysis procedures are available. The six LOS are given letter designations, A through F, with LOS A representing the best operating conditions and LOS F the worst.

The following discussion summarizes existing capacity constraints and projected future capacity constraints in relation to the need for the proposed improvements. For more detailed discussion of existing and future traffic conditions, refer to Chapter 6 of this report and the *SR 415 Final Technical Memorandum: Design Traffic Phase I Existing Conditions and Phase II Future Conditions*.

3.1.1.1 Existing Conditions

Traffic counts were performed to determine the existing (2002) operating conditions and LOS along the SR 415 corridor. The LOS analyses were completed in accordance with the procedures outlined in the FDOT's *Design Traffic Handbook*, Topic No. 525-030-120-f.

According to the existing (2002) traffic capacity analyses, the average annual daily traffic (AADT) within the project study limits ranged between approximately 4,971 vehicles along SR 415, north of SR 44 to 18,091 vehicles along SR 415, between Celery Avenue (CR 415) and Reed Ellis Road. The volumes are expected to increase to approximately 12,300 vehicles along SR 415, between Howland Boulevard and Fort Smith Boulevard, and approximately 32,000 vehicles between SR 46 and Celery Avenue for the No Build Scenario in year 2030. Based on 2002 FDOT traffic data, SR 415 currently operates at an acceptable level of service (LOS D) from SR 46 to Doyle Road (CR 4162). To the north of Doyle Road (CR 4162), SR 415 operates at LOS C or better.

In addition, several SR 415 cross streets currently operate at deficient LOS (below the acceptable standard of LOS D). These cross streets include SR 46, Celery Avenue (CR 415), Reed Ellis Road, Enterprise-Osteen Road (CR 5758), and Doyle Road (CR 4162). Past and current development within the study area have increased traffic flow such that portions of the corridor operate under forced flow conditions. Primary causes for these deficient LOS result from inadequate capacity at the cross street locations. It is anticipated that this operational constraint will remain a primary factor that will impede traffic flow along the facility even under improved conditions. For a more detailed discussion of existing traffic conditions, refer to Chapter 6 of this report and the *SR 415 Final Technical Memorandum: Design Traffic Phase I Existing Conditions*.

3.1.1.2 Future Conditions

LOS analyses were performed for the No Build and Build Scenarios for the design year (2030). The LOS analyses were completed in accordance with the procedures outlined in the FDOT's *Design Traffic Handbook*, Topic No. 525-030-120-f. The results of the traffic forecasting effort predict that the AADT along SR 415 will vary from approximately 19,600 vehicles north of SR 44 to approximately 45,300 vehicles from SR 46 to Celery Avenue (CR 415) for the 2030 Build Scenario.

The results of the analyses for the No Build Scenario indicate that portions of SR 415 will operate at LOS F from the beginning of the project, at SR 46 to Doyle Road (CR 4162). The remainder of the corridor will operate at LOS D or better from north of Doyle Road (CR 4162) to the project's terminus, SR44. Figure 6-4, in Chapter 6 of this report, illustrates the future (2030) LOS for the No Build Scenario.

The results of the traffic analyses indicate that implementing the proposed improvements will improve the operations of SR 415 for the design year (2030). For the Build Scenario, SR 415 will operate at an acceptable LOS D or better from north of Reed Ellis Road to SR 44. The highway will operate at a LOS E from Celery Avenue (CR 415) to Reed Ellis Road, and LOS F from south of SR 46 to Celery Avenue (CR 415).

3.1.2 Evacuation Routes and Emergency Services

SR 415 is classified as an emergency evacuation route by the Volusia County Emergency Management Division, providing an inland evacuation route for the coastal regions of Volusia County. SR 46 and SR 44 are also emergency evacuation routes.

3.2 Safety

Overall, the FDOT and County's crash data for SR 415 indicate that a considerable number of crashes are occurring in Seminole County. FDOT and County crash data are not consistent, but are similar. The number of crashes in the Seminole County portion of the corridor results in FDOT safety ratios well over 1.0. The number of crashes in the Volusia County portion result in a safety ratio lower than 1.0, based on the FDOT crash data; however, 100% of the fatalities along the corridor are occurring in Volusia County. The proposed expansion of the SR 415 facility will better accommodate the projected number of trips along the study area between SR 46 and Deltona. The improvement will also provide better channelization of traffic and access management. This will reduce the number of potential vehicle conflict points along the corridor. This would likely have a positive impact on reducing the number of crashes and injuries in the study area.

