# FDOT District 5

# SR 483 (Clyde Morris Boulevard) Project Development and Environment Study

***FINAL***

***Preliminary Engineering Report***

***August 2006***

**Reynolds, Smith and Hills, Inc.**
*Architectural, Engineering, Planning and Environmental Services*

**PRELIMINARY ENGINEERING REPORT**

**SR 483 (CLYDE MORRIS BOULEVARD)**

**FROM**

**SR 400 (BEVILLE ROAD) TO SR 600 (INTERNATIONAL SPEEDWAY BOULEVARD)**

**Volusia County, Florida**

**FIN: 408178-1-22-01**

# FINAL

**Prepared for:**
**Florida Department of Transportation**
**District 5**

**Prepared by:**
**Reynolds, Smith and Hills, Inc.**
**August 2006**

# PD & E / DESIGN Coordination Checklist

| CRITICAL ELEMENT (Needed for Design Phase) | STATUS (Complete or Needs Resolution) | RESOLUTION RQMNTS. (i.e. - Flag in WP, Mini-PD&E prior to Design, etc.) | LOCATION in PD&E (i.e. - Pg. #'s, Commitments Section; Appendix; Etc.) |
|---|---|---|---|
| 1. Preferred Alignment with Concept Maps | Complete | | Pg 8-8 thru 8-12, Ch 9, Appendix B |
| 2. Intersection R/W Impacts (R/W for turn lanes, corner clips) | Complete | | Appendix B |
| 3. Local Agency Commitments | Continued coordination required | Continued contact with Airport and Halifax Medical | Pg 9-13 |
| 4. Agreements for Local Agency/Other Commitments | ***List Agreements & Status on Next Page | Continued contact with City of Daytona Beach and Embry-Riddel University | Pg 9-13 |
| 5. Identification of Funding Sources for Commitments | N/A | | N/A |
| 6. Environmental & Permitting Commitments/Requirements | Continued coordination required | With pond selection, for SJRWMD Permit | Pg 4-26 |
| 7. Approved Typical Sections | Completed | | Figure 8-1, Figure 8-2, Appendix E |
| 8. Bridge Recommendation (Widen / Replace / Remove) | N/A | | N/A |
| 9. Recommended Pond Sites (on aerials/concept plans) | Completed | | Appendix A, Appendix B |
| 10. Location Hydraulics Report (structures, flood plain impacts) | N/A | | N/A |
| 11. Notable Soil Conditions Id'd (sink hole areas, muck, etc.) | N/A | | N/A |
| 12. Access Management Plan | Complete | | Pg 2-2, 4-1, 9-8, 9-14 |
| 13. MOT Concept (constructible at estimated cost) | Need Resolution | Final MOT to be determined during Final Design | |
| 14. Bike / Ped. Requirements | Complete | | Pg 1-1, 1-2, 4-2, 5-1, 9-1, 9-7, 9-8, 9-15 |
| 15. Public Involvement Plan (state/local/public consensus) | Complete | | Pg 1-1, 9-13 |
| 16. Major Utilities - Preliminary Impacts Identified | Complete | | Pg 4-12, 9-12, 9-13 |
| 17. Construction & R/W Estimates (Enough detail to secure in WP) | Complete | | Pg 8-10, 9-5, Appendix E |
| 18. Development Coordination (DRI's, PUD's, etc.) | Need Resolution | Continued Coordination with Embry-Riddle University | |
| 19. Railroad Coordination | N/A | | N/A |

*** Agreements required with local agencies or other entities are as follows:

| **Agreements for Local Agencies or Other Commitments** | | | | |
|---|---|---|---|---|
| **Type of Agreement** (JPA, LFA, Maint., Other) | **Agency or Entity Agreement is With** | **Agency/Entity Contact** (Name, Phone #, Email) | **Status** (Complete/ Needs Resolution) | **Funding Considerations of Agreement** |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**PRELIMINARY ENGINEERING REPORT**
**SR 483 - SR 400 TO SR 600**
**DISTRICT 5**
**FIN: 408178-1-22-01**

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# 1.0 Executive Summary

The improvements to SR 483 in Volusia County are required to meet the traffic demands of the projected growth that has been recognized by the Volusia County Metropolitan Planning Organization in the Volusia County Comprehensive Land Use Plan and the projection of historical growth rates in the year 2030. The recommended improvements include capacity, operational, safety related and multi-modal elements. The existing four lane roadway will be widened to a six lane urban roadway with a raised median, bicycle lanes and pedestrian walkways.

## 1.1 Commitments

The SR 483 PD&E Study has been conducted for the segment of SR 483 from SR 400 to SR 600, a distance of approximately 2.5 miles, all in Volusia County, Florida. During the Study, the project limits were extended south of SR 400 in order to carry the improvements through the very congested intersection of SR 483/SR 400 and extend north of SR 600 to improve the very congested intersection and carry the improvement through the entrances of the Halifax Medical Center to assist their emergency service vehicles. The project included reviews by other federal, state, and local agencies. An extensive public involvement program was conducted throughout the course of the study, and comments have been considered for incorporation into subsequent phases of the project. The formal public hearing for the project was conducted on May 18, 2006. The major commitments that have been made by the Department are summarized below:

1. FDOT will coordinate with the City of Daytona Beach and Embry Riddle University in the design phase regarding stamped asphalt for crosswalks and a landscaped median. Two percent of the construction cost is to be utilized for landscaping.

2. The Lighting Justification Report's conclusion to install full lighting is recommended to be implemented if the anticipated research park is constructed.

3. The request from Volusia County to install enhanced signal apparatus in order to retain full operation after storms is recommended to be re-evaluated in the design phase.

4. Five-foot-wide bicycle lanes will be constructed at the outer edge of pavement on both sides of the roadway between SR 400 and Mayberry Avenue.

5. A five-foot wide sidewalk will be constructed from the beginning of the project, which is approximately 1350 feet south of SR 400, to Hancock Boulevard on both sides of the roadway. An eight-foot wide sidewalk on the west side and a five-foot wide sidewalk on the east side of the roadway will be constructed from Hancock Boulevard to Richard Petty Boulevard. From Richard Petty Boulevard to SR 600, the eight-foot wide sidewalk will be constructed on the east side and the five-foot sidewalk will be constructed on the west side. North of SR 600, a five-foot wide sidewalk will be constructed on both sides of the roadway.

6. Shangri La Park, located on the east side of the roadway between Shangi La Drive and SR 400, will not be impacted by the proposed SR 483 improvement.

7. Other than a potential temporary construction easement, there will be no impacts to the parcel owned by Halifax Medical Center and containing the historical building.

8. During the Final Design phase, FDOT will further coordinate with property owners where noise barriers were recommended for further consideration. FDOT is committed to the construction of feasible noise abatement measures at noise impacted locations, contingent upon the following conditions: detailed noise analyses during the final design process supports the need for abatement; reasonable cost analyses indicate that the economic cost of the barriers will not exceed the guidelines; community input regarding desires, types, heights, and locations of barriers has been solicited by FDOT; preferences regarding compatibility with adjacent land uses, particularly as addressed by officials having jurisdiction over such land uses, has been noted; safety and engineering aspects as related to the roadway user and the adjacent property owners have been reviewed; and any other mitigating circumstances found in Section 17-4.6.1 of FDOT's PD&E Manual have been analyzed.

## 1.2 Recommendations

The project under study, and the subject of this report, is the 2.5-mile segment of SR 483 from SR 400 to SR 600 in Volusia County, Florida. The proposed improvements to the existing four lane facility include the widening of the roadway to six general use lanes, turn lane improvements at the signalized intersection, continuous sidewalks and bicycle lanes in each direction of travel, storm water treatment facilities and safety features that include access management controls that will reduce the number of conflicting movements at median openings and driveway connections. An urban type typical section is being utilized in order to minimize right-of-way acquisition and avoid impacts to adjacent historic site, local parks and involvement with possible contamination sites.

The existing roadway will not meet the capacity needs of the traffic that is project to occur due to the growth in the area. The year 2030 traffic result in the four lane facility operating at a level of service below the adopted Volusia County and the City of Daytona Beach standards. Analysis of the intermediate improvements such as intersection turn lanes and interconnected signals will not provide the necessary operational improvements to meet the level of service standard in the design year. The project is shown in the Volusia County Long Range Comprehensive Plan.

The PD&E Study included the evaluation of a rural typical section and an urban typical section. The rural typical section was not considered reasonable due to its direct impact on residential units and institutions, business displacements as well as involvement with possible contamination sites. The urban alternative reduced the number of residential impacts and business displacements. It has no involvement with parks or recreational sites, and no significant effect upon the natural environment. The urban alternative typical

section is the preferred typical and Alternative 4 is the preferred alignment alternative due to its minimization of residential relocations and avoidance of business displacements.

The total project cost is estimated at $64,000,000.00, with a construction cost estimate of $39,667,000.00. The right of way costs are estimated to be $15,800,000, due primarily to the residential relocations. Engineering, CEI and other administrative costs are estimated to be $8,000,000.

# 2.0 Introduction

This Preliminary Engineering Report (PER) is prepared in accordance with the Department of Transportation's (FDOT) Project Development and Environment (PD&E) Manual, Part 1, Chapter 9. It is also consistent with the appropriate editions of the standard publications listed in Section 9.2.3.1 of the PD&E Manual.

## 2.1 Purpose

The purpose of this Preliminary Engineering Report is to provide the FDOT with the necessary documentation to develop conceptual design alternatives and to establish design requirements for the improvement of SR 483 in Volusia County. The design alternatives presented herein are considered to be feasible from both an engineering and environmental standpoint. The study includes development of a typical cross section, alternative horizontal alignments, appropriate intersection configuration and defined access locations. Each alternative is evaluated with respect to satisfying the travel demand; the right-of-way, construction and engineering costs; residential and business effects; and community and environmental impacts. This Preliminary Engineering Report identifies a preferred design alternative based on the evaluation of both engineering and environmental considerations, and with respect to the public input which has been received throughout the project study.

## 2.2 Project Description

This PD&E Study examines the six-laning of approximately 2.5 miles of SR 483 (Clyde Morris Boulevard) between SR 400 and SR 600, which is located in Daytona Beach, Volusia County, Florida. Clyde Morris Boulevard's southern most termini is its intersection with the Taylor Road in Port Orange, Florida. It continues north until its intersection with SR 40 in Ormond Beach, Florida where it terminates. The segment of Clyde Morris Boulevard from Taylor Road to SR 400 is a County facility, also named CR 483. The segment of Clyde Morris Boulevard from SR 400 to SR 430 is considered a State facility and is referred to as SR 483. The most northern segment, from SR 430 to SR 40 is once again considered a County roadway and is again referred to as CR 483. The study area for this project is within the segment that is a State facility. More specifically the project limits are defined by its southern terminus which is approximately 1,330 feet south of the SR 483/SR 400 intersection and by its northern terminus which is approximately 2,450 feet north of the SR 483/SR 600 intersection. SR 483 is one of the few major north-south arterials within the area. It is currently a four-lane urban principal arterial with the build condition being a six-lane divided urban principal arterial with accommodations for pedestrians and bicyclists. The build condition of SR 483 is designed in accordance with FDOT Plans Preparation Manual, Design Standards, and Florida Intersection Design Guide. A design speed of 45 mph is being used and a Class

5 access management policy is being applied for the entire project. A map of the Project Location is shown on Figure 2-1.

The project is intended to provide relief for the mounting traffic congestion and capacity problems along the facility. A traffic analysis has been performed as part of this study. Future traffic demands for the build and no-build scenarios were forecasted to the years 2010 (Opening Year), 2020 (Mid-Design Year), and 2030 (Design Year). The adopted model for Volusia County was utilized in developing the traffic forecasts. Chapter 6 discusses the traffic analysis in detail.

This PD&E Study examines in detail three alternatives along SR 483. The alternatives are presented and discussed in Chapter 8.


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**SR 483 PD&E STUDY**
**PRELIMINARY ENGINEERING REPORT**

**PROJECT LOCATION**

**FIGURE 2-1**

JOB NUMBER: 107-5777-000

DATE: 12/20/05

# 3.0 Need for Improvement

## 3.1 Area Needs

### 3.1.1 System Linkage

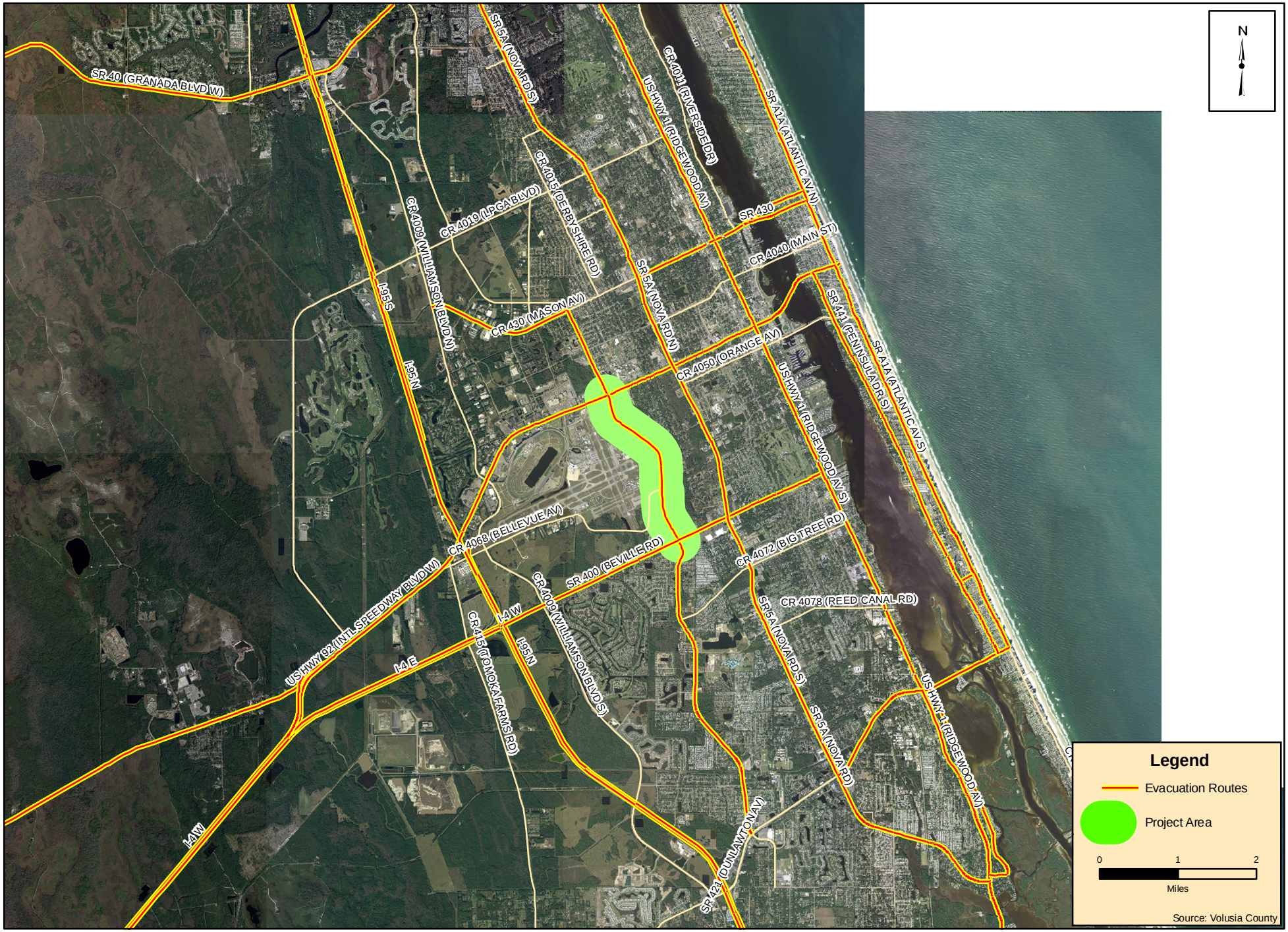
Development within Volusia County has caused a substantial demand on the existing roadway network within the City of Daytona Beach. Of particular concern are the north-south arterials within the area, as there are a limited number that exist. Between the Intracoastal Waterway and I-95 only four exist, which are Williamson Boulevard, SR 483 (Clyde Morris Blvd), SR 5A (Nova Road South), and US 1 (Ridgewood Avenue South), from west to east respectively. Currently Williamson Boulevard is two lanes except from Bellevue Avenue Extension to SR 600 which is four lanes, SR 483 and US 1 are four lanes while SR 5A is six lanes. All of the routes have numerous traffic signals and entrances and carry significant traffic volumes.

In examining the system linkage, several items should be analyzed. One such item is the Hurricane Evacuation Routes. The existing Hurricane Evacuation Routes for Volusia County are shown in Figure 3-1. All of the north-south arterials are included as routes and are vital in the evacuations of Daytona Beach and the surrounding areas.

Another important item to be analyzed is emergency services. The Halifax Medical Center is the only emergency service facility within the area. It is the 6$^{th}$ busiest hospital in Florida. It has a Level 2 trauma center, the only Neonatal Intensive Care and Inpatient Pediatric Unit in the area, is a nationally recognized Regional Oncology Center and is certified to accommodate special events. The hospital has approximately 5,000 employees and 700 beds. The location of this facility is shown in Sheets 11-13, Sheets 23-25 and Sheets 35-37 in Appendix A as well as Sheets 11-13 in Appendix B, within the northeast quadrant of the SR 600/SR 483 intersection.

### 3.1.2 Transportation Demand

As previously stated, all of the north-south arterials carry significant traffic volumes. As part of this study, a traffic analysis has been performed. This included traffic counts along SR 483 within the study area. The counts indicated that the annual average daily traffic (AADT) to be approximately 30,500 vehicles. The 2004 Florida Traffic Data CD indicates that the AADT for SR 5A to be 38,000 between SR 400 and SR 600 while US 1 has an AADT of 41,000 from SR 400 to Bellevue Avenue and 36,000 from Bellevue Avenue to SR 600.

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## EVACUATION ROUTES

FIGURE 3-1

The traffic analysis performed for this study also projected the existing traffic volumes to the design year of 2030. In doing so, the AADT grows from just over 30,000 vehicles to almost 50,000 vehicles. If no improvements were to occur along SR 483, the Level of Service (LOS) for all of the segments and for all the signalized intersections would be F, below the LOS that the Florida Department of Transportation (FDOT) considers acceptable, which is a LOS of D. It should be noted that the City of Daytona Beach has adopted the FDOT standards for level of service while the Volusia County Metropolitan Planning Organization (MPO) upholds the FDOT level of service standards.

### 3.1.3 Planned Transportation Improvements in Project Vicinity

**VOLUSIA COUNTY MPO**

In 1974, the Federal Aid Highway Act was amended by the United States Congress. The amendment mandated that every urbanized area having a population of 50,000 or more designate a single agency to administer federal transportation funds. The agencies that were established are called Metropolitan Planning Organizations (MPO). On January 18, 1977, the Daytona Beach Urbanized Area MPO was created. However, growth expanded within the County. Therefore, in 1988, the planning boundary of the MPO was expanded to include the entire County and re-titled the Volusia County MPO. The MPO includes members from the City of Bebary, City of Daytona Beach, City of Daytona Beach Shores, City of Deland, City of Deltona, City of Edgewater, City of Flagler Beach, City of Holly Hill, City of Lake Helen, City of New Smyrna Beach, City of Oak Hill, City of Orange City, City of Ormond Beach, City of Port Orange, City of South Daytona, Town of Beverly Beach, Town of Pierson, Town of Ponce Inlet, Volusia County, FDOT District 5, and Volusia County School Board.

One of the functions of the MPO is to maintain a Long Range Transportation Plan (LRTP) with a 20-year outlook that is updated every three to five years. As of the writing of the first draft of this report, the current LRTP has an outlook up to 2020. The 2020 LRTP was refined in November 2000 and addressed the Federal Highway Act (TEA-21) that was passed in June 1998, and referred to as the 2020 LRTP-R. The MPO was in the process of finalizing the 2025 LRTP. As of the writing of the second draft of this report, the MPO adopted the 2025 LRTP at it's November 22, 2005 meeting and subsequently amended the plan at the January 24, 2006 meeting.

An examination of the 2020 Long Range Transportation Plan – Refinement publicizes the six-laning of SR 483 in its Phase 2, which is the Year 2006 to 2010. Additionally, it publicizes the following planned projects in the vicinity of the SR 483 project limits in Phase 3, which is the Year 2010 to 2020:

SR 600 from Nova Road to US 1 to be widened to a six-lane facility
SR 400 from SR 483 to Nova Road to be widened to a six-lane facility (unfunded)
SR 400 from Nova Road to US 1 to be widened to a six-lane facility

A future widening of SR 483 is consistent with the following goals stated in the 2020 LRTP-R:

- To provide effective alternative modes of transportation to the automobile
- To provide highway corridor capacity for the safe, effective, and efficient movement of people and goods
- To be supportive and consistent with the Land Use and Growth Management Regulations of Volusia County

An examination of the 2025 Long Range Transportation Plan, reveals modifications for the SR 483 project. The Draft 2025 Long Range Transportation Plan contains the six-laning of SR 483 from SR 400 to SR 600 in Phase 2 which is the Year 2011 to 2025. However, the additional planned projects within the vicinity of SR 483 that were listed in the 2020 LRTP-R are no longer on the planned projects list.

**VOLUSIA COUNTY**

In 1985, the Florida's Growth Management Act was passed by the State Legislature. The bill mandated that all local governments in the State adopt Comprehensive Land Use Plans and was in response to the immense growth in population within the State. The Volusia County Comprehensive Plan has a 20 year outlook, with the time frame from 1990 to 2010. The County divided the effort into three areas in order to meet the State requirements. The areas were Technical requirements, Policy Direction and Citizen Participation. The Florida Department of Community affairs (DCA) Rule 9J-5 states that the Transportation Element shall be coordinated with the local MPO LRTP.

An examination of the Transportation Element of the Volusia County Comprehensive Land Use Plan lists the following segments of 483 as six-lane sections in the year 2020:

CR 483 from Big Tree Road to SR 400
CR 483 from SR 430/Mason Avenue to LPGA Boulevard

It should be noted that the section from Big Tree Road to SR 400 is a portion of the County's 483 segment that is adjacent to the southern limit of this PD&E. The section from SR 430 to LPGA Boulevard is the portion of County's 483 segment that begins where the jurisdiction of 483 changes from the State to the County. The listing of these two projects within the Comprehensive Land Use Plan emphasizes the expected traffic growth of the SR 483 corridor and the need for this project.

A future widening of the 483 corridor is consistent with the following goals stated in the Volusia County Comprehensive Land Use Plan:

- To coordinate with the Volusia County MPO and other related agencies to achieve and maintain levels of service on the thoroughfare system as well as for mass transit services
- Encourage bicycle use and pedestrian activity throughout Volusia County

**CITY OF DAYTONA BEACH**

In following Florida's Growth Management Act, the City of Daytona Beach adopted a Comprehensive Plan. The City divided the Transportation Element of the Comprehensive Plan into three sections. The sections were Traffic, Mass Transit and Aviation. The Traffic Section is responsible for vehicular, pedestrian and bicycle mobility. The Mass Transit Section is responsible for bus service and the Aviation Section is responsible for air service. The Transportation Element is based upon the Volusia County MPO 2020 LRTP and the Volusia County Comprehensive Land Use Plan.

The City of Daytona Beach Comprehensive Plan requests that the following projects be undertaken as soon as possible:

SR 600 from Nova Road to US 1 to be widened to a six-lane facility
SR 400 from SR 483 to US 1 to be widened to a six-lane facility
SR 5A from SR 400 to SR 430 to be widened to a six-lane facility

A future widening of SR 483 is consistent with the following goals stated in the City of Daytona Beach Comprehensive Plan:

- To promote safe and efficient traffic circulation servicing existing and future land uses.
- To protect the lives and safety of pedestrians and motorists by annually spending at least $100,000 to upgrade transportation facilities to reduce conflicts and hazardous conditions and Volusia County to appropriate safety fund in the City where necessary
- The City shall continue to support the development of bicycle facility development in the City consistent with the MPO LRTP as update

It should be noted that for the segment of SR 600 from Nova Road to US 1, the Volusia County Comprehensive Plan states that the maximum allowable number of lanes is 4, while the City of Daytona Beach's Comprehensive Plan states the maximum number of lanes to be 6.

### 3.1.4 Social and Economic Demands Planned Transportation Improvement in Project Vicinity

Daytona Beach is considered an essential part of the Orlando-Melbourne-Daytona Beach real estate market. The region's growth rate is 60% above the national average and 14% faster than the rest of Florida. It has one of the lowest cost of living ratios in the state. The population of Volusia County was

443,343 in 2000 and is projected to have an 18.9% increase by 2010, resulting in an estimated population of 527,210. This is based upon the University of Florida, Bureau of Economic & Business Research, "Florida Population Studies – Population Projections by Age, Sex & Race for Florida and It's Counties, 2003-2030." Historical trends, current data and projections are provided in Table 3.1.4.1 and show continuous growth within the county.

**Table 3.1.4.1**
**Volusia County Population Projections**

| Year | Population | Percent Increase |
|---|---|---|
| 1980 | 258,762 | ----- |
| 1990 | 370,737 | 43.3% |
| 1995 | 402,970 | 8.7% |
| 1996 | 407,199 | 1.0% |
| 1997 | 413,668 | 1.6% |
| 1998 | 420,431 | 1.6% |
| 1999 | 426,815 | 1.5% |
| 2000 | 443,343 | 3.9% |
| 2010 | 527,210 | 18.9% |
| 2030 | 674,481 | 27.9% |

Source: Florida Population Studies – Population Projections by Age, Sex & Race for Florida and It's Counties, 2003-2030 by the University of Florida, Bureau of Economic & Business Research.

Table 3.1.4.2 provides the population distribution by area within Volusia County based upon the year 2003.

**Table 3.1.4.2**
**Volusia County Population Distribution by Area: 2003**

| Area | Population |
|---|---|
| Daytona Beach | 64,889 |
| Daytona Beach Shores | 4,514 |
| DeBary | 17,124 |
| DeLand | 22,901 |
| Deltona | 76,332 |
| Edgewater | 20,088 |
| Holly Hill | 12,504 |
| Lake Helen | 2,823 |
| New Smyrna Beach | 20,595 |
| Oak Hill | 1,481 |
| Orange City | 7,102 |
| Ormond Beach | 38,325 |
| Pierson | 2,621 |
| Ponce Inlet | 2,917 |
| Port Orange | 50,981 |
| South Daytona | 13,714 |
| Unincorporated | 111,859 |
| Total | 470,770 |

Source: Florida Estimates of Population: 2003 by the University of Florida, Bureau of Economic & Business Research.

The Volusia County Department of Economic Development also provides significant statistics for the City of Daytona Beach based upon the U.S. Bureau of the Census, 2000 Census of Population and Housing which was updated and forecasted for 2005 and 2010. This information is provided in Table 3.1.4.3:

**Table 3.1.4.3**
**City of Daytona Beach Significant Statistics**
**67.24 square miles**

| | | | |
|---|---|---|---|
| | **2000 Census** | **2005 Update** | **2010 Forecast** |
| Population | 64,112 | 68,476 | 74,899 |
| Households | 28,605 | 30,538 | 33,591 |
| Families | 13,842 | 14,389 | 15,368 |
| Average Household Size | 2.06 | 2.07 | 2.08 |
| Owner-Occupied Households | 13,538 | 15,194 | 17,013 |
| Renter-Occupied Households | 15,067 | 15,344 | 16,578 |
| Median Age | 37.2 | 38.3 | 40 |
| Marketplace Population* | 389,543 | 444,287 | 512,643 |
| | | | |
| *Projected 2005-10 growth rates* | | | |
| | **Area** | **National** | |
| Population | 1.18% | 1.22% | |
| Households | 1.92% | 1.27% | |
| Families | 1.33% | 1.00% | |
| Owner Households | 2.29% | 1.46% | |
| Median Households Income | 2.34% | 3.25% | |
| | | | |
| Median Household Income | $29,313 (2005 Estimate) | | |
| Average Home Value | $160,154 (2005 Estimate) | | |
| Florida Price Level Index | 95.53 (2004) | | |
| | | | |

* Marketplace population based upon a 25-mile radius review of consumer population, ESRI Business Information Systems 2005

Source: U.S. Bureau of the Census, 2000 Census of Population and Housing. ESRI BIS forecasts for 2005 and 2010.

The City of Daytona Beach emphasizes that it has a diverse economic base. Tourism is a large portion of the city's economic base, but a number of national manufacturing firms have made the City of Daytona Beach home. The medical industry is also abundant in the area providing both direct health care services and support for the eight area hospitals. With more than 100 local companies exporting products and services overseas, area businesses are active in the international market. Some of the corporate partners that have settled in Dayton Beach are NASCAR and International Speedway Corporations; the Ladies Professional Golf Association; LPGA International; Gambro-Renal Products (medical manufacturing); Brown & Brown, Inc. (insurance); Enrichment Industries (vocational/rehabilitation/ manufacturing/assembly); Crane Cam (automotive manufacturing); Advanced Ordnance (military hardware); X1R (auto lubricants); Raydon (simulators); Piedmont Plastics, Inc. (plastics manufacturing); Embry-Riddle Aeronautical University (aviation-aerospace education); Halifax Community Health Systems

(hospitals/healthcare); and Consolidated-Tomoka Land Co. (land development). The City of Daytona Beach recognizes that what was once primarily a retirement area has become popular with young professionals and families. Twenty percent of the adults in the Daytona Beach area have incomes of $50,000 or more and sixty percent are college educated. The following figures, which were taken from the City of Daytona Beach Economic Development Division website, graphically present this information. Figure 3-2 is Population by Age, Figure 3-3 is the Income Growth Rate in the 1990's for Major Florida Cities, Figure 3-4 is a comparison of Daytona's income to other Florida Metro areas and Figure 3-5 is a pie graph of the 2001 Household Income.

