PRELIMINARY ENGINEERING REPORT

Florida Department of Transportation

ETDM Number 13748

Financial Management Number 413265-1-22-01

Federal-Aid Project Number N/A

This preliminary engineering report contains detailed engineering information that fulfills the purpose and need for project SR 9/I-95 at Central Boulevard Interchange.

Project Limits: I-95 from north of PGA Boulevard (MP 36.783) to Donald Ross Road (MP 40.163) in Palm Beach County.



FDOT

Prepared for:
FDOT District 4
3400 West Commercial Blvd.
Fort Lauderdale, Florida 33309

October, 2016

Rev. November, 2016

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10/12/16

Rev. 11/28/16

Date

Gavin Jones, FL PE #52676

Professional Engineer

Seal below



FDOT

Prepared for:
FDOT District 4
3400 West Commercial Blvd.
Fort Lauderdale, Florida 33309

November, 2016

TABLE OF CONTENTS

1.0 SUMMARY OF PROJECT 1-1
1.1 Project Description/Background 1-1
1.2 Purpose and Need 1-3
1.3 Recommendation 1-6
1.4 Commitments 1-6

2.0 EXISTING CONDITIONS 2-1
2.1 Typical Section 2-1
2.2 Existing Right-of-Way 2-6
2.3 Land Use 2-6
2.4 Horizontal and Vertical Alignments 2-6
2.5 Pedestrian Accommodations 2-10
2.6 Bicycle Facilities 2-12
2.7 Lighting 2-12
2.8 Existing Intersections and Traffic Signals 2-12
2.9 Design and Posted Speeds 2-12
2.10 Railroad Crossings 2-12
2.11 Drainage 2-13
2.12 Traffic Data 2-16
2.13 Crash Data 2-16
2.14 Utilities 2-20
2.15 Soils 2-22
2.16 Existing Bridges 2-22
3.0 PLANNING PHASE/CONCEPTUAL EVALUATION 3-1
4.0 DESIGN CONTROLS AND STANDARDS 4-1
5.0 ALTERNATIVE ALIGNMENT ANALYSIS 5-1
5.1 No-Build Alternative 5-1
5.2 Build Alternatives 5-1

5.3 Mainline Alternatives 5-2
5.3.1 Mainline Alternative 2 – CD Road 5-2
5.3.1.1 Typical Sections (I-95 Mainline) 5-2
5.3.1.2 Right-of-Way Required 5-4
5.3.1.3 Utilities 5-5
5.3.1.4 Traffic Control Concepts 5-5
5.3.2 Mainline Alternative 3 – Braided Ramp System 5-5
5.3.2.1 Proposed Typical Section 5-6
5.3.2.2 Right-of-Way Required 5-7
5.3.2.3 Utilities 5-8
5.3.2.4 Traffic Control Concepts 5-9
5.3.2.5 Bridge Analysis 5-9
5.4 Interchange Configuration Options for Proposed New Interchange at Central Boulevard 5-9
5.4.1 Tight Diamond Urban Interchange (TDUI) 5-9
5.4.1.1 Proposed Typical Sections 5-10
5.4.1.2 Right-of-Way Required 5-12
5.4.1.3 Traffic Control Concepts 5-13
5.4.1.4 Bridge Analysis 5-13
5.4.2 Diverging Diamond Interchange (DDI) 5-13
5.4.2.1 Proposed Typical Section 5-14
5.4.2.2 Right-of-Way Required 5-14
5.4.2.3 Traffic Control Concepts 5-15
5.4.2.4 Bridge Analysis 5-15
5.5 Build Alternatives (Mainline Options Combined with Interchange Options) 5-16
5.5.1 Build Alternative 2 (CD Road with TDUI) 5-16
5.5.1.1 Typical Sections 5-16
5.5.1.2. Conceptual Plans 5-16
5. 5.1.3 Right-of-Way 5-16
5.5.1.4 Cost Estimate 5-16
5.5.1.5 Drainage 5-17
5.5.1.6 Utilities 5-17
5.5.1.7 Traffic Control Concepts 5-18

5.5.1.8 Multi-Modal Accommodations 5-18
5.5.1.9 Access Management 5-18
5.5.1.10 Design Exceptions/Variations 5-19
5.5.1.11 Safety Analysis 5-19
5.5.1.12 Bridge Analysis 5-19
5.5.2 Build Alternative 2A (CD Road with DDI) 5-19
5.5.2.1 Typical Sections 5-19
5.5.2.2 Conceptual Plans 5-19
5.5.2.3 Right-of-Way Required 5-19
5.5.2.4 Cost Estimate 5-19
5.5.2.5 Drainage 5-20
5.5.2.6 Utilities 5-20
5.5.2.7 Traffic Control Concepts 5-20
5.5.2.8 Multi-Modal Accommodations 5-20
5.5.2.9 Access Management 5-21
5.5.2.10 Design Exceptions/Variations 5-21
5.5.2.11 Safety Analysis 5-21
5.5.2.12 Bridge Analysis 5-21
5.5.3 Build Alternative 3 (Braided Ramp System with TDUI) 5-21
5.5.3.1 Typical Section 5-21
5.5.3.2 Conceptual Plans 5-21
5.5.3.3 Right-of-Way 5-22
5.5.3.4 Cost Estimate 5-22
5.5.3.5 Drainage 5-22
5.5.3.6 Utilities 5-22
5.5.3.7 Traffic Control Concepts 5-23
5.5.3.8 Multi-Modal Accommodations 5-23
5.5.3.9 Access Management 5-23
5.5.3.10 Design Exceptions/Variations 5-23
5.5.3.11 Safety Analysis 5-24
5.5.3.12 Bridge Analysis 5-24
5.5.4 Build Alternative 3A (Braided Ramp System with DDI) 5-25

5.5.4.1 Typical Sections 5-25
5.5.4.2 Conceptual Plans 5-25
5.5.4.3 Right-of-Way Required 5-25
5.5.4.4 Cost Estimate 5-25
5.5.4.5 Drainage 5-26
5.5.4.6 Utilities 5-26
5.5.4.7 Traffic Control Concepts 5-26
5.5.4.8 Multi-Modal Accommodations 5-26
5.5.4.9 Access Management 5-26
5.5.4.10 Design Exceptions/Variations 5-26
5.5.4.11 Safety Analysis 5-26
5.5.4.12 Bridge Analysis 5-27
5.6 Environmental Impacts 5-27
5.6.1 Land Use 5-27
5.6.2 Relocations 5-28
5.6.3 Community Cohesion 5-28
5.6.4 Farmlands 5-28
5.6.5 Cultural Resources 5-28
5.6.6 Potential Section 4(f) Lands 5-28
5.6.7 Wetlands 5-30
5.6.8 Wildlife and Habitat 5-30
5.6.9 Essential Fish Habitat 5-30
5.6.10 Contamination 5-30
5.6.11 Noise 5-31
5.6.12 Construction 5-31
5.7 Alternatives Evaluation 5-32
5.8 Recommended Alternative 5-37
6.0 DESIGN DETAILS OF RECOMMENDED ALTERNATIVE 6-1
6.1 Typical Section (Rev. 11-28-16) 6-1
6.2 Horizontal and Vertical Alignment 6-5
6.3 Traffic Operational Analysis 6-10

6.3.1 Freeway Analysis 6-10
6.3.2 Interchange Ramp Intersections Analyses 6-10
6.3.3 Other Intersection Analyses 6-10
6.3.4 Roadway Analysis 6-10
6.4 Design Traffic Volumes 6-10
6.5 Right of Way Impacts and Relocation 6-10
6.6 Design Exceptions and Variations 6-11
6.7 Preliminary Cost Estimate 6-12
6.8 Pedestrian and Bicycle Facilities 6-12
6.9 Utility Impacts 6-12
6.10 Preliminary Traffic Control Plan 6-13
6.11 Drainage 6-14
6.12 Bridge Analysis 6-14
6.13 Special Features 6-15
6.14 Access Management 6-15
6.15 Multi-Modal Accommodations 6-15
6.16 Schedule 6-15
7.0 PUBLIC COMMENTS 7-1
7.1 Public Involvement Plan 7-1
7.2 Kickoff Meeting 7-1
7.3 Alternatives Public Workshop 7-1
7.4 Public Hearing 7-2
7.5 Other Meetings 7-2
7.6 Project Website 7-2
8.0 LIST OF TECHNICAL REPORTS COMPLETED FOR THE PROJECT 8-1

LIST OF FIGURES

Figure 1-1 Project Study Area 1-2
Figure 2-1 Existing I-95 Roadway Typical Section - South of Central Boulevard 2-2
Figure 2-2 Existing I-95 Roadway Typical Section - North of Central Boulevard 2-3
Figure 2-3 Existing Central Boulevard Roadway Typical Section 2-4
Figure 2-4 Existing Central Boulevard Bridge Typical Section 2-5

Figure 2-5 Existing Land Use 2-8
Figure 2-5 Existing Land Use (Continued) 2-9
Figure 2-6 I-95 Corridor Crash Distribution by Location 2-19
Figure 2-7 Soil Types within the Study Area 2-25
Figure 2-7 Soil Types (Continued) 2-26
Figure 5-1 Typical Section – I-95 South of Central Boulevard (Mainline Alternative 2) 5-3
Figure 5-2 Typical Section – I-95 North of Central Boulevard (Mainline Alternatives 2 and 3) 5-3
Figure 5-3 Right-of-Way Impacts for Mainline Alternative 2 5-4
Figure 5-4 Typical Section – I-95 South of Central Boulevard (Mainline Alternative 3) 5-7
Figure 5-5 Right-of-Way Impacts of Proposed Mainline Alternative 3 5-8
Figure 5-6 Proposed TDUI Option 5-10
Figure 5-7 Typical Section - Central Blvd. Bridge for TDUI Interchange 5-11
Figure 5-8 Proposed Typical Section - Central Blvd East of I-95 – TDUI Interchange 5-11
Figure 5-9 Proposed Typical Section - Central Blvd West of I-95 – TDUI Interchange 5-12
Figure 5-10 Right-of-Way Impacts of Proposed TDUI Option 5-12
Figure 5-11 Proposed DDI Option 5-13
Figure 5-12 Proposed Typical Section Central Blvd. Bridge DDI Option 5-14
Figure 5-13 Right-of-Way Impacts of DDI Option 5-15
Figure 6-1 Proposed Typical Section Recommended Alternative I-95 South of Central Boulevard 6-2
Figure 6-2 Proposed Typical Section Recommended Alternative I-95 North of Central Boulevard 6-2
Figure 6-3 Concept Typical Section, Recommended Alternative I-95 Ultimate Under Hood Rd. Bridge 6-3
Figure 6-4 Proposed Typical Section, Recommended Alternative- Central Blvd. Bridge for TDUI 6-3
Figure 6-5 Proposed Typical Section, Recommended Alternative - Central Blvd. East of I-95 6-4
Figure 6-6 Proposed Typical Section Recommended Alternative - Central Blvd. West of I-95 6-4
Figure 6-7 Mainline Right-of-Way Impacts – Recommended Alternative 6-11
Figure 6-8 Interchange Right-of-Way Impacts – Recommended Alternative 6-12

LIST OF TABLES

Table 2.1 Existing Horizontal Alignment Geometric Characteristics 2-7
Table 2.2 Existing Vertical Alignment Geometric Characteristics 2-11
Table 2.3 Existing Intersections within the Project Limits 2-13
Table 2.4 I-95 Corridor Crash Rates. 2-17

Table 2.5 PGA Boulevard Corridor Crash Rates. 2-18
Table 2.6 Military Trail Corridor Crash Rates 2-18
Table 2.7 Existing Utility Companies 2-20
Table 2.8 Soil Types Within the Study Area 2-23
Table 2.9 Existing Bridge Characteristics 2-27
Table 3.1 IJR Tier 1 Comparative Evaluation Matrix 3-2
Table 4.1 General Design Standards 4-2
Table 4.1 General Design Standards (Continued) 4-3
Table 4.2 Structural Design Standards 4-4
Table 4.2 Structural Design Standards (Continued) 4-5
Table 4.2 Structural Design Standards (Continued) 4-6
Table 4.2 Structural Design Standards (Continued) 4-7
Table 4.3 Speed Specific Design Standards 4-8
Table 5.1 Mainline Alternative 2 (CD Road) - Right-of-Way Impacts 5-4
Table 5.2 Mainline Alternative 3 (Braided Ramp System) - Right-of-Way Impacts 5-7
Table 5.3 TDUI Option - Right-of-Way Impacts 5-13
Table 5.4 DDI Option - Right-of Way Impacts 5-15
Table 5.5 Alternative 2 (CD Road /TDUI) - Right of Way Impacts 5-17
Table 5.6 Alternative 2A (CD Road/DDI) - Right of Way Impacts 5-20
Table 5.7 Alternative 3 (Braided Ramp System/TDUI) - Right-of-Way Impacts 5-22
Table 5.8 Alternative 3A (Braided Ramp System/DDI) - Right-of-Way Impacts 5-25
Table 5.9 Alternatives Evaluation Matrix Comparison of Interchange Options 5-34
Table 5.10 Alternative Evaluation Matrix Comparison of Mainline Options 5-35
Table 5.11 Alternatives Evaluation Matrix Comparison of Alternatives 5-36
Table 5.12 Cost Estimates for Viable Build Alternatives 5-37
Table 6.1 Horizontal Alignment Data 6-6
Table 6.1 Horizontal Alignment Data (Continued) 6-7
Table 6.1 Horizontal Alignment Data (Continued) 6-8
Table 6.1 Horizontal Alignment Data (Continued) 6-9
Table 6.2 Recommended Alternative - Right of Way Impacts 6-11

Table 6.3 Bridge Structural Information 6-14

LIST OF PHOTOS

Photo 1 Drainage Basin 1, Existing 48” Pipe 2-14

Photo 2 Drainage Basin 3, Control Weir 2-15

LIST OF APPENDICES

Appendix A – Operational Analyses

Appendix B – Alternative Concept Plans and Profiles

Appendix C – Cost Estimates

Appendix D – Recommended Alternative Typical Section Package

1.0 SUMMARY OF PROJECT

1.1 PROJECT DESCRIPTION/BACKGROUND

This preliminary engineering report contains detailed engineering information that fulfills the purpose and need for project SR 9/I-95 at Central Boulevard Interchange, project limits: I-95 from north of PGA Boulevard (MP 36.783) to Donald Ross Road (MP 40.163), July 2016.

The Florida Department of Transportation, District Four is conducting a Project Development and Environment (PD&E) study to evaluate potential improvements for State Road 9/I-95 from north of Northlake Boulevard to south of Donald Ross Road, PGA Boulevard from west of Military Trail to west of Lake Victoria Gardens Drive; and Central Boulevard from 1.0 mile south of I-95 to 1.0 mile north of I-95. The purpose of the study is to evaluate alternatives that could reduce congestion and improve mobility in the northern Palm Beach County area, within the City of Palm Gardens. The improvements evaluated include construction of a new interchange at I-95 and Central Boulevard.

The study area is located within Sections 25, 26, 35, and 36 of Township 41 South, Range 42 East; Sections 30 and 31 of Township 41 South, Range 43 East; Sections 1, 2, 11, 12, 13 and 14 of Township 42 South, Range 42 East; and Sections 6, 7 and 18 of Township 42 South, Range 43 East. The study area is shown in Figure 1.

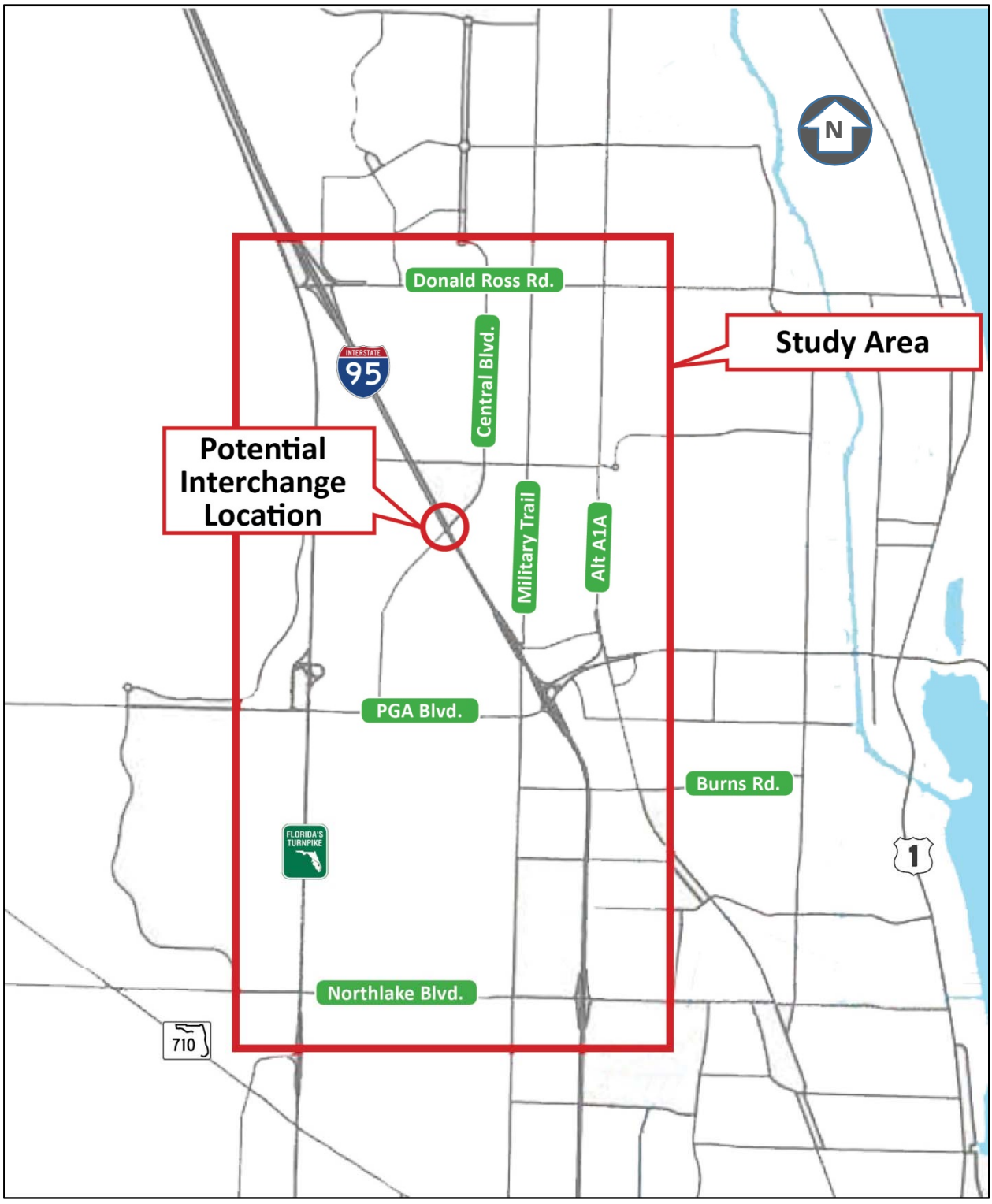
Construction of a new interchange on I-95 at Central Boulevard is consistent with the Cost Feasible Plan of the Palm Beach County Metropolitan Planning Organization (MPO)'s 2040 Long Range Transportation Plan (LRTP), adopted in late 2014. The *I-95 Area Wide Mobility Study,* produced in 2011, demonstrated that improvements to the area's major intersections alone would be unable to preserve acceptable levels of service on arterial and collector roads in the area.

Subsequently, an Interchange Justification Report (IJR) was prepared by FDOT in 2015. Analysis conducted for preparation of this report estimated that construction of a new interchange at Central Boulevard would result in an annual reduction of over 1.4 million hours in delay on area roads. The IJR (*I-95 at Central Boulevard Interchange Justification Report, October 13, 2015*) was approved by the Federal Highway Administration (FHWA) in November, 2015 and is published separately.

The PD&E study evaluated two alternatives for the I-95 mainline improvements and two configurations for the proposed interchange. The mainline alternatives included a collector distributor (CD) road system and a braided ramp system. The mainline improvements were developed to address the weaving section of I-95 between the Military Trail ramps and the Central Boulevard ramps. A tight diamond urban interchange (TDUI) and a diverging diamond interchange (DDI) were evaluated for the proposed new interchange at Central Avenue. Four viable build alternatives which combined the mainline improvement alternatives with the interchange options were developed, evaluated, and compared to the No-Build alternative. The naming of the build alternatives is consistent with the alternatives described in the IJR referenced above. These alternatives are listed below.

- No-Build Alternative
- Alternative 2: Collector Distributor Road System along Mainline I-95 with a TDUI

Figure 1-1 Project Study Area



- Alternative 2A: A CD Road System along Mainline with a DDI
- Alternative 3: A Braided Ramp System along Mainline I-95 with a TDUI
- Alternative 3A: A Braided Ramp System along Mainline I-95-with a DDI

1.2 PURPOSE AND NEED

The purpose of the project is to improve operational capacity and overall traffic operations by determining if a new interchange at Central Blvd. at I-95 will relieve traffic congestion at the existing interchange of SR 9 (I-95) and SR 786 (PGA Boulevard). Conditions at PGA Boulevard are anticipated to deteriorate below acceptable level of service (LOS) standards if no improvements occur by 2035; the interchange will have insufficient capacity to accommodate the projected travel demand. The need for the project is based on the following primary and secondary criteria:

PRIMARY CRITERIA

CAPACITY/TRANSPORTATION DEMAND: Improve Operational Capacity and Overall Traffic Operations (Level of Service)

The project is anticipated to improve traffic operations at the PGA Boulevard interchange and study area roadways/intersections by implementing operational and capacity improvements to meet the future travel demand projected as a result of Palm Beach County population and employment growth. According to traffic data presented in the I-95 Area Wide Mobility Study, the northbound I-95 ramp terminal intersection at PGA Boulevard is currently operating at LOS E/F (AM/PM Peak Hours) and the intersection of PGA Boulevard at Military Trail is currently operating at LOS E (AM/PM Peak Hours). By year 2035, if no improvements occur, several additional locations are projected to deteriorate to unacceptable conditions, including the southbound I-95 ramp terminal intersection at PGA Boulevard to LOS F (PM Peak Hour), the intersection of PGA Boulevard and Central Boulevard to LOS F (AM/PM Peak Hours) and the intersection of PGA Boulevard at Florida's Turnpike to LOS F (AM/PM Peak Hours). The existing and projected future traffic conditions for the study area roadways are as follows:

I-95 (South of PGA Boulevard)
-Existing Conditions-

2011 AADT: 145,000

2011 Truck AADT: 6.4% (9,280 trucks per day)

LOS C (8 General Use and 2 HOV Lanes)

-Future Conditions-
2035 AADT: 182,400

2035 Truck AADT: 6.4% (11,674 trucks per day)

LOS D (8 General Use and 2 HOV Lanes)

PGA Boulevard (Florida's Turnpike to Military Trail)
-Existing Conditions-

2011 AADT: 42,000

2011 Truck AADT: 4.8% (2,016 trucks per day)

LOS D (6 Lanes)

-Future Conditions-
2035 AADT: 55,700

2035 Truck AADT: 4.8% (2,674 trucks per day)

LOS F (6 Lanes)

PGA Boulevard (Military Trail to I-95)
-Existing Conditions-

2011 AADT: 37,000

2011 Truck AADT: 7.0% (2,590 trucks per day)

LOS D (6 Lanes)

-Future Conditions-
2035 AADT: 69,200

2035 Truck AADT: 7.0% (4,844 trucks per day)

LOS F (6 Lanes)

PGA Boulevard (I-95 to Alt A1A)
-Existing Conditions-

2011 AADT: 64,500

2011 Truck AADT: 2.6% (1,677 trucks per day)

LOS F (6 General Use plus 1 Auxiliary Lane [Eastbound])

-Future Conditions-
2035 AADT: 78,100

2035 Truck AADT: 2.6% (2,030 trucks per day)

LOS F (8 Lanes)

Military Trail (South of PGA Boulevard)
-Existing Conditions-

2011 AADT: 37,000

2011 Truck AADT: 4.7% (1,739 trucks per day)

LOS C (6 Lanes)

-Future Conditions-
2035 AADT: 59,100

2035 Truck AADT: 4.7% (2,778 trucks per day)

LOS F (6 Lanes)
Sources:

(1) 2011 AADT and 2011 Truck AADT volumes obtained from the FDOT's Florida Traffic Online (2011).

(2) Projected 2035 AADT volumes derived from the Southeast Regional Planning Model (SERPM) Version 6.5.2e.

(3) Projected 2035 Truck AADT volumes are based on the assumption that future truck traffic percentages are consistent with the 2011 existing percentages.

(4) LOS derived from the FDOT 2009 Quality/Level of Service Handbook: Generalized Annual Average Daily Volumes for Florida's Urban Areas, Table 1.

It should additionally be noted that the Palm Beach MPO 2035 LRTP states that volume to capacity (V/C) ratios exceeding 1.1 are assumed to constitute a travel demand need or deficiency. Based on the projected 2035 AADT volumes derived from the Southeast Regional Planning Model (SERPM), PGA Boulevard and the interchange at I-95 are expected to have a V/C ratio greater than 1.1 and are, therefore, projected to be deficient in the future if no improvements are made.

GROWTH MANAGEMENT: Accommodate Future Population and Employment Growth

The area surrounding the existing I-95 and PGA Boulevard interchange is urbanized containing a mixture of commercial, industrial, mixed-use and residential land uses with vacant land in the northeast quadrant. According to the City of Palm Beach Gardens Comprehensive Plan, future land use is to remain relatively unchanged, with the exception of the area east of the interchange which has been designated as part of the Bioscience Research Protection Overlay (BRPO). The BRPO was developed to protect portions of land for biotechnology/biosciences land uses and includes the Scripps Florida Phase II/Briger Tract Development of Regional Impact (DRI) which consists of 82 acres located south of Donald Ross Road, north of Hood Road and east and west of I-95 (just north of the study area). The DRI includes 1,600,000 square feet of Biotech Research and Development, 2,400,000 square feet of biotechnological/biomedical, pharmaceutical, and office space, 2,700 residential dwelling units, and 500,000 square feet of retail space.

According to SERPM projections developed for Palm Beach County as part of the Palm Beach MPO 2035 LRTP development:

- Population is projected to grow from 1,270,302 in 2005 to 1,677,170 in 2035 (32% increase).
- Employment is projected to grow from 544,496 in 2005 to 800,045 in 2035 (46.9% increase).

The improvements will be critical in supporting the growing bioscience industry and vision of the County, as well as the expanding residential, commercial and industrial uses in the vicinity of the interchange.

SECONDARY CRITERIA

MODAL INTERRELATIONSHIPS: Enhance Freight Mobility

I-95 is the primary interstate route along the east coast of the United States extending from Maine to Florida and serving some of the most populated urban areas in the country. In Florida, I-95 is both a designated Strategic Intermodal System (SIS) highway and a major facility of Florida's Intrastate Highway System (FIHS). The SIS is a statewide network of highway, railway and waterway corridors as well as transportation hubs that handle the bulk of Florida's passenger and freight traffic. Highways that are designated as part of the SIS provide for movement of high volumes of goods and people at high speeds.

The FIHS is composed of interconnected limited- and controlled-access roadways (which include designated SIS highway corridors) that provide for high-speed and high-volume traffic movements within the state to serve both interstate and regional commerce and long-distance trips. This statewide transportation network accommodates high occupancy vehicles, express bus transit and, in some corridors, passenger rail service. Within southeast Florida, I-95 is a vital north-south transportation corridor providing important regional access to major east/west and north/south transportation corridors, as well as residential and employment activity centers and other regional destinations in the area.

The proposed improvements at the I-95 and PGA Boulevard interchange and surrounding roadways/intersections are critical to enhance the mobility of goods by alleviating current and future congestion at the interchange and on the surrounding freight network. Reduced congestion will serve to maintain and improve viable access to the major transportation facilities and businesses of the area (including connectors to freight activity centers/local distribution facilities or between the regional freight corridors).

EMERGENCY EVACUATION: Enhance Emergency Evacuation and Response Times

I-95 and PGA Boulevard serve as part of the emergency evacuation route network designated by the Florida Division of Emergency Management. Also designated by Palm Beach County and the City of Palm Beach Gardens as evacuation facilities, I-95 and PGA Boulevard are critical in facilitating traffic during emergency evacuation periods as they connect other major arterials and highways of the state evacuation route network. The project is anticipated to:

- Improve emergency evacuation capabilities by enhancing connectivity and accessibility to I-95 and other major arterials designated on the state evacuation route network.
- Increase the operational capacity of traffic that can be evacuated during an emergency event.

1.3 RECOMMENDATION

Based on a comprehensive comparative analysis (see Chapter 5), which considered impacts to the natural, physical and social environment, input from the local community and local government, operational and engineering issues, and construction costs, the project team selected Alternative 2, construction of a collector distributor road system along mainline I-95 with a TDUI, as the Recommended Alternative. The Recommended Alternative will meet the purpose and need of the project, have minimal environmental impacts, require acquisition of the least amount of additional right-of-way, and is the most acceptable to the community. Construction cost for this alternative, which is estimated to be approximately 33.9 million dollars, is estimated to be the lowest of the four build alternatives evaluated.

1.3 COMMITMENTS

As part of a separate PD&E Study, the Department will study the possible additional improvements to the I-95 interchange at Northlake Boulevard, south of PGA Boulevard. That study scope has been amended to include an analysis of the feasibility of improving the operational performance of the area where the PGA Boulevard eastbound to I-95 southbound slip ramp, and the PGA Boulevard westbound to I-95 southbound flyover ramps merge with each other and subsequently with the I-95 travel lanes.

The Department commits to negotiating with Palm Beach County during the design phase to convey to the County a portion of an existing FDOT parcel adjacent to the County's District Park parcel as compensation for the expected right-of-way needed due to construction of the Recommended Alternative within the park parcel where it abuts I-95.

The Department commits to facilitate the negotiation between Palm Beach County and the City of Palm Beach Gardens to modify an existing City conservation easement within the County's park parcel to extend the easement onto the parcel the FDOT is conveying to the County, as compensation for the easement area lost due to construction of the Recommended Alternative.

2.0 Existing Conditions

Data collection to document existing conditions included review of all existing information and field reviews.

2.1 Typical Sections

Within the study area, SR 9/I-95 is a ten-lane divided, limited access facility. Central Boulevard is a four-lane divided collector road. The existing typical sections for I-95 and Central Boulevard are described below.

SR 9/I-95 South of Central Boulevard (from the PGA Boulevard ramps to Central Boulevard overpass)

Figure 2-1 depicts the existing roadway typical section for I-95 south of Central Boulevard. . This section provides four 12-foot wide general purpose lanes, one 12-foot wide auxiliary lane, and a 15-foot inside and 12-foot outside shoulder in each direction. The northbound and southbound lanes are separated by 32-foot median which contains a concrete barrier. The 12-foot auxiliary lanes are not continuous throughout the section. The roadside swales vary from 60 feet to 150 feet. The maximum width of the typical section is 300 feet.

SR 9/I-95 north of Central Boulevard (from Central Boulevard to Donald Ross Road)

Figure 2-2 depicts the existing roadway typical section for I-95 north of Central Boulevard. This typical consists of four 12-foot wide general purpose lanes, two 12-foot wide auxiliary lanes, and a 14-foot inside and 12-foot outside shoulder in each direction. The northbound and southbound lanes are separated by a 28-foot grassed median (excluding the shoulders) and a double faced guardrail. The auxiliary lanes are not continuous throughout the section. The roadside swales vary from 60 feet to 146 feet. The maximum width of the typical section is 372 feet.

Central Boulevard

Figure 2-3 depicts the existing roadway typical section for Central Boulevard approaching the bridge over I-95. Two 12-foot through lanes with a 10-foot wide outside shoulder are provided in each direction. The eastbound and westbound lanes are separated by a 22-foot raised median An eight-foot wide sidewalk is provided on the west side and a five-foot wide sidewalk is provided on the east side of Central Avenue. The area between the outside of the sidewalk and the outer edge of the right-of-way varies from three to 98 feet. The total width of the typical section for this segment of Central Boulevard varies from 120 to 265 feet.

Central Boulevard Bridge over SR 9/I-95

Figure 2-4 depicts the existing bridge typical section for the Central Boulevard Bridge over I-95. Two 12-foot through lanes with a 10-foot wide outside shoulder are provided in each direction. An eight-foot wide sidewalk is provided on the west side and a five-foot wide sidewalk is provided on the east side of Central Avenue. The eastbound and westbound lanes are separated by a 22-foot median (19 feet raised). The total out-to-out width of the existing bridge is 107 feet-six inches.

Figure 2-1 – Existing I-95 Roadway Typical Section - South of Central Boulevard

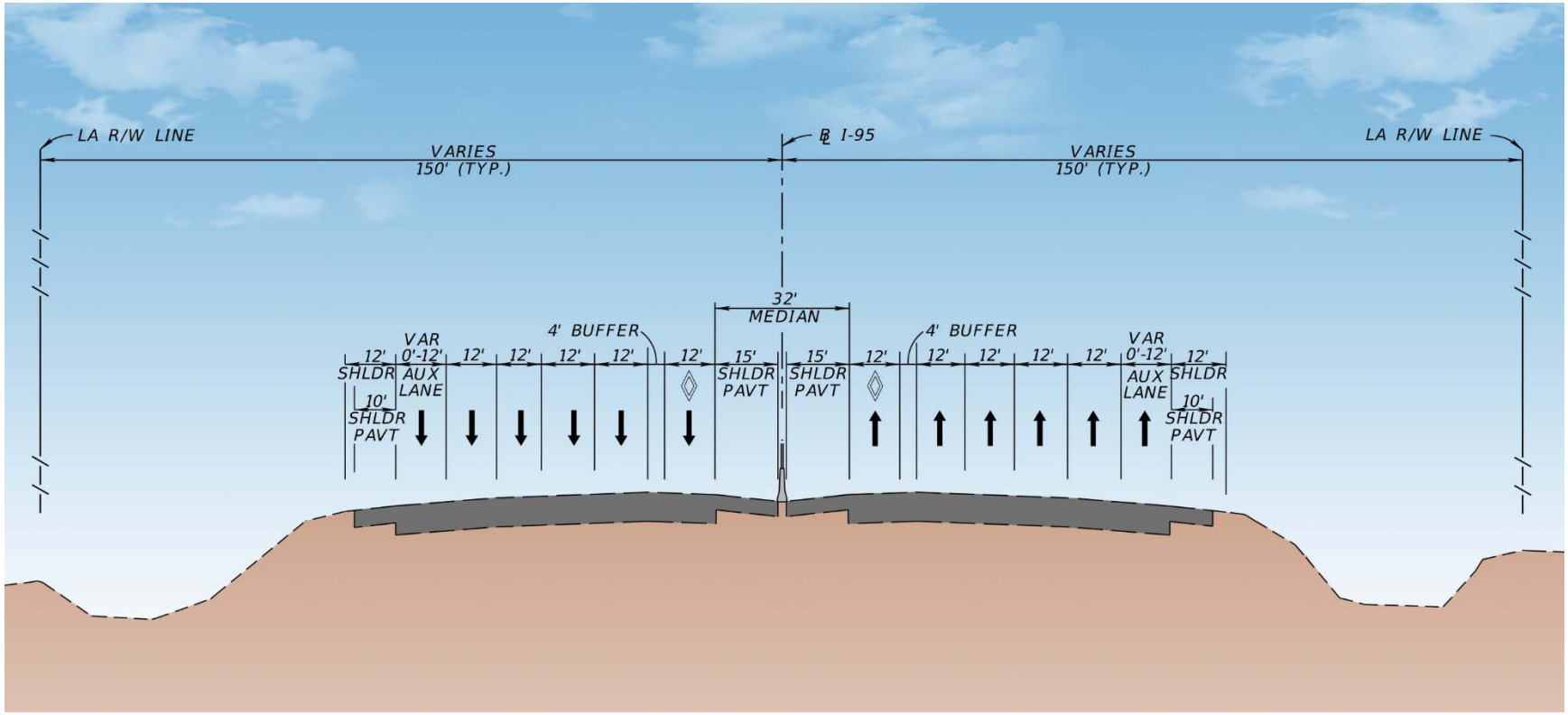


Figure 2-2 – Existing I-95 Roadway Typical Section - North of Central Boulevard

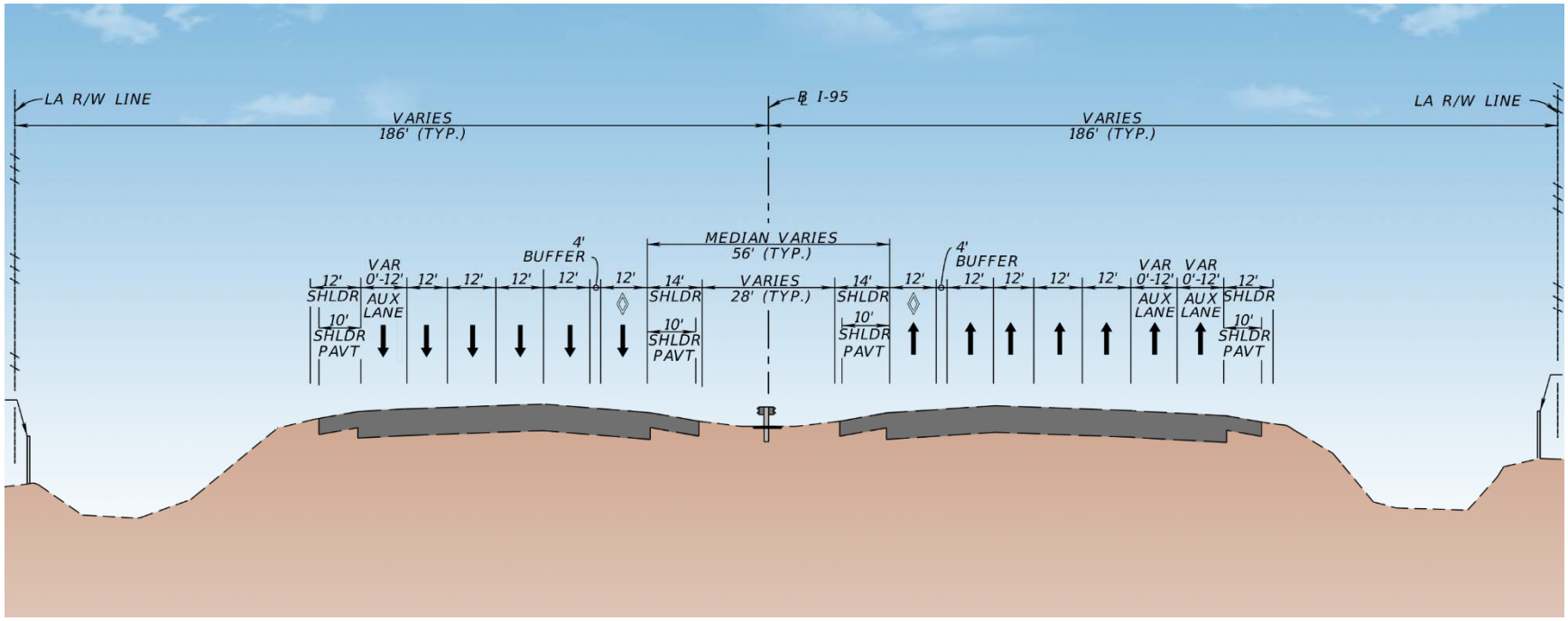


Figure 2-3 – Existing Central Boulevard Roadway Typical Section

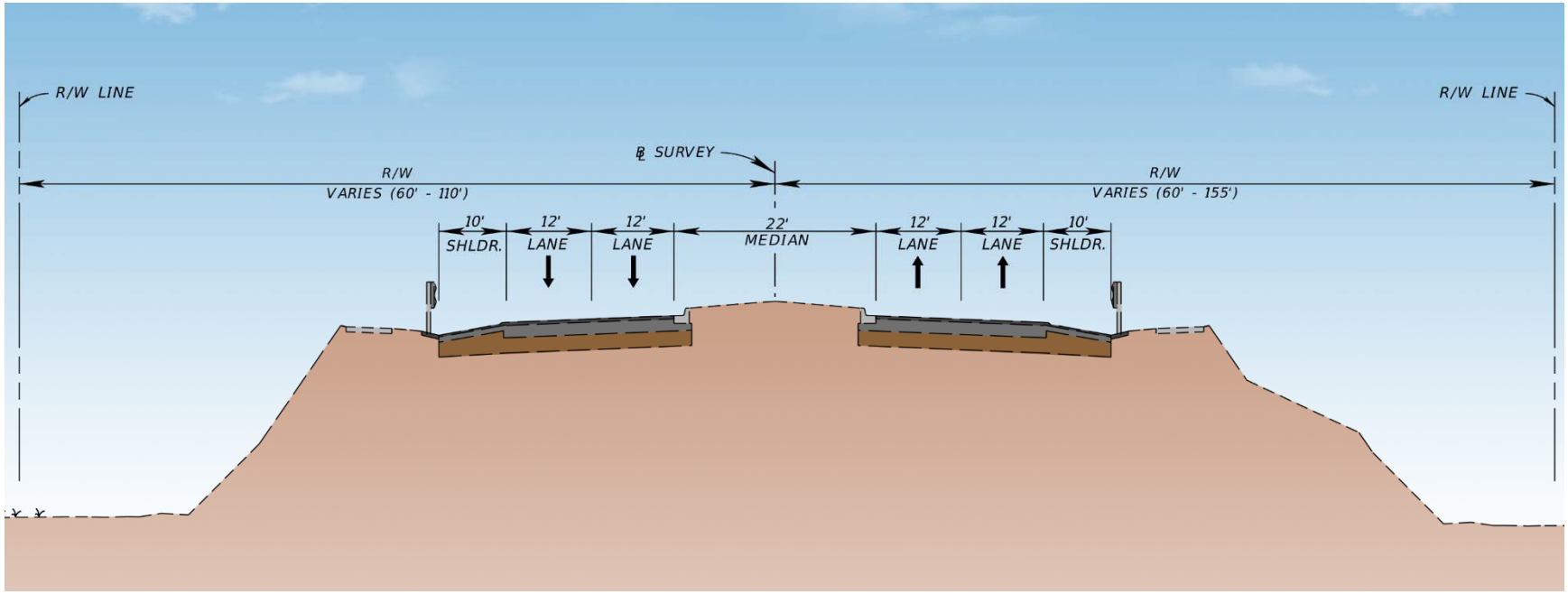
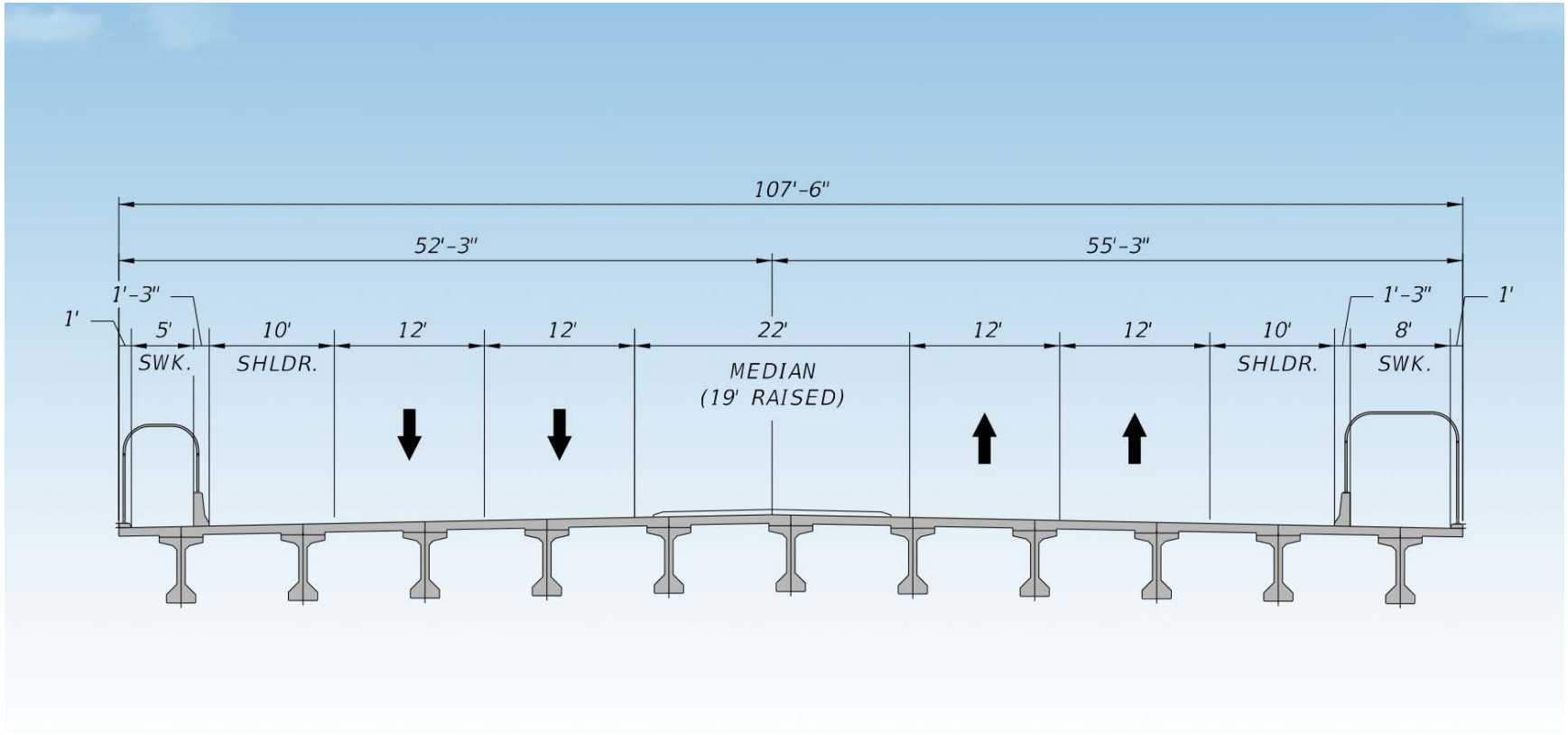


Figure 2-4 – Existing Central Boulevard Bridge Typical Section



2.2 Existing Right-of-Way

According to right-of-way maps prepared for the project, the existing SR 9/I-95 mainline limited access right-of -way is 300 feet from north of Northlake Boulevard to north of Burns Road approaching PGA Boulevard. The right-of-way widens substantially south of PGA Boulevard to north of Military Trail to accommodate the interchange. From north of PGA Boulevard to south of Donald Ross Road, SR 9/I-95 mainline limited access right-of-way varies from approximately 300 to 375 feet. Existing right-of-way on Central Boulevard varies from an average of 300 feet west of SR 9/I-95 to 240 feet east of SR9/I-95.

2.3 Land Use

As shown in **Figure 2-5**, the project study area encompasses a mixture of land use classifications:

- Agricultural
- Commercial
- Conservation
- Golf
- Industrial
- Mixed Use
- Public / Institutional
- Professional Office
- Recreational
- Residential
- Vacant Land

The current land use along the project corridor is mainly open space/vacant land from Donald Ross Road to Hood Road. From south of Hood Road to the end of the project limits, the area is predominantly open space/vacant land and low density residential. A private golf course (Old Palm Golf Club) is also located within this area.

2.4 Horizontal and Vertical Alignments

Horizontal Alignment

The existing horizontal alignment of I-95 was evaluated to determine if the existing facility meets the current design standards for horizontal curves and sight distance. The design elements evaluated included curve radius, curve length, stopping sight distance (SSD), and super-elevation of the roadway surface.

The mainline alignment contains one horizontal curve within the study limits. The radius of this horizontal curve meets current FDOT and American Association of State Highway and Transportation Officials (AASHTO) criteria for a 70 MPH design speed. **Table 2.1** summarizes the geometric characteristics for the existing horizontal alignment. Based on the current design standards for

Table 2.1: Existing Horizontal Alignment Geometric Characteristics

Location/ Adjacent Cross Road	Station	Radius of Curve (ft)	Length of Curve (ft)	Degree of Curve (D)	Defelction Angle Δ	Super-elevation e	SSD Value	SSD Required for 70 MPH Interstate Florida PPM		SSD Required for 70 MPH AASHTO	
North of Burns Road	PC 1922+38.78 PI 1933+41.02 PT 1943+84.96	3,819.83	2,146.18	1°30'00"	32°11'30" (LT)	0.054	742	820	✗	730	✓

Figure 2-5 – Existing Land Use

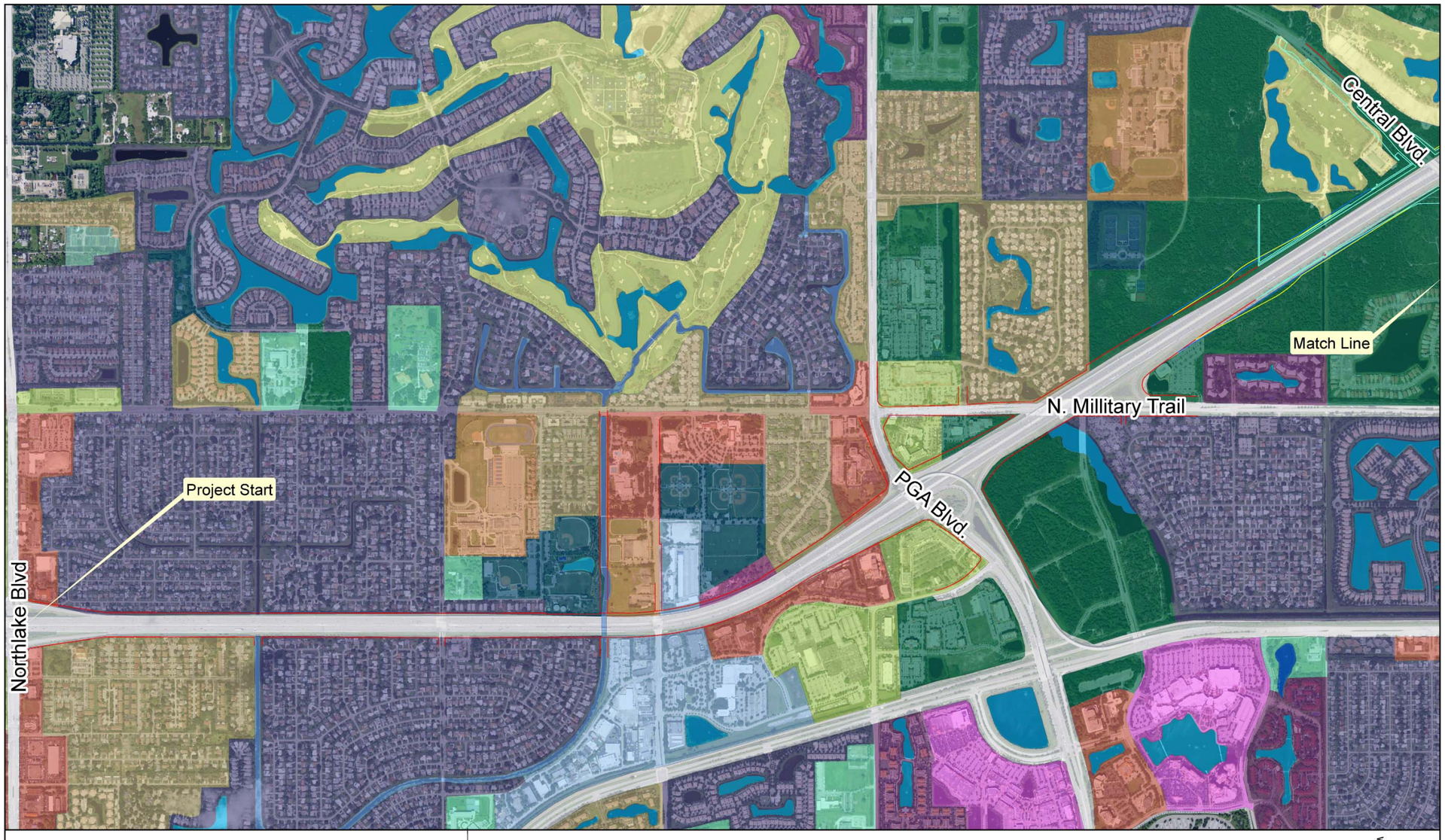
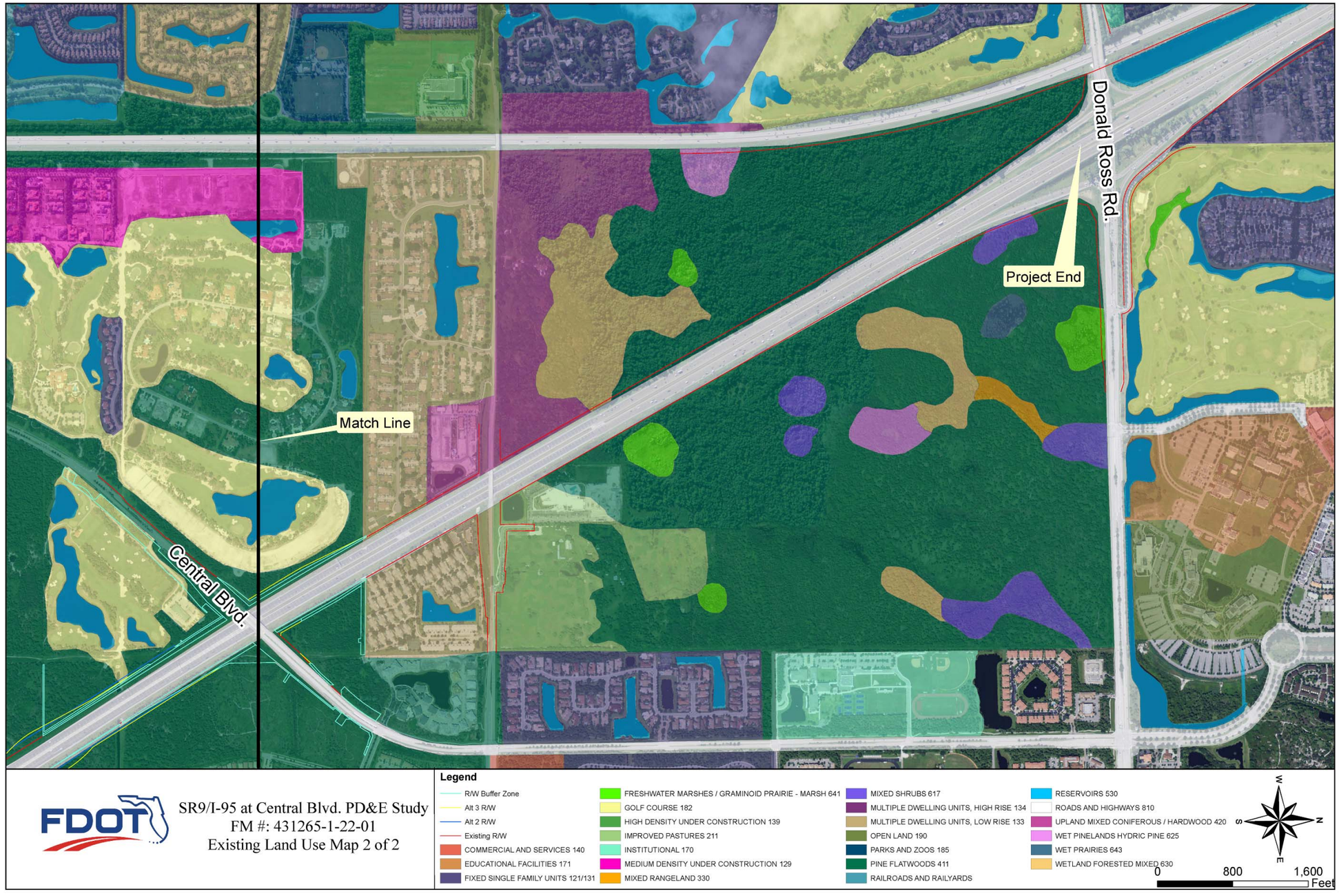


Figure 2-5 – Existing Land Use (Continued)



horizontal curves and sight distance, **Table 2.1** shows that the horizontal curve does not meet stopping sight distance requirements for the Florida Plans and Preparation Manual (PPM).

Vertical Alignment

The existing vertical alignment was evaluated to determine if the existing facilities meet the current design standards for vertical curves and sight distance. The following components were verified during the review: percent grade, changes in grade, SSD, length of vertical curve, and K value.

The K value of a vertical curve can be defined as the length of the curve divided by the change in grade of the curve. The minimum K value according to the PPM Volume I, Chapter 2, Section 2.8.2, is based on a minimum SSD requirement. If the curve K value meets the minimum criteria, the SSD criterion is also met. The minimum K value assigned to a crest vertical curve is based on the driver's ability to see over the curve, while for a sag vertical curve the K value is based on the headlight illumination distance. The minimum lengths of the vertical curves and the percent grades were also verified against the criteria in Section 2.8.2 of the PPM. **Table 2.2** summarizes the vertical alignment data.

The current as-built plans and existing roadway survey illustrate the presence of a split profile grade line (PGL), an independent PGL for each direction, along I- 95 from south of Northlake Boulevard (Station 1846+07.44) to south of Donald Ross Road (Station 150+00). Within the limits of the spilt PGL, the corridor has five crest vertical curves and ten sag vertical curves. Twelve roadway grade separations and a pedestrian overpass exist within the limits of the study along the corridor and are listed below:

- I-95 over Northlake Boulevard
- I-95 over Earman Canal
- I-95 over Holly Drive
- I-95 over Thompson Canal
- I-95 over Burns Road
- I-95 over PGA Boulevard
- PGA Boulevard flyover ramp over I-95
- I-95 over Military Trail
- I-95 over canal south of Central Boulevard
- Central Boulevard over I-95
- Hood Road over I-95
- I-95 over Donald Ross Road

2.5 Pedestrian Accommodations

Pedestrians are not permitted on limited access roadways. Accordingly, no pedestrian facilities occur on I-95. Pedestrian facilities do occur on the following connecting streets within the project corridor.

- Central Boulevard from PGA Boulevard to Donald Ross Road – sidewalks on both sides
- PGA Boulevard
    - Florida Turnpike to I-95 Ramps – sidewalks on both sides
    - I-95 Ramps to Lake Victoria Gardens Boulevard – sidewalk only on south side

Table 2.2: Existing Vertical Alignment Geometric Characteristics

Location/ Adjacent Cross Road	Type of Curve	VPI Station	VPI Elevation (ft)	PGL High / Low (ft)	Grade (Back) %	Grade (Ahead) %	Length of Curve (ft)	Length Required for Interstate		K-Value	K-Value Required for 70 MPH Interstate		K-Value Required for 70 MPH AASHTO	
Northlake Boulevard	Sag	1833 + 20.00	16.62	16.69	0.00	0.97	60	800	✗	62	181	✗	157	✗
	Sag	1834 + 48.35	16.62	18.72	0.00	3.00	560	800	✗	187	181	✓	157	✓
	Crest	1847 + 09.35	54.45	40.95	3.00	-3.00	1,800	1,800	✓	300	401	✗	193	✓
	Sag	1859 + 69.68	16.64	18.71	-3.00	-0.05	560	800	✗	190	181	✓	157	✓
Holly Drive	Sag	1888 + 62.92	16.15	17.80	0.05	2.80	480	800	✗	175	181	✗	181	✓
	Crest	1900 + 03.94	48.10	36.20	2.80	-2.80	1,700	1,800	✗	304	401	✗	193	✓
	Sag	1913 + 14.42	11.41	17.71	-2.80	2.80	900	800	✓	161	181	✗	157	✓
Burns Road	Crest	1926 + 85.61	50.30	38.40	2.80	-2.80	1,700	1,800	✗	304	401	✗	193	✓
	Sag	1938 + 43.95	17.87	19.61	-2.80	0.10	480	800	✗	166	181	✗	157	✓
	Sag	1947 + 50.00	18.80	19.79	0.10	1.68	500	800	✗	316	181	✓	157	✓
PGA Boulevard	Sag	1950 + 65.00	22.90	22.95	1.66	1.99	130	800	✗	394	181	✓	157	✓
	Crest	1955 + 20.00	31.97	31.27	1.99	0.96	540	1,000	✗	524	401	✓	193	✓
	Sag	1970 + 00.00	35.40	36.45	-0.70	0.70	600	800	✗	429	181	✓	157	✓
Military Trail	Crest	1984 + 00.00	45.20	40.03	0.70	-1.60	1,800	1,800	✓	783	401	✓	193	✓
	Sag	45 + 43.51	19.73	21.33	-1.60	0.00	800	800	✓	500	181	✓	157	✓

- Military Trail
  - PGA Boulevard to Garden Square Shoppes – existing sidewalk on both sides
  - Garden Square Shoppes to Elm Avenue – Existing sidewalk on east side only
  - Elm Avenue to Donald Ross Road – Existing sidewalk on both sides

2.6 Bicycle Facilities

Bicyclists are not permitted on limited access roadways. Accordingly, no bicycle facilities occur on I-95. No designated bicycle lanes are present on connecting roadways within the project limits. However, shoulders that could be used by bicycles do occur on Northlake Boulevard, PGA Boulevard, Donald Ross Road, Military Trail, and Hood Road, east of Central Boulevard. No shoulders occur on North Central Boulevard and Hood Road, west of Central Boulevard.

2.7 Lighting

The existing lighting along the corridor consists of 250-W and 400-W High Pressure Sodium (HPS) luminaires on standard aluminum poles. The pole mounting height varies from 40 to 50 feet. The light poles are located on the median barrier wall throughout the mainline at an approximate spacing of 270 feet. At the interchanges, the light poles are located outside the shoulder. The roadway lighting is maintained by FDOT under a maintenance contract. All of the interchange bridges have a lighting feature under the deck. Overpasses that do not connect to I-95 via an interchange do not have lighting under the deck.

2.8 Existing Intersections and Traffic Signals

Twenty-five intersections were analyzed within the project limits. Twenty-one of these intersections are signalized and four intersections are stop-controlled. Existing intersections within the project corridor are listed in **Table 2.3**.