3.3 Consistency with Regional and Local Transportation Planning

The proposed improvements have been coordinated with and are consistent with other transportation improvements planned for the project study area. The FDOT transportation plan provides the basis for the development of a statewide transportation system by prioritizing state projects listed in the Long Range Transportation Plans (LRTPs) of regional and local jurisdictions. METROPLAN ORLANDO and the Volusia County MPO are responsible for developing and updating the LRTPs within Seminole and Volusia Counties, respectively and for addressing all the transportation needs of the region. All local government comprehensive plans must be consistent with the LRTPs of both planning organizations.

The following current adopted comprehensive planning documents of the regional and local government jurisdictions within the project study area were reviewed to determine their consistency with the proposed improvements:

- Florida Department of Transportation 2020 Florida Transportation Plan (adopted March 1995).
- METROPLAN ORLANDO *2020 Long Range Transportation Plan Update* (adopted December 2000). Major long-term planned improvements of the surrounding roadway network within Seminole County are summarized in Table 3-1 and presented in Figure 3-1.
- Volusia County MPO *2020 Long Range Transportation Plan Refinement* (adopted November 2000). Major long-term planned improvements of the surrounding roadway network within Volusia County are summarized in Table 3-1 and presented in Figure 3-1.
- METROPLAN ORLANDO *Transportation Improvement Program (TIP) FY 2003/04 – 2007/08* (adopted July 9, 2003). The SR 415 widening from SR 46 to the Volusia County line and other major roadway improvements within close proximity to the project study area are listed in Table 3-2 and presented in Figure 3-2.
- Volusia County MPO *Transportation Improvement Program FY 2003/04 – 2007/08* (adopted June 24, 2003). The SR 415 widening from the Seminole County line to SR 44 and other major roadway improvements within close proximity to the project study area are listed in Table 3-2 and presented in Figure 3-2.
- Seminole County *Vision 2020 Comprehensive Plan* (adopted September 1991; amended through September 2002)
- *The Volusia County Comprehensive Plan* (adopted March 1990; amended through August 2002)

It should be noted that the regional and local government comprehensive plans have not been approved by FHWA and, therefore, do not constitute a Federal action or an endorsement.

Table 3-1. METROPLAN ORLANDO and Volusia County MPO's 2020 Long Range Transportation Plans

County	Project Name	From	To	Work Description
Federal and State				
Volusia	SR 44	Pioneer Tr (CR 4118)	SR 415	Widen to 4 lanes
Seminole	SR 46	Mellonville Ave	SR 415	Widen to 4 lanes
Seminole	SR 46	SR 415	Volusia County line	Widen to 4 lanes
Seminole	SR 415	SR 46	Volusia County line	Widen to 4 lanes
Volusia	SR 415	SR 44	Howland Blvd	Widen to 4 lanes
Volusia	SR 415	Howland Blvd	Seminole County line	Widen to 4 lanes
Local				
Volusia	Elkcam Blvd Extension	Riverhead Dr	SR 415	New 2-lane road
Volusia	Howland Blvd	Deltona High School	Providence Blvd	Widen to 4 lanes
Volusia	Providence Blvd	Ft Smith Blvd	Tivoli Dr	Widen to 4 lanes
Volusia	Providence Blvd	Howland Blvd	Elkcam Blvd	Widen to 4 lanes
Volusia	Saxon Blvd	Enterprise Rd	I-4	Widen to 6 lanes
Volusia	Saxon Blvd	Tivoli Dr	Providence Blvd	Widen to 4 lanes

Note: Only projects that are within close proximity to the project study area are included above and presented on Figure 3-1.
 Sources: METROPLAN ORLANDO 2020 Long Range Transportation Plan Update (adopted December 2000) and Volusia County MPO 2020 Long Range Transportation Plan Refinement (adopted November 2000)