**Figure 3-2**

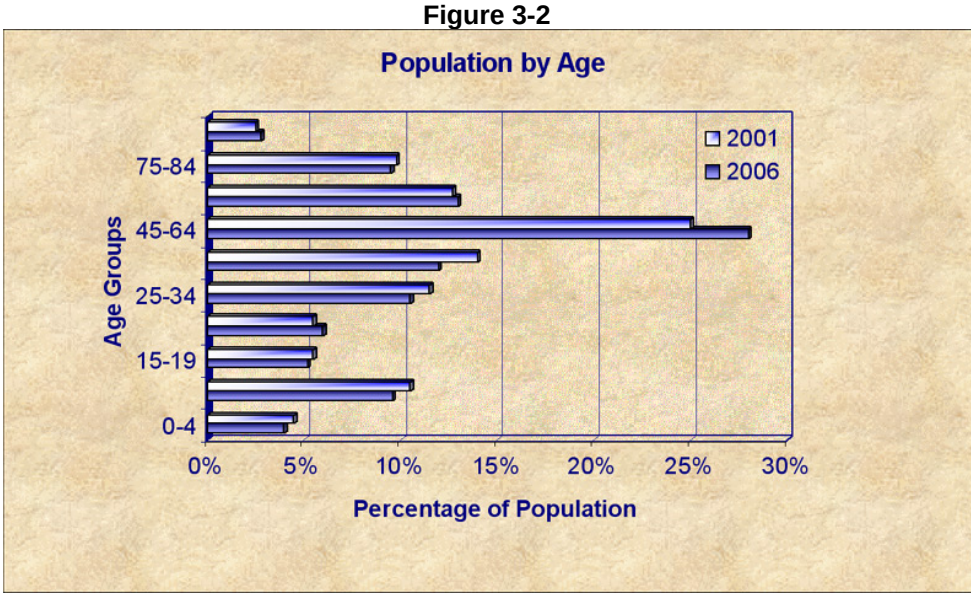



**Figure 3-3**

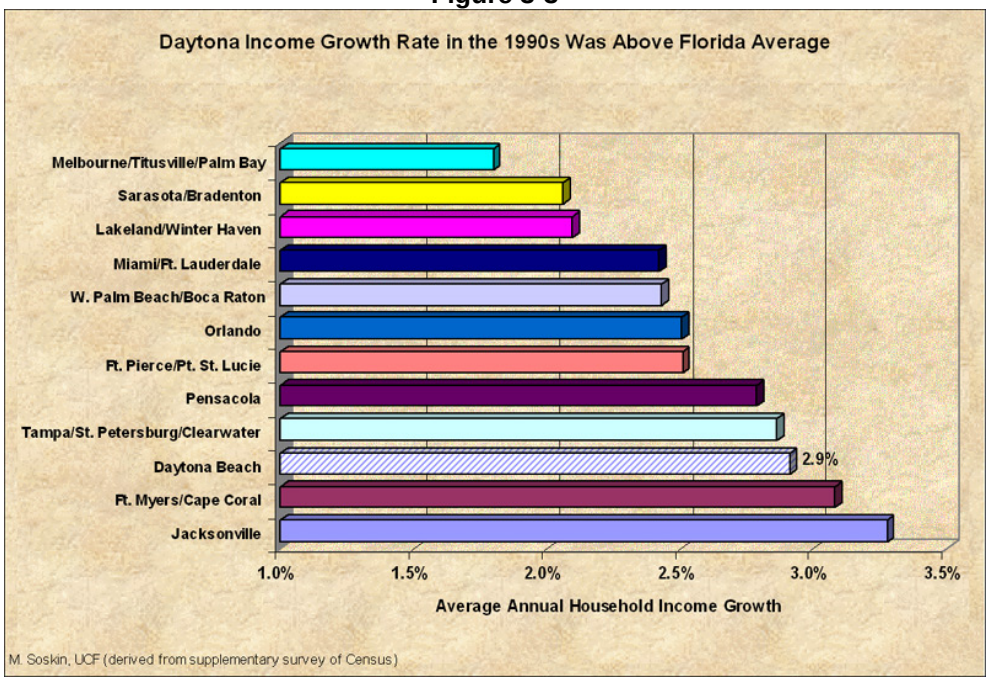


**Figure 3-4**

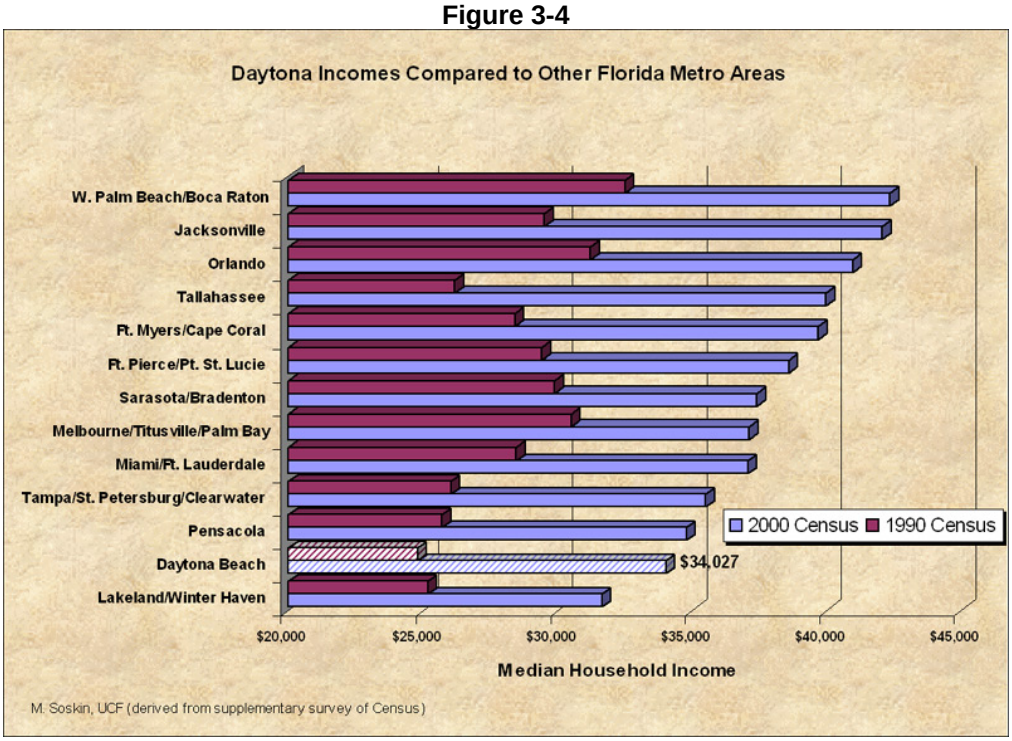
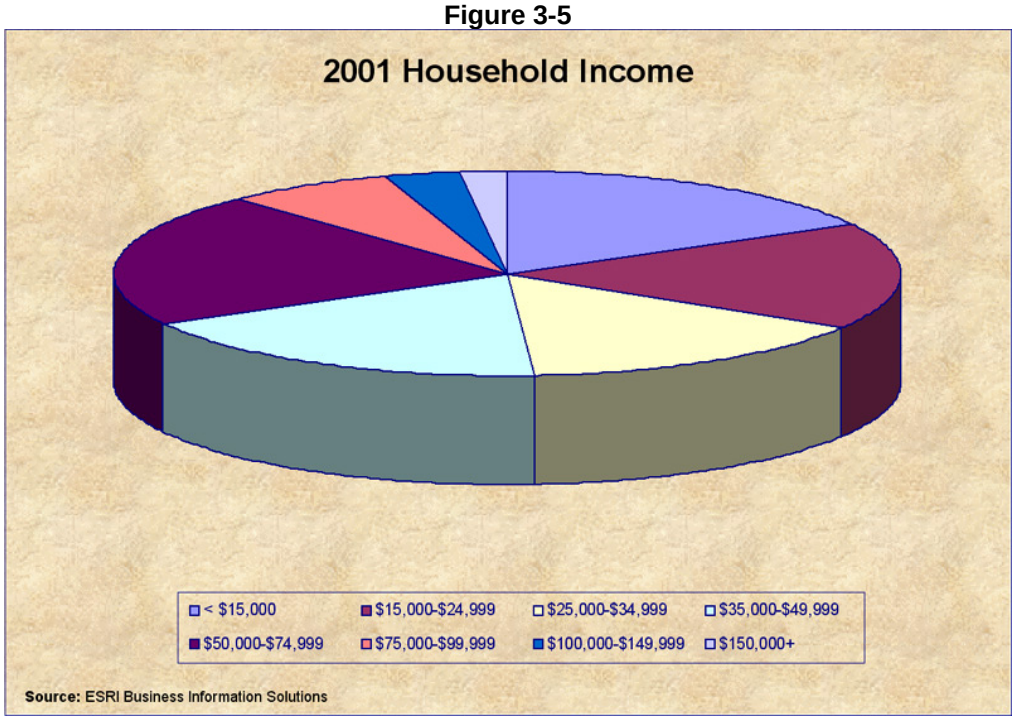



**Figure 3-5**




It is felt that Daytona Beach will continue to attract the young professionals and families, thereby continuing it's population growth and its traffic growth. Considering the limited number of north-south

arterials in the area, the importance of maintaining at least the minimum approved level of service for SR 483 will increase.

### 3.1.5 Modal Interrelationships

Reducing congestion on existing arterials is in the best interest of multi-modal transportation. SR 483 is adjacent to the Daytona Beach International Airport and the termini of the study area are SR 400 and SR 600. SR 400 connects to the I-4/I-95 interchange while SR 600 connects with I-95. One of the goals of the Long Range Transportation Plan – Refinement is to improve intermodal facilities and it states, "As Volusia County faces increasing travel demands on the transportation infrastructure, the MPO and VOTRAN (Volusia County's Public Transit System) have become major partners in the refinement of the intermodal transportation planning process."

In addition, VOTRAN felt that as the population of Volusia County increases, the demographics of the county changes. The growth and transformation has a major impact to the transit situation. In an effort to respond to the changes and to ensure that the most efficient and effective transit system is being provided, the VOTRAN maintains a Transit Development Plan (TDP). The TDP allows the VOTRAN to analyze current services and examine new services for areas that are in need. The TDP is a five-year planning document and the most recent update occurred in 2002. Within this document, a list of priorities is provided. These priorities include later evening service, improved frequency, expanded weekend service, service coverage, additional express service, linkage to Orlando and coordination with rail service. The document also lists as one of the actions to be initiated within three year of its publication to continue to seek to improve the frequency of VOTRAN's busiest routes, however it does not state which routes would fall into this category.

Portions of the study area are within several bus routes, with the destinations being Embry-Riddle University or Halifax Medical Center. However, none of the bus routes nor any combination of routes travel the entire length of the study area. There is no indication that bus route(s) would be added to accommodate the study area.

## 3.2 Project Corridor Needs

### 3.2.1 Capacity

The Policy on Geometric Design of Highways and Streets, 2004, Fifth Edition by the American Association of State Highway and Transportation Officials (AASHTO) defines capacity as "the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point (i.e. a uniform segment of a lane or roadway) during a given time period under prevailing roadway and traffic

conditions." The traffic study, *Project Traffic - Existing & Future Conditions For SR 483 (Clyde Morris Boulevard) from SR 400 (Beville Road) to SR 600 (US 92)*, was prepared for the Florida Department of Transportation (FDOT) by Ghyabi & Associates. For this Technical Memorandum, the FDOT provided historical traffic counts and the most current CFRPM II (FSUTMS) model. Data was also provided by Volusia County. Additionally, traffic counts were taken during April and May 2004.

The Policy on Geometric Design of Highways and Streets, 2004, Fifth Edition by the American Association of State Highway and Transportation Officials (AASHTO) defines level of service (LOS) as "the operating conditions on the facility in terms of traffic performance measures related to speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience." LOS ranges in value from A, high level of performance, comfort and low interruptions, to F, low level of performance, discomfort and high number of interruptions. A LOS A occurs on non congested roadways where traffic is free flowing. A LOS F occurs on very congested roadways where the traffic flow is often interrupted. The FDOT has established the acceptable LOS for all roadway facilities that are classified as roads on the State Highway System which is not a part of the Florida Intrastate Highway System (FIHS) and within an urbanized area to be a LOS of D or better. The existing LOS for the roadway segments and major signalized intersections at SR 400 and SR 600 fall below the FDOT acceptable level and therefore it is unacceptable to the City of Daytona Beach and the Volusia County MPO. Chapter 6 will discuss the traffic analysis and the LOS in detail.

### 3.2.2 Safety

Accident data for the corridor was collected via FDOT's Crash Analysis and Reporting System. Accidents for 1999, 2000, 2001, 2002, and 2003 were analyzed. The details of this analysis can be found in Section 4.2.9. The data collected included the nearest intersection (location), date, time, type of crash, number of injuries and/or fatalities, property damage, daylight and weather conditions, and primary contributing cause.

Historical crash data for the five-year period of 1999 to 2003 showed 375 collisions occurred on SR 483 from SR 400 to SR 600. The number of head-on, angle and left turn collisions accounted for approximately 31 percent of the total for the five-year period. The trend of theses collisions shows that driver at fault failed to yield the right of way. If a median were to be installed, drivers would have limited access to turning lanes therefore minimizing conflict points were head-on, angle and left turn collisions occur.

Approximately 42 percent of the reported crashes were rear end collisions. A majority of the rear-end collisions were caused by careless driving. The trends in the collision summary shows a large number of the rear-end collisions occurred in the through traffic lanes. This demonstrated the driver at fault did not

stop when vehicles queued at the traffic signal. From a roadway standpoint there are no changes that can be made to prevent this type of crash.

# 4.0 Existing Conditions

## 4.1 Existing Roadway Networks

As previously stated, Clyde Morris Boulevard's southern most termini is its intersection with Taylor Road in Port Orange, Florida. It continues north until its intersection with SR 40 in Ormond Beach, Florida where it terminates. The segment of Clyde Morris Boulevard from Taylor Road to SR 400 is a County facility, also named CR 483. The segment of Clyde Morris Boulevard from SR 400 to SR 430 is considered a State facility and is referred to as SR 483. The most northern segment, from SR 460 to SR 40 is once again considered a County roadway and is again referred to as CR 483. The project area is within the segment that is a State facility. More specifically the study limits are defined by its southern terminus which is approximately 1,330 feet south of the SR 483/SR 400 intersection and by its northern terminus which is approximately 2,450 feet north of the SR 483/SR 600 intersection. The total length of Clyde Morris Boulevard within the Daytona Beach area is 8.24 miles. It is an important north south arterial roadway serving major businesses, educational centers, the Daytona Beach Airport and the Daytona Beach International Speedway.

## 4.2 Existing Roadway Conditions

### 4.2.1 Functional Classification

SR 483 is a four-lane divided urban (other) principal arterial (functional classification 14). It provides a major north/south link for the City of Daytona Beach and the surrounding areas. It has a posted speed of 45 mph from SR 400 to just north of Embry Riddle Drive and a posted speed of 40 mph from Embry Riddle Drive to north of SR 600. The Access Management Classification is currently 4.

### 4.2.2 Typical Sections

The existing roadway configuration varies throughout the study area. Beginning at the project's southern terminus to northern Shangri La Drive, the typical section consists of four 12 foot travel lanes, no median, flush unpaved shoulders and 5 foot sidewalks. From northern Shangri La Drive to Verona Street, the typical section contains four 12 foot travel lanes, designated turn lanes within the median area, curb and gutter and a 5 foot sidewalk along the east side of the roadway. From Verona Street to New Bellevue Avenue, the typical sections consists of four 12 foot travel lanes, designated turn lanes within the median, and flush shoulders, of which approximately 2.5 feet are paved.

From New Bellevue Avenue to Bellevue Avenue Extension, the typical section consists of four 12 foot travel lanes with the northbound and southbound traffic separated by a double yellow paint stripe. The

east side of the roadway has a flush shoulder of which approximately 2.5 feet is paved and the west side has a flush shoulder which has a paved width that ranges from 8 feet to 16.5 feet wide. From Bellevue Avenue Extension to approximately 1,060 feet north of Bellevue Avenue/Aviation Center Parkway, the typical section contains four 12 foot travel lanes with the northbound and southbound traffic separated by a double yellow paint stripe. The east side of the roadway has a flush shoulder of which approximately 2.5 feet is paved and the west side has a flush shoulder which of which approximately 5 feet is paved. From approximately 1,060 feet north of Bellevue Avenue/Aviation Center Parkway to the southern west entrance into the Embry Riddle Campus (the right-in, right-out access that is south of Embry-Riddle Drive), the roadway contains four 12 foot travel lanes with the northbound and southbound traffic separated by a double yellow paint stripe. The east side of the roadway has a flush shoulder of which approximately 4 feet is paved and the west side has a curb and gutter with about 5 feet of pavement between the edge of the travel lane and the cub and gutter.

From the southern access into the Embry-Riddle Campus to about 230 feet north of the pedestrian overpass, the typical section is four 12 foot travel lanes with the northbound and southbound traffic separated by a double yellow paint stripe, and with flush shoulders of which approximately 5 feet are paved. From approximately 230 feet north of the pedestrian overpass to 515 feet north of Richard Petty Boulevard the typical section contains four 12 foot travel lanes, designated turn lanes within the median, and the curb and gutter with approximately 5 feet of pavement between the edge of travel lane and the face of the curb. From about 515 feet north of Richard Petty Boulevard to SR 600, the typical section contains four 12 foot travel lanes and a continuous turn lane within the median. The east side of the roadway has a flush shoulder with pavement of varying width between the edge of pavement and face of curb and the west side of the roadway has flush shoulders with guardrail to protect against the canal that runs along the toe of the embankment. A sidewalk is on the east side of the roadway. From SR 600 to Mayberry, the typical section is composed of four 12 foot travel lanes, designated turn lanes within the median, curb and gutter and sidewalks. Between SR 600 and the first entrance into the K-Mart shopping center, a guardrail exists to protect traffic from the existing deep drainage ditch on the west.

### 4.2.3 Pedestrian & Bicycle Facilities

Five-foot wide sidewalks exist sporadically within the study area, mostly at the southern and northern ends of the project limits where more residential and/or commercial development exist. There are no designated bicycle facilities along the study area, however bicyclists have been seen riding along the roadway during field visits.

### 4.2.4 Right-of-Way

The existing right-of-way for SR 483 for the majority of the study area is 80 feet. The one exception is in the area of Bellevue Avenue Extension to Bellevue Avenue/Aviation Center Parkway, where the right-of-

way widens to the east resulting in a total right-of-way width of 140 feet. The right-of-way also widens at the major intersections at SR 400 and SR 600 at each end of the project to accommodate the turning lanes.

### 4.2.5 Horizontal Alignment

The segment of SR 483 from SR 400 to SR 600 consists of nine tangents and six curves. Three of the curves do not meet the minimum length required by the FDOT Design Criteria and the deflection angle between two tangents does not meet criteria in one location. The existing horizontal alignment is not sufficient to meet the current FDOT design criteria. Table 4.2.5.1 lists the degree of curvature and the length of curve.

**Table 4.2.5.1**
**Existing Horizontal Curvature**

| Curve No | Reference Location | Degree of Curvature | Curve Direction | Curve Length |
|---|---|---|---|---|
| 1 | Woodbine Street | 2° 36' 39.98" | LT | 269.63' |
| 2 | New Bellevue | 2° 48' 55.02" | RT | 750.65 |
| 3 | Future Site of Embry Riddle Research Park | 1° 57' 24.01" | RT | 320.02 |
| 4 | Bellevue Avenue Extension | 1° 02' 00.00" | RT | 322.58 |
| 5 | Airport Property | 3° 53' 20.00" | LT | 739.63 |
| 6 | North of Richard Petty Boulevard | 5° 26' 54.94" | RT | 754.02 |

The location where the deflection angle between two tangents is substandard is just south of the SR 483/SR 600 intersection. The deflection angle is 11° 25' 56".

### 4.2.6 Vertical Alignment

The vertical alignment of SR 483 can be characterized as relatively flat throughout the length of the study area with the exceptions of the approaches to the SR 400 and SR 600 intersection. At the SR 400 intersection north approach the grade is approximately 4.98%, while at the SR 600 south approach the grade line is approximately 3.00%. The existing vertical alignment will not be sufficient to handle a curb and gutter section.

### 4.2.7 Drainage

The southern end of the project area from SR 400 south drains into Pine Lake which is located in the Spruce Creek Basin. Roadway and offsite areas from SR 400 to SR 600 generally collect in ditches, drains to the west of the roadway and collect in a ditch network that traverses Daytona Beach International Airport and Embry-Riddle University properties. These ditches converge on a large ditch that travels eastward under SR 483 though dual 60 inch pipes at approximately STA 96+00, which is just

north of the security fence for the airfield of the Daytona Beach International Airport. This ditch travels eastward to the Nova Road Canal which discharges into the Halifax River and ultimately the Atlantic Ocean. The northern end of the project area north of the intersection with SR 600 drains south through a cross-drain and is connected to a ditch along the west side of SR 483. Roadway flooding currently exists in the Bellevue Avenue Extension and New Bellevue Avenue area during heavy storm events, causing lane blockage and unsafe operating conditions. Also, the project is clear of any floodplains identified on FEMA Flood Insurance Rate Maps (FIRM's). An existing drainage map can be found in Figure 4-1.

### 4.2.8 Geotechnical Data

An examination of the *Soil Survey, Volusia County, Florida* produced by the U. S. Department of Agriculture, Soil Conservation Service (SCS, 1980) revealed seven soil types found within the project corridor. The soil types and their corresponding map unit identification numbers are listed below. The most abundant soil types present are Immokalee sand (29), Quartzipsamments (54), and Urban land (71). The other soil types present within the project corridor listed in descending occurrence are

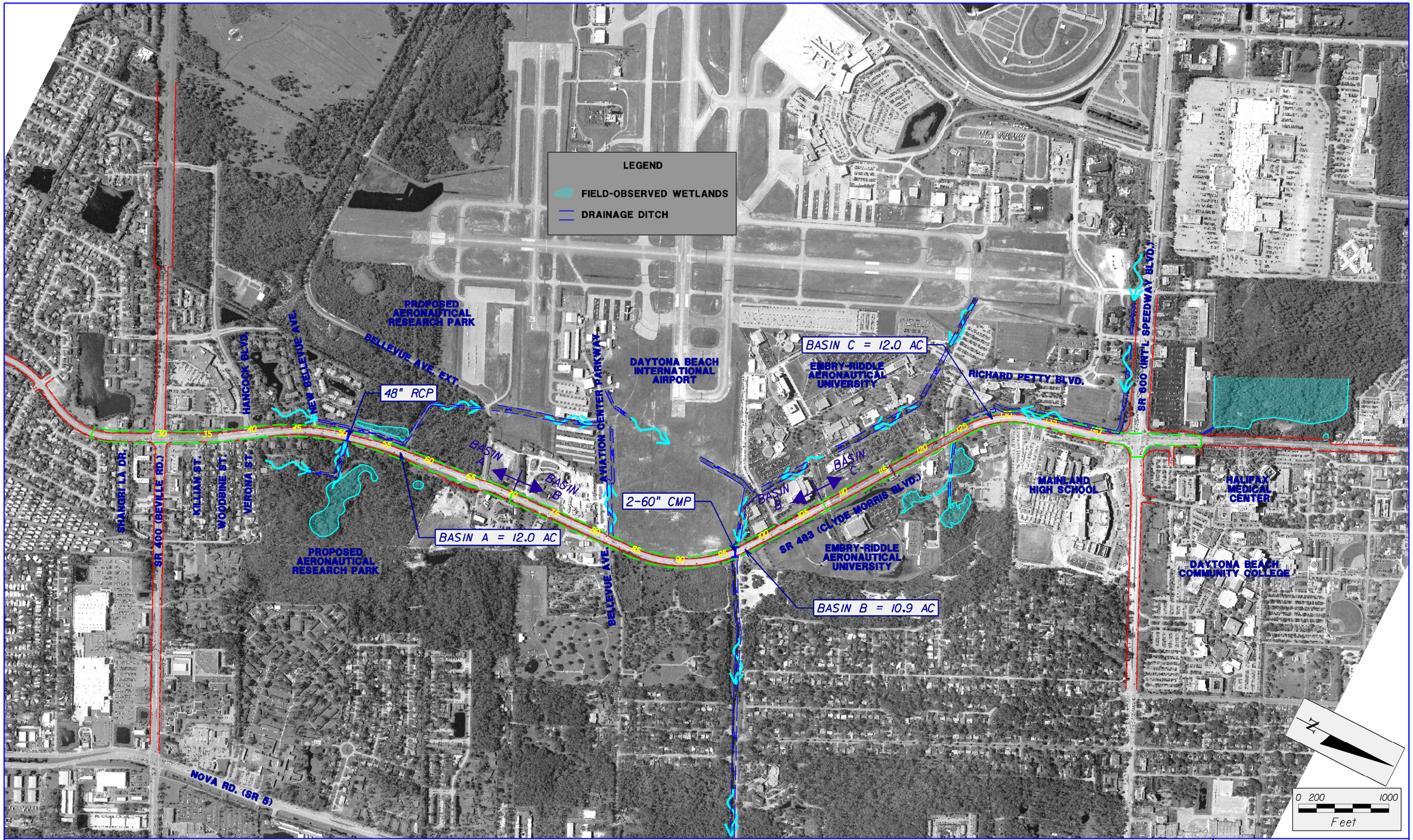
- Myakka-St. Johns Complex (34)
- Myakka find sand (32)
- Paola-Urban (44)
- Orsino fine sand (37)

A description of soil characteristics follows.

Immokalee sand is a nearly level, poorly drained sandy soil, which generally occurs in broad areas in the flatwoods, in low areas between sand ridges, or in slightly elevated areas between ponds and sloughs. The water table is within 10 inches of the surface for one to two months in most years and between 10 and 40 inches more than half the time.

Quartzipsamments are gently sloping, moderately well drained sandy soils that have been reworked and shaped by earthmoving equipment. Most areas are around former sloughs and shallow ponds that have been deepened to form lakes. Others are low areas that have been filled with sandy material. The water table is variable, but is generally below a depth of 40 inches in most places.

Urban land is located in developed areas. Streets, parking lots, buildings, and other structures cover the surface 85 percent or more. Lawns, vacant lots, or playgrounds cover the few small areas that are not covered with buildings and pavement. Individual areas are rectangular or polyhedral in shape and generally range from 5 to 150 acres.

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# SR 483 (CLYDE MORRIS BLVD.)
# PROJECT DEVELOPMENT AND ENVIRONMENT STUDY

JOB NUMBER: 107-5777-000

DATE: 4/21/06

## EXISTING DRAINAGE MAP
## FIGURE 4-1

The Myakka-St. Johns complex is a nearly level, poorly drained soil type occurring in low areas and depressions in the flatwoods. The seasonal high water table rises as much as 10 inches above the soil surface in wet periods and the soil is continuously saturated within 10 inches of the surface in summer, fall and winter. This soil type is listed as a hydric by both the federal and state criteria.

Myakka fine sand is a nearly level, poorly drained soil located in flatwoods. The acreage is extensive and ranges from a few acres to more than 750 acres. The water table is within 12 inches of the surface from June to November and commonly within 40 inches of the surface for the rest of the year except during extended droughts.

The Paola-Urban land complex consists of nearly level to sloping Paola soils that have been used for urban development. About 40 to 60 percent of the unit is Paola fine sand, and 15 to 45 percent is Urban land. About 25 to 45 percent of the areas of Paola soil has been reworked or reshaped by earth moving machines. The open areas of Paola soils are mostly lawn, vacant lots, or playgrounds. The Urban land is covered with houses, streets, driveways, buildings, parking lots, and other structures. The water table is more than 72 inches below the soil surface.

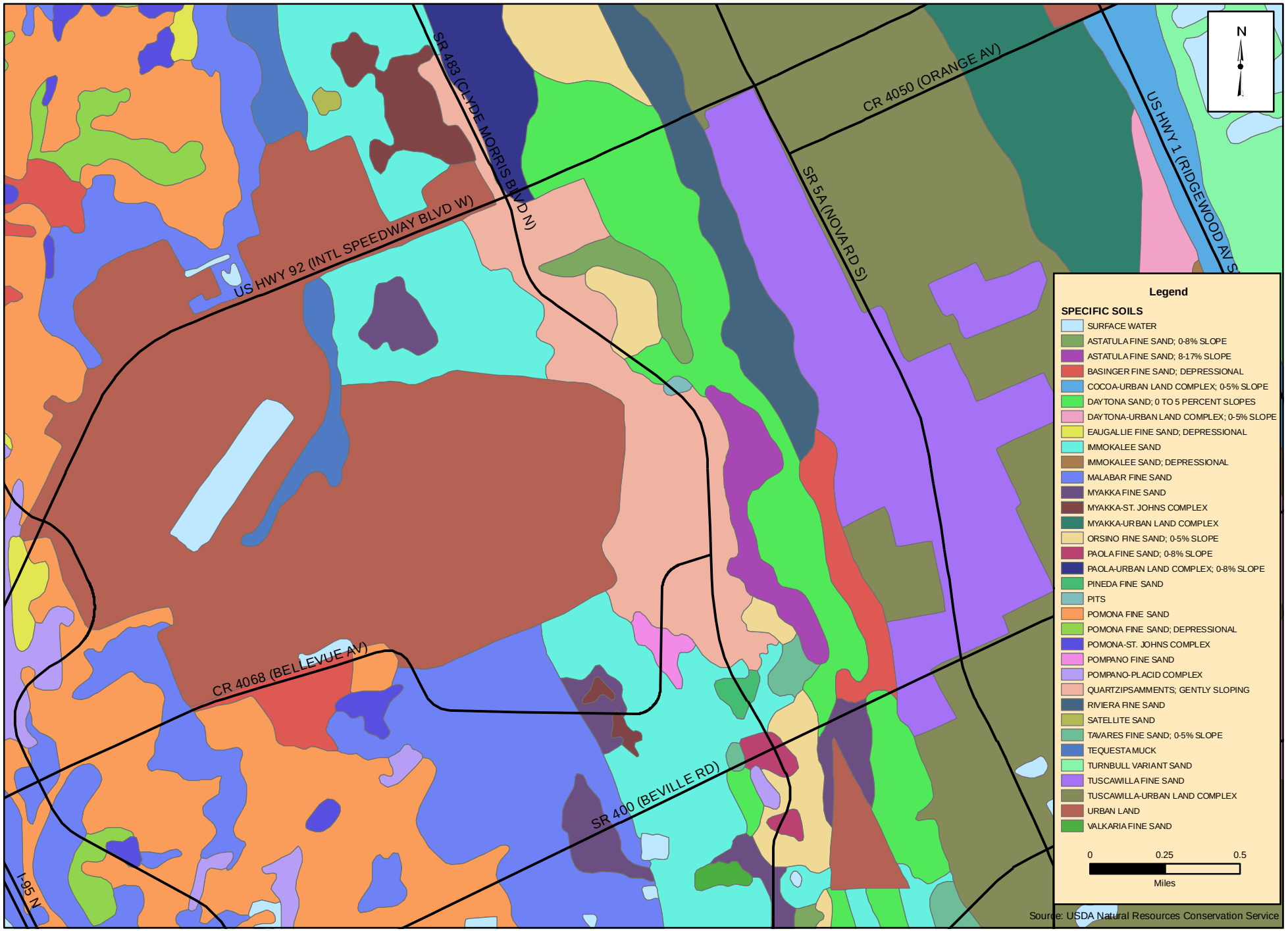
Orsino fine sand is a moderately well drained, nearly level and gently sloping sandy soil that occurs on low flat ridges and low side slopes of higher sandhills. The acreage is small with individual areas that are generally long or oval and range from about 5 to 200 acres. Slopes are smooth to convex. The water table is 40 to 60 inches below the soil surface in wet seasons. It recedes to below 60 inches in dry seasons.

Of the listed soils, three are described with hydric components and/or inclusions (*Hydric Soils of Florida Handbook*, Florida Association of Environmental Soil Scientists, March 2000). Hydric components and/or inclusions of each soil map unit are as follows:

**TABLE 4.2.8.1**
**Hydric Soils**

| Soil Type | Hydric Inclusions and Components (%) |
|---|---|
| Immokalee sand | 15% |
| Myakka fine sand | 15% |
| Myakka-St. Johns Complex | 85% |

Figure 4-2 displays the SCS Soil Survey Map of the study area.

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# SR 483 PD&E STUDY
# PRELIMINARY ENGINEERING REPORT

**SOILS SURVEY**

**FIGURE 4-2**

JOB NUMBER: 107-5777-000

DATE: 01/16/06

### 4.2.9 Crash Data

Crash data from 1999 to 2003 was complied and analyzed to assess the safety conditions within the project corridor. Data collected included the milepost, date, time, type of crash, number of injuries and/or fatalities, property damage, daylight and weather conditions, and primary contributing cause. For SR 483, the accident data began at milepost 0.000, which is the intersection of SR 483 and SR 400 and ends at milepost 3.377 which is the intersection of SR 483 and SR 430. The summary of the accident data for SR 483 (from SR 400 to SR 430) has been separated by the roadway and year, as shown in Table 4.2.9.1.

**Table 4.2.9.1**
**Accident Data – SR 483 from milepost 0.00 to 3.377**

| Location | Year | Number of Accidents |
|---|---|---|
| SR 483 | 1999 | 114 |
| | 2000 | 85 |
| | 2001 | 85 |
| | 2002 | 92 |
| | 2003 | 94 |

A more detailed analysis of the accident data for the project study area, which is milepost 0.00 (the center of the intersection of SR 400/SR 483) to milepost 2.587 (just north of the SR 483/Mayberry Avenue intersection), has been performed. The analysis also included all crashes within a maximum of 250 feet of an intersection, such as SR 400/SR 483 and SR 600/SR 483. Table 4.9.2.1 contains a crash summary for the categories of year, accident type, lighting condition, and number of injuries and fatalities. Figure 4-3 displays a summary of crashes by type and year for each intersection and segment.