2.9 Design and Posted Speeds

According to FDOT roadway plans for the existing facility, the design speed along I-95 within the project limits is 70 MPH. The existing posted speed is 65 MPH from Northlake Boulevard to south of Central Boulevard, and 70 MPH from Central Boulevard to Donald Ross Road. The Design Speed for the proposed improvements on I-95 is 70 MPH. The posted speed on Central Boulevard is 45 MPH.

2.10 Railroad Crossings

There are no existing railroad crossings within the project limits. However, the Tri-Rail and Florida East Coast (FEC) rail line operate in the project vicinity. The northern terminus of Tri-Rail is the Mangonia Park station, which is located approximately seven miles south of the PGA Boulevard interchange. Palm Tran Route 20 provides service from Mangonia Park station north to the Gardens Mall. The FEC rail line runs parallel to, and just west of A1A. Within the project limits, it passes underneath PGA Blvd. There are at grade railroad crossings at Donald Ross Road, Hood Road and Kyoto Gardens Drive. Two future types of passenger service are proposed on the FEC track.

Coastal Link Service

Tri-Rail Coastal Link is a proposed commuter service on the FEC line for which the PD&E phase will commence in late 2013. The SFRTA publication *Tri-Rail Coastal Link Station Area Opportunities, April 2013,* shows a proposed station at PGA Blvd.

All Aboard Florida

All Aboard Florida is one of four business lines overseen by Florida East Coast Industries (FECI). FECI will operate the Brightline intercity passenger rail service on the FEC track, providing three-hour service from Miami to Orlando. A new station is proposed between Datura and Evernia Streets, about 11 miles from the study area.

Table 2.3: Existing Intersections within the Project Limits

Corridor	Intersection	Signalized (Yes / No)
Central Boulevard	Central Boulevard and Victoria Falls Boulevard	No
	Central Boulevard and 117th Court	Yes
Hood Road	Hood Rd and Eastpointe Boulevard	No
	Hood Rd and Central Boulevard	Yes
	Hood Rd and North Military Trail	Yes
Northlake Boulevard	Northlake Boulevard and Keating Drive	Yes
	Northlake Boulevard and I-95 West Ramp	Yes
	Northlake Boulevard and I-95 East Ramp	Yes
	Northlake Boulevard and Roan Lane	Yes
	Northlake Boulevard and Sandtree Drive	Yes
Donald Ross Road	Donald Ross Rd and 64th Dr N-E Pointe Court	No
	Donald Ross Rd and West Ramp	Yes
	Donald Ross Rd and East Ramp	Yes
	Donald Ross Rd and Parkside Drive	Yes
	Donald Ross Rd and Central Boulevard	Yes
	Donald Ross Rd and North Military Trail	Yes
North Military Trail	North Military Trail and Kyoto Gardens Drive	Yes
PGA Boulevard	PGA Boulevard and FL Turnpike	Yes
	PGA Boulevard and Central Boulevard	Yes
	PGA Boulevard and North Military Trail	Yes
	PGA Boulevard and West Ramps	Yes
	PGA Boulevard and NB OFF Ramps	Yes
	PGA Boulevard and RCA Boulevard	No
	PGA Boulevard and Lake Victoria Gardens	Yes
Lake Victoria Gardens	PGA Passage and Lake Victoria Gardens	Yes

2.11 Drainage

Nine drainage basins occur within the project limits. Each basin is described below. Basin maps and additional drainage information can be found in the *Location Hydraulics Report* prepared for this study and published separately.

Basin 1

This drainage basin encompasses I-95 northeast of PGA Boulevard (SR 786) from station 19+45.00 to approximately station 19+65.25. Basin 1 includes an area of 273.5 acres. Runoff from Basin 1 outfalls through sheet flow into a cross drain beneath I-75, south of PGA Boulevard and through outfall control structures on the ponds at the northeast quadrant of the interchange with pipes beneath PGA Boulevard toward a road side ditch. This ditch ultimately outfalls to an existing 48-inch pipe southeast of the intersection of I-95 and PGA Boulevard of I-95 (See **Photo 1 below**).

Photo 1- Drainage Basin 1, Existing 48" Pipe



Basin 2

This drainage basin encompasses I-95 north of PGA Boulevard (SR 786) to approximately 1,500 feet from intersection with North Military Trail (SR 809). Basin 2 includes an area of 47.18 acres and is approximately defined from station 19+45.00 to station 49+50.00. Runoff from basin also sheet flows into an existing 36- inch pipe northeast of intersection of I-95 and PGA Boulevard and discharges into an adjacent canal northeast of I-95. Moreover, the basin includes discharge from North Military Trail to northeast of I-95 through a pipe system ultimately flowing into a local canal.

Basin 3

This drainage basin encompasses I-95 from 1500 feet northwest of North Military Trail (SR 809) to the intersection with Central Boulevard. Basin 3 has an area of 23.02 acres and is approximately defined from I-95 station 49+50.00 to station 85+00.00. Runoff from basin 3 sheet flows along I-95 toward an existing 84-inch cross-drain that provides continuity to a local canal crossing I-95 (**See Photo 2, below**).

Basin 4

This drainage basin encompasses I-95 southbound from the intersection with Central Boulevard to Hood Road. Basin 4 includes an area of 9.65 acres and is approximately defined from I-95 station 85+00.00 to station 114+00.00. Runoff from basin 4 sheet flows along I-95 into a ditch concrete weir adjacent to southwest of Hood Road, which drains away from I-95.

Photo 2 - Drainage Basin 3, Control Weir



Basin 5

This drainage basin encompasses I-95 northbound from the intersection with Central Boulevard to Hood Road. Basin 5 includes an area of 15.12 acres and is approximately defined from I-95 station 85+00.00 to station 114+00.00. Runoff from Basin 5 sheet flows through I-95 into a concrete weir adjacent to southeast of Hood Road, which drains away from I-95.

Basin 6

This drainage basin encompasses I-95 from the intersection with Hood Road to approximately 2000 feet south of the intersection with Donald Ross Road. Basin 6 includes an area of 47.71 acres and is approximately defined from I-95 station 114+00.00 to station 169+00.00. Runoff from Basin 6 sheet flows along either side of I-95 into an existing 60 inch cross-drain that provides continuity to a local canal across I-95.

Basin 7

This drainage basin encompasses the southbound of I-95 southeast of Donald Ross Road. Basin 7 includes an area of 13.90 acres and is approximately defined from station 169+00.00 to station

189+00.00. Runoff from Basin 7 contributes into an adjacent swale southwest of the intersection of I-95 and Donald Ross Road. The swale has a concrete wall, which runs along the right-of-way of I-95.

Basin 8

This drainage basin encompasses the northbound of I-95 southeast of Donald Ross Road. Basin 8 includes an area of 19.29 acres and is approximately defined from of I-95 station 169+00.00 to station 189+00.00. Runoff from Basin 8 flows directly into an existing ditch southwest of intersection of I-95 and Donald Ross Road.

Basin 9

This drainage basin encompasses I-95 north of Donald Ross Road. Basin 9 includes an area of 68.92 acres and is approximately defined from station 189+00.00 to station 229+00.00. Runoff from Basin 9 discharges into a pond on the northwest side of the interchange through a concrete weir. The berm along the I-95 southbound exit ramp has a breach that needs repairing. The existing pond outfalls through a control with structure skimmer and flows through an existing pipe across I-95. Basin 9 ultimately discharges directly into a swale northeast of intersection of I-95 and Donald Ross Road.

2.12 Traffic Data

A detailed traffic analysis was conducted as part of the Interchange Justification Study conducted for this project prior to commencement of the PD&E study. An analysis of traffic operations included the collection of existing geometric conditions, AM and PM peak hour turning movements, and AM and PM peak hour I-95 mainline, ramp, and arterial volumes.

A detailed AM and PM peak hour capacity and Level of Service (LOS) analysis was performed using the latest version of Trafficware's Synchro software (Synchro 8) utilizing the methodologies outlined in the Highway Capacity Manual, 2010 edition (HCM 2010). A vehicular queuing analysis was performed to determine if turn bay lengths were adequate for the queues that develop. The existing AM and PM peak hour operating conditions for the I-95 mainline sections were analyzed using Highway Capacity Software 2010, based on Highway Capacity Manual 2010 methodology. The Freeway Facilities module was used, which combines mainline segments and ramps.

The results of this analysis are included in the *I-95 at Central Boulevard Interchange Justification Report*, dated October 13, 2015, published separately. This report documents the traffic counts compilation, process and locations. The report also documents existing field conditions and other operational information along the corridor.

2.13 Crash Data

An analysis of FDOT Crash Reporting System (CAR) crash data for I-95, PGA Blvd. between the Florida Turnpike and Victoria Gardens, and Military Trail between PGA Blvd and Donald Ross Blvd was performed. The raw data was obtained from FDOT District 4. The crash rates, calculated spot safety ratios and confidence levels for the years 2009 through 2013 for the PGA Boulevard corridor, the Military Trail corridor, and the I-95 mainline are presented in **Tables 2.4 through 2.6.** According to the Highway Safety Improvement Guidelines (HSIG), locations with a confidence level greater than 99.95% for urban facilities and safety rations greater than 1.0 are regarded as experiencing abnormally high crash rates.

As shown in **Tables 2.4 through 2.6** the calculated confidence levels and safety ratios indicate that PGA Boulevard, Military Trail and I-95 within the study limits did not experience a greater frequency of crashes than would typically be anticipated on similar facilities during the five-year review period.

Table 2.4: I-95 Corridor Crash Rates

Year	Number of Crashes	ADT	Actual Crash Rate (ACR)	District 4 Average Crash Rate (A)	Average Vehicle Exposure (M)	Critical Crash Rate (CCR)	Safety Ratio	Statistical Significance	Confidence Level
2009	147	108,372	0.548	0.936	268.228	1.129	0.486	-6.536	0.0000%
2010	234	145,659	0.649	0.722	360.515	0.868	0.748	-1.599	5.4947%
2011	170	142,346	0.483	0.645	352.316	0.784	0.615	-3.764	0.0084%
2012	123	124,788	0.398	0.771	308.858	0.934	0.426	-7.428	0.0000%
2013	173	113,744	0.615	0.888	281.524	1.071	0.574	-4.838	0.0001%

LEGEND	
ADT:	Average Daily Traffic
ACR:	Actual Crash Rate = No. of crashes in a year / Average Vehicle Exposure (M)
M:	Average Vehicle Exposure (million vehicles or million vehicles miles) = [(ADT * 365 * L) / 1,000,000
L:	Length of the Segment for Segment Analysis, 1 for Spot Analysis
A:	Average Crash Rate
CCR:	Critical Crash Rate = A + K * (SQRT[A/M]) - (1/[2 * M]) (Ref: FDOT Highway Safety Improvement Program Guidelines)
K:	3.291 for Urban, 1.960 for Suburban, 1.645 for Rural
Safety Ratio:	ACR/CCR
Statistical Significance:	(ACR - A + (1/2M))/SQRT(A/M)
Confidence Level:	Percent probability that the crash rate is abnormally high for the location under study, using the district-wide average as a basis.

Table 2.5: PGA Boulevard Corridor Crash Rates

Year	Number of Crashes	ADT	Actual Crash Rate (ACR)	District 4 Average Crash Rate (A)	Average Vehicle Exposure (M)	Critical Crash Rate (CCR)	Safety Ratio	Statistical Significance	Confidence Level
2009	95	34,383	2.846	3.015	33.382	3.989	0.713	-0.513	30.3923%
2010	97	46,762	2.137	2.986	45.401	3.819	0.559	-3.270	0.0539%
2011	60	46,325	1.334	3.062	44.977	3.910	0.341	-6.580	0.0000%
2012	103	46,587	2.277	3.570	45.231	4.484	0.508	-4.562	0.0003%
2013	120	46,174	2.677	4.085	44.830	5.067	0.528	-4.628	0.0002%

LEGEND	
ADT:	Average Daily Traffic
ACR:	Actual Crash Rate = No. of crashes in a year / Average Vehicle Exposure (M)
M:	Average Vehicle Exposure (million vehicles or million vehicles miles) = [(ADT * 365 * L) / 1,000,000]
L:	Length of the Segment for Segment Analysis, 1 for Spot Analysis
A:	Average Crash Rate
CCR:	Critical Crash Rate = A + K * (SQRT[A/M]) - (1/[2 * M]) (Ref: FDOT Highway Safety Improvement Program Guidelines)
K:	3.291 for Urban, 1.960 for Suburban, 1.645 for Rural K = 3.291
Safety Ratio:	ACR/CCR
Statistical Significance:	(ACR - A + (1/2M))/SQRT(A/M)
Confidence Level:	Percent probability that the crash rate is abnormally high for the location under study, using the district-wide average as a basis.

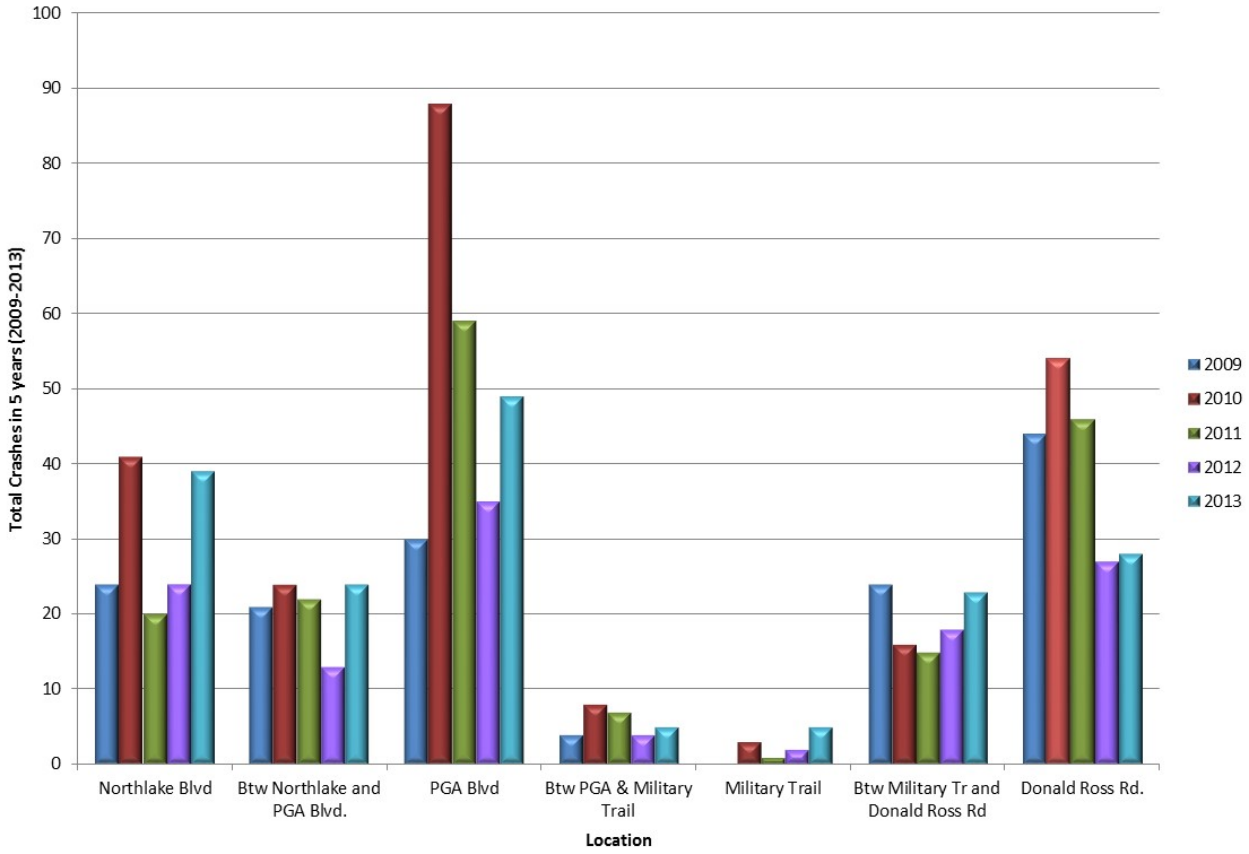
Table 2.6: Military Trail Corridor Crash Rates

Year	Number of Crashes	ADT	Actual Crash Rate (ACR)	District 4 Average Crash Rate (A)	Average Vehicle Exposure (M)	Critical Crash Rate (CCR)	Safety Ratio	Statistical Significance	Confidence Level
2009	16	36,438	0.391	3.015	40.950	3.896	0.100	-9.627	0.0000%
2010	11	32,500	0.301	2.986	36.525	3.913	0.077	-9.342	0.0000%
2011	4	42,000	0.085	3.062	47.201	3.890	0.022	-11.648	0.0000%
2012	9	33,000	0.243	3.570	37.087	4.578	0.053	-10.681	0.0000%
2013	25	31,500	0.706	4.085	35.401	5.189	0.136	-9.905	0.0000%

LEGEND	
ADT:	Average Daily Traffic
ACR:	Actual Crash Rate = No. of crashes in a year / Average Vehicle Exposure (M)
M:	Average Vehicle Exposure (million vehicles or million vehicles miles) = [(ADT * 365 * L) / 1,000,000]
L:	Length of the Segment for Segment Analysis, 1 for Spot Analysis
A:	Average Crash Rate
CCR:	Critical Crash Rate = A + K * (SQRT[A/M]) - (1/[2 * M]) (Ref: FDOT Highway Safety Improvement Program Guidelines)
K:	3.291 for Urban, 1.960 for Suburban, 1.645 for Rural K = 3.291
Safety Ratio:	ACR/CCR
Statistical Significance:	(ACR - A + (1/2M))/SQRT(A/M)
Confidence Level:	Percent probability that the crash rate is abnormally high for the location under study, using the district-wide average as a basis.

Figure 2-6 provides a breakdown of the 847 crashes by location along the I-95 corridor within the study area. More detailed analyses of crash data can be found in the *I-95 at Central Boulevard Interchange Justification Report*, dated October 13, 2015, published separately.

Figure 2-6: I-95 Corridor Crash Distribution by Location



2.14 Utilities

Several utilities are located with the study corridor. **Table 2.7** lists the existing utility owner and contact information for the 21 utility companies identified in the project area.

Table 2.7: Existing Utility Companies

Existing Utility Companies			
Utility	Owner	Contact	Phone
Communications	AT&T	Greg Jacobson	(813)342-0512
	AT&T Distribution	Robert Lowen	(561) 329-5451
	Belcan Engineering Group	Russell Moore	(561) 627-7234
	CenturyLink	Allen Aten	(850) 599-1257
	Comcast PBG	Anthony Springsteel	(772) 321-3425
	Fiberlight LLC	Troy Gaeta	(954) 422-5618
	FPL Fibernet LLC	Danny Haskett	(786) 246-7827
	Level 3 Communications	Jake Jacobson	(954) 218-6359
	MCI (Verizon)	Chuck Czumak	(941) 906 6703
	Sprint Nextel	Mark Caldwell	(321) 287-9942
	Windstream Communications	Locate Desk	(800) 289-1901
Electrical	FDOT Palm Beach	Katherine Rico	(954) 847-2680
	FPL Palm Beach	Michael Fetto	(561) 575-6302
	FPL Subaqueous	George Sanchez	(561) 616-1612
	FPL Transmission	Seyeh Hajassadollah	(305) 495-8601
	Systems Integration & Maintenance Inc	Michael Collier	(305)624-1113
Gas	Florida Gas Transmission WPB	Joseph Sanchez	(832) 444 7158
	Teco Peoples Gas Palm Beach	Max Chamorro	(954) 453-0812
Municipal	Palm Beach County Traffic Operations	Rod Friedel	(561) 681-4371
	Seacoast Utility Authority	Thomas Skoran	(561) 627-2900
	Town of Jupiter / Jupiter Water Systems	Lee Harding	(561) 748-2705

A request was made to all 21 companies for additional detail. Nine companies responded.

Approximately 59 utility crossings have been noted within the study limits, most commonly found in and around interchanges and overpasses. The utility and crossing locations are summarized below:

Above ground electric transmission crossings (3):

- FPL Fibernet at Shady Lakes Boulevard
- FPL Fibernet at Central Boulevard in the southeast, east, and northeast quadrant
- FPL Fibernet at Donald Ross Road

Above ground electric distribution crossings (2):

- 23 kV at Central Boulevard in the east quadrant
- 23 kV at Central Boulevard in the north quadrant

Gas utility crossings (2):

- 18-inch at Florida Turnpike crossing Donald Ross
- 12-inch at Florida Turnpike crossing Donald Ross

Force main sanitary sewer utility crossings (16):

- 20-inch located north of Northlake Boulevard
- 18-inch located north of Northlake Boulevard
- 20-inch located south of Burns Road
- 12-inch located at the canal, south of Burns Road
- 8-inch located at the canal, south of Burns Road
- 12-inch located on the north side of Burns Road
- 10-inch located south of PGA Boulevard
- 24-inch located on the south side of PGA Boulevard
- 30-inch located on the south side of PGA Boulevard and west of I-95
- 30-inch located on the south side of PGA Boulevard and underneath I-95
- 16-inch located on the south side of PGA Boulevard and underneath I-95
- 30-inch located on the south side of PGA Boulevard and east of I-95
- 18-inch located on the west side of PGA Boulevard and underneath I-95
- 30-inch at Central Boulevard
- 12-inch located on the south side of Central Boulevard and east of I-95
- 6-inch located south of Hood Road

Water line utility crossings (20):

- Town of Jupiter Water Systems located at Heights Boulevard
- Town of Jupiter Water Systems located at 64th Way North
- 24-inch at Northlake Boulevard
- 24-inch located at the canal, north of Northlake Boulevard
- 14-inch located at Holly Drive
- 16-inch located at the canal, south of Burns Road
- 10-inch located on the south side of Burns Road
- 20-inch located on the north side of Burns Road
- 24-inch located south of PGA Boulevard

- 14-inch located on the south side of PGA Boulevard
- 12-inch located along the west side of I-95, at Military Trail
- 24-inch located at Military Trail
- 16-inch located on pathway before I-95 and Central Boulevard
- 18-inch located on pathway before I-95 and Central Boulevard
- 16-inch located at Central Boulevard
- 10-inch located at Central Boulevard
- 24-inch located between Central Boulevard and Hood Road
- 36-inch located between Central Boulevard and Hood Road
- 24-inch located south of Hood Road
- 12-inch located at Donald Ross Road

Buried electric distribution crossings (4):

- 13 kV at PGA Boulevard
- 23 kV at Central Boulevard in the southeast quadrant
- 23 kV at Central Boulevard in the northeast quadrant
- 23 kV at Hood Road

Buried communication line crossings (12):

- SunGuide located along I-95 from Northlake Boulevard to PGA Boulevard
- FPL Fibernet located west of I-95, south of Burns Road
- FPL Fibernet at Burns Road
- FPL Fibernet at PGA Boulevard
- PBC Traffic at Northlake Boulevard
- PBC Traffic at Burns Road
- PBC Traffic at PGA Boulevard
- PBC Traffic at Military Trail
- PBC Traffic at Donald Ross Road
- PBC Traffic at Florida Turnpike crossing Donald Ross
- Seacoast Utility located at the canal, south of Burns Road
- Windstream Communication at PGA Boulevard

2.15 Soils

Soil types within the study area are listed in Table **2.8** and shown in Figure **2-7**

2.16 Existing Bridges

There are 10 existing bridges and 2 existing concrete bridge culverts located within the study limits (see **Table 2.9** for structure locations).

- Six bridges along the I-95 mainline traversing surface streets
- Four bridges over I-95
- One triple cell bridge culvert along the I-95 mainline
- One double cell bridge culvert along the I-95 mainline

It should be noted that there is an ongoing Palm Beach County project (County Project No. 2013522) which includes construction of a new eastbound Hood Road Bridge over I-95. For the purposes of this evaluation, that bridge is considered to be "existing."

The following data were collected and analyzed for each structure: location, geometrics, alignment, type of structure, and condition. **Table 2.9** identifies the characteristics of the existing bridges along the I-95 study corridor and the following sections summarize the structures within the study area.

Table 2.8
Soil Types Within the Study Area

Soil Types	*Hydric Classifications*	*Acres*
Anclote Fine Sand	Hydric	7.11
Arents-Urban Land Complex	Not Hydric	18.96
Basinger Fine Sand	Hydric	39.2
Basinger and Myakka Sands	Hydric	60.85
Floridana	Hydric	0
Hobe	Not Hydric	0
Holopaw Fine Sand	Hydric	3.1
Immokalee Fine Sand	Not Hydric	58.24
Jonathan	Not Hydric	0
Kesson	Hydric	0
Myakka Fine Sand	Not Hydric	69.99
Myakka, Urban Land Complex	Not Hydric	21.00
Nettles	Not Hydric	0
Okeelanta Muck	Hydric	1.2
Oldsmar Sand	Not Hydric	9.15
Pineda	Hydric	0
Pinellas Fine Sand	Not Hydric	0.21
Pits	unranked	0
Placid	Hydric	0
Pomello	Not Hydric	0
Pompano	Hydric	0
Riviera	Hydric	0
Sanibel Muck	Hydric	1.05
St. Lucie	Not Hydric	0
Tequesta	Hydric	0
Udorthents	Not Hydric	0
Urban Land	unranked	3.3
Wabasso Fine Sand	Not Hydric	25.19

Table 2.8
Soil Types Within the Study Area

Soil Types	*Hydric Classifications*	*Acres*
Water	Hydric	0.02
Waveland and Lawnwood Fine Sands, Depressional	Hydric	0
Waveland and Immokalee Fine Sands	Not Hydric	0
Winder Sand, Depressional	Hydric	0
Winder Fine Sand	Hydric	0

Figure 2-7 – Soil Types within the Study Area

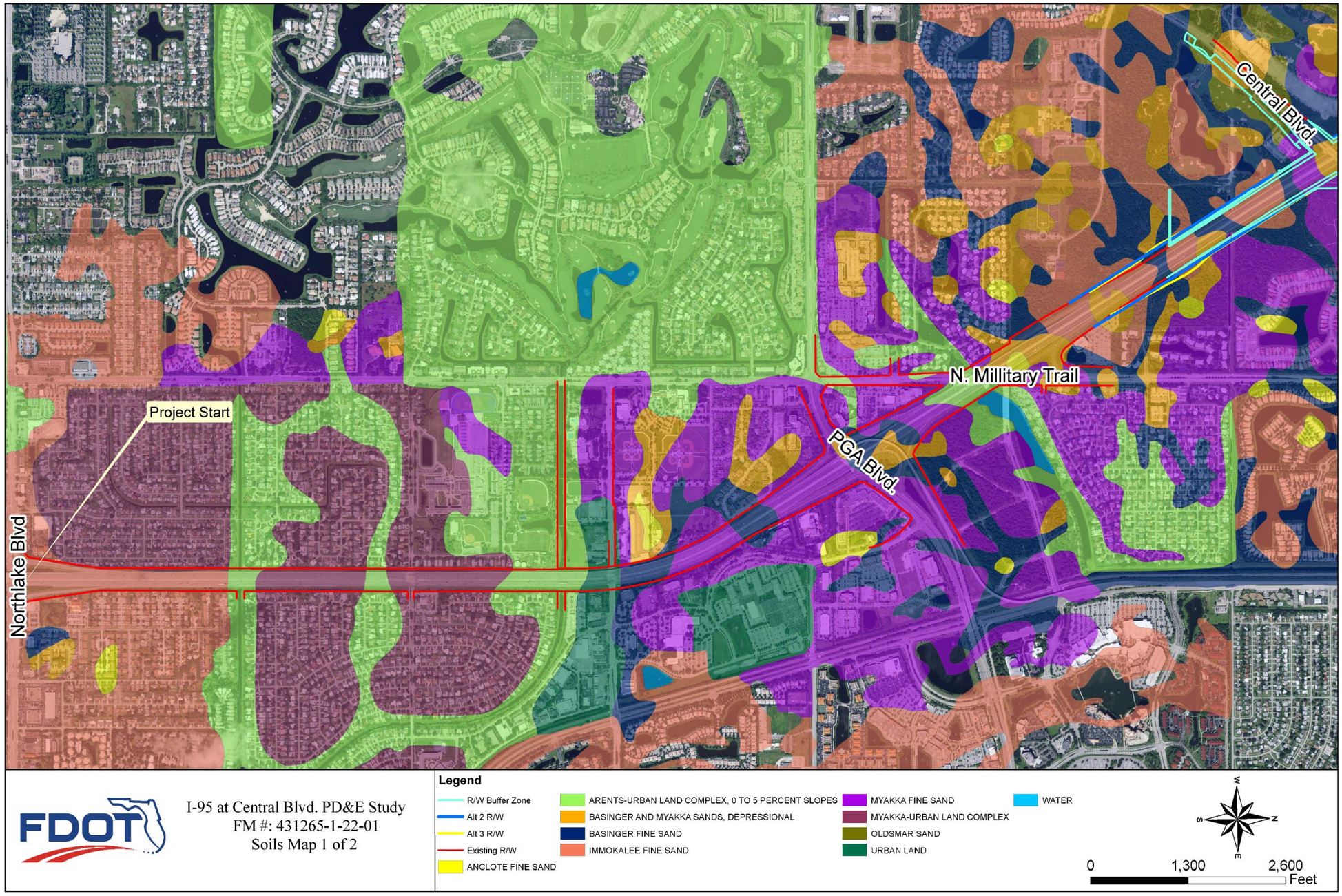


Figure 2-7 – Soil Types (Continued)

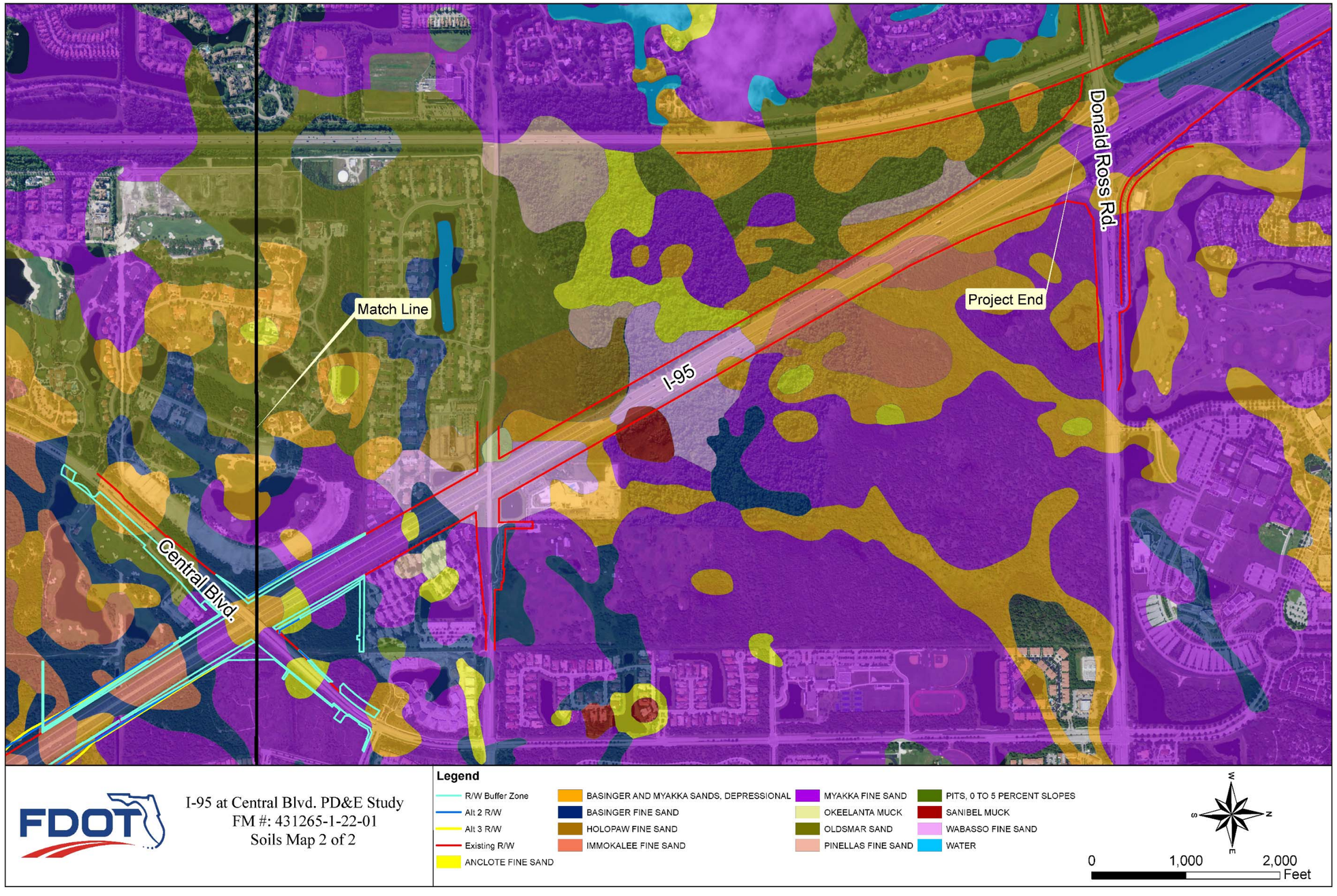


Table 2.9 – Existing Bridge Characteristics

LOCATION			GEOMETRICS			ALIGNMENT				STRUCTURAL				CONDITION					
Bridge ID No.	Bridge Location	Direction	Structure Length (ft)[2]	Deck Width (ft)[2]	No. of Lanes	Skew Angles (Degrees) [2]	Horizontal Clearance[2]		Min. Vertical Clearance[2]	Number of Spans[2,3]	Max. Span (ft)[2]	Superstructure Type[2,3]	Substructure Type[2,3]	Year Built / Widened[1]	Sufficiency Rating (%)[1]	Health Index (%)[1]	Inspection Date[1]	Number of Docu-mented Hits	Significant Defic-iencies[1,3]
							Inside (LF)	Outside (RT)											
930178	I-95 over Earman Canal	Northbound and Southbound	37'-8"	-	11	90	-	-	-	-	-	Triple Box Culvert (3) 10' x 12' x 236'	-	1967 / 2004	76.2	73.6	5/27/2014	-	-
930517	I-95 over Holly Drive	Northbound and Southbound	120'-0"	195'-1"	11	90	-	30'-6"	17.15	1	120'-0"	Prestressed Concrete Girder	Retaining Wall Abutment	2006	85	100	6/11/2015	-	None
-	I-95 over Thompson canal	Northbound and Southbound	37'-0"	-	11	96	-	-	-	-	-	Double Box Culvert (2) 7' x 12' x 220'	Precast Prestressed Concrete Piles	-	-	-	-	-	None
930518	I-95 SB over Burns Rd.	Southbound	120'-0"	103'-6"	6	83	-	22'-0"	17.32	1	120'-0"	Prestressed Concrete Girder	Retaining Wall Abutment	2004	85	100	6/10/2015	-	None
930521	I-95 NB over Burns Rd.	Northbound	120'-0"	91'-6"	5	83	-	22'-0"	17.32	1	120'-0"	Prestressed Concrete Girder	Retaining Wall Abutment	2004	85	99.9	10/6/2015	-	None
930335	I-95 SB over PGA Blvd.	Southbound	221'-3"	91'-6"	5	18	13'-3"	-	16.14	2	117'-3"	Prestressed Concrete Girder	Multi-Column Pier	1978 / 2011	86.8	98.6	3/24/2014	-	None
930336	I-95 NB over PGA Blvd.	Northbound	224'-0"	103'-6"	6	18	13'-3"	-	16.14	2	119'-0"	Prestressed Concrete Girder	Multi-Column Pier	1978 / 2011	86.8	98.6	3/24/2014	-	None
930388	PGA Blvd. WB to I-95 South	Westbound to Southbound	1201'-2"	29'-9"	1	90	30'-0"	31'-4"	16.3	10	198'-1"	Prestressed Concrete Girder and Steel Girder	Hammer Head Pier	1986	97.3	100	3/5/2015	-	Approach Guardrail Connections
930378	I-95 over Military Trail	Northbound and Southbound	378'-6"	207'-1"	12	58	9'-1 1/2"	12'-10 1/2"	16.32	4	122'-0 1/2 "	Prestressed Concrete Girder	Multi-Column Pier	1986 / 2011	83	100	3/5/2015	-	None
930379	Central Blvd. over I-95	Westbound and Eastbound	296'-1"	107'-6"	4	72	41'-7"	30'-0"	16.35	4	118'-6"	Prestressed Concrete Girder	Multi-Column Pier	1986	96.9	100	3/5/2015	-	Approach Guardrail Connections
930398	Hood Rd. over I-95	Westbound and Eastbound	352'-3"	46'-9"	2	60	29'-5"	30'-0"	16.57	4	143'-7"	Prestressed Concrete Girder	Multi-Column Pier	1987	98	99.8	3/10/2015	-	Approach Guardrail Connections
XXXXXX	Hood Rd. over I-95 (Future)	Westbound	297'-0"	40'-6"	2	60	29'-5"	38'-6"	16'-6"	2	148'-6"	Prestressed Concrete Girder	Multi-Column Pier	-	-	-	-	-	None

3.0 PLANNING PHASE/CORRIDOR EVALUATION

The proposed interchange on SR 9/I-95 at Central Boulevard is consistent with the Cost Feasible Plan of the Palm Beach County Metropolitan Planning Organization (MPO)'s 2040 Long Range Transportation Plan (LRTP), adopted in late 2014. The *I-95 Area Wide Mobility Study,* produced in 2011, demonstrated that improvements to the area's major intersections alone would be unable to preserve acceptable levels of service on arterial and collector roads in the area.

An Interchange Justification Report (IJR) was prepared in 2015 which documented the evaluation of 25 possible build solutions to reduce congestion and improve mobility in northern Palm Beach County. An evaluation matrix comparing the 25 alternatives is provided in Table 3.1 – IJR Tier 1 Comparative Evaluation Matrix. Additional information about the analysis of these alternatives can be found in Chapter 6 of the IJR, published separately. The conclusion of this analysis was that construction of new interchange at Central Boulevard was the best transportation solution to address the purpose and need of the project. FHWA approved the IJR in November 2015. Accordingly, no other corridors were evaluated as part of the PD&E study.

SR-9/I-95 @ Central Boulevard Interchange PD&E Study

Table 3.1 - IJR Tier 1 Comparative Evaluation Matrix

LEGEND: ○ Very High ◔ High ◑ Moderate ◕ Low ● Very Low to None — Concept No Longer Being Considered — Concept May Be Incorporated into Other Concepts

Tier 1 Concepts	Regional Transportation Performance			R/W Impacts		Environmental Impacts			Utility Impacts			Construction Costs							Other Costs			
	Mainline I-95 Operations	PGA Boulevard	Military Trail	Land Acquisition	Relocation Potential	Natural Environment	Physical Environment	Social Environment	Major Utility Impacts	Miles of Utility Relocation	Utility Conflict Sites	Roadway Only Costs	Roadway Bridges	Interchange	Right-of-Way Land Costs	Right-of-Way Bus Dam	Utility Relocation	Environmental Mitigation	Mobilization	Contingency	Engineering	CEI
1 New Diamond Interchange at Central Boulevard	◔	◕	●	◕	●	◕	◕	◕	●	●	◕	◕	●	◑	◕	●	◕	●	◕	◕	◕	◕
2 New Diamond Interchange at Central Boulevard with No Interchange at Military Trail	◔	◕	●	◕	●	◕	◕	◕	●	●	◕	◕	●	◑	●	●	◕	●	◕	◕	◕	◕
3 New Diamond Interchange at Central Boulevard with New Partial Diamond Interchange at Military Trail to Special Use Lanes to/from the South	Flawed Concept – Direct Access to Future Special Use Lanes from Military Trail is Cost Prohibitive																					
4 New Partial Diamond Interchange to/from the South at Central Boulevard	◔	◕	●	●	●	●	◕	◕	●	●	◕	●	●	◕	◕	●	●	●	●	●	●	●
5 New Partial Diamond Interchange to/from the South at Central Boulevard with No Interchange at Military Trail	◔	◕	●	●	●	●	◕	◕	●	●	◕	●	●	◕	●	●	●	●	●	●	●	●
6 New Partial Diamond Interchange to/from the South at Central Boulevard with Partial Diamond Interchange to Special Use Lanes to/from the South	Flawed Concept – Direct Access to Future Special Use Lanes from Military Trail is Cost Prohibitive																					
7 New Partial Cloverleaf (NE Quadrant) Interchange at Central Boulevard	May be Considered as an Option in Concept 1 in Tier 2																					
8 New Partial Cloverleaf (NE Quadrant) Interchange at Central Boulevard with No Interchange at Military Trail	Removal of Military Trail makes Right-of-Way Acquisition in NE Quadrant not Necessary. Concept 2 Superior.																					
9 New Partial Cloverleaf (NE Quadrant) Interchange at Central Boulevard with Partial Diamond Interchange at Military Trail to Special Use Lanes to/from the South	Removal of Military Trail makes Right-of-Way Acquisition in NE Quadrant not Necessary. Also see Concept 6 Flaw.																					
10 Existing Military Trail Interchange with Partial Diamond Interchange at Military Trail to Special Use Lanes to/from the South	Flawed Concept – Direct Access to Future Special Use Lanes from Military Trail is Cost Prohibitive																					
11 New Diamond Interchange at Hood Road	○	◑	◕	◑	◕	◕	◑	◕	●	●	◕	◕	●	◑	◑	●	◕	◕	◕	◕	◕	◕
12 New Diamond Interchange at Hood Road with No Interchange at Military Trail	○	◑	◕	◑	◕	◕	◑	◕	●	●	◕	◕	●	◑	◕	●	◕	◕	◕	◕	◕	◕
13 New Diamond Interchange at Hood Road with Partial Diamond Interchange at Military Trail to Special Use Lanes to/from the South	Flawed Concept – Direct Access to Future Special Use Lanes from Military Trail is Cost Prohibitive																					
14 New Partial Diamond Interchange to/from the South at Hood Road	○	◑	◕	◕	◕	◕	◑	◕	●	●	◕	◕	●	◕	◕	●	◕	◕	◕	◕	◕	◕
15 New Partial Diamond Interchange to/from the South at Hood Road with No Interchange at Military Trail	○	◑	◕	◕	◕	◕	◑	◕	●	●	◕	◕	●	◕	●	●	◕	◕	◕	◕	◕	◕
16 New Partial Diamond Interchange to/from the South at Hood Road with Partial Diamond Interchange at Military Trail to Special Use Lanes to/from the South	Flawed Concept – Direct Access to Future Special Use Lanes from Military Trail is Cost Prohibitive																					
17 New Partial Cloverleaf (NE Quadrant) Interchange at Hood Road	May be Considered as an Option in Concept 11 in Tier 2																					
18 New Partial Cloverleaf (NE Quadrant) Interchange at Hood Road with No Interchange at Military Trail	Removal of Military Trail makes Right-of-Way Acquisition in NE Quadrant not Necessary. Concept 2 Superior.																					
19 New Partial Cloverleaf (NE Quadrant) Interchange at Hood Road with Partial Diamond Interchange at Military Trail to Special Use Lanes to/from the South	Flawed Concept – Direct Access to Future Special Use Lanes from Military Trail is Cost Prohibitive																					
20 New Diamond Interchange at Central Boulevard with a New Diamond Interchange at Hood Road with a New Diamond Interchange at Military Trail	Fatal Flaw – Mainline Operational Impacts Due to Closely Spaced Interchanges																					
21 New Diamond Interchange at Hood Road Combined with a New Diamond Interchange at Military Trail	Flawed Concept – Interchange Ramps to/from the South Are Cost Prohibitive & May Introduce Operational Challenges																					
22 New Partial Special Use Interchange to/from the South at Central Boulevard	Fatal Flaw – Special Use Demand at Central Boulevard Does Not Warrant Interchange																					
23 New Full Special Use Interchange at Central Boulevard	◔	◑	◕	●	●	●	●	◕	●	●	◕	●	●	◕	◕	●	●	●	●	●	●	●
24 New Full Special Use Interchange at Hood Road	○	◑	◑	●	●	●	◕	◕	●	●	◕	●	●	◕	◕	●	●	●	●	●	●	●
25 New Partial Special Use Interchange to/from the South at Hood Road	Fatal Flaw – Special Use Demand at Central Boulevard Does Not Warrant Interchange																					

4.0 DESIGN CONTROLS AND STANDARDS

The design standards utilized in the preliminary design of the alternatives for this project include:

1. Florida Department of Transportation, Plans Preparation Manual, Volumes 1 and 2, January 2016
2. Florida Department of Transportation, 2016 FDOT Design Standards for Construction Operations on the State Highway System
3. Florida Department of Transportation, Structures Manual, 2016
4. AASHTO, A Policy on Geometric Design of Highways and Streets, 2011, 6th Edition
5. FHWA, Manual on Uniform Traffic Control Devices for Streets and Highways, 2009 Edition, including Revision 1 dated May 2012 and Revision 2 dated May 2012

The project design standards are based on I-95 as an SIS facility with a functional classification of Urban Principal Arterial Highway with a design speed of 70 mph, PGA Boulevard is an Urban Principal Arterial with a 45 MPH design speed, Military Trail is a Principal Arterial with a 45 MPH design speed, and Central Boulevard is classified as a Major Collector with a 45 MPH design speed. The design criteria used for I-95, the interchange ramps, and Central Boulevard are summarized in Tables 4.1 through 4.3.

Table 4.1 – General Design Standards

Design Element	Design Standard	Source
Functional Classification I-95 PGA Blvd. Military Trail Central Blvd.	Urban Principal Arterial - Interstate Urban Principal Arterial Prinicpal Arterial Major Collector	FDOT Straight Line Diagrams
Design Vehicle	FLWB – 62	PPM Vol. 1 CH 1.12
Design Year	2040	
Design Speed I-95 PGA Blvd. Military Trail Central Blvd.	 70 MPH 45 MPH 45 MPH 45 MPH	PPM Vol.1, Table 1.9.2
Maximum Degree of Curve	See Table 2	PPM Vol. 1, Table 2.8.3
Length of Horizontal Curve (Mainline) Desired Minimum	 30(V) = 1950' 15(V) = 975' Full superelevation in curve not less than 100 ft Urban	PPM Vol.1, Table 2.8.2a
Length of Horizontal Curve (Arterial) Desired Minimum	 15(V) = 600' 400' Full superelevation in curve not less than 100 ft Urban	PPM Vol.1, Table 2.8.2a
Minimum Stopping Sight Distance	See Table 2	PPM Vol.1, Table 2.7.1 adjustment for grade may be necessary AASHTO (2011), p. 3-4
Maximum Lane "Roll-Over" Travel Lanes Roadway Terminals	0.04 0.05	PPM Vol. 1, Figure 2.1.1 PPM Vol. 1, Table 2.1.4
Maximum Shoulder "Roll-Over"	0.07	PPM Vol. 1, Figure 2.3.1
Superelevation Transition Tangent Curve	80% , 50% for reverse curves 20% , 50% for reverse curves	PPM Vol. 1, Ch. 2.9
Maximum Superelevation (Mainline / Ramps)	0.10	PPM Vol. 1, Table 2.9.1
Maximum Superelevation (Arterial)	0.05	PPM Vol. 1, Table 2.9.2
Maximum Profile Grade	See Table 2	PPM Vol. 1, Table 2.6.1
Maximum Change in Grade w/o V.C.	See Table 2	PPM Vol. 1, Table 2.6.2

Table 4.1 – General Design Standards (Continued)

Design Element	Design Standard	Source
K-Value Crest Vertical Curve	See Table 2	PPM Vol. 1, Table 2.8.5
K-Value Sag Vertical Curve	See Table 2	PPM Vol. 1, Table 2.8.6
Minimum Vertical Clearance	16'-6" over roadway	PPM Vol.1, Table 2.10.1
Lane Widths Mainline One-lane Ramps Two-lane Ramps Arterials Collectors	 12' 15' 24' 12' 11'	PPM Vol. 1, Table 2.1.1, 2.1.3 Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (Florida Green Book) Table 3-8
Lane Drop Taper	50:1 minimum, 70:1 desirable	AASHTO (2011) p. 10-79 to 10-80
Inside Shoulder Width Mainline One-lane Ramps Two-lane Ramps	 12' full / 10' paved 12' paved against barrier 6' full / 2' paved 8' full / 4' paved	PPM Vol. 1, Table 2.3.1
Outside Shoulder Width Mainline One-lane Ramps Two-lane Ramps	 12' full / 10' paved 12' paved against barrier 6' full / 4' paved 12' full / 10' paved	PPM Vol. 1, Table 2.3.1
Bridge Shoulder Width Mainline One-lane Ramps Two-lane Ramps	 10' inside / 10' outside 6' inside / 6' outside 6' inside / 10' outside	PPM Vol. 1, Figure 2.0.1
Median Width I-95	 26'	PPM Vol. 1, Table 2.2.1
Cross Slopes Mainline Inside Shoulder Outside Shoulder	 0.02 to 0.03 0.05 to 0.06 0.06	PPM Vol. 1, Figure 2.1.1
Clear Zone	See Table 2	PPM Vol. 1, Table 2.11.9
Border Width	94' from edge of pavement	PPM Vol. 1, Table 2.5.1
Minimum Standard Roadway Base Clearance Mainline Ramp	 3' 2'	PPM Vol. 1 Table 2.6.3

Table 4.2 – Structural Design Standards

Design Element	Design Standard	Source
Standards and Specifications	**American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Seventh Edition, with interims (AASHTO LRFD)**	
	AASHTO "LRFD Bridge Design Specifications", Seventh Edition, with interims (AASHTO LRFD)	AASHTO
	AASHTO Manual for Bridge Evaluation, 2nd Edition, with 2015 Interim Revisions	AASHTO
	Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (Florida Green Book) Table 3-8	
	Florida Department of Transportation (FDOT)	
	FDOT Standard Specifications for Road and Bridge Construction (2016 Edition) and applicable workbook modifications (FDOT Specs)	FDOT
	FDOT Structures Manual, January 2016 •Structures Design Guidelines (SDG) •Structures Detailing Manual (SDM)	FDOT
	FDOT Bridge Load Rating Manual (2015 Edition) with revisions	FDOT
	FDOT Plans Preparation Manual, January 2016 (PPM)	FDOT
	FDOT 2016 Design Standards, with latest Design Standards Modifications (FDOT Standards)	FDOT
Design Methodology	Load and Resistance Factor Design (LRFD) method using strength, service (extreme event) and fatigue limit states. For bridges designed by grid or 3-D analyses provide name and version number of design software.	AASHTO LRFD, FDOT
Design Loading	Varies	AASHTO LRFD, FDOT
Dead Load	Varies	SDG 2.2
Concrete, Structural	150 lb/cf	SDG 2.2
Future Wearing Surface	15 lb/sf	SDG 2.2
Soil; Compacted	115 lb/cf	SDG 2.2
Stay-in-Place Metal Forms	20 lb/sf	SDG 2.2
32" F-Shape Traffic Railing (Index 420)	420 lb/ft	SDG 2.2
Median, 32" F-Shape (Index 421)	485 lb/ft	SDG 2.2
Pedestrian/Bicycle Railing (27" Concrete Parapet only) (Index 820)	225 lb/ft	SDG 2.2
Bridge Fencing (Enclosed) (Index 812)	85 lb/ft	SDG 2.2

Table 4.2 – Structural Design Standards (Continued)

Design Element	Design Standard	Source
AASHTO Type II Prestressed Beams (Archived Index 20120)	385 lb/ft	SDG 2.2
AASHTO Type V Prestressed Beams (Archived Index 20150)	1055 lb/ft	SDG 2.2
Florida-I 54 Prestressed Beams (Index 20054)	971 lb/ft	SDG 2.2
Florida-I 63 Prestressed Beams (Index 20063)	1037 lb/ft	SDG 2.2
Live Load		
Vehicles	HL-93 with Dyanamic Load Allowance	AASHTO LRFD 3.6
Fatigue	Varies	AASHTO LRFD 3.6
Pedestrians		AASHTO LRFD 3.6
Wind Load	150 mph Basic Wind Speed	SDG 2.4
Construction Loading	Varies	SDG 2.13
Finishing Machine Load	7 kip to 16 kip moving load postioned for maximum response	SDG 2.13
Construction Live Load	20 lb/sf applied over bridge width and 50 feet in longitudinal length centered on the finishing machine	SDG 2.13
Removable Deck Cantilever Forms with Overhang Brackets	15 psf	SDG 2.13
Live Load at or near the outside edge of bridge deck during deck placement	75 lb/ft applied as a moving load over a length of 20 feet and positioned to produce maximum response	SDG 2.13
Construction Inactive Basic Wind Speed Including Exposure Period Reduction Factor (R_E)	Varies	SDG Table 2.4.1-2 x R_E
For Exposure Period < one year (R_E = 0.6)	90 mph	SDG Table 2.4.1-2 x R_E
For Exposure Period > one year (R_E = 1.0)	150 mph	SDG Table 2.4.1-2 x R_E
Velocity Pressure Coefficient (k_z)	Varies	SDG 2.4.1.D
Construction Active Basic Wind Speed	20 mph	SDG 2.13
Thermal Effects	Varies	FDOT
Design Mean Temperature	70° F	SDG 2.7
Temperature Rise/Fall	40° F	SDG 2.7
Coefficient of Thermal Expansion - concrete	6.0 x 10^{-6} per °F	SDG 2.7
Coefficient of Thermal Expansion - steel	6.5 x 10^{-6} per °F	SDG 2.7
Seismic Provisions	Minimum bridge support lengths only	SDG 2.3

Table 4.2 – Structural Design Standards (Continued)

Design Element	Design Standard	Source
Material Properties	Varies	FDOT
Structural Steel	A709 Grade 50W and Grade HPS 70W	American Society for Testing and Materials (ASTM)
Reinforcing Steel	Varies	ASTM
Deformed carbon-steel bar	A615 Grade 60	ASTM
Deformed welded wire reinforcement (WWR)	A1064 Grade 75	ASTM
Concrete	Varies	FDOT
Cast in Place Superstructure (Other Than Bridge Deck)	Class II 3400 psi	SDG Tables 1.4.3-1 and 1.4.3-2
Cast in Place Superstructure (Bridge Deck)	Class II (Bridge Deck) 4500 psi	SDG Tables 1.4.3-1 and 1.4.3-2
Approach Slabs	Class II (Bridge Deck) 4500 psi	SDG Tables 1.4.3-1 and 1.4.3-2
Prestressed Concrete Beams	Class VI 8500 psi	SDG Tables 1.4.3-1 and 1.4.3-2
Cast In Place Substructure	Class IV 5500 psi	SDG Tables 1.4.3-1 and 1.4.3-2
Prestressed Concrete Piles	Class V (Special) 6000 psi or VI 8500 psi	SDG Tables 1.4.3-1 and 1.4.3-2
Drilled Shafts	Class IV (Drilled Shafts) 4000 psi	SDG Tables 1.4.3-1 and 1.4.3-2
Retaining Walls	Class II 3400 psi or III 5000 psi	SDG Tables 1.4.3-1 and 1.4.3-2
Seals	Class III Seal 3000 psi	SDG Tables 1.4.3-1 and 1.4.3-2
Concrete Cover	Varies	FDOT
Cast In Place Superstructure (Top of Deck)	2 1/2"	SDG Table 1.4.2-1
Cast In Place Superstructure (Except Top of Deck)	2"	SDG Table 1.4.2-1
Precast Prestressed Beams (Except Top Surface)	2"	SDG Table 1.4.2-1
Top Surface of Beam Top Flange	3/4"	SDG Table 1.4.2-1
Cast In Place Substructure (Cast Against Earth and in contact with water)	4"	SDG Table 1.4.2-1
Cast In Place Substructure (Formed Surfaces)	3"	SDG Table 1.4.2-1
Cast In Place Substructure (Top of Beam Pedestals)	2"	SDG Table 1.4.2-1
Drilled Shafts	6"	SDG Table 1.4.2-1
Auger Cast Piles	4"	SDG Table 1.4.2-1
Retaining Walls (Excluding MSE Walls and external surfaces cast against earth)	2"	SDG Table 1.4.2-1
Box and Three-sided Culverts	2"	SDG Table 1.4.2-1
Bulkheads	4"	SDG Table 1.4.2-1
Aesthetics	Varies	PPM Chapter 26
Applied Finish Coating	Class 5 Finish Coating per Surface Finish Details provided in the plans, as applicable	FDOT

Table 4.2 – Structural Design Standards (Continued)

Design Element	Design Standard	Source
Environmental Classification*	Slightly, Moderate, or Extremely Aggressive	FDOT
Substructure	Slightly Aggressive	SDG 1.3
Superstructure	Slightly Aggressive	SDG 1.3
Location	Inland	SDG 1.3
*Based on Palm Beach County Hood Road Bridge		
Clearances	Varies	Varies
Horizontal - Interstate	36 ft from edge of travel lane	FDOT
Horizontal - Surface Street	16 ft from edge of travel lane	Florida Greenbook
Horizontal - Surface Street	4 ft from face of outside curb	Florida Greenbook
Horizontal - Surface Street	6 ft from edge of inside traffic lane	Florida Greenbook
Vertical - New Construction	16.5 ft	PPM Vol.1, Table 2.10.1
Vertical - Widening or Resurfacing	16.0 ft	PPM Vol.1, Chapter 2.10
Pedestrian Facilities (Sidewalks, Shared Use Paths)	Width, Grades, Cross Slopes, Surfaces, Shielding	FDOT, 2010 ADA Standards for Accessible Design

Table 4.3 – Speed Specific Design Standards

Description	Design Speed (MPH)	Roadway Type	Clear Zone (Ft)	Min. Stopping Sight Distance (Ft)	Max Degree of Curve	Min. Radius using normal X-slope (Ft.)	Super-elevation Slope Rate	K-Value Crest Curve	K-value Sag Curve	Min. length of vertical curve (ft)	Max Change in Grade w/o VC	Max Profile Grade
I-95 Mainline	70	Principal Arterial - Interstate	36	820	3º30'	14714	190	506	206	1000 (Crest) 800 (Sag)	0.2	3%
PGA Boulevard	45	Principal Arterial	24	360	8º15'	2083	150	98	79	135	0.7	6%
Military Trail	45	Principal Arterial	24	360	8º15'	2083	150	98	79	135	0.7	6%
Central Boulevard	45	Major Collector	18	360	8º15'	2083	N/A	98	79	135	0.7	8%
Single Lane Ramps	50	Ramp	14	425	8º15'	8337	200	136	96	300 (Crest) 200 (Sag)	0.6	5%
Multi Lane Ramps	50	Ramp	24	425	8º15'	8337	200	136	96	300 (Crest) 200 (Sag)	0.6	5%

5.0 ALTERNATIVE ALIGNMENT ANALYSIS

Alternatives evaluated during the study include the No-Build Alternative and four viable build alternatives. The naming of the build alternatives is consistent with the alternatives described in the interchange justification study that preceded this PD&E study. These alternatives are listed below.

- No-Build Alternative.
- Alternative 2: Collector Distributor (CD) Road System along Mainline I-95 with a Tight Diamond Urban Interchange (TDUI).
- Alternative 2A: A CD Road System along Mainline I-95 with a Diverging Diamond Interchange (DDI).
- Alternative 3: A Braided Ramp System along Mainline I-95 with a TDUI.
- Alternative 3A: A Braided Ramp System along Mainline I-95-with a DDI.

5.1 No-Build Alternative

The No-Build Alternative consists of maintaining the existing transportation network along I-95 within the project limits. No future capacity or major operational improvements would occur.

The advantages of the No-Build alternative include the following:

- No disruption to motorists during construction,
- No additional noise impacts,
- No wetland or wildlife impacts,
- No temporary construction impacts, or disruption to motorists during construction,
- No additional right-of-way impacts, and
- No impacts to the Palm Beach County planned District Park.

The disadvantages of the No-Build Alternative include the following:

- Congestion within the project limits will not be reduced,
- Operational capacity will not be improved during emergency evacuations,
- Traffic Demand will continue to increase at the existing I-95/PGA Boulevard Interchange, and
- Mobility will not be improved within the City of Palm Beach Gardens.

5.2 Build Alternatives

The proposed build alternatives were designed to reduce congestion and improve mobility within the City of Palm Beach Gardens in northern Palm Beach County. No new through lanes are proposed. Four proposed build alternatives include two mainline alternatives, each combined with two different interchange configurations for the proposed new interchange at Central Boulevard.

The mainline alternatives consist of construction of a CD road or a braided ramp system to address the weaving section of I-95 between the Military Trail ramps and the Central Boulevard ramps. The interchange options include a TDUI and a DDI.

A more detailed discussion of the four build alternatives is presented in this section. General descriptions of the mainline options and the two interchange designs are presented first. A detailed

description of the combined Alternatives 2, 2A, 3 and 3A, and anticipated impacts of those alternatives follows.

5.3 Mainline Alternatives

5.3.1 Mainline Alternative 2 – CD Road

Alternative 2 includes a CD roadway system adjacent to northbound and southbound SR 9/I-95 between the Military Trail ramps and the Central Boulevard interchange ramps. This alternative removes the direct connection of the ramps at Military Trail to I-95. A more detailed description of this alternative is provided below.

Northbound

South of Central Boulevard

The two Military Trail interchange northbound on-ramps merge to one-lane, and this single lane merges with a two-lane northbound off-ramp for the Central Boulevard interchange, forming a three lane at-grade CD road. South of the Central Boulevard interchange, this CD road splits into a one-lane northbound on-ramp for Military Trail traffic, and a two-lane off-ramp for Central Boulevard traffic. The single lane northbound on-ramp has a parallel type entrance to an auxiliary lane that passes beneath the Central Boulevard Bridge and merges with the I-95 mainline.

North of Central Boulevard

The Central Boulevard interchange northbound on-ramp merges from three lanes to one-lane with a parallel type entrance. The auxiliary lane passes under the Hood Road Bridge and then merges onto the I-95 mainline.

Southbound

North of Central Boulevard

The Donald Ross Road interchange southbound two-lane on-ramp has a tapered entrance onto I-95. The outside lane becomes an auxiliary lane that passes underneath the Hood Road Bridge. This lane then becomes a single lane, southbound off-ramp to the Central Boulevard interchange.