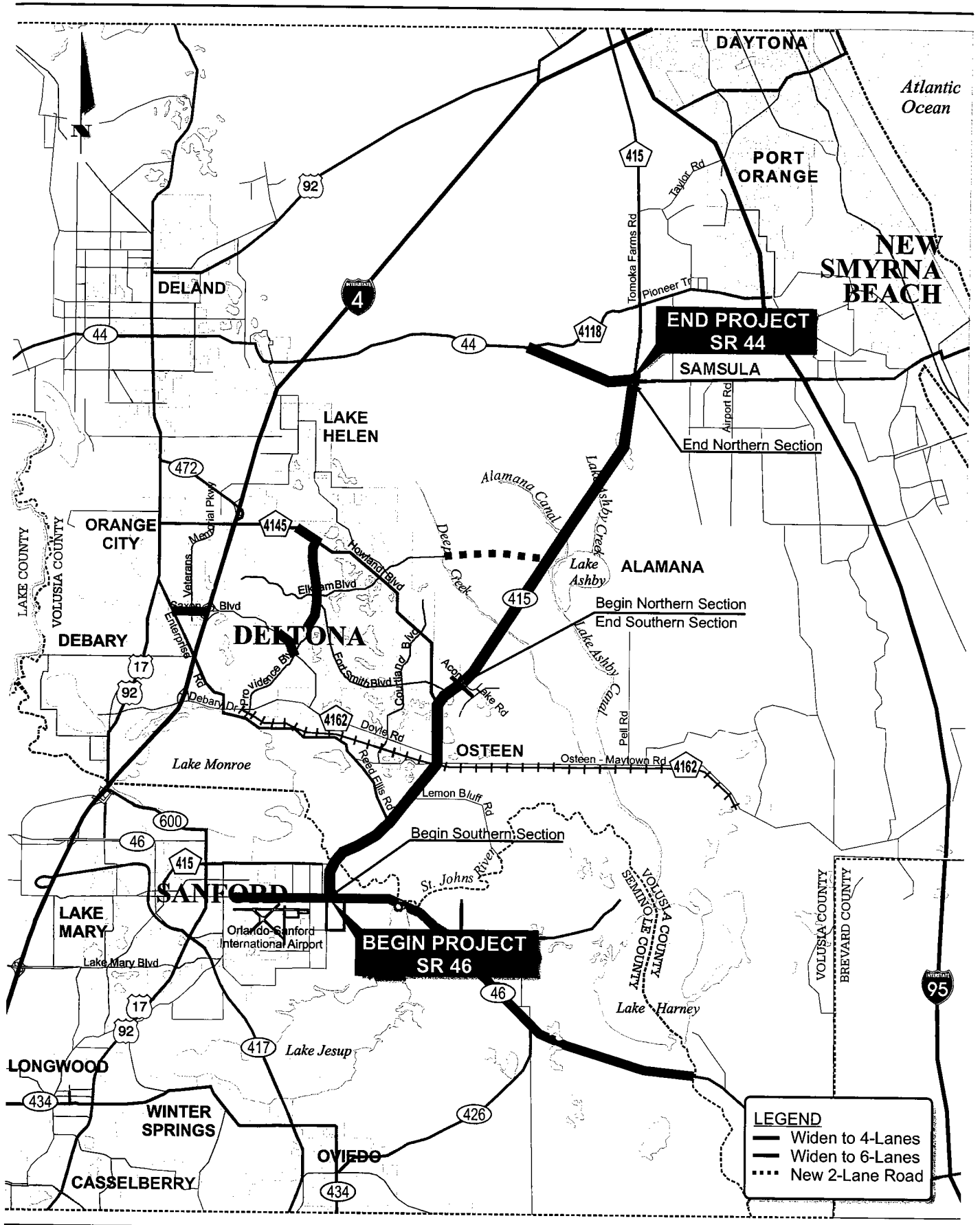


Figure 3-1
 METROPLAN ORLANDO and Volusia County MPO's
 Long Range Transportation Plans
 SR 415 PD&E Study

Table 3-2. METROPLAN ORLANDO and Volusia County MPO's Transportation Improvement Programs FY 2003/04 – 2007/08