Conclusions that can be drawn from the tabulation of crashes are as follows:

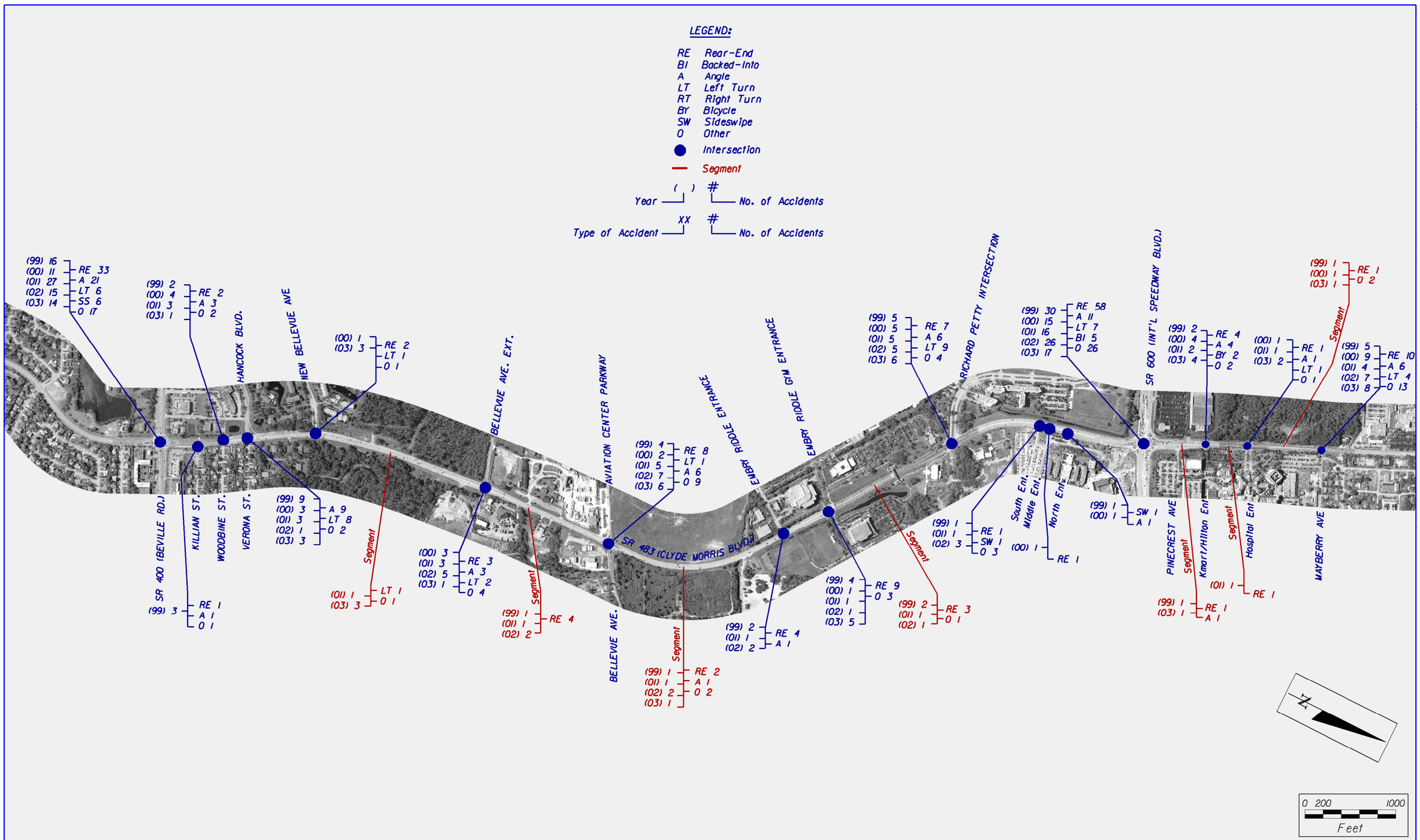
**General Observations**

- Of the total 375 reported crashes over 5 years, 42% were rear-end, 20% angle, and 10% left-turn.
- 245 crashes (65%) had injuries, while a single fatality occurred (vicinity of SR 483 / Hancock).
- 73% of the crashes occurred in daylight; 20% occurred at night in the vicinity of street lighting.
- The number of head-on, angle and left-turn collisions accounted for approximately 31% of the total for the five-year period. The trend of these collisions shows the driver at fault failed to yield the right of way. The installation of a median will minimize conflict points where head-on, angle and left turn collisions occur by channelizing traffic to designated turn lanes.
- A majority of the rear-end collisions were apparently caused by careless driving. The trends in the collision summary shows a large number of the rear-end collisions occurred in the through traffic lanes. The data suggests that the driver at fault did not stop for vehicles queued at the traffic signal. Updated traffic signals, detector loops, and additional through lanes should improve traffic flow through the intersections. A priority should be placed on interconnecting and synchronizing the traffic signals for improved traffic flow.

**TABLE 4.2.9.2**
**ACCIDENT HISTORY DATA - SR 483 Within Project Area (Milepost 0.00 to 2.587)**

| | Year | | | | | Accident Type | | | | | | | | | | | | | | | | | | | | | | | Lighting Condition | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1999 | 2000 | 2001 | 2002 | 2003 | Unknown | Rear-End | Head-On | Angle | Left-Turn | Right-Turn | Sideswipe | Backed into | Parked Car | mv on roadway | pedestrian | bicycle | bicycle(bike lane) | animal | sign / post | utility pole | guardrail | fence | tree / shrub | fixed object | object on rd | overturned | fell from vehicle | hit conc. barrier wall | All Other | Total | Daylight | Dusk | Dawn | Dark - St. Light | Dark - No St. Light | Unknown | # Fatalities | # Injured |
| *Intersection: SR 400 / SR 483* | 16 | 11 | 27 | 15 | 14 | 3 | 33 | - | 21 | 6 | 3 | 6 | 1 | - | - | - | 1 | - | - | - | - | - | - | 1 | 1 | - | - | - | - | 7 | 83 | 51 | 3 | 1 | 25 | - | 3 | - | 73 |
| *Intersection: SR 483 / Killian St.* | 3 | - | - | - | - | - | 1 | - | 1 | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 | - | - | - | - | - | - | 2 |
| *Intersection: SR 483 / Woodbine / Shopping Center Entrance* | 2 | 4 | - | - | 1 | - | 2 | - | 3 | - | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - | - | - | - | - | - | - | - | 7 | 7 | - | - | - | - | - | - | 1 |
| *Intersection: SR 483 / Hancock / Verona* | 9 | 3 | 3 | 1 | 3 | - | - | - | 9 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 19 | 13 | 2 | - | 4 | - | - | 1 | 16 |
| *Segment : New Bellevue - Bellevue Ave. Ext.* | - | 1 | - | - | 3 | - | 2 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 4 | 3 | - | - | 1 | - | - | - | 4 |
| *Intersection: SR 483 / Bellevue Ave. Extension* | - | 3 | 3 | 5 | 1 | 2 | 3 | - | 3 | 2 | - | 1 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 12 | 10 | - | - | - | 1 | 1 | - | 18 |
| *Segment: Bellevue Ave Ext. - Aviation Center Parkway* | 1 | 1 | 0 | 2 | 0 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 4 | 4 | - | - | - | - | - | - | 4 |
| *Intersection: SR 483 / Aviation Center Parkway* | 4 | 2 | 5 | 7 | 6 | 2 | 8 | - | 6 | 1 | - | 1 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 4 | 24 | 18 | - | 1 | 4 | - | 1 | - | 16 |
| *Segment: Aviation Center Pkwy. - Embry Riddle Entrance* | 1 | - | 1 | 2 | 1 | - | 2 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 | 5 | 2 | - | - | 3 | - | - | - | 3 |
| *Intersection: SR 483 / Embry Riddle Entrance* | 2 | - | 1 | 2 | - | - | 4 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 5 | 2 | 2 | - | 1 | - | - | - | 2 |
| *Intersection: SR 483 / Embry Riddle Gym Entrance* | 4 | 1 | 1 | 1 | 5 | - | 9 | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 1 | 12 | 8 | - | - | 3 | 1 | - | - | 12 |
| *Segment: Embry Riddle Entrance - Richard Petty* | 2 | - | 1 | 1 | - | - | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 4 | 3 | - | - | - | 1 | - | - | 7 |
| *Intersection: SR 483 / Richard Petty* | 5 | 5 | 5 | 5 | 6 | 1 | 7 | 1 | 6 | 9 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - | - | - | 26 | 16 | - | - | 10 | - | - | - | 42 |
| *Intersection: SR 483 / Mainland H.S. South Entrance* | 1 | - | 1 | 3 | - | 1 | 1 | - | - | - | - | 1 | - | - | 1 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 5 | 4 | - | - | - | - | 1 | - | - |
| *Intersection: SR 483 / Mainland H.S. Middle Entrance* | - | 1 | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | 1 | - | - | - | 1 |
| *Intersection: SR 483 / Mainland H.S. North Entrance* | 1 | 1 | - | - | - | - | - | - | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 2 | - | - | - | - | - | - | 4 |
| *Intersection: SR 483 / SR 600* | 30 | 15 | 16 | 26 | 17 | 5 | 58 | - | 11 | 7 | - | 3 | 2 | - | - | - | 5 | - | - | 1 | - | - | - | - | - | - | - | - | - | 12 | 104 | 81 | 2 | - | 20 | - | 1 | - | 94 |
| *Segment: SR 600 - Hilton* | 1 | - | - | - | 1 | - | 1 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 2 | - | - | - | - | - | - | 1 |
| *Intersection: SR 483 / Kmart* | 2 | 4 | 2 | - | 4 | - | 4 | - | 4 | - | 1 | 1 | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | 12 | 11 | 1 | - | - | - | - | - | 14 |
| *Segment: Kmart-Hilton to Hospital Entrance* | - | - | 1 | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - | - | - | - | - | 2 |
| *Intersection: SR 483 / Hospital Entrance* | - | 1 | 1 | - | 2 | - | 1 | - | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | 4 | 1 | - | 1 | 2 | - | - | - | - |
| *Segment: Hospital Entrance to Mayberry* | 1 | 1 | - | - | 1 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | 2 | - | - | - | - | 1 | - | 2 |
| *Intersection: SR 483 / Mayberry Ave.* | 5 | 9 | 4 | 7 | 8 | 8 | 10 | 1 | 6 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | 2 | 33 | 28 | - | - | 3 | - | 2 | - | 30 |
| *Grand-Totals* | 90 | 63 | 72 | 77 | 73 | 24 | 156 | 2 | 75 | 39 | 4 | 14 | 5 | 1 | 2 | 0 | 9 | 0 | 0 | 2 | 1 | 1 | 0 | 3 | 3 | 1 | 1 | 1 | 1 | 30 | 375 | 272 | 10 | 4 | 76 | 3 | 10 | 1 | 348 |

TABLE 4.2.9.2
SR 483 CRASH HISTORY
YEARS 1999 TO 2003
PAGE 4-9

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## CRASH HISTORY DATA
## FIGURE 4-3

- The average for the five year period was 75 collisions per year. However, 1999 had a higher number than average of collisions (90) for reasons not readily apparent.
- Roadway segments showed no apparent accident trends. At each intersection, rear-end crashes tended to be the highest, followed by angle crashes. One exception is the intersection with Richard Petty Blvd., where 9 of the 26 crashes were left-turn related.
- Despite the prominence of pedestrians and cyclists in the vicinity of the roadway, no pedestrian incidents occurred, and there were 9 crashes involving bicycles.
- Mayberry Avenue had the highest number of accidents for minor intersections with 33. The majority of these were rear-end and left-turn. The addition of a barrier median on the south leg and a lane drop into a right-turn lane should improve the safety at this intersection.

**SR 400/SR 483 Intersection**

- Out of 83 crashes, 40% were rear-end and 25% were angle. The relatively low number of left-turn accidents (6) suggests that protected left-turn phasing is working effectively.
- A disproportionate number of accidents (30%) of the 83 total occurred at night with street lights. A noteworthy point is that 16 of the 83 accidents occurred with both vehicles traveling south, the highest of any other directional combination. The second highest were north-north and west-west combinations, both with 11 crashes apiece. These trends suggest that the 5% grade on the north side of intersection is problematic for drivers, especially at night.

**SR 600/SR 483 Intersection**

- Out of 104 crashes, 56% were rear-end and 11% were angle. As with SR 400, the low number of left-turn crashes (7) suggest that protected left-turn phasing is working effectively.
- Of the 9 bicycle accidents, 5 occurred at this intersection. The higher number of bicycling incidents can be attributed to the location of Mainland High School in the southeast quadrant. The addition of bicycle lanes and 8'-wide sidewalk will further protect pedestrians and cyclists.

In summary, additional through lanes, a 22' median, new traffic signal hardware, and a wider sidewalk will improve safety. In particular, two additional through lanes and modernized traffic signal equipment should lessen the number of rear-end collisions. Consideration should be given to lessening the severity of the vertical curve on the north leg of the SR 400/SR 483 intersection.

### 4.2.10 Intersection and Signalizaion

Within the study area several signalized and non-signalized intersections exist. Beginning at the southern terminus of the project and heading north, the intersections are Shangri La Drive (south and north), SR 400, Woodbine Street, Verona Street/Hancock Boulevard, New Bellevue, Bellevue Avenue Extension,

Bellevue Avenue/Aviation Center Parkway, Embry-Riddle Drive, Richard Petty Boulevard, SR 600, Pincrest Avenue, Hilton Avenue and Mayberry Avenue. Of those intersections SR 400, Bellevue Avenue Extension, Bellevue Avenue/Aviation Center Parkway, Embry-Riddle Drive, Richard Petty Boulevard, and SR 600 are signalized.

### 4.2.11 Lighting

The existing lighting is very sporadic within the study area. Lighting can be found at some of the intersections such SR 400 and SR 600. Some can also be found within the educational campuses of Embry Riddle Aeronautical University and Mainland High School There is no continuous street lighting along the roadway itself.

### 4.2.12 Utilities

The Department of Transportation has provided the Utility Impact Study to supplement the PD&E Report. The utility agency owner (UAO) list was based upon the Design Ticket created from the Sunshine State One Call System of Florida member database and an interview with Steven Nunnery, the Resident Utility Specialist for Volusia County. The potential existing UAO's identified are: AT&T Corporation, Bellsouth Telecommunications, Bright House Networks, City of Daytona Beach, Daytona Area Smart Highways (DASH), Embry Riddle Aeronautical University, Florida Power & Light – distribution, Florida Power & Light – Transmission, FPL Fibernet, KMC Telecom, TECO/Peoples Gas, Volusia County School Board, and WilTel Communications. Table 4.2.12.1 provides a tabulation of the existing utilities information.

**Table 4.2.12.1**
**Existing Utility Information**

| Utility Owner | Type of Facility | Limits | Offset / Side | Property Status | Cost to Relocate | Comments |
|---|---|---|---|---|---|---|
| AT&T | Approx. 1600' of a 6-way Conduit | West side of Clyde Morris from Bellevue (West) to Bellevue (East) | Varies 40' to 45' Lt from CL | FDOT r/w | $ 100,000 | |
| BellSouth | UG & OH | East & west sides of Clyde Morris w/ multiple crossings OH & UG. Manhole / conduit run on the east side of Clyde Morris and multiple pieces of electronic equipment on the west side near Beville Rd. | | FDOT r/w | $2,300,000 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Bright House Networks | UG & Aerial CATV | West side of Clyde Morris UG fiber optic from Richard Petty to Bellevue crossing UG to the northeast corner of the intersecion from west to east then onto an FPL pole, continuing aerial on FPL poles to Beville Rd. | | | $ 122,000 | |
| DASH | No Response | | | | | |
| Embry Riddle Aeronautical University | FOC, Utilities, Re-Use Water, Etc | ERAU states that all of their facilities are within their own property. If FDOT is to acquire r/w, then they could be affected. | | | | |
| FP&L-D overhead facilities | OH Feeder | OH Feeder is along the entire corridor | | | $1,250,000 | $250,000 / mile |
| FP&L-D underground facilities | 3 UG Feeders | No. 1 1000' D/B along the airport property on the west side of Clyde Morris | | FDOT r/w | $ 100,000 | |
| FP&L-D underground facilities | UG Feeder | No. 2 UG dip at the Embry Riddle Walk-over | | Embry Riddle Easement | $ 100,000 | $100,000 Reimbursable for easement |
| FP&L-D underground facilities | UG Feeder | No. 3 UG dip under SR 600 north-south | | FDOT r/w | $ 100,000 | |
| FP&L-T | No Response | | | | | |
| FPL Fibernet | (4) 1.25" HDPE conduit | North side SR 600 crossing Clyde Morris | | FDOT r/w | $142,800 to $357,000 | |
| TECO / Peoples Gas | 6" gas main | 6" steel west r/w of Clyde Morris | Varies from 17' to 57' from CL | FDOT r/w & under FDOT roadway | $ 250,000 | Cost includes crossings |
| | 1 1/4" steel | From west to east 1000' north of Richard Petty | | | | |
| | 2" steel | Extending west from west r/w on north side of Richard Petty | | | | |
| | 2" steel | 1227' south of Richard Petty | | | | |
| | 2" steel | 36' north of Aviation Center Parkway | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 4" steel | Extending west from west r/w on north side of Hancock Blvd. | | | | |
| Volusia Co. School Board | No Response | | | | | |
| WilTel Commun-ications | Approx. 1600' of a FOC at a depth of at least 48" | West side of Clyde Morris from Bellevue (west) to Bellevue (east) | Varies 39' to 40' lt of CL | FDOT r/w | | |
| City of Daytona Beach | 20" water main | West side of Beville to SR 600 | | | | |
| | old 8" water main | Few hundred feet south of Bellevue | | | | |
| | 20" force main | Along east side of Clyde Morris from a point near FDOT construction office to SR 600. The force main crosses to the west side near Richard Petty Blvd. | | | | |
| | Re-use water main | Along east side of Clyde Morris from a point near FDOT construction office to just north of the pedestrian overpass; then to an easement along the west side of Clyde Morris Blvd. | | | | |
| | 12" re-use water main | Going south to a point then crosses to the west to Hancock Blvd. | | | | |
| | re-use water pumping station | South of FDOT construction office | | | | |
| | 42" and 36" pipe | Crossing Clyde Morris south of FDOT construction office | | | | |
| | 4" high pressure sludge force main | Crossing Clyde Morris south of FDOT construction office; cannot be relocated | | | | |
| | 20" force main | East side of Clyde Morris Blvd. that has an air release valve which would need to be relocated | | | $ 100,000 | |
| | fire hydrants | West side of Clyde Morris | | | $ 1,000 | per hydrant |

## 4.3 Environmental Characteristics

### 4.3.1 Land Use Data

4.3.1.1 Existing Land Use

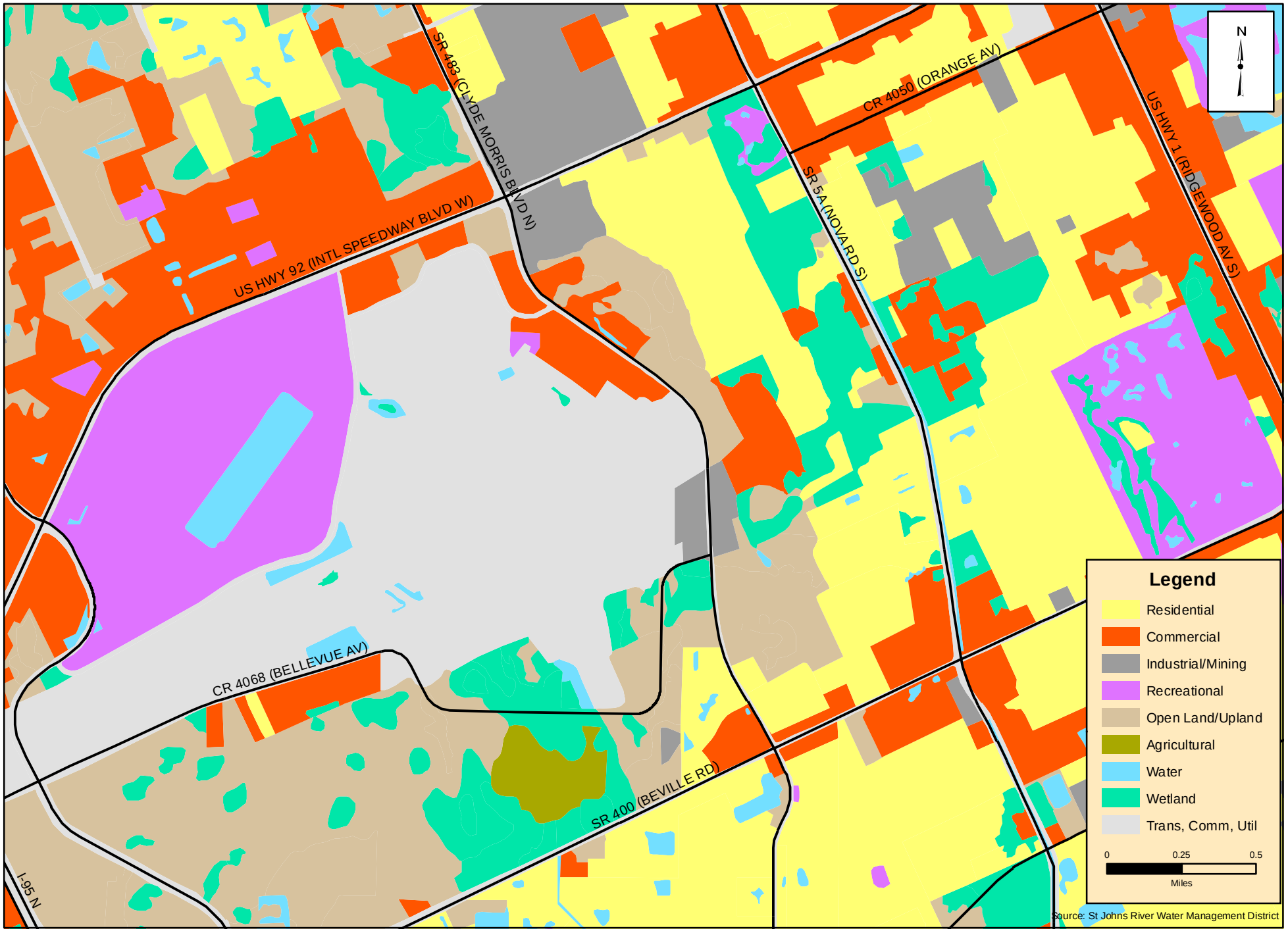
As previously discussed in Chapter Three, Volusia County has adopted a Comprehensive Land Use Plan and the City of Daytona Beach also has a Comprehensive Plan. The existing land use map produced by the City of Daytona Beach can be found in Figure 4-4. However, inconsistency was found regarding the land uses within the project limit. For example, the City of Daytona has the Mainland High School listed as industrial/mining. Therefore, a revised existing land use map was created for the project limits and can be found in Figure 4-5. In examining this figure, it can be seen that institutional, transportation, utilities, commercial, residential, and vacant land are the land uses found within the project corridor. Institutional development is the dominant land use and is concentrated in the northern half of the corridor. Institutional facilities along the project corridor include educational facilities (Embry Riddle Aeronautical University; Daytona Beach Mainland High School), the Halifax Medical Center, a Florida Department of Transportation (FDOT) maintenance yard, and the Volusia County School Board Bus Operations Complex. Transportation and utilities land uses are also prevalent in the northern part of the project site and include the Daytona Beach International Airport, a construction debris/yard waste landfill and lime ponds located on the airport property associated with an abandoned water treatment plant. Commercial development is clustered at the SR 400 and SR 600 intersections with the exception of a recycling center located adjacent to the previously mentioned solid waste landfill. Single family and multifamily residential development is located at the southern end of the project corridor near the SR 400 intersection.

Undeveloped areas are located primarily in the southern part of the project corridor. These lands generally are forested and exhibit a high level of anthropogenic disturbance, including but not limited to, unpaved trail roads, logging, ditches, trash dumping and landfilling of solid wastes.

4.3.1.2 Future Land Use

The City of Daytona Beach Comprehensive Plan also provides guidance for future land use planning. The designated land uses within the Comprehensive Plan for the SR 483 corridor indicate that the future land uses will follow the trend of the existing land uses. The future land use map produced by the City of Daytona Beach can be found in Figure 4-6.

Daytona Beach Community College, which is located east of the SR 483/SR 600 intersection, has developed a Master Plan that depicts the expansion and renovation plans that are anticipated. Figure 4-7 is an exhibit of the Master Plan. Additionally, Embry-Riddle Aeronautical University has expansion plans that involve the southwest quadrant of the SR 483/SR 600 intersections. The Embry-Riddle Master Plan can be seen in Figure 4-8. In addition, the County is considering various proposals for the development of

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**EXISTING LAND USE**

**FIGURE 4-4**

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**DATE: 12/20/05**

121 FIXED SINGLE FAMILY RESIDENTIAL, MEDIUM DENSITY
133 RESIDENTIAL HIGH DENSITY, MULTIPLE DWELLINGS
140 COMMERCIAL & SERVICES
148 CEMETERY
174 MEDICAL FACILITES
175 GOVERNMENTAL FACILITIES
411 PINE FLATWOODS
413 SAND PINE SCRUB
425 TEMPERATE HARDWOOD HAMMOCK
425/740 TEMPERATE HARDWOOD HAMMOCK/DISTURBED LAND
427 LIVE OAK HAMMOCK
427/740 LIVE OAK HAMMOCK/DISTURBED LAND
511 DITCH
512 DITCH & CANAL
616 INLAND PONDS AND SLOUGHS
740 DISTURBED LAND
740/833 DISTURBED LAND/WATER SUPPLY PLANT
811 AIRPORT
814 HIGHWAY
1711 COLLEGE
1713 HIGH SCHOOL

STRANGER LA DR.
SR 400 (BEVILLE RD.)
KILLIAN ST.
WOODBINE ST.
VERONA ST.
HANCOCK BLVD.
NEW BELLEVUE AVE.
PROPOSED AERONAUTICAL RESEARCH PARK
BELLEVUE AVE. EXT.
AVIATION CENTER PARKWAY
DAYTONA BEACH INTERNATIONAL AIRPORT
EMBRY-RIDDLE AERONAUTICAL UNIVERSITY
SR 483 (CLYDE MORRIS BLVD.)
RICHARD PETTY BLVD.
SR 600 (INT'L SPEEDWAY BLVD.)
MAINLAND HIGH SCHOOL
HALIFAX MEDICAL CENTER
DAYTONA BEACH COMMUNITY COLLEGE
BELLEVUE AVE.
NOVA RD. (SR 5)

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## MODIFIED EXISTING LAND USE
## FIGURE 4-5


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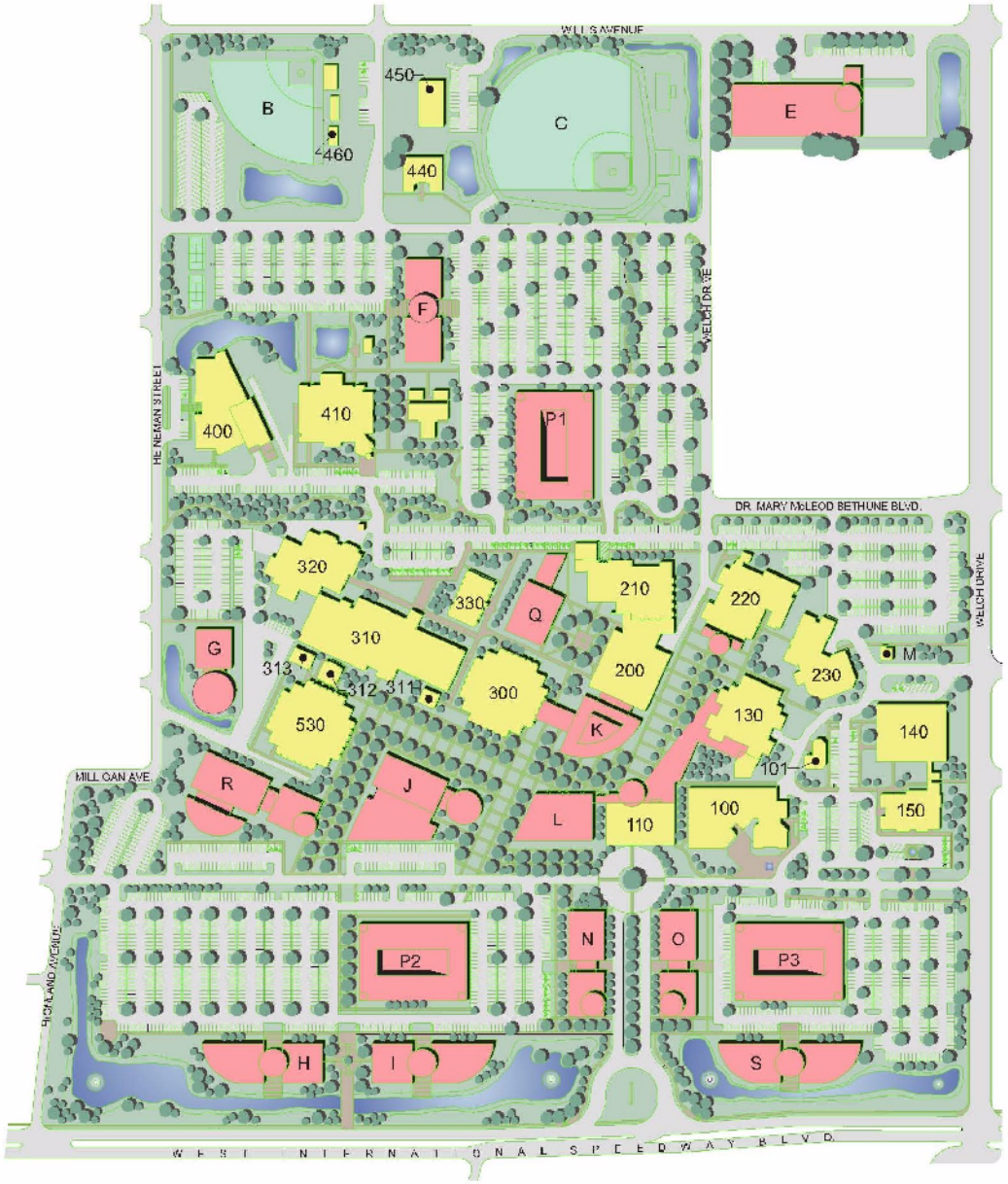
**FUTURE LAND USE**

**FIGURE 4-6**

JOB NUMBER: 107-5777-000

DATE: 12/20/05




## EXISTING FACILITIES

100 Wetherell Student Services / Administration
101 Utility Building
110 Bergengren / CBI
140 UCF Joint Use Facility I
150 UCF Joint Use Facility II
200 Learning Resources Center II / Bookstore
210 Learning Resources Center Library
300 J. G. Greene Student Resource Center
310 L. Gale Lemerand Center / Fitness Center
311 Pool Support
312 Central Refrigeration
313 Mechanical / Electrical
320 Allied Health & Nursing
330 Arts & Sciences
400 Educational Telecommunications Center - WCEU TV / 15
410 Science
440 Baseball Facility-Field
450 Kindercare Day Care Center
460 Softball Facility-Field
530 Applied Science
A Underground Thermal Storage
B Softball Field
C Baseball Field
M Mechanical

## NEW FACILITIES

E Maintenance / Facilities Dept.
F Adult Education / Child Care
G Chiller Plant
H Classrooms / Labs
I Hospitality / Tourism
J Classrooms / Labs
K Learning Resources Center
L Student Services Center
N Classrooms / Labs
O Classrooms / Labs
Q Classrooms / Labs
R Classrooms / Labs
S Classrooms / Labs

P Parking Structure

## PARKING DATA

| | |
|---|---|
| Surface Parking | 2,824 Cars |
| Parking Structures | 2,169 Cars |
| Total Parking | 4,993 Cars |

## LEGEND

EXISTING BUILDINGS

NEW BUILDINGS

N

NTS

North

0' 150' 300'

# DAYTONA BEACH CAMPUS

December 12, 2002

MASTER PLAN

Source: Daytona Beach Community College

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**DBCC**
**MASTER PLAN**

**FIGURE 4-7**

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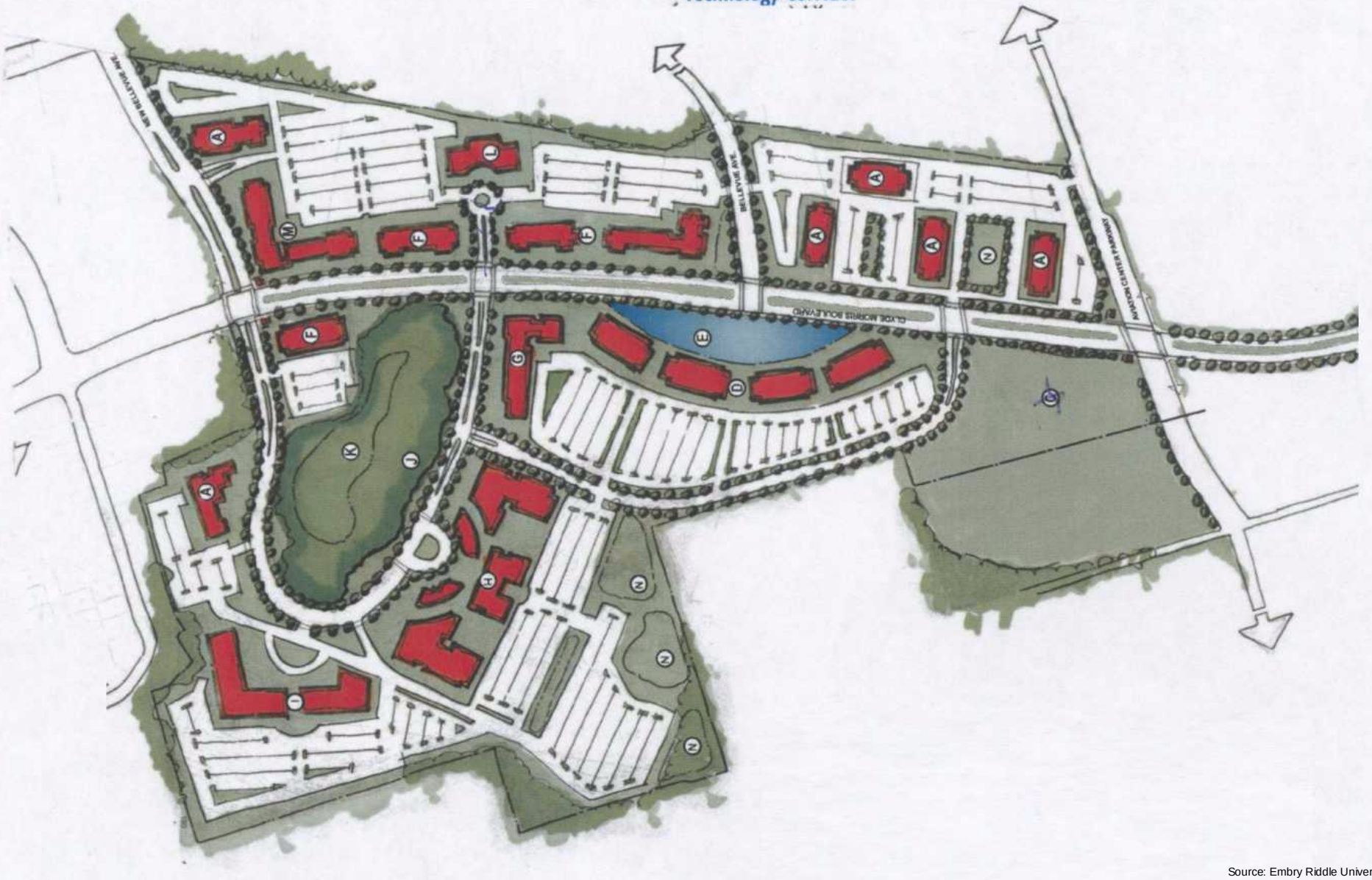
# Master Plan

Technology Corridor




Source: Embry Riddle University

| | | | |
|---|---|---|---|
| RS&H Reynolds, Smith and Hills, Inc. 10748 Deerwood Park Blvd. South Jacksonville, Florida 32256-0597 (904) 256-2500 | SR 483 PD&E STUDY<br>PRELIMINARY ENGINEERING REPORT | EMBRY RIDDLE<br>MASTER PLAN | FIGURE<br>4-8 |
| | JOB NUMBER: 107-5777-000 DATE: 12/20/05 | | |

the vacant land that is predominately located between Airport Boulevard and the apartment complexes that are in the vicinity of New Bellevue Road. Most of this land is owned by the City of Daytona Beach, Embry-Riddle University and Volusia County.