South of Central Boulevard

A single lane southbound off-ramp for the Military Trail interchange merges with a two-lane southbound on-ramp from the Central Boulevard interchange to form a three lane at-grade CD road. North of Military Trail, the CD road splits into a one-lane off-ramp to the Military Trail interchange and a two-lane on-ramp for Central Boulevard interchange traffic, with a tapered entrance into an auxiliary lane and the I-95 mainline.

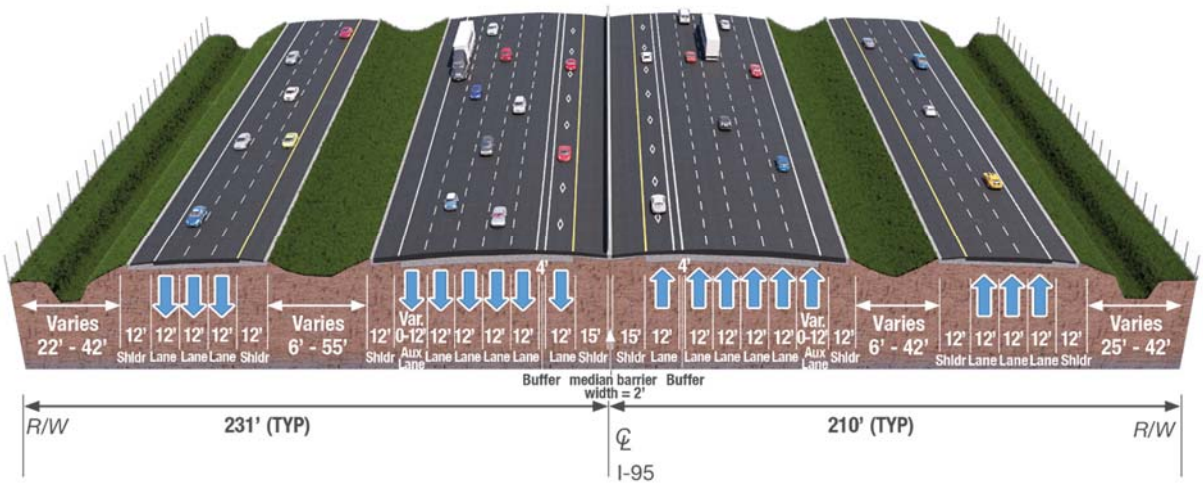
5.3.1.1 Typical Sections (I-95 Mainline)

The proposed typical section for I-95 south of Central Boulevard for the CD road alternative is shown in Figure 5-1. This section includes four 12-foot wide general purpose lanes and one 12-foot wide special use lane, a 15-foot inside shoulder, and a 12-foot outside shoulder in each direction. A continuous 12-foot wide auxiliary lane in each direction is also provided. The north and southbound lanes are separated by a two-foot wide concrete median barrier.

The proposed CD road is separated from the mainline by a grassed median that varies in width from six feet to 55 feet. Three 12-foot wide through lanes, with 12-foot wide inside and outside shoulders are

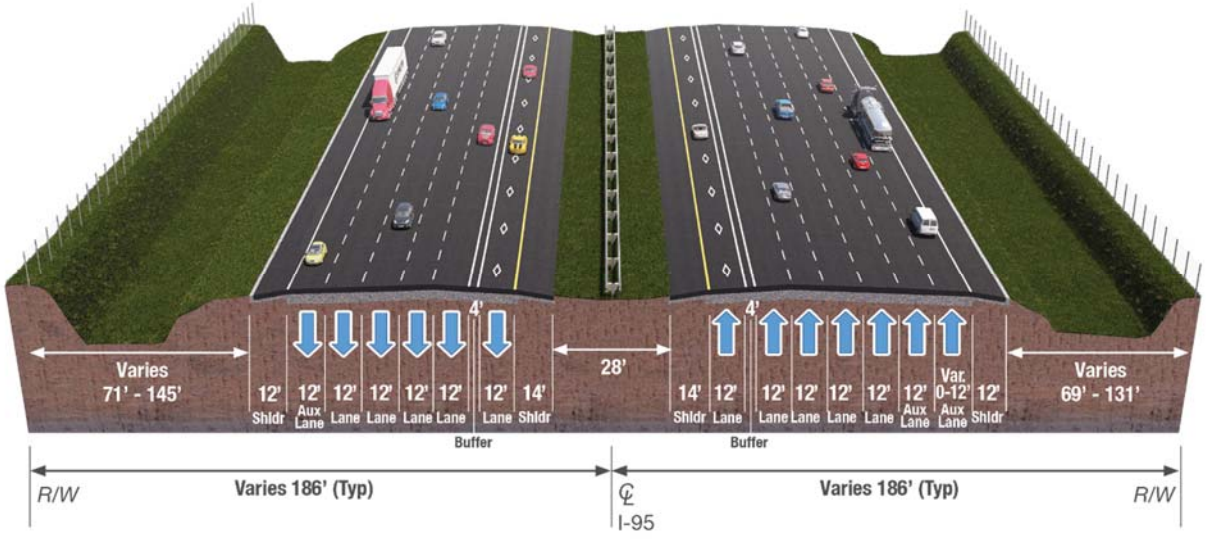
provided. The swales at the edges of the right-of-way vary in width from 22 feet to 42 feet. The total width of the typical section, including the CD road, is 441 feet.

Figure 5-1 –Typical Section – I-95 South of Central Boulevard (Mainline Alternative 2)



The proposed typical section for I-95 north of Central Boulevard is shown in Figure 5-2. This typical section is the same for Mainline Alternative 3. The typical section consists of four 12- foot wide general purpose lanes, one 12-foot wide special use lane, and a 14-foot inside and a 12-foot outside shoulder in each direction. Two southbound 12-foot auxiliary lanes are provided in each direction. Northbound and southbound lanes are separated by a 28-foot grassed median and a double faced guardrail. The swales at the edges of the right-of-way vary in width from 69 feet to 145 feet. The maximum total right-of-way required for this proposed typical section is 372 feet.

Figure 5-2 – Typical Section – I-95 North of Central Boulevard (Mainline Alternatives 2 and 3)



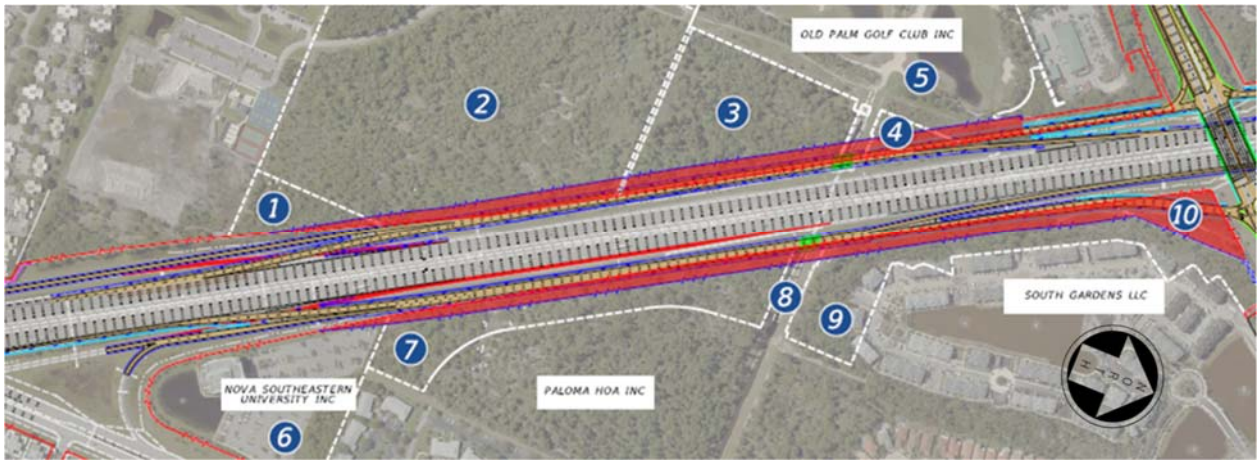
5.3.1.2 Right-of-Way Required

It is anticipated that acquisition of approximately 9.9 acres of right-of-way would be required for construction of the CD roadway system proposed for Mainline Alternative 2. As shown in Table 5.1 below, ten parcels will be impacted. Approximately 1.33 acres of the future planned Palm Beach County District Park (Parcel 2 in Table 5.1 and Figure 5-3) would be acquired. The remaining right-of-way impacts would occur to undeveloped residential and commercial property. Areas of additional right-of-way that would be acquired are shown on Figure 5-3. (The parcel numbers in Figure 5-3 refer to the parcel numbers in Table 5.1.) No business or residential relocations will be required.

Table 5.1
Mainline Alternative 2 (CD Road) - Right-of-Way Impacts

Parcel	*Parcel Name*	*Developed/Undeveloped*	*R/W Impact (acres)*
1	FDOT	Undeveloped	0.17
2	Palm Beach County (Planned District Park)	Undeveloped	1.33
3	Old Palm CDD	Undeveloped	1.50
4	Old Palm Golf Club Inc.	Undeveloped	0.54
5	Old Palm Golf Club Inc.	Undeveloped	0.54
6	Nova Southeastern University	Undeveloped	0.09
7	Paloma HOA Inc.	Undeveloped	1.97
8	North Palm County Improvements District	Developed	0.36
9	South Gardens LLC	Undeveloped	1.79
10	South Gardens LLC	Undeveloped	1.59
		Total	**9.88**

Figure 5-3 - Right-of-Way Impacts for Mainline Alternative 2



5.3.1.3 Utilities

Alternatives 2 and 2A will have major impacts to FPL transmission lines located in the SE quadrant of the Central Blvd. / I-95 crossing. Relocation of these lines will be required in to accommodate the proposed ramp alignment. Coordination will be required with FPL Transmission during the design phase to determine the extent of relocations required.

Substantial amounts of additional fill will be placed over the existing water and sewer lines. In some areas, construction of retaining walls over these utilities will be required. Accordingly, the existing water and sewer lines will need to be encased prior to construction of the proposed improvements. The FDOT Utility Accommodation Manual does not allow placement of pressurized utility lines within certain areas of retaining walls. The following water and sewer utility lines will have potential conflicts and coordination during the design phase will be required to determine if relocation is required:

- 36-inch force main (FM) South of Central Blvd parallel to canal- Partially encased. Evaluate if extension of casing under CD roads is required.
- 16-inch FM (South of Central Blvd. parallel to canal)- Partially encased. Evaluate if extension of casing under CD roads is required.
- 30-inch FM (South of Central Blvd. parallel to canal)- Partially encased. Evaluate if extension of casing under CD roads is required.
- Water main (WM) north of Central Blvd. - Will require encasement to cross under mechanically stabilized earth (MSE) walls at Central Blvd. ramps to/from the north.
- 36-inch WM (north of Central Blvd.) - Evaluate extension of existing casing under SB off ramp to Central Blvd.
- 24-inch reclaimed water main (RWM) north of Central Blvd. - Evaluate extension of existing casing under SB off-ramp to Central Blvd.

The Florida Department of Transportation maintains underground ITS and roadway lighting conduit/cables within the project limits. Coordination will be required during design and construction to determine if relocations are required. Existing roadway light poles are in direct conflict with the proposed ramp connections along I-95 and will require relocation.

5.3.1.4 Traffic Control Concepts

Construction of the CD roads will occur outside of mainline traffic. Shifting the lanes to the inside is anticipated on I-95 for the construction of ramp gores and auxiliary lanes. Extended closures (full weekend) may be required at the Military Trail ramps to construct connections to the new CD roads.

5.3.2 Mainline Alternative 3 – Braided Ramp System

Alternative 3 includes a braided ramp system adjacent to northbound and southbound SR 9/I-95 between the Military Trail interchange ramps and the Central Boulevard interchange ramps.

Northbound

South of Central Boulevard

The two Military Trail interchange northbound on-ramps merge to one-lane. This single lane at-grade ramp has a parallel type entrance merging to an auxiliary lane on the I-95 mainline south of Central Boulevard. A two-lane northbound off-ramp for the Central Boulevard interchange passes over the Military Trail on-ramp.

North of Central Boulevard

The Central Boulevard interchange northbound on-ramp merges from three lanes to one-lane with a parallel type entrance. The auxiliary lane passes under the Hood Road Bridge and then merges onto the I-95 mainline.

Southbound

North of Central Boulevard

The Donald Ross Road interchange southbound two-lane on-ramp has a tapered entrance onto I-95. The outside lane becomes an auxiliary lane that passes underneath the Hood Road Bridge. This lane then becomes a single lane southbound off-ramp to the Central Boulevard interchange.

South of Central Boulevard

The two-lane southbound on-ramp from the Central Boulevard interchange remains at-grade and has a tapered entrance into an auxiliary lane and the I-95 mainline. The one-lane southbound off-ramp to the Military Trail interchange passes over the Central Boulevard on-ramp.

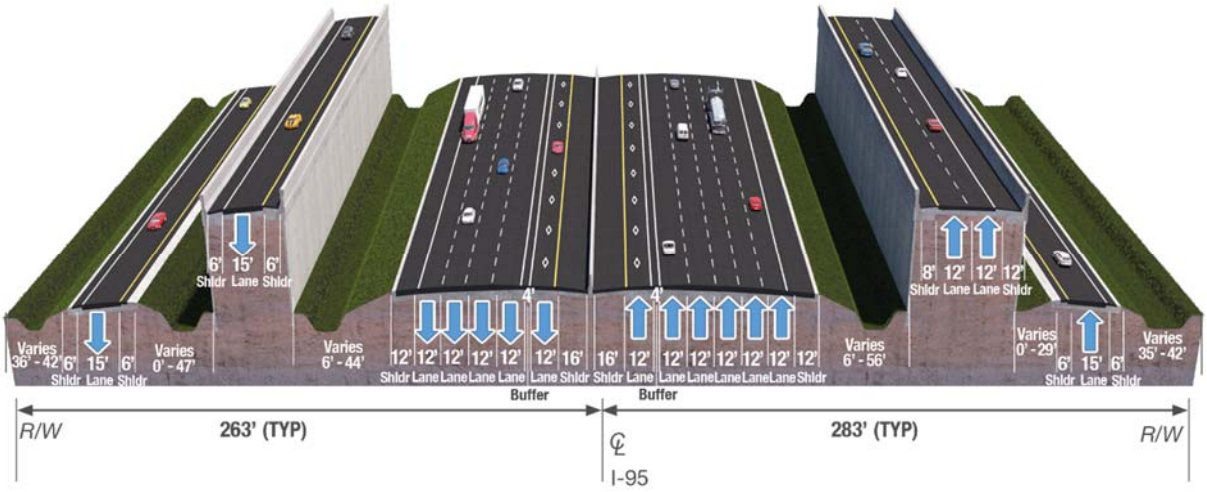
5.3.2.1. Proposed Typical Section

The proposed typical section for I-95 south of Central Boulevard for the Braided Ramp system is shown in Figure 5-4. The mainline section includes four 12-foot wide general purpose lanes and one 12-foot wide special use lane, a 16-foot inside shoulder, and a 12-foot outside shoulder in each direction. The north and southbound lanes are separated by a two-foot concrete median barrier.

The northbound braided ramps consist of two elevated 12-foot wide lanes, a 12-foot outside shoulder and an eight-foot inside shoulder. In addition, an at-grade 15-foot wide lane with six-foot outside and inside shoulders are provided. The medians between the mainline and the elevated ramps vary in width from six feet to 56 feet. The medians between the elevated ramps and the at-grade ramps vary in width from zero feet to 47 feet. The swales at the edges of the right-of-way vary in width from 35 feet to 42 feet The total width of this typical section is 546 feet.

North of Central Boulevard, the typical section is the same as proposed for Alternative 2. This typical section is shown in Figure 5-2 above.

Figure 5-4 - Typical Section – I-95 South of Central Boulevard (Mainline Alternative 3)



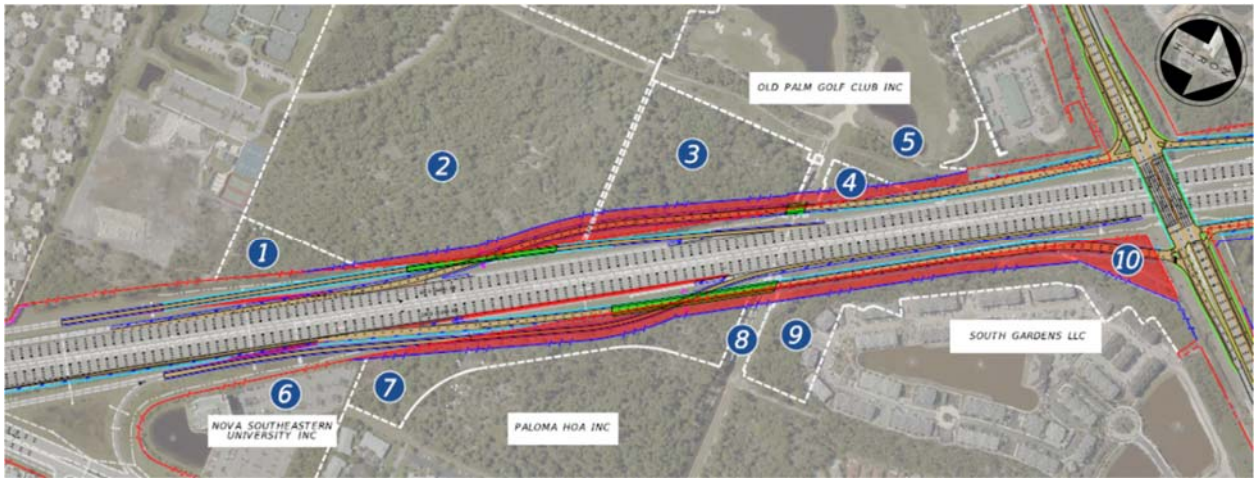
5.3.2.2 Right-of-Way Required

It is anticipated that acquisition of approximately 10.1 acres of right-of-way would be required for construction of these mainline improvements (see Table 5.2 and Figure 5-5). This includes approximately 1.33 acres of the future planned Palm Beach County District Park. This county property (Parcel 2) is currently undeveloped.

Table 5.2
Mainline Alternative 3 (Braided Ramp System) - Right-of-Way Impact

Parcel	*Parcel Name*	*Developed/Undeveloped*	*R/W Impact (acres)*
1	FDOT	Undeveloped	0.04
2	Palm Beach County	Undeveloped	1.33
3	Old Palm CDD	Undeveloped	1.79
4	Old Palm Golf Club Inc.	Undeveloped	0.38
5	Old Palm Golf Club Inc.	Undeveloped	0.27
6	Nova Southeastern University	Undeveloped	0.01
7	Paloma HOA Inc.	Undeveloped	2.47
8	North Palm County Improvements District	Developed	0.34
9	South Gardens LLC	Undeveloped	1.88
10	South Gardens LLC	Undeveloped	1.59
		Total	**10.10**

Figure 5-5 - Right-of-Way Impacts of Proposed Mainline Alternative 3



5.3.2.3 Utilities

Alternatives 3 and 3A will have major impacts to FPL transmission lines located in the SE quadrant of the Central Blvd. / I-95 crossing. Relocation of these lines will be required to accommodate the proposed ramp alignment. Coordination will be required with FPL Transmission during the design phase to determine the extent of required relocations.

Substantial amounts of additional fill will be placed over the existing water and sewer lines. In some areas, construction of retaining walls over these utilities will be required. Accordingly, the existing water and sewer lines will need to be encased prior to construction of the proposed improvements. The FDOT Utility Accommodation Manual does not allow placement of pressurized utility lines within certain areas of retaining walls. Because alternatives 3 and 3A introduce additional retaining wall sections on the braided ramps, additional encasement and protection is required when compared to alternatives 2 and 2A. The following water and sewer utility lines will have potential conflicts and coordination during the design phase will be required to determine if relocation is required:

- 36-inch FM (South of Central Blvd parallel to canal)- Partially encased. Evaluate if extension of casing under CD roads is required.
- 16-inch FM (South of Central Blvd parallel to canal)- Partially encased. Evaluate if extension of casing under CD roads is required.
- 30-inch FM (South of Central Blvd parallel to canal)- Partially encased. Evaluate if extension of casing under CD roads is required.
- WM (north of Central) - Will require encasement to cross under MSE walls at Central Blvd ramps to/from the north.
- 36-inch WM (north of Central Blvd.) - Evaluate extension of existing casing under SB off ramp to Central Blvd.
- 24-inch RWM (north of Central Blvd.) - Evaluate extension of existing casing under SB off ramp to Central Blvd.

The Florida Department of Transportation maintains underground ITS and roadway lighting conduit/cables within the project limits. Coordination will be required during design and construction to determine if relocations are required. Existing roadway light poles are in direct conflict with the proposed ramp connections along I-95 and will require relocation.

5.3.2.4 Traffic Control Concepts

Construction of the braided ramps will occur outside of mainline traffic. On I-95, shifting the lanes to the inside would be anticipated for the construction of ramp gores and auxiliary lanes. Extended closures (full weekend) may be required at the Military Trail ramps to construct connections to the braided ramps roads.

5.3.2.5 Bridge Analysis

The proposed condition consists of two braided ramp bridge structures located between PGA Boulevard and Central Boulevard – one adjacent to southbound I-95 and a second adjacent to northbound I-95. In general, both Florida-I Beam and Steel Plate Girder bridge types can span the required distances and accommodate the curvature of the ramps. For the purposes of this Preliminary Engineering Report, a Florida-I Beam concept is presented for the southbound braided ramp bridge, and a continuous steel plate girder concept is presented for the northbound braided ramp bridge. (Due to substructure complexity, steel bridge unit costs are used for both locations.)

Southbound Braided Ramp Bridge

The typical section includes one 15-foot through lane and six foot shoulders with concrete bridge traffic railings for an out-to-out width of 30 feet 1 inch. The proposed bridge total length is 350 feet, consisting of two 175-foot spans. The superstructure of the bridge is comprised of a 9 ½ inch reinforced concrete deck supported by prestressed concrete Florida-I Beam (FIB) 63 beams. The substructure is made up of an Inverted T Straddle Bent supported by columns with independent pile caps founded on prestressed concrete piles. Bridge abutments will be comprised of pile bents and MSE retaining walls.

Northbound Braided Ramp Bridge

The typical section includes two 12-foot lanes, a 6-foot inside shoulder, and a 10-foot outside shoulder with concrete bridge traffic railings for an out-to-out width of 43 feet, 1 inch. The proposed bridge total length is 501 feet with a 191-foot wide middle span and two 155 feet wide flanking spans. The superstructure of the bridge is comprised of a 9 ½ inch reinforced concrete deck supported by continuous steel plate girders with 57 inch webs. The substructure is made up of single column concrete piers with integral steel caps. The piers are supported by pile caps founded on prestressed concrete piles. Bridge abutments will be comprised of pile bents and MSE retaining walls.

5.4 Interchange Configuration Options for Proposed New Interchange at Central Boulevard

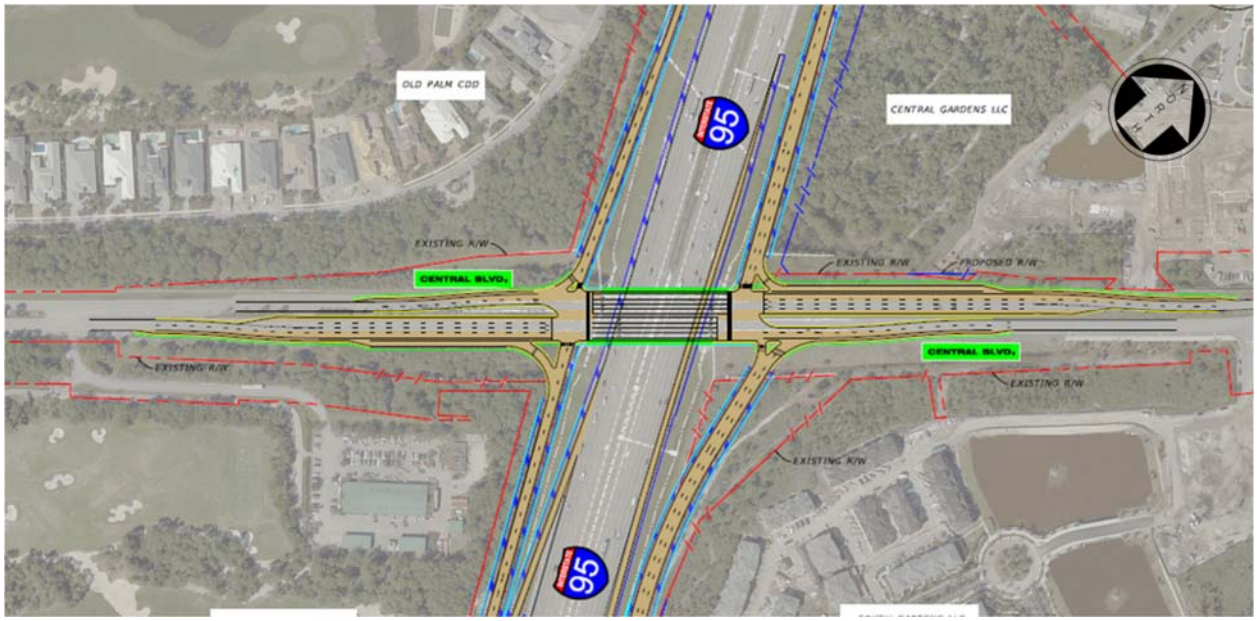
Two interchange types, a TDUI and a DDI, were developed and evaluated for the proposed new interchange at Central Boulevard.

5.4.1 Tight Diamond Urban Interchange (TDUI)

A TDUI was analyzed for the new Central Boulevard interchange with I-95. The interchange consists of one-way diagonal ramps in each quadrant of the interchange that are designed to minimize impacts to the existing right-of-way. The ramp terminals from the I-95 mainline to Central Boulevard will be signalized and consist of one left turn lane and two right turn lanes in each quadrant. The on-ramps

from Central Boulevard to the I-95 mainline will consist of two signalized left turn lanes and a free-flow right turn one-lane ramp (See Figure 5-6). This option requires widening of the existing Central Boulevard Bridge in order to accommodate the left turn lanes.

Figure 5-6 - Proposed TDUI Option



5.4.1.1 Proposed Typical Sections

The typical section for the proposed Central Boulevard Bridge for the proposed TDUI at Central Boulevard is shown in Figure 5-7. This section provides two 11-foot wide through lanes, two 11-foot left turn lanes, a seven–foot designated bicycle lane, and a ten-foot wide enclosed sidewalk in each direction, separated by a four-foot traffic separator. The out-to-out width of the proposed bridge is 134 feet six inches.

The proposed typical section for Central Boulevard east of I-95 is shown in Figure 5-8. In the eastbound direction, this section provides two 11-foot through lanes, a seven-foot designated bicycle lane and a ten–foot sidewalk. In the westbound direction this section provides four 11-foot through lanes, one 11-foot auxiliary lane, a seven-foot wide designated bicycle lane, and a ten-foot wide sidewalk separated from the travel lanes by a pedestrian rail. The eastbound and westbound lanes are separated by a grassed median that varies in width from 13 feet to 27.5 feet. The total width of this typical section varies from 120 feet to 253 feet.

The proposed typical section for Central Boulevard west of I-95 is shown in Figure 5-9. In the westbound direction, this section provides two 11-foot through lanes, a seven-foot designated bicycle lane and a ten–foot sidewalk. In the eastbound direction, this section provides four 11-foot through lanes, one 11-foot auxiliary lane, a seven-foot wide designated bicycle lane, and a ten-foot wide sidewalk separated from the travel lanes by a pedestrian rail. The east and westbound lanes are separated by a grassed

median that varies in width from 13 feet to 27.5 feet. The total width of this typical section varies from 120 feet to 265 feet.

Figure 5-7 – Proposed Typical Section - Central Blvd. Bridge for TDUI

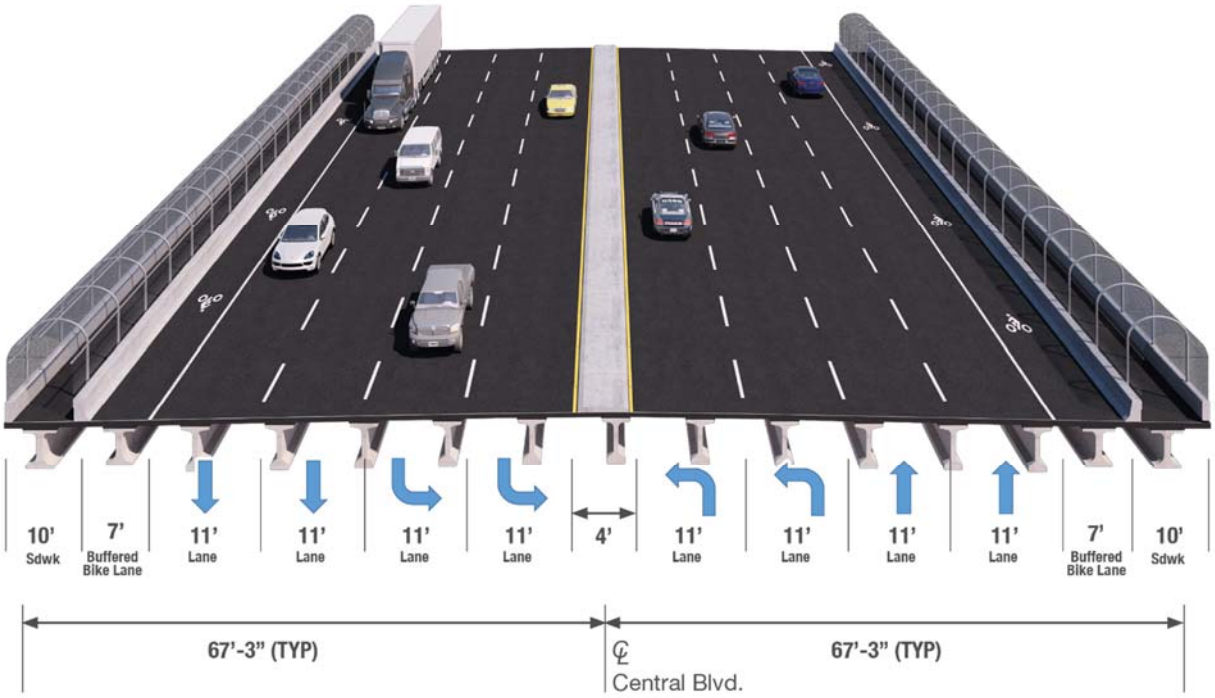


Figure 5-8 - Proposed Typical Section - Central Blvd. East of I-95 – TDUI

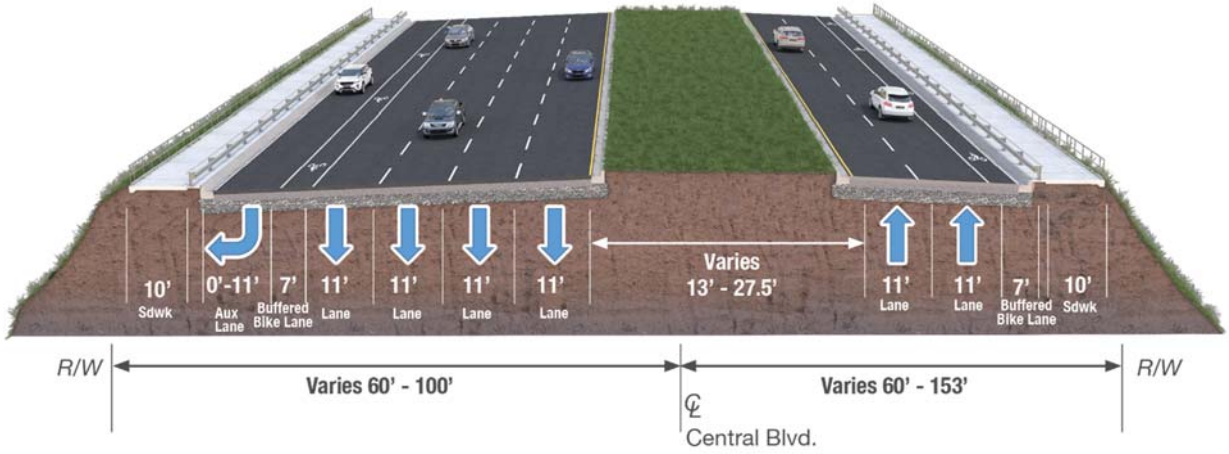
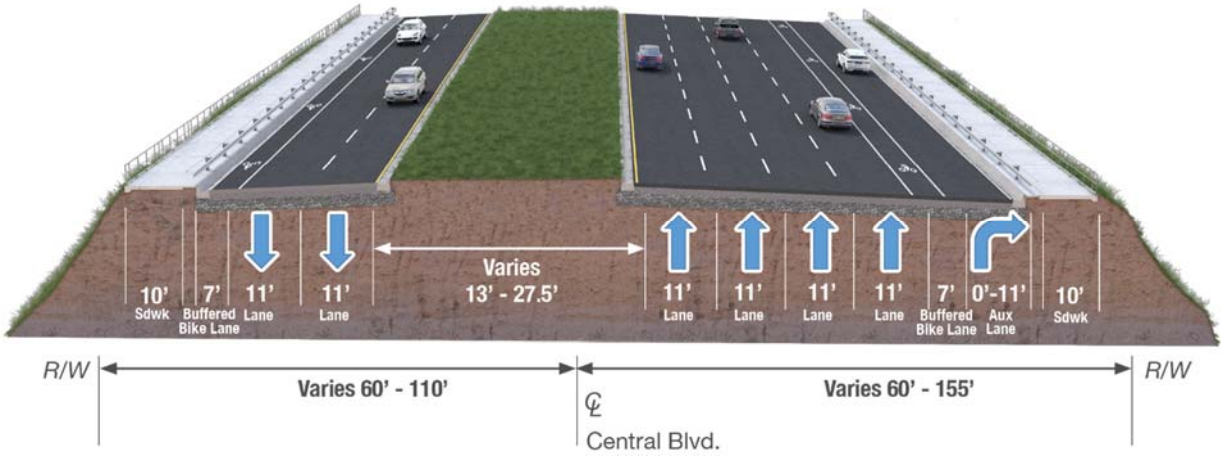


Figure 5-9 - Proposed Typical Section - Central Blvd. West of I-95 – TDUI



5.4.1.2 Right-of-Way Required

It is anticipated that acquisition of approximately 1.46 acres of right-of-way would be needed for construction of the TDUI at Central Boulevard. The areas that would be impacted are described in Table 5.3 and Figure 5-10.

Figure 5-10 – Right-of-Way Impacts of TDUI Option

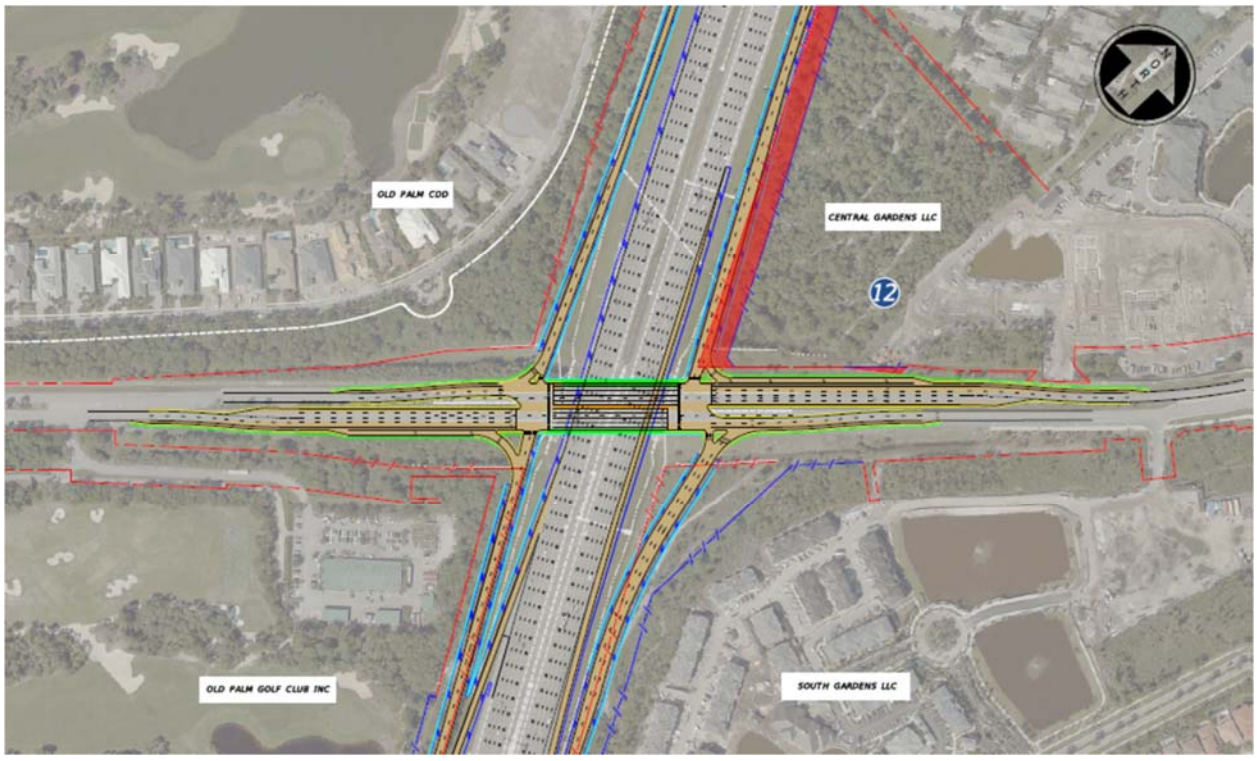


Table 5.3 TDUI Option - Right-of-Way Impacts			
Parcel	***Parcel Name***	***Developed/Undeveloped***	***R/W Impact (acres)***
12	Central Gardens POA Inc.	Undeveloped	1.46
		Total	**1.46**

5.4.1.3 Traffic Control Concepts

Standard bridge and roadway widening construction methods will be utilized for construction of the TDUI.

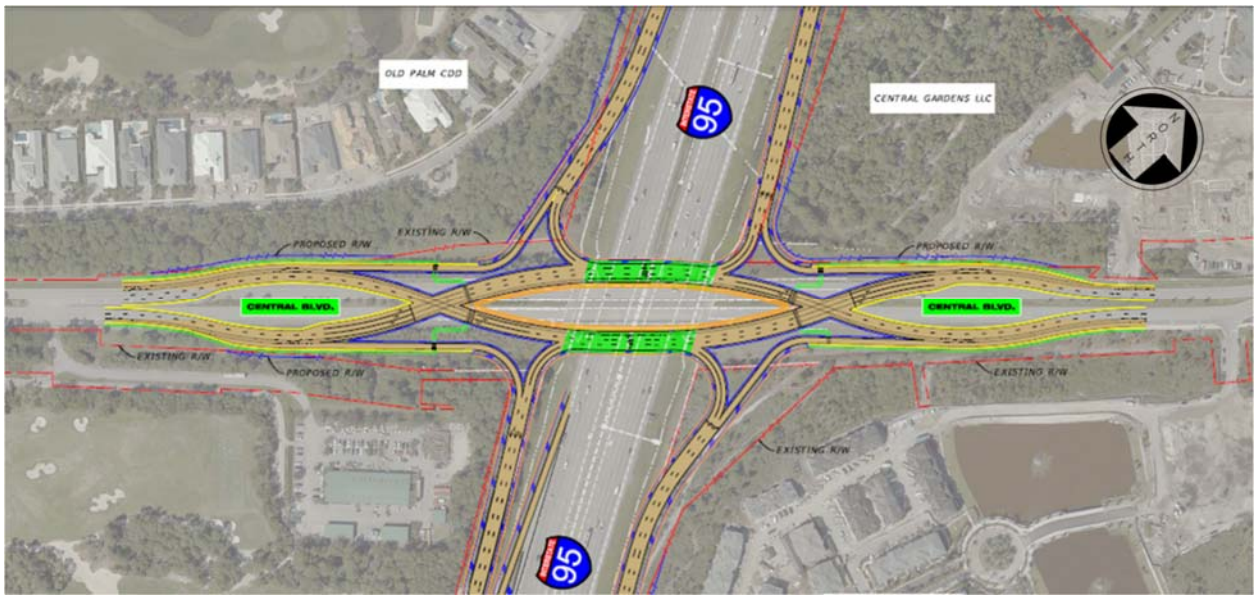
5.4.1.4 Bridge Analysis

The TDUI entails widening of the existing bridge. The proposed improvements will require a total bridge widening of 39 feet. The widened bridge will match the existing bridge in overall length, span configuration, and appearance. The existing minimum vertical clearance over I-95 would be maintained at 16 feet 4 ¼ inch by utilizing a 54-inch FIB superstructure that has a depth 8 inches less than that of the existing AASHTO Type V beam superstructure. The substructure would consist of reinforced concrete piers founded on pile caps supported by prestressed concrete piles.

5.4.2 Diverging Diamond Interchange (DDI)

The DDI option was analyzed (see analysis results in Appendix A) for the new Central Boulevard interchange with I-95. This concept is shown in Figure 5-11. The DDI alternative requires drivers to briefly cross to the left, or opposite side of the road at carefully designed crossover intersections. Drivers will travel for a short distance, then cross back to the right side of the road. The design allows for free-flow movements for the left and right turns to and from the I-95 ramps onto Central Boulevard without

Figure 5-11 - Proposed DDI Option

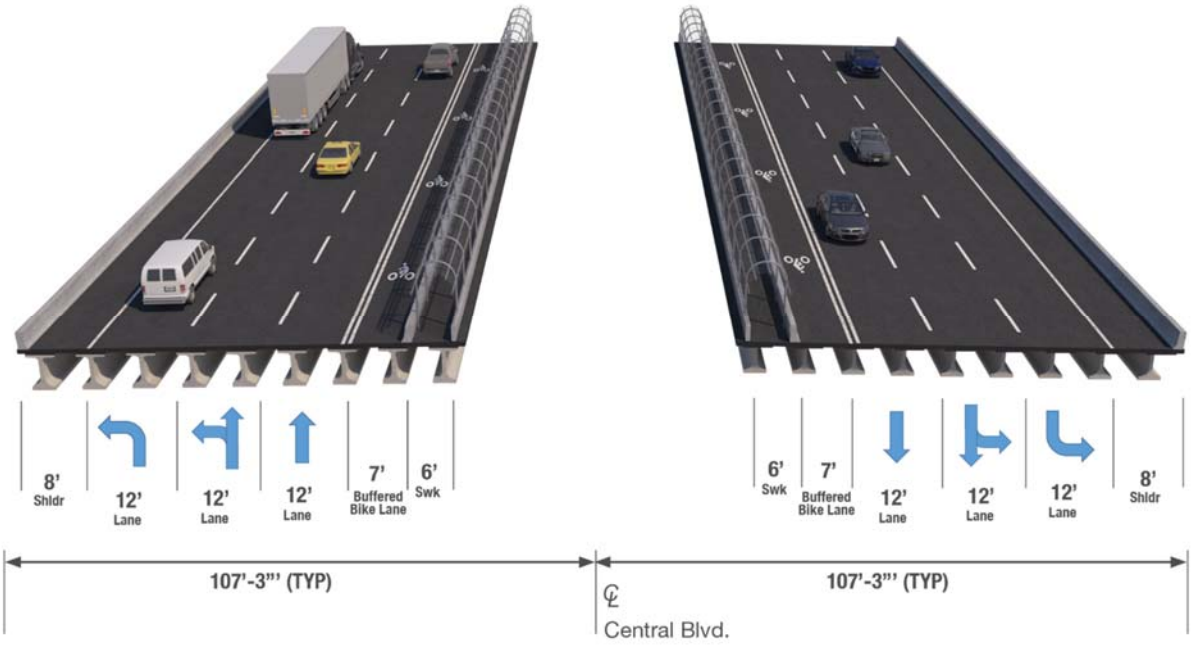


crossing the path of opposing traffic. This interchange does not require a signal for left turning vehicles, thus allowing more green time for opposing traffic. This design will, however, require the construction of two new bridges in order to accommodate the necessary geometry and acquisition of additional right-of-way.

5.4.2.1 Proposed Typical Section

The proposed Central Boulevard Bridge typical section for the DDI option is shown in Figure 5-12. Two single bridges are proposed. Two 12-foot wide through lanes, one 12-foot through/left-turn lane, an eight-foot shoulder, a seven-foot designated bicycle lane and a six-foot wide enclosed sidewalk separated from the bicycle lane by a concrete barrier.

Figure 5-12 - Proposed Typical Section – Central Blvd. Bridge - DDI Option

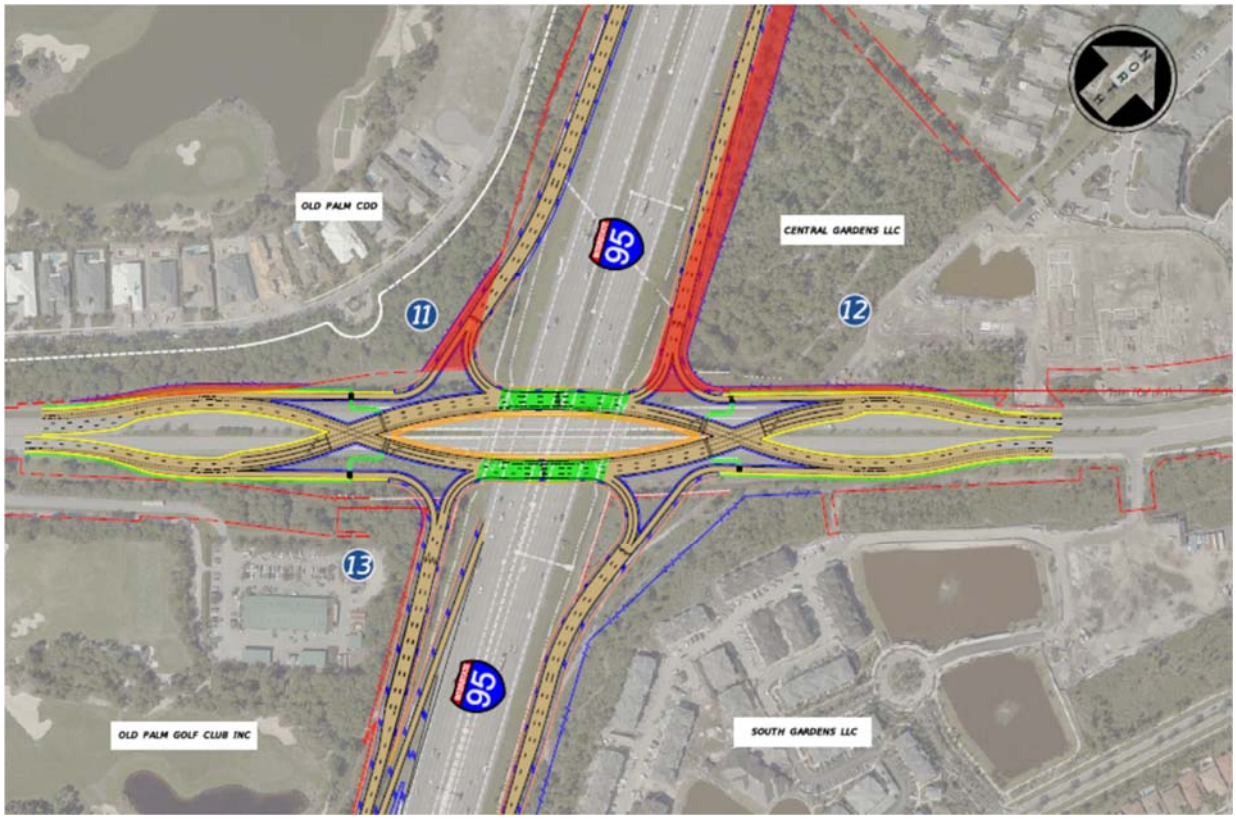


5.4.2.2 Right-of-Way Required

It is anticipated that acquisition of approximately 2.08 acres of right-of-way would be needed for construction of the DDI at Central Boulevard. The parcels that would be acquired are shown in Table 5.4 and Figure 5-13.

Table 5.4 DDI Option - Right-of Way Impacts			
Parcel	***Parcel Name***	***Developed/Undeveloped***	***R/W Impact (acres)***
11	Old Palm CDD	Undeveloped	0.34
12	Central Gardens POA Inc.	Undeveloped	1.73
13	Old Palm CDD	Undeveloped	0.01
		Total	**2.08**

Figure 5-13 - Right-of-Way Impacts of DDI Option



5.4.2.3 Traffic Control Concepts

Construction of the DDI will substantially impact maintenance of traffic. Construction of new bridges, the crossover ramps and the change in median width will contribute to the complexity of the traffic control plan for this alternative.

5.4.2.4 Bridge Analysis

The proposed improvements will require complete removal of the existing Central Boulevard bridge (Bridge No. 930379) over I-95. The proposed bridge total length is 307 feet consisting of two 153-foot 6-inch spans which locate the abutments outside of the Clear Zone of an I-95 section which includes a future 12-foot wide Express Lane. FIB-63 beams spaced at 7 feet may span the required distance and

provide a minimum clearance of 16 feet 6 inches. The substructure would consist of reinforced concrete piers founded on pile caps supported by prestressed concrete piles, and MSE retaining wall abutments.

5.5 Build Alternatives (Mainline Options Combined with Interchange Options)

5.5.1 Build Alternative 2 (CD Road with TDUI)

Build Alternative 2 combines the CD roadway system adjacent to northbound and southbound SR 9/I-95 between the Military Trail ramps and the Central Boulevard interchange ramps with construction of a new TDUI at Central Boulevard.

5.5.1.1 Typical Sections

The proposed typical sections for I-95 for this alternative are described in Section 5.3.1.1 Typical Sections (I-95 Mainline), and shown in Figures 5-1 and 5-2. The proposed typical sections associated with the proposed TDUI are described in Section 5.4.1.1 and shown in Figures 5-7, 5-8 and 5-9.

5.5.1.2 Conceptual Plans

The conceptual plans for Alternative 2 are provided in Appendix B.

5.5.1.3 Right- of-Way

It is anticipated that acquisition of approximately 11.34 acres of right-of-way would be required for construction of Alternative 2. As described in Sections 5.3.1.1 and 5.4.1.1 above, approximately 9.9 acres is required for the proposed mainline improvements, and approximately 1.46 acres would be required for construction of the TDUI. The parcels that would be impacted are listed in Table 5.5. See Figures 5-3 and 5-10 (above) for the location of the impacted parcels.

5.5.1.4 Cost Estimate

The preliminary construction cost estimates for the proposed alternatives were developed from the preliminary concept plans prepared as part of this study. In addition, existing construction plans and available existing topographical data were utilized. The estimates include major pay items such as embankment, excavation, pavement, drainage, signalization, lighting, mobilization and maintenance of traffic. Other components included are curb and gutter, clearing and grubbing, sodding, and signing and pavement marking. Contingency costs were also included in the estimate. The estimated total construction cost for Alternative 2 is approximately $33.9 million. Detailed back-up for cost estimates are included in Appendix C.

Table 5.5 Alternative 2 (CD Road /TDUI) - Right-of-Way Impacts			
Parcel #	***Parcel Name***	***Developed/Undeveloped***	***R/W Impact (acres)***
1	FDOT	Undeveloped	0.17
2	Palm Beach County (Planned District Park)	Undeveloped	1.33
3	Old Palm CDD	Undeveloped	1.50
4	Old Palm Golf Club Inc.	Undeveloped	0.54
5	Old Palm Golf Club Inc.	Undeveloped	0.54
6	Nova Southeastern University	Undeveloped	0.09
7	Paloma HOA Inc.	Undeveloped	1.97
8	North Palm County Improvements District	Developed	0.36
9	South Gardens LLC	Undeveloped	1.79
10	South Gardens LLC	Undeveloped	1.59
12	Central Gardens POA Inc.	Undeveloped	1.46
		Total	**11.34**

5.5.1.5 Drainage

Preliminary analysis of drainage requirements indicates that treatment of runoff from the proposed additional impervious areas can be accomplished in dry retention swales and exfiltration trenches located within the proposed roadway right-of-way. Construction of additional outfall control structures and modification of some existing outfall structures will be required to increase treatment capacity in some of the existing roadside swales.

5.5.1.6 Utilities

Alternative 2 will substantially impact FPL transmission lines located in the SE quadrant of the Central Blvd. / I-95 crossing. Relocation of these lines will be required to accommodate the proposed ramp alignment. Coordination will be required with FPL Transmission during the design phase to determine the extent of required relocations.

Substantial amounts of additional fill will be placed over the existing water and sewer lines. In some areas construction of retaining walls over these utilities will be required. Accordingly, the existing water and sewer lines will need to be encased prior to construction of the proposed improvements.

The FDOT Utility Accommodation Manual does not allow placement of pressurized utility lines within certain areas of retaining walls. Potential conflicts for the Water and Sewer utility lines described below in some locations will require coordination with the utility owners in the Design phase to determine if relocation is required:

- 36-inch FM (South of Central Blvd. parallel to canal)- Partially encased. Evaluate if extension of casing under CD roads is required.
- 16-inch FM (South of Central Blvd. parallel to canal)- Partially encased. Evaluate if extension of casing under CD roads is required.
- 30-inch FM (South of Central Blvd. parallel to canal)- Partially encased. Evaluate if extension of casing under CD roads is required.

- WM (north of Central Blvd.) - Will require encasement to cross under MSE walls at Central Blvd. ramps to/from the north.
- 36-inch WM (north of Central Blvd.) - Evaluate extension of existing casing under SB off ramp to Central Blvd.
- 24-inch RWM (north of Central Blvd.) - Evaluate extension of existing casing under SB off ramp to Central Blvd.

The Florida Department of Transportation maintains underground ITS and roadway lighting conduit/cables within the project limits. Coordination will be required during design and construction to determine if relocations are required. Existing roadway light poles are in direct conflict with the proposed ramp connections along I-95 and will require relocation.

5.5.1.7 Traffic Control Concepts

Minimal impacts to I-95 traffic are anticipated to I-95 traffic during construction of the proposed improvements. Construction of the CD roads will occur outside of mainline traffic. Shifting the lanes to the inside of I-95 is anticipated for the construction of ramp gores and auxiliary lanes. Extended closures (full weekend) may be required at the Military Trail ramps to construct connections to the new CD roads. Standard bridge and roadway widening construction methods and closures will be utilized for construction of the TDUI.

5.5.1.8 Multi-Modal Accommodations

Pedestrians and bicycles are not permitted on I-95 since it is a limited access facility. Accordingly, there are no pedestrian/bicycle facilities incorporated into the design. The proposed improvements will not adversely affect the potential for future express bus service within the special use lanes on I-95.

5.5.1.9 Access Management

According to FDOT Access Management standards, I-95 from Northlake Boulevard to Donald Ross Road is classified as Access Class 1, a limited access facility with no direct property connections. FDOT Access Management Guidelines Rule 14-07, Table 1.8.1 provides guidelines for interchange spacing based on the Area Type. The I-95 Interchange with Donald Ross Road is located approximately 2 miles north of the proposed new interchange at Central Boulevard. The I-95 interchange with Military Trail is located approximately one mile south of Central Boulevard. Access for the mainline is provided at interchange locations, specifically at Northlake Boulevard, PGA Boulevard, Donald Ross Road and proposed Central Boulevard within the project limits.

There is no access class assigned to Central Boulevard; however, the proposed design will provide signals and median openings at intersections. The existing median openings will be maintained at existing intersections and new signals at the Central Boulevard interchange will create new access points. No differences in Access Management are proposed for any of the viable build alternatives.

5.5.1.10 Design Exceptions/Variations

A Design Variation for Border Width will be required for construction of both the CD roads and the new TDUI. Acquisition of sufficient additional right-of-way to meet the required border width of 94 feet for a limited access facility will result in substantial additional impacts to adjacent properties. No additional design variations or exceptions are anticipated to be required for the proposed conceptual design.

5.5.1.11 Safety Analysis

An analysis of existing conditions did not identify any specific safety concerns that required evaluation during this study. The CD road isolates the merging and diverging ramp traffic volumes from the I-95 mainline volumes. This condition improves safety by reducing the weaving movements among mainline traffic. The conceptual design proposed for the TDUI provides acceptable level of service conditions. Accordingly, traffic congestion should not affect safety within the project limits.

5.5.1.12 Bridge Analysis

The TDUI option is proposed for Alternative 2. This option entails widening of the existing bridge. The proposed improvements will require a total bridge widening of 39 feet. The widened bridge will match the existing bridge in overall length, span configuration, and appearance. The existing minimum vertical clearance to I-95 would be maintained at 16 feet 4 ¼ inch by utilizing a 54-inch FIB superstructure that has a depth 8 inches less than that of the existing AASHTO Type V beam superstructure. The substructure would consist of reinforced concrete piers founded on pile caps supported by prestressed concrete piles.

5.5.2 Build Alternative 2A (CD Road with DDI)

Build Alternative 2A combines the CD roadway system adjacent to northbound and southbound SR 9/I-95 between the Military Trail interchange ramps and the Central Boulevard interchange ramps with construction of a new DDI at Central Boulevard.

5.5.2.1 Typical Sections

The proposed typical sections for I-95 for this alternative are described in Section 5.3.1.1 and shown in Figures 5-1 and 5-2. The typical section associated with the proposed DDI is described in Section 5.4.2.1 and shown in Figure 5-12.

5.5.2.2 Conceptual Plans

The concept plans for Alternative 2A are provided in Appendix B.

5.5.2.3 Right-of-Way Required

As described in Sections 5.3.1.1 and 5.4.1.1 above, approximately 9.9 acres is required for the proposed mainline improvements, and approximately 2.08 acres would be required for construction of the DDI. The total area of right-of-way required is approximately 12 acres. The parcels that will be impacted are listed in Table 5.6. Figures 5-3 and 5-13 show the location of these parcels.

5.5.2.4 Cost Estimate

The estimated total construction cost for this alternative is approximately $43.7 million. Detailed back up documentation for this estimate is included in Appendix C.

Table 5.6 Alternative 2A (CD Road/DDI) - Right-of-Way Impacts			
Parcel #	***Parcel Name***	***Developed/Undeveloped***	***R/W Impact (acres)***
1	FDOT	Undeveloped	0.17
2	Palm Beach County (Planned District Park)	Undeveloped	1.33
3	Old Palm CDD	Undeveloped	1.50
4	Old Palm Golf Club Inc.	Undeveloped	0.54
5	Old Palm Golf Club Inc.	Undeveloped	0.54
6	Nova Southeastern University	Undeveloped	0.09
7	Paloma HOA Inc.	Undeveloped	1.97
9	North Palm County Improvements District	Developed	0.36
9	South Gardens LLC	Undeveloped	1.79
10	South Gardens LLC	Undeveloped	1.59
11	Old Palm CDD	Undeveloped	0.34
12	Central Gardens POA Inc.	Undeveloped	1.73
13	Old Palm CDD	Undeveloped	0.01
		Total	**11.96**

5.5.2.5 Drainage

Preliminary analysis of drainage requirements indicates that treatment of runoff from the proposed additional impervious areas can be accomplished in dry retention swales and exfiltration trenches located within the proposed roadway right-of-way. Construction of additional outfall control structures and modification of some existing outfall structures will be required to increase treatment capacity in some of the existing roadside swales.

5.5.2.6 Utilities

Impacts to existing utilities resulting from construction of Alternative 2A are the same as those described in Section 5.5.1.6 for Alternative 2, above.

5.5.2.7 Traffic Control Concepts

Minimal impacts are anticipated to I-95 traffic during construction of the proposed improvements. Construction of the CD roads will occur outside of mainline traffic. Shifting the lanes to the inside of I-95 are anticipated for the construction of ramp gores and auxiliary lanes. Extended lane closures (full weekend) may be required at the Military Trail ramps to construct connections to the new CD roads. Construction of the DDI will substantially impact maintenance of traffic. Construction of new bridges, the crossover ramps, and the change in median width will contribute to the complexity of the traffic control plan for this alternative.

5.5.2.8 Multi-Modal Accommodations

Pedestrians and bicycles are not permitted on a limited access facility so none are incorporated in this alternative. The alternative does not affect the potential for express bus service within the special use lanes on I-95.

5.5.2.9 Access Management

A discussion of access management that applies to all viable build alternatives can be found in Section 5.5.1.9 of this report.

5.5.2.10 Design Exceptions/Variations

A Design Variation for Border Width will be required for construction of both the CD roads and the new TDUI. Acquisition of sufficient additional right-of-way to meet the required border width of 94 feet for a limited access facility will result in substantial additional impacts to adjacent properties. No additional design variations or exceptions are anticipated to be required for the proposed conceptual design.

5.5.2.11 Safety Analysis

An analysis of existing conditions did not identify any specific safety concerns that required evaluation during this study. The CD road isolates the merging and diverging ramp traffic volumes from the I-95 mainline volumes This condition improves safety by reducing weaving movements among mainline traffic. The DDI, compared to the TDUI, changes the nature and number of vehicle conflict points in a way that eliminates the potential for the type of broad side collisions that can occur when red light runners collide with the first vehicles entering from the cross street. These types of conflicts at a conventional signalized ramp terminus intersection are replaced by merging and diverging movements that create a potential for a different type of collision where relative speeds are not as high, and thus kinetic energy on impact is lower.

5.5.2.12 Bridge Analysis

The proposed DDI will require complete removal of the existing Central Boulevard bridge (Bridge No. 930379) over I-95. The proposed bridge total length is 307 feet consisting of two 153-foot 6-inch spans which locate the abutments outside of the Clear Zone of an I-95 section which includes a future 12-foot wide Express Lane. FIB-63 beams spaced at 7 feet may span the required distance and provide a minimum clearance of 16 feet 6 inches. The substructure would consist of reinforced concrete piers founded on pile caps supported by prestressed concrete piles, and MSE retaining wall abutments.

5.5.3 Build Alternative 3 (Braided Ramp System with TDUI)

Build Alternative 3 combines the Braided Ramp System mainline improvements on SR 9/I-95 between the Military Trail ramps and the Central Boulevard interchange ramps with construction of a new TDUI at Central Boulevard.