County	Project Name ¹	From	To	Work Description
Federal and State				
Volusia	SR 44	Summit Ave	West ramps of I-4	Widen to 4 lanes
Volusia	SR 44	West ramps of I-4	Pioneer Tr (CR 4118)	Widen to 4 lanes
Seminole	SR 46	US 17/92	0.145 miles east of SR 415	Resurfacing
Seminole	SR 46	St. Johns River north of Lake Jesup	Bridge #770004	Replace low-level bridge
Seminole	SR 415	SR 46	Volusia County line	Widen to 4 lanes
Volusia	SR 415	Seminole County line	Howland Blvd	Widen to 4 lanes
Volusia	SR 415	Howland Blvd	SR 44	Widen to 4 lanes
Seminole/ Volusia	Volusia/Seminole Co. Corridor Project ²	SR 417 in Seminole County	I-95 in Volusia County	New 4-lane road in SR 415 Corridor
Local				
Seminole	Airport Blvd	US 17/92	CR 46A	Widen to 4 lanes
Seminole	Airport Blvd	CR 46A	SR 46	Widen to 4 lanes
Seminole	C-15/Monroe Rd	SR 46	US 17/92	Widen to 4 lanes
Seminole	CR 46A	C-15	Old Lake Mary Blvd	Widen to 4 lanes
Volusia	DeBary Ave/Doyle Rd	I-4	Providence Blvd	Widen to 4 lanes
Seminole	E. Lake Mary Blvd	US 17/92	Airport entrance	Widen to 4 lanes
Seminole	E. Lake Mary Blvd	Airport entrance	SR 46/SR 415	New 4-lane road
Volusia	Enterprise Rd	Saxon Blvd	US 17/92	Widen to 6 lanes
Volusia	Howland Blvd	Elkcam Blvd	Newmark Dr	Widen to 4 lanes
Volusia	Howland Blvd	Newmark Dr	Courtland Blvd	Widen to 4 lanes
Volusia	Providence Blvd	Ft Smith Blvd	Elkcam Blvd	Widen to 4 lanes
Volusia	Saxon Blvd (Phase II)	Sumatra Ave	Tivoli Dr	Widen to 5 lanes

Notes:

1. Only projects that are within close proximity to the project study area are included above and presented on Figure 3-2.
2. This project was considered by both METROPLAN ORLANDO and the Volusia County MPO to be their joint #1 priority unfunded project due to the need to provide additional roadway capacity in the SR 415 corridor to serve the travel demand between I-95 in Volusia County and SR 417 in Seminole County. Florida's Turnpike District was conducting a planning study to determine the feasibility of such a facility. No subsequent phases are funded at this time, and therefore, this project is not shown on Figure 3-2.

Sources: METROPLAN ORLANDO *Transportation Improvement Program FY 2003/04 – 2007/08* (adopted July 9, 2003) and Volusia County MPO *Transportation Improvement Program FY 2003/04 – 2007/08* (adopted June 24, 2003).

3.4 Social Demands or Economic Developments

This section provides an overview of population, economics, and land use characteristics of Seminole and Volusia Counties, as well as the project study area.

3.4.1 Population and Employment

Over the last two decades, Volusia and Seminole Counties have experienced tremendous growth. In 2001, approximately 452,050 people resided in Volusia County and approximately 377,960 people resided in Seminole County. However, it is anticipated that by the year 2010, the population of Volusia and Seminole Counties will grow to approximately 513,800 residents and 447,100 residents, respectively. This represents a population increase of 14 percent for Volusia County and 18 percent for Seminole County from 2001. In addition, the population of Volusia and Seminole Counties is expected to increase to approximately 585,100 residents and 526,700 residents, respectively, by 2020. This represents a population increase of 29 percent for Volusia County and 39 percent for Seminole County from 2001. Notably, SR 415 is the one of the primary north-south facilities that serves the Volusia County area and has become a primary commuting corridor for residents.