### 4.3.2 Cultural Features and Community Services

4.3.2.1 Cultural Features

As part of the PD&E study, a Cultural Resource Assessment Survey was performed. A total of 63 shovel tests were excavated within the right of way of the SR 483 project corridor and within the proposed limits of the six retention ponds. Neither historic nor prehistoric artifacts were recovered during the surface survey and subsurface testing portion of the project. As such, no archaeological sites were identified.

Ten historic resources (8VO34581, 8VO6600, and 8VO7568-8VO7575) were identified within the Area Potential Effects (APE). They were evaluated as to their potential for listing in the National Register of Historic Places (NRHP). Two of the 10 resources were previously recorded by Historic Properties Associates in 1994. One of the previously recorded resources (8VO6600) no longer exists while 8VO3451 has not been significantly altered since the 1994 recording. Of the 10 historic resources recorded within the APE, eight have discernable architectural styles. The non-extant building (8VO6600), the resource group (8VO7573), and the Daytona Beach International Airport (8VO7574) are not typically associated with a particular architectural style. The most common building styles are Masonry Vernacular, Frame Vernacular, and Industrial Vernacular with two examples each. There is one example of the Mediterranean Revival style. Nine of the 10 historic resources did not meet the minimum criteria for listing in the NRHP because of common design type, lack of known significant historical associations, and/or significant alternations to the historic fabric. 8VO3451 (Halifax Medical Center) is potentially eligible for listing in the NRHP at the local level under Criterion C by embodying “the distinctive characteristics of a type, period, or a method of construction” (U.S. Department of the Interior 1998:17). The building features patterns common to grand Mediterranean Revival buildings built in Florida during the 1920’s. 8VO3451 has the distinctive Mediterranean Revival stucco exterior wall fabric, square towers, and arches that comprise the qualities of the style.

4.3.2.2 Community Services

A community facility not only serves the needs of the surrounding community, it is often a focal point for the community. This study will consider community services to include fire stations, police stations, medical and emergency treatment facilities, public and private schools, day care facilities, churches and other religious sanctuaries, cemeteries, parks and recreational areas, public buildings and facilities. Information for mapping the community facilities within the study area was based on field reconnaissance. Table 4.3.2.2.1 and Figure 4-9 consists of the listing and locations of the community features, respectively.

**Table 4.3.2.2.1**
**Summary of Community Facilities**

| Type | Name | Location |
|---|---|---|
| Day Cares | | |
| D-1 | Kinder Care | East of SR 483 on SR 400 |
| Parks | | |
| P-1 | Community Park | South of SR 400 on SR 483 |
| Medical Facilities | | |
| M-1 | Halifax Medical Center | North of SR 600 on SR 483 |
| Schools | | |
| S-1 | Embry-Riddle University | South of SR 600 on SR 483 |
| S-2 | Mainland High School | South of SR 600 on SR 483 |
| S-3 | Daytona Beach Community College | East of SR 483 on SR 600 |

### 4.3.3 Natural and Biological Features

4.3.3.1 Wetlands/Surface Water

During the course of the PD&E study, assessments of wetland and environmental resources within the project corridor have been conducted. The primary goal of these tasks was to determine the extent and characteristics of the wetlands located within the right of way. A total of five wetland systems have been identified, classified and characterized within the project corridor. Figure 4-10 shows the location of these systems within the project corridor. Only one of these wetlands may be impacted by the project. The wetland system impacted depends upon which pond design at the Embry Riddle campus is considered feasible from a drainage engineering standpoint. Surface waters (i.e., ditches and canals) will also be impacted by the proposed roadway design.

In compliance with Presidential Executive Order 11990, consideration was given to the protection of wetland resources. However, given that the project has to occur adjacent to the existing right of way and the stormwater regulations must be met to receive state water quality certification, there may not be a viable option that would allow for the avoidance of the wetland systems at the Embry Riddle campus. Best management practices will be used to reduce any secondary impacts to adjacent systems that fall outside of the project corridor. All mitigation for wetland impacts will be implemented by the SJRWMD through funding supplied by FDOT.

4.3.3.2 Wildlife and Habitat

A total of 16 protected species have been identified as potentially occurring within the project boundaries. The 16 species identified include four reptiles, one amphibian, nine birds and two mammals. Only one species, the Gopher Tortoise, is known to occur at the project site. One active Gopher Tortoise burrow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**COMMUNITY FEATURES**

**FIGURE 4-9**

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LEGEND

FIELD-OBSERVED WETLANDS

A ACTIVE GOPHER TORTISE

DRAINAGE DITCH

W-1

W-2

W-3

W-4

W-5

W-6

W-7

PROPOSED AERONAUTICAL RESEARCH PARK

DAYTONA BEACH INTERNATIONAL AIRPORT

EMBRY-RIDDLE AERONAUTICAL UNIVERSITY

MAINLAND HIGH SCHOOL

HALIFAX MEDICAL CENTER

DAYTONA BEACH COMMUNITY COLLEGE

HANCOCK BLVD.

NEW BELLEVUE AVE.

BELLEVUE AVE. EXT.

AVIATION CENTER PARKWAY

SHANGRI LA DR.

SR 400 (BEVILLE RD.)

KILLIAN ST.

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VERONA ST.

BELLEVUE AVE.

SR 483 (CLYDE MORRIS BLVD.)

RICHARD PETTY BLVD.

SR 600 (INT'L SPEEDWAY BLVD.)

NOVA RD. (SR 5)

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## EXISTING WETLANDS FIGURE 4-10

was identified along the project corridor as identified on Figure 4-10. The proposed construction is not anticipated to adversely impact any of these species.

The ditches and wetlands of the project corridor provide suitable foraging habitat but limited nesting habitat for the American Alligator. Substantial foraging habitat for the species will remain in the project area after the construction is complete. Additionally any unavoidable wetland impacts will be mitigated, therefore no adverse impacts to the alligator are anticipated to result from this project.

A single, active Gopher Tortoise burrow was discovered in the project area. To minimize impacts to Gopher Tortoises and commensal species, immediately preceding construction, a survey will need to be conducted to determine the current status of the Gopher Tortoise at the project site. If the Gopher Tortoise burrow is abandoned, then no action is necessary. If active or old burrows are discovered the Gopher Tortoises and commensals will need to be relocated under the auspices of FWC or an "Incidental Take" permit will need to be obtained from the agency.

It is doubtful whether the Florida Pine Snake and Gopher Frog inhabit the project site. However, since they have been documented utilizing Gopher Tortoise burrows these species may potentially occur at the project site. It is anticipated that the impact to these species will be insignificant.

The project site provides marginal habitat for the Eastern Indigo Snake due to its highly disturbed nature and location within an urban area. To minimize or eliminate impacts to the species during construction, the contractor will need to be advised as to the potential presence of the species and its protected status. If an Eastern Indigo Snake is discovered during construction, the contractor will be required to cease any operation, which might cause harm to the individual snake. If the snake does not move away from the construction area, the FWC will need to be contacted to capture and relocate the individual snakes to suitable habitat.

Of the nine listed birds six of them are wading birds that may utilize portions of the project area for foraging on an opportunistic basis. However, there are numerous suitable foraging sites in the area and these birds have the mobility to access them. Additionally all unavoidable wetland impacts will be mitigated. Site inspection as well as an examination of FWC's Waterbird Colony Locator database indicated no rookeries at or near the project site.

The Bald Eagle does not utilize the site for foraging and does not presently nest within 1.5 miles of the project area. Therefore no impact to the species is anticipated to result from the proposed construction.

Little suitable nesting habitat for the Southeastern American Kestrel is located at the project site, however the grasslands and disturbed lands do provide foraging habitat. Adequate foraging habitat will remain after the proposed construction therefore no impact to the species is anticipated.

Suitable foraging habitat exists at the project site for the Peregrine Falcon. The species typically migrates through Florida and may forage at the subject property. However, the project site is not an important staging area for Peregrine Falcon. A minor amount of foraging habitat will be eliminated by the proposed construction, however this is not anticipated to adversely impact the species.

Marginal habitat for the two listed mammalian species, the Florida Mouse and Sherman's Fox Squirrel, exists at the project site. Neither of these species is expected to inhabit the project site, therefore no impact to these species is anticipated.

No listed plant species are expected to occur within the project site.

Given the aforementioned conclusions and data collection efforts, the proposed project will not adversely impact any state or federally listed species.

#### 4.3.3.3 Water Quality

As part of the PD&E study, a Water Quality Impact Evaluation (WQIE) was completed. The project is not located in an area of a principal or sole source aquifer; therefore, coordination with the U.S. Environmental Protection Agency for compliance with the Safe Water Drinking Act is not required. The proposed project will discharge to a wetland, Pine Lake, and the Nova Road Canal. All of these surface waters are classified as Class III by the regulations of the Florida Department of Environmental Protection. At this planning stage in the project, a conceptual stormwater treatment plan consisting of storm sewer pipes with curb inlets, which will route stormwater to the proposed stormwater ponds, has been developed. During the deign phase this conceptual plan will be refined to meet the permitting requirement of the St Johns River Water Management District as contained in the FAC Chapters 40C-4, 40C-40, 40C-42, and the land development regulation of Volusia County. The final design for the stormwater systems will meet the most stringent of these various criteria and will assure that potential water quality impacts from the project are minimized and mitigated.

The Tomoka River Basin, which lies to the south and west of the SR 400/SR 483 intersection, is a basin that requires additional stormwater protection related to impervious surfaces due to its designation as an Outstanding Florida Water (OFW). The Tomoka basin stormwater management practices will be followed should there be any stormwater discharge to the basin.

4.3.3.4 Floodplains

The project is not located in any FEMA designated floodplain.

4.3.3.5 Hazardous Material

As part of the PD&E study, a Contamination Screening Evaluation Report was prepared for the project corridor. This study was performed in accordance with Part 2, Chapter 22 "Contamination Impacts" of the FDOT PD&E Manual, revised December 10, 2003. The objectives of this contamination screening were to identify and evaluate contamination sources with the potential to impact the proposed right-of-way.

The SR 483 corridor has developed land situated within a mixture of undeveloped, residential and commercial land use. The preliminary evaluation included obtaining pertinent environmental records from state and local agencies, reviewing and evaluating an environmental database and aerial photographs, performing a visual reconnaissance of the project corridor and surrounding area, interviewing knowledgeable persons and evaluating potential environmental impacts along the project corridor.

Review of available records identified thirty-two (32) sites with potential contamination sources, reported non-compliance and/or known contamination within one-quarter mile from the project corridor. Twenty (20) sites were identified as potential or known petroleum/fuel sites, underground storage tank (UST) and/or aboveground storage tank (AST) systems. Seven (7) sites were identified as a small quantity generator (SQG). Three (3) sites were identified as landfills and or dumping areas. Two (2) sites were identified as priority drycleaner sites. One (1) site was identified as a permit compliance system, one (1) site was identified as an incinerator site, one (1) site was identified as a lime pond/sludge site, and one (1) site was identified as a US Navy firing/gun range. Table 4.3.3.5.1 is a listing and Figure 4-11 illustrates the location of these sites within the project area, respectively

Based on the documented contamination, a project corridor walk-through, interviews, information obtained from review of available records and distances from the project corridor, the potential for environmental impact within the project corridor is high. It is recommended that additional subsurface investigations along the SR 483 widening project, be conducted prior to the next phase of the project development.

**Table 4.3.3.5.1**
**Potential Contamination Sources**

| SITE No. | FACILITY NAME & ADDRESS | Distance/ Direction From Project Corridor | FDEP FACILITY ID No. / EPA ID No. | POTENTIAL SOURCE OF CONTAMINATION | CONTAMINATION RISK RATING | RATIONALE FOR RISK RATING | SAMPLING RECOMMENDATION |
|---|---|---|---|---|---|---|---|
| 1 | Halifax Medical Center<br>303 N Clyde Morris Boulevard<br>Daytona Beach, FL 32115 | 0.30 Mile North | FDEP FAC ID. No. 9700952<br>USEPA No. FLD984187450 | Petroleum/SQG | Low | Petroleum Discharge 5/29/01. No cleanup required.<br>In compliance | None |
| 2 | KMART #4415<br>1300 Volusia Avenue<br>Daytona Beach, FL 32114 | 0.125 Mile East | FDEP FAC. ID. No. 8631499 | Petroleum | Low | One UST removed and one in service. | None |
| 2A | Daytona Beach City Lift Station #1110<br>Opp-KMART<br>US Highway 92<br>Daytona Beach, FL 32115 | 0.125 Mile East | FDEP FAC. ID. No. 9300590 | Petroleum | Low | 550 gallons diesel UST removed, 1,000 gallons UST in service | None |
| 3 | Shell-First Coast Energy #3093<br>1392 Volusia Avenue<br>Daytona Beach, FL 32114 | 0.125 Mile West | FDEP FAC. ID. No. 8517689 | Petroleum | Low | Reported discharge. RA ongoing but inactive due to score | None |
| 4 | Martin Marietta Corp<br>1800 International Speedway Boulevard<br>Daytona Beach, FL 32215 | 1.25 Miles West | USEPA No. FLD001690924 | SQG | Low | Violations – in compliance | None |
| 5 | Daytona Beach International Airport – Parcel 9/12<br>351 Coral Sea Avenue<br>Daytona Beach, FL 32214 | 0.5 Mile West | FDEP FAC. ID. No. 9806673 | Petroleum | Low | Reported discharge, cleanup required work status inactive | None |
| 6 | Volusia County Sheriff Department Aviation<br>489 Coral Sea Dr<br>Daytona Beach, FL 32214 | 0.5 Mile West | FDEP FAC. ID. No. 8631504 | Petroleum | Low | Two USTs removed, one in service. Reported discharge, no cleanup required. | None |
| 7 | Embry Riddle Aeronautical University<br>600 South Clyde Morris Boulevard<br>Daytona Beach, FL 32214 | Adjacent to West Side of Project Corridor | USEPA No. FLD981745177<br>FDEP FAC. ID. No. 8622722 | SQG/Petroleum | Low | 15 Violations associated with Env. Management Practices. RAP ongoing/Inactive Work Status. NFA Recommended in 1997 | None |

**Table 4.3.3.5.1**
**Potential Contamination Sources Con't**

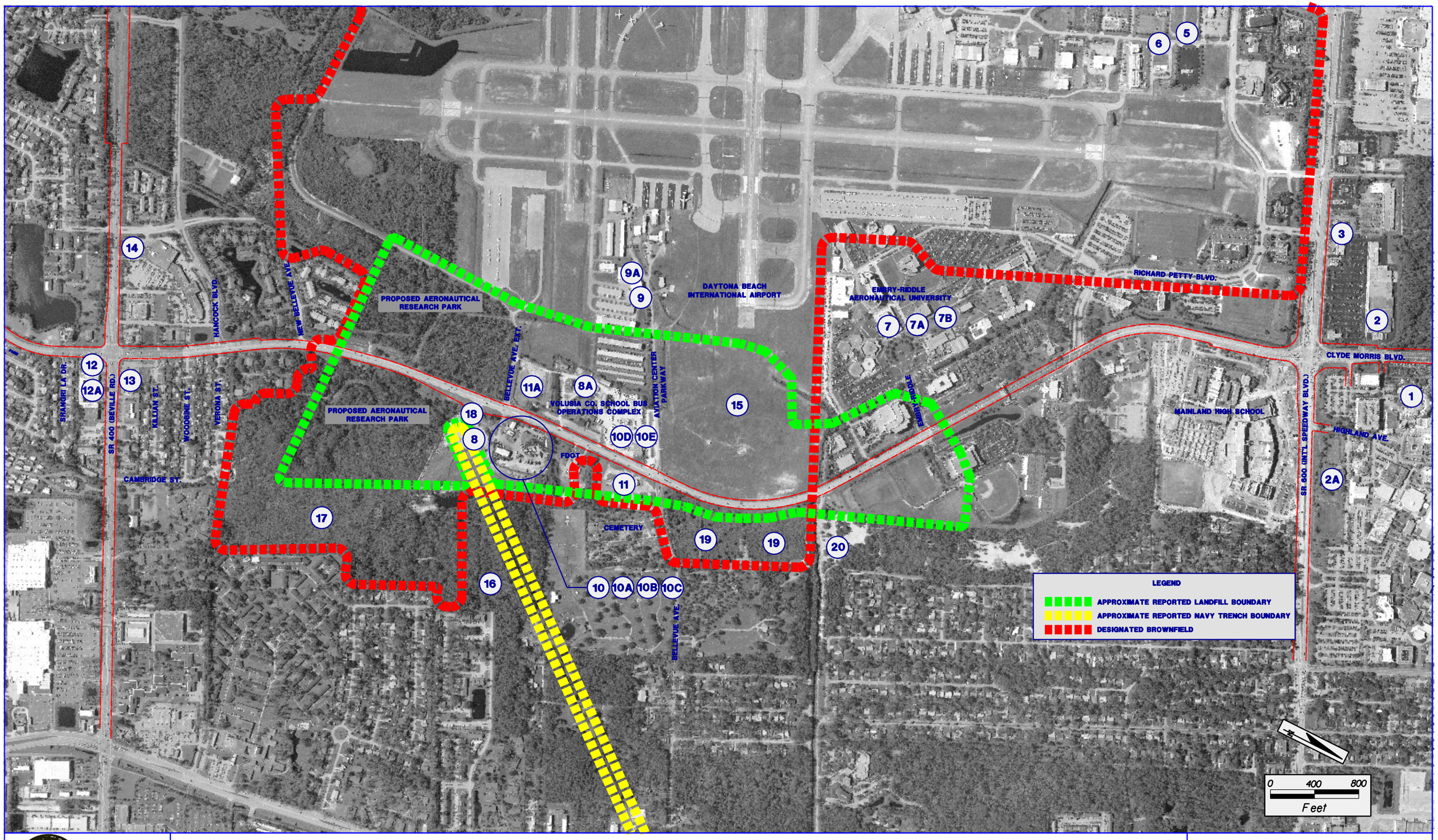
| SITE No. | FACILITY NAME & ADDRESS | Distance/ Direction From Project Corridor | FDEP FACILITY ID No. / EPA ID No. | POTENTIAL SOURCE OF CONTAMINATION | CONTAMINATION RISK RATING | RATIONALE FOR RISK RATING | SAMPLING RECOMMENDATION |
|---|---|---|---|---|---|---|---|
| 7A | 600 S. Clyde Morris Boulevard<br>Daytona Beach, FL 32214 | Adjacent to West Side of Project Corridor | None | Jet Fuel | Low | NFA-7/20/01 | None |
| 7B | The Ambassador E. William CROT<br>600 S. Clyde Morris Boulevard<br>Daytona Beach, FL 32214 | Adjacent to West Side of Project Corridor | EPA ID No. 110015727551 | Permit Compliance System | No | No violations – No documented discharge or spills | None |
| 8 | IWS<br>925 Clyde Morris Boulevard<br>Daytona Beach, FL 32114 | Adjacent to West Side of Project Corridor | USEPA No. FLD981479124 | SQG | Low | No violations reported | None |
| 8A | Volusia County School Board – Transportation<br>800 S. Clyde Morris Boulevard<br>Daytona Beach, FL 32214 | Adjacent to West Side of Project Corridor | FDEP FAC. ID. No. 8631507<br>USEPA No. FLD981478944 | Petroleum/SQG | Low | 3 USTs removed, 2 USTs in service, no reported discharges or spills ,no violations reported | None |
| 9 | Lynch Corporate Services Inc.<br>1624 Aviation Center Parkway<br>Daytona Beach, FL 32114 | 0.25 Miles West | FDEP FAC. ID. No. 8517225 | Petroleum | Low | 6 USTs removed, 2 USTs in service. Discharge 03/27/91 SRCR complete 3/25/96 | None |
| 9A | East Volusia Mosquito Control District<br>1600 Aviation Center Parkway<br>Daytona Beach, FL 32214 | 0.25 Miles West | FDEP FAC. ID. No. 8622783 | Petroleum | Low | 2 USTs closed in place, 3 USTs removed, discharge date 06/30/92. No cleanup required 5/29/01 | None |
| 10 | Browning Ferris Industries<br>925 S. Clyde Morris Boulevard<br>Daytona Beach, FL 32214 | Adjacent to East Side of Project Corridor | FDEP FAC. ID. No. 9202841 | Lube Oil | Low | All USTs removed – No discharge reported | None |
| 10A | Daytona Beach City – Solid Waste<br>925 S. Clyde Morris Boulevard<br>Daytona Beach, FL 32214 | Adjacent to East Side of Project Corridor | FDEP FAC. ID. No. 9300965 | Waste Oil | Low | Facility closed, UST removed, no discharge reported | None |
| 10B | Clyde Morris Boulevard C&D Disposal<br>925 S. Clyde Morris Boulevard<br>Daytona Beach, FL 32214 | Adjacent to East Side of Project Corridor | N/A | Landfill | Low | No Violations | None |

**Table 4.3.3.5.1**
**Potential Contamination Sources Con't**

| SITE No. | FACILITY NAME & ADDRESS | Distance/ Direction From Project Corridor | FDEP FACILITY ID No. / EPA ID No. | POTENTIAL SOURCE OF CONTAMINATION | CONTAMINATION RISK RATING | RATIONALE FOR RISK RATING | SAMPLING RECOMMENDATION |
|---|---|---|---|---|---|---|---|
| 10C | Browning Ferris Industries of FL Inc.<br>925 S. Clyde Morris Boulevard<br>Daytona Beach, FL 32214 | Adjacent to East Side of Project Corridor | FDEP FAC. ID. No. 9203038 | Vehicular Diesel & Lube Oil | Medium | RA-on going, last sampling in 2001 | Soil and Groundwater |
| 10D | Facilities Operating and Maintenance<br>900 S. Clyde Morris Boulevard<br>Daytona Beach, FL 32214 | Adjacent to East Side of Project Corridor | USEPA No. FLD982156721 | SQG | Low | No violations reported | No |
| 10E | Volusia County School Board – Maintenance Facility<br>900 S. Clyde Morris Boulevard<br>Daytona Beach, FL 32214 | Adjacent to East Side of Project Corridor | FDEP FAC. ID. No. 8731815 | Petroleum | Low | NFA – 6/18/04 | None |
| 11 | Volusia County Veh-Maint – Bellevue<br>1501 Bellevue Avenue<br>Daytona Beach, FL 32114 | Adjacent to East Side of Project Corridor | FDEP FAC. ID. No. 8622778 | Petroleum | No | Facility Closed, All USTs removed, SRCR 9-11-95 | None |
| 11A | Volusia County School BD – (South) Property<br>Bellevue Rd/Clyde Morris Boulevard S.<br>Daytona Beach, FL 32214 | Adjacent to West Side of Project Corridor | FDEP FAC. ID. No. 9804710 | Petroleum | High | Discharge SA ongoing Discharge date 10-12-93 | Soil and Groundwater |
| 12 | Lil Champ Food Stores #6082<br>1379 Beville Rd.<br>Daytona Beach, FL 32119 | 0.06 Miles East | FDEP FAC. ID. No. 8517473 | Petroleum | Low | Open retail, 3 USTs in service, No discharges or spills reported | None |
| 12A | Corner Cleaners<br>1377 Beville Rd.<br>Daytona Beach, FL 32119 | 0.06 Miles East | FDEP FAC. ID. No. 9500709 | Drycleaner | Medium | Priority Cleaner | Soil and Groundwater |
| 13 | Walgreens Company<br>1420 Beville Rd<br>Daytona Beach, FL 32114 | 0.06 Miles West | USEPA No. FLR000033845 | SQG | No | No violations reported | None |
| 14 | Caring Cleaners<br>1500 Beville Rd., Suite 101<br>Daytona Beach, FL 32114 | 0.20 Miles West | USEPA No. FLD981749062 | Drycleaner | Medium | Priority Cleaner | Soil and Groundwater |

**Table 4.3.3.5.1**
**Potential Contamination Sources Con't**

| SITE No. | FACILITY NAME & ADDRESS | Distance/ Direction From Project Corridor | FDEP FACILITY ID No. / EPA ID No. | POTENTIAL SOURCE OF CONTAMINATION | CONTAMINATION RISK RATING | RATIONALE FOR RISK RATING | SAMPLING RECOMMENDATION |
|---|---|---|---|---|---|---|---|
| 15 | Landfill | Throughout project corridor | None | C&D and Household Debris | High | Unknown contaminants | Test Pits Plan of Action (Appendix C) |
| 16 | Navy Trench | 0.08 Miles East | None | Crude, Hydraulic oils, and airplane parts | High | Old Navy dumping site | Soil and Groundwater |
| 17 | Brownfield | Throughout the corridor | BF 640401000 | Unknown | Low | Unknown dumping in area/Potential petroleum impacts in area | Soil and Groundwater will be funded by EPA/FDEP |
| 18 | Incinerator Approximate location near present C&D landfill | East of SR 483 | Unknown | Ash/Metals | Medium | Age and location of source | Soil and Groundwater |
| 19 | Lime Ponds | Adjacent to East of Project corridor | None | Unknown | Medium | Prior testing indicates no contamination reported | Soil and Groundwater |
| 20 | Gun/ Firing Range | Adjacent to the East and West of Project corridor | None | Lead | Medium | Possible lead bullets | Soil and Groundwater |

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# SR 483 (CLYDE MORRIS BLVD.)
# PROJECT DEVELOPMENT AND ENVIRONMENT STUDY

JOB NUMBER: 107-5777-000

DATE: 1/14/06

## POTENTIAL CONTAMINATION SITES
## FIGURE 4-11

# 5.0 Design Criteria

Table 5.0, Roadway Design Criteria, presents the design criteria established for the proposed roadway alternatives. All four alternatives considered utilize the same criteria for the entire length of the proposed improvement. The design criteria are based on parameters outlined the Florida Greenbook (May 2002), Plans Preparation Manual (PPM), Vol. 1 (FDOT, 2005), Florida Intersection Design Guide (FIDG, FDOT, 2002), and the FDOT Design Standards (2004).

**Table 5.0**
**Roadway Design Criteria**

| Design Element | Criteria | Source |
|---|---|---|
| ***Facility Type*** | Urban Principal Arterial | FDOT |
| ***Design Speed*** | 45 mph / 50 mph[1] | PPM Table 1.9.1 |
| ***Travel Lane Width*** | 12' | PPM, 2.1.4.1 |
| ***Bicycle Lane Width*** | 5' | PPM, 8.4.1 |
| ***Sidewalk Width*** | 8' & 5' | PPM, 8.3.1, BFMP |
| ***Median Width*** | 22' | PPM, Table 2.2.1 |
| ***Minimum Border Width*** | 12' | PPM, Table 2.5.2 |
| ***Grades*** | 6% max | PPM, Table 2.6.1 |
| ***Max. Change in Grade w/o VC*** | 0.60% | PPM, Table 2.6.2 |
| ***Pavement Cross Slopes*** | 2% (3% outside lane) | PPM, Figure 2.1.1 |
| ***Minimum Grade*** | 0.30% | PPM, Table 2.6.4 |
| ***Roadway Base Clearance*** | 1' above DHW | PPM, Table 2.6.3 |
| ***Min. Stopping Sight Distance*** | 360' / 425' | PPM, Table 2.7.1 |
| ***Horizontal Curves*** | | |
| ***Min. Length of curve*** | 400' | PPM, Table 2.8.2a |
| ***Max. Curvature*** | 8 deg 15' / 6 deg 30' | PPM, Table 2.8.3 |
| ***Max. Curvature w/o Superelev*** | 2 deg 45' / 2 deg 00' | PPM, Table 2.8.4 |
| ***Max. Deflection w/o curve*** | 1 deg | PPM, Table 2.8.1a |
| ***Min. K Crest Vertical Curve*** | 98 (45 mph)/136 (50 mph) | PPM, Table 2.8.5 |
| ***Min. K Sag Vertical Curve*** | 79 (45 mph)/96 (50mph) | PPM, Table 2.8.6 |
| ***Superelevation*** | | |
| ***Maximum Rate*** | 5% | PPM, Table 2.9.2 |
| ***Transition Rate*** | 1:150 | PPM Table 2.9.4 |
| ***Distribution of Runoff*** | 80/20 | Standard Index 510 |
| ***Minimum Intersection Design*** | Minimum Angle = 75; Design Vehicle = WB 50; | FIDG – 3.7.1 & 3.13 |
| ***Minimum Vertical Clearance*** | 16'6" Roadway Over Roadway | PPM, Figure 2.10.1 |
| ***Clear Zone*** | 4' (ultimate) | PPM, Table 2.11.9 |
| ***Minimum Turn Lane Lengths*** | 185' (decel) + Queue[1] | Standard Index 301 |

[1]The horizontal and vertical geometry is designed to 50 mph with the exception of the segment south of SR 400 and the segment between SR 400 and Verona Avenue. Due to the proposed curb and gutter, the design speed is officially 45 mph. Turn lane deceleration lengths are designed to 45 mph.

# 6.0 Traffic

As part of the Project Development and Environment Study, a detailed traffic analysis was performed. Existing traffic conditions were obtained and tabulated for roadways within the study area. Future traffic volumes were then projected for three scenarios - 2010 (Opening Year), 2020 (Interim Year), and 2030 (Design Year). The No Build condition was also analyzed as part of this study.

For the existing condition and each of the three future scenarios (2010, 2020, or 2030), the traffic analysis examined each roadway's average annual daily traffic (AADT), the peak hour volumes and levels of service for the corridor and intersections, and the recommended lane configurations to obtain a level of service "D" or above.