5.5.3.1 Typical Section

The proposed typical section for mainline I-95 for this alternative is described in Section 5.3.2.1 and shown in Figure 5-4. The typical sections associated with the proposed TDUI are described in Section 5.4.1.1 and shown in Figures 5-7, 5-8 and 5-9.

5.5.3.2. Conceptual Plans

The conceptual plans for Alternative 3 are provided in Appendix B.

5.5.3.3 Right-of-Way

It is anticipated that acquisition of approximately 11.6 acres of right-of-way would be required for construction of Alternative 3. As described in Sections 5.3.1.1 and 5.4.1.1 above, approximately 10.1 acres is required for the proposed mainline improvements, and approximately 1.46 acres would be required for construction of the TDUI. The impacted parcels are listed in Table 5.7. See Figures 5-5 and Figures 5-10 above for the locations of the parcels referenced in Table 5.7.

Table 5.7
Alternative 3 (Braided Ramp System/TDUI) - Right-of-Way Impacts

Parcel	*Parcel Name*	*Developed/Undeveloped*	*R/W Impact (acres)*
1	FDOT	Undeveloped	0.04
2	Palm Beach County (Planned District Park)	Undeveloped	1.33
3	Old Palm CDD	Undeveloped	1.79
4	Old Palm Golf Club Inc.	Undeveloped	0.38
5	Old Palm Golf Club Inc.	Undeveloped	0.27
6	Nova Southeastern University	Undeveloped	0.01
7	Paloma HOA Inc.	Undeveloped	2.47
8	North Palm County Improvements District	Developed	0.34
9	South Gardens LLC	Undeveloped	1.88
10	South Gardens LLC	Undeveloped	1.59
12	Central Gardens POA, Inc.	Undeveloped	1.46
		Total	**11.56**

5.5.3.4 Cost Estimate

The estimated construction cost is $47.3 million. Detailed back up documentation for this estimate is included in Appendix C.

5.5.3.5 Drainage

Preliminary analysis of drainage requirements indicates that treatment of runoff from the proposed additional impervious areas can be accomplished in dry retention swales and exfiltration trenches located within the proposed roadway right-of-way. Construction of additional outfall control structures and modification of some existing outfall structures will be required to increase treatment capacity in some of the existing roadside swales.

5.5.3.6 Utilities

Alternative 3 will have major impacts to FPL transmission lines located in the SE quadrant of the Central Blvd. / I-95 crossing. Relocation of these lines will be required in to accommodate the proposed ramp alignment. Coordination will be required with FPL Transmission during the design phase to determine the extent of required relocations.

Alternatives 3 have potential impact to water and sewer utilities which are limited to the need to encase existing utilities due to the addition of fill over existing lines or construction of retaining walls over the

existing lines. The FDOT Utility Accommodation Manual does not allow placement of pressurized utility lines within certain areas of retaining walls. Because alternatives 3 and 3A introduce additional retaining wall sections on the braided ramps additional encasement and protection is required when compared to alternatives 2 and 2A. The following Water and Sewer utility lines will have potential conflicts and coordination during the design phase will be required to determine if relocation is required:

- 36-inch FM (South of Central Blvd parallel to canal)- Partially encased. Evaluate if extension of casing under CD roads is required.
- 16-inch FM (South of Central Blvd parallel to canal)- Partially encased. Evaluate if extension of casing under CD roads is required.
- 30-inch FM (South of Central Blvd parallel to canal)- Partially encased. Evaluate if extension of casing under CD roads is required.
- WM (north of Central) - Will require encasement to cross under MSE walls at Central Blvd ramps to/from the north.
- 36-inch WM (north of Central Blvd.) - Evaluate extension of existing casing under SB off ramp to Central Blvd.
- 24-inch RWM (north of Central Blvd.) - Evaluate extension of existing casing under SB off ramp to Central Blvd.

The Florida Department of Transportation maintains underground ITS and roadway lighting conduit/cables within the project limits. Coordination will be required during design and construction to determine if relocations are required. Existing roadway light poles are in direct conflict with the proposed ramp connections along I-95 and will require relocation.

5.5.3.7 Traffic Control Concepts

Minimal impacts are anticipated to I-95 traffic during construction of the proposed improvements. Construction of the braided ramps will occur outside of mainline traffic. Shifting the I-95 lanes to the inside will be anticipated on I-95 for the construction of ramp gores and auxiliary lanes. Extended lane closures (full weekend) may be required at the Military Trail ramps to construct connections to the braided ramps roads. Standard bridge and roadway widening construction methods and closures will be utilized for construction of the TDUI.

5.5.3.8 Multi-Modal Accommodations

Pedestrians and bicycles are not permitted on I-95 since it is a limited access facility. Accordingly, there are no pedestrian/bicycle facilities incorporated into the design. The proposed improvements will not adversely affect the potential for future express bus service within the special use lanes on I-95.

5.5.3.9 Access Management

A discussion of access management that applies to all viable build alternatives can be found in Section 5.5.1.9 of this report.

5.5.3.10 Design Exceptions/Variations

A Design Variation for Border Width will be required for construction of both the braided ramp system on the mainline and the new TDUI. Acquisition of sufficient additional right-of-way to meet the required border width of 94 feet for a limited access facility will result in substantial additional impacts to

adjacent properties. No additional design variations or exceptions are anticipated to be required for the proposed conceptual design.

5.5.3.11 Safety Analysis

An analysis of existing conditions did not identify any specific safety concerns that required evaluation during this study. The Braided Ramp system isolates the merging and diverging ramp traffic volumes both from the I-95 mainline and from each other, making it slightly superior to the CD road option in this regard. The conceptual design proposed for the TDUI provides acceptable level of service conditions. Accordingly, traffic congestion should not affect safety within the project limits.

5.5.3.12 Bridge Analysis

The proposed condition for Alternative 3 mainline consists of two braided ramp bridge structures located between PGA Boulevard and Central Boulevard – one adjacent to southbound I-95 and a second adjacent to northbound I-95. In general, both Florida-I Beam and Steel Plate Girder bridge types can span the required distances and accommodate the curvature of the ramps. For the purposes of this Preliminary Engineering Report, a Florida-I Beam concept is presented for the Southbound braided ramp bridge, and a continuous steel plate girder concept is presented for the Northbound braided ramp bridge. (Due to substructure complexity, steel bridge unit costs are used for both locations.)

Southbound Braided Ramp Bridge

The typical section includes one 15-foot lane and 6-foot shoulders with concrete bridge traffic railings for an out-to-out width of 30 feet 1-inch. The proposed bridge total length is 350 feet consisting of two 175-foot spans. The superstructure of the bridge is comprised of a 9 ½ inch reinforced concrete deck supported by prestressed concrete FIB 63 beams. The substructure is made up of an Inverted T Straddle Bent supported by columns with independent pile caps founded on prestressed concrete piles. Bridge abutments will be comprised of pile bents and MSE retaining walls.

Northbound Braided Ramp Bridge

The typical section includes two 12-foot lanes, a 6-foot inside shoulder, and a 10-foot outside shoulder with concrete bridge traffic railings for an out-to-out width of 43 feet, 1 inch. The proposed bridge total length is 501 feet with a 191-foot wide middle span and two 155 feet wide flanking spans. The superstructure of the bridge is comprised of a 9 ½ inch reinforced concrete deck supported by continuous steel plate girders with 57 inch webs. The substructure is made up of single column concrete piers with integral steel caps. The piers are supported by pile caps founded on prestressed concrete piles. Bridge abutments will be comprised of pile bents and MSE retaining walls

TDUI

The TDUI option is included in Alternative 3. This option entails widening of the existing bridge. The proposed improvements will require a total bridge widening of 39 feet. The widened bridge will match the existing bridge in overall length, span configuration, and appearance. The existing minimum vertical clearance over I-95 would be maintained at 16 feet-4 ¼ inches by utilizing a 54-inch FIB superstructure that has a depth eight inches less than that of the existing AASHTO Type V beam superstructure. The substructure would consist of reinforced concrete piers founded on pile caps supported by prestressed concrete piles.

5.5.4 Build Alternative 3A (Braided Ramp System with DDI)

Build Alternative 3A combines the braided ramp roadway system along mainline SR9/I-95 between the Military Trail ramps and the Central Boulevard interchange ramps with construction of a new DDI at Central Boulevard.

5.5.4.1 Typical Sections

The proposed typical section for I-95 for this alternative are described in Section 5.3.2.1 Typical Sections (I-95 Mainline), and shown in Figure 5-4. The typical section associated with the proposed DDI is described in Section 5.4.2.1 and shown in Figure 5-12.

5.5.4.2 Conceptual Plans

The concept plans for Alternative 3A are provided in Appendix B.

5.5.4.3 Right-of-Way Required

It is anticipated that acquisition of approximately 12.2 acres of right-of-way would be required for construction of Alternative 3. As described in Sections 5.3.1.1 and 5.4.1.1 above, approximately 10.1 acres is required for the proposed mainline improvements, and approximately 2.08 acres would be required for construction of the DDI. See Table 5.8 below, and Figures 5-5 and 5-13 above for more details about the proposed areas to be acquired.

Table 5.8
Alternative 3A (Braided Ramp System/DDI) - Right-of-Way Impacts

Parcel	*Parcel Name*	*Developed/Undeveloped*	*R/W Impact (acres)*
1	FDOT	Undeveloped	0.04
2	Palm Beach County (Planned District Park)	Undeveloped	1.33
3	Old Palm CDD	Undeveloped	1.79
4	Old Palm Golf Club Inc.	Undeveloped	0.38
5	Old Palm Golf Club Inc.	Undeveloped	0.27
6	Nova Southeastern University	Undeveloped	0.01
7	Paloma HOA Inc.	Undeveloped	2.47
8	North Palm County Improvements District	Developed	0.34
9	South Gardens LLC	Undeveloped	1.88
10	South Gardens LLC	Undeveloped	1.59
11	Old Palm CDD	Undeveloped	0.34
12	Central Gardens POA, Inc.	Undeveloped	1.73
13	Old Palm CDD	Undeveloped	0.01
		Total	**12.18**

5.5.4.4 Cost Estimate

The estimated total construction cost for this alternative is approximately $57.4 million. Detailed back-up documentation for this estimate is included in Appendix C.

5.5.4.5 Drainage

Preliminary analysis of drainage requirements indicates that treatment of runoff from the proposed additional impervious areas can be accomplished in dry retention swales and exfiltration trenches located within the proposed roadway right-of-way. Construction of additional outfall control structures and modification of some existing outfall structures will be required to increase treatment capacity in some of the existing roadside swales.

5.5.4.6 Utilities

Alternative 3A will have the same impacts on utilities as Alternative 3. These impacts are described in Section 5.5.3.6 above.

5.5.4.7 Traffic Control Concepts

Minimal impacts are anticipated to I-95 traffic during construction of the proposed improvements. Construction of the braided ramps will occur outside of mainline traffic. Shifting the lanes to the inside will be anticipated on I-95 for the construction of ramp gores and auxiliary lanes. Extended closures (full weekend) may be required at the Military Trail ramps to construct connections to the new braided ramps. Construction of the DDI will substantially impact maintenance of traffic. Construction of new bridges, the crossover ramps, and the change in median width will contribute to the complexity of the traffic control plan for this alternative.

5.5.4.8 Multi-Modal Accommodations

Pedestrians and bicycles are not permitted on a limited access facility so none are incorporated in this alternative. The alternative does not affect the potential for express bus service within the special use lanes on I-95.

5.5.4.9 Access Management

A discussion of access management that applies to all viable build alternatives can be found in Section 5.5.1.9 of this report.

5.5.4.10 Design Exceptions/Variations

A Design Variation for Border Width will be required for construction of both the braided ramp system and the new DDI. Acquisition of sufficient additional right-of-way to meet the required border width of 94 feet for a limited access facility will result in substantial additional impacts to adjacent properties. No additional design variations or exceptions are anticipated to be required for the proposed conceptual design.

5.5.4.11 Safety Analysis

An analysis of existing conditions did not identify any specific safety concerns that required evaluation during this study. The Braided Ramp system isolates the merging and diverging ramp traffic volumes both from the I-95 mainline and from each other, making it slightly superior to the CD road option in this regard. The DDI, compared to the TDUI changes the nature and number of vehicle conflict points in a way that eliminates the potential for the type of broad side collisions that can occur when red light runners collide with the first vehicles entering from the cross street. These types of conflicts at a conventional signalized ramp terminus intersection are replaced by merging and diverging movements

that create a potential for a different type of collision where relative speeds are not as high, and thus kinetic energy on impact is lower.

5.5.4.12 Bridge Analysis

The proposed condition for Alternative 3A mainline consists of two braided ramp bridge structures located between PGA Boulevard and Central Boulevard – one adjacent to southbound I-95 and a second adjacent to northbound I-95. In general, both Florida-I Beam and Steel Plate Girder bridge types can span the required distances and accommodate the curvature of the ramps. For the purposes of this Preliminary Engineering Report, a Florida-I Beam concept is presented for the Southbound braided ramp bridge, and a continuous steel plate girder concept is presented for the Northbound braided ramp bridge. (Due to substructure complexity, steel bridge unit costs are used for both locations.)

Southbound Braided Ramp Bridge

The typical section includes one 15-foot lane and 6-foot shoulders with concrete bridge traffic railings for an out-to-out width of 30 feet 1 inch. The proposed bridge total length is 350 feet consisting of two 175-foot spans. The superstructure of the bridge is comprised of a 9 ½ inch reinforced concrete deck supported by prestressed concrete FIB 63 beams. The substructure is made up of an Inverted T Straddle Bent supported by columns with independent pile caps founded on prestressed concrete piles. Bridge abutments will be comprised of pile bents and MSE retaining walls

Northbound Braided Ramp Bridge

The typical section includes two 12-foot lanes, a 6-foot inside shoulder, and a 10-foot outside shoulder with concrete bridge traffic railings for an out-to-out width of 43 feet, 1 inch. The proposed bridge total length is 501 feet with a 191-foot wide middle span and two 155 feet wide flanking spans. The superstructure of the bridge is comprised of a 9 ½ inch reinforced concrete deck supported by continuous steel plate girders with 57 inch webs. The substructure is made up of single column concrete piers with integral steel caps. The piers are supported by pile caps founded on prestressed concrete piles. Bridge abutments will be comprised of pile bents and MSE retaining walls

DDI

The proposed DDI will require complete removal of the existing Central Boulevard bridge (Bridge No. 930379) over I-95. The proposed bridge total length is 307 feet consisting of two 153-foot 6-inch spans which locate the abutments outside of the Clear Zone of an I-95 section which includes a future 12-foot wide Express Lane. FIB-63 beams spaced at 7 feet may span the required distance and provide 16 feet 6 inches of minimum vertical clearance. The substructure would consist of reinforced concrete piers founded on pile caps supported by prestressed concrete piles, and MSE retaining wall abutments.

5.6 Environmental Impacts

5.6.1 Land Use

None of the build alternatives would result in changes to locally adopted land use plans. The project is consistent with the community's development goals as it is part of the Cost Feasible Plan of the Palm Beach County Metropolitan Planning Organization (MPO)'s 2040 Long Range Transportation Plan (LRTP), adopted in late 2014, and is listed in the MPO's Transportation Improvement

Program (TIP). It is also included in the Transportation Element of Palm Beach County's Comprehensive Plan.

5.6.2 Relocations

No business, institutional, or residential relocations will be required for construction of Alternatives 2, 2A, 3 or 3A.

5.6.3 Community Cohesion

The proposed improvements will occur along an existing regional limited access facility. These improvements, which include construction of a new interchange at Central Boulevard, will improve overall traffic operations and operational capacity. No direct impacts will occur to any community services, hospitals or schools in the project area. Since the proposed new interchange will relieve traffic congestion at SR 9/I-95 and PGA Boulevard, response times for emergency services could improve. No adverse impacts on cohesion of the existing communities in the vicinity of the SR 9/I-95 corridor will result from the proposed improvements for any of the viable alternatives discussed above.

5.6.4 Farmlands

According to the Efficient Transportation Decision Making (ETDM) Summary Report, the Natural Resources Conservation Service (NRCS) determined that there are substantial areas of Prime Farmland located in the immediate vicinity of the project. However, there are no active agricultural lands within the project vicinity, and the project area has been converted from agricultural to non-agricultural uses (urban land). According to Part 2, Chapter 28, Section 28-2.1 of the FDOT PD&E Manual, transportation projects situated entirely within urbanized areas with no adjacent existing or future agricultural land uses are excluded from Farmland Assessments. Since the proposed improvements are located within a designated urban area, a farmlands assessment is not required and anticipated impacts are minimal.

5.6.5 Cultural Resources

A Cultural Resource Assessment Survey (CRAS) was conducted to identify cultural resources within the project area of potential effect (APE) and assess their eligibility for listing in the National Register of Historic Places (National Register). The assessment complied with Section 106 of the National Historic Preservation Act of 1966, as implemented by 36 CFR 800 – Protection of Historic Properties, and all applicable laws as defined in the FDOT PD&E Manual.

The APE encompassed all areas potentially impacted by the viable alternatives described above. No archaeological sites were identified within the APE. The survey did result in identification of the previously recorded Military Trail Road (8PB13795). The portion of this resource located in the APE is considered ineligible for listing in the National Register. Two newly identified historic buildings and two newly identified historic canals were identified. These four resources are not considered eligible for inclusion in the National Register individually or as contributing to a historic district. Accordingly, improvements proposed by Alternatives 2, 2A, 3 and 3A (described above) are not anticipated to adversely impacts any historic or archaeological resource eligible for listing in the National Register.

5.6.6 Potential Section 4(f) Lands

One existing and one planned public park are located immediately adjacent to the north side of I-95 between Military Trail and Central Boulevard. Palm Beach Gardens City Park is an existing 32-acre park

which includes a 13-acre Tennis Center. Palm Beach County District Park is a planned County park, but the parcel intended for the future park development is currently vacant.

The Palm Beach Gardens City Park is owned and operated by the City of Palm Beach Gardens. The 32-acre property comprises a 19-acre multiuse recreational park and a 13-acre tennis center. A portion of the park is currently under construction to expand the facilities as the Joseph R. Russo Athletic Complex. Construction completion is estimated for October 2016. Additional facilities include basketball courts, racquet/handball courts, a multiuse trail, playground, restrooms and parking. No right-of-way will be acquired from City Park. Access from Central Blvd. will be maintained during construction; there will be no permanent or temporary changes to park access. There will be no direct use of the park, but the SR 9/I-95 Southbound edge of pavement will move slightly closer to the park.

A Noise Analysis was conducted for the Recommended Alternative. The analysis indicated potential noise impacts to two existing tennis courts, four proposed tennis courts, most existing handball courts, portions of a proposed multi-purpose field, and a walking trail. The Noise Analysis evaluated whether noise abatement is warranted, including a cost/benefit analysis which considered the number of park visitors. Noise barriers adjacent to the park failed to meet the twin criteria of feasible and cost reasonable.

The Federal Highway Administration (FHWA) concurred with the Department's determination that although the park is subject to the provisions of Section 4(f) of the US Transportation Act of 1966, the proposed transportation improvements will not entail a "use" (either actual or constructive) of the Section 4(f) resource.

The District Park property is currently an 80+ acre undeveloped parcel purchased by Palm Beach County using 1999 Recreational and Cultural Facilities Bond funds with the intent to develop the property as an active park facility. The property is located within the City of Palm Beach Gardens, which is actively pushing the County to develop the park and has expressed interest in operating the park post-construction. The County recognizes the need for the park and provided a letter of significance for the future park (see attached), which also states the County's intent to develop the park. However, park development is currently unfunded and there is no established timeframe for development. The County is currently considering a sales tax referendum for the 2016 ballot to begin acquiring funds for park development.

The County has developed a Conceptual Master Plan for the park, but any final plan would first require approval by Palm Beach County's Board of County Commissioners (landowner) and the City of Palm Beach Garden's Town Council (jurisdiction). Both Build Alternatives would require minor right-of-way acquisition (less than 2 acres or approximately 2% of total property) from the future park property. The County has acknowledged that the Conceptual Master Plan is subject to change and stated that they are willing to work with FDOT to accommodate the I-95 improvements since their design is not yet finalized. No other short or long term impacts will occur to the facility as there are currently no features, activities or attributes, or access to affect. The site is currently fenced with no access to the public. Future access is anticipated off a side road (117th Court N.) from Central Boulevard - the same road currently providing access to City Park. Access to 117th Court N. will be maintained during and post-construction. Regarding noise, as this park is only planned and not yet permitted, FHWA and FDOT procedures do not require consideration of noise impacts because there are no existing or future usage numbers available. However, the area will be reevaluated for noise, as well as other impacts, during the design phase.

The Department has requested to pursue a de minimis finding for the District Park. Since there are no existing facilities and currently no access to the park, it is anticipated that FHWA will concur that the proposed improvements will at most result in a de minimis impact to the future park.

5.6.7 Wetlands

Approximately 9.4 acres of wetlands would be impacted by each of the four viable alternatives. Accordingly, there are no differences among the alternatives as far as wetland impacts. Approximately 8.14 acres can be described as herbaceous wetlands which occur in existing swales. Approximately 1.25 acres of swales to be impacted can be classified as "Other Surface Waters". Impacts to these wetlands are unavoidable. It is anticipated that mitigation will be required for impacts to the 8.14 acres of herbaceous wetlands.

5.6.8 Wildlife and Habitat

The proposed improvements are not located within any federally designated Critical Habitat or Strategic Habitat Conservation Areas. The project is located within the consultation area for the Florida scrub jay, the red-cockaded woodpecker and the snail kite. However, field reviews indicate that the majority of the natural habitats remaining within the proposed right-of-way for the viable alternatives evaluated is not suitable for use by any of these three species. Some of the natural habitat remaining in this highly developed project corridor may be marginally suitable for red-cockaded woodpeckers and seasonal foraging for wood storks. However, none of these areas will be impacted by the proposed viable alternatives.

Preparation of an Endangered Species Biological Assessment report is ongoing. Concurrence with the conclusions of this report will be coordinated with the resource agencies.

5.6.9 Essential Fish Habitat

The project was reviewed for involvement with Essential Fish Habitat (EFH). The canals and water bodies in the vicinity of the project are not tidal and are located upstream of South Florida Water Management District (SFWMD) water control structures. According to the ETDM Program Summary Report, the National Marine Fisheries Service (NMFS) concluded that the proposed work would not directly impact areas that support EFH or National Oceanic and Atmospheric Administration (NOAA) trust fishery resources. No further consultation is required with NMFS.

5.6.10 Contamination

A Contamination Screening Evaluation Report (CSER) was prepared for this project. Potential contamination sites located within 500 feet of the existing roadway were evaluated for soil and groundwater contamination. Sites identified were rated as low, medium or high risk sites, depending on their current and historical use and regulatory status. Seven Low risk sites, two Medium risk sites and no High risk site were identified. The potential for involvement with contaminated sites is about the same for the four viable build alternatives. The No-Build Alternative will not result in any involvement with potentially contaminated sites. Right-of-way acquisition is not proposed from adjacent properties rated as High or Medium risk of contamination.

The majority of potential contamination sites within 500 feet of the project are considered to present Low risk based on their current and historical permit(s), site use, and regulatory status. This includes those sites which have no records of industrial or storage tank permits, no documented contamination events or have an agency approved

SRCO/NFA status as the result of successful remedial actions (other than petroleum contaminated sites). Sites are also assigned a Low rating based on their proximity to the project corridor if they held or currently hold a USEPA Hazardous Waste Generator permit, even if contamination concerns were not discovered in the records review.

Right-of-way acquisition is not anticipated from adjacent properties rated as High or Medium risk of contamination. It is recommended that the project be reevaluated during design to determine if any new contamination-related risks are present and to evaluate potential dewatering concerns. Level II Contamination Assessment investigations are recommended for any areas that have proposed dewatering or subsurface work activities (e.g. pole foundations, drainage features) occurring adjacent to or at any of these sites. If dewatering will be necessary during construction, a SFWMD Water Use Permit will be required. The contractor will be held responsible for ensuring compliance with any necessary dewatering permit(s). Any dewatering operations in the vicinity of potentially contaminated areas shall be limited to low-flow and short-term. A dewatering plan may be necessary to avoid potential contamination plume exacerbation. All permits will be obtained in accordance with Federal, State, and local laws and regulations.

Additionally, Section 120 Excavation and Embankment – Sub-article 120-1.2 *Unidentified Areas of Contamination* of the *Standard Specifications for Road and Bridge Construction* will be provided in the proposed project's construction contract documents. This specification requires that in the event that any material or suspected contamination is encountered during construction, or if any spills caused by construction-related activities should occur, the contractor shall be instructed to stop work immediately and notify the FDOT Planning and Environmental Management Office as well as the appropriate regulatory agencies for assistance.

5.6.11 Noise

A detailed noise analysis of the Recommended Alternative was conducted. The analysis was conducted in accordance with FDOT's PD&E Manual, Chapter 17, Noise (May 24, 2011), and with Title 23 CFR Part 772, Procedures for Abatement of Highway Traffic and Construction Noise. The analysis included an evaluation of whether abatement is warranted for impacted sites. Some receptors, including the existing City of Palm Gardens Park, may experience noise levels that approach within 1 dB(A) of 67.0 dB(A) as a result of construction of the Recommended Alternative. Of all the impacted sites, the Noise Study identified three areas where noise barriers are feasible and cost reasonable. These three areas will be evaluated further during final design.

5.6.12 Construction

Construction activities for the proposed project may have temporary air, noise, vibration, water quality, traffic flow, and visual impacts for those residents and travelers within the immediate vicinity of the project. Air quality impacts will be temporary and will primarily be in the form of emissions from diesel-powered construction equipment and dust from embankment and haul road areas. Air pollution associated with the creation of airborne particles will be effectively controlled through the use of watering or the application of other controlled materials in accordance with FDOT's Standard Specifications for Road and Bridge Construction as directed by the FDOT Project Engineer.

Water quality impacts resulting from erosion and sedimentation will be controlled in accordance with FDOT's Standard Specifications for Road and Bridge Construction and through the use of Best Management Practices.

Maintenance of traffic and sequence of construction will be planned and scheduled so as to minimize traffic delays throughout the project. Access to all businesses and residences will be maintained to the extent practical through controlled construction scheduling. Traffic delays will be controlled to the extent possible where many construction operations are in progress at the same time.

Construction of the project may require excavation of unsuitable material (muck), placement of embankments, and use of materials such as limerock, asphaltic concrete, and portland cement concrete. Any demucking will be controlled by adherence to Section 120 of FDOT's Standard Specifications for Road and Bridge Construction. Disposal will be on-site in detention areas or offsite.

The removal of structures and debris will be in accordance with local and State regulatory agencies permitting this operation. The contractor is responsible for his methods of controlling pollution on haul roads, in borrow pits, other materials pits, and areas used for disposal of waste materials from the project.

Temporary erosion control features as specified in the FDOT's Standard Specifications for Road and Bridge Construction, Section 104, will consist of temporary grassing, sodding, mulching, sand bagging, slope drains, sediment basins, sediment checks, artificial coverings, and berms.

Noise and vibration impacts are anticipated to result from movement of heavy equipment and construction activities such as pile driving and vibratory compaction of embankments. Noise control measures will include those contained in FDOT's Standard Specifications for Road and Bridge Construction in addition to those noted in the Noise Study Report developed under separate cover for this project. Adherence to local construction noise and/or construction vibration ordinances by the contractor will also be required where applicable.

5.7 Alternatives Evaluation

Evaluation Matrices were developed to facilitate comparison of environmental impacts of the four viable alternatives. Potential environmental impacts of the mainline options, the CD road and the Braided Ramp system, are compared in Table 5.9. There are no substantial differences in the level of environmental impacts between the two alternatives. Public input from the Alternatives Public Workshop and from meetings with local governments indicates there is more support for the CD road option for the mainline improvements.

Similarly, Table 5.10 compares potential environmental impacts of the two proposed interchange options, the TDUI and the DDI. Environmental Impacts of the two options are similar. Slightly more right-of-way is required for construction of the DDI option compared to the TDUI. Some preference was expressed by the public for the TDUI.

A more comprehensive comparison of the four viable build alternatives and the No-Build alternative is presented in Table 5.11. Engineering, socio-economic, natural and physical environmental criteria as well as project costs are compared. A qualitative scoring system was used to evaluate the criteria. The scores for all of the build alternatives were essentially the same. All of the build alternatives received a higher (more positive) score than the No-Build Alternative.

An operational analysis of the mainline alternatives indicates that although operating speeds on the braided ramp system are somewhat higher than on the CD road system, both will provide an acceptable LOS in the design year. Similarly, the average delay for the DDI is slightly less than for the TDUI configuration, but both provide an acceptable LOS. All four build alternatives meet the project purpose and need. The No-Build Alternative does not meet the project purpose and need.

A comparison of the costs for the four viable build alternatives is provided in Table 5.12. Construction costs vary from 33.9 million dollars for Alternative 2 to 57.4 million dollars for Alternative 3A. Estimated costs for construction of Alternatives 2 and 2A are substantially lower than construction cost estimates for Alternatives 3 and 3A.

Construction cost estimates for these alternatives were developed from the preliminary concept plans prepared for the alternatives as part of this study. In addition, existing construction plans and available existing topographical data were utilized. The estimates include major pay items such as embankment, excavation, pavement, drainage, signalization, lighting, mobilization, and maintenance of traffic. Other components included are curb and gutter, clearing and grubbing, sodding, and signing and pavement marking. Contingency costs were also included in the estimate. Detailed cost estimates are included in Appendix C.

Table 5.9 Alternatives Evaluation Matrix
Comparison of Interchange Options

INTERCHANGE OPTIONS	Right-of-Way Impacts/Relocations	Social & Neighborhood Impacts	Economic & Employment Impacts	Parks/Recreation Lands	Public Comments	Noise Impacts	Air Quality	Contamination	Wildlife / Wetland Impacts	Water Quality	Cultural Resources Historic / Archaeological
TDUI	1.46 acres/ No Relocations	Less Impact than DDI	No Impacts	No Impacts	28 comments received 4 prefer Diamond Interchange	No Substantial Differences	Minimal Impact	No Impacts	Minimal Impact	Minimal Impact	No Impacts
DDI	2.08 acres/ No Relocations	Visual Impacts Possibly Greater	No Impacts	No Impacts	28 comments received - No preference stated for DDI	No Substantial Differences	Minimal Impact	No Impacts	Minimal Impact	Minimal Impact	No Impacts

Table 5.10 Alternative Evaluation Matrix
Comparison of Mainline Options

MAINLINE ALTERNATIVES	Right-of-way Impacts/ Relocations	Social & Neighborhood Impacts	Economic & Employment Impacts	Section 4(f) Lands/Recreation	Public Comments	Noise Impacts	Air Quality	Contamination	Wildlife / Wetland Impacts	Water Quality	Cultural Resources Historic / Archaeological
CD Road	9.88 acres/No Relocations	Minimal Impact - No Substantial Difference	Minimal to None	1.86 Acres to Planned County District Park/ No Impacts to City Park	28 comments received - 1 preference for CD Road; Local Government generally support CD over Braided due to lower cost, lower ROW Impacts and less visual impacts	No Substantial Difference	Minimal Impact	No Impacts	Minimal Impact	Minimal Impact	No Impacts
Braided Ramp	10.1 acres/ No Relocations	Minimal Impact - No Substantial Difference	Minimal to None	1.75 Acres to Planned County District Park\ No Impacts to City Park	28 comments received - no preference stated for Braided Ramps	No Substantial Difference	Minimal Impact	No Impacts	Minimal Impact	Minimal Impact	No Impacts

Table 5.11 Alternatives Evaluation Matrix
Comparison of Alternatives

LEGEND	Engineering								Socio-Economic					Environment						Cost		SCORE
5 SUBSTANTIAL POSITIVE EFFECT OR BEST ALTERNATIVE 4 GENERALLY POSITIVE EFFECT OR GOOD ALTERNATIVE 3 GENERALLY NO EFFECT OR MODERATE ALTERNATIVE 2 GENERALLY NEGATIVE EFFECT OR INFERIOR ALTERNATIVE 1 SUBSTANTIAL NEGATIVE EFFECT OR WORST ALTERNATIVE	Geometric Compliance to Design Criteria	Access Management	Multi-modal Issues (Transit/Pedestrian/Bicycle)	Mobility	Safety Impacts	Utility Impacts	Maintenance of Traffic	Meets Purpose & Need	Displacements Residential / Businesses	Social & Neighborhood Impacts	Economic & Employment Impacts	Community Services / Features	Public Comments	Noise Impact	Air Quality	Contamination	Biological / Wetland Impacts	Water Quality	Cultural / Historic / Archaeological	Engineering, CEI & Construction	Right of Way / Business Damages	
ALTERNATIVES																						
No Build	3	3	3	1	3	3	5	1	3	3	3	3	3	3	2	3	3	3	3	5	5	64
Build Alternative 2	3	3	2	5	4	3	2	5	3	2	4	3	4	3	4	3	3	3	3	4	4	70
Build Alternative 2A	3	3	2	5	4	3	2	5	3	2	4	3	4	3	4	3	3	3	3	4	3	69
Build Alternative 3	3	3	2	5	5	3	2	5	3	2	4	3	4	3	4	3	3	3	3	3	4	70
Build Alternative 3A	3	3	2	5	5	3	2	5	3	2	4	3	4	3	4	3	3	3	3	3	3	69

Table 5.12 Cost Estimates for Viable Build Alternatives	
Alternative	**Total Cost**
Alternative 2 (CD Road / TDUI)	$33.9 Million
Alternative 2A (CD Road/DDI)	$43.7 Million
Alternative 3 (Braided Ramp System/TDUI	$47.3 Million
Alternative 3A (Braided Ramp System/DDI	$57.4

5.8 Recommended Alternative

Based on the comparative analysis discussed in Section 5.10 which considered impacts to the natural, physical and social environment, input from the local community and local government, operational and engineering issues, and construction costs, the project team selected Alternative 2 as the Recommended Alternative. The Recommended Alternative will meet the purpose and need of the project, have minimal environmental impacts, requires acquisition of the least amount of additional right-of-way, and is the most acceptable to the community. Construction costs for Alternative 2 are estimated to be the lowest of the four build alternatives evaluated. Chapter 6.0 of this report provides additional information about the Recommended Alternative.

6.0 DETAILS OF THE RECOMMENDED ALTERNATIVE

A detailed description of the improvements proposed for the Recommended Alternative is provided below:

- From Northlake Boulevard to PGA Boulevard, minor widening is proposed on northbound I-95 to increase the merge length for the auxiliary lane from the northbound on-ramp from Northlake Blvd. Widening is also proposed on northbound I-95 in order to lengthen the auxiliary lane for the westbound PGA Boulevard off-ramp.
- Collector Distributor (CD) roads will be constructed from the PGA Boulevard interchange to the proposed Central Boulevard interchange between Military Trail and the proposed Central Boulevard interchange.
- The southbound CD road, Ramp A, begins at the Central Boulevard interchange as two lanes and connects to the one-lane southbound off-ramp from I-95, Ramp A-2, to form a three-lane CD road. The outside lane will then depart to Military Trail, Ramp A-1, and two lanes will continue to southbound I-95 with a tapered entrance.
- The northbound CD road, Ramp B, begins as the eastbound and westbound on-ramps from Military Trail and merges to one lane. This will then connect with Ramp B-1, which has two lanes that depart from I-95. The northbound CD road will remain three lanes until one lane enters I-95 just before Central Blvd. as a parallel type entrance, Ramp B-2, and two lanes will proceed to the Central Boulevard Interchange.
- The existing auxiliary lane from the Military Trial on-ramp will be removed.

6.1 Typical Sections (Rev. 11-28-16)

The proposed typical section for I-95 south of Central Boulevard for the CD road alternative is shown in Figure 6-1. This section includes four 12-foot wide general purpose lanes and one 12-foot wide special use lane, a 15-foot inside shoulder, and a 12-foot outside shoulder in each direction. A continuous 12-foot wide auxiliary lane in each direction is also provided. The north and southbound lanes are separated by a two-foot wide concrete median barrier.

The proposed CD road is separated from the mainline by a grassed median that varies in width from six feet to 55 feet. Three 12-foot wide through lanes, with 12-foot wide inside and outside shoulders are provided. The swales at the edges of the right-of-way vary in width from 22 feet to 42 feet. The total width of the typical section, including the CD road, is 441 feet.

The proposed typical section for I-95 north of Central Boulevard is shown in Figure 6-2. This typical section is the same for Mainline Alternative 3. The typical section consists of four 12- foot wide general purpose lanes, one 12-foot wide special use lane, and a 14-foot inside and a 12-foot outside shoulder in each direction. Two southbound 12-foot auxiliary lanes are provided in each direction. Northbound and southbound lanes are separated by a 28-foot grassed median and a double faced guardrail. The swales at the edges of the right-of-way vary in width from 69 feet to 145 feet. The maximum total right-of-way required for this proposed typical section is 372 feet.

Additional details about the proposed typical sections for the Recommended Alternative can be found in the Typical Section Package which is included in Appendix D.

Figure 6-1 –Proposed Typical Section, Recommended Alternative – I-95 South of Central Boulevard

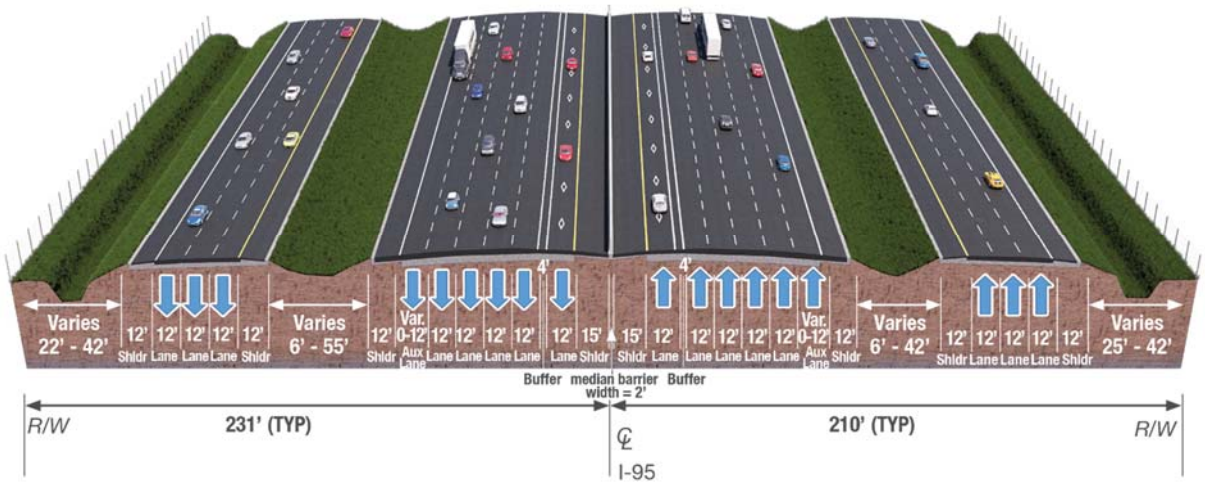
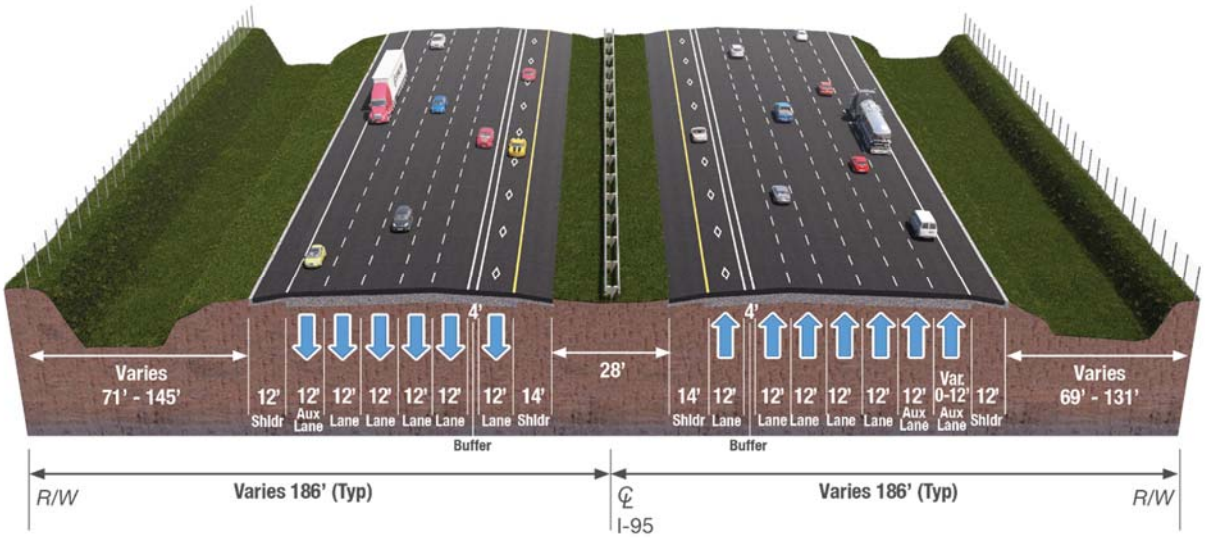
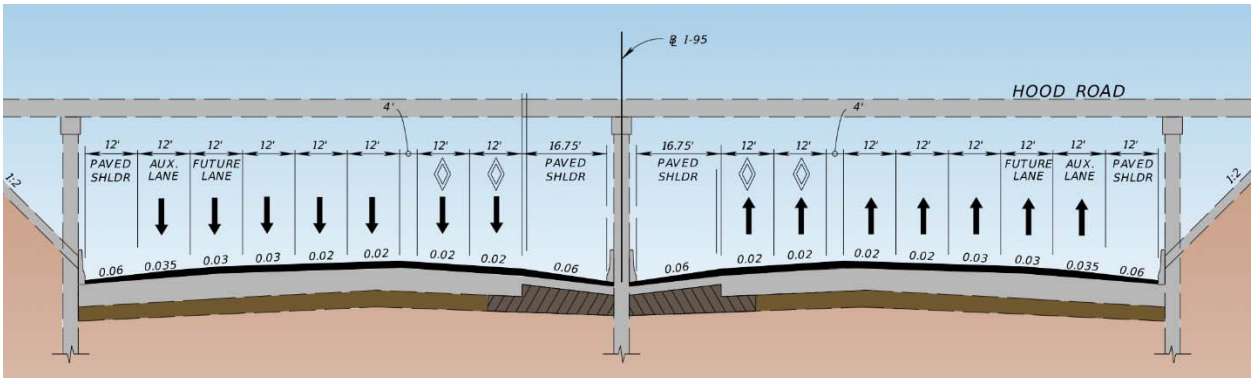


Figure 6-2 –Proposed Typical Section, Recommended Alternative – I-95 North of Central Boulevard



North of Central Boulevard, I-95 passes beneath an existing two-lane Hood Road bridge. An additional two-lane Hood Road bridge is being constructed alongside it as part of a separate project by Palm Beach County to widen Hood Road to four lanes in this area. The planned ultimate section for I-95 in this area proposes to add an additional special use lane in each direction alongside the existing high occupancy vehicle (HOV) lane. Figure 6-3 depicts a conceptual typical section that includes the auxiliary lanes that are proposed as part of this recommended alternative, along with the final two special use lanes proposed for I-95. The condition shown is beneath the existing bridge. Review of the design plans for the Hood Road widening project confirmed that the horizontal clearance beneath the new bridge will slightly exceed that of the existing bridge.

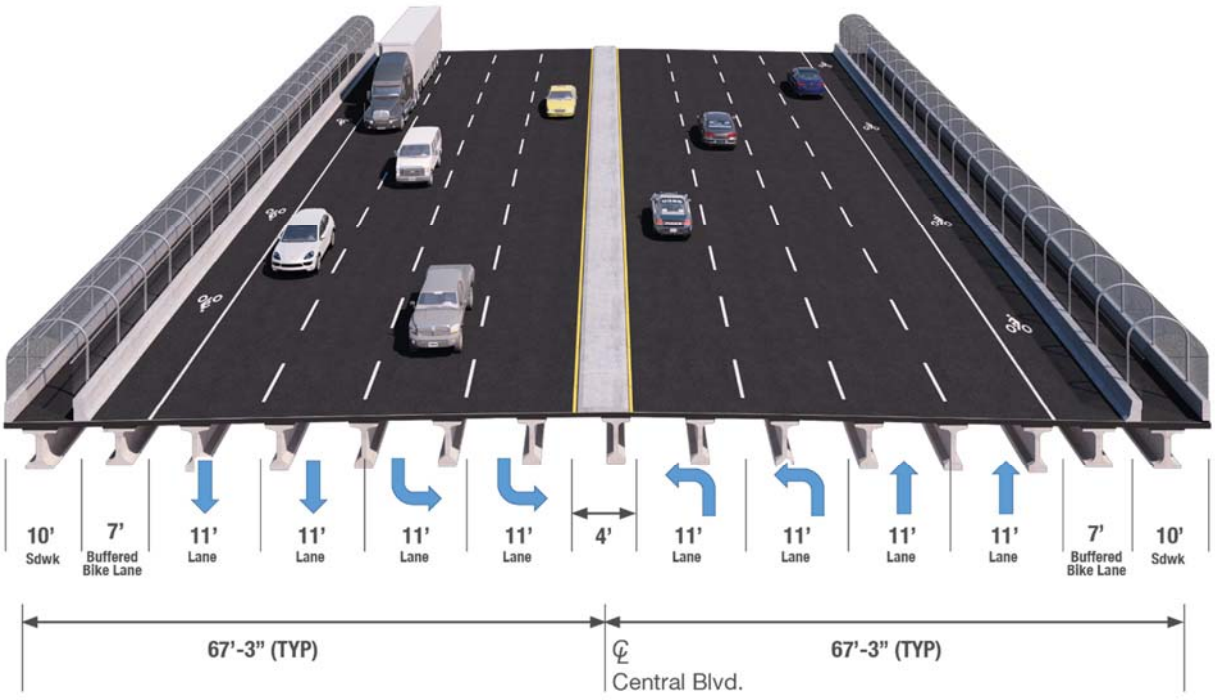
Figure 6-3 –Conceptual Typical Section, Recommended Alternative – I-95 Ultimate Under Hood Road Bridge



Along Central Boulevard through the project limits, the Palm Beach County MPO endorsed the use of 11-foot travel and turn lanes to maximize the space available within the right of way for bicycle and pedestrian facilities. The typical section descriptions and figures that follow reflect this.

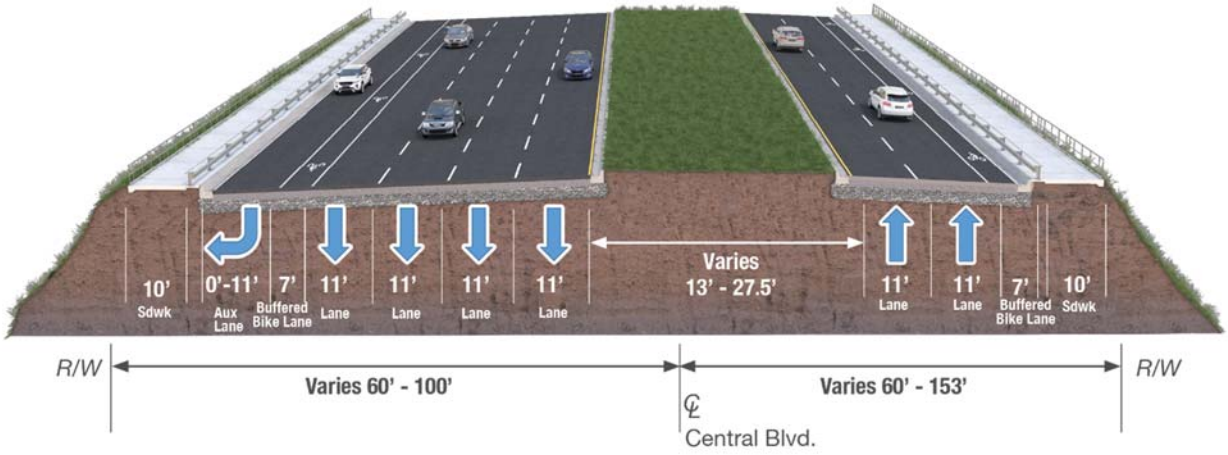
The typical section for the proposed Central Boulevard Bridge for the Tight Diamond Urban Interchange (TDUI) at Central Boulevard is shown in Figure 6-4. This section provides two 11-foot wide through lanes, two 11-foot left turn lanes, a seven–foot designated bicycle lane, and a ten-foot wide enclosed sidewalk in each direction, separated by a four-foot traffic separator. The out-to-out width of the proposed bridge is 134 feet six inches.

Figure 6-4 – Proposed Typical Section, Recommended Alternative - Central Blvd. Bridge for TDUI



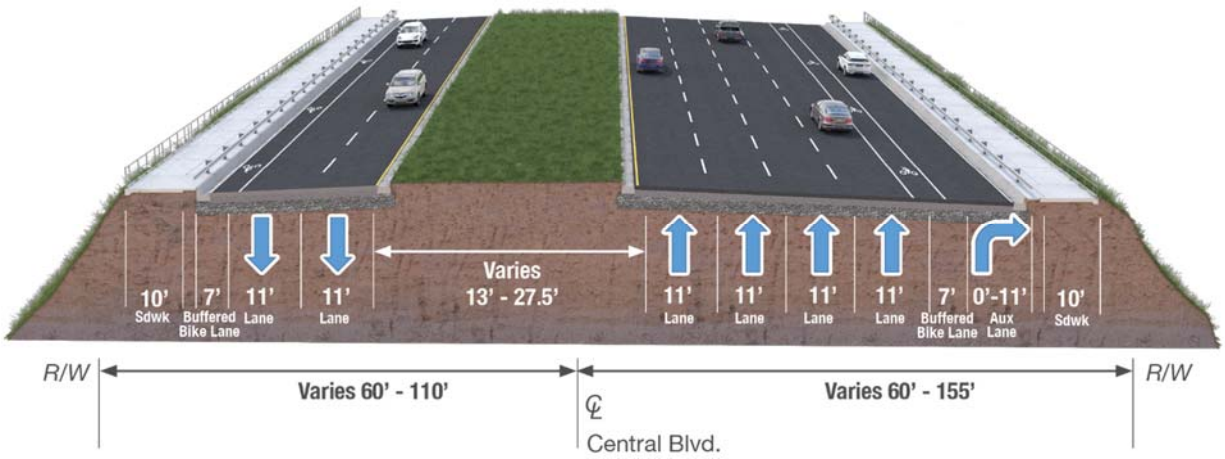
The proposed typical section for Central Boulevard east of I-95 is shown in Figure 6-5. In the eastbound direction, this section provides two 11-foot through lanes, a seven-foot designated bicycle lane and a ten–foot sidewalk. In the westbound direction this section provides four 11-foot through lanes, one 11-foot auxiliary lane, a seven-foot wide designated bicycle lane, and a ten-foot wide sidewalk separated from the travel lanes by a pedestrian rail. The eastbound and westbound lanes are separated by a grassed median that varies in width from 13 feet to 27.5 feet. The total width of this typical section varies from 120 feet to 253 feet.

Figure 6-5 - Proposed Typical Section, Recommended Alternative - Central Blvd. East of I-95



The proposed typical section for Central Boulevard west of I-95 is shown in Figure 6-6. In the westbound direction, this section provides two 11-foot through lanes, a seven-foot designated bicycle lane and a ten–foot sidewalk. In the eastbound direction, this section provides four 11-foot through lanes, one 11-foot auxiliary lane, a seven-foot wide designated bicycle lane, and a ten-foot wide sidewalk separated

Figure 6-6 - Proposed Typical Section, Recommended Alternative - Central Blvd. West of I-95



from the travel lanes by a pedestrian rail. The east and westbound lanes are separated by a grassed median that varies in width from 13 feet to 27.5 feet. The total width of this typical section varies from 120 feet to 265 feet.

6.2 Horizontal and Vertical Alignment

The horizontal alignment data for the proposed CD Roads and Ramps for the Recommended Alternative are provided in Table 6.1.

The proposed vertical alignment has been established considering the existing topography, the minimum required base clearance above the design high water elevation, minimum pavement elevations to accommodate the construction of a closed drainage system (gutter inlets, pipes, outfall to dry retention swales, etc.), and minimum and maximum profile grade criteria. The proposed profiles can be found in Appendix B.

Table 6.1 – Horizontal Alignment Data

RAMP A					
Description		**Station**	**Distance (ft)**	**Bearing**	**Horizontal Curve Data**
Begin Ramp A		6000+00.00	471.37	N 31° 29' 12" W	
Curve A-1	PC	6004+71.37			
	PI	6006+71.41			d = 2° 52' 45" D = 0° 43' 11" L = 400' R = 7,960.34 e = RC
	PT	6008+71.37	287.68	N 34° 21' 57" W	
Curve A-2	PC	6011+59.05			
	PI	6014+07.37			d = 3° 04' 05" D = 0° 37' 04" L = 496.52' R = 9,272.53 e = NC
	PT	6016+55.57	57.12	N 31° 17' 52" W	
SHIFT 12'		6017+12.69	923.11	N 31° 17' 52" W	
		6026+35.80	755.11	N 30° 32' 52" W	
		6033+90.91	1,418.67	N 30° 31' 54" W	
End Ramp A		6048+09.58			
RAMP A-1					
Description		**Station**	**Distance (ft)**	**Bearing**	**Horizontal Curve Data**
Begin Ramp A-1		5000+00.00	1,552.91	N 31° 16' 54" W	
Curve A-1-1	PC	5015+52.91			
	PI	5017+89.48			d = 4° 22' 13" D = 0° 55' 27" L = 472.91' R = 6,200 e = RC
	PT	5020+25.81			
End Ramp A-1		5020+25.81			
RAMP A-2					
Description		**Begin Station**	**Distance (ft)**	**Bearing**	**Horizontal Curve Data**
Begin Ramp A-1		7000+00.00			
Curve A-2-1	PC	7000+00.00			
	PI	7002+35.48			d = 4° 23' 27" D = 0° 55' 58" L = 470.74' R = 6,142.67 e = 0.021
	PT	7004+70.74	26.97	N 26° 09' 25" W	
SHIFT 15'		7004+97.71	846.72	N 26° 09' 25" W	
End Ramp A-2		7013+44.43			

Table 6.1 – Horizontal Alignment Data (Continued)

RAMP B					
Description		**Station**	**Distance (ft)**	**Bearing**	**Horizontal Curve Data**
Begin Ramp B		3000+00.00			
Curve B-1	PC	3000+00.00			
	PI	3002+02.44			d = 1° 56' 06" D = 0° 28' 41" L = 404.84' R = 11,987.71 e = NC
	PT, SHIFT 24'	3004+04.84	104.84	N 30° 23' 57" W	
		3005+09.69	339.83	N 31° 08' 57" W	
Curve B-2	PC	3008+49.51			
	PI	3010+57.77			d = 2° 23' 10" D = 0° 34' 23" L = 416.44' R = 10,000 e = NC
	PT	3012+65.96			
Curve B-3	PC	3012+65.96			
	PI	3014+26.07			d = 1° 47' 05" D = 0° 33' 26" L = 320.19' R = 10,279.97' e = NC
	PT	3015+86.15	2,479.88	N 30° 32' 52" W	
Curve B-4	PC	3040+66.02			
	PI	3042+78.14			d = 16° 05' 23" D = 3° 49' 04" L = 421.44' R = 1,500.74' e = 0.07
	PT	3044+87.46	360.26	N 14° 27' 29" W	
End Ramp B		3048+47.72			

Table 6.1 – Horizontal Alignment Data (Continued)

RAMP B-1					
Description		**Begin Station**	**Distance (ft)**	**Bearing**	**Horizontal Curve Data**
Begin Ramp B-1		2000+00.00	446.9	N 26° 04' 39" W	
Curve B-1-1	PC	2004+46.90			
	PI	2004+52.76			d = 0° 03' 55" D = 0° 33' 29" L = 11.71' R = 10,267.97' e = NC
	SHIFT 24'	2004+58.61			
	PI	2008+52.97			d = 4° 24' 33" D = 0° 33' 34" L = 788.32' R = 10,243.97' e = NC
	PT	2012+46.93			
End Ramp B-1		2012+46.93			
RAMP B-2					
Description		**Station**	**Distance (ft)**	**Bearing**	**Horizontal Curve Data**
Begin Ramp B-2		4000+00.00			
Curve B-2-1	PC	4000+00.00			
	PI	4001+58.53			d = 1° 20' 16" D = 0° 25' 19" L = 317.04' R = 13,577.82' e = NC
	SHIFT 15'	4003+17.04			
	PI	4008+85.07			d = 4° 47' 47" D = 0° 25' 21" L = 1,135.39' R = 13,562.82' e = NC
	PT	4014+52.43			
End Ramp B-2		4014+52.43			

Table 6.1 – Horizontal Alignment Data (Continued)

RAMP C					
Description		**Station**	**Distance (ft)**	**Bearing**	**Horizontal Curve Data**
Begin Ramp C		9000+00.00	402.13	N 30° 18' 46" W	
Curve C-1	PC	9004+02.13			
	PI	9007+30.13			d = 2° 18' 44" D = 0° 21' 09" L = 655.93' R = 16,254.34' e = NC
	PT	9010+58.05	420.42	N 28° 00' 03" W	
Curve C-2	PC	9014+78.47			
	PI	9018+00.34			d = 3° 58' 33" D = 0° 37' 04" L = 643.48' R = 9,273.30' e = NC
	PT	9021+21.95	630.43	N 31° 58' 36" W	
End Ramp C		9027+52.38			
RAMP D					
Description		**Station**	**Distance (ft)**	**Bearing**	**Horizontal Curve Data**
Begin Ramp D		8000+00.00			
Curve D-1	PC	8000+00.00			
	PI	8006+01.69			d = 2° 18' 38" D = 0° 11' 31" L = 1,203.21' R = 29,837.73' e = NC
	PT	8012+03.21	328.83	N 28° 00' 03" W	
Curve D-2	PC	8015+32.04			
	PI	8019+86.96			d = 3° 49' 24" D = 0° 25' 13" L = 909.51' R = 13,629.75' e = NC
	PT	8024+41.54	141.84	N 24° 00' 03" W	
	SHIFT 15'	8025+83.39	314.41	N 24° 00' 03" W	
End Ramp D		8028+97.80			

6.3 Traffic Operational Analysis

6.3.1 Freeway Analysis

Subsequent to the Interchange Justification Report's acceptance by FHWA, the conceptual design of the CD road system was changed from two lanes to three lanes in both directions. The revised analysis of the I-95 section containing the CD road system is located in Appendix A. In 2040, Level of Service (LOS) C or better is achieved within the CD road sections, without degradation of LOS within the travel lanes on I-95 when compared with the No-Build condition.

6.3.2 Interchange Ramp Intersections Analyses

Based on the analysis conducted in the IJR, the ramp termini intersections at the Central Boulevard interchange will operate at LOS C or better through the design year 2040. The intersection analysis summary tables are located in Appendix A.

6.3.3 Other Intersection Analyses

Overall level of service at almost all area intersections is projected to be the same or better in 2040 due to the effect on traffic of the new interchange. The intersection analysis summary tables are located in Appendix A.

6.3.4 Roadway Analysis

The portion of Central Boulevard from the proposed interchange to Donald Ross Road was analyzed to confirm that, with 2040 design year traffic volumes, the projected average travel speed on it will provide acceptable level of service with Central Boulevard as a four lane facility. This analysis is in Appendix A, and includes recommended intersection improvements along Central Boulevard.

6.4 Design Traffic Volumes

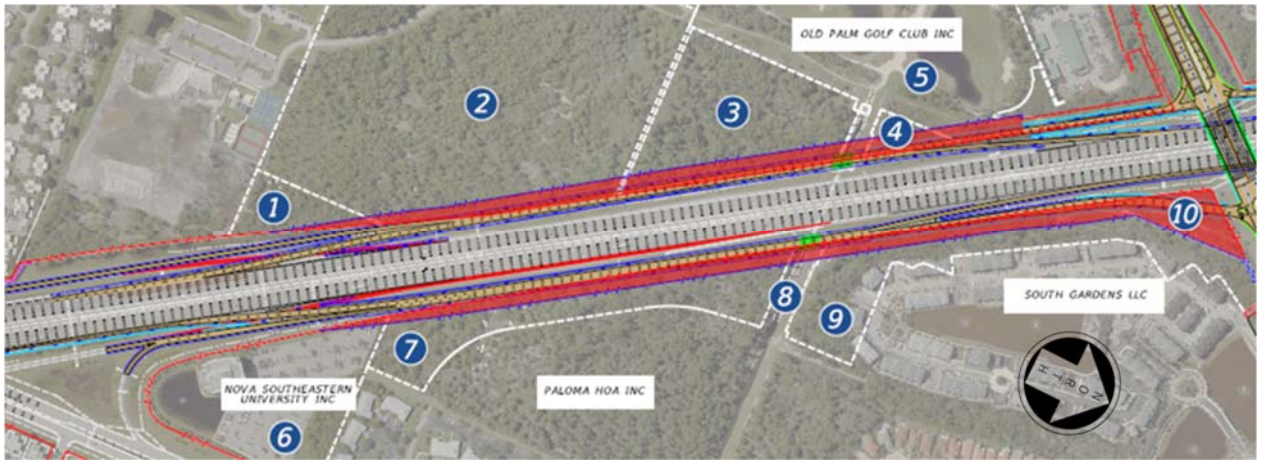
Design Traffic for the proposed interchange was developed as part of the IJR for an opening year 2020, interim year 2030, and design year 2040.

6.5 Right-of-Way Impacts and Relocation

Approximately 11.3 acres of additional property will need to be acquired to accommodate the proposed improvements. However, no residential or business relocations are required. A list of the parcels affected and the area required from each parcel is provided in Table 6.2. The locations of the affected parcels are shown on Figures 6-7 and 6-8.