3.4.2 Activity Centers

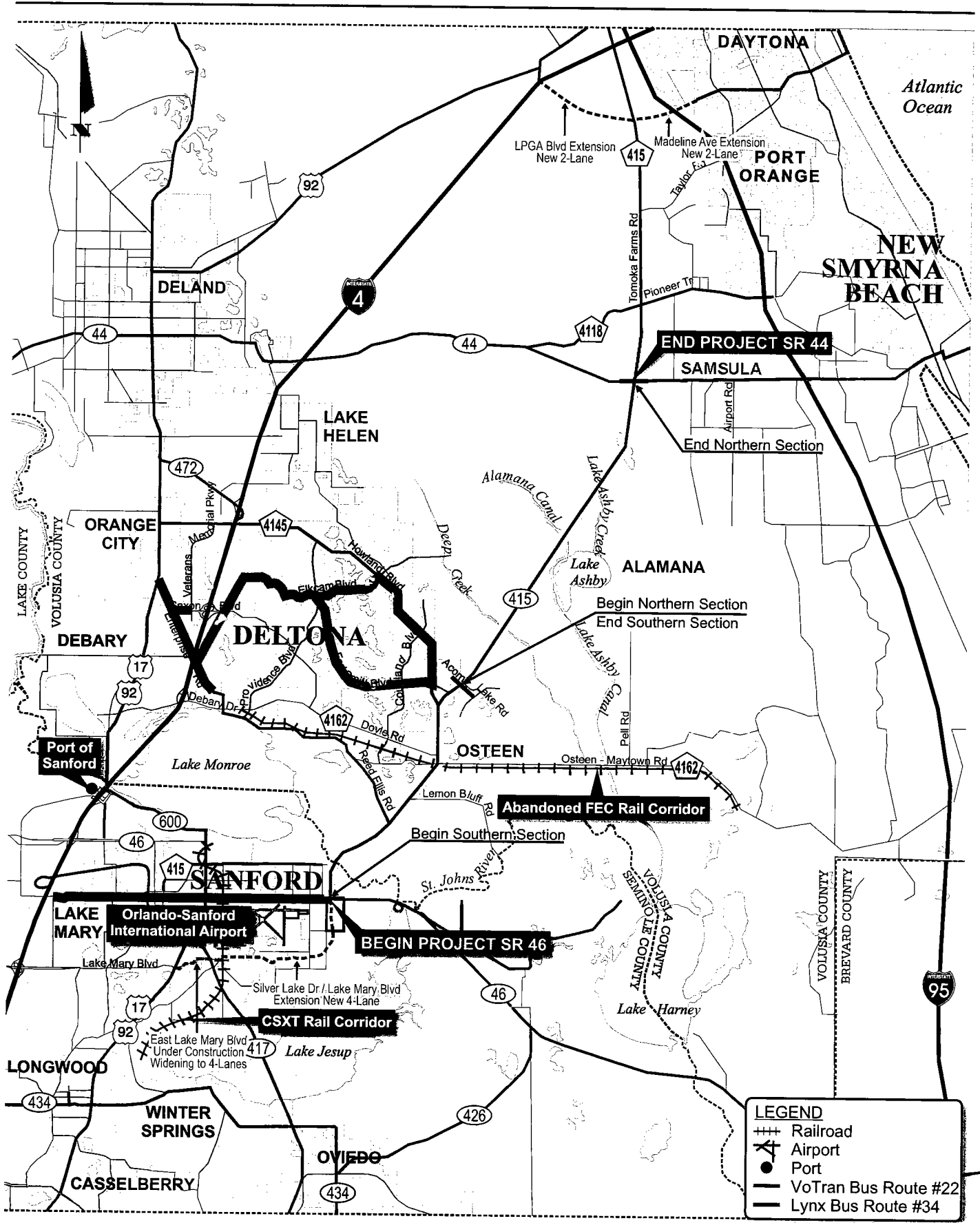
The *Land Use Corridor Analysis Study* has identified the area surrounding the Town of Osteen as a potential area for limited urban growth. Under this concept, compact commercial growth in the vicinity of Osteen-Maytown Road and Doyle Road would be encouraged. Other commercial nodes along the SR 415 corridor exist at the intersection of SR 46 and SR 44. In the Northern Section of the project study area, north of Deltona, portions of the project corridor have been identified as a Natural Resource Management Area (NRMA) by Volusia County, in which only growth which is compatible with the environmentally sensitive area would be encouraged.