## 6.1 Existing Traffic Conditions

In analyzing the existing conditions, traffic counts were collected and recommended traffic characteristics were established. All existing traffic counts were collected during February, April and May 2004. Utilizing the FDOT seasonal and axle adjustment factors for Volusia County, the counts were adjusted to average annual conditions. The data included:

**Table 6.1.1**
**Traffic County Data Inventory**

| Location | Type of Count | Date of Count |
|---|---|---|
| North of SR 400 (Beville Road) | 24-Hour Volume | Wk of 4/26/2004 |
| North of Bellevue Avenue EXT | 24-Hour Volume | Wk of 4/26/2004 |
| South of Embry Riddle Drive | 24-Hour Volume | Wk of 4/26/2004 |
| South of Richard Petty Blvd | 24-Hour Volume | Wk of 4/26/2004 |
| South of SR 600 (US 92) | 24-Hour Volume | Wk of 4/26/2004 |
| SR 400 (Beville Road) | 4-Hour Turing Movement Count | Wk of 4/26/2004 |
| Bellevue Avenue EXT | 4-Hour Turing Movement Count | Wk of 4/26/2004 |
| Bellevue Avenue | 4-Hour Turing Movement Count | Wk of 4/26/2004 |
| Embry Riddle Drive | 4-Hour Turing Movement Count | Wk of 4/19/2004 |
| Richard Petty Boulevard | 4-Hour Turing Movement Count | Wk of 4/19/2004 |
| SR 600 (US 92) | 4-Hour Turing Movement Count | Wk of 4/26/2004 |
| North of SR 400 (Beville Road) | 72-hour Classification Count | Wk of 2/16/2004 |
| North of Bellevue Avenue | 72-hour Classification Count | Wk of 5/17/2004 |

The Design Characteristics were developed from the existing travel characteristics and data from the traffic counts. Measured K and peak traffic direction (D measured) were assessed based upon the 24-hour volume. The 72-hour classification counts and the FDOT RCI data was utilized in the Truck (T) percentage. The value of $K_{30}$ was estimated using measured peak-to-daily ratios. An adjustment factor of 1.05 was applied for Volusia County. The summary of the roadway characteristics can be found in Table 6.1.2.

**Table 6.1.2**
**Roadway Characteristic Summary**

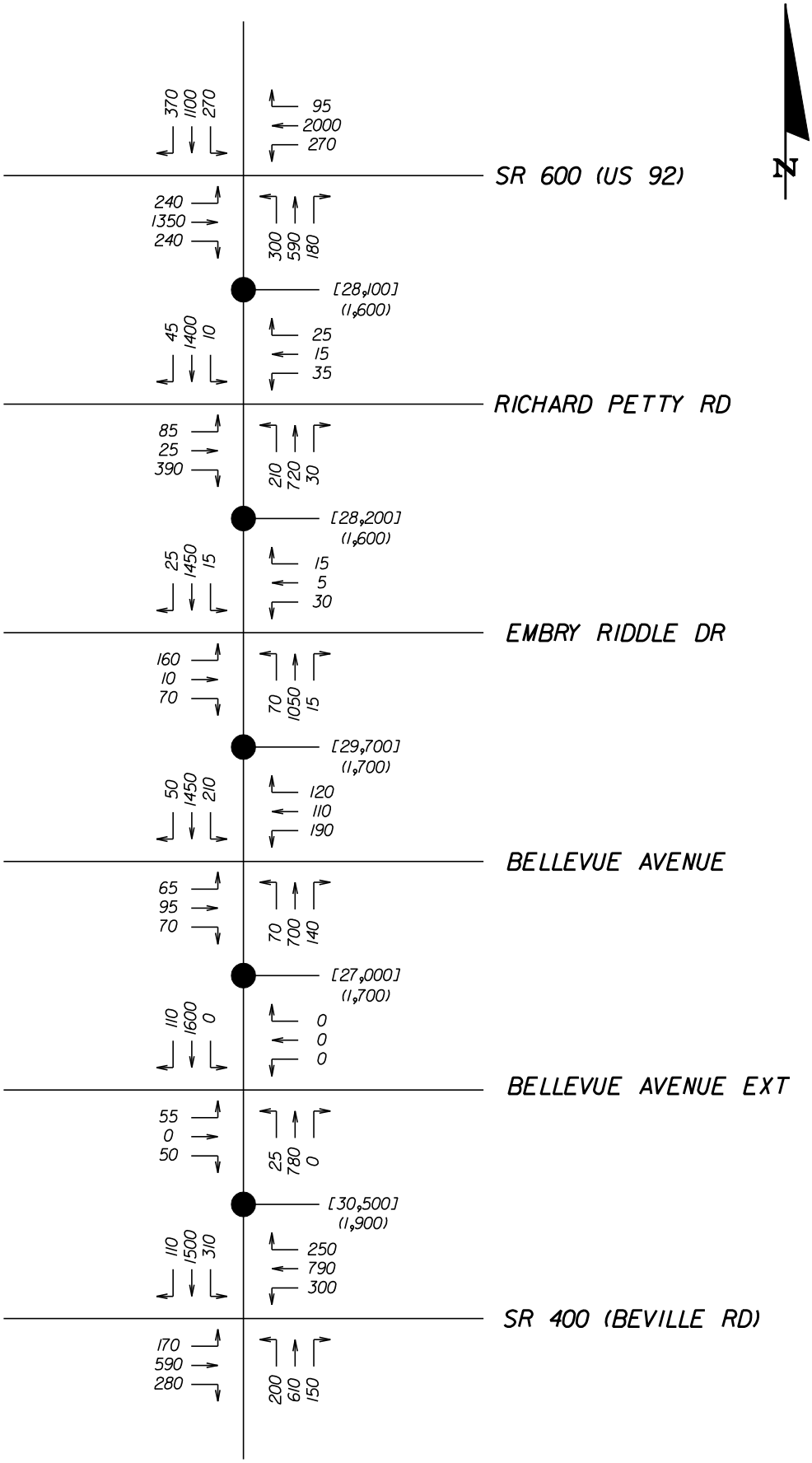
| Segment | North of SR 400 | North of Bellevue Avenue EXT | South of Embry Riddle Drive | South of Richard Petty | South of SR 600 |
|---|---|---|---|---|---|
| K Measured | 8.20% | 8.60% | 8.30% | 8.30% | 8.70% |
| $K_{30}$ Adj. Factor | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 |
| $K_{30}$ Estimated | 8.61% | 9.03% | 8.72% | 8.72% | 9.14% |
| D Measured | 65.5% | 64.5% | 61.9% | 59.4% | 50.6% |
| $T_{daily}$ Measured | 3.9% | N/A | 4.1% | N/A | N/A |
| $T_{peak}$ Measured | 3.6% | N/A | 4.3% | N/A | N/A |
| FDOT RCI – $K_{30}$ | 10.19% | 10.19% | 10.19% | 10.19% | 10.19% |
| FDOT RCI – $D_{30}$ | 55.15% | 55.15% | 55.15% | 55.15% | 55.15% |
| FDOT RCI – $T_{daily}$ | 4.29% | 4.29% | 3.89% | 3.89% | 3.89% |

Portable counters were used to obtain the RCI data. The $K_{30,}$ $D_{30}$, and $T_{daily}$ values were estimated values from several roadways with similar characteristics. To obtain a better representation of the existing and future Design Hour Factor, the $K_{30}$ from the FDOT RCI database and the traffic count estimated $K_{30}$ were averaged. The recommended value of 9.50 for the $K_{30}$ is within the FDOT acceptable limits for an urban arterial. Traffic counts showed a variation on the directional distribution factor for north and south of Bellevue Avenue within the study area. The D measured values from traffic counts were averaged to develop the $D_{30}$ factor for this two segments of SR 483 within the study area. The recommended design characteristics can be found in Table 6.1.3

**Table 6.1.3**
**Recommend Design Characteristics**

| **Average Existing Roadway Characteristics** | |
|---|---|
| K (Measured) | 8.42% |
| D (Measured) | 60.38% |
| $K_{30}$ (Estimated) | 8.84% |
| Recommended Design Characteristics | |
| $K_{30}$ | 9.50% |
| $D_{30}$ | SR 400 – Bellevue Av: 65.00%<br>Bellevue Av – SR 600: 60.00% |
| $T_{daily}$ | SR 400 – Bellevue Av: 4.29%<br>Bellevue Av – SR 600: 3.89% |

Figure 6-1 provides the calculated Existing Year 2004 AADT's and corresponding Directional Design Hour Volumes (DDHVs) for roadway links and intersections.




XXX - Design Hourly Volume (DHV)
(XXX) - Directional Design Hourly Volume (DDHV)
[XXX] - Annual Average Daily Traffic (AADT)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# SR 483 PD&E STUDY
# INTERCHANGE FEASIBILITY REPORT

**JOB NUMBER: 107-5777-000** **DATE: 7/29/05**

## EXISTING YEAR 2004 DHV, DDHV AND AADT

**FIGURE 6-1**

For the existing condition, the basic arterial segment's operational analysis was determined by ARTPLAN. SR 483 from SR 400 to SR 600 will operate at LOS C or better for all the segments with the exception of the segment between SR 400 and Bellevue Avenue Extension. The intersection operational analyses were based upon the design peak period. The most current adopted procedures found in the Transportation Research Board's Special Report 209 – Highway Capacity Manual (HCM) were used in the analysis of the signalized intersections. The intersection signal timing and phases were provided by Volusia County and utilized in the analysis. SR 400, Bellevue Avenue, and SR 600 operate at an unacceptable LOS E or worse during the design hour of the existing year.

## 6.2 Traffic Analysis Assumptions

An examination of historical traffic growth, proposed development within the corridor's surrounding area, and a basic knowledge of the traffic circulation patterns and characteristics of the corridor were used to develop the traffic projections. The No-Build condition assumed that SR 483 would remain as the existing four-lane roadway segment and maintain the existing intersection configurations, that SR 400 would remain a four-lane divided roadway and that SR 600 would remain a six-lane divided facility. The "Build" condition consisted of the widening of SR 483 to six-lanes, and that the SR 400 and SR 600 intersection locations would involve a grade separated facility.

## 6.3 Traffic Volume Projections

Within the study limits, two FDOT count stations exist. Table 6.3.1 provides a summary of results from the trend analyses that were performed at these stations.

**Table 6.3.1**
**Trend Growth Rates**

| Location | FDOT Station | Location | 2003 AADT | R2 (%) | Annual Growth Rate (%) |
|---|---|---|---|---|---|
| 1 | 795183 | SR 483 – 0.499 Mi. S of SR 600 | 31,000 | 44.4 | 1.83 |
| 2 | 795193 | SR 483 – 0.52 Mi N of SR 400 | 32,000 | 41.7 | 1.75 |

The approved CFRPM II model provided by the Department for this study was also utilized to evaluate the No-Build and Build conditions, in addition to the historical count-based trend analysis. The model has a base year 1999 validation and a long-range forecasting application for the year 2025.

Between the 1999 AADT volumes and the 2025 model forecast for the No-Build and Build conditions, an annual simple growth rate was calculated. The traffic study corridor, which consisted of SR 483 from SR 400 to SR 600, was broken into segments. For each segment, a growth rate was calculated and then averaged. For the No-Build condition, the simple overall average growth rate was 4.80%. For the Build condition, it was 5.24%. Table 6.3.2 provides a summary of the growth rates used obtained based on the CFRPM II model.

**Table 6.3.2**
**CFRPM II Model Growth Rate**

| | 2025 Growth Rates | |
|---|---|---|
| **Segment** | **No-Build** | **Build** |
| SR 400 – Bellevue Avenue EXT | 4.16% | 4.56% |
| Bellevue Avenue EXT – Bellevue Avenue | 4.33% | 4.65% |
| Bellevue Avenue - Embry Riddle Drive | 5.00% | 5.54% |
| Embry Riddle Drive - Richard Petty Blvd | 5.24% | 5.74% |
| Richard Petty Blvd - SR 600 | 5.24% | 5.71% |
| **Average** | **4.80%** | **5.24%** |

Before accepting the model results for use, they were reviewed to determine accuracy. This information, in combination with other data, was used to develop the future forecasts of travel demand. Previous completed studies within the study corridor vicinity were examined for consistency with this study's developed forecasts. A reasonable growth rate of 2.5% was used to develop the forecasts.

The design hour turning movements for the intersections within the traffic study corridor were developed employing the existing counts, the recommended AADT's and the recommended design characteristics. The PM peak hour turning movement percentages were used for the development of the design hour turning movements. Figure 6-2 provides projected traffic for the opening year 2010, Figure 6-3 depicts the projected traffic for the mid-design year 2020, and Figure 6-4 provides the projected traffic for the design year 2030.

## 6.4 Level of Service Analysis

The Level of Service (LOS) was determined for the roadway segments of SR 483 from SR 400 to SR 600. In addition, the signalized intersections were also analyzed to establish their Level of Service. Figure 6-5 provides the LOS for the existing year condition. The LOS was then determined for the No-Build scenario. Figure 6-6, Figure 6-7, Figure 6-8 depict the LOS for the Opening Year (2010), the Mid-Design Year (2020) and the Design Year (2030), respectively. This information has also been summarized in Table 6.4.1 and 6.4.2.

**Table 6.4.1**
**Roadway Segment Level of Service Summary – No Build**

| Segment | Existing Year 2004 | Opening Year 2010 | Mid-Design Year 2020 | Design Year 2030 |
|---|---|---|---|---|
| SR 400 – Bellevue Avenue EXT | F | F | F | F |
| Bellevue Avenue EXT – Bellevue Avenue | C | C | F | F |
| Bellevue Avenue - Embry Riddle Drive | B | C | F | F |
| Embry Riddle Drive - Richard Petty Blvd | C | C | F | F |
| Richard Petty Blvd - SR 600 | C | D | F | F |

**Table 6.4.2**
**Intersection Level of Service Summary – No Build**

| Intersection with SR 483 | Opening Year 2010 | | Mid-Design Year 2020 | | Design Year 2030 | |
|---|---|---|---|---|---|---|
| | LOS | Delay | LOS | Delay | LOS | Delay |
| SR 400 | F | 139.4 | F | 210.7 | F | 304.0 |
| Bellevue Avenue EXT | B | 19.5 | E | 58.7 | F | 115.9 |
| Bellevue Avenue | F | 99.3 | F | 203.8 | F | 303.5 |
| Embry Riddle Drive | E | 55.8 | F | 118.0 | F | 198.7 |
| Richard Petty Blvd | E | 66.6 | F | 125.0 | F | 196.1 |
| SR 600 | F | 214.1 | F | 294.7 | F | 392.8 |

The Level of Service was also determined for two Build circumstances. The Build Scenario 1 incorporates the corridor improvements of six-laning SR 483 and minor improvements to the at-grade intersections. Figure 6-9, Figure 6-10, Figure 6-11 depict the LOS for the Opening Year (2010), the Mid-Design Year (2020) and the Design Year (2030), respectively, for this condition. The Build Scenario 2 involves grade-separated facilities (interchanges) at SR 400 and SR 600. The configuration of the interchange at SR 400 is that defined by SR 483 overpassing SR 400. The configuration of the interchange at SR 600 is that defined by SR 600 overpassing SR 483 with advanced U-Turns. Figure 6-12, Figure 6-13, Figure 6-14 depict the LOS for the Opening Year (2010), the Mid-Design Year (2020) and the Design Year (2030), respectively for the Build Scenario 2. This information has also been summarized in Table 6.4.3 and 6.4.4.

**Table 6.4.3**
**Roadway Segment Level of Service Summary – Build**

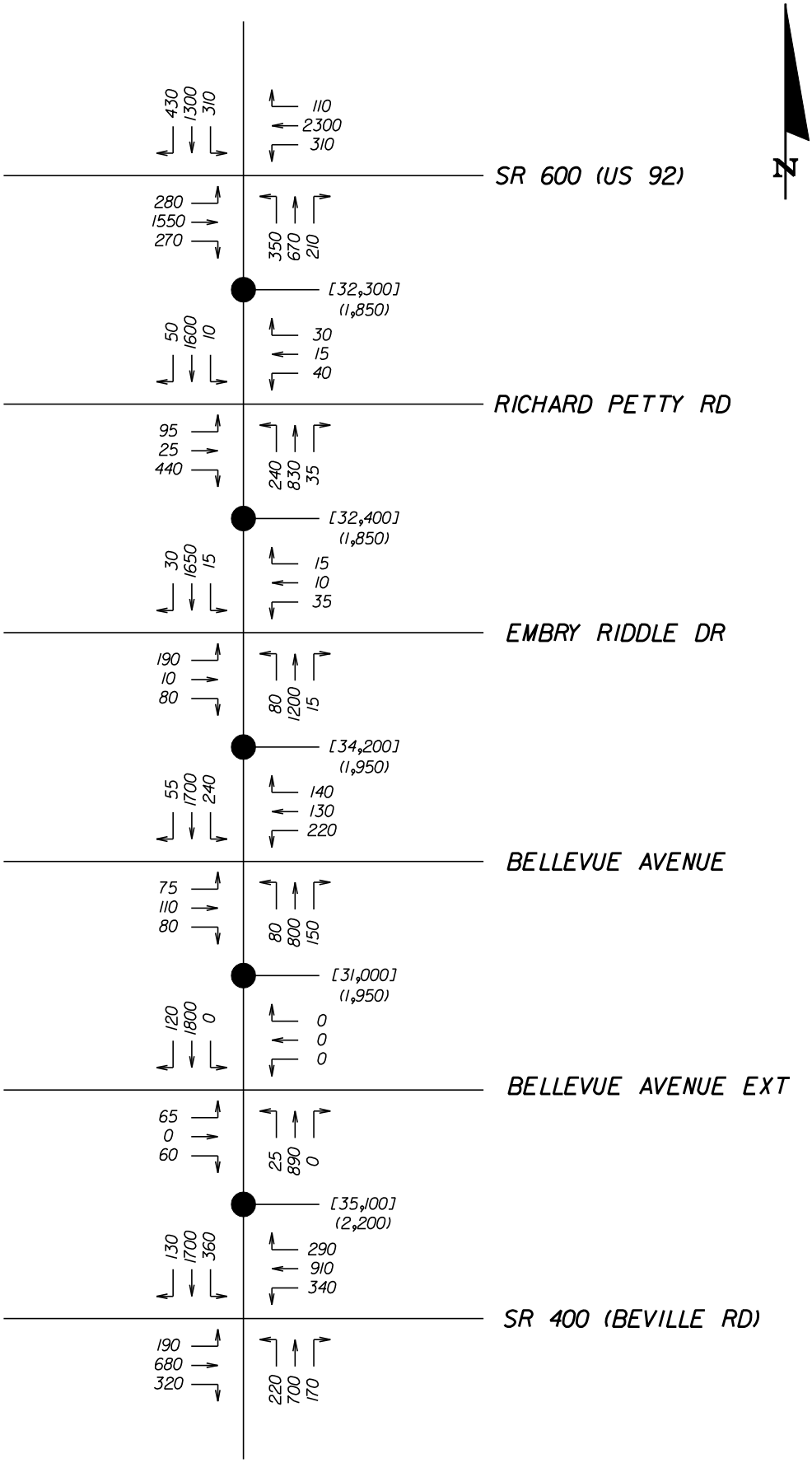
| Segment | Existing Year 2004 | Opening Year 2010 | | Mid-Design Year 2020 | | Design Year 2030 | |
|---|---|---|---|---|---|---|---|
| | | Alternative 1 | Alterntavie 2 | Alternative 1 | Alterntavie 2 | Alternative 1 | Alterntavie 2 |
| SR 400 – Bellevue Avenue EXT | F | D | A | D | A | F | A |
| Bellevue Avenue EXT – Bellevue Avenue | C | C | C | C | C | C | C |
| Bellevue Avenue - Embry Riddle Drive | B | B | B | C | C | B* | B* |
| Embry Riddle Drive - Richard Petty Blvd | C | C | C | C | C | D | D |
| Richard Petty Blvd - SR 600 | C | C | C | D | D | D | D |

* The Design Year 2030 Roadway Segment LOS improves over the Mid-Design Year 2020 due to recommended roadway improvements (i.e., additional exclusive right and left-turn lanes) at the intersection of SR 483 and Bellevue Avenue

**Table 6.4.4**
**Intersection Level of Service Summary – Build**

| Intersection with SR 483 | Opening Year 2010 | | Mid-Design Year 2020 | | Design Year 2030 | |
|---|---|---|---|---|---|---|
| | LOS | Delay | LOS | Delay | LOS | Delay |
| SR 400 – Alternative 1 | D | 53.3 | F | 120.0 | F | 181.3 |
| SR 400 – Alternative 2 | C | 26 | C | 28.4 | C | 34.7 |
| Bellevue Avenue EXT | B | 11.8 | B | 13.8 | B | 18.8 |
| Bellevue Avenue | C | 32.4 | D | 54.9 | D | 50.2 |
| Embry Riddle Drive | C | 20.6 | C | 28.9 | D | 41.2 |
| Richard Petty Blvd | D | 53.3 | D | 45.2 | D | 41.9 |
| SR 600 – Alternative 1 | F | 112.1 | F | 170.3 | F | 240.9 |
| SR 600 – Alternative 2 | C | 26.2 | C | 27.7 | C | 31.6 |

An examination of the LOS analysis reveals the “No-Build” Scenario does not meet the acceptable Level of Service adopted by the City of Daytona Beach and the Volusia County MPO. It also reveals that the Build Scenario 1 (at-grade intersection improvements at SR 400 and SR 600) meets the acceptable LOS with the exception of the intersection of SR 400, the segment between SR 400 and Bellevue Avenue Extension and the intersection of SR 600. However, the Build Scenario 2 (grade separated facilities at SR 400 and SR 600) meets the acceptable LOS at all of the intersection and segments within the project study limits. Achieving an acceptable LOS in Build Scenario 2 supports the need for the Build alternative.




XXX - Design Hourly Volume (DHV)
(XXX) - Directional Design Hourly Volume (DDHV)
[XXX] - Annual Average Daily Traffic (AADT)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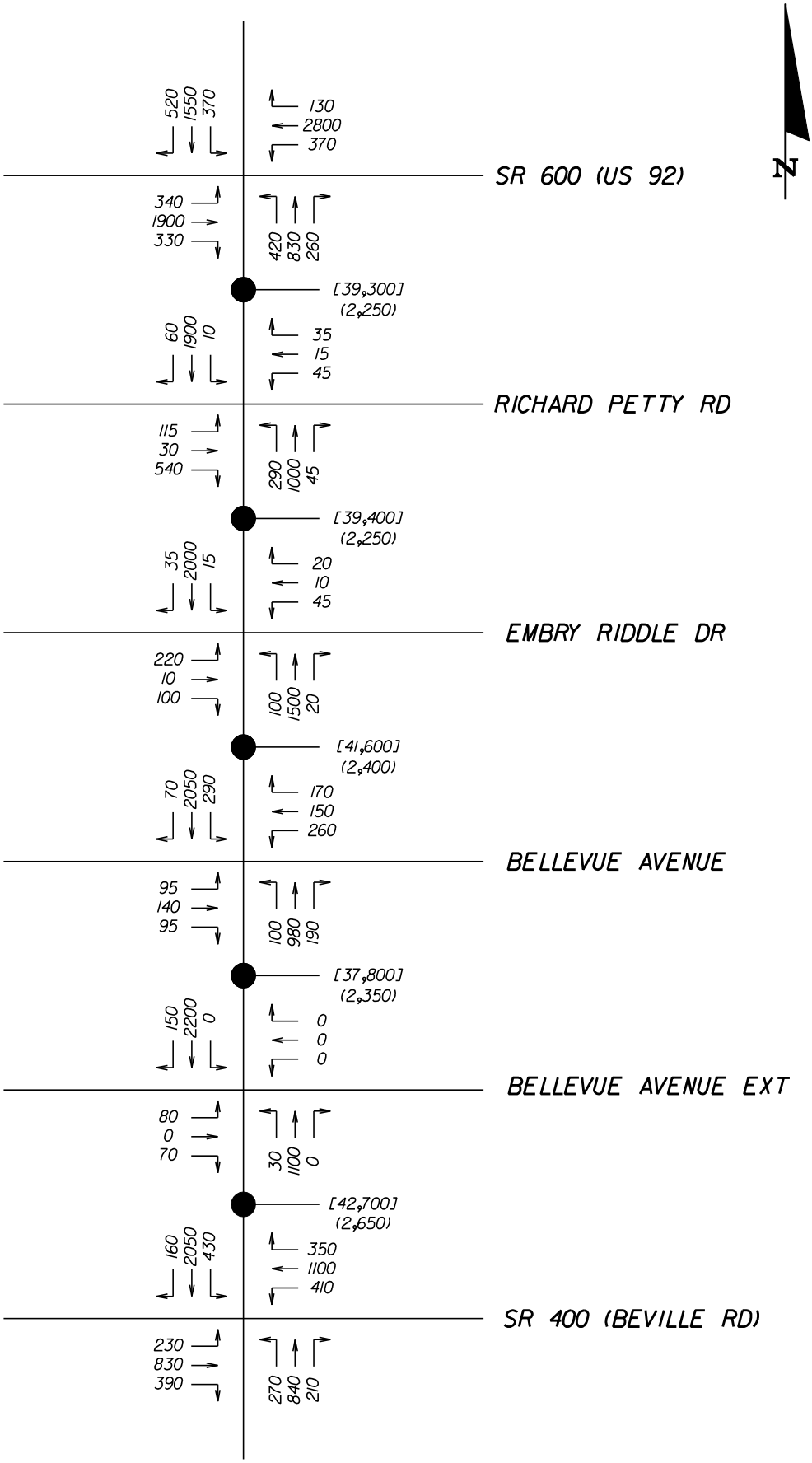
## OPENING YEAR 2010 DHV, DDHV AND AADT

**FIGURE 6-2**




XXX - Design Hourly Volume (DHV)
(XXX) - Directional Design Hourly Volume (DDHV)
[XXX] - Annual Average Daily Traffic (AADT)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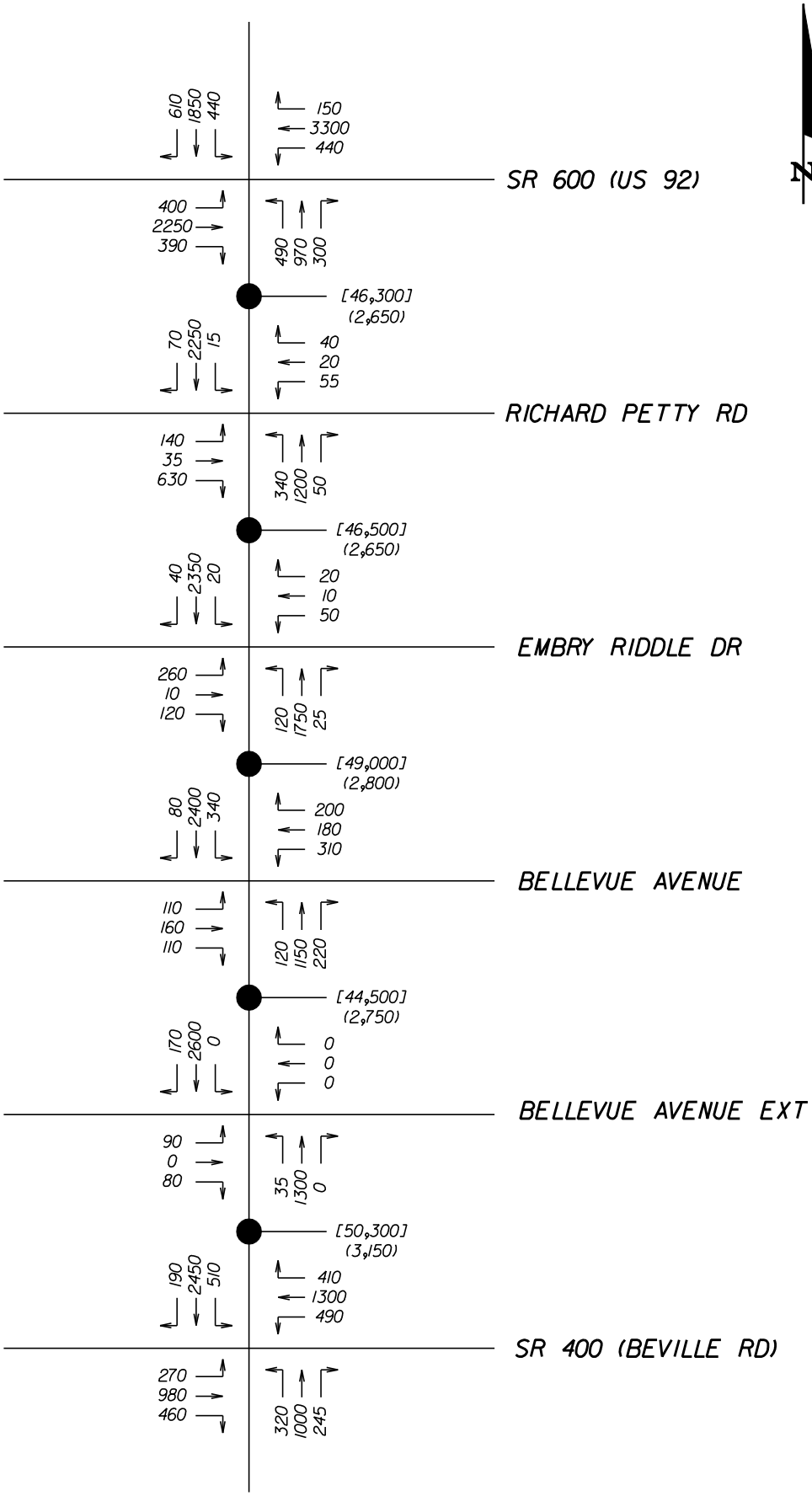
## MID-DESIGN YEAR 2020 DHV, DDHV AND AADT

**FIGURE 6-3**




XXX - Design Hourly Volume (DHV)
(XXX) - Directional Design Hourly Volume (DDHV)
[XXX] - Annual Average Daily Traffic (AADT)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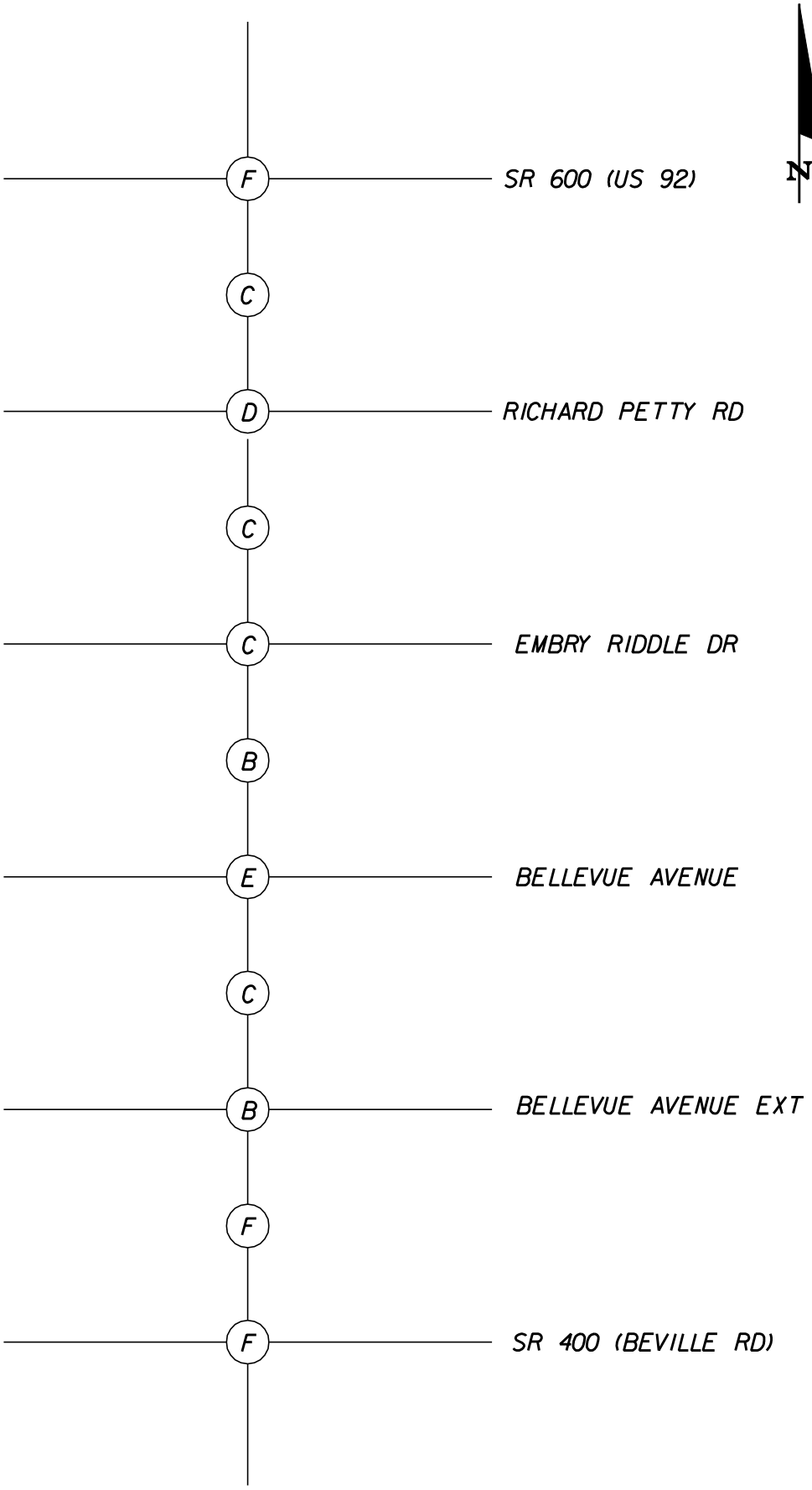
## DESIGN YEAR 2030 DHV, DDHV AND AADT