	Table 6.2 Recommended Alternative – Right-of-Way Impacts		
Parcel	***Parcel Name***	***Developed/Undeveloped***	***R/W Impact (acres)***
1	FDOT	Undeveloped	0.17
2	Palm Beach County *(Planned District Park)*	Undeveloped	1.33
3	Old Palm CDD	Undeveloped	1.50
4	Old Palm Golf Club Inc.	Undeveloped	0.54
5	Old Palm Golf Club Inc.	Undeveloped	0.54
6	Nova Southeastern University	Undeveloped	0.09
7	Paloma HOA Inc.	Undeveloped	1.97
8	North Palm County Improvements District	Developed	0.36
9	South Gardens LLC	Undeveloped	1.79
10	South Gardens LLC	Undeveloped	1.59
12	Central Gardens POA Inc.	Undeveloped	1.46
		Total	**11.34**

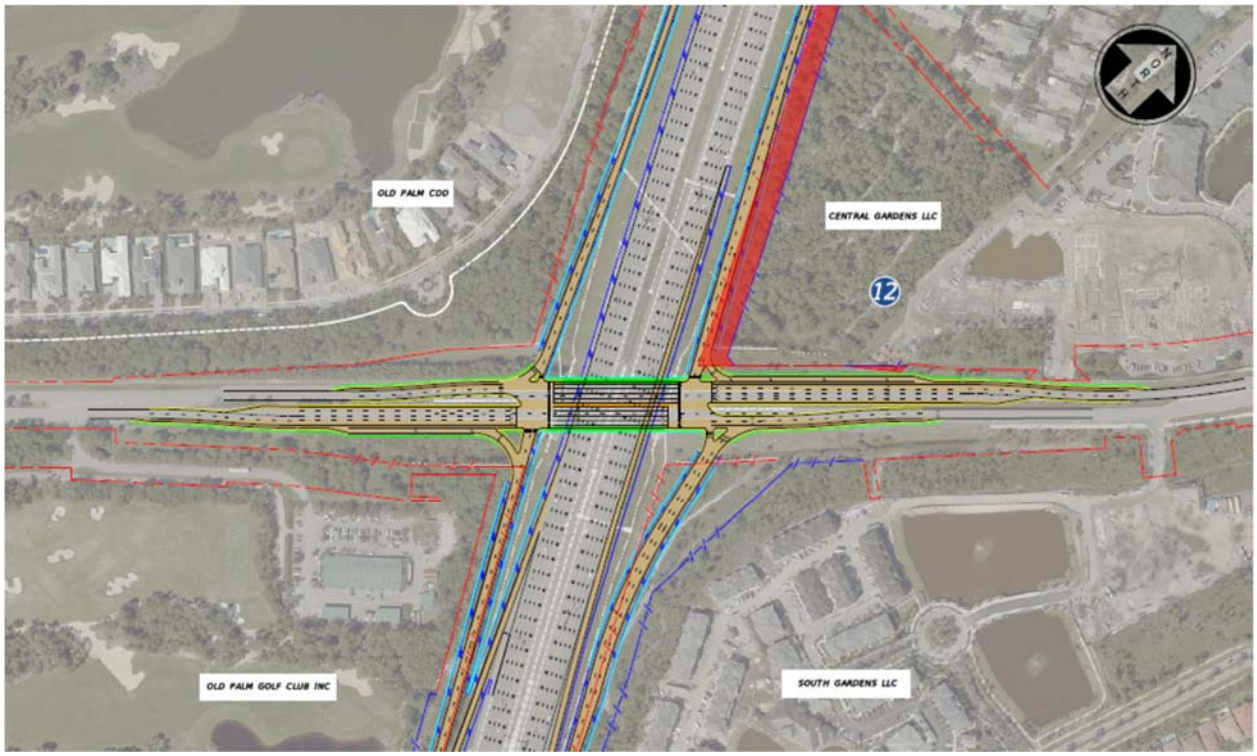
Figure 6-7 - Mainline Right-of-Way Impacts – Recommended Alternative



6.6 Design Exceptions and Variations

A Design Variation for Border Width will be required for construction of both the CD roads and the new TDUI. Acquisition of sufficient additional right-of-way to meet the required border width of 94 feet for a limited access facility would result in substantial additional impacts to adjacent properties. The proposed conceptual design of the Recommended Alternative is not anticipated to require any additional design variations or exceptions.

Figure 6-8 - Interchange Right-of-Way Impacts – Recommended Alternative



6.7 Preliminary Cost Estimate

The preliminary construction cost estimates for the proposed alternatives were developed from the Preliminary Concept Plans (See Appendix B). In addition, existing construction plans and available existing topographical data were utilized. The estimates include major pay items such as embankment, excavation, pavement, drainage, signalization, lighting, mobilization, and maintenance of traffic. Other components included are curb and gutter, clearing and grubbing, sodding, and signing and pavement marking. Contingency costs were also included in the estimate.

The estimated total construction cost for Alternative 2 is approximately $33.9 million. Detailed back-up for cost estimates are included in Appendix C.

6.8 Pedestrian and Bicycle Facilities

Pedestrians and bicycles are not permitted on a limited access facility so none of those facilities are incorporated in this alternative. The alternative does not affect the potential for express bus service within the special use lanes on I-95.

6.9 Utility Impacts

The Recommended Alternative will substantially impact FPL transmission lines located in the SE quadrant of the Central Blvd. / I-95 crossing. Relocation of these lines will be required to accommodate the proposed ramp alignment. Coordination will be required with FPL Transmission during the design phase to determine the extent of required relocations.

Substantial amounts of additional fill will be placed over the existing water and sewer lines. In some areas construction of retaining walls over these utilities will be required. Accordingly, the existing water and sewer lines will need to be encased prior to construction of the proposed improvements.

The FDOT Utility Accommodation Manual does not allow placement of pressurized utility lines within certain areas of retaining walls. In some locations, potential conflicts for the water and sewer utility lines described below will require coordination with the utility owners in the Design phase to determine if relocation is required:

- 36-inch Force Main (FM) (South of Central Blvd parallel to canal)- Partially encased. Evaluate if extension of casing under CD roads is required.
- 16-inch FM (South of Central Blvd parallel to canal)- Partially encased. Evaluate if extension of casing under CD roads is required.
- 30-inch FM (South of Central Blvd parallel to canal)- Partially encased. Evaluate if extension of casing under CD roads is required.
- Water Main (WM) (north of Central) - Will require encasement to cross under Mechanically Stabilized Earth (MSE) walls at Central Blvd ramps to/from the north.
- 36-inch WM (north of Central) - Evaluate extension of existing casing under SB off ramp to Central
- 24-inch Reclaimed Water Main (RWM) (north of Central) - Evaluate extension of existing casing under southbound off ramp to Central.

The Florida Department of Transportation maintains underground ITS and roadway lighting conduit/cables within the project limits. Coordination will be required during design and construction to determine if relocations are required. Existing roadway light poles are in direct conflict with the proposed ramp connections along I-95 and will require relocation or replacement.

6.10 Preliminary Traffic Control Plan

Temporary Traffic control during the construction of the proposed improvements on SR 9/I-95 is anticipated to be accomplished in three phased construction sequences.

Phase I (I-95)

Traffic on the mainline will be maintained in its existing condition, as the CD roads will be constructed outside of mainline traffic.

Phase II (I-95)

This phase will require shifting I-95 mainline traffic to the inside in order to construct the widening required for auxiliary lanes and ramp gores.

Phase III (I-95)

This phase will consist of milling and resurfacing for mainline I-95.

Central Boulevard improvements will also be constructed in three phases.

Phase I (Central Blvd.)

Traffic will be shifted to the outside to construct any inside widening and median work.

Phase II (Central Blvd.)

Traffic will be shifted to the inside to construct the outside widening.

Phase III (Central Blvd)

This phase consists of the milling and resurfacing of Central Boulevard.

Closures will be required for any overhead work, including mainline I-95 closures for overhead bridge work and Central Boulevard closures for any sign structures, signals, lighting, etc. Detours shall be provided for any anticipated closures. A Lane Closure Analysis shall be performed in order to determine off peak hours for allowable lane closures.

6.11 Drainage

Preliminary analysis of drainage requirements indicates that treatment of runoff from the proposed additional impervious areas can be accomplished in dry retention swales and exfiltration trenches located within the proposed roadway right-of-way. Construction of additional outfall control structures and modification of some existing outfall structures will be required to increase treatment capacity in some of the existing roadside swales.

6.12 Bridge Analysis

The proposed improvements will require a bridge widening of 18 feet to the south side, and 21 feet to the north side, for a total widening width of 39 feet. The bridge widening will match the existing bridge in overall length and span configuration. See Table 6.3 for a summary of the Bridge Structural Information.

Table 6.3 – Bridge Structural Information

Width	Length	Superstructure Type	Structure Depth	Minimum Vertical Clearance	Number of Spans	Maximum Span Length
136’-6”	296’-1”	FIB 54	5.42’	16’-4 ¼”	4	118’-6”

Per Structures Design Guidelines (SDG) section 7.6, the superstructure options for the proposed widening are limited to Florida I-Beams (FIB). FIB-54 beams may span the required distance and maintain the existing minimum vertical clearance by providing a superstructure depth that is eight inches less than the depth of the existing superstructure. Two lines of FIB-54 beams may be used to accommodate the proposed widening on each side of the bridge. The proposed number of girders is based upon the spacing requirements for the FIB-54 beams given the required span lengths; enabling a feasible bridge deck overhang; and providing a spacing to the existing exterior beam that does not result in a tributary deck width that results in exceeding the capacity of the existing exterior beams. The existing deck will be saw cut along the center line of the existing exterior beams. The concrete will be removed without damaging the top of the existing exterior beam or the existing bridge deck reinforcing steel, which will be cleaned, straightened, and extended into the widened bridge deck to splice with the transverse bridge reinforcement of the widening. The existing traffic railing barriers will be removed. Barrier reinforcing extending up from the bridge deck will be cut, burned back below the deck surface, and sealed with epoxy.

The widening will not be an obvious “add on” to the existing bridge. The sizes of the substructure elements (column and pier cap) at the intermediate piers of the proposed widening will closely match that of the existing, and multi-column piers will be used to match the existing pier type. If preferred, a Class 5 Applied Finish Coating could be used to further blend widened portions of the bridge with the existing bridge. The new bridge pier columns will be designed for Vehicle Collision Forces in accordance with the American Association of State Highway and Transportation Officials (AASHTO) LRFD Section

3.5.6 and the existing concrete barrier wall in the I-95 median extended to envelop the new pier columns. The existing end bents will be widened to closely matching the existing as well. The proposed piers and end bents will be supported by deep foundations that match the existing foundations.

6.13 Special Features

There are no special features proposed for this project.

6.14 Access Management

According to FDOT Access Management standards, I-95 from Northlake Boulevard to Donald Ross Road is classified as Access Class 1, a limited access facility with no direct property connections. FDOT Access Management Guidelines Rule 14-07, Table 1.8.1 provides guidelines for interchange spacing based on the Area Type. I-95 Interchange with Donald Ross Road is located approximately 2 miles north of the proposed new interchange at Central Boulevard. I-95 interchange with Military Trail is located approximately one mile south of Central Boulevard. Access for the mainline is provided at interchange locations, specifically at Northlake Boulevard, PGA Boulevard, Donald Ross Road and proposed Central Boulevard within the project limits.

There is no access class assigned to Central Boulevard; however, the proposed design will provide signals and median openings at intersections. The existing median openings will be maintained at existing intersections and new signals at the Central Boulevard interchange will create new access points.

6.15 Multi-Modal Accommodations

Transit service is provided along Northlake Boulevard, PGA Boulevard, and Military Trail, however it will not be affected by the proposed design concept. There are no transit routes along Central Boulevard within the vicinity of I-95. To accommodate bicycle and pedestrian traffic, the proposed improvements would provide a six-foot wide sidewalk and seven-foot wide bicycle lane on both sides of the roadway on Central Boulevard.

6.16 Schedule

The design phase for this project was funded in fiscal year (FY) 15/16. Right of Way acquisition is programmed in FY 20/21. The construction phase is not programmed in the current FDOT District 4 Five-Year Work Program.

7.0 PUBLIC COMMENTS

7.1 Public Involvement Plan

A project specific Public Involvement Plan (PIP) was developed at the beginning of the study process. The PIP was created to guide the project team's communications and interactions with all interested parties during the study. The plan describes specific methods and techniques regarding the public involvement approach for the project and ensures a free flow of information between the FDOT, property owners, local governments, agencies, stakeholder groups, business owners, and other interested parties.

7.2 Kick-off Meeting

Two Kick-off meetings, the Agency Kick-Off Meeting and the Public Kick-Off Meeting, were held on Thursday, January 29, 2015 at the City of Palm Beach Gardens Council Chamber, located at 10500 North Military Trail, Palm Beach Gardens, Florida. An opportunity was provided to agency representatives to review information and displays in an open house format at 2:30, with a formal presentation at 3:00 pm. Similarly, information and displays were available for review in an open house format at the Public Kick-off meeting prior to the formal presentation at 6:00 pm. The purpose of the meeting was to provide elected officials, residents, businesses and interested parties an opportunity to obtain information regarding the study, answer questions and receive comments.

Approximately 30 individuals attended the Agency Kick-off representing local agencies, elected officials, and media, as well as FDOT staff and FDOT consultants. The Public Kick-off was attended by approximately 125 residents, business owners, interested parties, members of the media and staff. The two media outlets in attendance were the Palm Beach Post and ABC affiliate WBPF 25.

7.3 Alternatives Public Workshop

An Alternatives Public Workshop was held on Thursday, February 18, 2016 at the City of Palm Beach Gardens Council Chamber, located at 10500 North Military Trail, Palm Beach Gardens, Florida 33410. The format of the workshop was an open house. Graphics and informational displays were available for review from 5:30 pm to 7:30 pm. The purpose of the workshop was to provide elected officials, residents, businesses, stakeholders and interested parties an opportunity to provide input concerning the alternatives under consideration and to encourage interested parties to submit their comments. Comment forms were available. The Workshop was attended by over 100 residents, business owners, interested parties and staff. A handout was provided that provided information about the alternatives under consideration.

Twenty-six written comments were received in response to the workshop. These included comments submitted on comment forms (either left at the workshop and mailed to the project manager after the workshop), and emails sent to the project manager. Some individuals indicated a preference for a specific alternative, or opposed specific alternatives. Of these, 15 opposed construction of any new interchange, regardless of the configuration. Four individuals stated they preferred construction of a new tight diamond urban interchange over construction of a diverging diamond interchange. One individual expressed a preference for the CD road system over the braided ramp system.

7.4 Public Hearing

The Public Hearing was held on Wednesday, September 28, 2016 at the City of Palm Beach Gardens Council Chamber, located at 10500 North Military Trail, Palm Beach Gardens, Florida 33410. An open house began at 5.30 pm. Graphics and informational displays were available for review from 5:30 p.m. to 7:30 p.m. The presentation began at 6 p.m., outlining the process by which the Recommended Alternative was selected, and summarizing its environmental impacts. A comment period followed, that provided elected officials, residents, businesses, stakeholders and interested parties an opportunity to provide input concerning the Recommended Alternative. Comment forms were available. Attendees could also dictate their comment to the reporter recording the hearing. The Public Hearing was attended by nearly 100 residents, business owners, interested parties and staff. A handout provided information about the Recommended Alternative.

Twenty citizens and elected officials provided comments in response to the Public Hearing (before, during, and after). These included comments submitted following the notice of the Hearing, provided verbally during the Hearing, submitted on comment forms (either left at the Hearing or mailed to the project manager after the Hearing), dictated to the reporter, or emails sent to the project manager. Of these, nine people opposed construction of a new interchange at Central Boulevard.

7.5 Other Meetings

The study team met with City of Palm Beach Gardens, Palm Beach County MPO, and Palm Beach County School Board staff on November 10, 2015 at the MPO office, 2300 North Jog Road, West Palm Beach, Florida and presented an update on the study progress.

A presentation to Palm Beach County District One Commissioner Hal Valeche on January 20, 2016 at his office at 3188 PGA Boulevard, Palm Beach Gardens, Florida.

The project team gave a presentation to the Northern Palm Beach County Chamber of Commerce Government Affairs Committee to update them on the progress of the PD&E study. The presentation was made on Friday, February 12, 2016 at the North Palm Beach Country Club, 951 US Hwy 1, North Palm Beach, Florida.

A presentation was made to the Palm Beach Gardens City Council to update them on the progress of the study. The presentation was made on Thursday, April 7, 2016 at the City of Palm Beach Gardens Council Chamber, located at 10500 North Military Trail, Palm Beach Gardens, Florida.

7.6 Project Website

A project specific FDOT web page was established (www.95pgacentralblvd.com) to provide updated information about the project and upcoming public meetings.

Website contents include:

- Project Fact Sheet;
- Project Schedule;
- Kick-off meeting presentation;
- Alternatives Workshop Display Boards;
- Northern Palm Beach Chamber of Commerce Government Affairs Committee presentation; and
- Interchange Justification Report.

8.0 LIST OF TECHNICAL REPORTS COMPLETED FOR THE PROJECT

The following technical support documents were completed for this PD&E study:

- Interchange Justification Report; Approved by FHWA, November 2015
- Section 4(f) Determination of Applicability, submitted to FHWA May 25, 2016
- Cultural Resources Assessment Survey
- Endangered Species Biological Assessment
- Wetlands Evaluation Report
- Contamination Screening Evaluation Report
- Location Hydraulics Report
- Noise Study Report
- Air Quality Report
- Pond Siting Report.

APPENDICES

Appendix A – Operational Analyses

Appendix B – Alternative Concept Plans and Profiles

Appendix C – Cost Estimates

Appendix D – Recommended Alternative Typical Section Package

APPENDIX A

OPERATIONAL ANALYSES RESULTS

A.0 UPDATE TO TRAFFIC OPERATIONS ANALYSIS SUMMARY

A traffic analysis was performed as part of an Interchange Justification Report (IJR) for the proposed I-95 at Central Boulevard interchange. The Federal Highway Administration (FHWA) approved the proposed interchange access in November 2015 based on a review of the IJR. Updates to the traffic analysis that have been made subsequent to the approval of the IJR are included in this section of the Preliminary Engineering Report (PER).

Arterial Roadway Level of Service Analysis

The IJR included a generalized planning level assessment of arterial roadway segments within the project's area of influence (AOI). That generalized planning level roadway LOS assessment was performed using a simple comparison of the design hour peak hour directional volumes on arterial roadway segments to their peak hour peak direction service volume thresholds derived from the Generalized FDOT 2012 LOS Tables. For roadway segments on PGA Boulevard and Northlake Boulevard that are designated as a Constrained Roadway at a Lower Level of Service (CRALLS), the relevant maximum service volumes were used based on CRALLS thresholds noted in the City of Palm Beach Gardens Transportation Element for those segments.

The traffic analysis has been updated to use the service volume thresholds that have been adopted by Palm Beach County in the Transportation Element of its Comprehensive Plan, revised April 27, 2016. Since the CRALLS thresholds noted in the City of Palm Beach Gardens Transportation Element are the same as the CRALLS thresholds noted in the Palm Beach County Transportation Element for roadway segments on PGA Boulevard and Northlake Boulevard, the service volumes for these segments remain the same as previously analyzed.

Given that the proposed I-95 interchange directly impacts the Central Boulevard corridor between PGA Boulevard and Hood Road on the Palm Beach County Thoroughfare Map and the critical importance of this roadway facility to the future traffic circulation within the project's AOI, a more refined roadway level of service analysis was performed as part of this Preliminary Engineering Report (PER) to better quantify the anticipated traffic operations on this subject facility. Accordingly, an arterial analysis utilizing the Arterial Analysis Operational methodology promulgated in the 2010 Highway Capacity Manual (HCM) as well as guidelines obtained from the Palm Beach County Traffic Division, were performed for the arterial facility on Central Boulevard between PGA Boulevard and Hood Road. It should be noted that the limits of the subject arterial satisfy the 2.0-mile minimum corridor length pursuant to the Palm Beach County Traffic Division guidelines and the 2010 HCM. For this arterial analysis, Central Boulevard was modeled as a four-lane roadway.

Tables A-1, A-2 and **A-3** on the following pages, summarize any changes that were made to the intersection analyses as previously performed in the IJR as part of the arterial analysis on Central Boulevard between PGA Boulevard and Hood Road for the 2020, 2030 and 2040 future years. HCM Arterial and Intersection Analysis Sheets from the SYNCHRO traffic analysis software are included at the end of this summary.

Table A-1: 2020 Intersection Analysis Changes

Intersection	Intersection Geometry								Comment
	Existing				Future				
	App	Left	Thru	Right	App	Left	Thru	Right	
Central Blvd at Hood Road	NB	1	2	<	NB	2	2	1	- Changes to intersection geometry reflect programmed improvements that are being performed by Palm beach County. - Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	SB	1	2	1	SB	2	2	1	
	EB	2	2	1	EB	2	2	1	
	WB	2	2	1	WB	2	2	1	
Central Blvd at Victoria Falls Blvd	App	Left	Thru	Right	App	Left	Thru	Right	- Analyzed as a signalized intersection. Development orders for partially developed adjacent properties (incl. Central Gardens and Cimarron Cove) are required to monitor intersection for signalization. - Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	NB	1	2	<*	No Change				
	SB	1	2	1					
	EB	1	1	< *					
	WB	1	1	< *					
Central Blvd at Proposed I-95 NB Ramp Terminal	App	Left	Thru	Right	App	Left	Thru	Right	Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	Not Existing				NB	1	-	2	
					SB	-	-	-	
					EB	2	2	-	
					WB	-	4	1	
					-NB represents I-95 Ramp Terminal				
					-EB/WB represents Central Boulevard				
Central Blvd at Proposed I-95 SB Ramp Terminal	App	Left	Thru	Right	App	Left	Thru	Right	Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	Not Existing				NB	-	-	-	
					SB	1	-	1	
					EB	-	4	1	
					WB	2	2	-	
					-SB represents I-95 Ramp Terminal				
					-EB/WB represents Central Boulevard				
Central Blvd at 117th Court N	App	Left	Thru	Right	App	Left	Thru	Right	- Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	NB	-	2	1	No Change				
	SB	1	2	-					
	EB	-	-	-					
	WB	1	-	1					
Central Blvd at PGA Boulevard	App	Left	Thru	Right	App	Left	Thru	Right	- Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	NB	>	1	1	No Change				
	SB	2	<	1					
	EB	2	3	<					
	WB	1	3	1					

Note:

** Signal Timing Optimizations performed consistent with Palm Beach County Traffic Division Guidelines.*

Table A-2: 2030 Intersection Analysis Changes

Intersection	Intersection Geometry								Comment
	Existing				Future				
	App	Left	Thru	Right	App	Left	Thru	Right	
Central Blvd at Hood Road	NB	1	2	<	NB	2	2	1	- Changes to intersection geometry reflect programmed improvements that are being performed by Palm beach County. - Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	SB	1	2	1	SB	2	2	1	
	EB	2	2	1	EB	2	2	1	
	WB	2	2	1	WB	2	2	1	
Central Blvd at Victoria Falls Blvd	App	Left	Thru	Right	App	Left	Thru	Right	- Analyzed as a signalized intersection. Development orders for partially developed adjacent properties (incl. Central Gardens and Cimarron Cove) are required to monitor intersection for signalization. - Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	NB	1	2	<*	No Change				
	SB	1	2	1					
	EB	1	1	< *					
	WB	1	1	< *					
Central Blvd at Proposed I-95 NB Ramp Terminal	App	Left	Thru	Right	App	Left	Thru	Right	Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	Not Existing				NB	1	-	2	
					SB	-	-	-	
					EB	2	2	-	
					WB	-	4	1	
					-NB represents I-95 Ramp Terminal				
					-EB/WB represents Central Boulevard				
Central Blvd at Proposed I-95 SB Ramp Terminal	App	Left	Thru	Right	App	Left	Thru	Right	Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	Not Existing				NB	-	-	-	
					SB	1	-	1	
					EB	-	4	1	
					WB	2	2	-	
					-SB represents I-95 Ramp Terminal				
					-EB/WB represents Central Boulevard				
Central Blvd at 117th Court N	App	Left	Thru	Right	App	Left	Thru	Right	- Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	NB	-	2	1	No Change				
	SB	1	2	-					
	EB	-	-	-					
	WB	1	-	1					
Central Blvd at PGA Boulevard	App	Left	Thru	Right	App	Left	Thru	Right	- Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	NB	>	1	1	No Change				
	SB	2	<	1					
	EB	2	3	<					
	WB	1	3	1					

Note:

** Signal Timing Optimizations performed consistent with Palm Beach County Traffic Division Guidelines.*

Table A-3: 2040 Intersection Analysis Changes

Intersection	Intersection Geometry								Comment
	Existing				Future				
	App	Left	Thru	Right	App	Left	Thru	Right	
Central Blvd at Hood Road	NB	1	2	<	NB	2	2	1	- Changes to intersection geometry reflect programmed improvements that are being performed by Palm beach County. - Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	SB	1	2	1	SB	2	2	1	
	EB	2	2	1	EB	2	2	1	
	WB	2	2	1	WB	2	2	1	
Central Blvd at Victoria Falls Blvd	App	Left	Thru	Right	App	Left	Thru	Right	- Analyzed as a signalized intersection. Development orders for partially developed adjacent properties (incl. Central Gardens and Cimarron Cove) are required to monitor intersection for signalization. Additionally, Cimarron Cove is required to provide exclusive northbound right lane if driveway to the south is converted to exit only. - Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	NB	1	2	<*	NB	1	2	1	
	SB	1	2	1	SB	1	2	1	
	EB	1	1	< *	EB	1	1	< *	
	WB	1	1	< *	WB	1	1	< *	
Central Blvd at Proposed I-95 NB Ramp Terminal	App	Left	Thru	Right	App	Left	Thru	Right	Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	Not Existing				NB	1	-	2	
					SB	-	-	-	
					EB	2	2	-	
					WB	-	4	1	
					-NB represents I-95 Ramp Terminal				
					-EB/WB represents Central Boulevard				
Central Blvd at Proposed I-95 SB Ramp Terminal	App	Left	Thru	Right	App	Left	Thru	Right	Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	Not Existing				NB	-	-	-	
					SB	1	-	1	
					EB	-	4	1	
					WB	2	2	-	
					-SB represents I-95 Ramp Terminal				
					-EB/WB represents Central Boulevard				
Central Blvd at 117th Court N	App	Left	Thru	Right	App	Left	Thru	Right	- Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	NB	-	2	1	No Change				
	SB	1	2	-					
	EB	-	-	-					
	WB	1	-	1					
Central Blvd at PGA Boulevard	App	Left	Thru	Right	App	Left	Thru	Right	- Signal timing splits optimized to accommodate future design hour traffic patterns at intersection.
	NB	>	1	1	No Change				
	SB	2	<	1					
	EB	2	3	<					
	WB	1	3	1					

Note:

** Signal Timing Optimizations performed consistent with Palm Beach County Traffic Division Guidelines.*

Tables A-4 through **A-6** on the following pages, summarize the roadway level of service (LOS) for the years 2020, 2030, and 2040 respectively, based on the maximum peak hour directional volumes on those segments as summarized in the IJR. The reported level of service on Central Boulevard between PGA Boulevard and Hood Road is based on the aforementioned arterial level of service analysis. Among the observations that can be made from the roadway LOS analysis is that the traffic operations along the Central Boulevard corridor are projected to meet the level of service standard as a four lane facility through the future years.

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Table A-4: 2020 Build Arterial Volumes and Levels of Service

Road Name	SR #	From	To	Number of Lanes	FHWA Funct-ional Class	Facility Type (1)	Peak Hour Volume (2)	LOS D SV Pk. Hr. Pk. Dir. (1)	CRALLS (3)	Defic-ient
Donald Ross Road		East- pointe Way	I-95	4 standard lanes divided	Major Collector	Class II	786	1770		N
Donald Ross Road		I-95	Parkside Drive	6 standard lanes divided	Principal Arterial	Class II	1601	2680		N
Donald Ross Road		Parkside Drive	Central Boulevard	6 standard lanes divided	Principal Arterial	Class I	1537	2940		N
Donald Ross Road		Central Boulevard	Military Trail	6 standard lanes divided	Principal Arterial	Class II	1640	2680		N
Hood Road		Jog Road	E. of Turnpike	2 standard lanes undivided	Major Collector	Uninter-rupted	458	1140		N
Hood Road		E of Turn- pike	Central Boulevard	4 standard lanes divided	Major Collector	Class I	458	1960		N
Hood Road		Central Boulevard	Military Trail	4 standard lanes divided	Major Collector	Class II	923	1770		N
PGA Boulevard	786	Florida Turnpike	Central Boulevard	6 standard lanes divided	Principal Arterial	Class II	2305	2680	2747	N
PGA Boulevard	786	Central Boulevard	Military Trail	6 standard lanes divided	Principal Arterial	Class II	2185	2680	2900	N
PGA Boulevard	786	Military Trail	I-95	6 standard lanes divided	Principal Arterial	Class II	2156	2680	3720	N
PGA Boulevard	786	I-95	RCA Blvd.	8 standard lanes divided	Principal Arterial	Class II	3403	3590	4811	N
PGA Boulevard	786	RCA Blvd.	Lake Victoria Gardens	8 standard lanes divided	Principal Arterial	Class II	3403	3590	4835	N
Military Trail	809	PGA Boulevard	I-95	6 standard lanes divided	Principal Arterial	Class II	1512	2680		N
Military Trail	809	I-95	Hood Road	6 standard lanes divided	Principal Arterial	Class I	990	2940		N
Military Trail	809	Hood Road	Donald Ross Road	6 standard lanes divided	Principal Arterial	Class I	1300	2940		N
Northlake Boulevard		Military Trail	I-95	6 standard lanes divided	Principal Arterial	Class II	2092	2680	3890	N
Northlake Boulevard		I-95	Sandtree Lane	6 standard lanes divided	Principal Arterial	Class II	2815	2680	3890	N
Central Boulevard (4)		PGA Boulevard	I-95	4 standard lanes divided	Major Collector	Class I	1150	(4)		N
Central Boulevard (4)		PGA Boulevard	Hood Road	4 standard lanes divided	Major Collector	Class II	1777	(4)		N
Central Boulevard		Hood Road	Donald Ross Road	4 standard lanes divided	Major Collector	Class I	1145	1960		N

Notes: 1) Palm Beach County Comprehensive Plan Transportation Element Table TE 1a
2) Maximum of the AM and PM directional volumes
3) City of Palm Beach Gardens Transportation Element
4) LOS based on the HCM 2010 arterial analysis which shows overall LOS 'D' for SB direction during the PM peak period.

Table A-5: 2030 Build Arterial Volumes and Levels of Service

Road Name	SR #	From	To	Number of Lanes	FHWA Funct-ional Class	Facility Type (1)	Peak Hour Volume (2)	LOS D SV Pk. Hr. Pk. Dir. (2)	CRALLS (3)	Defic-ient
Donald Ross Road		East- pointe Way	I-95	4 standard lanes divided	Major Collector	Class II	888	1770		N
Donald Ross Road		I-95	Parkside Drive	6 standard lanes divided	Principal Arterial	Class II	1841	2680		N
Donald Ross Road		Parkside Drive	Central Boulevard	6 standard lanes divided	Principal Arterial	Class I	1856	2940		N
Donald Ross Road		Central Boulevard	Military Trail	6 standard lanes divided	Principal Arterial	Class II	1750	2680		N
Hood Road		Jog Road	E. of Turnpike	2 standard lanes undivided	Major Collector	Uninter-rupted	600	1140		N
Hood Road		E of Turn- pike	Central Boulevard	4 standard lanes divided	Major Collector	Class I	600	1960		N
Hood Road		Central Boulevard	Military Trail	4 standard lanes divided	Major Collector	Class II	1182	1770		N
PGA Boulevard	786	Florida Turnpike	Central Boulevard	6 standard lanes divided	Principal Arterial	Class II	2478	2680	2747	N
PGA Boulevard	786	Central Boulevard	Military Trail	6 standard lanes divided	Principal Arterial	Class II	2428	2680	2900	N
PGA Boulevard	786	Military Trail	I-95	6 standard lanes divided	Principal Arterial	Class II	2280	2680	3720	N
PGA Boulevard	786	I-95	RCA Blvd.	8 standard lanes divided	Principal Arterial	Class II	3632	3590	4811	N
PGA Boulevard	786	RCA Blvd.	Lake Victoria Gardens	8 standard lanes divided	Principal Arterial	Class II	3632	3590	4835	N
Military Trail	809	PGA Boulevard	I-95	6 standard lanes divided	Principal Arterial	Class II	1626	2680		N
Military Trail	809	I-95	Hood Road	6 standard lanes divided	Principal Arterial	Class I	1113	2940		N
Military Trail	809	Hood Road	Donald Ross Road	6 standard lanes divided	Principal Arterial	Class I	1410	2940		N
Northlake Boulevard		Military Trail	I-95	6 standard lanes divided	Principal Arterial	Class II	2339	2680	3890	N
Northlake Boulevard		I-95	Sandtree Lane	6 standard lanes divided	Principal Arterial	Class II	3004	2680	3890	N
Central Boulevard (4)		PGA Boulevard	I-95	4 standard lanes divided	Major Collector	Class I	1257	(4)		N
Central Boulevard (4)		PGA Boulevard	Hood Road	4 standard lanes divided	Major Collector	Class II	2125	(4)		N
Central Boulevard		Hood Road	Donald Ross Road	4 standard lanes divided	Major Collector	Class I	1488	1960		N

Notes: 1) Palm Beach County Comprehensive Plan Transportation Element Table TE 1a

2) Maximum of the AM and PM directional volumes

3) City of Palm Beach Gardens Transportation Element

4) LOS based on the HCM 2010 arterial analysis which shows overall LOS 'D' in the peak direction of the AM / PM Peak period.

Table A-6: 2040 Build Arterial Volumes and Levels of Service

Road Name	SR #	From	To	Number of Lanes	FHWA Funct-ional Class	Facility Type (1)	Peak Hour Volume (2)	LOS D SV Pk. Hr. Pk. Dir. (2)	CRALLS (3)	Defic-ient
Donald Ross Road		East- pointe Way	I-95	4 standard lanes divided	Major Collector	Class II	981	1770		N
Donald Ross Road		I-95	Parkside Drive	6 standard lanes divided	Principal Arterial	Class II	2084	2680		N
Donald Ross Road		Parkside Drive	Central Boulevard	6 standard lanes divided	Principal Arterial	Class I	2181	2940		N
Donald Ross Road		Central Boulevard	Military Trail	6 standard lanes divided	Principal Arterial	Class II	1843	2680		N
Hood Road		Jog Road	E. of Turnpike	2 standard lanes undivided	Major Collector	Uninter-rupted	747	1140		N
Hood Road		E of Turn- pike	Central Boulevard	4 standard lanes divided	Major Collector	Class I	747	1960		N
Hood Road		Central Boulevard	Military Trail	4 standard lanes divided	Major Collector	Class II	1447	1770		N
PGA Boulevard	786	Florida Turnpike	Central Boulevard	6 standard lanes divided	Principal Arterial	Class II	2653	2680	2747	N
PGA Boulevard	786	Central Boulevard	Military Trail	6 standard lanes divided	Principal Arterial	Class II	2670	2680	2900	N
PGA Boulevard	786	Military Trail	I-95	6 standard lanes divided	Principal Arterial	Class II	2384	2680	3720	N
PGA Boulevard	786	I-95	RCA Blvd.	8 standard lanes divided	Principal Arterial	Class II	3829	3590	4811	N
PGA Boulevard	786	RCA Blvd.	Lake Victoria Gardens	8 standard lanes divided	Principal Arterial	Class II	3829	3590	4835	N
Military Trail	809	PGA Boulevard	I-95	6 standard lanes divided	Principal Arterial	Class II	1740	2680		N
Military Trail	809	I-95	Hood Road	6 standard lanes divided	Principal Arterial	Class I	1230	2940		N
Military Trail	809	Hood Road	Donald Ross Road	6 standard lanes divided	Principal Arterial	Class I	1521	2940		N
Northlake Boulevard		Military Trail	I-95	6 standard lanes divided	Principal Arterial	Class II	2605	2680	3890	N
Northlake Boulevard		I-95	Sandtree Lane	6 standard lanes divided	Principal Arterial	Class II	3167	2680	3890	N
Central Boulevard (4)		PGA Boulevard	I-95	4 standard lanes divided	Major Collector	Class I	1373	(4)		N
Central Boulevard (4)		PGA Boulevard	Hood Road	4 standard lanes divided	Major Collector	Class II	2490	(4)		N
Central Boulevard		Hood Road	Donald Ross Road	4 standard lanes divided	Major Collector	Class I	1821	1960		N

Notes: 1) Palm Beach County Comprehensive Plan Transportation Element Table TE 1a

2) Maximum of the AM and PM directional volumes

3) City of Palm Beach Gardens Transportation Element

4) LOS based on the HCM 2010 arterial analysis which shows overall LOS 'D' in the peak direction of the AM / PM Peak period.

Other Attachments

In addition to the Central Boulevard HCM Arterial analysis SYNCHRO outputs, the other attachments included with this traffic operations analysis summary include:

- Build Design Hour Traffic Volume Summaries (Links and Turning Movement Volumes)
- Intersection Level Of Service Analysis Summary
- Freeway Highway Capacity Analysis Summaries for the Build Alternative
- Diverging Diamond Interchange Analysis Summary

Central Boulevard Arterial Analysis

2020 AM

Arterial Level of Service: NB Central Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
117 Ct	II	45	61.9	15.2	77.1	0.77	36.1	A
SB On Ramp	II	45	52.1	27.2	79.3	0.65	29.5	B
NB Off Ramp	II	45	9.8	41.6	51.4	0.09	6.3	F
Victoria Falls Blvd	II	45	30.0	14.1	44.1	0.30	24.8	C
Hood Rd	II	45	23.7	39.3	63.0	0.23	13.0	E
Total	II		177.5	137.4	314.9	2.04	23.4	C

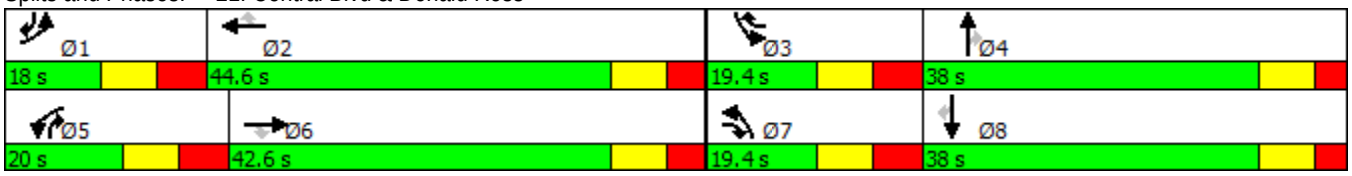
Arterial Level of Service: SB Central Blvd

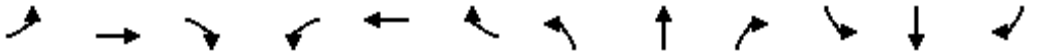
Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Victoria Falls Blvd	II	45	23.7	11.2	34.9	0.23	23.5	C
NB On Ramp	II	45	30.0	29.8	59.8	0.30	18.3	D
SB Off Ramp	II	45	9.8	6.5	16.3	0.09	19.8	D
117 Ct	II	45	52.1	7.2	59.3	0.65	39.4	A
PGA Blvd	II	45	61.9	88.8	150.7	0.77	18.5	D
Total	II		177.5	143.5	321.0	2.04	22.9	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	128	1204	368	245	526	176	183	737	88	219	578	80
Future Volume (vph)	128	1204	368	245	526	176	183	737	88	219	578	80
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases			6			2			4			8
Detector Phase	1	6	7	5	2	3	7	4	5	3	8	1
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	14.0	24.5	13.5	14.0	24.5	14.0	13.5	24.5	14.0	14.0	24.0	14.0
Total Split (s)	18.0	42.6	19.4	20.0	44.6	19.4	19.4	38.0	20.0	19.4	38.0	18.0
Total Split (%)	15.0%	35.5%	16.2%	16.7%	37.2%	16.2%	16.2%	31.7%	16.7%	16.2%	31.7%	15.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	4.5	3.5	4.5	4.5	3.5	4.5	4.5	3.0	4.5	4.5	3.0	4.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	9.5	8.5	9.5	9.5	8.5	9.5	9.5	8.0	9.5	9.5	8.0	9.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	None	Max	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 119.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 21: Central Blvd & Donald Ross





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	1204	368	245	526	176	183	737	88	219	578	80
Future Volume (veh/h)	128	1204	368	245	526	176	183	737	88	219	578	80
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	135	1267	387	258	554	185	193	776	93	231	608	84
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	192	1457	568	304	1621	636	249	864	526	285	901	492
Arrive On Green	0.06	0.29	0.29	0.09	0.32	0.32	0.07	0.24	0.24	0.08	0.25	0.25
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	135	1267	387	258	554	185	193	776	93	231	608	84
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	4.6	28.2	24.7	8.8	9.9	9.4	6.6	25.3	5.0	7.9	18.4	4.6
Cycle Q Clear(g_c), s	4.6	28.2	24.7	8.8	9.9	9.4	6.6	25.3	5.0	7.9	18.4	4.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	192	1457	568	304	1621	636	249	864	526	285	901	492
V/C Ratio(X)	0.70	0.87	0.68	0.85	0.34	0.29	0.77	0.90	0.18	0.81	0.67	0.17
Avail Cap(c_a), veh/h	246	1457	568	304	1621	636	286	892	539	286	901	492
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.2	40.4	32.4	53.5	31.0	24.1	54.2	43.5	28.2	53.7	39.9	29.9
Incr Delay (d2), s/veh	6.2	7.3	6.5	19.8	0.6	1.2	10.9	11.6	0.2	15.9	2.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.2	20.3	17.4	8.7	8.3	7.7	6.3	19.7	3.9	7.8	14.3	3.7
LnGrp Delay(d),s/veh	61.4	47.7	38.8	73.3	31.6	25.3	65.2	55.1	28.3	69.6	41.9	30.0
LnGrp LOS	E	D	D	E	C	C	E	E	C	E	D	C
Approach Vol, veh/h		1789			997			1062			923	
Approach Delay, s/veh		46.8			41.2			54.6			47.8	
Approach LOS		D			D			D			D	

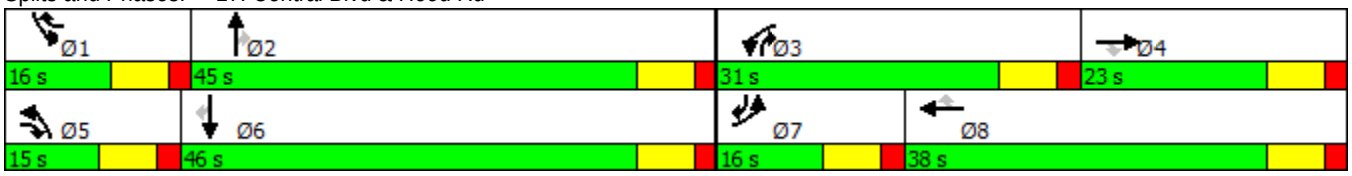
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.2	46.4	19.4	37.1	20.0	42.6	18.1	38.3
Change Period (Y+Rc), s	9.5	8.5	9.5	8.0	9.5	8.5	9.5	8.0
Max Green Setting (Gmax), s	8.5	36.1	9.9	30.0	10.5	34.1	9.9	30.0
Max Q Clear Time (g_c+I1), s	6.6	11.9	9.9	27.3	10.8	30.2	8.6	20.4
Green Ext Time (p_c), s	0.1	15.8	0.0	1.8	0.0	3.4	0.1	5.9

Intersection Summary	
HCM 2010 Ctrl Delay	47.6
HCM 2010 LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	197	115	605	105	5	138	933	608	220	792	99
Future Volume (vph)	106	197	115	605	105	5	138	933	608	220	792	99
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	23.0	11.0	11.0	23.0	11.0	11.0	23.0	11.0	11.0	23.0	11.0
Total Split (s)	16.0	23.0	15.0	31.0	38.0	16.0	15.0	45.0	31.0	16.0	46.0	16.0
Total Split (%)	13.9%	20.0%	13.0%	27.0%	33.0%	13.9%	13.0%	39.1%	27.0%	13.9%	40.0%	13.9%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max	None

Intersection Summary
Cycle Length: 115
Actuated Cycle Length: 110.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 17: Central Blvd & Hood Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	197	115	605	105	5	138	933	608	220	792	99
Future Volume (veh/h)	106	197	115	605	105	5	138	933	608	220	792	99
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	112	207	121	637	111	5	145	982	640	232	834	104
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	170	351	252	707	903	536	205	1247	883	287	1331	674
Arrive On Green	0.05	0.10	0.10	0.21	0.26	0.26	0.06	0.35	0.35	0.08	0.38	0.38
Sat Flow, veh/h	3442	3539	1583	3442	3539	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	112	207	121	637	111	5	145	982	640	232	834	104
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	3.4	6.0	7.5	19.5	2.6	0.2	4.5	26.8	32.4	7.1	20.7	4.4
Cycle Q Clear(g_c), s	3.4	6.0	7.5	19.5	2.6	0.2	4.5	26.8	32.4	7.1	20.7	4.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	170	351	252	707	903	536	205	1247	883	287	1331	674
V/C Ratio(X)	0.66	0.59	0.48	0.90	0.12	0.01	0.71	0.79	0.72	0.81	0.63	0.15
Avail Cap(c_a), veh/h	287	525	329	766	1017	587	255	1247	883	287	1331	674
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	46.5	41.3	41.8	30.9	23.7	49.8	31.3	17.7	48.6	27.5	19.0
Incr Delay (d2), s/veh	4.3	1.6	1.4	13.2	0.1	0.0	6.5	5.1	5.2	15.6	2.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.1	5.5	6.1	15.9	2.3	0.2	4.1	20.1	21.7	7.2	15.8	3.6
LnGrp Delay(d),s/veh	54.6	48.0	42.7	55.0	31.0	23.7	56.3	36.4	22.9	64.2	29.7	19.5
LnGrp LOS	D	D	D	D	C	C	E	D	C	E	C	B
Approach Vol, veh/h		440			753			1767			1170	
Approach Delay, s/veh		48.3			51.2			33.1			35.6	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	45.0	29.1	17.7	13.4	47.6	12.3	34.5
Change Period (Y+Rc), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Green Setting (Gmax), s	9.0	38.0	24.0	16.0	8.0	39.0	9.0	31.0
Max Q Clear Time (g_c+I1), s	9.1	34.4	21.5	9.5	6.5	22.7	5.4	4.6
Green Ext Time (p_c), s	0.0	3.3	0.7	1.2	0.1	12.4	0.1	2.2

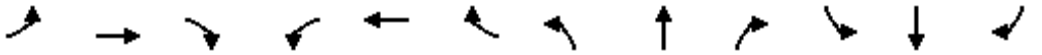
Intersection Summary	
HCM 2010 Ctrl Delay	38.7
HCM 2010 LOS	D

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	121	13	86	12	22	1637	108	1482	37
Future Volume (vph)	121	13	86	12	22	1637	108	1482	37
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4	3	8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0	23.0	11.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	11.0	34.0	116.0	116.0	116.0	116.0	116.0
Total Split (%)	15.3%	15.3%	7.3%	22.7%	77.3%	77.3%	77.3%	77.3%	77.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes						
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 149.9
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 13: Central Blvd & Victoria Falls Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	13	10	86	12	69	22	1637	140	108	1482	37
Future Volume (veh/h)	121	13	10	86	12	69	22	1637	140	108	1482	37
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	127	14	11	91	13	73	23	1723	147	114	1560	39
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	187	103	81	224	44	248	210	2401	202	151	2572	1151
Arrive On Green	0.11	0.11	0.11	0.03	0.18	0.18	0.73	0.73	0.73	0.73	0.73	0.73
Sat Flow, veh/h	1306	968	761	1774	245	1375	317	3305	279	243	3539	1583
Grp Volume(v), veh/h	127	0	25	91	0	86	23	913	957	114	1560	39
Grp Sat Flow(s),veh/h/ln	1306	0	1729	1774	0	1620	317	1770	1814	243	1770	1583
Q Serve(g_s), s	14.4	0.0	2.0	4.0	0.0	6.9	5.7	43.7	45.8	63.2	32.3	1.0
Cycle Q Clear(g_c), s	14.4	0.0	2.0	4.0	0.0	6.9	38.1	43.7	45.8	109.0	32.3	1.0
Prop In Lane	1.00		0.44	1.00		0.85	1.00		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	187	0	184	224	0	292	210	1286	1318	151	2572	1151
V/C Ratio(X)	0.68	0.00	0.14	0.41	0.00	0.29	0.11	0.71	0.73	0.76	0.61	0.03
Avail Cap(c_a), veh/h	187	0	184	224	0	292	210	1286	1318	151	2572	1151
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.3	0.0	60.7	59.3	0.0	53.3	19.3	11.6	11.9	46.6	10.0	5.7
Incr Delay (d2), s/veh	9.4	0.0	0.3	1.2	0.0	0.6	0.2	1.8	2.0	19.6	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.6	0.0	1.7	6.0	0.0	5.6	0.9	29.3	31.3	9.4	22.3	0.8
LnGrp Delay(d),s/veh	75.7	0.0	61.1	60.5	0.0	53.8	19.5	13.4	13.9	66.1	10.4	5.8
LnGrp LOS	E		E	E		D	B	B	B	E	B	A
Approach Vol, veh/h		152			177			1893			1713	
Approach Delay, s/veh		73.3			57.2			13.7			14.0	
Approach LOS		E			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6		8
Phs Duration (G+Y+Rc), s		116.0	11.0	23.0		116.0		34.0
Change Period (Y+Rc), s		7.0	7.0	7.0		7.0		7.0
Max Green Setting (Gmax), s		109.0	4.0	16.0		109.0		27.0
Max Q Clear Time (g_c+I1), s		47.8	6.0	16.4		111.0		8.9
Green Ext Time (p_c), s		54.9	0.0	0.0		0.0		0.8

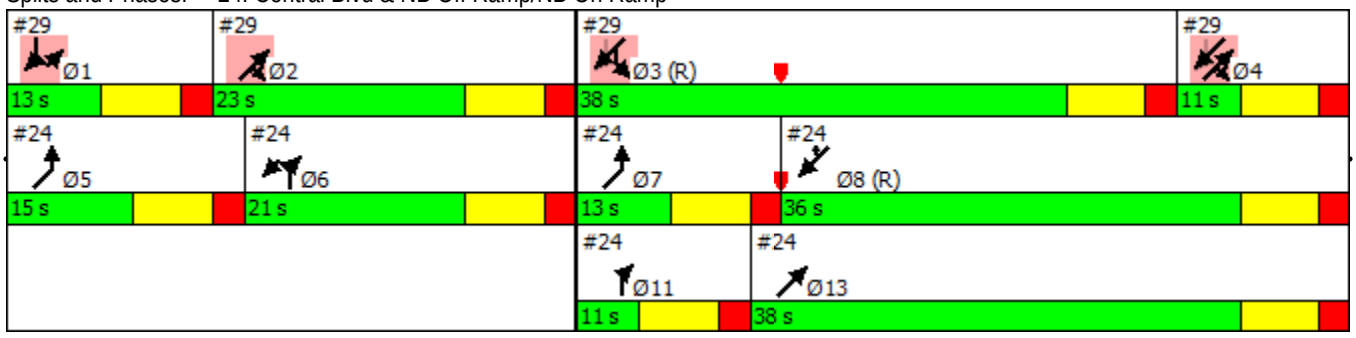
Intersection Summary	
HCM 2010 Ctrl Delay	18.1
HCM 2010 LOS	B

Lane Group	NBL	NBR	NEL	NET	SWT	SWR	Ø1	Ø2	Ø3	Ø4	Ø5	Ø7
Lane Configurations												
Traffic Volume (vph)	21	993	280	805	1723	30						
Future Volume (vph)	21	993	280	805	1723	30						
Lane Group Flow (vph)	22	1045	295	847	1814	32						
Turn Type	Prot	custom	Prot	NA	NA	Prot						
Protected Phases	6	6 11	5 7	13	8	8	1	2	3	4	5	7
Permitted Phases												
Detector Phase	6	6 11	5 7	13	8	8						
Switch Phase												
Minimum Initial (s)	4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0			23.0	23.0	23.0	11.0	11.0	11.0	11.0	11.0	11.0
Total Split (s)	21.0			38.0	36.0	36.0	13.0	23.0	38.0	11.0	15.0	13.0
Total Split (%)	24.7%			44.7%	42.4%	42.4%	15%	27%	45%	13%	18%	15%
Yellow Time (s)	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0						
Total Lost Time (s)	7.0			7.0	7.0	7.0						
Lead/Lag	Lag				Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None			None	C-Max	C-Max	None	None	C-Max	None	None	None
v/c Ratio	0.07	0.90	0.53	0.66	0.83	0.05						
Control Delay	30.9	27.5	17.3	41.6	29.8	0.1						
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0						
Total Delay	30.9	27.5	17.3	41.6	30.0	0.1						
Queue Length 50th (ft)	10	175	63	263	255	0						
Queue Length 95th (ft)	31	#319	m99	324	302	0						
Internal Link Dist (ft)				394	826							
Turn Bay Length (ft)		550	160			450						
Base Capacity (vph)	294	1160	565	1290	2186	692						
Starvation Cap Reductn	0	0	0	0	0	0						
Spillback Cap Reductn	0	0	0	0	57	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	0.07	0.90	0.52	0.66	0.85	0.05						

Intersection Summary

Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 3:SWTL and 8:, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: Central Blvd & NB Off Ramp/NB On Ramp



Lane Group	Ø11
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	11
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	11.0
Total Split (s)	11.0
Total Split (%)	13%
Yellow Time (s)	5.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	21	0	993	0	0	0	280	805	0	0	1723	30
Future Volume (vph)	21	0	993	0	0	0	280	805	0	0	1723	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0		7.0				7.0	7.0			7.0	7.0
Lane Util. Factor	1.00		0.88				0.97	0.95			0.86	1.00
Frt	1.00		0.85				1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		2787				3433	3539			6408	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		2787				3433	3539			6408	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	0	1045	0	0	0	295	847	0	0	1814	32
RTOR Reduction (vph)	0	0	337	0	0	0	0	0	0	0	0	21
Lane Group Flow (vph)	22	0	708	0	0	0	295	847	0	0	1814	11
Turn Type	Prot		custom				Prot	NA			NA	Prot
Protected Phases	6		6 11				5 7	13			8	8
Permitted Phases												
Actuated Green, G (s)	14.1		25.1				13.9	31.0			29.0	29.0
Effective Green, g (s)	14.1		25.1				13.9	31.0			29.0	29.0
Actuated g/C Ratio	0.17		0.30				0.16	0.36			0.34	0.34
Clearance Time (s)	7.0							7.0			7.0	7.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	293		822				561	1290			2186	540
v/s Ratio Prot	0.01		c0.25				c0.09	0.24			c0.28	0.01
v/s Ratio Perm												
v/c Ratio	0.08		0.86				0.53	0.66			0.83	0.02
Uniform Delay, d1	29.9		28.3				32.5	22.6			25.7	18.6
Progression Factor	1.00		1.00				0.86	1.74			1.00	1.00
Incremental Delay, d2	0.1		9.2				0.6	0.9			3.8	0.1
Delay (s)	30.1		37.5				28.7	40.1			29.6	18.6
Level of Service	C		D				C	D			C	B
Approach Delay (s)		37.4			0.0			37.1			29.4	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

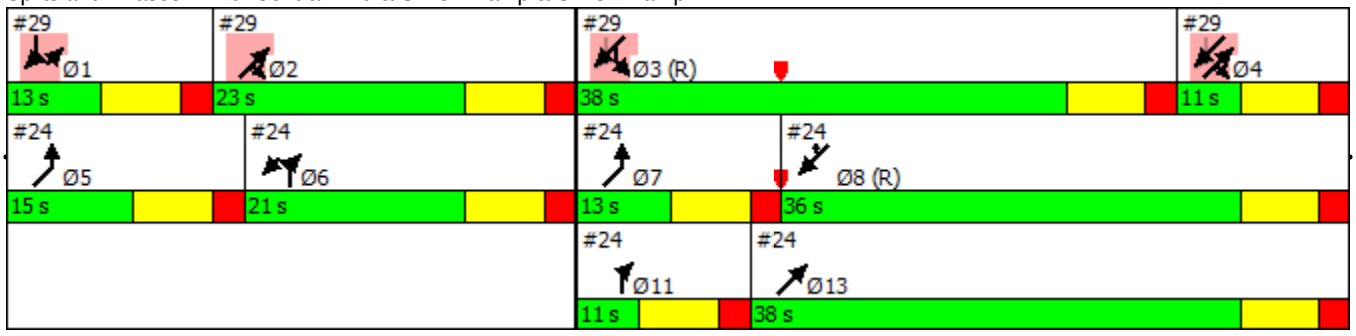
c Critical Lane Group

Lane Group	SBL2	SBR	NET	NER	SWL	SWT	Ø2	Ø4	Ø5	Ø6	Ø7	Ø8
Lane Configurations												
Traffic Volume (vph)	69	130	1016	53	1062	682						
Future Volume (vph)	69	130	1016	53	1062	682						
Lane Group Flow (vph)	73	137	1069	56	1118	718						
Turn Type	Prot	custom	NA	Prot	Prot	NA						
Protected Phases	1	1	2 4	2 4	3	3 4	2	4	5	6	7	8
Permitted Phases		3 4										
Detector Phase	1	1	2 4	2 4	3	3 4						
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0			11.0		11.0	11.0	11.0	11.0	11.0	23.0
Total Split (s)	13.0	13.0			38.0		23.0	11.0	15.0	21.0	13.0	36.0
Total Split (%)	15.3%	15.3%			44.7%		27%	13%	18%	25%	15%	42%
Yellow Time (s)	5.0	5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0							
Total Lost Time (s)	7.0	7.0			7.0							
Lead/Lag	Lead	Lead			Lead		Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes			Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None			C-Max		None	None	None	None	None	C-Max
v/c Ratio	0.59	0.10	0.71	0.10	0.89	0.41						
Control Delay	59.2	0.1	27.2	0.4	39.7	6.5						
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0						
Total Delay	59.2	0.1	27.2	0.4	39.7	6.5						
Queue Length 50th (ft)	39	0	101	0	207	23						
Queue Length 95th (ft)	#96	0	125	0	#277	m67						
Internal Link Dist (ft)			967			394						
Turn Bay Length (ft)		300		450	190							
Base Capacity (vph)	124	1409	1510	550	1252	1748						
Starvation Cap Reductn	0	0	0	0	0	0						
Spillback Cap Reductn	0	0	0	0	0	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	0.59	0.10	0.71	0.10	0.89	0.41						

Intersection Summary

Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 3:SWTL and 8:, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 29: Central Blvd & SB On Ramp & SB Off Ramp



Lane Group	Ø11	Ø13
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	11	13
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	11.0	23.0
Total Split (s)	11.0	38.0
Total Split (%)	13%	45%
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary



Movement	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Traffic Volume (vph)	69	0	130	0	0	0	1016	53	1062	682	0
Future Volume (vph)	69	0	130	0	0	0	1016	53	1062	682	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0		7.0				7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00		1.00				0.86	1.00	0.97	0.95	
Frt	1.00		0.85				1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770		1583				6408	1583	3433	3539	
Flt Permitted	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770		1583				6408	1583	3433	3539	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	73	0	137	0	0	0	1069	56	1118	718	0
RTOR Reduction (vph)	0	0	60	0	0	0	0	43	0	0	0
Lane Group Flow (vph)	73	0	77	0	0	0	1069	13	1118	718	0
Turn Type	Prot		custom				NA	Prot	Prot	NA	
Protected Phases	1		1				2 4	2 4	3	3 4	
Permitted Phases			3 4								
Actuated Green, G (s)	6.0		48.0				20.0	20.0	31.0	42.0	
Effective Green, g (s)	6.0		48.0				20.0	20.0	31.0	42.0	
Actuated g/C Ratio	0.07		0.56				0.24	0.24	0.36	0.49	
Clearance Time (s)	7.0		7.0						7.0		
Vehicle Extension (s)	3.0		3.0						3.0		
Lane Grp Cap (vph)	124		1024				1507	372	1252	1748	
v/s Ratio Prot	c0.04		0.01				c0.17	0.01	c0.33	0.20	
v/s Ratio Perm			0.04								
v/c Ratio	0.59		0.08				0.71	0.04	0.89	0.41	
Uniform Delay, d1	38.3		8.4				29.8	25.1	25.4	13.6	
Progression Factor	1.00		1.00				1.00	1.00	1.30	0.44	
Incremental Delay, d2	7.0		0.0				1.6	0.0	5.8	0.1	
Delay (s)	45.3		8.4				31.4	25.1	39.0	6.1	
Level of Service	D		A				C	C	D	A	
Approach Delay (s)		21.2		0.0			31.1			26.1	
Approach LOS		C		A			C			C	

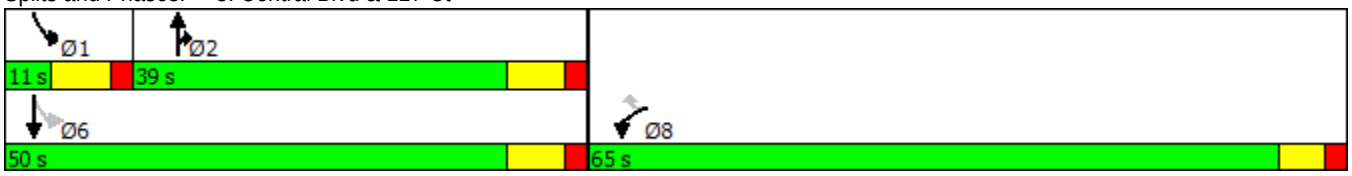
Intersection Summary			
HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

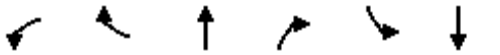
c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	194	152	954	196	68	712
Future Volume (vph)	194	152	954	196	68	712
Turn Type	Prot	Perm	NA	Prot	pm+pt	NA
Protected Phases	8		2	2	1	6
Permitted Phases		8			6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	65.0	65.0	36.0	36.0	11.0	46.0
Total Split (s)	65.0	65.0	39.0	39.0	11.0	50.0
Total Split (%)	56.5%	56.5%	33.9%	33.9%	9.6%	43.5%
Yellow Time (s)	4.0	4.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Max	Max	None	Max