3.4.3 DRIs and other Development Activity

Information on DRIs was collected using the East Central Florida Regional Planning Council's (ECFRPC's) *1998 - 2001 Development of Regional Impact Summaries*. The ECFRPC's *Perspective on Regional Growth 1992 - 1996* was referenced in order to determine the development activity that is being proposed for the study area.

The only DRI located within close proximity to the project study area is the Orlando Sanford International Airport. SR 46 provides regional access to the Airport from the west via Interstate 4 and from the east via Interstate 95. The Airport was opened in 1942 and has experienced considerable growth since. Future plans include more development and expansion in this area. The Airport master plan was recently updated in 2001. Highlights of infrastructure development during the last 5 years include runways, domestic/international terminals, taxiways, a control tower, a fire station, and additional parking. Other new projects include commerce park improvements, a hangar, a Fixed Base Operator facility and a seven-gate domestic terminal expansion.

Some of the land use types characterized by this area is comprised of a mixture of flight training school/general aviation/light industrial. The location of the Airport is presented on Figure 3-3.



LEGEND	
+++	Railroad
✈	Airport
●	Port
—	VoTran Bus Route #22
—	Lynx Bus Route #34

Figure 3-3
Intermodal Services

3.4.4 Modal Interrelationships

The project study area is served by different modes of travel including public transit service, rail service, airports, and sea ports.

3.4.4.1 Mass Transit

LYNX provides existing public transportation service within the Seminole County area while VOTRAN provides service within the Volusia County area. LYNX was established in 1989 as an agency by the Florida Legislature to operate and maintain public regional bus service. The existing LYNX system consists of one bus route (Link 34) that serves the SR 46 corridor just southwest of the beginning of the SR 415 study limits. This route links commuters to the City of Sanford, Seminole County Administrative Services, and the Orlando Sanford International Airport. The existing LYNX bus route is presented on Figure 3-3.

VOTRAN was established in 1975 by the Volusia County Government to operate and maintain bus service in Volusia County. The existing VOTRAN system consists of one bus route (Route 22) that serves the City of Deltona, just west of the project study area. This route links commuters to the City of Deltona, Deltona Plaza, the Saxon Market Place, and Pine Ridge High School. The existing VOTRAN bus route is presented on Figure 3-3.

3.4.4.2 Rail Service

CSX Transportation (CSXT) currently provides freight and passenger rail service in the Central Florida area. There is one railroad line that runs west of the Orlando Sanford International Airport, which is shown on Figure 3-3. There are no existing freight or passenger lines located within the project study limits. There is an abandoned Florida East Coast (FEC) railroad line that runs east-west through the Town of Osteen and parallels Doyle Road and Osteen-Maytown Road.

3.4.4.3 Airports

Orlando Sanford International Airport, located in the City of Sanford, has expanded to become the third busiest international port of entry in Florida. Orlando Sanford International Airport offers both domestic and international service to locals and business travelers while providing charter flights, ground handling, and cargo services. The Airport is operated and maintained by the Sanford Airport Authority. SR 415 provides regional access to the Airport from the north via SR 44 in Volusia County and from the south via SR 46 in Seminole County. Refer to Figure 3-3 for a general location of the airport. Orlando Sanford International Airport is located to the south of the project study limits. Therefore, there are no existing airports located along the SR 415 corridor.

3.4.4.4 Ports

The Port of Sanford has river barge access from the Atlantic Intercoastal Waterway in Jacksonville via the St. Johns River to Lake Monroe. It is located in Seminole County near the I-4/US 17-92 interchange. This port includes 250,000 square feet of industrial and distribution space, a 350-foot main pier, and a 100-foot bulk unloading pier. Access to the port from the SR 415 corridor is via SR 46 west to US 17-92 north. Although this port is not located within the project study limits, SR 415 does provide regional access to this facility. The location of the port is shown on Figure 3-3.

4. Existing Conditions

The existing (2003) conditions for the SR 415 corridor were evaluated by performing a review of existing plans and documents, coordination with regulatory agencies, and field reconnaissance. The posted speed limit on SR 415 varies between 45 and 55 mph through the urban and rural sections, respectively. This project was reviewed against a design speed ranging from 45 to 60 mph and desirable design criteria (as referenced in Chapter 5).