FIGURE 6-4




(X) - Level of Service (LOS)

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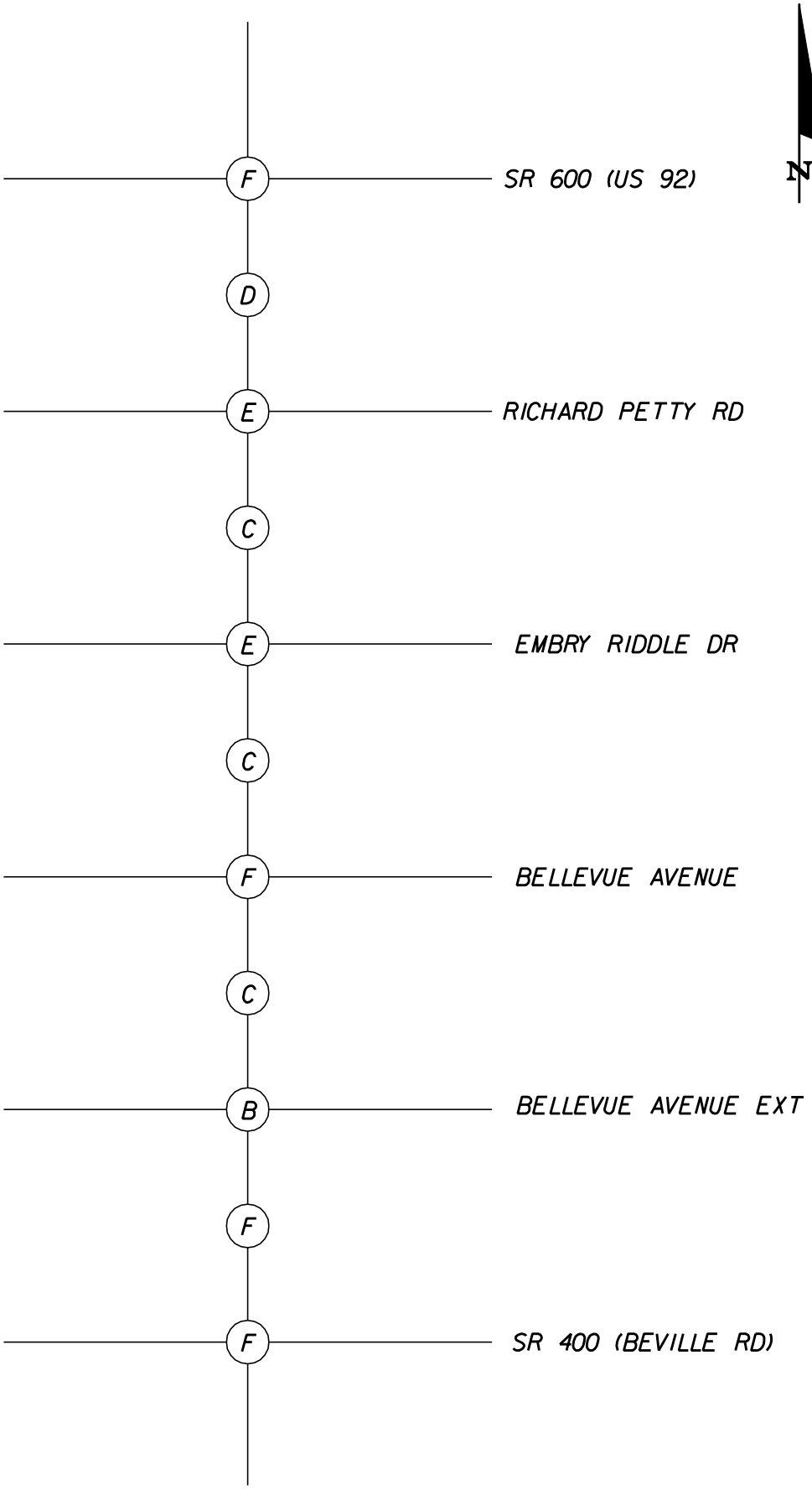
## EXISTING YEAR (2004) DESIGN HOUR LOS

FIGURE 6-5




(X) - Level of Service (LOS)

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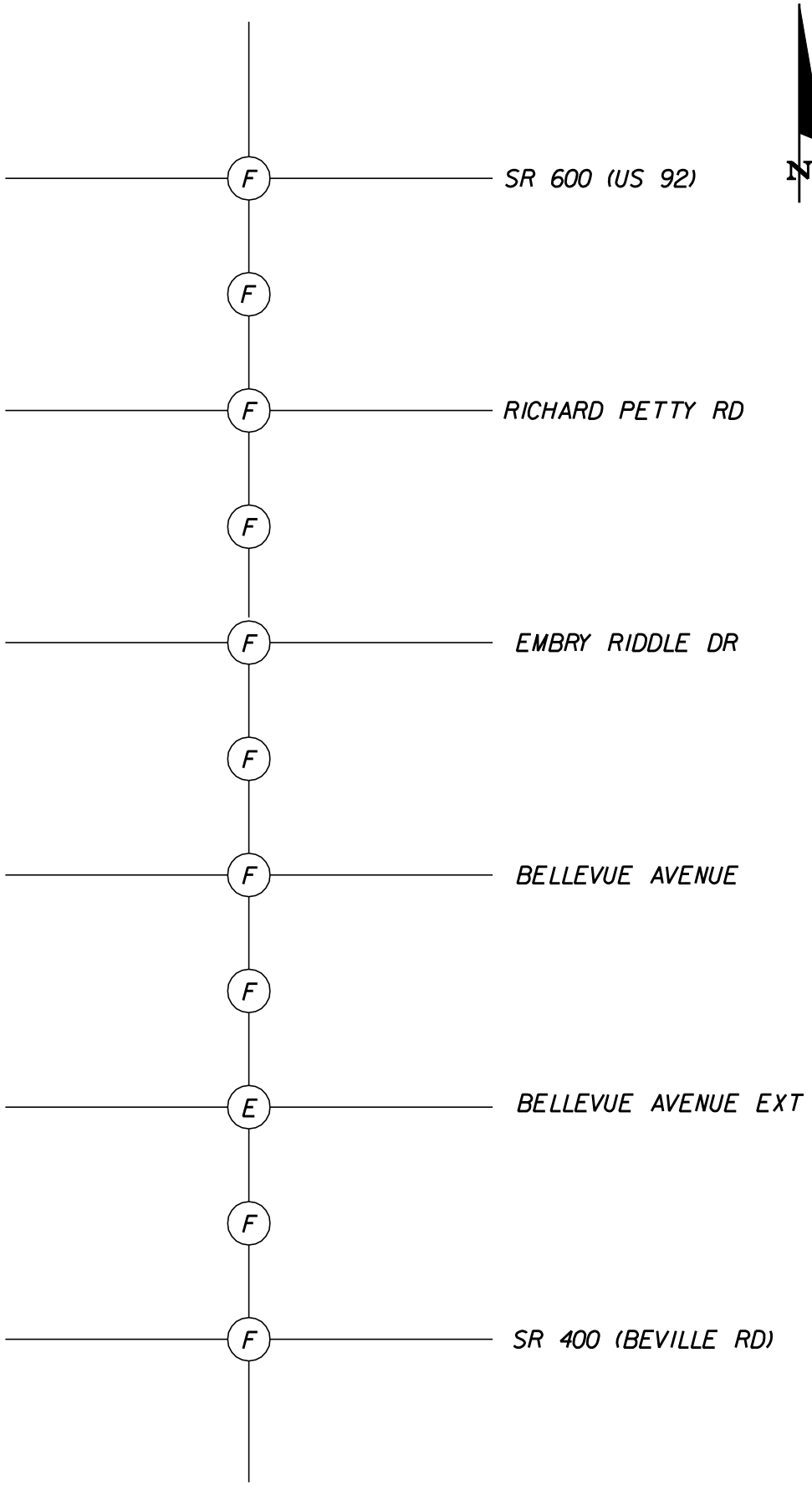
## OPENING YEAR (2010) DESIGN HOUR LOS NO BUILD CONDITION

FIGURE 6-6




(X) - Level of Service (LOS)

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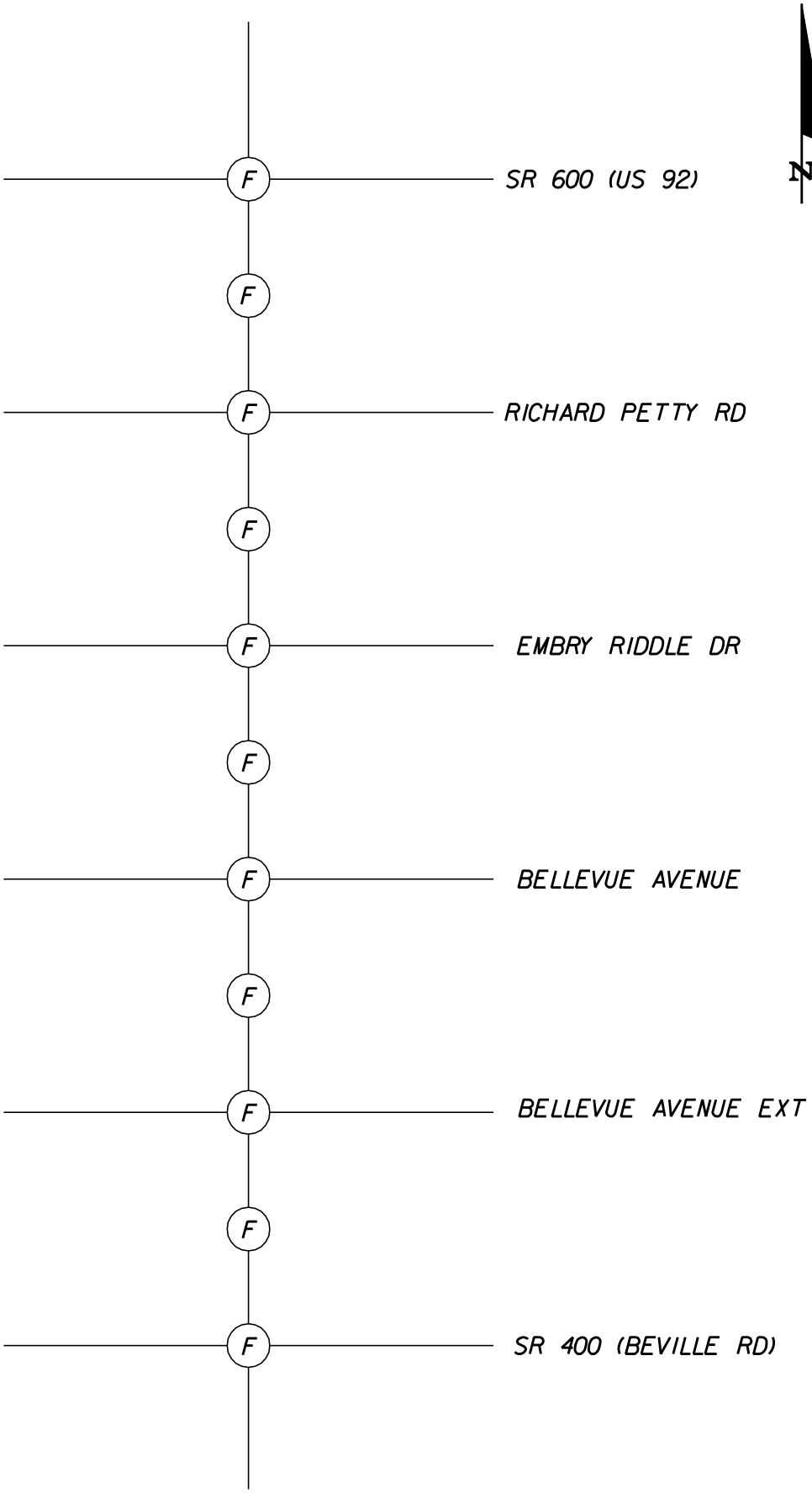
**MID-DESIGN YEAR (2020)**
**DESIGN HOUR LOS**
**NO BUILD CONDITION**

**FIGURE**
**6-7**




(X) - Level of Service (LOS)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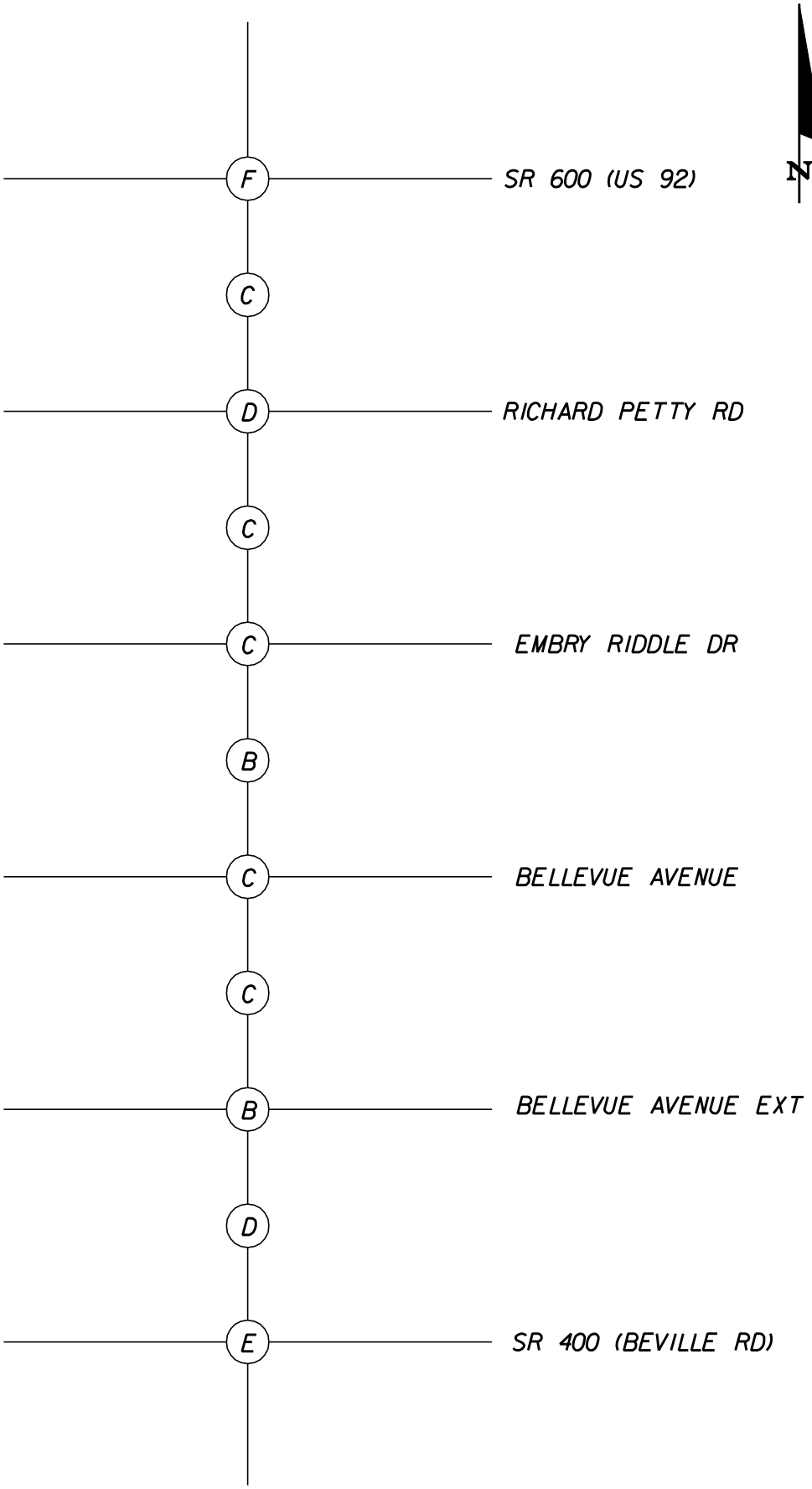
## DESIGN YEAR (2030) DESIGN HOUR LOS NO BUILD CONDITION

**FIGURE 6-8**




(X) - Level of Service (LOS)

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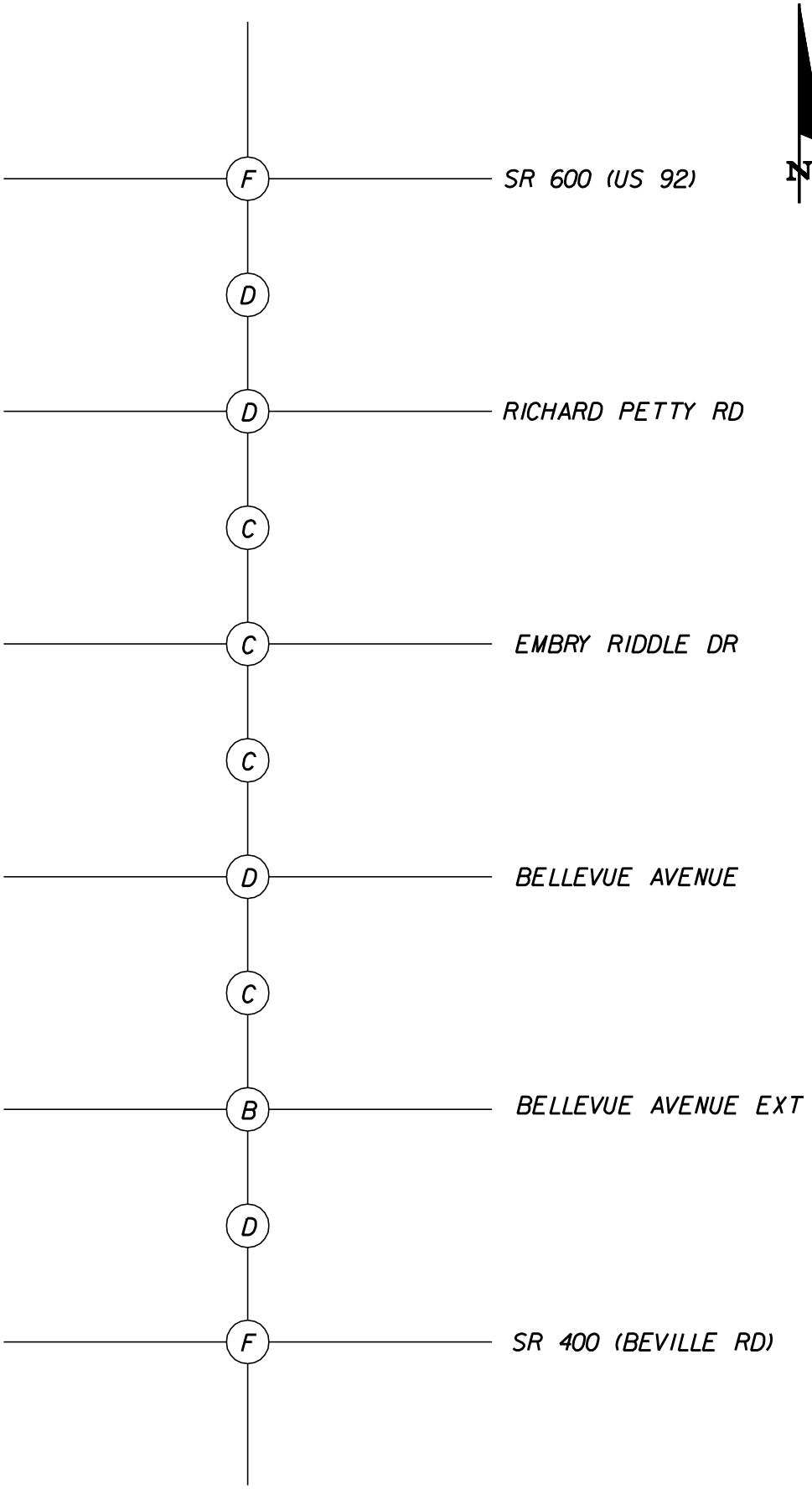
**OPENING YEAR (2010) DESIGN HOUR LOS BUILD CONDITION (ALTERNATIVE 1)**

**FIGURE 6-9**




(X) - Level of Service (LOS)

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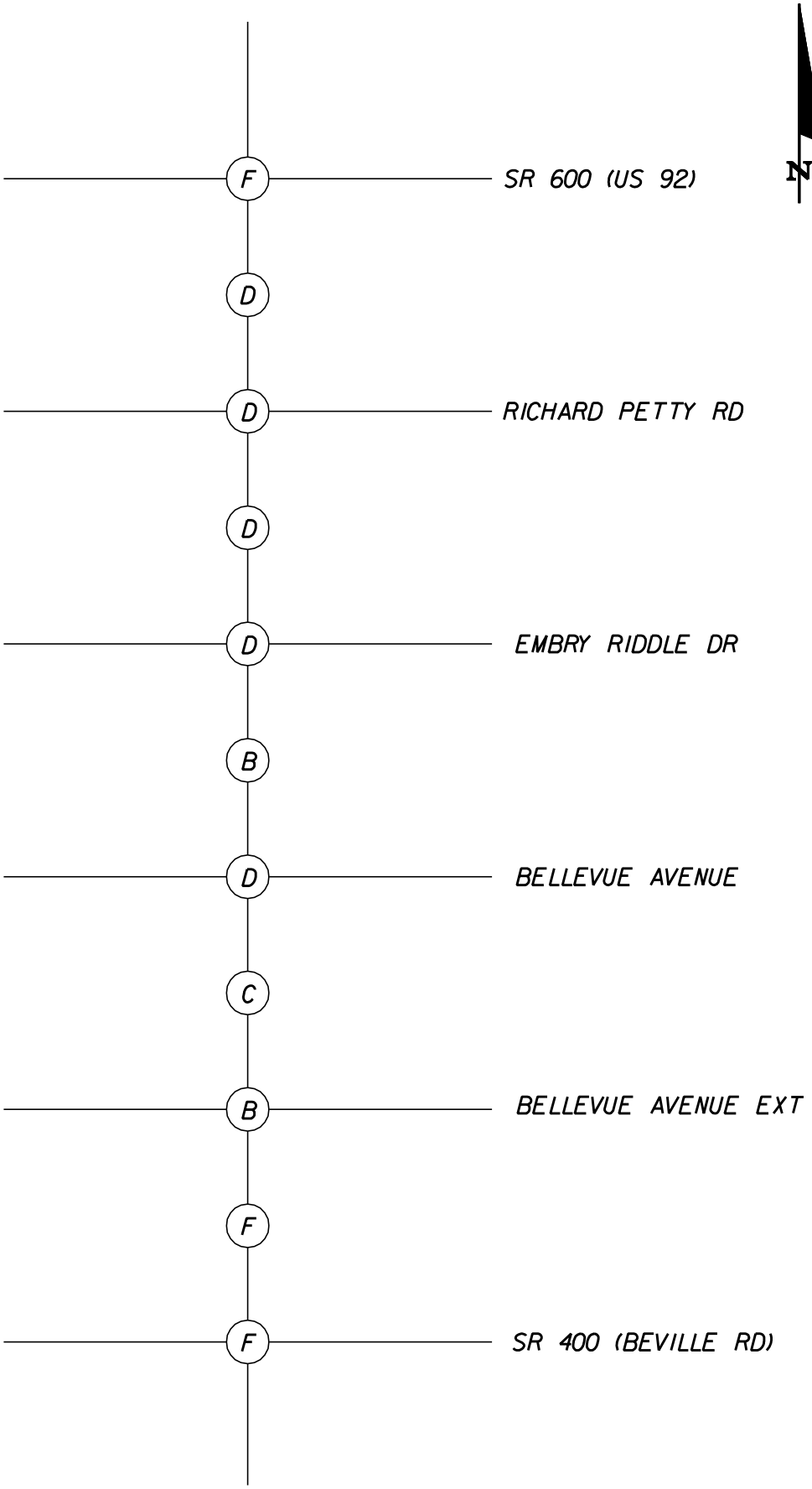
**MID-DESIGN YEAR (2020) DESIGN HOUR LOS BUILD CONDITION (ALTERNATIVE 1)**

**FIGURE 6-10**




(X) - Level of Service (LOS)

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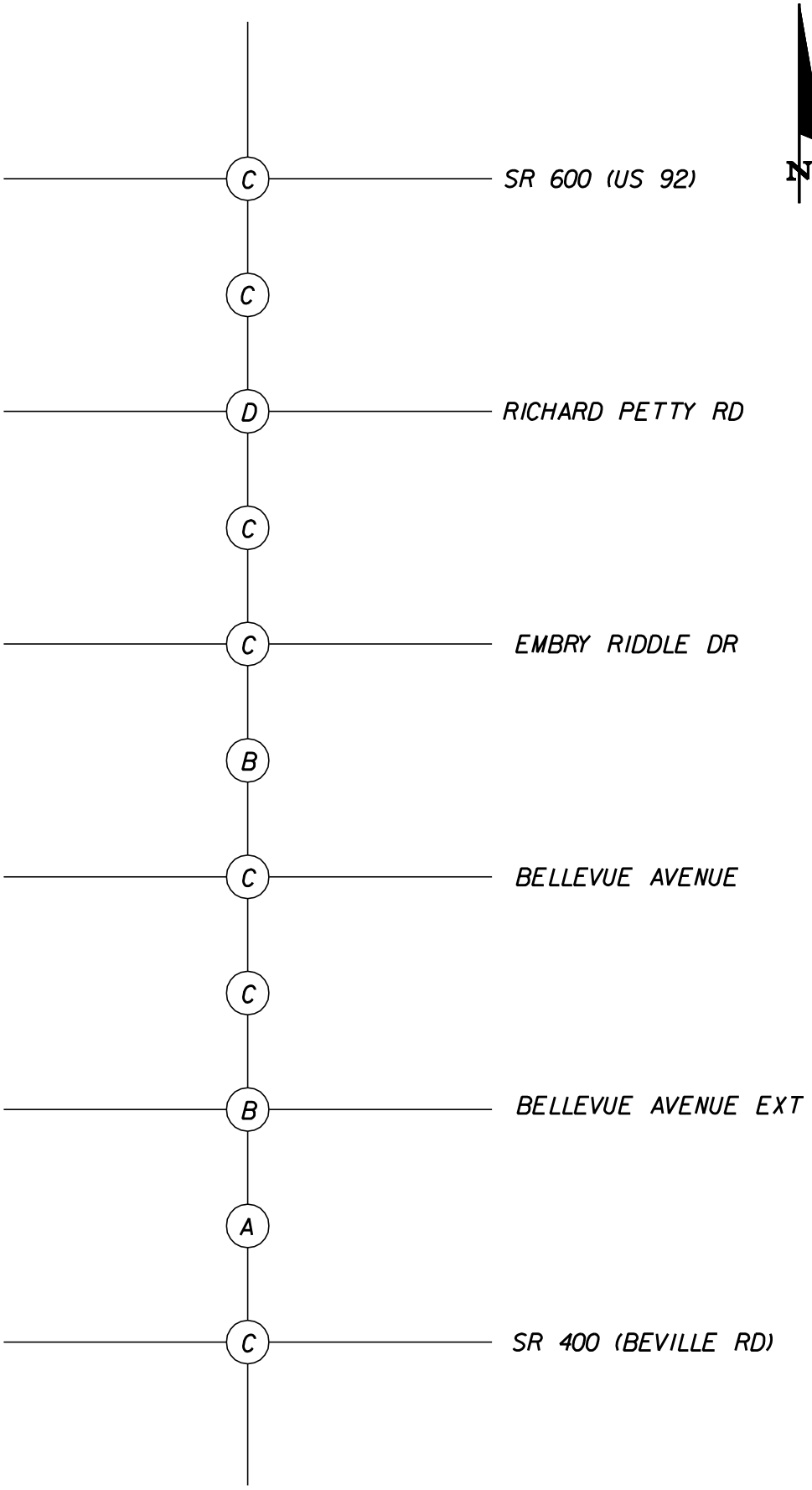
**DESIGN YEAR (2030)**
**DESIGN HOUR LOS**
**BUILD CONDITION**
**(ALTERNATIVE 1)**

**FIGURE**
**6-11**




(X) - Level of Service (LOS)

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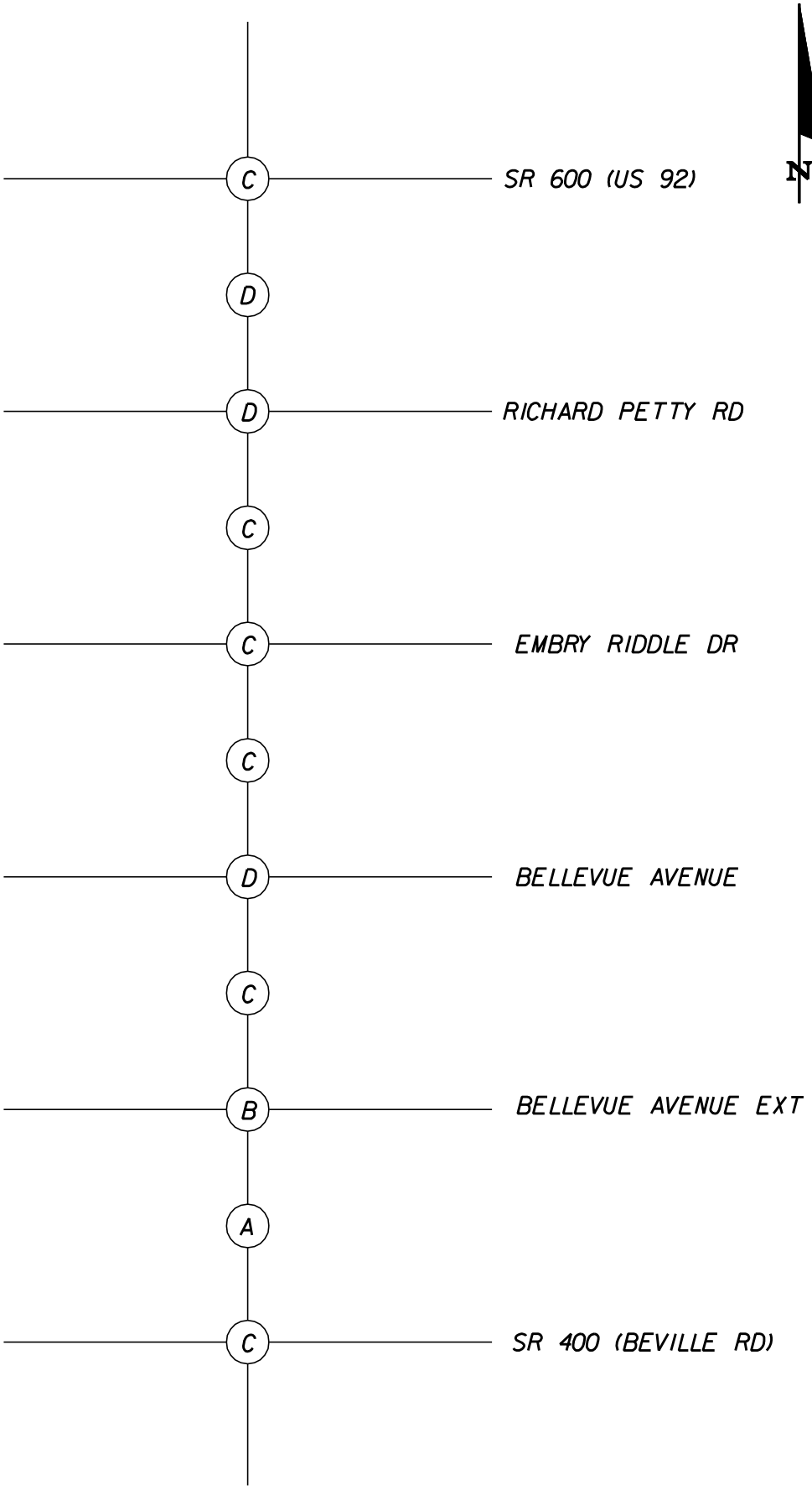
**OPENING YEAR (2010) DESIGN HOUR LOS BUILD CONDITION (ALTERNATIVE 2)**

**FIGURE 6-12**




(X) - Level of Service (LOS)

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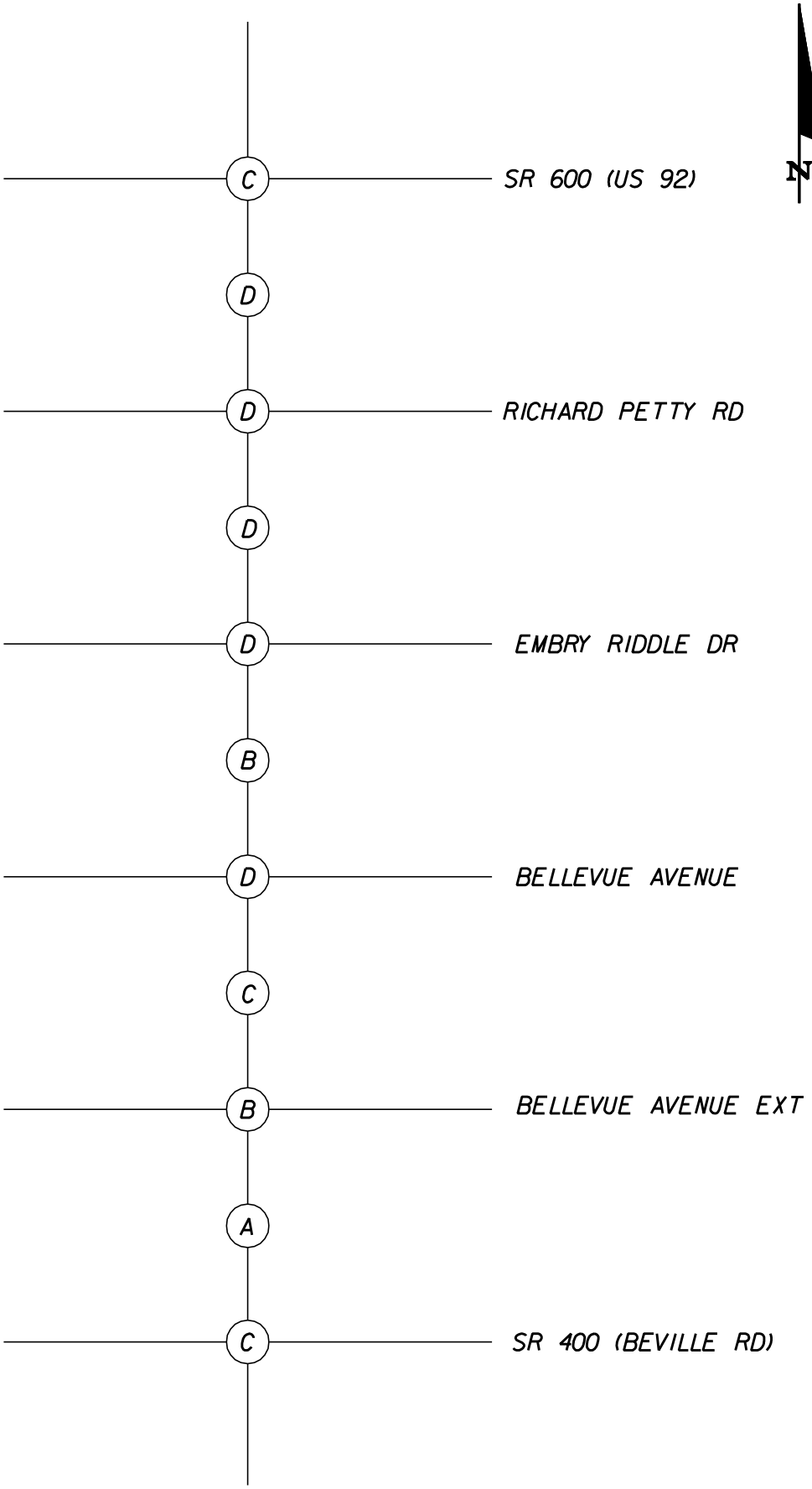
**MID-DESIGN YEAR (2020) DESIGN HOUR LOS BUILD CONDITION (ALTERNATIVE 2)**

**FIGURE 6-13**




(X) - Level of Service (LOS)

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**DESIGN YEAR (2030)**
**DESIGN HOUR LOS**
**BUILD CONDITION**
**(ALTERNATIVE 2)**

**FIGURE**
**6-14**

# 7.0 Corridor Analysis

A corridor analysis was not performed since this PD&E study involves capacity improvements to an existing facility. Any proposed improvements will accommodate multimodal means of transportation.