Intersection Summary
Cycle Length: 115
Actuated Cycle Length: 69.8
Natural Cycle: 115
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Central Blvd & 117 Ct





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	194	152	954	196	68	712
Future Volume (veh/h)	194	152	954	196	68	712
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	204	160	1004	206	72	749
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	277	247	1763	789	325	2293
Arrive On Green	0.16	0.16	0.50	0.50	0.04	0.65
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	204	160	1004	206	72	749
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	7.3	6.3	13.2	5.0	1.2	6.3
Cycle Q Clear(g_c), s	7.3	6.3	13.2	5.0	1.2	6.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	277	247	1763	789	325	2293
V/C Ratio(X)	0.74	0.65	0.57	0.26	0.22	0.33
Avail Cap(c_a), veh/h	1577	1408	1763	789	353	2293
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.7	26.3	11.7	9.6	8.4	5.2
Incr Delay (d2), s/veh	3.8	2.8	1.3	0.8	0.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.0	5.3	11.0	4.2	1.1	5.6
LnGrp Delay(d),s/veh	30.5	29.1	13.0	10.4	8.7	5.6
LnGrp LOS	C	C	B	B	A	A
Approach Vol, veh/h	364		1210			821
Approach Delay, s/veh	29.9		12.6			5.9
Approach LOS	C		B			A

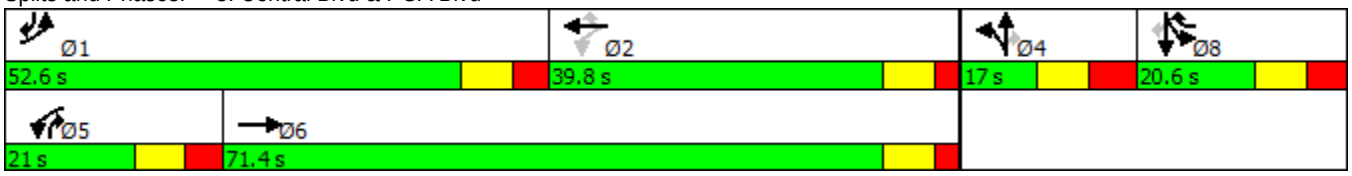
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.9	40.1				50.0		16.4
Change Period (Y+Rc), s	7.0	7.0				7.0		6.0
Max Green Setting (Gmax), s	4.0	32.0				43.0		59.0
Max Q Clear Time (g_c+I1), s	3.2	15.2				8.3		9.3
Green Ext Time (p_c), s	0.0	10.8				16.5		1.1

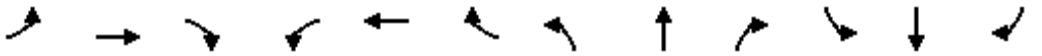
Intersection Summary	
HCM 2010 Ctrl Delay	12.9
HCM 2010 LOS	B

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	985	1436	110	1063	194	37	140	180	31	605
Future Volume (vph)	985	1436	110	1063	194	37	140	180	31	605
Turn Type	Prot	NA	pm+pt	NA	pm+ov	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6	5	2	8	4	5	8	8	1
Permitted Phases			2		2		4			8
Detector Phase	1	6	5	2	8	4	5	8	8	1
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.5	24.5	12.5	12.0	13.0	13.5	12.5	13.0	13.0	12.5
Total Split (s)	52.6	71.4	21.0	39.8	20.6	17.0	21.0	20.6	20.6	52.6
Total Split (%)	40.5%	54.9%	16.2%	30.6%	15.8%	13.1%	16.2%	15.8%	15.8%	40.5%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.5	2.5	3.5	2.5	4.0	4.5	3.5	4.0	4.0	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.5	7.5	8.5	7.5	9.0	9.5	8.5	9.0	9.0	8.5
Lead/Lag	Lead	Lag	Lead	Lag			Lead			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes
Recall Mode	None	Max	None	Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 128.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Central Blvd & PGA Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	985	1436	33	110	1063	194	32	37	140	180	31	605
Future Volume (vph)	985	1436	33	110	1063	194	32	37	140	180	31	605
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.5	7.5		8.5	7.5	9.0		9.5	8.5	9.0	9.0	8.5
Lane Util. Factor	0.97	0.91		1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	0.97	1.00
Satd. Flow (prot)	3433	5068		1770	5085	1583		1820	1583	1681	1709	1583
Flt Permitted	0.95	1.00		0.15	1.00	1.00		0.98	1.00	0.95	0.97	1.00
Satd. Flow (perm)	3433	5068		287	5085	1583		1820	1583	1681	1709	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1037	1512	35	116	1119	204	34	39	147	189	33	637
RTOR Reduction (vph)	0	2	0	0	0	130	0	0	128	0	0	68
Lane Group Flow (vph)	1037	1545	0	116	1119	74	0	73	19	110	112	569
Turn Type	Prot	NA		pm+pt	NA	pm+ov	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2	8	4	4	5	8	8	1
Permitted Phases				2		2			4			8
Actuated Green, G (s)	42.4	65.9		42.1	32.8	43.8		7.4	16.7	11.0	11.0	53.4
Effective Green, g (s)	42.4	65.9		42.1	32.8	43.8		7.4	16.7	11.0	11.0	53.4
Actuated g/C Ratio	0.33	0.51		0.33	0.26	0.34		0.06	0.13	0.09	0.09	0.42
Clearance Time (s)	8.5	7.5		8.5	7.5	9.0		9.5	8.5	9.0	9.0	8.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1136	2607		201	1302	541		105	206	144	146	659
v/s Ratio Prot	c0.30	0.30		0.04	c0.22	0.01		c0.04	0.01	0.07	0.07	c0.29
v/s Ratio Perm				0.15		0.04			0.01			0.07
v/c Ratio	0.91	0.59		0.58	0.86	0.14		0.70	0.09	0.76	0.77	0.86
Uniform Delay, d1	41.1	21.7		30.9	45.5	29.1		59.2	49.0	57.3	57.3	34.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.1	1.0		4.0	7.6	0.1		18.1	0.2	21.1	21.1	11.3
Delay (s)	52.2	22.7		34.9	53.0	29.2		77.3	49.2	78.3	78.4	45.3
Level of Service	D	C		C	D	C		E	D	E	E	D
Approach Delay (s)		34.5			48.2			58.6			53.9	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	42.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	128.1	Sum of lost time (s)	34.5
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

2020 PM

Arterial Level of Service: NB Central Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
117 Ct	II	45	61.9	15.2	77.1	0.77	36.1	A
SB On Ramp	II	45	52.1	25.8	77.9	0.65	30.0	B
NB Off Ramp	II	45	9.8	31.9	41.7	0.09	7.8	F
Victoria Falls Blvd	II	45	30.1	32.9	63.0	0.30	17.4	D
Hood Rd	II	45	23.7	28.7	52.4	0.23	15.7	E
Total	II		177.6	134.5	312.1	2.04	23.6	C

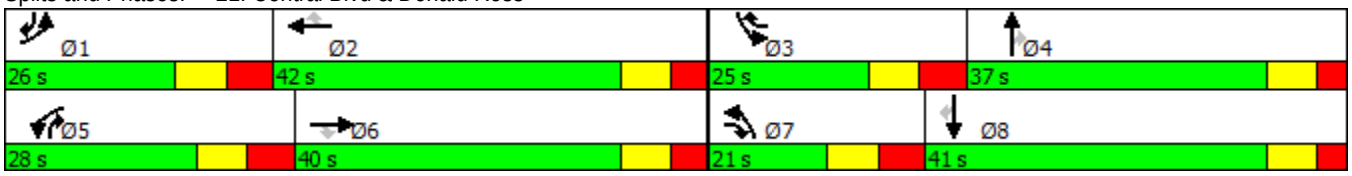
Arterial Level of Service: SB Central Blvd

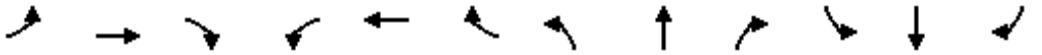
Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Victoria Falls Blvd	II	45	23.7	21.9	45.6	0.23	18.0	D
NB On Ramp	II	45	30.1	29.4	59.5	0.30	18.4	D
SB Off Ramp	II	45	9.8	5.3	15.1	0.09	21.4	D
117 Ct	II	45	52.1	7.7	59.8	0.65	39.1	A
PGA Blvd	II	45	61.9	119.1	181.0	0.77	15.4	E
Total	II		177.6	183.4	361.0	2.04	20.4	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	308	816	276	301	1112	324	151	717	47	337	637	116
Future Volume (vph)	308	816	276	301	1112	324	151	717	47	337	637	116
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases			6		2	2			4			8
Detector Phase	1	6	7	5	2	3	7	4	5	3	8	1
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	24.5	13.5	14.0	24.5	14.0	13.5	24.5	14.0	14.0	24.0	26.0
Total Split (s)	26.0	40.0	21.0	28.0	42.0	25.0	21.0	37.0	28.0	25.0	41.0	26.0
Total Split (%)	20.0%	30.8%	16.2%	21.5%	32.3%	19.2%	16.2%	28.5%	21.5%	19.2%	31.5%	20.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	4.5	3.5	4.5	4.5	3.5	4.5	4.5	3.0	4.5	4.5	3.0	4.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	9.5	8.5	9.5	9.5	8.5	9.5	9.5	8.0	9.5	9.5	8.0	9.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	None	Max	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 128.9
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 21: Central Blvd & Donald Ross





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	308	816	276	301	1112	324	151	717	47	337	637	116
Future Volume (veh/h)	308	816	276	301	1112	324	151	717	47	337	637	116
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	324	859	291	317	1171	341	159	755	49	355	671	122
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	381	1348	518	378	1344	605	214	803	533	406	1000	623
Arrive On Green	0.11	0.27	0.27	0.11	0.26	0.26	0.06	0.23	0.23	0.12	0.28	0.28
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	324	859	291	317	1171	341	159	755	49	355	671	122
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	11.7	18.9	19.2	11.4	27.9	21.5	5.8	26.6	2.7	12.9	21.3	6.4
Cycle Q Clear(g_c), s	11.7	18.9	19.2	11.4	27.9	21.5	5.8	26.6	2.7	12.9	21.3	6.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	381	1348	518	378	1344	605	214	803	533	406	1000	623
V/C Ratio(X)	0.85	0.64	0.56	0.84	0.87	0.56	0.74	0.94	0.09	0.87	0.67	0.20
Avail Cap(c_a), veh/h	448	1348	518	502	1344	605	312	810	536	421	1000	623
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.3	41.2	35.1	55.3	44.5	30.8	58.4	48.1	28.8	55.0	40.2	25.3
Incr Delay (d2), s/veh	12.8	2.3	4.4	9.2	8.0	3.8	5.4	18.6	0.1	17.7	1.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.4	14.1	13.9	9.9	20.1	15.2	5.2	21.5	2.1	11.5	16.0	5.1
LnGrp Delay(d),s/veh	68.1	43.5	39.5	64.5	52.5	34.6	63.8	66.8	28.8	72.7	42.0	25.4
LnGrp LOS	E	D	D	E	D	C	E	E	C	E	D	C
Approach Vol, veh/h		1474			1829			963			1148	
Approach Delay, s/veh		48.1			51.2			64.4			49.7	
Approach LOS		D			D			E			D	

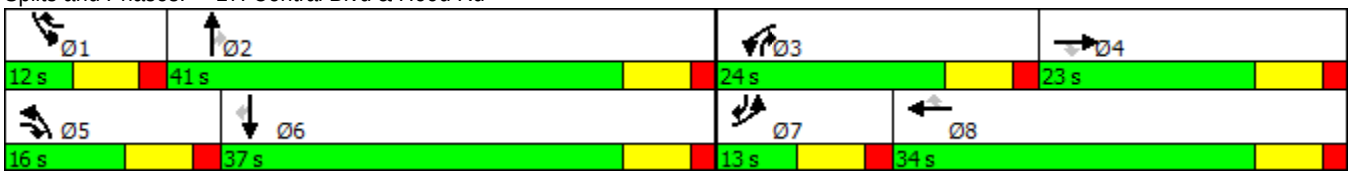
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.5	42.0	24.4	36.7	23.4	42.1	17.4	43.8
Change Period (Y+Rc), s	9.5	8.5	9.5	8.0	9.5	8.5	9.5	8.0
Max Green Setting (Gmax), s	16.5	33.5	15.5	29.0	18.5	31.5	11.5	33.0
Max Q Clear Time (g_c+I1), s	13.7	29.9	14.9	28.6	13.4	21.2	7.8	23.3
Green Ext Time (p_c), s	0.3	3.3	0.1	0.2	0.5	8.7	0.1	6.1

Intersection Summary	
HCM 2010 Ctrl Delay	52.4
HCM 2010 LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	148	81	397	185	72	178	871	560	142	637	164
Future Volume (vph)	73	148	81	397	185	72	178	871	560	142	637	164
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	23.0	11.0	11.0	23.0	11.0	11.0	23.0	11.0	11.0	23.0	11.0
Total Split (s)	13.0	23.0	16.0	24.0	34.0	12.0	16.0	41.0	24.0	12.0	37.0	13.0
Total Split (%)	13.0%	23.0%	16.0%	24.0%	34.0%	12.0%	16.0%	41.0%	24.0%	12.0%	37.0%	13.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max	None

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 92.1
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 17: Central Blvd & Hood Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	148	81	397	185	72	178	871	560	142	637	164
Future Volume (veh/h)	73	148	81	397	185	72	178	871	560	142	637	164
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	77	156	85	418	195	76	187	917	589	149	671	173
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	133	320	264	509	707	406	263	1368	846	196	1299	642
Arrive On Green	0.04	0.09	0.09	0.15	0.20	0.20	0.08	0.39	0.39	0.06	0.37	0.37
Sat Flow, veh/h	3442	3539	1583	3442	3539	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	77	156	85	418	195	76	187	917	589	149	671	173
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	1.9	3.7	4.2	10.4	4.1	3.3	4.7	18.9	24.3	3.8	13.0	6.4
Cycle Q Clear(g_c), s	1.9	3.7	4.2	10.4	4.1	3.3	4.7	18.9	24.3	3.8	13.0	6.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	133	320	264	509	707	406	263	1368	846	196	1299	642
V/C Ratio(X)	0.58	0.49	0.32	0.82	0.28	0.19	0.71	0.67	0.70	0.76	0.52	0.27
Avail Cap(c_a), veh/h	235	644	409	665	1086	576	352	1368	846	196	1299	642
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.6	38.1	32.3	36.3	29.8	25.5	39.7	22.3	15.2	40.9	21.8	17.5
Incr Delay (d2), s/veh	4.0	1.1	0.7	6.3	0.2	0.2	4.3	2.6	4.7	16.0	1.5	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.8	3.3	3.4	9.2	3.6	2.6	4.3	14.8	17.1	4.0	10.8	5.4
LnGrp Delay(d),s/veh	45.6	39.2	33.0	42.6	30.0	25.7	44.0	25.0	19.9	56.9	23.2	18.5
LnGrp LOS	D	D	C	D	C	C	D	C	B	E	C	B
Approach Vol, veh/h		318			689			1693			993	
Approach Delay, s/veh		39.1			37.2			25.3			27.5	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	41.0	20.0	15.0	13.7	39.3	10.4	24.6
Change Period (Y+Rc), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Green Setting (Gmax), s	5.0	34.0	17.0	16.0	9.0	30.0	6.0	27.0
Max Q Clear Time (g_c+I1), s	5.8	26.3	12.4	6.2	6.7	15.0	3.9	6.1
Green Ext Time (p_c), s	0.0	6.2	0.7	1.8	0.1	10.7	0.0	2.4

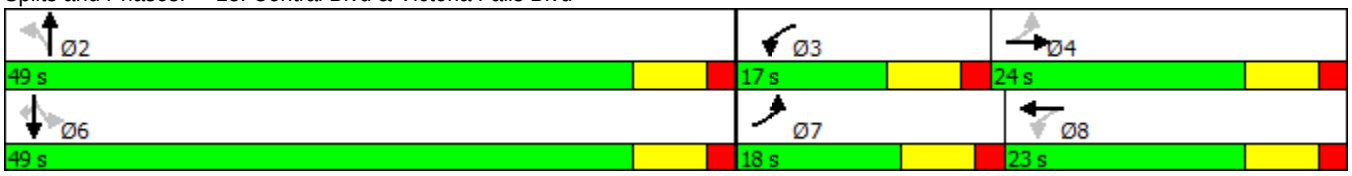
Intersection Summary	
HCM 2010 Ctrl Delay	29.3
HCM 2010 LOS	C

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	272	29	194	29	39	1310	30	1135	73
Future Volume (vph)	272	29	194	29	39	1310	30	1135	73
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm
Protected Phases	7	4	3	8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	23.0	11.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	18.0	24.0	17.0	23.0	49.0	49.0	49.0	49.0	49.0
Total Split (%)	20.0%	26.7%	18.9%	25.6%	54.4%	54.4%	54.4%	54.4%	54.4%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 87.2
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 13: Central Blvd & Victoria Falls Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	272	29	33	194	29	205	39	1310	132	30	1135	73
Future Volume (veh/h)	272	29	33	194	29	205	39	1310	132	30	1135	73
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	286	31	35	204	31	216	41	1379	139	32	1195	77
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	325	147	166	480	35	244	167	1525	153	106	1661	743
Arrive On Green	0.12	0.18	0.18	0.11	0.17	0.17	0.47	0.47	0.47	0.47	0.47	0.47
Sat Flow, veh/h	1774	800	903	1774	203	1411	434	3249	326	343	3539	1583
Grp Volume(v), veh/h	286	0	66	204	0	247	41	748	770	32	1195	77
Grp Sat Flow(s),veh/h/ln	1774	0	1703	1774	0	1614	434	1770	1805	343	1770	1583
Q Serve(g_s), s	11.0	0.0	2.9	8.3	0.0	13.4	7.5	34.7	35.3	6.7	24.2	2.4
Cycle Q Clear(g_c), s	11.0	0.0	2.9	8.3	0.0	13.4	31.7	34.7	35.3	42.0	24.2	2.4
Prop In Lane	1.00		0.53	1.00		0.87	1.00		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	325	0	314	480	0	279	167	831	847	106	1661	743
V/C Ratio(X)	0.88	0.00	0.21	0.42	0.00	0.88	0.25	0.90	0.91	0.30	0.72	0.10
Avail Cap(c_a), veh/h	325	0	324	480	0	289	167	831	847	106	1661	743
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	0.0	31.0	25.9	0.0	36.1	31.7	21.8	22.0	42.1	19.0	13.2
Incr Delay (d2), s/veh	23.0	0.0	0.3	0.6	0.0	25.6	0.8	12.8	13.7	1.6	1.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	2.5	7.4	0.0	12.6	1.7	27.1	28.2	1.5	17.9	1.9
LnGrp Delay(d),s/veh	51.7	0.0	31.3	26.5	0.0	61.7	32.5	34.7	35.6	43.7	20.6	13.3
LnGrp LOS	D		C	C		E	C	C	D	D	C	B
Approach Vol, veh/h		352			451			1559			1304	
Approach Delay, s/veh		47.8			45.8			35.1			20.7	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		49.0	17.0	23.5		49.0	18.0	22.5
Change Period (Y+Rc), s		7.0	7.0	7.0		7.0	7.0	7.0
Max Green Setting (Gmax), s		42.0	10.0	17.0		42.0	11.0	16.0
Max Q Clear Time (g_c+I1), s		37.3	10.3	4.9		44.0	13.0	15.4
Green Ext Time (p_c), s		4.4	0.0	1.3		0.0	0.0	0.1

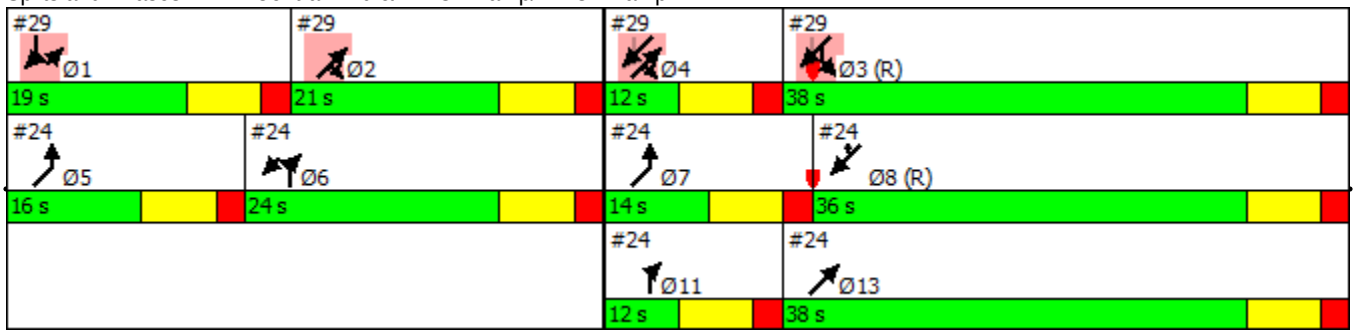
Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Lane Group	NBL	NBR	NEL	NET	SWT	SWR	Ø1	Ø2	Ø3	Ø4	Ø5	Ø7
Lane Configurations												
Traffic Volume (vph)	43	1057	302	588	1468	45						
Future Volume (vph)	43	1057	302	588	1468	45						
Lane Group Flow (vph)	45	1113	318	619	1545	47						
Turn Type	Prot	custom	Prot	NA	NA	Prot						
Protected Phases	6	6 11	5 7	13	8	8	1	2	3	4	5	7
Permitted Phases												
Detector Phase	6	6 11	5 7	13	8	8						
Switch Phase												
Minimum Initial (s)	4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0			23.0	23.0	23.0	11.0	11.0	11.0	12.0	11.0	11.0
Total Split (s)	24.0			38.0	36.0	36.0	19.0	21.0	38.0	12.0	16.0	14.0
Total Split (%)	26.7%			42.2%	40.0%	40.0%	21%	23%	42%	13%	18%	16%
Yellow Time (s)	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0						
Total Lost Time (s)	7.0			7.0	7.0	7.0						
Lead/Lag	Lag				Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None			None	C-Max	C-Max	None	None	C-Max	None	None	None
v/c Ratio	0.14	0.85	0.53	0.51	0.73	0.07						
Control Delay	31.7	20.9	25.5	31.9	29.4	0.2						
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0						
Total Delay	31.7	20.9	25.5	31.9	29.4	0.2						
Queue Length 50th (ft)	22	165	87	203	225	0						
Queue Length 95th (ft)	51	#282	132	260	269	0						
Internal Link Dist (ft)				394	852							
Turn Bay Length (ft)		550	160			450						
Base Capacity (vph)	334	1277	610	1218	2104	666						
Starvation Cap Reductn	0	0	0	0	0	0						
Spillback Cap Reductn	0	0	0	0	0	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	0.13	0.87	0.52	0.51	0.73	0.07						

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 3:SWTL and 8:, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 24: Central Blvd & NB Off Ramp/NB On Ramp



Lane Group	Ø11
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	11
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	11.0
Total Split (s)	12.0
Total Split (%)	13%
Yellow Time (s)	5.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	43	0	1057	0	0	0	302	588	0	0	1468	45
Future Volume (vph)	43	0	1057	0	0	0	302	588	0	0	1468	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0		7.0				7.0	7.0			7.0	7.0
Lane Util. Factor	1.00		0.88				0.97	0.95			0.86	1.00
Frt	1.00		0.85				1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		2787				3433	3539			6408	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		2787				3433	3539			6408	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	45	0	1113	0	0	0	318	619	0	0	1545	47
RTOR Reduction (vph)	0	0	398	0	0	0	0	0	0	0	0	32
Lane Group Flow (vph)	45	0	715	0	0	0	318	619	0	0	1545	15
Turn Type	Prot		custom				Prot	NA			NA	Prot
Protected Phases	6		6 11				5 7	13			8	8
Permitted Phases												
Actuated Green, G (s)	16.7		29.3				15.8	30.9			29.5	29.5
Effective Green, g (s)	16.7		29.3				15.8	30.9			29.5	29.5
Actuated g/C Ratio	0.19		0.33				0.18	0.34			0.33	0.33
Clearance Time (s)	7.0							7.0			7.0	7.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	328		907				602	1215			2100	518
v/s Ratio Prot	0.03		c0.26				c0.09	0.17			c0.24	0.01
v/s Ratio Perm												
v/c Ratio	0.14		0.79				0.53	0.51			0.74	0.03
Uniform Delay, d1	30.6		27.5				33.7	23.5			26.8	20.5
Progression Factor	1.00		1.00				1.29	1.29			1.00	1.00
Incremental Delay, d2	0.2		4.6				0.8	0.3			2.3	0.1
Delay (s)	30.8		32.1				44.1	30.6			29.1	20.6
Level of Service	C		C				D	C			C	C
Approach Delay (s)		32.1			0.0			35.2			28.9	
Approach LOS		C			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

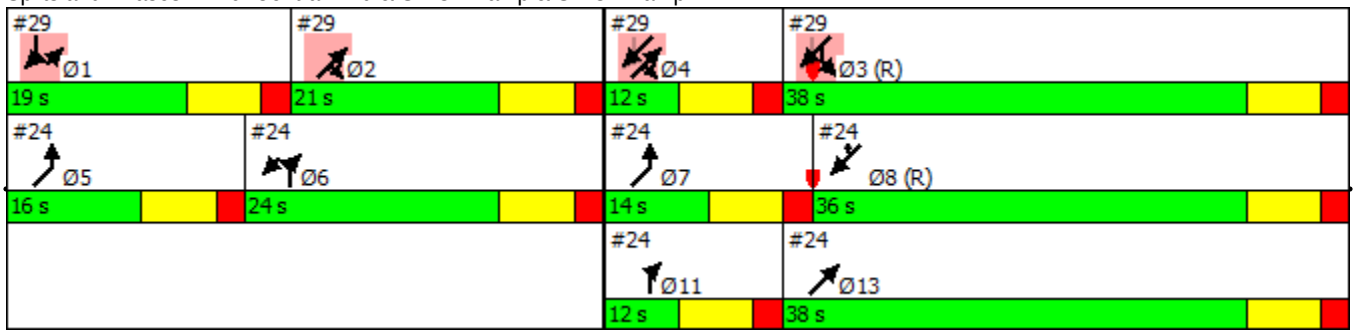
c Critical Lane Group

Lane Group	SBL2	SBR	NET	NER	SWL	SWT	Ø2	Ø4	Ø5	Ø6	Ø7	Ø8
Lane Configurations												
Traffic Volume (vph)	109	308	781	23	983	528						
Future Volume (vph)	109	308	781	23	983	528						
Lane Group Flow (vph)	115	324	822	24	1035	556						
Turn Type	Prot	custom	NA	Prot	Prot	NA						
Protected Phases	1	1	2 4	2 4	3	3 4	2	4	5	6	7	8
Permitted Phases		3 4										
Detector Phase	1	1	2 4	2 4	3	3 4						
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0			11.0		11.0	12.0	11.0	11.0	11.0	23.0
Total Split (s)	19.0	19.0			38.0		21.0	12.0	16.0	24.0	14.0	36.0
Total Split (%)	21.1%	21.1%			42.2%		23%	13%	18%	27%	16%	40%
Yellow Time (s)	5.0	5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0							
Total Lost Time (s)	7.0	7.0			7.0							
Lead/Lag	Lead	Lead			Lag		Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes			Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None			C-Max		None	None	None	None	None	C-Max
v/c Ratio	0.57	0.23	0.42	0.04	0.88	0.32						
Control Delay	48.9	0.4	25.8	0.1	20.7	5.3						
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0						
Total Delay	48.9	0.4	25.8	0.1	20.7	5.3						
Queue Length 50th (ft)	62	0	108	0	65	19						
Queue Length 95th (ft)	115	0	140	0	#146	44						
Internal Link Dist (ft)			967			394						
Turn Bay Length (ft)		800		450	190							
Base Capacity (vph)	236	1432	1976	580	1182	1712						
Starvation Cap Reductn	0	0	0	0	0	0						
Spillback Cap Reductn	0	0	0	0	0	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	0.49	0.23	0.42	0.04	0.88	0.32						

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 3:SWTL and 8:, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 29: Central Blvd & SB On Ramp & SB Off Ramp



Lane Group	Ø11	Ø13
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	11	13
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	11.0	23.0
Total Split (s)	12.0	38.0
Total Split (%)	13%	42%
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary



Movement	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Traffic Volume (vph)	109	0	308	0	0	0	781	23	983	528	0
Future Volume (vph)	109	0	308	0	0	0	781	23	983	528	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0		7.0				7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00		1.00				0.86	1.00	0.97	0.95	
Frt	1.00		0.85				1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770		1583				6408	1583	3433	3539	
Flt Permitted	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770		1583				6408	1583	3433	3539	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	115	0	324	0	0	0	822	24	1035	556	0
RTOR Reduction (vph)	0	0	131	0	0	0	0	17	0	0	0
Lane Group Flow (vph)	115	0	193	0	0	0	822	7	1035	556	0
Turn Type	Prot		custom				NA	Prot	Prot	NA	
Protected Phases	1		1				2 4	2 4	3	3 4	
Permitted Phases			3 4								
Actuated Green, G (s)	10.2		53.7				27.9	27.9	30.9	43.5	
Effective Green, g (s)	10.2		53.7				27.9	27.9	30.9	43.5	
Actuated g/C Ratio	0.11		0.60				0.31	0.31	0.34	0.48	
Clearance Time (s)	7.0		7.0						7.0		
Vehicle Extension (s)	3.0		3.0						3.0		
Lane Grp Cap (vph)	200		1067				1986	490	1178	1710	
v/s Ratio Prot	c0.06		0.02				c0.13	0.00	c0.30	c0.16	
v/s Ratio Perm			0.10								
v/c Ratio	0.57		0.18				0.41	0.02	0.88	0.33	
Uniform Delay, d1	37.8		8.2				24.6	21.5	27.8	14.3	
Progression Factor	1.00		1.00				1.00	1.00	0.47	0.34	
Incremental Delay, d2	4.0		0.1				0.1	0.0	6.7	0.1	
Delay (s)	41.8		8.3				24.7	21.5	19.9	4.9	
Level of Service	D		A				C	C	B	A	
Approach Delay (s)		17.1		0.0			24.6			14.6	
Approach LOS		B		A			C			B	

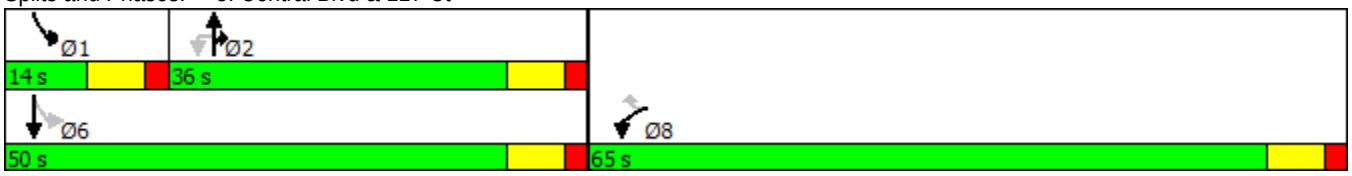
Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

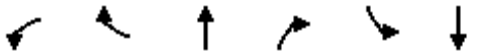
c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	198	145	579	96	95	701
Future Volume (vph)	198	145	579	96	95	701
Turn Type	Prot	Perm	NA	Prot	pm+pt	NA
Protected Phases	8		2	2	1	6
Permitted Phases		8			6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	65.0	65.0	36.0	36.0	11.0	46.0
Total Split (s)	65.0	65.0	36.0	36.0	14.0	50.0
Total Split (%)	56.5%	56.5%	31.3%	31.3%	12.2%	43.5%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Max	Max	None	Max

Intersection Summary
Cycle Length: 115
Actuated Cycle Length: 70.8
Natural Cycle: 115
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Central Blvd & 117 Ct





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	198	145	579	96	95	701
Future Volume (veh/h)	198	145	579	96	95	701
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	208	153	609	101	100	738
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	279	249	1706	763	471	2250
Arrive On Green	0.16	0.16	0.48	0.48	0.05	0.64
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	208	153	609	101	100	738
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	7.6	6.1	7.3	2.4	1.8	6.5
Cycle Q Clear(g_c), s	7.6	6.1	7.3	2.4	1.8	6.5
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	279	249	1706	763	471	2250
V/C Ratio(X)	0.75	0.61	0.36	0.13	0.21	0.33
Avail Cap(c_a), veh/h	1521	1358	1706	763	566	2250
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.2	26.6	11.0	9.7	7.6	5.7
Incr Delay (d2), s/veh	3.9	2.4	0.6	0.4	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.2	5.0	6.6	2.0	1.6	5.8
LnGrp Delay(d),s/veh	31.1	29.0	11.5	10.1	7.8	6.1
LnGrp LOS	C	C	B	B	A	A
Approach Vol, veh/h	361		710			838
Approach Delay, s/veh	30.2		11.3			6.3
Approach LOS	C		B			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	10.4	39.6				50.0		17.6
Change Period (Y+Rc), s	7.0	7.0				7.0		7.0
Max Green Setting (Gmax), s	7.0	29.0				43.0		58.0
Max Q Clear Time (g_c+I1), s	3.8	9.3				8.5		9.6
Green Ext Time (p_c), s	0.1	8.9				11.0		1.1

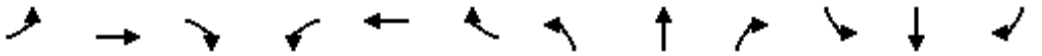
Intersection Summary	
HCM 2010 Ctrl Delay	12.7
HCM 2010 LOS	B

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	980	1129	158	1557	334	35	138	155	27	683
Future Volume (vph)	980	1129	158	1557	334	35	138	155	27	683
Turn Type	Prot	NA	pm+pt	NA	Perm	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6	5	2		4	5	8	8	1
Permitted Phases			2		2		4			8
Detector Phase	1	6	5	2	2	4	5	8	8	1
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.5	24.5	12.5	12.0	12.0	13.5	12.5	13.0	13.0	12.5
Total Split (s)	54.0	89.3	23.7	59.0	59.0	18.0	23.7	19.0	19.0	54.0
Total Split (%)	36.0%	59.5%	15.8%	39.3%	39.3%	12.0%	15.8%	12.7%	12.7%	36.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.5	2.5	3.5	2.5	2.5	4.5	3.5	4.0	4.0	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.5	7.5	8.5	7.5	7.5	9.5	8.5	9.0	9.0	8.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes			Yes
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 149.9
Natural Cycle: 130
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Central Blvd & PGA Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	980	1129	19	158	1557	334	40	35	138	155	27	683
Future Volume (vph)	980	1129	19	158	1557	334	40	35	138	155	27	683
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.5	7.5		8.5	7.5	7.5		9.5	8.5	9.0	9.0	8.5
Lane Util. Factor	0.97	0.91		1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	0.97	1.00
Satd. Flow (prot)	3433	5073		1770	5085	1583		1815	1583	1681	1709	1583
Flt Permitted	0.95	1.00		0.22	1.00	1.00		0.97	1.00	0.95	0.97	1.00
Satd. Flow (perm)	3433	5073		411	5085	1583		1815	1583	1681	1709	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1032	1188	20	166	1639	352	42	37	145	163	28	719
RTOR Reduction (vph)	0	1	0	0	0	181	0	0	127	0	0	64
Lane Group Flow (vph)	1032	1207	0	166	1639	171	0	79	18	95	96	655
Turn Type	Prot	NA		pm+pt	NA	Perm	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4	5	8	8	1
Permitted Phases				2		2			4			8
Actuated Green, G (s)	45.5	86.5		62.0	51.5	51.5		8.4	18.9	10.0	10.0	55.5
Effective Green, g (s)	45.5	86.5		62.0	51.5	51.5		8.4	18.9	10.0	10.0	55.5
Actuated g/C Ratio	0.30	0.58		0.41	0.34	0.34		0.06	0.13	0.07	0.07	0.37
Clearance Time (s)	8.5	7.5		8.5	7.5	7.5		9.5	8.5	9.0	9.0	8.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1042	2927		265	1747	543		101	199	112	114	586
v/s Ratio Prot	0.30	0.24		0.04	c0.32			c0.04	0.01	0.06	0.06	c0.34
v/s Ratio Perm				0.21		0.11			0.01			0.07
v/c Ratio	0.99	0.41		0.63	0.94	0.32		0.78	0.09	0.85	0.84	1.12
Uniform Delay, d1	52.0	17.6		28.4	47.7	36.2		69.8	57.9	69.2	69.2	47.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.4	0.4		4.6	11.2	1.5		31.6	0.2	41.5	40.1	73.7
Delay (s)	77.4	18.0		33.0	58.8	37.7		101.4	58.1	110.7	109.2	120.9
Level of Service	E	B		C	E	D		F	E	F	F	F
Approach Delay (s)		45.4			53.4			73.4			118.6	
Approach LOS		D			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	61.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	149.9	Sum of lost time (s)	34.5
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2030 AM

Arterial Level of Service: NB Central Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
117th Ct	II	45	61.9	17.2	79.4	0.77	35.2	A
SB On Ramp	II	45	52.1	36.7	88.8	0.65	26.3	C
NB Off Ramp	II	45	9.8	47.0	56.8	0.09	5..7	F
Victoria Falls Blvd	II	45	30.0	40.1	70.1	0.30	15.5	E
Hood Rd	II	45	23.7	39.4	63.1	0.23	13.0	E
Total	II		177.5	180.4	357.9	2.04	20.5	D

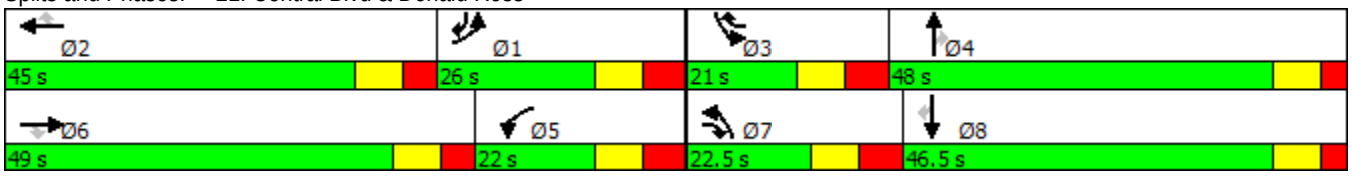
Arterial Level of Service: SB Central Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Victoria Falls Blvd	II	45	23.7	17.3	41.0	0.23	20.0	D
NB On Ramp	II	45	30.0	31.0	61.0	0.30	17.9	D
SB Off Ramp	II	45	9.8	6.0	15.8	0.09	20.5	D
117th Ct	II	45	52.1	8.4	60.5	0.65	38.7	A
PGA Blvd	II	45	61.9	76.2	138.1	0.77	20.2	D
Total	II		177.5	138.9	316.4	2.04	23.3	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1275	371	270	540	195	224	929	79	250	689	94
Future Volume (vph)	150	1275	371	270	540	195	224	929	79	250	689	94
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4		3	8	1
Permitted Phases			6		2	2		4	4		8	8
Detector Phase	1	6	7	5	2	3	7	4	4	3	8	1
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	24.5	13.5	14.0	24.5	14.0	13.5	24.5	24.5	14.0	24.0	26.0
Total Split (s)	26.0	49.0	22.5	22.0	45.0	21.0	22.5	48.0	48.0	21.0	46.5	26.0
Total Split (%)	18.6%	35.0%	16.1%	15.7%	32.1%	15.0%	16.1%	34.3%	34.3%	15.0%	33.2%	18.6%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	4.5	3.5	4.5	4.5	3.5	4.5	4.5	3.0	3.0	4.5	3.0	4.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	9.5	8.5	9.5	9.5	8.5	9.5	9.5	8.0	8.0	9.5	8.0	9.5
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	None	Max	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 21: Central Blvd & Donald Ross



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	1275	371	270	540	195	224	929	79	250	689	94
Future Volume (veh/h)	150	1275	371	270	540	195	224	929	79	250	689	94
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	158	1342	391	284	568	205	236	978	83	263	725	99
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	406	1471	589	307	1326	543	285	1011	452	283	1009	638
Arrive On Green	0.12	0.29	0.29	0.09	0.26	0.26	0.08	0.29	0.29	0.08	0.29	0.29
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	158	1342	391	284	568	205	236	978	83	263	725	99
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	5.9	35.7	15.7	11.5	13.0	7.1	9.5	38.2	3.9	10.6	25.8	1.4
Cycle Q Clear(g_c), s	5.9	35.7	15.7	11.5	13.0	7.1	9.5	38.2	3.9	10.6	25.8	1.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	406	1471	589	307	1326	543	285	1011	452	283	1009	638
V/C Ratio(X)	0.39	0.91	0.66	0.92	0.43	0.38	0.83	0.97	0.18	0.93	0.72	0.16
Avail Cap(c_a), veh/h	406	1471	589	307	1326	543	320	1011	452	283	1009	638
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.1	48.0	13.2	63.3	43.1	12.2	63.2	49.4	18.5	63.9	45.0	9.4
Incr Delay (d2), s/veh	0.6	10.1	5.8	32.3	1.0	2.0	15.2	20.7	0.2	35.5	2.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.2	25.0	12.4	11.1	10.3	6.1	8.8	29.1	3.1	10.6	18.8	2.4
LnGrp Delay(d),s/veh	57.7	58.2	19.0	95.6	44.1	14.2	78.4	70.1	18.7	99.4	47.5	9.5
LnGrp LOS	E	E	B	F	D	B	E	E	B	F	D	A
Approach Vol, veh/h		1891			1057			1297			1087	
Approach Delay, s/veh		50.0			52.1			68.3			56.6	
Approach LOS		D			D			E			E	

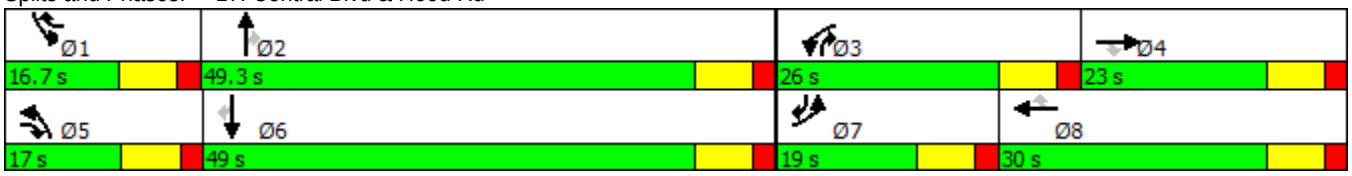
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.0	45.0	21.0	48.0	22.0	49.0	21.1	47.9
Change Period (Y+Rc), s	9.5	8.5	9.5	8.0	9.5	8.5	9.5	8.0
Max Green Setting (Gmax), s	16.5	36.5	11.5	40.0	12.5	40.5	13.0	38.5
Max Q Clear Time (g_c+I1), s	7.9	15.0	12.6	40.2	13.5	37.7	11.5	27.8
Green Ext Time (p_c), s	1.0	4.2	0.0	0.0	0.0	2.2	0.1	7.5

Intersection Summary	
HCM 2010 Ctrl Delay	56.2
HCM 2010 LOS	E

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	137	267	149	629	109	6	156	1058	703	299	1061	87
Future Volume (vph)	137	267	149	629	109	6	156	1058	703	299	1061	87
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	23.0	11.0	11.0	23.0	11.0	11.0	23.0	11.0	11.0	23.0	11.0
Total Split (s)	19.0	23.0	17.0	26.0	30.0	16.7	17.0	49.3	26.0	16.7	49.0	19.0
Total Split (%)	16.5%	20.0%	14.8%	22.6%	26.1%	14.5%	14.8%	42.9%	22.6%	14.5%	42.6%	16.5%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max	None

Intersection Summary
Cycle Length: 115
Actuated Cycle Length: 112.8
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 17: Central Blvd & Hood Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	267	149	629	109	6	156	1058	703	299	1061	87
Future Volume (veh/h)	137	267	149	629	109	6	156	1058	703	299	1061	87
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	144	281	157	662	115	6	164	1114	740	315	1117	92
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	206	409	286	584	798	494	225	1338	867	298	1413	727
Arrive On Green	0.06	0.12	0.12	0.17	0.23	0.23	0.07	0.38	0.38	0.09	0.40	0.40
Sat Flow, veh/h	3442	3539	1583	3442	3539	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	144	281	157	662	115	6	164	1114	740	315	1117	92
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	4.6	8.5	10.1	19.0	2.9	0.3	5.2	32.0	42.3	9.7	31.0	3.7
Cycle Q Clear(g_c), s	4.6	8.5	10.1	19.0	2.9	0.3	5.2	32.0	42.3	9.7	31.0	3.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	206	409	286	584	798	494	225	1338	867	298	1413	727
V/C Ratio(X)	0.70	0.69	0.55	1.13	0.14	0.01	0.73	0.83	0.85	1.06	0.79	0.13
Avail Cap(c_a), veh/h	369	506	330	584	798	494	307	1338	867	298	1413	727
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.6	47.6	41.7	46.5	34.7	26.6	51.3	31.6	21.5	51.1	29.5	17.4
Incr Delay (d2), s/veh	4.3	2.9	1.6	79.6	0.1	0.0	5.6	6.2	10.4	67.7	4.6	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.1	7.8	8.0	27.8	2.6	0.2	4.8	23.5	29.4	13.3	22.5	3.1
LnGrp Delay(d),s/veh	55.9	50.4	43.3	126.1	34.8	26.6	56.9	37.8	31.9	118.8	34.1	17.7
LnGrp LOS	E	D	D	F	C	C	E	D	C	F	C	B
Approach Vol, veh/h		582			783			2018			1524	
Approach Delay, s/veh		49.9			111.9			37.2			50.6	
Approach LOS		D			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.7	49.3	26.0	19.9	14.3	51.7	13.7	32.2
Change Period (Y+Rc), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Green Setting (Gmax), s	9.7	42.3	19.0	16.0	10.0	42.0	12.0	23.0
Max Q Clear Time (g_c+I1), s	11.7	44.3	21.0	12.1	7.2	33.0	6.6	4.9
Green Ext Time (p_c), s	0.0	0.0	0.0	0.8	0.1	8.2	0.2	2.6

Intersection Summary	
HCM 2010 Ctrl Delay	54.8
HCM 2010 LOS	D

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	121	13	96	12	21	1816	123	1649	38
Future Volume (vph)	121	13	96	12	21	1816	123	1649	38
Turn Type	Perm	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases		4	3	8	5	2	1	6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	3	8	5	2	1	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0	23.0	11.0	23.0	8.0	23.0	11.0	23.0	23.0
Total Split (s)	23.0	23.0	11.0	34.0	8.0	92.0	14.0	98.0	98.0
Total Split (%)	16.4%	16.4%	7.9%	24.3%	5.7%	65.7%	10.0%	70.0%	70.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	3.5	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	7.0
Lead/Lag	Lag	Lag	Lead		Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	Min

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 139.2
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 13: Central Blvd & Victoria Falls Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	13	10	96	12	77	21	1816	153	123	1649	38
Future Volume (veh/h)	121	13	10	96	12	77	21	1816	153	123	1649	38
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	127	14	11	101	13	81	22	1912	161	129	1736	40
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	196	108	85	239	43	266	172	2010	167	152	2347	1050
Arrive On Green	0.11	0.11	0.11	0.03	0.19	0.19	0.02	0.61	0.61	0.05	0.66	0.66
Sat Flow, veh/h	1297	968	761	1774	224	1393	1774	3309	275	1774	3539	1583
Grp Volume(v), veh/h	127	0	25	101	0	94	22	1010	1063	129	1736	40
Grp Sat Flow(s),veh/h/ln	1297	0	1729	1774	0	1617	1774	1770	1814	1774	1770	1583
Q Serve(g_s), s	13.4	0.0	1.8	4.0	0.0	6.9	0.7	72.4	77.0	5.1	45.0	1.2
Cycle Q Clear(g_c), s	13.4	0.0	1.8	4.0	0.0	6.9	0.7	72.4	77.0	5.1	45.0	1.2
Prop In Lane	1.00		0.44	1.00		0.86	1.00		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	196	0	192	239	0	308	172	1075	1102	152	2347	1050
V/C Ratio(X)	0.65	0.00	0.13	0.42	0.00	0.30	0.13	0.94	0.96	0.85	0.74	0.04
Avail Cap(c_a), veh/h	202	0	199	239	0	315	193	1085	1112	152	2347	1050
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.7	0.0	55.6	54.3	0.0	48.2	15.4	24.9	25.8	41.5	15.5	8.1
Incr Delay (d2), s/veh	6.8	0.0	0.3	1.2	0.0	0.6	0.3	15.0	18.9	34.1	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.9	0.0	1.6	3.1	0.0	5.7	0.6	49.9	55.1	10.4	29.8	0.9
LnGrp Delay(d),s/veh	67.5	0.0	55.9	55.5	0.0	48.8	15.7	39.9	44.8	75.6	16.7	8.1
LnGrp LOS	E		E	E		D	B	D	D	E	B	A
Approach Vol, veh/h		152			195			2095			1905	
Approach Delay, s/veh		65.6			52.2			42.1			20.5	
Approach LOS		E			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	14.0	91.2	11.0	22.4	6.3	98.9		33.4
Change Period (Y+Rc), s	7.0	7.0	7.0	7.0	4.0	7.0		7.0
Max Green Setting (Gmax), s	7.0	85.0	4.0	16.0	4.0	91.0		27.0
Max Q Clear Time (g_c+I1), s	7.1	79.0	6.0	15.4	2.7	47.0		8.9
Green Ext Time (p_c), s	0.0	5.2	0.0	0.1	0.0	40.9		0.9

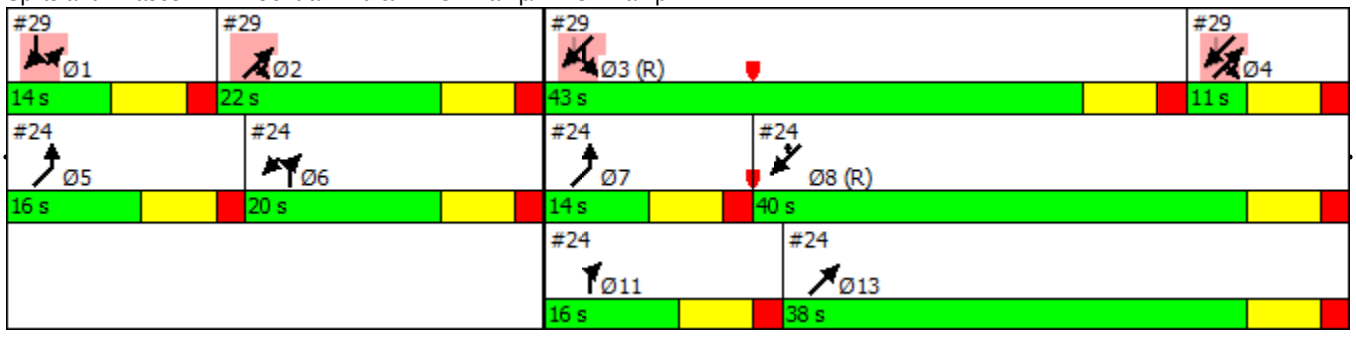
Intersection Summary	
HCM 2010 Ctrl Delay	33.9
HCM 2010 LOS	C

Lane Group	NBL	NBR	NEL	NET	SWT	SWR	Ø1	Ø2	Ø3	Ø4	Ø5	Ø7
Lane Configurations												
Traffic Volume (vph)	23	1092	307	883	1916	34						
Future Volume (vph)	23	1092	307	883	1916	34						
Lane Group Flow (vph)	24	1149	323	929	2017	36						
Turn Type	Prot	custom	Prot	NA	NA	Prot						
Protected Phases	6	6 11	5 7	13	8	8	1	2	3	4	5	7
Permitted Phases												
Detector Phase	6	6 11	5 7	13	8	8						
Switch Phase												
Minimum Initial (s)	4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0			11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Total Split (s)	20.0			38.0	40.0	40.0	14.0	22.0	43.0	11.0	16.0	14.0
Total Split (%)	22.2%			42.2%	44.4%	44.4%	16%	24%	48%	12%	18%	16%
Yellow Time (s)	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0						
Total Lost Time (s)	7.0			7.0	7.0	7.0						
Lead/Lag	Lag				Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None			None	C-Max	C-Max	None	None	C-Max	None	None	None
v/c Ratio	0.09	0.94	0.54	0.76	0.86	0.05						
Control Delay	34.5	33.2	15.8	47.0	31.0	0.1						
Queue Delay	0.0	0.0	0.0	0.1	0.1	0.0						
Total Delay	34.5	33.2	15.8	47.1	31.1	0.1						
Queue Length 50th (ft)	12	231	77	305	303	0						
Queue Length 95th (ft)	35	#393	m96	m357	353	0						
Internal Link Dist (ft)				394	841							
Turn Bay Length (ft)			160			450						
Base Capacity (vph)	259	1222	610	1218	2349	718						
Starvation Cap Reductn	0	0	0	19	0	0						
Spillback Cap Reductn	0	0	0	0	28	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	0.09	0.94	0.53	0.77	0.87	0.05						

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 3:SWTL and 8:, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: Central Blvd & NB Off Ramp/NB On Ramp



Lane Group	Ø11
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	11
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	11.0
Total Split (s)	16.0
Total Split (%)	18%
Yellow Time (s)	5.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	23	0	1092	0	0	0	307	883	0	0	1916	34
Future Volume (vph)	23	0	1092	0	0	0	307	883	0	0	1916	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0		7.0				7.0	7.0			7.0	7.0
Lane Util. Factor	1.00		0.88				0.97	0.95			0.86	1.00
Frt	1.00		0.85				1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		2787				3433	3539			6408	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		2787				3433	3539			6408	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	24	0	1149	0	0	0	323	929	0	0	2017	36
RTOR Reduction (vph)	0	0	319	0	0	0	0	0	0	0	0	23
Lane Group Flow (vph)	24	0	830	0	0	0	323	929	0	0	2017	13
Turn Type	Prot		custom				Prot	NA			NA	Prot
Protected Phases	6		6 11				5 7	13			8	8
Permitted Phases												
Actuated Green, G (s)	13.2		29.2				15.8	31.0			33.0	33.0
Effective Green, g (s)	13.2		29.2				15.8	31.0			33.0	33.0
Actuated g/C Ratio	0.15		0.32				0.18	0.34			0.37	0.37
Clearance Time (s)	7.0							7.0			7.0	7.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	259		904				602	1218			2349	580
v/s Ratio Prot	0.01		c0.30				c0.09	0.26			c0.31	0.01
v/s Ratio Perm												
v/c Ratio	0.09		0.92				0.54	0.76			0.86	0.02
Uniform Delay, d1	33.2		29.3				33.8	26.2			26.3	18.2
Progression Factor	1.00		1.00				0.77	1.68			1.00	1.00
Incremental Delay, d2	0.2		13.9				0.5	1.5			4.4	0.1
Delay (s)	33.4		43.2				26.5	45.4			30.7	18.3
Level of Service	C		D				C	D			C	B
Approach Delay (s)		43.0			0.0			40.6			30.5	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

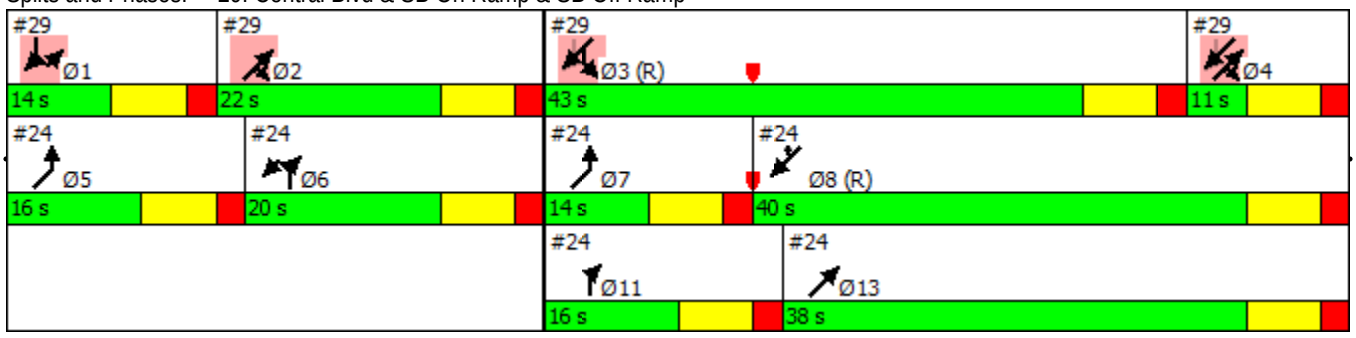
c Critical Lane Group

Lane Group	SBL2	SBR	NET	NER	SWL	SWT	Ø2	Ø4	Ø5	Ø6	Ø7	Ø8
Lane Configurations												
Traffic Volume (vph)	76	143	1114	58	1168	771						
Future Volume (vph)	76	143	1114	58	1168	771						
Lane Group Flow (vph)	80	151	1173	61	1229	812						
Turn Type	Prot	custom	NA	Prot	Prot	NA						
Protected Phases	1	1	2 4	2 4	3	3 4	2	4	5	6	7	8
Permitted Phases		3 4										
Detector Phase	1	1	2 4	2 4	3	3 4						
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0			11.0		11.0	11.0	11.0	11.0	11.0	11.0
Total Split (s)	14.0	14.0			43.0		22.0	11.0	16.0	20.0	14.0	40.0
Total Split (%)	15.6%	15.6%			47.8%		24%	12%	18%	22%	16%	44%
Yellow Time (s)	5.0	5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0							
Total Lost Time (s)	7.0	7.0			7.0							
Lead/Lag	Lead	Lead			Lead		Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes			Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None			C-Max		None	None	None	None	None	C-Max
v/c Ratio	0.60	0.11	0.86	0.12	0.90	0.44						
Control Delay	59.9	0.1	36.7	0.5	35.3	6.0						
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0						
Total Delay	59.9	0.1	36.7	0.5	35.3	6.0						
Queue Length 50th (ft)	45	0	127	0	214	26						
Queue Length 95th (ft)	#104	0	#160	0	m#275	m71						
Internal Link Dist (ft)			967			394						
Turn Bay Length (ft)		800		450	190							
Base Capacity (vph)	137	1424	1366	509	1373	1848						
Starvation Cap Reductn	0	0	0	0	0	0						
Spillback Cap Reductn	0	0	0	0	0	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	0.58	0.11	0.86	0.12	0.90	0.44						

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 3:SWTL and 8:, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 29: Central Blvd & SB On Ramp & SB Off Ramp



Lane Group	Ø11	Ø13
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	11	13
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	11.0	11.0
Total Split (s)	16.0	38.0
Total Split (%)	18%	42%
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary



Movement	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Traffic Volume (vph)	76	0	143	0	0	0	1114	58	1168	771	0
Future Volume (vph)	76	0	143	0	0	0	1114	58	1168	771	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0		7.0				7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00		1.00				0.86	1.00	0.97	0.95	
Frt	1.00		0.85				1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770		1583				6408	1583	3433	3539	
Flt Permitted	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770		1583				6408	1583	3433	3539	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	80	0	151	0	0	0	1173	61	1229	812	0
RTOR Reduction (vph)	0	0	61	0	0	0	0	48	0	0	0
Lane Group Flow (vph)	80	0	90	0	0	0	1173	13	1229	812	0
Turn Type	Prot		custom				NA	Prot	Prot	NA	
Protected Phases	1		1				2 4	2 4	3	3 4	
Permitted Phases			3 4								
Actuated Green, G (s)	6.8		53.8				19.2	19.2	36.0	47.0	
Effective Green, g (s)	6.8		53.8				19.2	19.2	36.0	47.0	
Actuated g/C Ratio	0.08		0.60				0.21	0.21	0.40	0.52	
Clearance Time (s)	7.0		7.0						7.0		
Vehicle Extension (s)	3.0		3.0						3.0		
Lane Grp Cap (vph)	133		1069				1367	337	1373	1848	
v/s Ratio Prot	c0.05		0.01				c0.18	0.01	c0.36	0.23	
v/s Ratio Perm			0.05								
v/c Ratio	0.60		0.08				0.86	0.04	0.90	0.44	
Uniform Delay, d1	40.3		7.7				34.1	28.1	25.2	13.3	
Progression Factor	1.00		1.00				1.00	1.00	1.17	0.42	
Incremental Delay, d2	7.5		0.0				5.6	0.0	5.0	0.1	
Delay (s)	47.7		7.7				39.7	28.1	34.6	5.6	
Level of Service	D		A				D	C	C	A	
Approach Delay (s)		21.6		0.0			39.1			23.1	
Approach LOS		C		A			D			C	

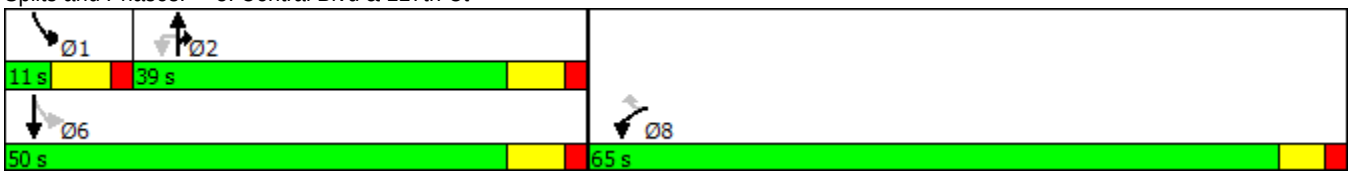
Intersection Summary			
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	226	170	1043	214	78	836
Future Volume (vph)	226	170	1043	214	78	836
Turn Type	Prot	Perm	NA	Prot	pm+pt	NA
Protected Phases	8		2	2	1	6
Permitted Phases		8			6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	65.0	65.0	36.0	36.0	11.0	46.0
Total Split (s)	65.0	65.0	39.0	39.0	11.0	50.0
Total Split (%)	56.5%	56.5%	33.9%	33.9%	9.6%	43.5%
Yellow Time (s)	4.0	4.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Max	Max	None	Max