The following sections provide a description of the existing roadway and bridge conditions, and social and environmental characteristics for the SR 415 corridor. As described in Chapter 2, the project study area has been divided into two sections, the Southern and Northern Sections. The Southern Section extends from SR 46 to Acorn Lake Road and is further divided into seven segments, Segment A through G. The Northern Section extends from Acorn Lake Road to SR 44.

4.1 Existing Roadway Characteristics

4.1.1 Functional Classification

SR 415 is functionally classified by the FDOT Straight Line Diagrams as a two-lane, rural minor arterial from MPs 0.000 to 0.897 in Seminole County. In Volusia County, SR 415 is classified as a rural minor arterial from MPs 0.000 to 4.388 and 8.826 to 17.590, and as an urban minor arterial from MPs 4.388 to 8.826. The corridor is a key north-south facility that provides system linkage between Seminole and Volusia Counties, and is part of Florida's State Highway System. In addition, SR 415 is classified as an emergency evacuation route by the Volusia County Emergency Management Division, providing an inland evacuation route for the coastal regions of Volusia County.

The existing roadway network along the SR 415 corridor from SR 46 to SR 44 consists of several at-grade intersections with local roads, collectors, and arterials. Table 4-1 presents the functional classification and the maintaining agency of the collector and arterial cross streets located along the SR 415 corridor. All other cross streets within the project corridor are classified as local roads. The functional classification data was obtained from the Seminole County *Vision 2020 Comprehensive Plan* and the Volusia County *Comprehensive Plan*.

4.1.2 Typical Section(s)

Roadway

The existing typical section for the majority of the SR 415 study corridor consists of two 12-foot travel lanes (one in each direction) with no median separation. The outside shoulders vary between 8 and 12 feet, with 4 feet paved on both sides of the roadway. Through the center of Osteen, from Thompson Avenue, south of Enterprise-Osteen Road, to Lake Street, just south of Doyle Road, the typical section is modified to include a 12-foot center turn lane.

Table 4-1. Functional Classification of Cross Streets

Cross Street	Classification	Maintaining Agency
<i>Southern Section</i>		
Lake Mary Blvd Extension (under construction)	Minor Arterial	Seminole County
SR 46	Principle Arterial	FDOT
Celery Ave (CR 415)	Collector	Seminole County
Reed Ellis Rd	Collector	Volusia County
Lemon Bluff Rd	Collector	Volusia County
Enterprise-Osteen Rd	Collector	Volusia County
Doyle Rd (CR 4162)	Arterial	Volusia County
Howland Blvd (CR 4145)	Arterial	Volusia County
Fort Smith Blvd	Collector	Volusia County
<i>Northern Section</i>		
SR 44	Rural Principle Arterial	FDOT

The original roadway was constructed with a 3/16" per foot (0.0156 ft/ft) cross slope; however, several reconstruction and milling and resurfacing projects in recent years have corrected the slope to 0.02 ft/ft, per current design standards (with the exception of the superelevated sections). The original grassed shoulders were constructed with a 0.0625 ft/ft slope to natural ground. The shoulders have since been reworked with a 4-paved width to the outside of the travel lane, and a varying grassed width to natural ground, with a 0.06 ft/ft slope. The typical section right-of-way width varies between approximately 100 and 150 feet with the exception of a wider section near the SR 415/St. Johns River Bridge (Douglas Stenstrom Bridge No. 790124). For further information on the existing right-of-way widths refer to Section 4.1.5. The existing typical section was obtained from existing SR 415 construction drawings. Figure 4-1 presents the existing SR 415 roadway typical section. The existing bridge typical section is described in Section 4.2.

4.1.3 Pedestrian and Sidewalk Facilities

A summary of existing sidewalks along the SR 415 corridor is presented in Table 4-2.

A crosswalk on the north side of the intersection of SR 415 and Doyle Road connects the existing 8-foot sidewalk that runs along the east side of SR 415 from New Smyrna Boulevard to Doyle Road with an existing sidewalk that runs along the north side of Doyle Road. The location of these existing sidewalks are shown on Figure 4-2.