# 8.0 Alternative Alignment Analysis

## 8.1 "No-Build" Alternatives

The "No Build" Alternative involves retaining the existing roadway network. Under this scenario, the existing roadway configuration would remain in place and would not be improved. Additionally, the intersections within the project limits would not be improved. The "No-Build" Alternative has some advantages and disadvantages. The advantages of the "No-Build" alternative include:

- No design, utility, right-of-way, or construction costs
- No inconveniences to the motoring public due to construction
- No business or residential damages or displacements
- No environmental degradation, particularly wetland impacts

The disadvantages of the "No- Build" alternative include:

- Continued increased congestion on the local roadway network, particularly at the intersections of SR 483/SR 400 and SR 483/SR 600, which are already operating at a LOS F
- Failing of the roadway segment from SR 400 to Bellevue Avenue Extension
- Reduced safety along SR 400, SR 600 and SR 483 due to poor traffic mobility
- Greater delays to emergency service vehicles, especially to the Halifax Medical Complex ambulance deliveries
- Greater degradation to the air quality due to the greater length of delay time at the intersections
- Continued flooding of the roadway in the Bellevue Avenue Extension and New Bellevue Avenue areas during heavy storm events, causing lane blockage and unsafe operating conditions
- Failure to implement sidewalk and bicycle lane improvements in an area identified as needing these facilities

According to Figure 6-5, the intersection of SR 400 and SR 483 and the intersection of SR 600 and SR 483 currently operate at a level of service F in the AM and PM peak hours. The intersections will continue to experience failing levels of service as Volusia County continues to grow. In fact, Figure 6-8, illustrates that all segments and all of the signalized intersections along the corridor will operate at a level of service F in the AM and PM peak hours. The "No-Build" alternative does not address this issue. Therefore it is not a preferred alternative.

## 8.2 Transportation System Management

Transportation System Management (TSM) alternatives include improvements by means of additional turn lanes, improving intersections and signalization through timing optimization and improving signing and pavement markings to enhance traffic safety and mobility. Projected traffic volumes along SR 400, SR 600 and SR 483 justify improvements to the segments and intersections along the study area. However, TSM improvements do not address the significant capacity problems that exist along the corridor. The signals along SR 600 are monitored by the City of Daytona Beach during peak hour and timing adjusted in an attempt to enhance performance. Despite this effort, the SR 600/SR 483 intersection still has a level of service of F, which is further testament that TSM alternatives are not a viable option.

The base condition improvements at both the SR 400 and the SR 600 intersections included the six-laning of SR 483 through each of the intersections. Double left turn lanes and separate right turn lanes were also provided for every approach to the intersections. The LOS of the SR 400 intersection and the SR 600 intersection in the Year 2030 was forecasted as LOS F. The average delay time at the SR 400 intersection in the Year 2030 was predicted to be 183 seconds. The average delay time at the SR 600 intersection in the Year 2030 was predicted to be 240 seconds.

Similar to the “No Build” alternative, the TSM improvement scenarios do not satisfy the additional traffic loadings forecasted for the future years. In fact, since the intersection improvements evaluated at each end of the project fall well below the adopted level of service established by the Volusia County MPO, these types of TSM improvements are not recommended for consideration as the preferred alternative.

It has been mentioned that TSM improvements similar to the above be considered in concert with the introduction of a raised and landscaped median. This alternative has been evaluated. It retains the deficiencies of the TSM improvements previously identified. It also requires the reconstruction of the entire roadway segment between the two project termini. While the median will offer some protection to pedestrians crossing the roadway at the intersection locations, it does not provide adequate capacity improvements and increases the cost of a TSM alternative by approximately $34.5 million dollars. Since a marginal benefit would be gained from such a large capital expenditure and the level of service of the major intersections and the overall mainline segment will remain in an unacceptable condition, the TSM improvement with a landscaped median is not considered a candidate as a preferred alternative.

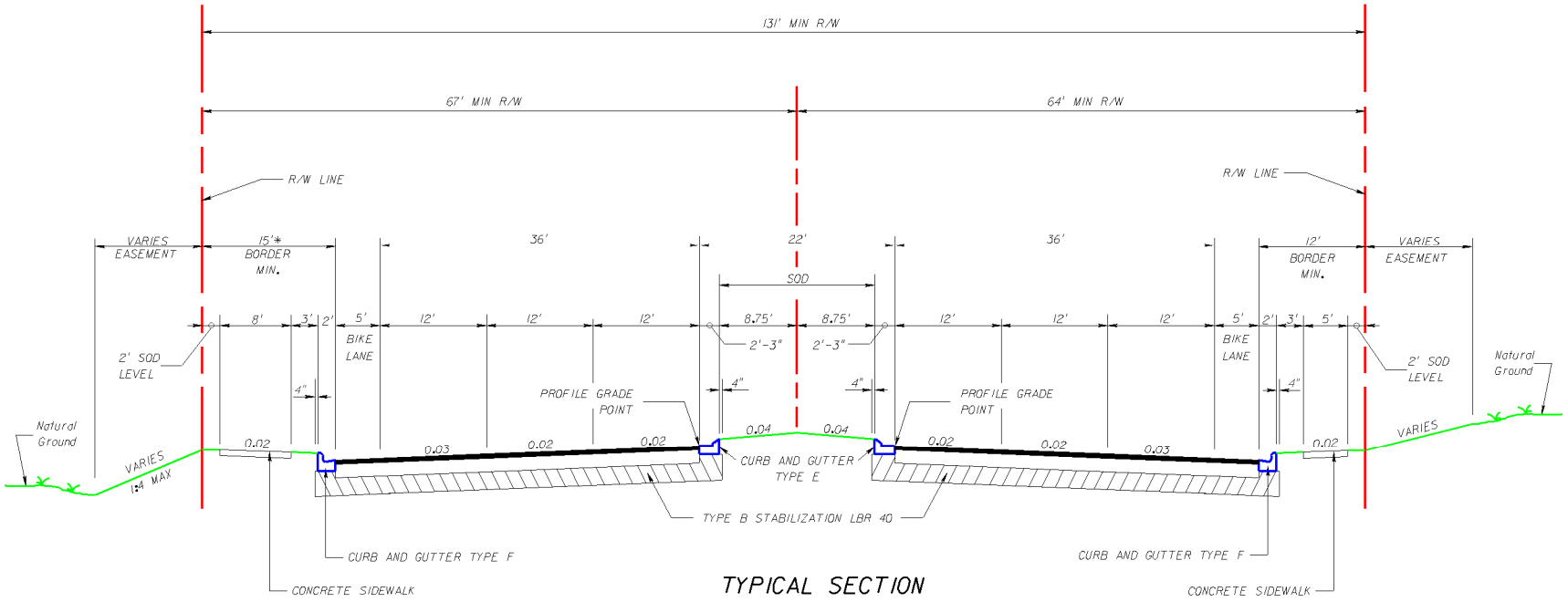
## 8.3 Study Alternatives

In addition to the “No-Build” alternatives, three alignment alternatives have been examined along SR 483. Horizontal and vertical geometry for the alternatives meet 50 mph criteria, utilize curb and gutter, and contain a bicycle lane and sidewalks, throughout the majority of the corridor. The only areas where a 45 mph design speed was utilized were, south of SR 400 in the transition into existing conditions, for 500 feet north of SR 400 where the vertical and horizontal geometry was restricted by the existing conditions and north of SR 600 in the transition into existing conditions and where the existing posted speed is 40 mph. All of the alignments avoided infringement into the community park located on the east side of SR 483 approximately 900 feet south of the SR 400, and maintained the existing number of lanes during construction as there are no reasonable detour routes through the area. A graphical depiction of the typical section applied to all of the alternatives can be found in Figure 8-1 and Figure 8-2.

**ALTERNATIVE 1**

Alternative 1 considered widening SR 483 symmetrically about the baseline, with the exception of a few areas (See Appendix A). The south end of this alternative tied into the existing roadway approximately 250 feet north of the Shangri La Drive intersection. Beginning near Station 16+77, approximately 820 feet of the proposed centerline was shifted west of the existing centerline of SR 483 and tied back into the existing SR 483 centerline near Station 25+00. The alignment was shifted to the west in order to avoid the neighborhood park previously mentioned. It was one of the few exception areas where the widening was not symmetrical around the centerline. Heading north from Station 25+00, the widening became symmetrical about the centerline. A tangent section was utilized through the intersection of SR 483 and SR 400, which ended near Station 32+13. The tangent section was followed by a horizontal curve to the left which had a radius of 2,865 feet and ended at approximately Station 35+65; Following this curve there is a short tangent segment of about 450 feet, then a 1,577 foot horizontal curve to the right with a radius of 3,300 feet, ending at Station 55+84. In the tangent roadway segment, additional pavement was only required on the west side of the roadway.

Continuing north, a tangent section of approximately 1,170 feet was utilized through the intersection of SR 483 and New Bellvue Avenue. The tangent section leads into a short horizontal curve to the right with a length of approximately 450 feet and a radius of 5,547 feet. Heading north from Station 72+02, which was the end of the horizontal curve, the centerline was shifted to the east in order to avoid encroachment onto the airfield of the Daytona Beach International Airport. This was another area in which the widening was not symmetrical around the existing centerline. Instead all of the widening occurred to the east of the existing pavement.




TYPICAL SECTION

DESIGN SPEED = 45 MPH

SR 483 (CLYDE MORRIS BLVD.)

STA 16+42 TO 123+00

SHANGRI LA DR. TO RICHARD PETTY BLVD.

* NOTE
5' SIDEWALK WITH 12' BORDER IS USED BETWEEN SHANGRI LA DR. AND HANCOCK BLVD.
8' SIDEWALK AND MINIMUM 15' BORDER BEGIN AT HANCOCK BLVD.

Not To Scale

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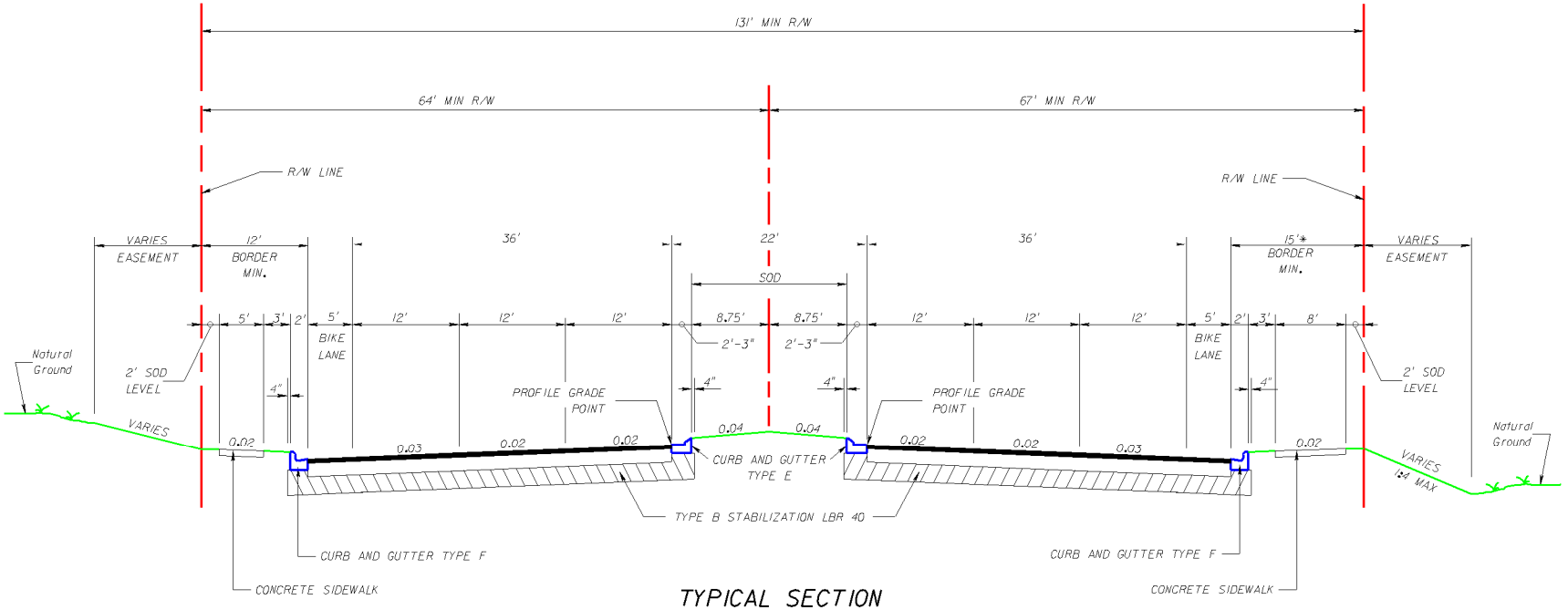
**SR 483 (CLYDE MORRIS BOULEVARD)**
**PD & E STUDY - FDOT - DISTRICT 5**

**JOB NUMBER: 107-5777-000**

**DATE: 6/20/06**

**Typical Section**
**Figure 8-1**




TYPICAL SECTION

DESIGN SPEED = 45 MPH

SR 483 (CLYDE MORRIS BLVD.)

STA 123+00 TO 169+40

RICHARD PETTY BLVD. TO MAYBERRY AVE.

* NOTE
5' SIDEWALK WITH 12' BORDER IS USED
BETWEEN SR 600 AND MAYBERRY AVENUE.

Not To Scale

RS+H

**SR 483 (CLYDE MORRIS BOULEVARD)**
**PD & E STUDY - FDOT - DISTRICT 5**

**JOB NUMBER: 107-5777-000**

**DATE: 6/20/06**

**Typical Section**
**Figure 8-2**

Once the Daytona Beach International Airport's property was cleared, the widening became symmetrical once again. This was accomplished with the 2,800 foot tangent segment developed from the end of the horizontal curve at Station 97+32. Within this tangent segment, SR 483 intersected Embry-Riddle University's main entrance and Richard Petty Boulevard. Additionally, the roadway passes through the pedestrian overpass that is located on the Embry-Riddle campus. The symmetrical widening continued northward through the northern most section of the Embry-Riddle campus and the Mainland High School campus. This takes the alignment to the southern end of the intersection of SR 483 and SR 600. A tangent section was utilized through the SR 600 intersection and continued to approximately 200 feet north of the Halifax Medical Center main entrance. The alignment then tied back into the existing roadway through a slight deflection to the right that began at Station 158+41 and ended at Station 165+04.

**ALTERNATIVE 2**

Alternative 2 considered widening SR 483 to the east, with the exception of a few areas (See Appendix A). The south end of this alternative tied into the existing SR 483 at the Shangri La Drive intersection at Station 14+61. Beginning near Station 15+99, a 1,050 foot horizontal curve to the left was introduced. This curve was developed in order to avoid the neighborhood park previously mentioned and was one of the few exception areas where the widening was not to the east of the existing centerline. Heading north from Station 26+53, a tangent section was utilized through the intersection of SR 483 and SR 400, which ended near Station 32+72. The tangent section was followed by a horizontal curve to the left which had a radius of 2,889 feet and ended around Station 35+51, then followed by a short tangent segment of about 450 feet; then a 1,567 foot horizontal curve to the right with a radius of 3,277 feet, ending at Station 55+70.

Continuing north, a tangent section of approximately 1,170 feet was utilized through the intersection of SR 483 and New Bellvue Avenue. The tangent section leads into a short horizontal curve to the right with a length of 345 feet and a radius of 5,500 feet. Heading north from Station 70+84, a horizontal tangent of nearly 1,400 feet was developed followed by and a horizontal curve to the left that was almost 1,200 feet long with a radius of 1,300 feet. This last horizontal curve allowed us to clear the area adjacent to Daytona Beach International Airport.

It should be noted that once the Daytona Beach International Airport's property was cleared, the widening needed to become symmetrical about the existing centerline due to the layout of the Embry-Riddle campus, which includes the previously mentioned pedestrian overpass. Within this tangent segment, SR 483 intersected Embry-Riddle University's main entrance and Richard Petty Boulevard. Additionally, the roadway passes through the pedestrian overpass located on the Embry-Riddle campus. Following this tangent section was a horizontal curve to the right that enabled the widening to once again occur to the

east of the existing centerline. This curve was 750 feet long and ended near Station 132+42. This curve was followed by a tangent section over 500 feet in length and another horizontal curve to the right. This takes the alignment to the southern end of the intersection of SR 483 and SR 600.

A tangent section was utilized through the SR 600 intersection and continued past the Halifax Medical Center main entrance. This 2,180 foot long tangent segment tied the alignment back into the existing roadway at Station 164+72.

**ALTERNATIVE 3**

Alternative 3 considered widening SR 483 to the west, with the exception of a few areas (See Appendix A). The south end of this alternative tied into the existing SR 483 approximately 230 feet north of the Shangri La Drive intersection. Beginning near Station 16+67, the proposed centerline is shifted to the west of the existing centerline of SR 483 in order to avoid encroachment into the neighborhood park previously mentioned. Continuing north through the intersection of SR 483 and SR 400, a tangent section was utilized which ended near Station 32+74. The tangent section was followed by a horizontal curve to the left which had a radius of 2,865 feet and ended around Station 36+26; then followed by a short tangent segment of about 576 feet; a 1,316 foot horizontal curve to the right with a radius of 2,700 feet, ending near Station 55+19. This was followed by a tangent section of approximately 1,300 feet that ends in close proximity to Station 68+14, just north of the intersection of SR 483 and New Bellvue Avenue.

Heading north from Station 68+14, which is the end of the tangent section, the centerline was shifted to the east in order to avoid encroachment onto the airfield of the Daytona Beach International Airport. This was accomplished by developing a short horizontal curve to the right approximately 460 feet in length with a radius of 5,558 feet, followed by a tangent of over 1,330 feet leading to a horizontal curve to the left of over 1,330 feet with a radius of 1,400 feet. This was another area in which the widening was not to the west of the existing centerline. Instead all of the widening occurred to the east of the existing pavement in order to avoid the Daytona Beach International Airport to the greatest extent possible.

Once the Daytona Beach International Airport's property was cleared, the widening became symmetrical about the existing centerline due to the layout of the Embry-Riddle campus, including the pedestrian overpass. This was accomplished through the horizontal curve just mentioned. The symmetrical widening was then continued with a tangent segment more than 2,825 feet long. Within this tangent segment, SR 483 intersected Embry-Riddle University's main entrance and Richard Petty Boulevard. Additionally, the roadway passes through the pedestrian overpass that is located on the Embry-Riddle campus. Following the tangent section was a horizontal curve to the right that enables the widening to once again occur to the west of the existing centerline. This curve was roughly 750 feet long and ended near Station 133+20.

This curve was followed by a tangent section nearly 600 feet in length followed by another horizontal curve to the left that was 540 feet long and with a radius of 2,865 feet. This takes the alignment to the southern end of the intersection of SR 483 and SR 600.

A tangent section was utilized through the SR 600 intersection and continued to approximately 1,500 feet north of the SR 483/SR 600 intersection. The alignment tied back into the existing roadway through a slight deflection to the right that began at Station 159+91 and ended at Station 165+17.

## 8.4 Preferred Alternative

In comparing the three mainline alternatives, all three impact a number of parcels. Alternative 2 (east), however, impacts a disproportionate number of buildings (7) compared to the other two. The residential and commercial buildings located in the vicinity of SR 400 on the east side of SR 483 are particularly affected by an alternative holding the western right-of-way line. Similarly, this alternative has significant effects on both the new Mainland High School Campus and the Halifax Medical Complex. Therefore, Alternative 2 is dropped from further analysis.

Alternatives 1 and 3 have few differences between them, as is shown in Table 8.3.1. Both impact nearly 40 parcels, including Daytona Beach International Airport, Mainland High School, Halifax Medical Center, and Embry Riddle Aeronautical University. However, the difference in severity of the impacts is significant depending on the specific location along the corridor. Regarding utility impacts, there is no significant difference in utility relocation or construction costs between Alternatives 1 and 3. For these reasons, the preferred alternative is a combination of Alternatives 1 and 3 and is identified as Alternative 4. Appendix B shows Alternative 4 in detail.

In the section south of SR 400, Alternative 4 places impacts primarily on the west side of SR 483 as is shown with Alternative 3. Just north of SR 400, the western alternative has more severe impacts to Taco Bell and Bank of America, as the drive-throughs of both businesses would require closure. A slight modification of Alternative 1 results in no impacts to the drive-throughs and the elimination of impacts to the parking lot of CVS located in the northeast quadrant of the intersection. The proposed right-of-way of the preferred alternative was placed no more than 2 feet east of the curb line of both drive-throughs. However, three residences between Killian and Verona Streets was impacted by the preferred alternative and require relocation.

Continuing north, Alternative 4 follows the Alternative 1 alignment between New Bellevue and Hancock Avenues, avoiding impacts to apartment buildings flanking both sides of the roadway. The existing ditch located on the east side of the roadway will also be spared, although a number of large trees may require

removal. This area will required closer examination during he design phase when topographical survey has been collected.

Approaching the Bellevue Avenue Extension, the preferred alternative diagonally transitions across the existing pavement to place all impacts on the west, sparing impacts to the business located in the northeast quadrant of the intersection. Right-of-way impacts resume at the FDOT construction office location on the east side of the roadway, where Alternative 4 transitions to place more impacts on the east side in the vicinity of Daytona Beach International Airport (similar to Alternative 2). Transitioning from airport property to the campus of Embry Riddle, Alternative 4 has been shifted to the east, compared with Alternatives 1 and 3, which shared a common alignment in this area. The right-of-way width of the proposed roadway is 131 feet. Coincidentally, the approximate distance between the roadside piers of the Embry Riddle pedestrian walkway across SR 483 is also 131 feet. The eastward shift allows the preferred alternative to fit between the piers, resulting in no impacts to the piers or adjustment of the typical section. Alternatives 1 and 3 both have right-of-way impacts to the west side pier, although the roadway itself fit within the piers. The resulting alignment modification only required a minor change to the skew angle of the tangent that is north of the airport curve.

North of Richard Petty Boulevard, the preferred alternative utilizes the Alternative 3 alignment that requires right of way on the west side of the existing roadway from the Embry Riddle campus as opposed to impacting the newly renovated campus of Mainland High School. Any impact to the east side of the roadway would affect the soon-to-be-constructed retention ponds immediately adjacent to the existing right-of-way. However, a small portion of right-of-way will be needed for a right-turn lane at the proposed high school entrance. The consequence of almost eliminating impacts to Mainland High School is that the large existing ditch flowing parallel to the roadway will require relocation.

Crossing SR 483, the preferred alternative resembles Alternative 3 (west) with some slight modifications. Alternative 4 is shifted a few feet further west than Alternative 3 to preserve the existing east-side curb line, sidewalk, and landscaping adjacent to the Halifax medical Complex. A normal-crown, reverse curve transitions Alternative 4 back to the existing alignment north of Mayberry Avenue, where this SR 483 project will tie into an upcoming 5-lane widening project. Approximately 400 feet of the existing roadside features will require removal on the east side of the roadway as the pavement edge transitions to drop the outer lane at Mayberry Avenue. Although wetlands are located on the west side of the roadway, impacts to this system can be completely avoided.

Chapter 9 discusses Alternative 4 in more detail, including specifics on dropping and adding the additional lanes, intersection configurations, right-of-way impacts, and costs.

Table 8.4.1 displays an evaluation matrix for the SR 483 alternatives.

**Table 8.4.1**

**Evaluation Matrix**

| Resource | Alternatives | | | |
|---|---|---|---|---|
| | 1 Central | 2 East | 3 West | 4 Preferred |
| ***Right-of-way*** | | | | |
| **Business** | | | | |
| Partial Impacts to Parcels | 9 | 8 | 9 | 15 |
| Relocations | 2 | 1 | 2 | 0 |
| **Institutional** | | | | |
| Partial Impacts to Parcels | | | | |
| University | 6 | 6 | 6 | 7 |
| High School | 1 | 1 | 1 | 1 |
| Medical | 2 | 3 | | 1 |
| Airport | 1 | 1 | 1 | 1 |
| **Residential - Houses** | | | | |
| Partial Impacts to Parcels | 6 | 3 | 6 | 4 |
| Relocations | 0 | 6 | 0 | 3 |
| **Residential - Apartments** | | | | |
| Partial Impacts to Parcels | 3 | 3 | 2 | 3 |
| Relocations | 0 | 1 | 0 | 0 |
| **Government** | | | | |
| Partial Impacts to Parcels | 3 | 3 | 3 | 2 |
| | | | | |
| **Vacant** | 10 | 9 | 11 | 11 |
| *Total Impacted Parcels* | **43** | **45** | **41** | **48** |
| ***Environment*** | | | | |
| **Wetlands (ac)** | | | | |
| Roadway | None | None | None | None |
| Ponds | Potential | Potential | Potential | Potential |
| **Contamination Sites** | High | High | High | High |
| **Community Impacts** | | | | |
| Residential Disruptions | Moderate | Most | | Moderate |
| Business Disruptions | Moderate | Least | | Moderate |
| Community Service Disruptions | Moderate | Most | | Moderate |
| Utility Involvement | High | High | | High |
| **Costs (in millions)** | | | | |
| Right of Way [3] | $13.2 | $18.8 | $13.4 [1] | $15.8 |
| Utility Relocations [4] | $4.7 | $4.4 | $4.4 | $4.7 |
| Reconstruct 4-lane | $34.5 million | | | |
| New 6-lane [5] | $39.7 million | | | |

Notes:
1) Two business relocations exist in the NW quadrant of SR 400 and SR 483. (Taco Bell and Bank of America). Costs for impacting these businesses were accounted for in Alternative 3 but not Alternative 1, although in both cases the businesses are included in the total number of relocations.
2) Three residential relocations are located on the east side between Killian and Verona Avenues.
3) Right-of-way costs were obtained from District 5 estimates dated 11/10/05. TCE's were not included in the costs or number of parcels.
4) Utility costs were obtained from the Utility Impact Report, June 2005, by MACTEC, Inc. The report identified 3 utility companies requiring facility relocations (WilTel Communications, FPL Fibernet, and City of Daytona Beach) but did not list relocation costs. Buried utilities in the vicinity of proposed pavement or curb and gutter (but not sidewalk) are assumed to require relocation. In cases where a roadside was not specified, impacts were assumed for all four alternatives.
5) FDOT Long Range Estimating was used for construction costs, which were provided by District 5.

## 8.5 Special Intersection Alternatives

### 8.5.1 Introduction

Even with the six-laning of SR 483, and the use of separate double left turn lanes and separate right turn lanes for every approach to the intersection at both the SR 400 location and the SR 600 location, the design year Level of Service for these two intersections was predicted to be "LOS F". This Level of Service falls below the standard established by the FDOT and adopted by the City of Daytona Beach and the Volusia County MPO. The traffic report prepared for the project also evaluated the Level of Service that would occur if Single Point Urban Interchanges were utilized at these locations. The traffic analysis results predicted that the use of Single Point Interchanges at each location would result in Levels of Service that meet the FDOT, City of Daytona and the Volusia County MPO standard. Therefore, one of the initial project phases considered the development of an Interchange Feasibility Study for both SR 400 and SR 600.

The development of the interchanges included an evaluation of construction costs, constructability and maintenance of traffic, right-of-way impacts, environmental impacts, and community values. The interchange alternatives were presented to the public and to special interest groups, affected land owners, and government agencies.

**SR 400 (BEVILLE ROAD)**

The evaluation of this location included two interchange alternatives. Due to the need to provide accesses to business establishments in each of the four quadrants of the interchange, "modified" single point interchanges were studied. A "modified" single point allows for the movement of vehicles across the side road, similar to that of a tight urban diamond interchange configuration. Alternative A considered elevating

SR 400 over SR 483, with the signalized movements occurring on SR 483. Alternative B considered SR 483 as the free flowing movement overpassing SR 400. Of the two, Alternative B became the preferred alternative due to the fact that Alternative A did not provide an acceptable Level of Service operation for the intersection movements at the ramp terminals and the cross street. The SR 400 alternatives can be found in Appendix C.

**SR 600 (INTERNATIONAL SPEEDWAY BOULEVARD)**

The evaluation of this location also included two interchange alternatives. Due to the need to provide accesses to adjacent land uses in each of the four quadrants of the interchange, “modified” single point interchanges were studied. A “modified” single point allows for the movement of vehicles across the side road, similar to that of a tight urban diamond interchange configuration. Based upon the turning movements and the heavier volumes on SR 600, the free flowing movements in the interchange were for the SR 600 eastbound and westbound directions. Both interchanges considered elevating SR 600 over SR 483 due to the approach vertical geometry of the intersection. The difference between the two interchange configurations is that Alternative B introduced free flowing advance U-turn movements for the ramp traffic paralleling SR 600. Alternative A did not provide the advance U-turns. A benefit of the advance U-turns is that it removes a number of cars from the signal operation at the crossroad, which became an important consideration at this location. Alternative B was preferred due to the advance U-turn provision. The SR 600 Alternatives are found in Appendix C.