Intersection Summary
Cycle Length: 115
Actuated Cycle Length: 70.7
Natural Cycle: 115
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Central Blvd & 117th Ct





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	226	170	1043	214	78	836
Future Volume (veh/h)	226	170	1043	214	78	836
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	238	179	1098	225	82	880
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	312	278	1711	766	292	2240
Arrive On Green	0.18	0.18	0.48	0.48	0.05	0.63
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	238	179	1098	225	82	880
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	8.7	7.1	15.8	5.8	1.5	8.3
Cycle Q Clear(g_c), s	8.7	7.1	15.8	5.8	1.5	8.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	312	278	1711	766	292	2240
V/C Ratio(X)	0.76	0.64	0.64	0.29	0.28	0.39
Avail Cap(c_a), veh/h	1541	1375	1711	766	314	2240
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.7	26.0	13.1	10.6	9.8	6.1
Incr Delay (d2), s/veh	3.9	2.5	1.9	1.0	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.1	6.0	12.7	4.9	1.3	7.3
LnGrp Delay(d),s/veh	30.5	28.5	15.0	11.5	10.3	6.6
LnGrp LOS	C	C	B	B	B	A
Approach Vol, veh/h	417		1323			962
Approach Delay, s/veh	29.7		14.4			6.9
Approach LOS	C		B			A

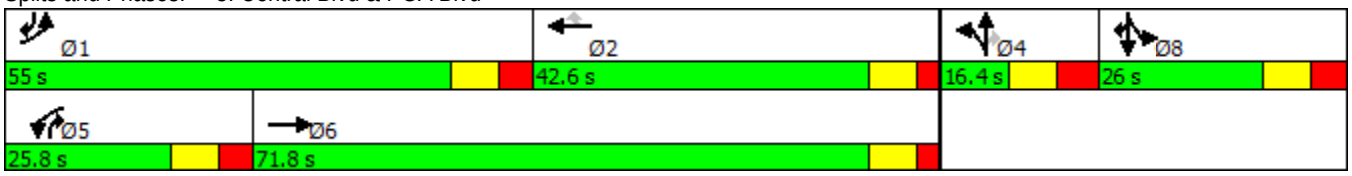
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	10.1	39.9				50.0		17.9
Change Period (Y+Rc), s	7.0	7.0				7.0		6.0
Max Green Setting (Gmax), s	4.0	32.0				43.0		59.0
Max Q Clear Time (g_c+I1), s	3.5	17.8				10.3		10.7
Green Ext Time (p_c), s	0.0	10.5				18.7		1.3

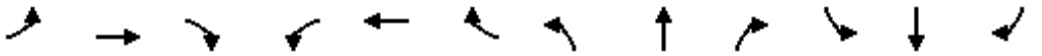
Intersection Summary	
HCM 2010 Ctrl Delay	14.1
HCM 2010 LOS	B

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1111	1604	115	1168	200	41	181	229	35	709
Future Volume (vph)	1111	1604	115	1168	200	41	181	229	35	709
Turn Type	Prot	NA	Prot	NA	Perm	NA	pm+ov	Split	NA	pt+ov
Protected Phases	1	6	5	2		4	5	8	8	8 1
Permitted Phases					2		4			
Detector Phase	1	6	5	2	2	4	5	8	8	8 1
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	12.5	24.5	12.5	12.0	12.0	13.5	12.5	13.0	13.0	
Total Split (s)	55.0	71.8	25.8	42.6	42.6	16.4	25.8	26.0	26.0	
Total Split (%)	39.3%	51.3%	18.4%	30.4%	30.4%	11.7%	18.4%	18.6%	18.6%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	3.5	2.5	3.5	2.5	2.5	4.5	3.5	4.0	4.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	8.5	7.5	8.5	7.5	7.5	9.5	8.5	9.0	9.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lag		Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes			
Recall Mode	None	Max	None	Max	Max	None	None	None	None	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Natural Cycle: 140
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Central Blvd & PGA Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1111	1604	38	115	1168	200	36	41	181	229	35	709
Future Volume (vph)	1111	1604	38	115	1168	200	36	41	181	229	35	709
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.5	7.5		8.5	7.5	7.5		9.5	8.5	9.0	9.0	9.0
Lane Util. Factor	0.97	0.91		1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	0.96	1.00
Satd. Flow (prot)	3433	5068		1770	5085	1583		1820	1583	1681	1707	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	0.96	1.00
Satd. Flow (perm)	3433	5068		1770	5085	1583		1820	1583	1681	1707	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1169	1688	40	121	1229	211	38	43	191	241	37	746
RTOR Reduction (vph)	0	2	0	0	0	158	0	0	145	0	0	53
Lane Group Flow (vph)	1169	1726	0	121	1229	53	0	81	46	137	141	693
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	pm+ov	Split	NA	pt+ov
Protected Phases	1	6		5	2		4	4	5	8	8	8 1
Permitted Phases						2			4			
Actuated Green, G (s)	46.5	67.4		14.2	35.1	35.1		6.9	21.1	17.0	17.0	72.5
Effective Green, g (s)	46.5	67.4		14.2	35.1	35.1		6.9	21.1	17.0	17.0	72.5
Actuated g/C Ratio	0.33	0.48		0.10	0.25	0.25		0.05	0.15	0.12	0.12	0.52
Clearance Time (s)	8.5	7.5		8.5	7.5	7.5		9.5	8.5	9.0	9.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1140	2439		179	1274	396		89	238	204	207	819
v/s Ratio Prot	c0.34	0.34		0.07	c0.24			c0.04	0.02	0.08	0.08	c0.44
v/s Ratio Perm						0.03			0.01			
v/c Ratio	1.03	0.71		0.68	0.96	0.13		0.91	0.19	0.67	0.68	0.85
Uniform Delay, d1	46.8	28.6		60.7	51.8	40.7		66.2	52.0	58.8	58.9	29.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	33.3	1.8		9.7	18.1	0.7		66.4	0.4	8.4	8.9	8.1
Delay (s)	80.1	30.3		70.4	69.9	41.4		132.6	52.4	67.2	67.8	37.1
Level of Service	F	C		E	E	D		F	D	E	E	D
Approach Delay (s)		50.4			66.1			76.3			45.3	
Approach LOS		D			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	55.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	34.5
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2030 PM

Arterial Level of Service: NB Central Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
117th Ct	II	45	61.9	16.9	78.8	0.77	35.4	A
SB On Ramp	II	45	52.1	26.5	78.6	0.65	29.8	B
NB Off Ramp	II	45	9.8	52.3	62.1	0.09	5.2	F
Victoria Falls Blvd	II	45	30.0	46.0	76.0	0.30	14.4	E
Hood Rd	II	45	23.7	36.3	60.0	0.23	13.7	E
Total	II		177.5	178.0	355.5	2.04	20.7	D

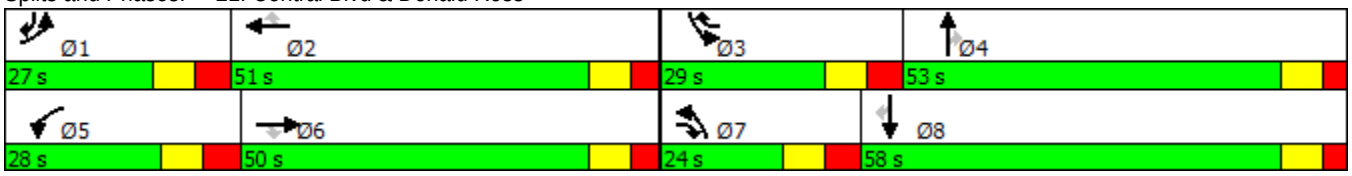
Arterial Level of Service: SB Central Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Victoria Falls Blvd	II	45	23.7	33.8	57.5	0.23	14.3	E
NB On Ramp	II	45	30.0	28.5	58.5	0.30	18.6	D
SB Off Ramp	II	45	9.8	5.2	15.0	0.09	21.5	D
117th Ct	II	45	52.1	8.5	60.6	0.65	38.6	A
PGA Blvd	II	45	61.9	118.3	180.2	0.77	15.5	E
Total	II		177.5	194.3	371.8	2.04	19.8	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	377	874	316	306	1273	345	226	975	60	430	815	173
Future Volume (vph)	377	874	316	306	1273	345	226	975	60	430	815	173
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4		3	8	1
Permitted Phases			6		2	2			4			8
Detector Phase	1	6	7	5	2	3	7	4	4	3	8	1
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	24.5	13.5	14.0	24.5	14.0	13.5	24.5	24.5	14.0	24.0	26.0
Total Split (s)	27.0	50.0	24.0	28.0	51.0	29.0	24.0	53.0	53.0	29.0	58.0	27.0
Total Split (%)	16.9%	31.3%	15.0%	17.5%	31.9%	18.1%	15.0%	33.1%	33.1%	18.1%	36.3%	16.9%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	4.5	3.5	4.5	4.5	3.5	4.5	4.5	3.0	3.0	4.5	3.0	4.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	9.5	8.5	9.5	9.5	8.5	9.5	9.5	8.0	8.0	9.5	8.0	9.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	None	Max	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 160
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 21: Central Blvd & Donald Ross



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	377	874	316	306	1273	345	226	975	60	430	815	173
Future Volume (veh/h)	377	874	316	306	1273	345	226	975	60	430	815	173
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	397	920	333	322	1340	363	238	1026	63	453	858	182
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	376	1368	555	365	1351	614	281	995	445	419	1138	682
Arrive On Green	0.11	0.27	0.27	0.11	0.27	0.27	0.08	0.28	0.28	0.12	0.32	0.32
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	397	920	333	322	1340	363	238	1026	63	453	858	182
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	17.5	25.8	27.7	14.8	42.0	29.2	10.9	45.0	4.8	19.5	34.7	11.8
Cycle Q Clear(g_c), s	17.5	25.8	27.7	14.8	42.0	29.2	10.9	45.0	4.8	19.5	34.7	11.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	376	1368	555	365	1351	614	281	995	445	419	1138	682
V/C Ratio(X)	1.05	0.67	0.60	0.88	0.99	0.59	0.85	1.03	0.14	1.08	0.75	0.27
Avail Cap(c_a), veh/h	376	1368	555	398	1351	614	312	995	445	419	1138	682
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	71.3	52.2	42.7	70.5	58.6	38.9	72.5	57.5	43.0	70.3	48.6	29.3
Incr Delay (d2), s/veh	61.5	2.7	4.7	19.0	22.7	4.2	17.9	36.7	0.1	67.1	2.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	20.7	18.2	18.7	12.6	30.4	19.4	9.9	48.7	3.8	23.7	24.4	8.9
LnGrp Delay(d),s/veh	132.7	54.9	47.5	89.6	81.2	43.1	90.4	94.2	43.2	137.3	51.5	29.5
LnGrp LOS	F	D	D	F	F	D	F	F	D	F	D	C
Approach Vol, veh/h		1650			2025			1327			1493	
Approach Delay, s/veh		72.1			75.7			91.1			74.9	
Approach LOS		E			E			F			E	

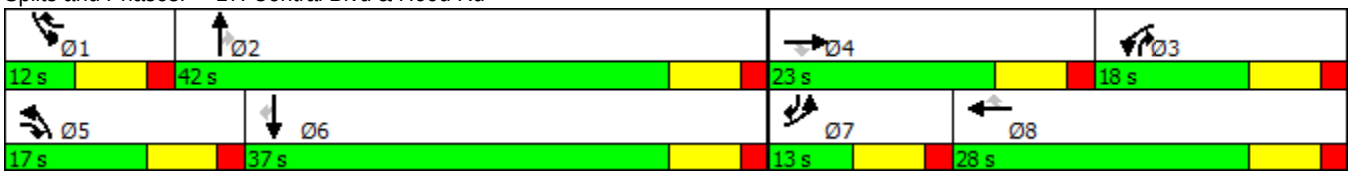
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.0	51.0	29.0	53.0	26.5	51.5	22.5	59.5
Change Period (Y+Rc), s	9.5	8.5	9.5	8.0	9.5	8.5	9.5	8.0
Max Green Setting (Gmax), s	17.5	42.5	19.5	45.0	18.5	41.5	14.5	50.0
Max Q Clear Time (g_c+I1), s	19.5	44.0	21.5	47.0	16.8	29.7	12.9	36.7
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.2	10.3	0.1	9.7

Intersection Summary	
HCM 2010 Ctrl Delay	77.7
HCM 2010 LOS	E

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	171	98	501	223	102	241	1197	756	189	887	218
Future Volume (vph)	102	171	98	501	223	102	241	1197	756	189	887	218
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	23.0	11.0	11.0	23.0	11.0	11.0	23.0	11.0	11.0	23.0	11.0
Total Split (s)	13.0	23.0	17.0	18.0	28.0	12.0	17.0	42.0	18.0	12.0	37.0	13.0
Total Split (%)	13.7%	24.2%	17.9%	18.9%	29.5%	12.6%	17.9%	44.2%	18.9%	12.6%	38.9%	13.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max	None

Intersection Summary
Cycle Length: 95
Actuated Cycle Length: 88.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 17: Central Blvd & Hood Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	171	98	501	223	102	241	1197	756	189	887	218
Future Volume (veh/h)	102	171	98	501	223	102	241	1197	756	189	887	218
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	107	180	103	527	235	107	254	1260	796	199	934	229
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	172	292	284	440	568	346	333	1438	846	200	1302	661
Arrive On Green	0.05	0.08	0.08	0.13	0.16	0.16	0.10	0.41	0.41	0.06	0.37	0.37
Sat Flow, veh/h	3442	3539	1583	3442	3539	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	107	180	103	527	235	107	254	1260	796	199	934	229
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	2.6	4.2	2.7	11.0	5.1	4.9	6.2	28.3	15.4	5.0	19.5	8.5
Cycle Q Clear(g_c), s	2.6	4.2	2.7	11.0	5.1	4.9	6.2	28.3	15.4	5.0	19.5	8.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	172	292	284	440	568	346	333	1438	846	200	1302	661
V/C Ratio(X)	0.62	0.62	0.36	1.20	0.41	0.31	0.76	0.88	0.94	1.00	0.72	0.35
Avail Cap(c_a), veh/h	240	658	447	440	863	478	400	1438	846	200	1302	661
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.1	38.2	11.3	37.6	32.5	28.2	37.9	23.6	4.9	40.5	23.4	17.1
Incr Delay (d2), s/veh	3.7	2.1	0.8	109.6	0.5	0.5	7.0	7.8	19.6	62.4	3.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.4	3.9	2.7	21.4	4.6	3.9	5.9	21.6	22.1	7.3	15.3	7.1
LnGrp Delay(d),s/veh	43.8	40.3	12.1	147.1	33.0	28.7	44.9	31.3	24.5	102.9	26.8	18.5
LnGrp LOS	D	D	B	F	C	C	D	C	C	F	C	B
Approach Vol, veh/h		390			869			2310			1362	
Approach Delay, s/veh		33.8			101.7			30.5			36.5	
Approach LOS		C			F			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	42.0	18.0	14.1	15.3	38.7	11.3	20.8
Change Period (Y+Rc), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Green Setting (Gmax), s	5.0	35.0	11.0	16.0	10.0	30.0	6.0	21.0
Max Q Clear Time (g_c+I1), s	7.0	30.3	13.0	6.2	8.2	21.5	4.6	7.1
Green Ext Time (p_c), s	0.0	4.5	0.0	0.9	0.2	7.8	0.0	3.1

Intersection Summary	
HCM 2010 Ctrl Delay	45.0
HCM 2010 LOS	D

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	272	29	198	29	41	1724	41	1412	88
Future Volume (vph)	272	29	198	29	41	1724	41	1412	88
Turn Type	Perm	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm
Protected Phases		4	3	8	5	2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	3	8	5	2	6	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0	23.0	11.0	23.0	11.0	23.0	23.0	23.0	23.0
Total Split (s)	38.0	38.0	11.0	49.0	11.0	81.0	70.0	70.0	70.0
Total Split (%)	29.2%	29.2%	8.5%	37.7%	8.5%	62.3%	53.8%	53.8%	53.8%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lag	Lag	Lead		Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Natural Cycle: 130
Control Type: Actuated-Uncoordinated

Splits and Phases: 13: Central Blvd & Victoria Falls Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	272	29	23	198	29	229	41	1724	155	41	1412	88
Future Volume (veh/h)	272	29	23	198	29	229	41	1724	155	41	1412	88
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	286	31	24	208	31	241	43	1815	163	43	1486	93
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	233	180	398	59	462	138	1869	165	60	1734	776
Arrive On Green	0.24	0.24	0.24	0.03	0.32	0.32	0.02	0.57	0.57	0.49	0.49	0.49
Sat Flow, veh/h	1103	975	755	1774	184	1427	1774	3290	291	219	3539	1583
Grp Volume(v), veh/h	286	0	55	208	0	272	43	964	1014	43	1486	93
Grp Sat Flow(s),veh/h/ln	1103	0	1730	1774	0	1611	1774	1770	1811	219	1770	1583
Q Serve(g_s), s	24.2	0.0	3.2	4.0	0.0	17.8	1.5	67.0	71.3	2.4	47.9	4.1
Cycle Q Clear(g_c), s	31.0	0.0	3.2	4.0	0.0	17.8	1.5	67.0	71.3	63.5	47.9	4.1
Prop In Lane	1.00		0.44	1.00		0.89	1.00		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	261	0	413	398	0	522	138	1006	1029	60	1734	776
V/C Ratio(X)	1.10	0.00	0.13	0.52	0.00	0.52	0.31	0.96	0.99	0.72	0.86	0.12
Avail Cap(c_a), veh/h	261	0	413	398	0	522	149	1010	1033	60	1734	776
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.3	0.0	38.8	41.4	0.0	35.7	25.8	26.5	27.5	64.7	29.1	17.9
Incr Delay (d2), s/veh	83.5	0.0	0.1	1.2	0.0	0.9	1.3	19.0	24.4	34.5	4.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	27.6	0.0	2.8	8.3	0.0	12.7	1.4	47.8	52.8	3.8	32.5	3.3
LnGrp Delay(d),s/veh	138.9	0.0	38.9	42.6	0.0	36.6	27.0	45.5	51.9	99.2	33.6	18.0
LnGrp LOS	F		D	D		D	C	D	D	F	C	B
Approach Vol, veh/h		341			480			2021			1622	
Approach Delay, s/veh		122.7			39.2			48.3			34.4	
Approach LOS		F			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4	5	6		8
Phs Duration (G+Y+Rc), s		80.7	11.0	38.0	10.2	70.5		49.0
Change Period (Y+Rc), s		7.0	7.0	7.0	7.0	7.0		7.0
Max Green Setting (Gmax), s		74.0	4.0	31.0	4.0	63.0		42.0
Max Q Clear Time (g_c+I1), s		73.3	6.0	33.0	3.5	65.5		19.8
Green Ext Time (p_c), s		0.4	0.0	0.0	0.0	0.0		3.1

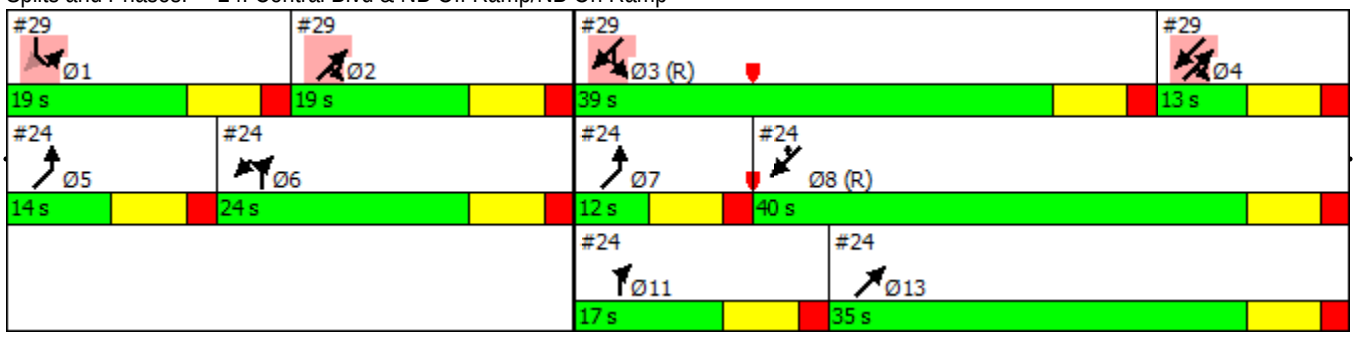
Intersection Summary	
HCM 2010 Ctrl Delay	48.0
HCM 2010 LOS	D

Lane Group	NBL	NBR	NEL	NET	SWT	SWR	Ø1	Ø2	Ø3	Ø4	Ø5	Ø7
Lane Configurations												
Traffic Volume (vph)	48	1179	342	741	1769	45						
Future Volume (vph)	48	1179	342	741	1769	45						
Lane Group Flow (vph)	51	1241	360	780	1862	47						
Turn Type	Prot	custom	Prot	NA	NA	Prot						
Protected Phases	6	6 11	5 7	13	8	8	1	2	3	4	5	7
Permitted Phases												
Detector Phase	6	6 11	5 7	13	8	8						
Switch Phase												
Minimum Initial (s)	4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0			23.0	23.0	23.0	11.0	15.0	11.0	12.0	11.0	11.0
Total Split (s)	24.0			35.0	40.0	40.0	19.0	19.0	39.0	13.0	14.0	12.0
Total Split (%)	26.7%			38.9%	44.4%	44.4%	21%	21%	43%	14%	16%	13%
Yellow Time (s)	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0						
Total Lost Time (s)	7.0			7.0	7.0	7.0						
Lead/Lag	Lag				Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None			None	C-Max	C-Max	None	None	C-Max	None	None	None
v/c Ratio	0.15	0.90	0.79	0.71	0.79	0.07						
Control Delay	32.0	25.1	28.6	52.3	28.5	0.2						
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0						
Total Delay	32.0	25.1	28.6	52.3	28.6	0.2						
Queue Length 50th (ft)	24	231	72	256	270	0						
Queue Length 95th (ft)	56	#397	m#122	317	316	0						
Internal Link Dist (ft)				394	844							
Turn Bay Length (ft)			160			450						
Base Capacity (vph)	334	1382	457	1101	2349	718						
Starvation Cap Reductn	0	0	0	0	0	0						
Spillback Cap Reductn	0	0	0	0	54	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	0.15	0.90	0.79	0.71	0.81	0.07						

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 3:SWTL and 8:, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: Central Blvd & NB Off Ramp/NB On Ramp



Lane Group	Ø11
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	11
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	11.0
Total Split (s)	17.0
Total Split (%)	19%
Yellow Time (s)	5.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	48	0	1179	0	0	0	342	741	0	0	1769	45
Future Volume (vph)	48	0	1179	0	0	0	342	741	0	0	1769	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0		7.0				7.0	7.0			7.0	7.0
Lane Util. Factor	1.00		0.88				0.97	0.95			0.86	1.00
Frt	1.00		0.85				1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		2787				3433	3539			6408	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		2787				3433	3539			6408	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	51	0	1241	0	0	0	360	780	0	0	1862	47
RTOR Reduction (vph)	0	0	329	0	0	0	0	0	0	0	0	30
Lane Group Flow (vph)	51	0	912	0	0	0	360	780	0	0	1862	17
Turn Type	Prot		custom				Prot	NA			NA	Prot
Protected Phases	6		6 11				5 7	13			8	8
Permitted Phases												
Actuated Green, G (s)	17.0		34.0				12.0	28.0			33.0	33.0
Effective Green, g (s)	17.0		34.0				12.0	28.0			33.0	33.0
Actuated g/C Ratio	0.19		0.38				0.13	0.31			0.37	0.37
Clearance Time (s)	7.0							7.0			7.0	7.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	334		1052				457	1101			2349	580
v/s Ratio Prot	0.03		c0.33				c0.10	0.22			c0.29	0.01
v/s Ratio Perm												
v/c Ratio	0.15		0.87				0.79	0.71			0.79	0.03
Uniform Delay, d1	30.5		25.9				37.8	27.4			25.4	18.2
Progression Factor	1.00		1.00				0.91	1.79			1.00	1.00
Incremental Delay, d2	0.2		7.7				6.2	1.5			2.8	0.1
Delay (s)	30.7		33.6				40.5	50.4			28.3	18.3
Level of Service	C		C				D	D			C	B
Approach Delay (s)		33.5			0.0			47.3			28.0	
Approach LOS		C			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	34.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

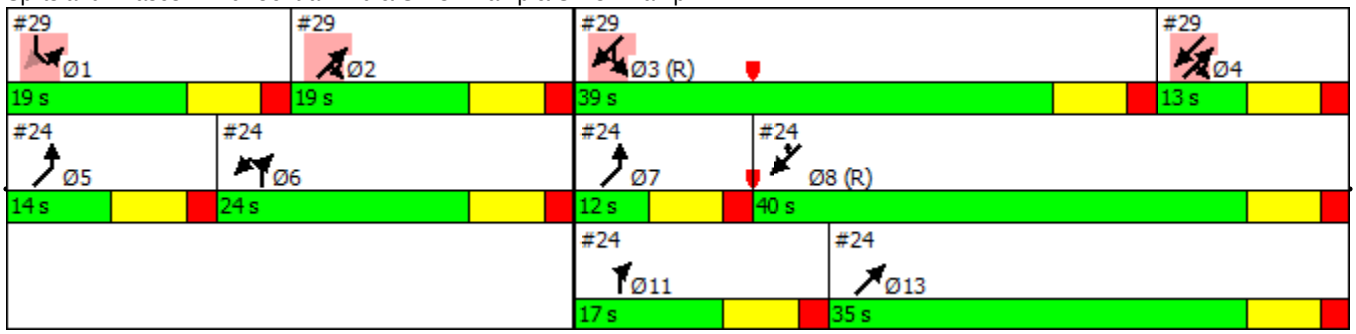
c Critical Lane Group

Lane Group	SBL2	SBR	NET	NER	SWL	SWT	Ø2	Ø4	Ø5	Ø6	Ø7	Ø8
Lane Configurations												
Traffic Volume (vph)	122	343	961	25	1096	721						
Future Volume (vph)	122	343	961	25	1096	721						
Lane Group Flow (vph)	128	361	1012	26	1154	759						
Turn Type	Prot	Perm	NA	Prot	Prot	NA						
Protected Phases	1		2 4	2 4	3	3 4	2	4	5	6	7	8
Permitted Phases		1										
Detector Phase	1	1	2 4	2 4	3	3 4						
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0			11.0		15.0	12.0	11.0	11.0	11.0	23.0
Total Split (s)	19.0	19.0			39.0		19.0	13.0	14.0	24.0	12.0	40.0
Total Split (%)	21.1%	21.1%			43.3%		21%	14%	16%	27%	13%	44%
Yellow Time (s)	5.0	5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0							
Total Lost Time (s)	7.0	7.0			7.0							
Lead/Lag	Lead	Lead			Lead		Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes			Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None			C-Max		None	None	None	None	None	C-Max
v/c Ratio	0.62	0.62	0.73	0.05	0.95	0.43						
Control Delay	50.7	6.4	26.5	0.2	44.3	5.2						
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0						
Total Delay	50.7	6.4	26.5	0.2	44.3	5.2						
Queue Length 50th (ft)	69	0	97	0	214	25						
Queue Length 95th (ft)	126	30	120	0	#426	58						
Internal Link Dist (ft)			967			394						
Turn Bay Length (ft)		800		450	190							
Base Capacity (vph)	236	597	1384	512	1220	1769						
Starvation Cap Reductn	0	0	0	0	0	0						
Spillback Cap Reductn	0	0	0	0	0	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	0.54	0.60	0.73	0.05	0.95	0.43						

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 3:SWTL and 8:, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 29: Central Blvd & SB On Ramp & SB Off Ramp



Lane Group	Ø11	Ø13
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	11	13
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	11.0	23.0
Total Split (s)	17.0	35.0
Total Split (%)	19%	39%
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary



Movement	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Traffic Volume (vph)	122	0	343	0	0	0	961	25	1096	721	0
Future Volume (vph)	122	0	343	0	0	0	961	25	1096	721	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0		7.0				7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00		1.00				0.86	1.00	0.97	0.95	
Frt	1.00		0.85				1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770		1583				6408	1583	3433	3539	
Flt Permitted	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770		1583				6408	1583	3433	3539	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	128	0	361	0	0	0	1012	26	1154	759	0
RTOR Reduction (vph)	0	0	318	0	0	0	0	20	0	0	0
Lane Group Flow (vph)	128	0	43	0	0	0	1012	6	1154	759	0
Turn Type	Prot		Perm				NA	Prot	Prot	NA	
Protected Phases	1						2 4	2 4	3	3 4	
Permitted Phases			1								
Actuated Green, G (s)	10.6		10.6				19.4	19.4	32.0	45.0	
Effective Green, g (s)	10.6		10.6				19.4	19.4	32.0	45.0	
Actuated g/C Ratio	0.12		0.12				0.22	0.22	0.36	0.50	
Clearance Time (s)	7.0		7.0						7.0		
Vehicle Extension (s)	3.0		3.0						3.0		
Lane Grp Cap (vph)	208		186				1381	341	1220	1769	
v/s Ratio Prot	c0.07						c0.16	0.00	c0.34	0.21	
v/s Ratio Perm			0.03								
v/c Ratio	0.62		0.23				0.73	0.02	0.95	0.43	
Uniform Delay, d1	37.8		36.0				32.9	27.8	28.2	14.3	
Progression Factor	1.00		1.00				1.00	1.00	1.16	0.33	
Incremental Delay, d2	5.3		0.6				2.0	0.0	10.8	0.1	
Delay (s)	43.1		36.6				34.9	27.8	43.5	4.8	
Level of Service	D		D				C	C	D	A	
Approach Delay (s)		38.3		0.0			34.8			28.2	
Approach LOS		D		A			C			C	

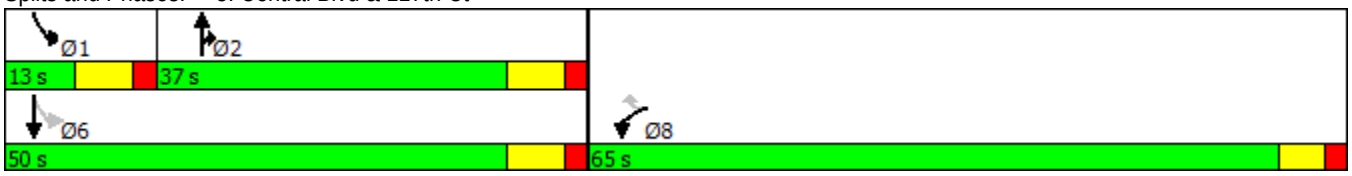
Intersection Summary			
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

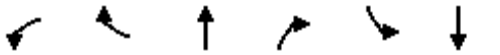
c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	224	162	726	120	112	883
Future Volume (vph)	224	162	726	120	112	883
Turn Type	Prot	Perm	NA	Prot	pm+pt	NA
Protected Phases	8		2	2	1	6
Permitted Phases		8			6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	65.0	65.0	36.0	36.0	11.0	46.0
Total Split (s)	65.0	65.0	37.0	37.0	13.0	50.0
Total Split (%)	56.5%	56.5%	32.2%	32.2%	11.3%	43.5%
Yellow Time (s)	4.0	4.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Max	Max	None	Max

Intersection Summary
Cycle Length: 115
Actuated Cycle Length: 70.6
Natural Cycle: 115
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Central Blvd & 117th Ct





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	224	162	726	120	112	883
Future Volume (veh/h)	224	162	726	120	112	883
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	236	171	764	126	118	929
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	309	276	1685	754	410	2244
Arrive On Green	0.17	0.17	0.48	0.48	0.05	0.63
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	236	171	764	126	118	929
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	8.6	6.8	9.8	3.1	2.1	8.8
Cycle Q Clear(g_c), s	8.6	6.8	9.8	3.1	2.1	8.8
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	309	276	1685	754	410	2244
V/C Ratio(X)	0.76	0.62	0.45	0.17	0.29	0.41
Avail Cap(c_a), veh/h	1543	1377	1685	754	469	2244
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.7	25.9	11.9	10.1	8.3	6.2
Incr Delay (d2), s/veh	3.9	2.3	0.9	0.5	0.4	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.0	5.6	8.6	2.6	1.9	7.9
LnGrp Delay(d),s/veh	30.6	28.2	12.8	10.6	8.7	6.7
LnGrp LOS	C	C	B	B	A	A
Approach Vol, veh/h	407		890			1047
Approach Delay, s/veh	29.6		12.5			6.9
Approach LOS	C		B			A

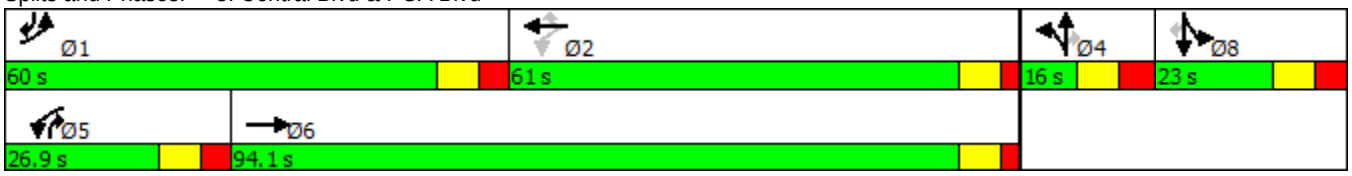
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	10.7	39.3				50.0		17.8
Change Period (Y+Rc), s	7.0	7.0				7.0		6.0
Max Green Setting (Gmax), s	6.0	30.0				43.0		59.0
Max Q Clear Time (g_c+I1), s	4.1	11.8				10.8		10.6
Green Ext Time (p_c), s	0.0	10.8				14.7		1.2

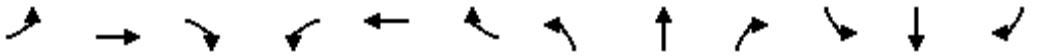
Intersection Summary	
HCM 2010 Ctrl Delay	13.0
HCM 2010 LOS	B

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1071	1253	173	1704	339	37	175	204	36	883
Future Volume (vph)	1071	1253	173	1704	339	37	175	204	36	883
Turn Type	Prot	NA	pm+pt	NA	Perm	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6	5	2		4	5	8	8	1
Permitted Phases			2		2		4			8
Detector Phase	1	6	5	2	2	4	5	8	8	1
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.5	24.5	12.5	12.0	12.0	13.5	12.5	13.0	13.0	12.5
Total Split (s)	60.0	94.1	26.9	61.0	61.0	16.0	26.9	23.0	23.0	60.0
Total Split (%)	37.5%	58.8%	16.8%	38.1%	38.1%	10.0%	16.8%	14.4%	14.4%	37.5%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.5	2.5	3.5	2.5	2.5	4.5	3.5	4.0	4.0	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.5	7.5	8.5	7.5	7.5	9.5	8.5	9.0	9.0	8.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes			Yes
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 159.7
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Central Blvd & PGA Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1071	1253	21	173	1704	339	45	37	175	204	36	883
Future Volume (vph)	1071	1253	21	173	1704	339	45	37	175	204	36	883
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.5	7.5		8.5	7.5	7.5		9.5	8.5	9.0	9.0	8.5
Lane Util. Factor	0.97	0.91		1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	0.97	1.00
Satd. Flow (prot)	3433	5073		1770	5085	1583		1813	1583	1681	1710	1583
Flt Permitted	0.95	1.00		0.19	1.00	1.00		0.97	1.00	0.95	0.97	1.00
Satd. Flow (perm)	3433	5073		357	5085	1583		1813	1583	1681	1710	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1127	1319	22	182	1794	357	47	39	184	215	38	929
RTOR Reduction (vph)	0	1	0	0	0	181	0	0	132	0	0	56
Lane Group Flow (vph)	1127	1340	0	182	1794	176	0	86	52	125	128	873
Turn Type	Prot	NA		pm+pt	NA	Perm	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4	5	8	8	1
Permitted Phases				2		2			4			8
Actuated Green, G (s)	51.5	92.7		65.8	53.5	53.5		6.5	18.8	13.7	13.7	65.2
Effective Green, g (s)	51.5	92.7		65.8	53.5	53.5		6.5	18.8	13.7	13.7	65.2
Actuated g/C Ratio	0.32	0.58		0.41	0.34	0.34		0.04	0.12	0.09	0.09	0.41
Clearance Time (s)	8.5	7.5		8.5	7.5	7.5		9.5	8.5	9.0	9.0	8.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1107	2944		255	1703	530		73	186	144	146	646
v/s Ratio Prot	0.33	0.26		0.05	c0.35			c0.05	0.02	0.07	0.07	c0.44
v/s Ratio Perm				0.24		0.11			0.01			0.12
v/c Ratio	1.02	0.46		0.71	1.05	0.33		1.18	0.28	0.87	0.88	1.35
Uniform Delay, d1	54.1	19.1		44.1	53.1	39.7		76.6	64.3	72.1	72.2	47.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	31.7	0.5		9.1	37.4	1.7		161.2	0.8	38.7	40.2	168.1
Delay (s)	85.8	19.6		53.3	90.5	41.4		237.8	65.1	110.8	112.4	215.3
Level of Service	F	B		D	F	D		F	E	F	F	F
Approach Delay (s)		49.8			80.1			120.1			193.1	
Approach LOS		D			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	91.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	159.7	Sum of lost time (s)	34.5
Intersection Capacity Utilization	113.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

2040 AM

Arterial Level of Service: NB Central Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
117th Ct	II	45	61.9	20.1	82.0	0.77	34.0	B
SB On Ramp	II	45	52.1	32.3	84.4	0.65	27.7	C
NB Off Ramp	II	45	9.8	56.5	66.3	0.09	4.9	F
Victoria Falls Blvd	II	45	29.9	45.6	75.5	0.30	14.4	E
Hood Rd	II	45	23.7	39.2	62.9	0.23	13.1	E
Total	II		177.4	193.7	371.1	2.04	19.8	D

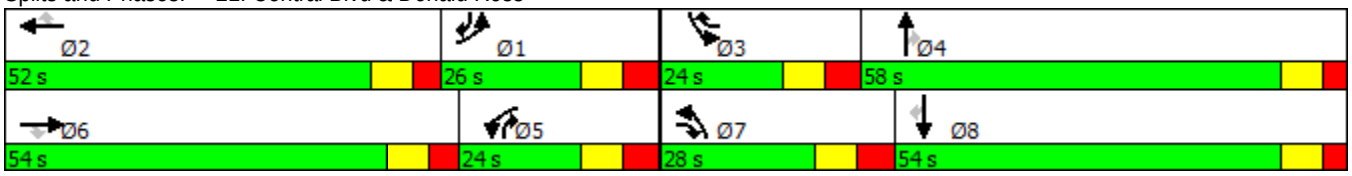
Arterial Level of Service: SB Central Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Victoria Falls Blvd	II	45	23.7	17.8	41.5	0.23	19.8	D
NB On Ramp	II	45	29.9	30.6	60.5	0.30	18.0	D
SB Off Ramp	II	45	9.8	4.7	14.5	0.09	22.3	C
117th Ct	II	45	52.1	10.4	62.5	0.65	37.4	A
PGA Blvd	II	45	61.9	113.8	175.7	0.77	15.9	E
Total	II		177.4	177.3	354.7	2.04	20.8	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	1458	493	311	621	228	271	1120	95	306	846	114
Future Volume (vph)	171	1458	493	311	621	228	271	1120	95	306	846	114
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases			6			2			4			8
Detector Phase	1	6	7	5	2	3	7	4	5	3	8	1
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	24.5	13.5	14.0	24.5	14.0	13.5	24.5	14.0	14.0	24.0	26.0
Total Split (s)	26.0	54.0	28.0	24.0	52.0	24.0	28.0	58.0	24.0	24.0	54.0	26.0
Total Split (%)	16.3%	33.8%	17.5%	15.0%	32.5%	15.0%	17.5%	36.3%	15.0%	15.0%	33.8%	16.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	4.5	3.5	4.5	4.5	3.5	4.5	4.5	3.0	4.5	4.5	3.0	4.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	9.5	8.5	9.5	9.5	8.5	9.5	9.5	8.0	9.5	9.5	8.0	9.5
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	None	Max	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 160
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 21: Central Blvd & Donald Ross



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	171	1458	493	311	621	228	271	1120	95	306	846	114
Future Volume (veh/h)	171	1458	493	311	621	228	271	1120	95	306	846	114
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	180	1535	519	327	654	240	285	1179	100	322	891	120
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	355	1446	602	312	1383	574	331	1106	638	312	1087	649
Arrive On Green	0.10	0.28	0.28	0.09	0.27	0.27	0.10	0.31	0.31	0.09	0.31	0.31
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	180	1535	519	327	654	240	285	1179	100	322	891	120
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	7.9	45.5	27.9	14.5	17.2	10.4	13.1	50.0	1.6	14.5	37.3	2.0
Cycle Q Clear(g_c), s	7.9	45.5	27.9	14.5	17.2	10.4	13.1	50.0	1.6	14.5	37.3	2.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	355	1446	602	312	1383	574	331	1106	638	312	1087	649
V/C Ratio(X)	0.51	1.06	0.86	1.05	0.47	0.42	0.86	1.07	0.16	1.03	0.82	0.18
Avail Cap(c_a), veh/h	355	1446	602	312	1383	574	398	1106	638	312	1087	649
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.9	57.3	17.8	72.8	48.7	14.9	71.3	55.0	11.6	72.8	51.3	11.2
Incr Delay (d2), s/veh	1.2	41.9	15.0	64.2	1.2	2.2	15.2	46.5	0.1	59.6	5.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.9	48.4	20.9	17.4	12.9	8.5	11.2	56.8	2.9	17.0	26.1	3.3
LnGrp Delay(d),s/veh	69.1	99.1	32.8	136.9	49.8	17.1	86.4	101.5	11.8	132.3	56.4	11.4
LnGrp LOS	E	F	C	F	D	B	F	F	B	F	E	B
Approach Vol, veh/h		2234			1221			1564			1333	
Approach Delay, s/veh		81.3			66.7			93.0			70.7	
Approach LOS		F			E			F			E	

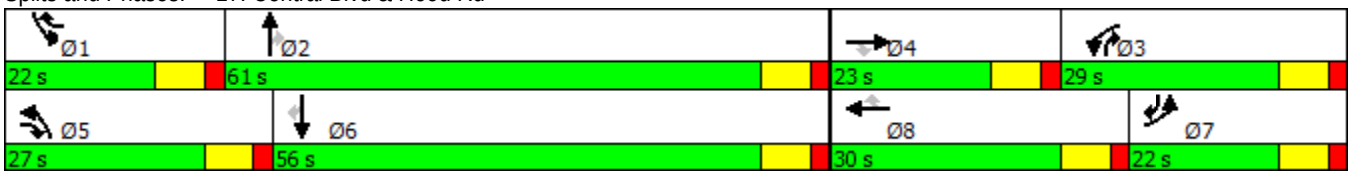
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.0	52.0	24.0	58.0	24.0	54.0	24.9	57.1
Change Period (Y+Rc), s	9.5	8.5	9.5	8.0	9.5	8.5	9.5	8.0
Max Green Setting (Gmax), s	16.5	43.5	14.5	50.0	14.5	45.5	18.5	46.0
Max Q Clear Time (g_c+I1), s	9.9	19.2	16.5	52.0	16.5	47.5	15.1	39.3
Green Ext Time (p_c), s	1.0	5.1	0.0	0.0	0.0	0.0	0.3	5.7

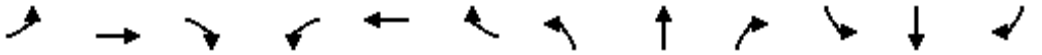
Intersection Summary	
HCM 2010 Ctrl Delay	79.2
HCM 2010 LOS	E

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	372	183	654	113	6	150	1020	772	404	1189	157
Future Volume (vph)	168	372	183	654	113	6	150	1020	772	404	1189	157
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	23.0	11.0	11.0	23.0	11.0	11.0	23.0	11.0	11.0	23.0	11.0
Total Split (s)	22.0	23.0	27.0	29.0	30.0	22.0	27.0	61.0	29.0	22.0	56.0	22.0
Total Split (%)	16.3%	17.0%	20.0%	21.5%	22.2%	16.3%	20.0%	45.2%	21.5%	16.3%	41.5%	16.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max	None

Intersection Summary
Cycle Length: 135
Actuated Cycle Length: 135
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 17: Central Blvd & Hood Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	372	183	654	113	6	150	1020	772	404	1189	157
Future Volume (veh/h)	168	372	183	654	113	6	150	1020	772	404	1189	157
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	177	392	193	688	119	6	158	1074	813	425	1252	165
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	792	419	286	561	182	257	214	1416	891	382	1588	1075
Arrive On Green	0.23	0.12	0.12	0.16	0.05	0.05	0.06	0.40	0.40	0.11	0.45	0.45
Sat Flow, veh/h	3442	3539	1583	3442	3539	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	177	392	193	688	119	6	158	1074	813	425	1252	165
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	5.6	14.8	9.4	22.0	4.5	0.2	6.1	35.3	25.5	15.0	40.7	1.8
Cycle Q Clear(g_c), s	5.6	14.8	9.4	22.0	4.5	0.2	6.1	35.3	25.5	15.0	40.7	1.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	792	419	286	561	182	257	214	1416	891	382	1588	1075
V/C Ratio(X)	0.22	0.93	0.67	1.23	0.65	0.02	0.74	0.76	0.91	1.11	0.79	0.15
Avail Cap(c_a), veh/h	792	419	286	561	603	446	510	1416	891	382	1588	1075
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.2	59.0	22.8	56.5	62.8	19.2	62.2	34.9	8.4	60.0	31.7	1.8
Incr Delay (d2), s/veh	0.1	28.1	6.1	117.1	3.9	0.0	4.9	3.9	15.2	79.7	4.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.9	13.8	8.1	35.2	4.1	0.2	5.5	24.9	20.9	20.4	28.2	1.5
LnGrp Delay(d),s/veh	42.3	87.1	28.9	173.6	66.8	19.3	67.1	38.7	23.6	139.7	35.8	2.1
LnGrp LOS	D	F	C	F	E	B	E	D	C	F	D	A
Approach Vol, veh/h		762			813			2045			1842	
Approach Delay, s/veh		62.0			156.9			34.9			56.7	
Approach LOS		E			F			C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.0	61.0	29.0	23.0	15.4	67.6	38.0	14.0
Change Period (Y+Rc), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Green Setting (Gmax), s	15.0	54.0	22.0	16.0	20.0	49.0	15.0	23.0
Max Q Clear Time (g_c+I1), s	17.0	37.3	24.0	16.8	8.1	42.7	7.6	6.5
Green Ext Time (p_c), s	0.0	14.8	0.0	0.0	0.3	5.9	2.1	0.5

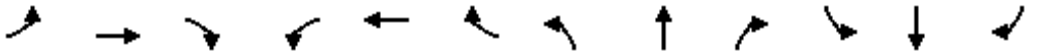
Intersection Summary	
HCM 2010 Ctrl Delay	64.2
HCM 2010 LOS	E

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	121	13	101	11	21	1955	167	137	1831	38
Future Volume (vph)	121	13	101	11	21	1955	167	137	1831	38
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	2	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	11.0	23.0	23.0
Total Split (s)	23.0	23.0	23.0	23.0	89.0	89.0	89.0	15.0	104.0	104.0
Total Split (%)	15.3%	15.3%	15.3%	15.3%	59.3%	59.3%	59.3%	10.0%	69.3%	69.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	None	None	None	Min	Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 139.4
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 13: Central Blvd & Victoria Falls Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	13	10	101	11	81	21	1955	167	137	1831	38
Future Volume (veh/h)	121	13	10	101	11	81	21	1955	167	137	1831	38
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	127	14	11	106	12	85	22	2058	176	144	1927	40
Adj No. of Lanes	1	1	0	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	215	83	65	275	15	106	124	2077	929	155	2457	1099
Arrive On Green	0.08	0.09	0.09	0.07	0.08	0.08	0.59	0.59	0.59	0.06	0.69	0.69
Sat Flow, veh/h	1774	968	761	1774	200	1414	221	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	127	0	25	106	0	97	22	2058	176	144	1927	40
Grp Sat Flow(s),veh/h/ln	1774	0	1729	1774	0	1613	221	1770	1583	1774	1770	1583
Q Serve(g_s), s	9.1	0.0	1.9	7.6	0.0	8.3	10.3	80.2	7.2	7.0	51.0	1.1
Cycle Q Clear(g_c), s	9.1	0.0	1.9	7.6	0.0	8.3	46.4	80.2	7.2	7.0	51.0	1.1
Prop In Lane	1.00		0.44	1.00		0.88	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	215	0	148	275	0	121	124	2077	929	155	2457	1099
V/C Ratio(X)	0.59	0.00	0.17	0.39	0.00	0.80	0.18	0.99	0.19	0.93	0.78	0.04
Avail Cap(c_a), veh/h	275	0	198	355	0	185	124	2077	929	155	2457	1099
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.9	0.0	59.2	54.4	0.0	63.6	34.9	28.5	13.4	46.3	14.3	6.7
Incr Delay (d2), s/veh	2.6	0.0	0.5	0.9	0.0	13.3	0.7	17.5	0.1	51.0	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.1	0.0	1.7	6.8	0.0	7.4	1.2	54.8	5.7	12.3	33.4	0.9
LnGrp Delay(d),s/veh	56.5	0.0	59.8	55.3	0.0	76.8	35.6	46.0	13.5	97.3	16.1	6.7
LnGrp LOS	E		E	E		E	D	D	B	F	B	A
Approach Vol, veh/h		152			203			2256			2111	
Approach Delay, s/veh		57.1			65.6			43.4			21.4	
Approach LOS		E			E			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	15.0	89.0	16.7	19.0		104.0	18.2	17.5
Change Period (Y+Rc), s	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Max Green Setting (Gmax), s	8.0	82.0	16.0	16.0		97.0	16.0	16.0
Max Q Clear Time (g_c+I1), s	9.0	82.2	9.6	3.9		53.0	11.1	10.3
Green Ext Time (p_c), s	0.0	0.0	0.1	0.4		42.1	0.1	0.2

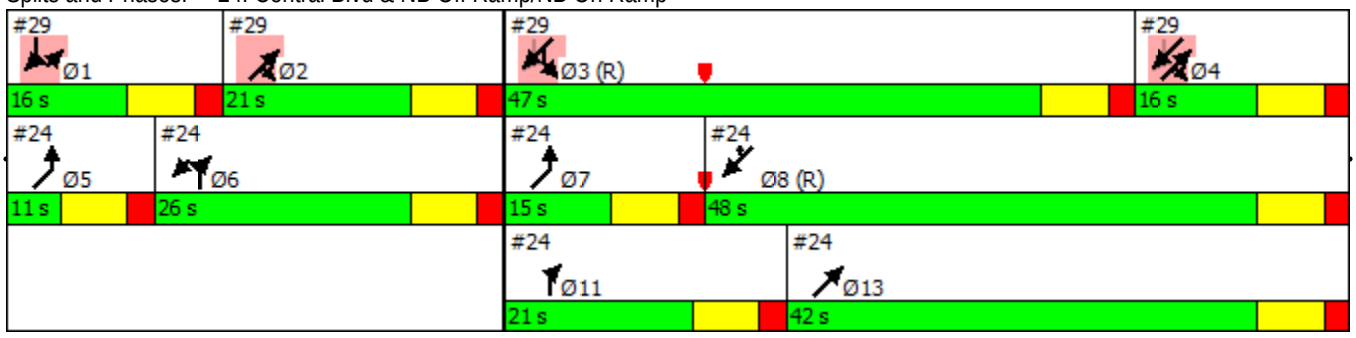
Intersection Summary	
HCM 2010 Ctrl Delay	34.9
HCM 2010 LOS	C

Lane Group	NBL	NBR	NEL	NET	SWT	SWR	Ø1	Ø2	Ø3	Ø4	Ø5	Ø7
Lane Configurations												
Traffic Volume (vph)	25	1201	336	949	2118	39						
Future Volume (vph)	25	1201	336	949	2118	39						
Lane Group Flow (vph)	26	1264	354	999	2229	41						
Turn Type	Prot	custom	Prot	NA	NA	Prot						
Protected Phases	6	6 11	5 7	13	8	8	1	2	3	4	5	7
Permitted Phases												
Detector Phase	6	6 11	5 7	13	8	8						
Switch Phase												
Minimum Initial (s)	4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0			16.0	16.0	16.0	11.0	12.0	11.0	16.0	11.0	11.0
Total Split (s)	26.0			42.0	48.0	48.0	16.0	21.0	47.0	16.0	11.0	15.0
Total Split (%)	26.0%			42.0%	48.0%	48.0%	16%	21%	47%	16%	11%	15%
Yellow Time (s)	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0						
Total Lost Time (s)	7.0			7.0	7.0	7.0						
Lead/Lag	Lag				Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None			None	C-Max	C-Max	None	None	C-Max	None	None	None
v/c Ratio	0.08	0.99	0.86	0.81	0.85	0.05						
Control Delay	34.1	46.7	26.6	56.5	30.6	0.1						
Queue Delay	0.0	0.0	0.0	1.3	0.2	0.0						
Total Delay	34.1	46.7	26.6	57.8	30.8	0.1						
Queue Length 50th (ft)	14	373	77	342	365	0						
Queue Length 95th (ft)	37	#554	m#109	408	418	0						
Internal Link Dist (ft)				394	829							
Turn Bay Length (ft)			160			450						
Base Capacity (vph)	336	1279	411	1238	2627	764						
Starvation Cap Reductn	0	0	0	96	0	0						
Spillback Cap Reductn	0	0	0	0	57	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	0.08	0.99	0.86	0.87	0.87	0.05						

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 3:SWTL and 8:, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: Central Blvd & NB Off Ramp/NB On Ramp



Lane Group	Ø11
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	11
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	11.0
Total Split (s)	21.0
Total Split (%)	21%
Yellow Time (s)	5.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	25	0	1201	0	0	0	336	949	0	0	2118	39
Future Volume (vph)	25	0	1201	0	0	0	336	949	0	0	2118	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0		7.0				7.0	7.0			7.0	7.0
Lane Util. Factor	1.00		0.88				0.97	0.95			0.86	1.00
Frt	1.00		0.85				1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		2787				3433	3539			6408	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		2787				3433	3539			6408	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	0	1264	0	0	0	354	999	0	0	2229	41
RTOR Reduction (vph)	0	0	165	0	0	0	0	0	0	0	0	24
Lane Group Flow (vph)	26	0	1099	0	0	0	354	999	0	0	2229	17
Turn Type	Prot		custom				Prot	NA			NA	Prot
Protected Phases	6		6 11				5 7	13			8	8
Permitted Phases												
Actuated Green, G (s)	19.0		40.0				12.0	35.0			41.0	41.0
Effective Green, g (s)	19.0		40.0				12.0	35.0			41.0	41.0
Actuated g/C Ratio	0.19		0.40				0.12	0.35			0.41	0.41
Clearance Time (s)	7.0							7.0			7.0	7.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	336		1114				411	1238			2627	649
v/s Ratio Prot	0.01		c0.39				c0.10	0.28			c0.35	0.01
v/s Ratio Perm												
v/c Ratio	0.08		0.99				0.86	0.81			0.85	0.03
Uniform Delay, d1	33.3		29.7				43.2	29.4			26.7	17.6
Progression Factor	1.00		1.00				0.39	1.78			1.00	1.00
Incremental Delay, d2	0.1		23.5				10.0	2.2			3.6	0.1
Delay (s)	33.4		53.2				26.8	54.7			30.3	17.7
Level of Service	C		D				C	D			C	B
Approach Delay (s)		52.8			0.0			47.4			30.1	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	40.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		

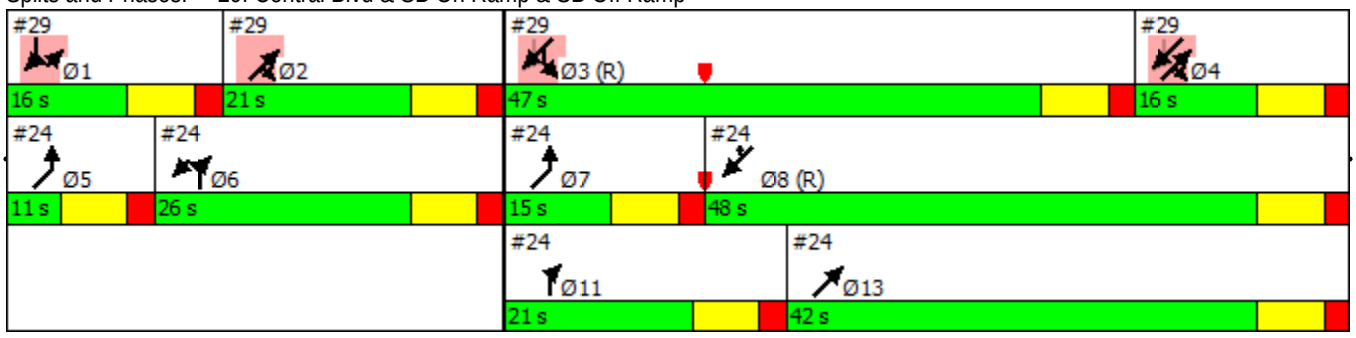
c Critical Lane Group

Lane Group	SBL2	SBR	NET	NER	SWL	SWT	Ø2	Ø4	Ø5	Ø6	Ø7	Ø8
Lane Configurations												
Traffic Volume (vph)	83	157	1202	61	1287	856						
Future Volume (vph)	83	157	1202	61	1287	856						
Lane Group Flow (vph)	87	165	1265	64	1355	901						
Turn Type	Prot	custom	NA	Prot	Prot	NA						
Protected Phases	1	1	2 4	2 4	3	3 4	2	4	5	6	7	8
Permitted Phases		3 4										
Detector Phase	1	1	2 4	2 4	3	3 4						
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0			11.0		12.0	16.0	11.0	11.0	11.0	16.0
Total Split (s)	16.0	16.0			47.0		21.0	16.0	11.0	26.0	15.0	48.0
Total Split (%)	16.0%	16.0%			47.0%		21%	16%	11%	26%	15%	48%
Yellow Time (s)	5.0	5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0							
Total Lost Time (s)	7.0	7.0			7.0							
Lead/Lag	Lead	Lead			Lead		Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes			Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None			C-Max		None	None	None	None	None	C-Max
v/c Ratio	0.59	0.11	0.84	0.12	0.99	0.45						
Control Delay	60.4	0.2	32.3	0.5	48.2	4.7						
Queue Delay	0.0	0.0	0.2	0.0	0.0	0.1						
Total Delay	60.4	0.2	32.4	0.5	48.2	4.8						
Queue Length 50th (ft)	54	0	152	0	266	27						
Queue Length 95th (ft)	#106	0	182	0	#562	m67						
Internal Link Dist (ft)			967			394						
Turn Bay Length (ft)		800		450	190							
Base Capacity (vph)	159	1445	1513	523	1373	1981						
Starvation Cap Reductn	0	0	0	0	0	232						
Spillback Cap Reductn	0	0	21	0	0	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	0.55	0.11	0.85	0.12	0.99	0.52						

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 3:SWTL and 8:, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 29: Central Blvd & SB On Ramp & SB Off Ramp



Lane Group	Ø11	Ø13
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	11	13
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	11.0	16.0
Total Split (s)	21.0	42.0
Total Split (%)	21%	42%
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary



Movement	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Traffic Volume (vph)	83	0	157	0	0	0	1202	61	1287	856	0
Future Volume (vph)	83	0	157	0	0	0	1202	61	1287	856	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0		7.0				7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00		1.00				0.86	1.00	0.97	0.95	
Frt	1.00		0.85				1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770		1583				6408	1583	3433	3539	
Flt Permitted	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770		1583				6408	1583	3433	3539	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	87	0	165	0	0	0	1265	64	1355	901	0
RTOR Reduction (vph)	0	0	59	0	0	0	0	49	0	0	0
Lane Group Flow (vph)	87	0	106	0	0	0	1265	15	1355	901	0
Turn Type	Prot		custom				NA	Prot	Prot	NA	
Protected Phases	1		1				2 4	2 4	3	3 4	
Permitted Phases			3 4								
Actuated Green, G (s)	8.4		64.4				23.6	23.6	40.0	56.0	
Effective Green, g (s)	8.4		64.4				23.6	23.6	40.0	56.0	
Actuated g/C Ratio	0.08		0.64				0.24	0.24	0.40	0.56	
Clearance Time (s)	7.0		7.0						7.0		
Vehicle Extension (s)	3.0		3.0						3.0		
Lane Grp Cap (vph)	148		1130				1512	373	1373	1981	
v/s Ratio Prot	c0.05		0.01				c0.20	0.01	c0.39	0.25	
v/s Ratio Perm			0.06								
v/c Ratio	0.59		0.09				0.84	0.04	0.99	0.45	
Uniform Delay, d1	44.1		6.7				36.4	29.5	29.7	13.0	
Progression Factor	1.00		1.00				1.00	1.00	1.11	0.33	
Incremental Delay, d2	5.9		0.0				4.2	0.0	14.6	0.1	
Delay (s)	50.0		6.8				40.6	29.5	47.6	4.4	
Level of Service	D		A				D	C	D	A	
Approach Delay (s)		21.7		0.0			40.0			30.3	
Approach LOS		C		A			D			C	

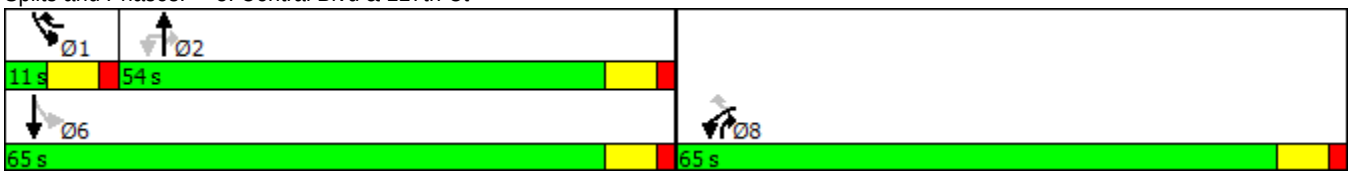
Intersection Summary			
HCM 2000 Control Delay	33.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		