Existing SR 415 Typical Section

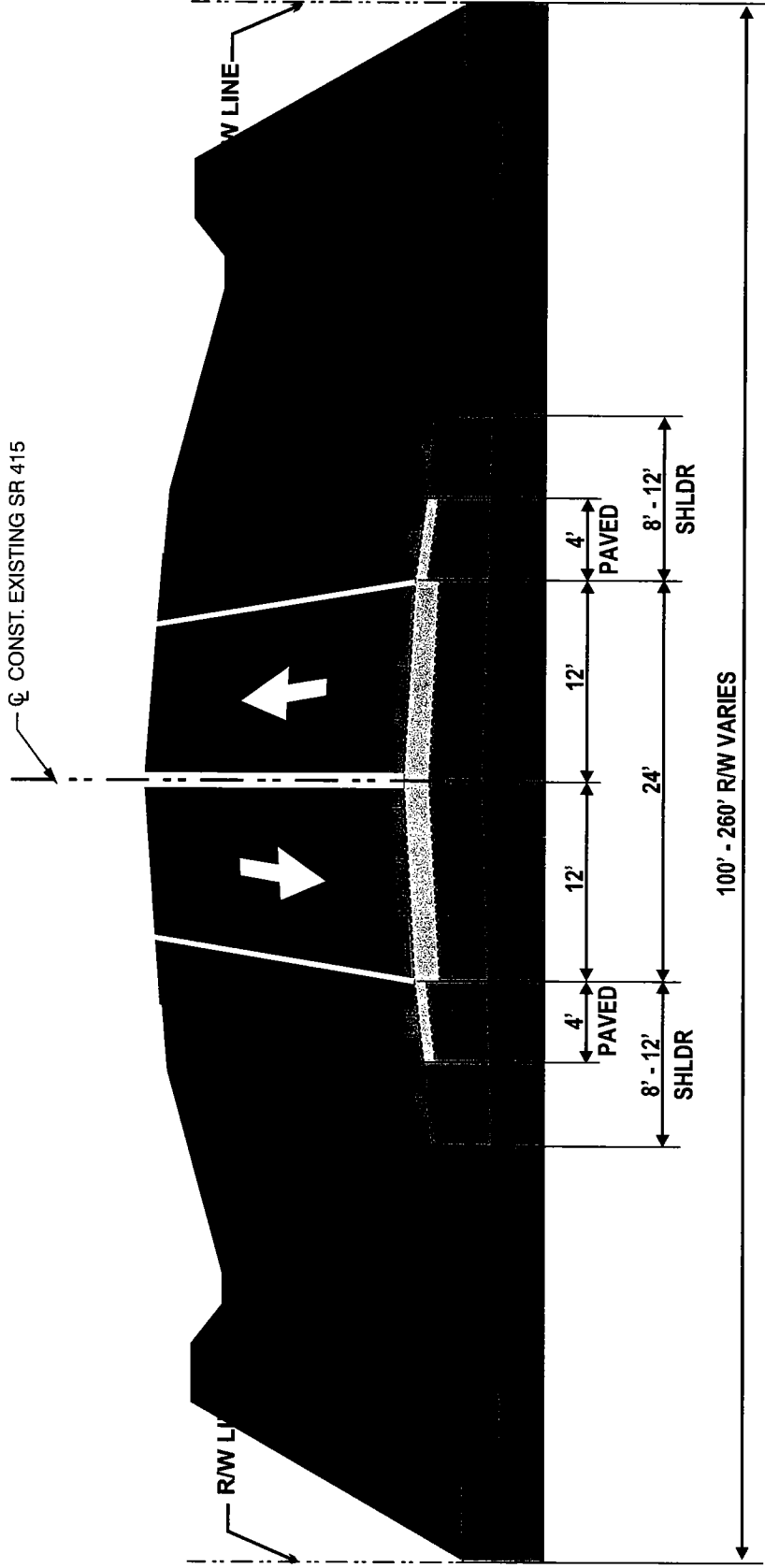


Figure 4-1
Existing SR 415 Typical Section
SR 415 PD&E Study