**INTERCHANGE FEASIBILITY REPORT**

An Interchange Feasibility Report has been provided to the FDOT. Due to the direct impacts upon the land uses adjacent to the interchanges, and the affect upon access at each location, the total lack of community support, and the Volusia County MPO Board unanimous resolution to oppose the further consideration of the interchanges, the FDOT has dropped them from further consideration.

# 9.0 Preliminary Design Analysis

## 9.1 Design Traffic Volumes

The analysis of the design traffic volumes is contained in Chapter 6 of this report.

## 9.2 Typical Section

Figures 8-1 and Figure 8-2 display the proposed typical sections. Both typical sections feature six lanes, each 12 feet wide, 5 foot bicycle lanes on each side, curb and gutter, and sidewalk on both sides. The segment south of SR 400 features lane tapers with a 12 foot border on both sides. North of SR 400, the west roadside features an 8 foot concrete sidewalk separated from the curb and gutter by a 4 foot grass strip all within a 15 foot minimum border. However, to reduce impacts to the Taco Bell and Bank of America, the west-side sidewalk is reduce to 5 feet within a 12 foot border between SR 400 and Hancock Boulevard. The east roadside features a 5 foot sidewalk separated from the back of curb by a 4 foot grass strip within a 12 foot minimum between the project beginning at Richard Petty Boulevard.

The standard median width is 22 feet, which is widened to 28 feet where dual left-turn lanes are required.

North of Richard Petty Boulevard, the east-side border width increases to a minimum of 15 feet to accommodate the 8 foot sidewalk, which is relocated from the west side. The border width and sidewalk on the west side are reduced 12 feet and 5 feet, respectively.

North of SR 600, the border width is a minimum of 12 feet on both sides, accommodating a 5 foot sidewalk separated from the back of curb by a 4 foot grass strip. The outer northbound lane is dropped as a right-turn lane at Mayberry Avenue. Conversely, the outer southbound lane begins with a taper just south of the Mayberry Avenue intersection. The 22 foot raised median terminates south of the Mayberry Avenue intersection in favor of a double yellow stripe, which continues into bi-directional turn lane north of Mayberry Avenue.

In locations where the existing ground is at a significantly different elevation than the proposed back of sidewalk, the right-of-way width is increased to accommodate the transitioning slopes. Easements are also proposed in specific locations to facilitate construction activity or provide for retaining wall inspection and maintenance.

## 9.3 Intersection Concepts and Signal Analysis

The proposed lane configurations for each intersection are based on the traffic analysis contained in Chapter 6. The SR 483 intersections with SR 400 and SR 600 contain the heaviest traffic volumes and will have a projected a LOS of F in 2030 even with the proposed widening of SR 483 and the installation of dual left-turn lanes in all four quadrants. Triple left-turn lanes also fail at these intersections and are therefore not proposed. The only concepts which provide an acceptable LOS are the single-point urban diamond interchanges, which were dropped from further study.

Appendix B displays the proposed lane configuration and turn lane geometry for each intersection. The length of each turn lane is established by the storage length based on 2030-year traffic volumes plus the required deceleration distance for 45 mph.

## 9.4 Alignment and Right-of-Way Needs

The Preferred Alternative utilizes the optimum benefits of Alternatives 1, 2, and 3 to provide the necessary capacity improvements and enhances safety of vehicles, bicycles, and pedestrians. Detailed plan sheets of the preferred alignment can be found in Appendix B.

From the beginning of the project to SR 400, Alternative 4 places impacts primarily on the west side of SR 483. A curve radius of 900 feet is used to transition the alignment into the existing pavement and requires a superelevation rate of 0.023 at 45 mph. A tangent section of 359 feet precedes the radius returns of the SR 400 intersection and is sufficient to run out the superelevation prior to the intersection. A 12 foot border width is proposed on both sides of the roadway. A temporary construction easement (TCE) is proposed on the east side of the roadway on the service station property. A wall easement will be required in front of the H & R Block building to provide for future maintenance and inspection of the required retaining wall.

From the SR 400 intersection, the alignment transitions slightly to the east to avoid business relocations at Taco Bell and Bank of America, however three residences are impacted. A 12 foot border width with 10 foot TCE's are proposed on both sides of the roadway in this vicinity. The parcels of the three residential displacements are proposed to be purchased in there entirety. A 45 mph normal crown, 2,500 foot radius curve followed by a 285 foot tangent transition the alignment into a long, 3,300 foot, normal crown curve, placing the alignment roughly centered atop the existing roadway. Just past Hancock Blvd. on the west side, the 12 foot border widens to a 25 foot border to accommodate an 8 foot sidewalk and transitional slopes, since the ground drops significantly into an existing tree-lined ditch in front of the apartments. The 12 foot border is retained on the east side, however. Additional right-of-way will be

needed to replace the existing culvert located at STA 50+50. As previously stated in the report, this area will need close examination during the design phase, once topographic survey has been obtained due to the potential right-of-way impacts and drainage issues.

Following the normal crown curve, a tangent length of 1,143 feet transitions the alignment from centered on the existing roadway to roughly holding the location of the existing eastern edge of pavement. This location eliminates impacts to existing buildings at the business located on the east side of the roadway across from the Bellevue Avenue Extension intersection. Border widths of 15 feet and 12 feet are utilized on the west and east sides, respectively. However, north of Bellevue Avenue Extension, an extra 10 feet of border width is proposed to harmonize the proposed grade with the existing ground.

Another normal crown curve (5,550 foot radius) moves the alignment gradually to the east in order to minimize impacts to the Daytona Beach International Airport. On the west side of the roadway, some right-of-way is required for a right turn lane to Aviation Center Parkway. Excluding the intersection, approximately 530 feet of Aviation Center Parkway is proposed to be widened to accommodate a double left-turn lane. Likewise, Bellevue Avenue will also be reconstructed for approximately 650 feet to accommodate double left-turn lanes and a right-turn lane. A border with of 15 feet is proposed on the west side, while the east side has a 32 foot border width due to the varying topography through this area. Right-of-way flare-outs are shown at the ends of the culvert carrying the large drainage ditch beneath SR 483 at the north side of the airport property.

Throughout the duration of this project, Daytona Beach International Airport has expressed the desire and need for the widening of SR 483 to occur on the east side of the roadway, that any impacts to the fence line on the west side would severely impact ongoing and upcoming airport projects. Examples of such projects are the service road that will be placed along the perimeter of the airfield as well as the extension of the taxiway system. Additionally, Daytona Beach International Airport has asked that the profile of the roadway within the airport area remain the same due to a flight navigation system that is currently being designed. If any change to the profile occurs during the design phase, coordination with the airport is essential. In exchange, Daytona Beach International Airport has indicated that they would work with the Florida Department of Transportation regarding the additional land that would be required on the west side of the roadway for the roadway improvements.

A 1,400 foot radius curve requiring a reverse crown at 50 mph transitions the alignment with impacts mostly on the eastern side to slightly offset from the existing pavement as the roadway enters the Embry Riddle campus. Once again, border widths of 15 feet and 12 feet are proposed on the west and east sides, respectively. Although the slightly offset location of the alignment relative to the existing centerline impacts the existing recreational fields on the east side, this location allows the entire roadway to pass

beneath the existing pedestrian overpass. Harmonizing easements are shown on both sides of the roadway to transition the ground behind the proposed sidewalk.

Because of the newly-constructed Mainland High School, a 975 foot radius curve shifts the alignment so that very little impact occurs on school property. This curve requires a superelevation rate of 0.038 at 50 mph. A small portion of right-of-way will be needed to construct a right-turn lane into the new high school entrance. North of Richard Petty Boulevard, the 8 foot sidewalk is located on the east side of the roadway, where a 15 foot border is held. Where no right-of-way is taken, the proposed edge of pavement is located no closer than 15 feet to the existing right-of-way. A right-of-way width of 65 feet is proposed on the west side, since the existing ditch will require a westward shift to accommodate the wider pavement and roadside features.

Approaching the SR 600 intersection from the south, a 2,865 foot radius curve is followed by a tangent through the SR 600 intersection and up to the entrance to Halifax Medical Center. This curve is the minimum radius for a normal crown condition at 50 mph.

Except for a small corner clip in the northwest quadrant of the SR 483/SR 600 intersection, no right-of-way is needed for approximately 600 feet north of the intersection. The alignment is positioned to retain the existing east-side curb line between Hilton Avenue to approximately 400 feet south of Mayberry Avenue. This alignment location avoids impacts to the existing parking lots and the property containing the historic Halifax main building. A 22 foot border is proposed along the west side, where right-of-way will be required on the vacant parcel. Halifax Medical Center has indicated that they would be willing to work with the Florida Department of Transportation regarding the additional land that would be required on the west side of the roadway within this area to accommodate the necessary roadway improvements.

The proposed alignment matches into a future roadway improvement, which widens SR 483 to 5 lanes north of Mayberry Avenue. This transition is accomplished with normal crown curves of 5,300 feet and 5,600 feet. To achieve a minimum 12 foot border, some small right-of-way areas are needed. The outer northbound through lane becomes a right-turn only lane at Mayberry Avenue. The proposed SR 483 improvement ends 437 feet north of Mayberry Avenue.

A profile correction is made at the SR 483/SR 400 intersection to increase design speed from 30 mph to 45 mph and improve sight distance at southbound intersection approach. This correction includes a 616 foot crest vertical curve followed by a 350 foot sag vertical curve. This will also alleviate flooding in the vicinity of the sag curve. Additional examination of the profile correction will need to be examined once topography has been obtained in the next phase of the project.

A detailed geometric description of the Preferred Alternative is contained at the end of Appendix B.

## 9.5 Relocations

The Preferred Alternative result in zero business relocations, including the west side of SR 483 north of SR 400. Three residential relocations are necessary due to the proposed profile correction north of SR 400. These residences are located between Killian and Verona Avenues.

## 9.6 Right-of-Way Costs

The right-of-way cost for the preferred alternative was determined through the FDOT Right-of-way Department. The total right-of-way cost of $15.8 million was estimated and can be found in detail in Table 8.4.1.

## 9.7 Construction Costs

The construction cost for the preferred alternative was determined through the FDOT Long Range Estimate System (LRES). The LRES calculates a price based upon pay item quantities and the associated unit prices. The maintenance of traffic and mobilization costs are a percentage of the subtotals of the other roadway items. Ten percent was used in these estimates. A total construction cost of $39.7 million was estimated and can be found in detail in Appendix D.

## 9.8 Preliminary Engineering Costs

Preliminary engineering costs and CEI costs were estimated at 10% each of the total construction cost. The cost for these engineering components is estimated to be $4.0 million each.

## 9.9 Production Schedule

Currently, the FDOT Adopted Five Year Work Program has the design phase of this project allocated for 2008-2009. No other activities have been scheduled.

## 9.10 Recycling of Salvageable Materials

Except for the existing concrete pavement at the SR 483 / SR 600 intersection, the existing pavement and sub-base will be removed and replaced. Existing guardrail and traffic signal hardware will also be removed. Also, existing culverts and storm sewer will likely require complete removal and replacement. The existing bituminous pavement will not be salvaged on this project. Any concrete structures removed

may be crushed and recycled as riprap if the reinforcing bars are removed. Guardrail, light poles, signal mast arms or strain poles, and signal controllers may be reused at the discretion of the Department and City of Daytona Beach.

## 9.11 User Benefit

Benefits to roadway users are accrued primarily through the travel time saved in commuting on a non-congested roadway versus a congested facility. The person-hour costs and the vehicle operating costs can be annualized to provide an indication of the travel timesaving that will be achieved in the build out year. The analysis of user benefits is depicted in Table 9.11.1 for the SR 483 corridor, where the comparison of the time related costs are shown for the build versus the no build condition.

According to Table 6.4.2, a vehicle traversing the corridor from SR 400 to SR 600 would experience a time delay of 1,511 seconds (25 minutes) in the year 2030 under the no-build condition. Under the build condition (Table 6.4.4), the 2030 time delay is reduced by over half to 641 seconds (11 minutes).

This 14.5-minute reduction in time delay can be converted to an economic benefit. When the timesaving per vehicle are multiplied by the number of vehicles per year (47,320 x 360 days/year), the total timesaving produced in the design year is determined. The total number of trips is then multiplied by the average occupancy per vehicle, which is 1.2 people. This travel timesaving is representative of commercial trips, business travelers and individuals traveling on their own time. Over a one-year period, the estimated savings of the Build over the No-Build is over 4.9 million people hours when traversing the 2.8-mile corridor.

The vehicle operating cost savings are computed by multiplying the annual projected travel time delay by the average operating cost per day based on the Build and No-Build conditions. An estimated $1.5 million is projected to be wasted annually in vehicle fuel and maintenance costs. This figure is small when compared with the loss in productivity of the traveling public. In order to arrive at a cost value of time, the average hourly income for a Volusia County worker ($12.21) was utilized in obtaining the annual person-hour time delay cost. The 4.9 million person-hours equates to a cost of over $60 million in lost wages in a single year.

When the vehicle operating cost savings and the person time saving costs are combined, the resulting savings in cost of the build alternative is approximately $62 million in a single year.

**Table 9.11.1**
**Annual Travel Time Savings**

| SR 400 | | | |
|---|---|---|---|
| **Roadway** | **No Build Time Delay** | **Build Time Delay** | **Savings** |
| ***Projected LOS*** | F | | |
| ***Projected Travel Delay (Hours)*** | 1,511 sec (0.420 hr) | 641 sec (0.178 hr) | 870 sec (0.242 hr) |
| ***Projected AADT (Average)*** | 47,320 | 47,320 | |
| ***Annual Projected Time Delay (Vehicle Operating Hours)*** | 7,150,052 | 3,031,319 | 4,118,733 |
| ***Annual Projected Vehicle Operation Cost*** | $2,547,206 | $1,079,907 | $1,467,299 |
| ***Annual Projected Time Delay (Person Hours) (**)*** | 8,580,062 | 3,637,583 | 4,942,479 |
| ***Annual Projected Person Hour Time Delay Cost (***)*** | $104,762,562 | $44,414,889 | $60,347,673 |
| | | | |
| ***Total Annual Travel Time Cost*** | $107,309,768 | $45,494,796 | $61,814,972 |
| | | | |
| ***Based on auto operating costs of $8.55 (National Transportation Statistics)*** | | | |
| ***** Based upon auto occupancy of 1.2 people*** | | | |
| ****** Year 2003 Voulsia County average hourly income of $12.21 (Florida Statistical Abstracts)*** | | | |

## 9.12 Pedestrian and Bicycle Facilities

The pedestrian and bicycle facilities will be designed to meet the requirements of the Americans with Disabilities Act. The proposed typical section features the following bicycle and pedestrian accommodations:

- 5 foot wide bicycle lanes on both sides of the roadway between SR 400 and Mayberry Avenue. (Standard bicycle lane with is 4').
- 5 foot sidewalk on both sides of the roadway between beginning of project and SR 400.
- 5 foot sidewalk on west side between SR 400 and Hancock Blvd.
- 5 foot sidewalk on east side between SR 400 and Richard Petty Blvd.
- 8 foot sidewalk on west side between Hancock Blvd. and Richard Petty Blvd.
- 8 foot sidewalk on east side between Richard Petty Blvd. and SR 600
- 5 foot sidewalk on west side between Richard Petty Blvd. and SR 600
- 5 foot sidewalk on both sides between SR 600 to project limits north of Mayberry Avenue.

The Preferred Alternative also retains the existing pedestrian overpass on the Embry Riddle campus.

## 9.13 Safety

One of the primary focuses of this PD&E study was to examine concepts to enhance the safety of vehicles, bicycles, and pedestrians, which all share the roadway corridor. The Preferred Alternative includes the following safety improvements:

- Two additional through lanes, which will improve traffic flow and reduce rear-end accidents.
- Extra-wide (5 foot) bicycle lanes to accommodate cyclists between SR 400 and Mayberry.
- Extra-wide (8 foot) sidewalk to accommodate student-oriented cyclists and pedestrians.
- Standard-width (5 foot) sidewalk on roadway side opposite of 8 foot wide sidewalk.
- Profile correction at SR 483/SR 400 intersection to increase design speed from 30 mph to 45 mph and improve sight distance at southbound intersection approach.
- Construction of curb, gutter, and storm sewer system to improve roadway drainage and eliminate existing flooding problem in the vicinity of Woodbine and Verona Avenues.
- Implementation of Class 5 access management.
- New traffic signal hardware, detector loops, pavement markings, raised reflective pavement markers, and signs.

## 9.14 Environmental Impacts

### 9.14.1 Wetlands and Surface Waters

A total of seven wetland systems were identified and classified during the field reviews. The only wetland type found was forested wetlands. Section 4.3.3 discusses the existing wetland system in more detail. Only one of these wetlands may be impacted by the project. The wetland system impacted depends upon if a pond design at the Embry Riddle campus is considered feasible from a drainage engineering standpoint. Surface waters (i.e., ditches and canals) will also be impacted by the proposed roadway design.

If the pond construction on the Embry Riddle campus is required, a total of either 0.61 acres or 1.24 acres of wetlands will be impacted by the proposed project, depending upon which pond is constructed. The wetlands involved are both highly impacted, palustrine, forested systems in an urban setting.

### 9.14.2 Wildlife and Habitat

A total of 16 protected species have been identified as potentially occurring within the project boundaries. The 16 species identified include four reptiles, one amphibian, nine birds and two mammals. Only one

species, the Gopher Tortoise, is known to occur at the project site. The proposed construction is not anticipated to adversely impact any of these species.

### 9.14.3 Noise

In accordance with the *Title 23 Code of Federal Regulations Part 772,* "Procedures for Abatement of Highway Traffic Noise and Construction Noise", and the procedures outlined in the *FDOT PD&E Manual (Part 2, Chapter 17)*, a study was conducted to assess the potential noise impacts associated with the proposed project. A Noise Study Report was prepared and is available at the FDOT District 5 Office.

Single and multi-family residences represent the noise sensitive sites along the project corridor likely to be affected by the project. These residences are associated within four residential communities along the project corridor (i.e., Ridgecrest Subdivision, Camellia Court Apartments, Emerald Park Apartments, and Misty Springs Apartments). The other noise sensitive sites along the project corridor include Embry Riddle Aeronautical University, Daytona Beach Mainland High School, and the Halifax Medical Center. However, these facilities did not have any adjacent exterior areas of use that would be affected by traffic noise and therefore, were not evaluated.

To facilitate the noise analysis, 49 receiver sites were selected to represent the 66 residences adjacent to SR 483 between SR 400 and SR 600. All 49 representative noise receiver sites are classified under Activity Category B of Federal Highway Administration's (FHWA) Noise Abatement Criteria (NAC). For Activity Category B, noise abatement measures must be considered when predicted design year noise levels are within 1.0 dBA of or exceed the 67.0 dBA NAC (>66 dBA) or when a substantial noise increase (i.e., 15 dBA) occurs above existing conditions. For this project, FHWA's Traffic Noise Model Version 2.5 was used to predict traffic noise levels.

For the Build Alternative, the design year (2030) noise levels range from 60.1 dBA to 72.8 dBA. Noise levels at 39 residences are predicted to be equal to or above 66.0 dBA. The 39 residences with predicted Build Alternative noise levels that are equal to or above 66.0 dBA are located within Ridgecrest Subdivision, Camellia Court Apartments, Emerald Park Apartments, and Misty Springs Apartments. The future design year (2030) noise levels at the representative noise sensitive sites are an average of 4.0 dBA higher than the predicted existing noise levels. The project is predicted to increase noise levels between 1.1 and 5.8 dBA higher than the existing conditions. The increase in predicted noise levels is attributed to an increase in traffic volumes between existing and future conditions and from the alignment shifts of travel lanes closer to the residences from the widening of SR 483.

Predicted design year noise levels for the Build Alternative were compared to the NAC and to existing conditions predicted levels to assess potential noise impacts associated with the proposed project. With

the Build Alternative, design year traffic noise levels will approach or exceed the NAC at 39 residences. The Build Alternative will result in an additional 24 noise sensitive sites with predicted noise levels equal to or greater than 66.0 dBA compared to the existing conditions (39 versus 15). Although a number of sites approach or exceed the NAC, the proposed improvements do not result in any substantial noise increases (i.e., greater than 15 dBA).

In accordance with FHWA's and FDOT's traffic noise study requirements, noise abatement measures were evaluated for each of the 39 noise sensitive sites that have predicted design year noise levels which approach or exceed the NAC with the Build Alternative. The abatement measures evaluated include traffic management, alignment modification, property acquisition, and noise barriers. Following analysis of abatement alternatives, available right-of-way, safety criteria, and associated constructability and maintenance issues, construction of noise barriers was determined to be the most reasonable and feasible abatement alternative. A design goal of 10.0 dBA noise reduction with a minimum reduction of 5.0 dBA was used in the development and evaluation of the noise barriers. FDOT's cost guideline of $35,000 per benefited receiver site was used to determine the cost reasonableness.

Noise barriers at three locations (Camellia Court Apartments, Emerald Park Apartments and Misty Springs Apartments) were determined to be effective in providing the minimum 5 dBA of noise reduction to the impacted residences. For Misty Springs Apartments, a 14 feet tall noise barrier that extends 440 feet from Station 47+00 to 51+40 is recommended for further consideration during the design phase. This barrier would benefit a total of eight residences, provides an average noise reduction of 5.4 dBA to benefited receivers, and has a cost per benefited residence of $19,250 with an estimated construction cost of $154,000.

For Emerald Park Apartments, a 14 feet tall noise barrier that extends 560 feet from Station 40+40 to 46+00 is recommended for further consideration during the design phase. This barrier would benefit a total of 18 residences, provides an average noise reduction of 8.0 dBA to benefited receivers, and has a cost per benefited residence of $10,889 with an estimated construction cost of $196,000.

For Camellia Court Apartments, a 12 feet tall noise barrier with two barrier segments, one 400 feet long that extends from Station 39+60 to 43+60 and the second 160 feet long that extends from Station 44+40 to 46+00 is recommended for further consideration during the design phase. This barrier would benefit a total of nine residences, provides an average noise reduction of 6.3 dBA to benefited receivers, and has a cost per benefited residence of $18,667 with an estimated construction cost of $168,000.

These three noise barriers with heights of 12 or 14 feet are expected to reduce traffic noise levels by at least 5.0 dBA at 35 residences along the project corridor including 29 that have predicted design year

noise levels (2030) which approach or exceed the NAC with the Build Alternative. The estimated construction cost of these barriers is approximately $518,000. However, this cost does not include the necessary right of way to construct noise barrier at these locations. Based on the proposed typical section, there is insufficient right-of-way to accommodate noise barriers without acquiring additional right-of-way or obtaining an easement from the adjacent property owners. The cost to acquire this additional right-of-way will substantially increase the noise barrier cost so that it is no longer within FDOT's reasonable cost criteria of $35,000 per benefited receiver. Therefore, FDOT will further coordinate with the owners of these properties during the design phase to determine if they are willing to donate the necessary right of way to construct these noise barriers.

FDOT is committed to the construction of feasible noise abatement measures at the locations where noise barriers have been recommended for further consideration during the Final Design phase, contingent upon the following conditions:

- Detailed noise analyses during the final design process supports the need for abatement;
- Reasonable cost analyses indicate that the economic cost of the barrier(s) will not exceed the guidelines;
- Community input regarding desires, types, heights, and locations of barriers has been solicited by FDOT;
- Preferences regarding compatibility with adjacent land uses, particularly as addressed by officials having jurisdiction over such land uses, has been noted;
- Safety and engineering aspects as related to the roadway user and the adjacent property owner have been reviewed; and
- Any other mitigating circumstances found in Section 17-4.6.1 of FDOT's PD&E Manual have been analyzed.

It is likely that the noise abatement measures for the identified locations will be constructed if found feasible based on the contingencies listed above. If, during the Final Design phase, any of the contingency conditions listed above cause abatement to no longer be considered reasonable or feasible for a given location(s), such determination(s) will be made prior to requesting approval for construction advertisement. Commitments regarding the exact abatement measure locations, heights, and type (or approved alternatives) will be made during project reevaluation and at a time before the construction advertisement is approved.

The cost to construct noise barriers at the remaining location Ridgecrest Subdivision (South of Verona Street) that was evaluated substantially exceeded FDOT's reasonable cost criteria of $35,000 per benefited residence. Therefore, a noise barrier is not recommended for further consideration or construction at this location because it is not cost reasonable. Based on the noise analyses performed to date, there appears to be no apparent solutions available to mitigate the noise impacts at the remaining noise sensitive sites along the project corridor. The traffic noise impacts to 10 of 39 noise sensitive sites affected by the project are an unavoidable consequence of the project. Because of the relatively low number of impacted sites, the noise impacts associated with this project are considered minimal.

The project area includes residential areas that may be affected by noise and vibration associated with construction activities. Construction noise and vibration impacts to these sites will be minimized by adherence to the controls listed in the latest edition of the FDOT's Standard Specifications for Road and Bridge Construction. Furthermore, to aid local agencies in promoting compatible land use, a copy of the Noise Study Report will be provided to the local agencies responsible for controlling land use. The Noise Study Report provides information that can be used by local communities to protect future land development from becoming incompatible with anticipated high traffic noise levels.

### 9.14.4 Air Quality

An air quality study was conducted to determine whether project related motor vehicle emissions would cause or contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO). FDOT's Air Quality Screening Model (CO Florida 2004, Version 2.0.5, August 20, 2004) was used to evaluate the No Build and Build Alternatives. The CO Florida 2004 Model makes worst-case assumptions about the project involving meteorology, traffic, and site conditions and provides an estimate of the 1-hour and 8-hour CO concentrations at a particular location.

The No Build and Build Alternatives were evaluated to determine which portion of the study area would have the highest CO concentrations. Based on the evaluation of traffic data and the proximity of the right of way line, the worst-case location is expected to occur at the intersection of SR 600/US 92 and SR 483. FDOT's Air Quality Screening Model was used to predict future CO concentrations at the representative worst-case sites at this intersection for the No Build and Build Alternatives for the first year the project will be open to traffic (2010) and the design year (2030). The results of the analysis indicated that the worst-case 1-hour and 8-hour CO concentrations are not predicted to exceed the NAAQS for CO. Therefore, the project passes FDOT's the screening test and further air quality analysis is not required. In addition, the results indicate that the project will not have a significant adverse impact on air quality

The project is located in an area which is designated attainment for all of the National Ambient Air Quality Standards under the criteria provided in the Clean Air Act. Therefore, the Clean Air Act conformity requirements do not apply to the project.

## 9.15 Utility Impacts

The Department of Transportation has provided the Utility Impact Study to supplement the PD&E Report. The utility agency owner (UAO) list was based upon the Design Ticket created from the Sunshine State One Call System of Florida member database and an interview with Steven Nunnery, the Resident Utility Specialist for Volusia County. The potential existing UAO's identified are: AT&T Corporation, Bellsouth Telecommunications, Bright House Networks, City of Daytona Beach, Daytona Area Smart Highways

(DASH), Embry Riddle Aeronautical University, Florida Power & Light – distribution, Florida Power & Light – Transmission, FPL Fibernet, KMC Telecom, TECO/Peoples Gas, Volusia County School Board, and WilTel Communications.

Since the existing roadway will be completely removed and replaced, significant utility impacts will occur at a cost of around $4.7 million. The proposed construction will include installation of new storm sewer, curb and gutter and sidewalk. The Preferred Alternative generally requires 131' of right-of-way, while the existing utilities are primarily located within the existing 80' of right-of-way.

## 9.16 Results of Public Involvement Program

The public involvement for the project has been accomplished in a variety of methods targeted to secure the greatest degree of community participation. These methods included public meetings, special interest group presentations, a web site, direct mailings to all of the business establishments in the project area, MPO presentations to the CAC, TAC, Bike/Ped and the full MPO Board, and a specially formed Project Advisory Group (PAG) consisting of local government representatives and local citizens, whose primary purpose was to convey information and issues to the design team and build consensus for project related decisions.

The PAG consisted of citizens, community leaders, and local government personnel. This 12-person group of volunteers met on three occasions during the course of the project. Each meeting included a presentation by the project team and was instrumental in obtaining comments on the proposed alternatives. The PAG, which represented a cross section of adjacent businesses and government entities, provided a forum for ideas to be voiced and concerns heard.

The presentations to special interest groups was an effective means of distributing information about the study process and provided an opportunity for citizens to comment on the SR 483 concepts. Meetings were held with the Daytona Beach Chamber of Commerce, Halifax Medical Center, Daytona Beach Community College, Embry-Riddle University, and the Volusia County School Board.

Approximately 43 people attended the initial public kick-off meeting in February 2005. The kick-off meeting presented information regarding the project area, the purpose of the study, outlined the schedule, exhibits of preliminary design of grade separated facilities at SR 400 and SR 600 and an opportunity for the citizens and local government to present their ideas and concerns regarding the interchanges and the SR 483 corridor.

A Public Alternatives Meeting was held on October 11, 2005. Three mainline alternatives were presented at this meeting. No comments were received at the meeting, and one comment was received in writing by the City traffic engineer following the meeting.

A public hearing was held on May 18, 2006. The preferred alternative was presented at this meeting. One comment was received at the meeting, and two comments were received in writing following the meeting.

## 9.17 Bridge Analysis

No bridges will be involved with the Preferred Alternative.

## 9.18 Access Management

The FDOT has adopted a State Highway System Access Management Classification System and Standards through Rule of the Department of Transportation, Chapter 14-97. The Preferred Alternative will be designed for 45 mph and a Class 5 access management classification. This designation allows full median openings at 1,320 foot intervals, directional median openings at 660 foot intervals, signal spacing at 1,320 foot intervals, and connection points at 245 foot intervals. An access management hearing will be held after the public hearing.

## 9.19 Aesthetics

Very early in the concept development phase, community input from adjacent stakeholders placed an emphasis on a “context sensitive design” with a real concern that landscaping be included in the project in order to provide a parkway type feeling. The use of the raised grass median is one of the design elements that not only provides safety for turning vehicles and reduces the incidence of head on collisions from opposing directions of traffic, but also provides an opportunity to provide aesthetics via landscaping.

A commitment has been made to coordinate landscaping and decorative crosswalks through the Embry Riddle campus. The proposed aeronautical research park may also utilize joint use ponds.

## 9.20 Commitments

The following commitments have been adopted during the course of this project:

1. FDOT will coordinate with the City of Daytona Beach and Embry Riddle University in the design phase regarding stamped asphalt for crosswalks and a landscaped median. Two percent of the construction cost is to be utilized for landscaping.

2. The Lighting Justification Report's conclusion to install full lighting is recommended to be implemented if the anticipated research park is constructed.

3. The request from Volusia County to install enhanced signal apparatus in order to retain full operation after storms is recommended to be re-evaluated in the design phase.

4. Five-foot-wide bicycle lanes will be constructed at the outer edge of pavement on both sides of the roadway between SR 400 and Mayberry Avenue.

5. A five-foot wide sidewalk will be constructed from the beginning of the project, which is approximately 1350 feet south of SR 400, to Hancock Boulevard on both sides of the roadway. An eight-foot wide sidewalk on the west side and a five-foot wide sidewalk on the east side of the roadway will be constructed from Hancock Boulevard to Richard Petty Boulevard. From Richard Petty Boulevard to SR 600, the eight-foot wide sidewalk will be constructed on the east side and the five-foot sidewalk will be constructed on the west side. North of SR 600, a five-foot wide sidewalk will be constructed on both sides of the roadway.

6. Shangri La Park, located on the east side of the roadway between Shangri La Drive and SR 400, will not be impacted by the proposed SR 483 improvement.

7. Other than a potential temporary construction easement, there will be no impacts to the parcel owned by Halifax Medical Center and containing the historical building.

8. During the Final Design phase, FDOT will further coordinate with property owners where noise barriers were recommended for further consideration. FDOT is committed to the construction of feasible noise abatement measures at noise impacted locations, contingent upon the following conditions: detailed noise analyses during the final design process supports the need for abatement; reasonable cost analyses indicate that the economic cost of the barriers will not exceed the guidelines; community input regarding desires, types, heights, and locations of barriers has been solicited by FDOT; preferences regarding compatibility with adjacent land uses, particularly as addressed by officials having jurisdiction over such land uses, has been noted; safety and engineering aspects as related to the roadway user and the adjacent property owners have been reviewed; and any other mitigating circumstances found in Section 17-4.6.1 of FDOT's PD&E Manual have been analyzed.