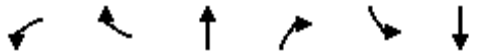
c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	280	190	1139	234	87	940
Future Volume (vph)	280	190	1139	234	87	940
Turn Type	Prot	pm+ov	NA	pm+ov	pm+pt	NA
Protected Phases	8	1	2	8	1	6
Permitted Phases		8		2	6	
Detector Phase	8	1	2	8	1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	65.0	11.0	50.0	65.0	11.0	50.0
Total Split (s)	65.0	11.0	54.0	65.0	11.0	65.0
Total Split (%)	50.0%	8.5%	41.5%	50.0%	8.5%	50.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag		Lead	Lag		Lead	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	Max	None	None	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 92.8
Natural Cycle: 130
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Central Blvd & 117th Ct





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	280	190	1139	234	87	940
Future Volume (veh/h)	280	190	1139	234	87	940
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	295	200	1199	246	92	989
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	353	379	1866	1150	256	2284
Arrive On Green	0.20	0.20	0.53	0.53	0.04	0.65
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	295	200	1199	246	92	989
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	14.4	9.9	21.8	4.5	2.0	12.4
Cycle Q Clear(g_c), s	14.4	9.9	21.8	4.5	2.0	12.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	353	379	1866	1150	256	2284
V/C Ratio(X)	0.84	0.53	0.64	0.21	0.36	0.43
Avail Cap(c_a), veh/h	1145	1085	1866	1150	264	2284
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.6	29.8	15.2	4.0	12.2	7.9
Incr Delay (d2), s/veh	5.2	1.1	1.7	0.4	0.8	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.1	7.9	16.4	6.4	1.9	10.1
LnGrp Delay(d),s/veh	39.8	30.9	16.9	4.4	13.0	8.5
LnGrp LOS	D	C	B	A	B	A
Approach Vol, veh/h	495		1445			1081
Approach Delay, s/veh	36.2		14.8			8.8
Approach LOS	D		B			A

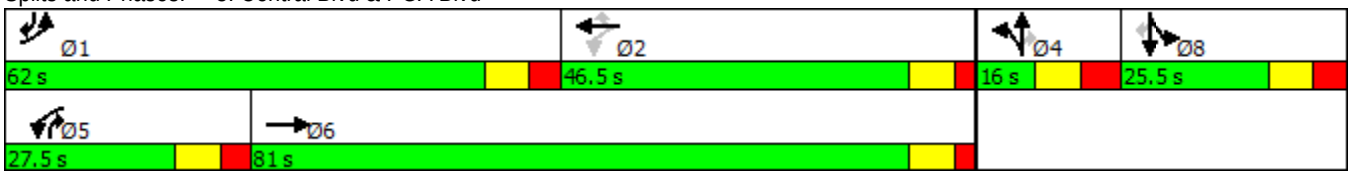
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	10.6	54.4				65.0		24.9
Change Period (Y+Rc), s	7.0	7.0				7.0		7.0
Max Green Setting (Gmax), s	4.0	47.0				58.0		58.0
Max Q Clear Time (g_c+I1), s	4.0	23.8				14.4		16.4
Green Ext Time (p_c), s	0.0	16.7				25.1		1.5

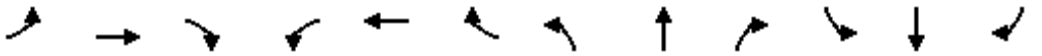
Intersection Summary	
HCM 2010 Ctrl Delay	16.2
HCM 2010 LOS	B

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1177	1700	152	1228	258	46	182	288	41	798
Future Volume (vph)	1177	1700	152	1228	258	46	182	288	41	798
Turn Type	Prot	NA	pm+pt	NA	Perm	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6	5	2		4	5	8	8	1
Permitted Phases			2		2		4			8
Detector Phase	1	6	5	2	2	4	5	8	8	1
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.5	24.5	12.5	12.0	12.0	13.5	12.5	13.0	13.0	12.5
Total Split (s)	62.0	81.0	27.5	46.5	46.5	16.0	27.5	25.5	25.5	62.0
Total Split (%)	41.3%	54.0%	18.3%	31.0%	31.0%	10.7%	18.3%	17.0%	17.0%	41.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.5	2.5	3.5	2.5	2.5	4.5	3.5	4.0	4.0	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.5	7.5	8.5	7.5	7.5	9.5	8.5	9.0	9.0	8.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes			Yes
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 150
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Central Blvd & PGA Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1177	1700	38	152	1228	258	40	46	182	288	41	798
Future Volume (vph)	1177	1700	38	152	1228	258	40	46	182	288	41	798
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.5	7.5		8.5	7.5	7.5		9.5	8.5	9.0	9.0	8.5
Lane Util. Factor	0.97	0.91		1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	0.96	1.00
Satd. Flow (prot)	3433	5069		1770	5085	1583		1820	1583	1681	1706	1583
Flt Permitted	0.95	1.00		0.11	1.00	1.00		0.98	1.00	0.95	0.96	1.00
Satd. Flow (perm)	3433	5069		212	5085	1583		1820	1583	1681	1706	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1239	1789	40	160	1293	272	42	48	192	303	43	840
RTOR Reduction (vph)	0	1	0	0	0	201	0	0	138	0	0	54
Lane Group Flow (vph)	1239	1828	0	160	1293	71	0	90	54	173	173	786
Turn Type	Prot	NA		pm+pt	NA	Perm	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4	5	8	8	1
Permitted Phases				2		2			4			8
Actuated Green, G (s)	53.5	78.3		53.2	39.0	39.0		6.5	20.7	16.5	16.5	70.0
Effective Green, g (s)	53.5	78.3		53.2	39.0	39.0		6.5	20.7	16.5	16.5	70.0
Actuated g/C Ratio	0.36	0.52		0.35	0.26	0.26		0.04	0.14	0.11	0.11	0.47
Clearance Time (s)	8.5	7.5		8.5	7.5	7.5		9.5	8.5	9.0	9.0	8.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1224	2646		222	1322	411		78	218	184	187	738
v/s Ratio Prot	0.36	0.36		0.07	c0.25			c0.05	0.02	0.10	0.10	c0.38
v/s Ratio Perm				0.19		0.04			0.01			0.12
v/c Ratio	1.01	0.69		0.72	0.98	0.17		1.15	0.25	0.94	0.93	1.06
Uniform Delay, d1	48.2	26.8		34.3	55.1	43.0		71.8	57.7	66.3	66.1	40.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	28.8	1.5		10.9	20.0	0.9		149.4	0.6	49.2	44.6	51.6
Delay (s)	77.0	28.3		45.3	75.1	43.9		221.2	58.3	115.4	110.8	91.6
Level of Service	E	C		D	E	D		F	E	F	F	F
Approach Delay (s)		48.0			67.4			110.3			97.9	
Approach LOS		D			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	65.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	34.5
Intersection Capacity Utilization	99.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2040 PM

Arterial Level of Service: NB Central Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
117th Ct	II	45	61.9	17.2	79.1	0.77	35.2	A
SB On Ramp	II	45	52.1	40.3	92.4	0.65	25.3	C
NB Off Ramp	II	45	9.8	54.1	63.9	0.09	5.1	F
Victoria Falls Blvd	II	45	29.9	38.4	68.3	0.30	15.9	E
Hood Rd	II	45	23.7	38.6	62.3	0.23	13.2	E
Total	II		177.4	188.6	366.0	2.04	20.1	D

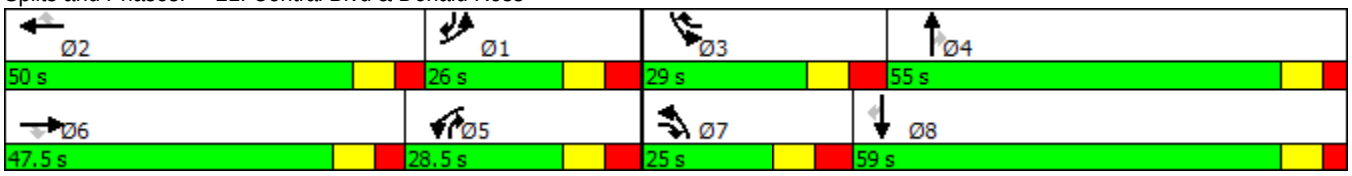
Arterial Level of Service: SB Central Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Victoria Falls Blvd	II	45	23.7	27.2	50.9	0.23	16.1	E
NB On Ramp	II	45	29.9	37.2	67.1	0.30	16.2	E
SB Off Ramp	II	45	9.8	8.1	17.9	0.09	18.1	D
117th Ct	II	45	52.1	10.0	62.1	0.65	37.7	A
PGA Blvd	II	45	61.9	112.1	174.0	0.77	16.0	E
Total	II		177.4	194.6	372.0	2.04	19.8	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	429	936	377	339	1426	363	302	1233	72	520	1077	235
Future Volume (vph)	429	936	377	339	1426	363	302	1233	72	520	1077	235
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases			6		2	2			4			8
Detector Phase	1	6	7	5	2	3	7	4	5	3	8	1
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	24.5	13.5	14.0	24.5	14.0	13.5	24.5	14.0	14.0	24.0	26.0
Total Split (s)	26.0	47.5	25.0	28.5	50.0	29.0	25.0	55.0	28.5	29.0	59.0	26.0
Total Split (%)	16.3%	29.7%	15.6%	17.8%	31.3%	18.1%	15.6%	34.4%	17.8%	18.1%	36.9%	16.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	4.5	3.5	4.5	4.5	3.5	4.5	4.5	3.0	4.5	4.5	3.0	4.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	9.5	8.5	9.5	9.5	8.5	9.5	9.5	8.0	9.5	9.5	8.0	9.5
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	None	Max	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 160
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 21: Central Blvd & Donald Ross



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	429	936	377	339	1426	363	302	1233	72	520	1077	235
Future Volume (veh/h)	429	936	377	339	1426	363	302	1233	72	520	1077	235
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	452	985	397	357	1501	382	318	1298	76	547	1134	247
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	355	1240	539	409	1319	604	333	1040	653	419	1128	668
Arrive On Green	0.10	0.24	0.24	0.12	0.26	0.26	0.10	0.29	0.29	0.12	0.32	0.32
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	452	985	397	357	1501	382	318	1298	76	547	1134	247
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	16.5	29.1	19.7	16.3	41.5	17.5	14.7	47.0	1.5	19.5	51.0	4.6
Cycle Q Clear(g_c), s	16.5	29.1	19.7	16.3	41.5	17.5	14.7	47.0	1.5	19.5	51.0	4.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	355	1240	539	409	1319	604	333	1040	653	419	1128	668
V/C Ratio(X)	1.27	0.79	0.74	0.87	1.14	0.63	0.95	1.25	0.12	1.30	1.01	0.37
Avail Cap(c_a), veh/h	355	1240	539	409	1319	604	333	1040	653	419	1128	668
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	71.8	56.7	17.9	69.3	59.3	15.2	71.9	56.5	10.2	70.3	54.5	11.6
Incr Delay (d2), s/veh	143.4	5.3	8.7	18.4	71.8	5.0	37.1	119.9	0.1	153.3	28.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	26.8	20.4	15.1	13.7	50.7	13.3	13.6	72.5	1.9	32.7	52.8	7.4
LnGrp Delay(d),s/veh	215.1	62.1	26.6	87.7	131.1	20.2	109.0	176.4	10.2	223.5	82.6	11.9
LnGrp LOS	F	E	C	F	F	C	F	F	B	F	F	B
Approach Vol, veh/h		1834			2240			1692			1928	
Approach Delay, s/veh		92.1			105.3			156.3			113.5	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.0	50.0	29.0	55.0	28.5	47.5	25.0	59.0
Change Period (Y+Rc), s	9.5	8.5	9.5	8.0	9.5	8.5	9.5	8.0
Max Green Setting (Gmax), s	16.5	41.5	19.5	47.0	19.0	39.0	15.5	51.0
Max Q Clear Time (g_c+I1), s	18.5	43.5	21.5	49.0	18.3	31.1	16.7	53.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.3	4.5	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	115.4
HCM 2010 LOS	F

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	208	114	604	280	122	255	1222	785	252	1135	292
Future Volume (vph)	103	208	114	604	280	122	255	1222	785	252	1135	292
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	23.0	11.0	11.0	23.0	11.0	11.0	23.0	11.0	11.0	23.0	11.0
Total Split (s)	24.0	23.0	18.0	24.0	23.0	15.0	18.0	53.0	24.0	15.0	50.0	24.0
Total Split (%)	20.9%	20.0%	15.7%	20.9%	20.0%	13.0%	15.7%	46.1%	20.9%	13.0%	43.5%	20.9%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max	None

Intersection Summary

Cycle Length: 115
Actuated Cycle Length: 111.2
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 17: Central Blvd & Hood Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	208	114	604	280	122	255	1222	785	252	1135	292
Future Volume (veh/h)	103	208	114	604	280	122	255	1222	785	252	1135	292
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	108	219	120	636	295	128	268	1286	826	265	1195	307
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	169	332	299	536	709	433	328	1490	913	252	1412	710
Arrive On Green	0.05	0.09	0.09	0.16	0.20	0.20	0.10	0.42	0.42	0.07	0.40	0.40
Sat Flow, veh/h	3442	3539	1583	3442	3539	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	108	219	120	636	295	128	268	1286	826	265	1195	307
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	3.4	6.5	7.3	17.0	7.9	7.0	8.3	36.1	46.0	8.0	33.5	14.5
Cycle Q Clear(g_c), s	3.4	6.5	7.3	17.0	7.9	7.0	8.3	36.1	46.0	8.0	33.5	14.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	169	332	299	536	709	433	328	1490	913	252	1412	710
V/C Ratio(X)	0.64	0.66	0.40	1.19	0.42	0.30	0.82	0.86	0.90	1.05	0.85	0.43
Avail Cap(c_a), veh/h	536	518	383	536	709	433	347	1490	913	252	1412	710
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.0	47.8	38.9	46.1	38.1	31.4	48.5	28.7	20.5	50.6	29.8	20.6
Incr Delay (d2), s/veh	4.0	2.2	0.9	101.9	0.4	0.4	13.6	6.8	14.1	70.8	6.4	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.1	5.9	5.9	28.1	7.1	5.5	8.1	26.1	33.7	11.3	24.4	11.0
LnGrp Delay(d),s/veh	55.0	50.1	39.7	148.1	38.5	31.7	62.1	35.6	34.5	121.4	36.2	22.6
LnGrp LOS	D	D	D	F	D	C	E	D	C	F	D	C
Approach Vol, veh/h		447			1059			2380			1767	
Approach Delay, s/veh		48.5			103.5			38.2			46.6	
Approach LOS		D			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	53.0	24.0	17.2	17.4	50.6	12.4	28.9
Change Period (Y+Rc), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Green Setting (Gmax), s	8.0	46.0	17.0	16.0	11.0	43.0	17.0	16.0
Max Q Clear Time (g_c+I1), s	10.0	48.0	19.0	9.3	10.3	35.5	5.4	9.9
Green Ext Time (p_c), s	0.0	0.0	0.0	1.0	0.1	7.2	0.2	2.0

Intersection Summary	
HCM 2010 Ctrl Delay	53.9
HCM 2010 LOS	D

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	272	29	208	27	42	1966	176	51	1712	98
Future Volume (vph)	272	29	208	27	42	1966	176	51	1712	98
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8		2			6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	23.0	11.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	20.0	24.0	27.0	31.0	99.0	99.0	99.0	99.0	99.0	99.0
Total Split (%)	13.3%	16.0%	18.0%	20.7%	66.0%	66.0%	66.0%	66.0%	66.0%	66.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min	Min

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 150
Natural Cycle: 130
Control Type: Actuated-Uncoordinated

Splits and Phases: 13: Central Blvd & Victoria Falls Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	272	29	23	208	27	241	42	1966	176	51	1712	98
Future Volume (veh/h)	272	29	23	208	27	241	42	1966	176	51	1712	98
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	286	31	24	219	28	254	44	2069	185	54	1802	103
Adj No. of Lanes	1	1	0	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	202	123	95	393	26	232	98	2171	971	60	2171	971
Arrive On Green	0.09	0.13	0.13	0.12	0.16	0.16	0.61	0.61	0.61	0.61	0.61	0.61
Sat Flow, veh/h	1774	975	755	1774	160	1448	235	3539	1583	167	3539	1583
Grp Volume(v), veh/h	286	0	55	219	0	282	44	2069	185	54	1802	103
Grp Sat Flow(s),veh/h/ln	1774	0	1730	1774	0	1607	235	1770	1583	167	1770	1583
Q Serve(g_s), s	13.0	0.0	4.3	15.9	0.0	24.0	27.2	81.6	7.7	10.4	60.2	4.0
Cycle Q Clear(g_c), s	13.0	0.0	4.3	15.9	0.0	24.0	87.3	81.6	7.7	92.0	60.2	4.0
Prop In Lane	1.00		0.44	1.00		0.90	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	202	0	219	393	0	257	98	2171	971	60	2171	971
V/C Ratio(X)	1.42	0.00	0.25	0.56	0.00	1.10	0.45	0.95	0.19	0.91	0.83	0.11
Avail Cap(c_a), veh/h	202	0	219	416	0	257	98	2171	971	60	2171	971
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.6	0.0	59.1	48.6	0.0	63.0	57.2	27.0	12.7	73.9	22.8	12.0
Incr Delay (d2), s/veh	214.5	0.0	0.6	1.5	0.0	84.4	3.2	10.4	0.1	83.8	2.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	21.6	0.0	3.8	12.5	0.0	30.0	3.3	53.5	6.1	6.5	39.2	3.2
LnGrp Delay(d),s/veh	270.0	0.0	59.7	50.1	0.0	147.4	60.4	37.4	12.8	157.7	25.7	12.0
LnGrp LOS	F		E	D		F	E	D	B	F	C	B
Approach Vol, veh/h		341			501			2298			1959	
Approach Delay, s/veh		236.1			104.9			35.9			28.6	
Approach LOS		F			F			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		99.0	25.0	26.0		99.0	20.0	31.0
Change Period (Y+Rc), s		7.0	7.0	7.0		7.0	7.0	7.0
Max Green Setting (Gmax), s		92.0	20.0	17.0		92.0	13.0	24.0
Max Q Clear Time (g_c+I1), s		89.3	17.9	6.3		94.0	15.0	26.0
Green Ext Time (p_c), s		2.7	0.1	1.4		0.0	0.0	0.0

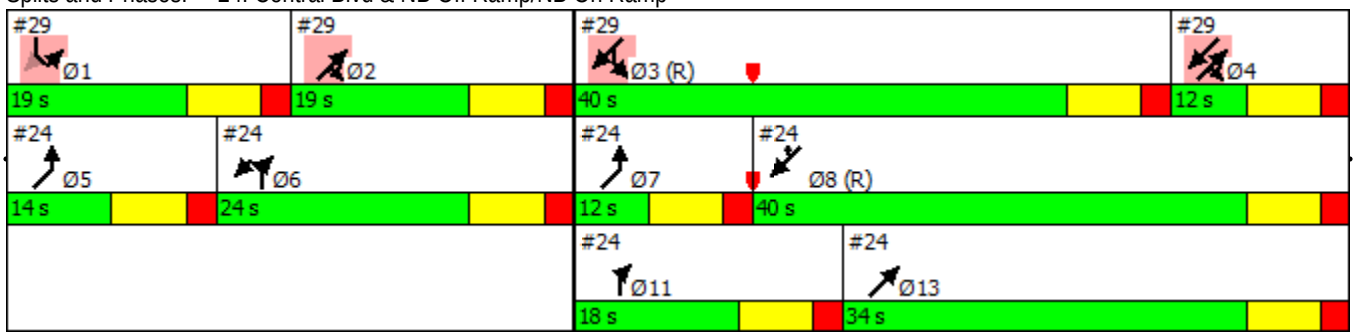
Intersection Summary	
HCM 2010 Ctrl Delay	53.3
HCM 2010 LOS	D

Lane Group	NBL	NBR	NEL	NET	SWT	SWR	Ø1	Ø2	Ø3	Ø4	Ø5	Ø7
Lane Configurations												
Traffic Volume (vph)	53	1295	366	890	2099	59						
Future Volume (vph)	53	1295	366	890	2099	59						
Lane Group Flow (vph)	56	1363	385	937	2209	62						
Turn Type	Prot	custom	Prot	NA	NA	Prot						
Protected Phases	6	6 11	5 7	13	8	8	1	2	3	4	5	7
Permitted Phases												
Detector Phase	6	6 11	5 7	13	8	8						
Switch Phase												
Minimum Initial (s)	4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0			15.0	15.0	15.0	11.0	15.0	11.0	12.0	11.0	11.0
Total Split (s)	24.0			34.0	40.0	40.0	19.0	19.0	40.0	12.0	14.0	12.0
Total Split (%)	26.7%			37.8%	44.4%	44.4%	21%	21%	44%	13%	16%	13%
Yellow Time (s)	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0						
Total Lost Time (s)	7.0			7.0	7.0	7.0						
Lead/Lag	Lag				Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None			None	C-Max	C-Max	None	None	C-Max	None	None	None
v/c Ratio	0.17	0.97	0.84	0.88	0.94	0.09						
Control Delay	32.2	36.4	32.1	54.1	37.2	0.2						
Queue Delay	0.0	0.0	0.0	0.0	2.3	0.0						
Total Delay	32.2	36.4	32.1	54.1	39.5	0.2						
Queue Length 50th (ft)	27	296	90	308	347	0						
Queue Length 95th (ft)	61	#482	m102	m341	#435	0						
Internal Link Dist (ft)				394	809							
Turn Bay Length (ft)			160			450						
Base Capacity (vph)	334	1400	457	1061	2349	718						
Starvation Cap Reductn	0	0	0	0	0	0						
Spillback Cap Reductn	0	0	0	0	74	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	0.17	0.97	0.84	0.88	0.97	0.09						

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 88 (98%), Referenced to phase 3:SWTL and 8:, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: Central Blvd & NB Off Ramp/NB On Ramp



Lane Group	Ø11
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	11
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	11.0
Total Split (s)	18.0
Total Split (%)	20%
Yellow Time (s)	5.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	53	0	1295	0	0	0	366	890	0	0	2099	59
Future Volume (vph)	53	0	1295	0	0	0	366	890	0	0	2099	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0		7.0				7.0	7.0			7.0	7.0
Lane Util. Factor	1.00		0.88				0.97	0.95			0.86	1.00
Frt	1.00		0.85				1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		2787				3433	3539			6408	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		2787				3433	3539			6408	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	56	0	1363	0	0	0	385	937	0	0	2209	62
RTOR Reduction (vph)	0	0	317	0	0	0	0	0	0	0	0	39
Lane Group Flow (vph)	56	0	1046	0	0	0	385	937	0	0	2209	23
Turn Type	Prot		custom				Prot	NA			NA	Prot
Protected Phases	6		6 11				5 7	13			8	8
Permitted Phases												
Actuated Green, G (s)	17.0		35.0				12.0	27.0			33.0	33.0
Effective Green, g (s)	17.0		35.0				12.0	27.0			33.0	33.0
Actuated g/C Ratio	0.19		0.39				0.13	0.30			0.37	0.37
Clearance Time (s)	7.0							7.0			7.0	7.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	334		1083				457	1061			2349	580
v/s Ratio Prot	0.03		c0.38				c0.11	0.26			c0.34	0.01
v/s Ratio Perm												
v/c Ratio	0.17		0.97				0.84	0.88			0.94	0.04
Uniform Delay, d1	30.6		26.9				38.1	30.0			27.5	18.3
Progression Factor	1.00		1.00				1.09	1.62			1.00	1.00
Incremental Delay, d2	0.2		19.5				6.5	4.3			9.0	0.1
Delay (s)	30.8		46.4				48.1	52.9			36.6	18.4
Level of Service	C		D				D	D			D	B
Approach Delay (s)		45.8			0.0			51.5			36.1	
Approach LOS		D			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	42.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

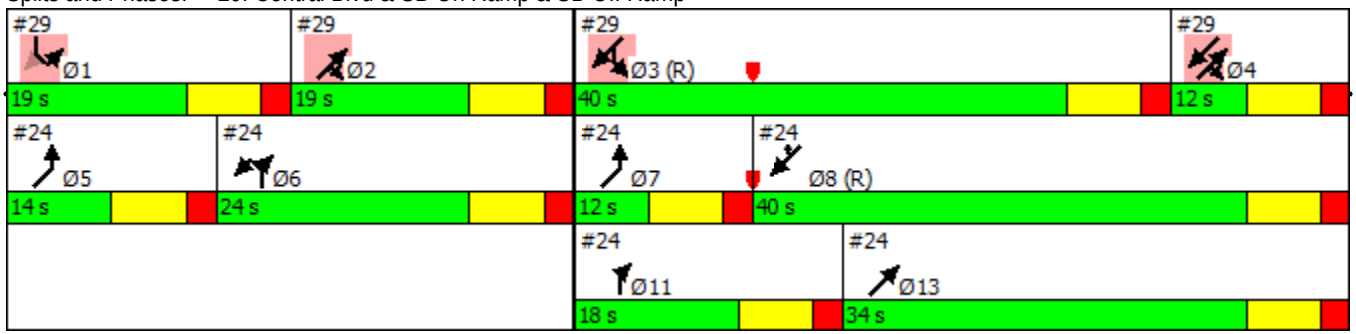
c Critical Lane Group

Lane Group	SBL2	SBR	NET	NER	SWL	SWT	Ø2	Ø4	Ø5	Ø6	Ø7	Ø8
Lane Configurations												
Traffic Volume (vph)	134	377	1122	26	1206	946						
Future Volume (vph)	134	377	1122	26	1206	946						
Lane Group Flow (vph)	141	397	1181	27	1269	996						
Turn Type	Prot	Perm	NA	Prot	Prot	NA						
Protected Phases	1		2 4	2 4	3	3 4	2	4	5	6	7	8
Permitted Phases		1										
Detector Phase	1	1	2 4	2 4	3	3 4						
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0			11.0		15.0	12.0	11.0	11.0	11.0	15.0
Total Split (s)	19.0	19.0			40.0		19.0	12.0	14.0	24.0	12.0	40.0
Total Split (%)	21.1%	21.1%			44.4%		21%	13%	16%	27%	13%	44%
Yellow Time (s)	5.0	5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0							
Total Lost Time (s)	7.0	7.0			7.0							
Lead/Lag	Lead	Lead			Lead		Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes			Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None			C-Max		None	None	None	None	None	C-Max
v/c Ratio	0.66	0.73	0.91	0.05	1.01	0.56						
Control Delay	53.0	12.2	40.3	0.2	50.8	8.1						
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1						
Total Delay	53.0	12.2	40.3	0.2	50.8	8.2						
Queue Length 50th (ft)	77	0	120	0	~242	61						
Queue Length 95th (ft)	#140	79	#195	0	m#415	m83						
Internal Link Dist (ft)			967			394						
Turn Bay Length (ft)		800		450	190							
Base Capacity (vph)	236	562	1293	493	1258	1769						
Starvation Cap Reductn	0	0	0	0	0	105						
Spillback Cap Reductn	0	0	0	0	0	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	0.60	0.71	0.91	0.05	1.01	0.60						

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 88 (98%), Referenced to phase 3:SWTL and 8:, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 29: Central Blvd & SB On Ramp & SB Off Ramp



Lane Group	Ø11	Ø13
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	11	13
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	11.0	15.0
Total Split (s)	18.0	34.0
Total Split (%)	20%	38%
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary



Movement	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Traffic Volume (vph)	134	0	377	0	0	0	1122	26	1206	946	0
Future Volume (vph)	134	0	377	0	0	0	1122	26	1206	946	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0		7.0				7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00		1.00				0.86	1.00	0.97	0.95	
Frt	1.00		0.85				1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770		1583				6408	1583	3433	3539	
Flt Permitted	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770		1583				6408	1583	3433	3539	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	141	0	397	0	0	0	1181	27	1269	996	0
RTOR Reduction (vph)	0	0	349	0	0	0	0	22	0	0	0
Lane Group Flow (vph)	141	0	48	0	0	0	1181	5	1269	996	0
Turn Type	Prot		Perm				NA	Prot	Prot	NA	
Protected Phases	1						2 4	2 4	3	3 4	
Permitted Phases			1								
Actuated Green, G (s)	10.8		10.8				18.2	18.2	33.0	45.0	
Effective Green, g (s)	10.8		10.8				18.2	18.2	33.0	45.0	
Actuated g/C Ratio	0.12		0.12				0.20	0.20	0.37	0.50	
Clearance Time (s)	7.0		7.0						7.0		
Vehicle Extension (s)	3.0		3.0						3.0		
Lane Grp Cap (vph)	212		189				1295	320	1258	1769	
v/s Ratio Prot	c0.08						c0.18	0.00	c0.37	0.28	
v/s Ratio Perm			0.03								
v/c Ratio	0.67		0.25				0.91	0.02	1.01	0.56	
Uniform Delay, d1	37.9		35.9				35.1	28.7	28.5	15.7	
Progression Factor	1.00		1.00				1.00	1.00	1.13	0.48	
Incremental Delay, d2	7.6		0.7				9.9	0.0	17.7	0.2	
Delay (s)	45.5		36.6				45.0	28.8	50.1	7.7	
Level of Service	D		D				D	C	D	A	
Approach Delay (s)		39.0		0.0			44.6			31.4	
Approach LOS		D		A			D			C	

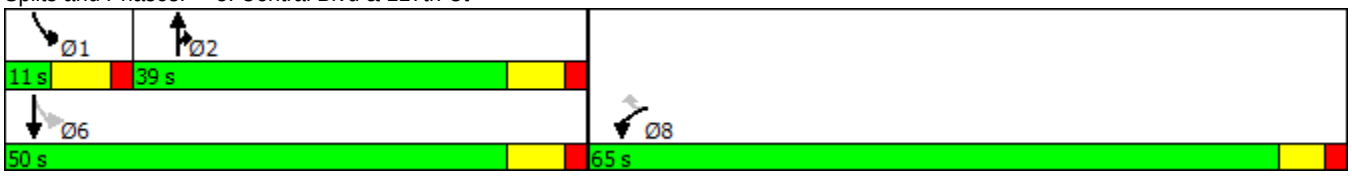
Intersection Summary			
HCM 2000 Control Delay	36.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	246	169	873	145	150	1059
Future Volume (vph)	246	169	873	145	150	1059
Turn Type	Prot	Perm	NA	Prot	pm+pt	NA
Protected Phases	8		2	2	1	6
Permitted Phases		8			6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	65.0	65.0	36.0	36.0	11.0	46.0
Total Split (s)	65.0	65.0	39.0	39.0	11.0	50.0
Total Split (%)	56.5%	56.5%	33.9%	33.9%	9.6%	43.5%
Yellow Time (s)	4.0	4.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Max	Max	None	Max

Intersection Summary
Cycle Length: 115
Actuated Cycle Length: 71.7
Natural Cycle: 115
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Central Blvd & 117th Ct





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	246	169	873	145	150	1059
Future Volume (veh/h)	246	169	873	145	150	1059
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	259	178	919	153	158	1115
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	332	297	1644	735	352	2209
Arrive On Green	0.19	0.19	0.46	0.46	0.06	0.62
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	259	178	919	153	158	1115
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	9.6	7.1	12.9	3.9	3.0	11.9
Cycle Q Clear(g_c), s	9.6	7.1	12.9	3.9	3.0	11.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	332	297	1644	735	352	2209
V/C Ratio(X)	0.78	0.60	0.56	0.21	0.45	0.50
Avail Cap(c_a), veh/h	1519	1356	1644	735	352	2209
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	25.6	13.3	10.9	9.9	7.1
Incr Delay (d2), s/veh	4.0	1.9	1.4	0.6	0.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.7	5.8	10.8	3.3	2.7	10.0
LnGrp Delay(d),s/veh	30.6	27.6	14.7	11.6	10.8	7.9
LnGrp LOS	C	C	B	B	B	A
Approach Vol, veh/h	437		1072			1273
Approach Delay, s/veh	29.4		14.3			8.3
Approach LOS	C		B			A

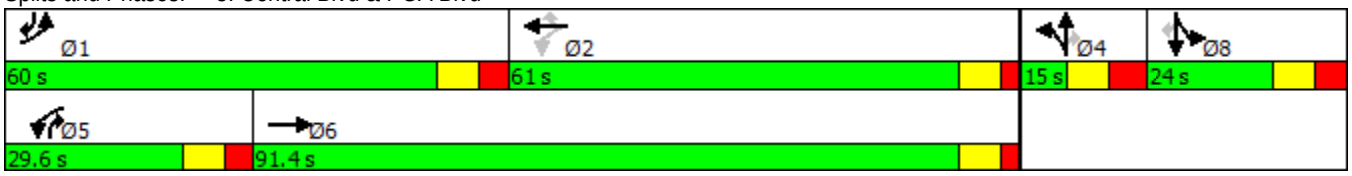
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	11.0	39.0				50.0		18.9
Change Period (Y+Rc), s	7.0	7.0				7.0		6.0
Max Green Setting (Gmax), s	4.0	32.0				43.0		59.0
Max Q Clear Time (g_c+I1), s	5.0	14.9				13.9		11.6
Green Ext Time (p_c), s	0.0	12.2				17.6		1.3

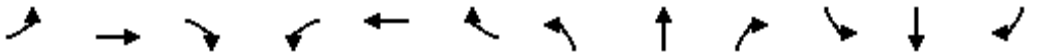
Intersection Summary	
HCM 2010 Ctrl Delay	13.9
HCM 2010 LOS	B

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1170	1396	189	1863	423	38	196	211	37	927
Future Volume (vph)	1170	1396	189	1863	423	38	196	211	37	927
Turn Type	Prot	NA	pm+pt	NA	Perm	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6	5	2		4	5	8	8	1
Permitted Phases			2		2		4			8
Detector Phase	1	6	5	2	2	4	5	8	8	1
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.5	24.5	12.5	12.0	12.0	13.5	12.5	13.0	13.0	12.5
Total Split (s)	60.0	91.4	29.6	61.0	61.0	15.0	29.6	24.0	24.0	60.0
Total Split (%)	37.5%	57.1%	18.5%	38.1%	38.1%	9.4%	18.5%	15.0%	15.0%	37.5%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.5	2.5	3.5	2.5	2.5	4.5	3.5	4.0	4.0	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.5	7.5	8.5	7.5	7.5	9.5	8.5	9.0	9.0	8.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes			Yes
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 159.5
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Central Blvd & PGA Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1170	1396	23	189	1863	423	50	38	196	211	37	927
Future Volume (vph)	1170	1396	23	189	1863	423	50	38	196	211	37	927
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.5	7.5		8.5	7.5	7.5		9.5	8.5	9.0	9.0	8.5
Lane Util. Factor	0.97	0.91		1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	0.97	1.00
Satd. Flow (prot)	3433	5073		1770	5085	1583		1811	1583	1681	1709	1583
Flt Permitted	0.95	1.00		0.16	1.00	1.00		0.97	1.00	0.95	0.97	1.00
Satd. Flow (perm)	3433	5073		304	5085	1583		1811	1583	1681	1709	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1232	1469	24	199	1961	445	53	40	206	222	39	976
RTOR Reduction (vph)	0	1	0	0	0	187	0	0	131	0	0	56
Lane Group Flow (vph)	1232	1492	0	199	1961	258	0	93	75	129	132	920
Turn Type	Prot	NA		pm+pt	NA	Perm	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4	5	8	8	1
Permitted Phases				2		2			4			8
Actuated Green, G (s)	51.5	90.6		67.9	53.5	53.5		5.5	19.9	14.5	14.5	66.0
Effective Green, g (s)	51.5	90.6		67.9	53.5	53.5		5.5	19.9	14.5	14.5	66.0
Actuated g/C Ratio	0.32	0.57		0.43	0.34	0.34		0.03	0.12	0.09	0.09	0.41
Clearance Time (s)	8.5	7.5		8.5	7.5	7.5		9.5	8.5	9.0	9.0	8.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1108	2881		261	1705	530		62	197	152	155	655
v/s Ratio Prot	0.36	0.29		0.07	c0.39			c0.05	0.03	0.08	0.08	c0.45
v/s Ratio Perm				0.25		0.16			0.01			0.13
v/c Ratio	1.11	0.52		0.76	1.15	0.49		1.50	0.38	0.85	0.85	1.41
Uniform Delay, d1	54.0	21.1		29.6	53.0	42.1		77.0	64.1	71.4	71.4	46.8
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	63.2	0.7		12.4	74.9	3.2		292.1	1.2	33.2	33.7	191.4
Delay (s)	117.2	21.8		42.0	127.9	45.3		369.1	65.3	104.6	105.1	238.1
Level of Service	F	C		D	F	D		F	E	F	F	F
Approach Delay (s)		64.9			107.2			159.8			210.0	
Approach LOS		E			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	111.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	159.5	Sum of lost time (s)	34.5
Intersection Capacity Utilization	119.4%	ICU Level of Service	H
Analysis Period (min)	15		

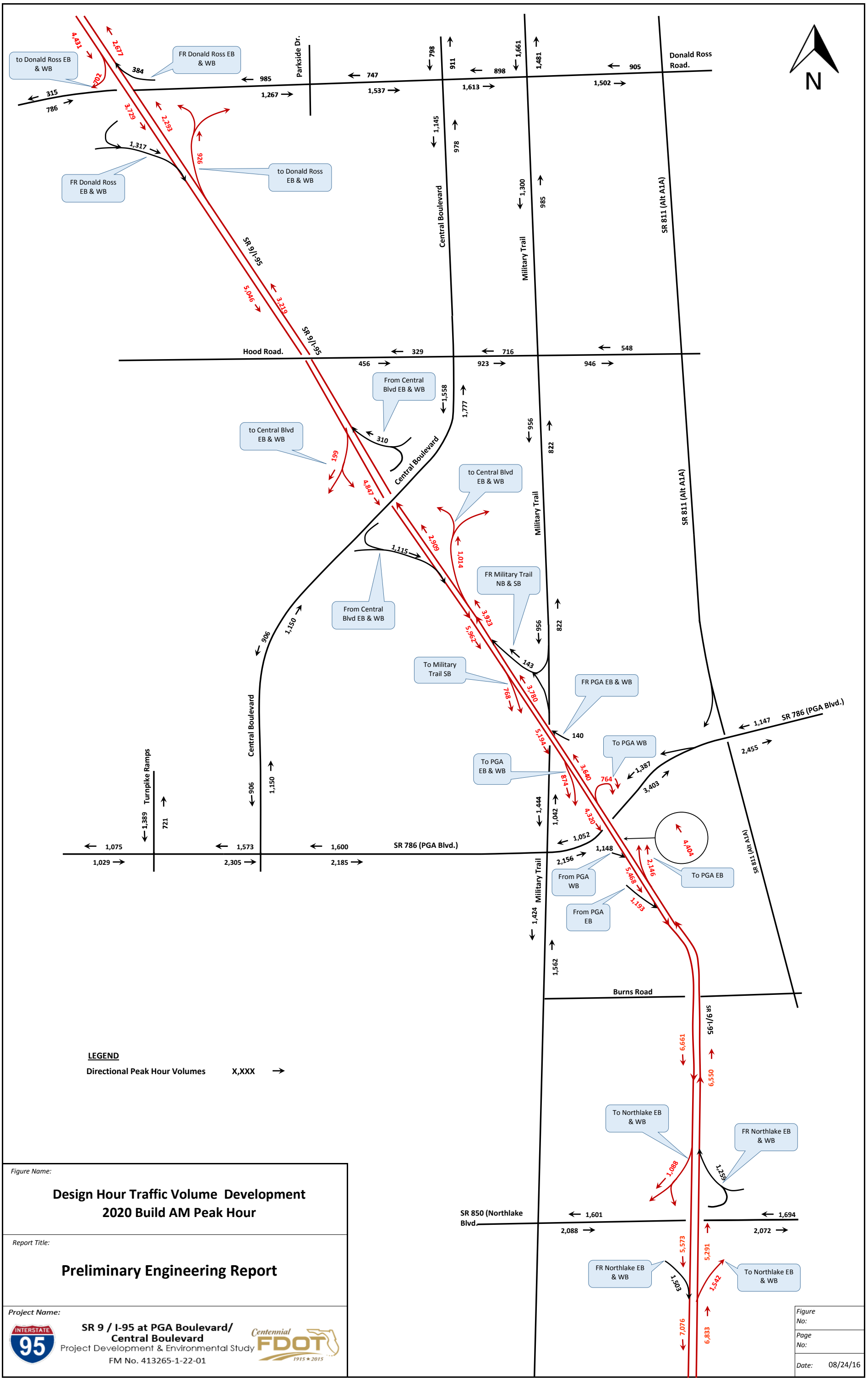
c Critical Lane Group

Build Design Hour Traffic Volume Summaries

(Links and Turning Movement Volumes)

Link Volumes

(2020 to 2040)



LEGEND

Directional Peak Hour Volumes X,XXX →

Figure Name:

Design Hour Traffic Volume Development
2020 Build AM Peak Hour

Report Title:

Preliminary Engineering Report

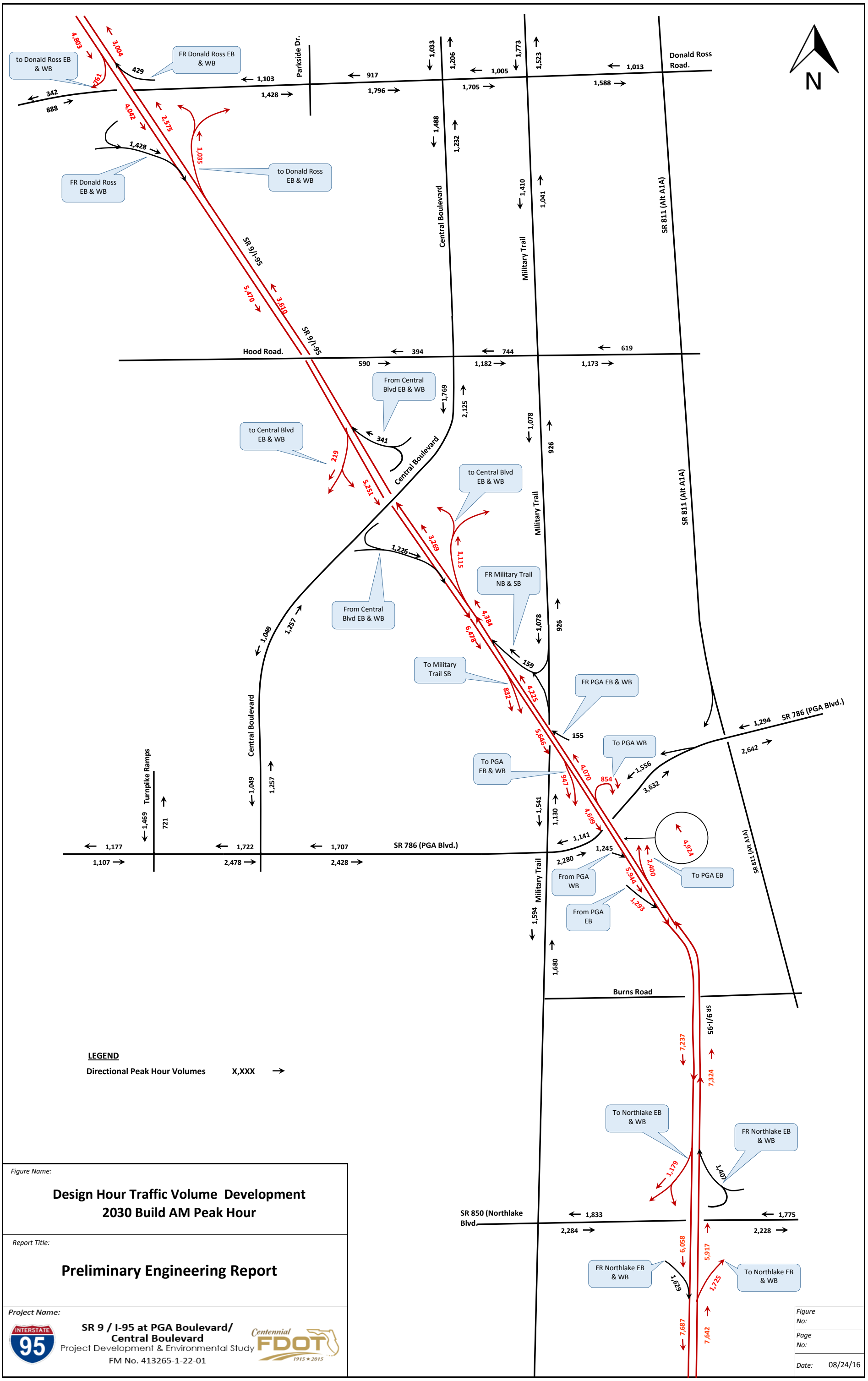
Project Name:

SR 9 / I-95 at PGA Boulevard/ Central Boulevard
Project Development & Environmental Study
FM No. 413265-1-22-01

Figure No:

Page No:

Date: 08/24/16



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Directional Peak Hour Volumes X,XXX →

Figure Name:

Design Hour Traffic Volume Development
2030 Build AM Peak Hour

Report Title:

Preliminary Engineering Report

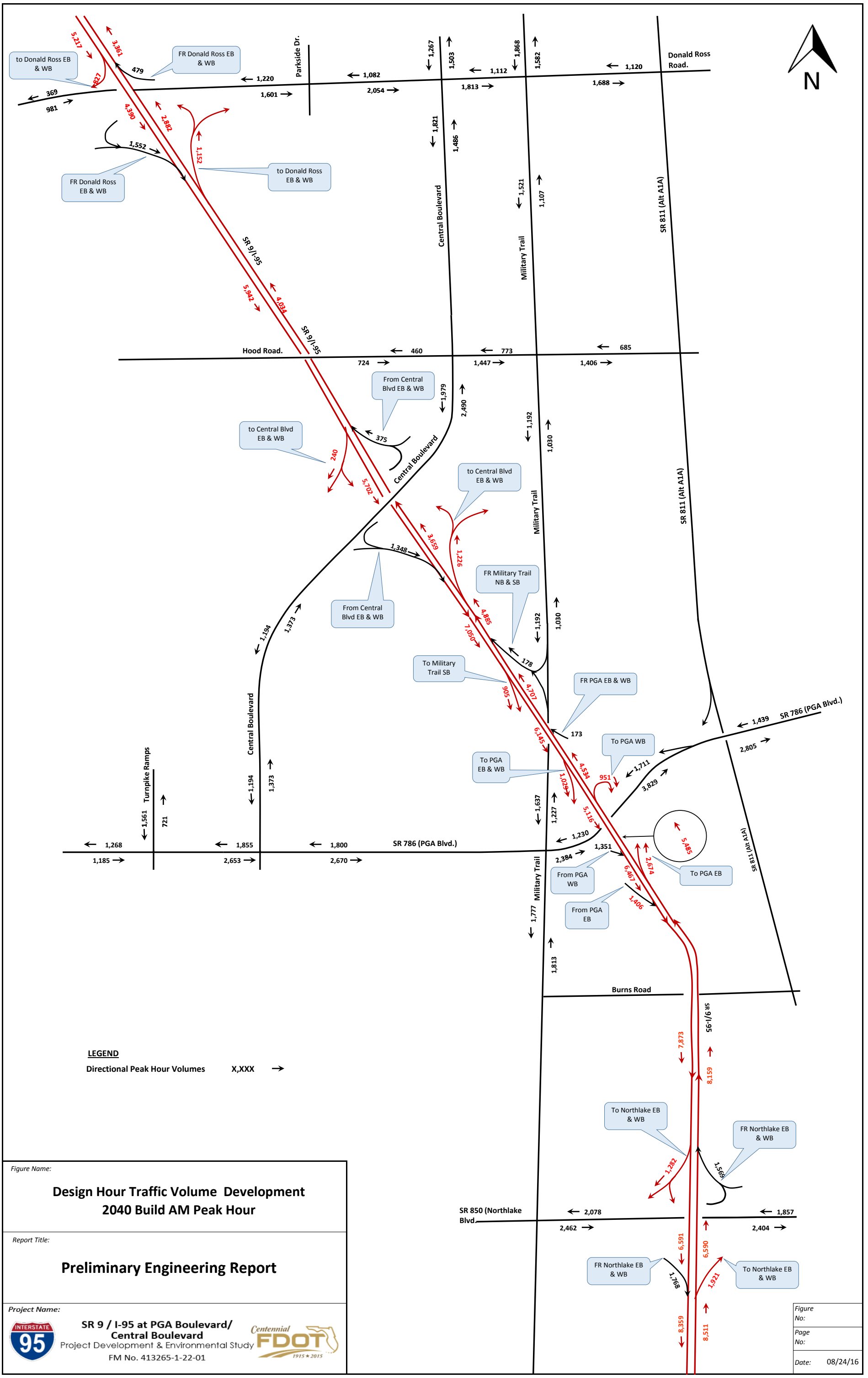
Project Name:

SR 9 / I-95 at PGA Boulevard/ Central Boulevard
Project Development & Environmental Study
FM No. 413265-1-22-01

Figure No:

Page No:

Date: 08/24/16



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Directional Peak Hour Volumes X,XXX →

Figure Name:

Design Hour Traffic Volume Development
2040 Build AM Peak Hour

Report Title:

Preliminary Engineering Report

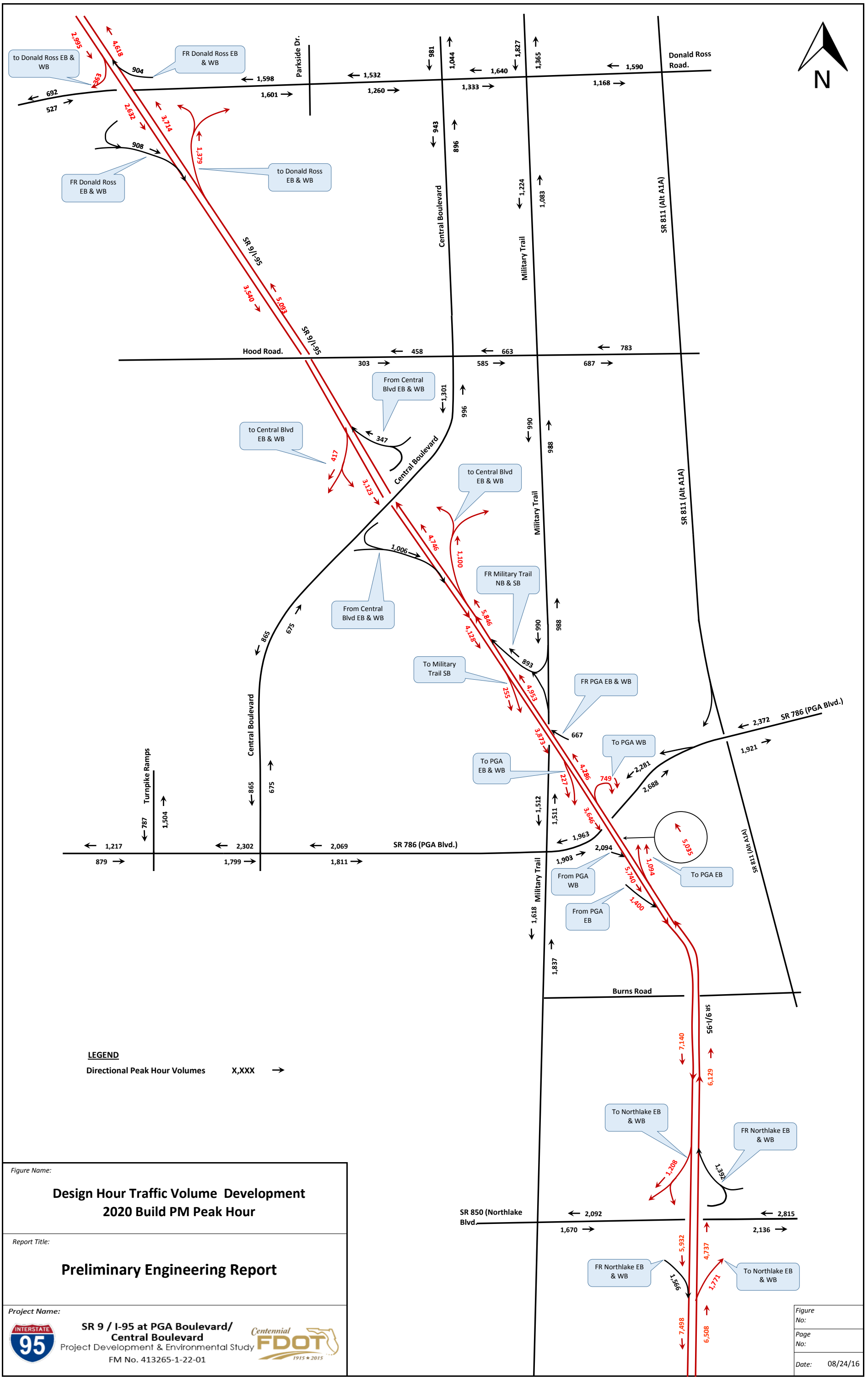
Project Name:

SR 9 / I-95 at PGA Boulevard/ Central Boulevard
Project Development & Environmental Study
FM No. 413265-1-22-01

Figure No:

Page No:

Date: 08/24/16



LEGEND

Directional Peak Hour Volumes X,XXX →

Figure Name:

Design Hour Traffic Volume Development
2020 Build PM Peak Hour

Report Title:

Preliminary Engineering Report

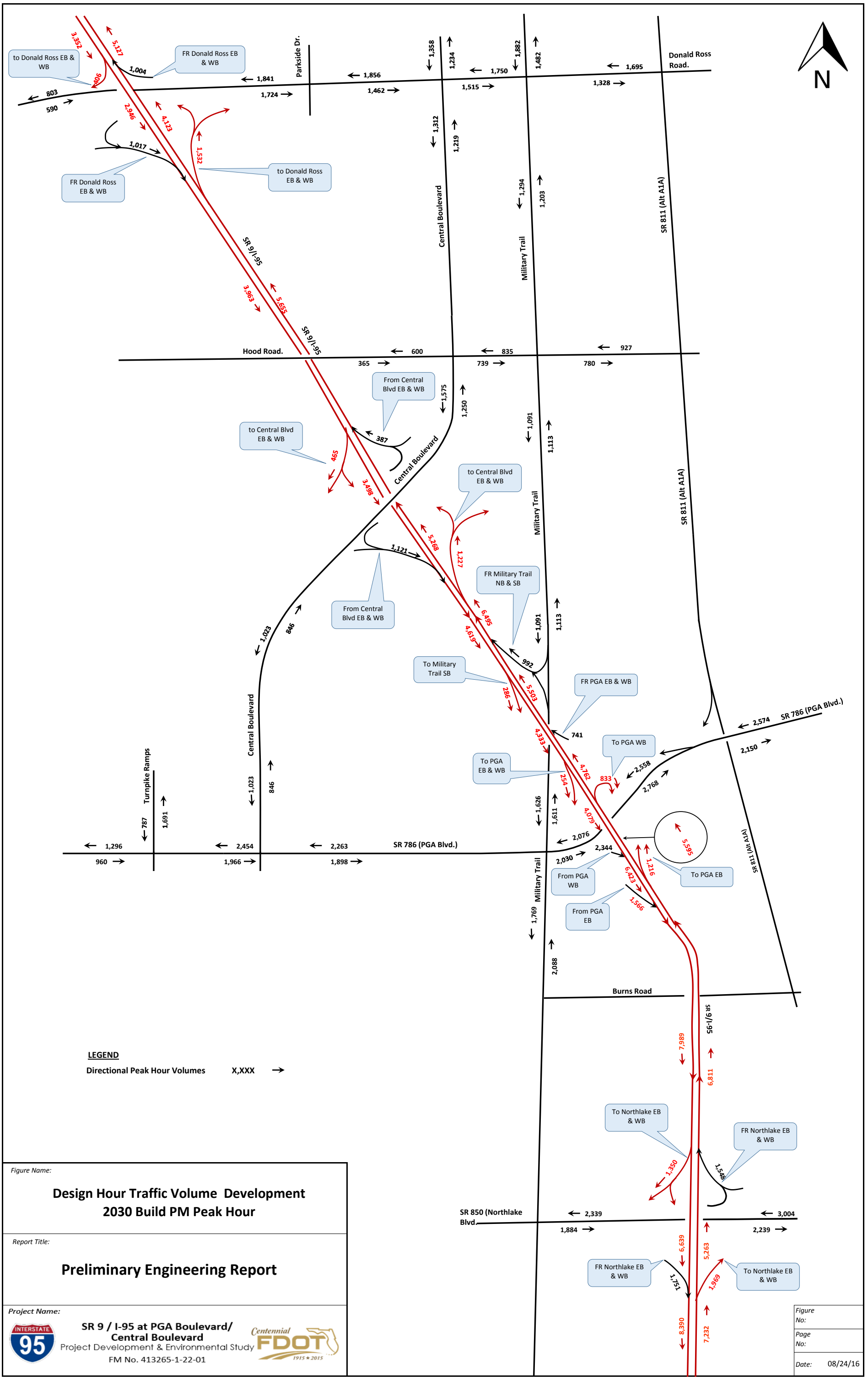
Project Name:

SR 9 / I-95 at PGA Boulevard/ Central Boulevard
Project Development & Environmental Study
FM No. 413265-1-22-01

Figure No:

Page No:

Date: 08/24/16



LEGEND

Directional Peak Hour Volumes X,XXX →

Figure Name:

Design Hour Traffic Volume Development
2030 Build PM Peak Hour

Report Title:

Preliminary Engineering Report

Project Name:

SR 9 / I-95 at PGA Boulevard/ Central Boulevard
Project Development & Environmental Study
FM No. 413265-1-22-01

Figure No:	
Page No:	
Date:	08/24/16

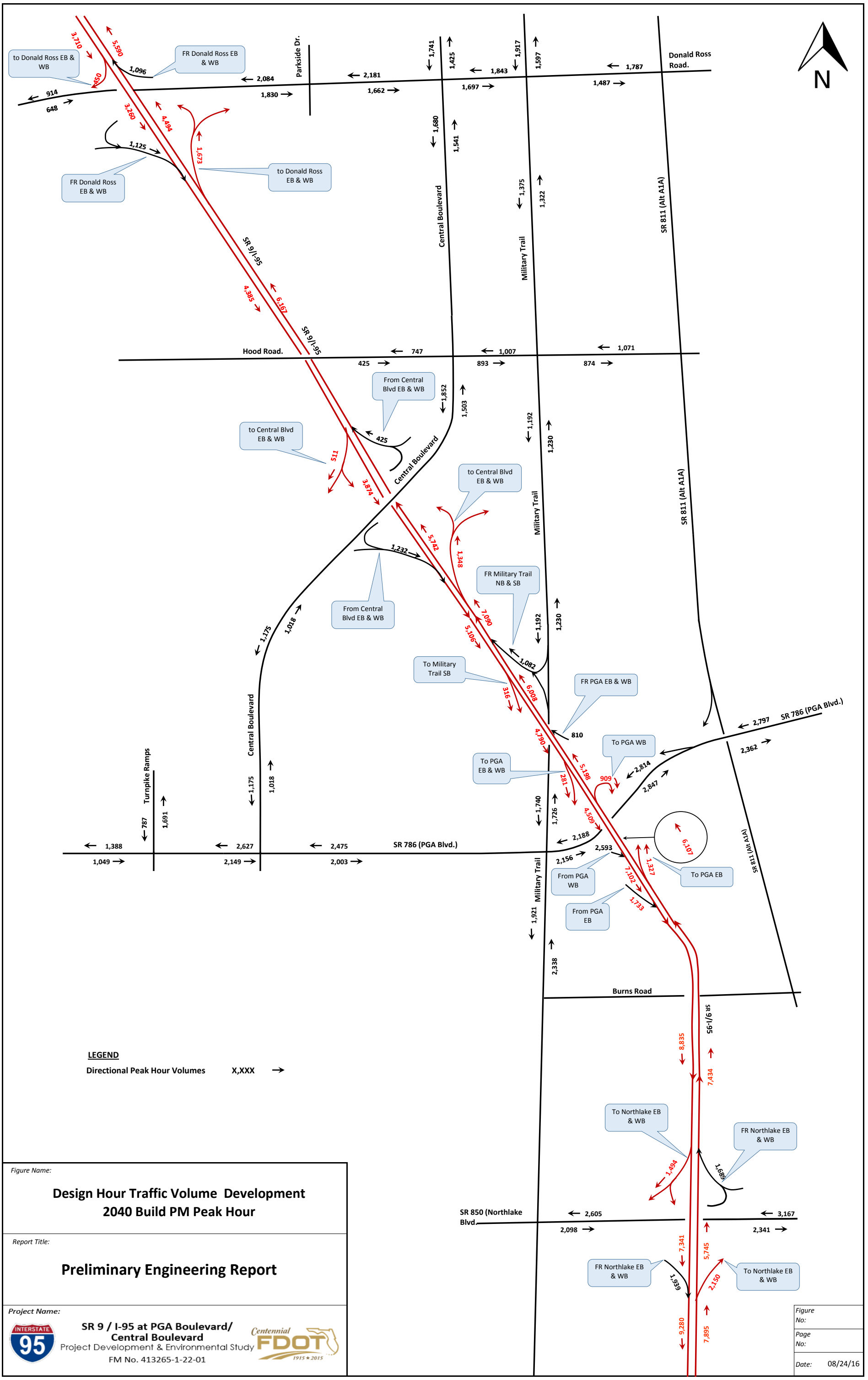


Figure Name:

Design Hour Traffic Volume Development
2040 Build PM Peak Hour

Report Title:

Preliminary Engineering Report

Project Name:

SR 9 / I-95 at PGA Boulevard/ Central Boulevard
Project Development & Environmental Study
FM No. 413265-1-22-01

Figure No:

Page No:

Date: 08/24/16

Turning Movement Volumes

(2020 to 2040)

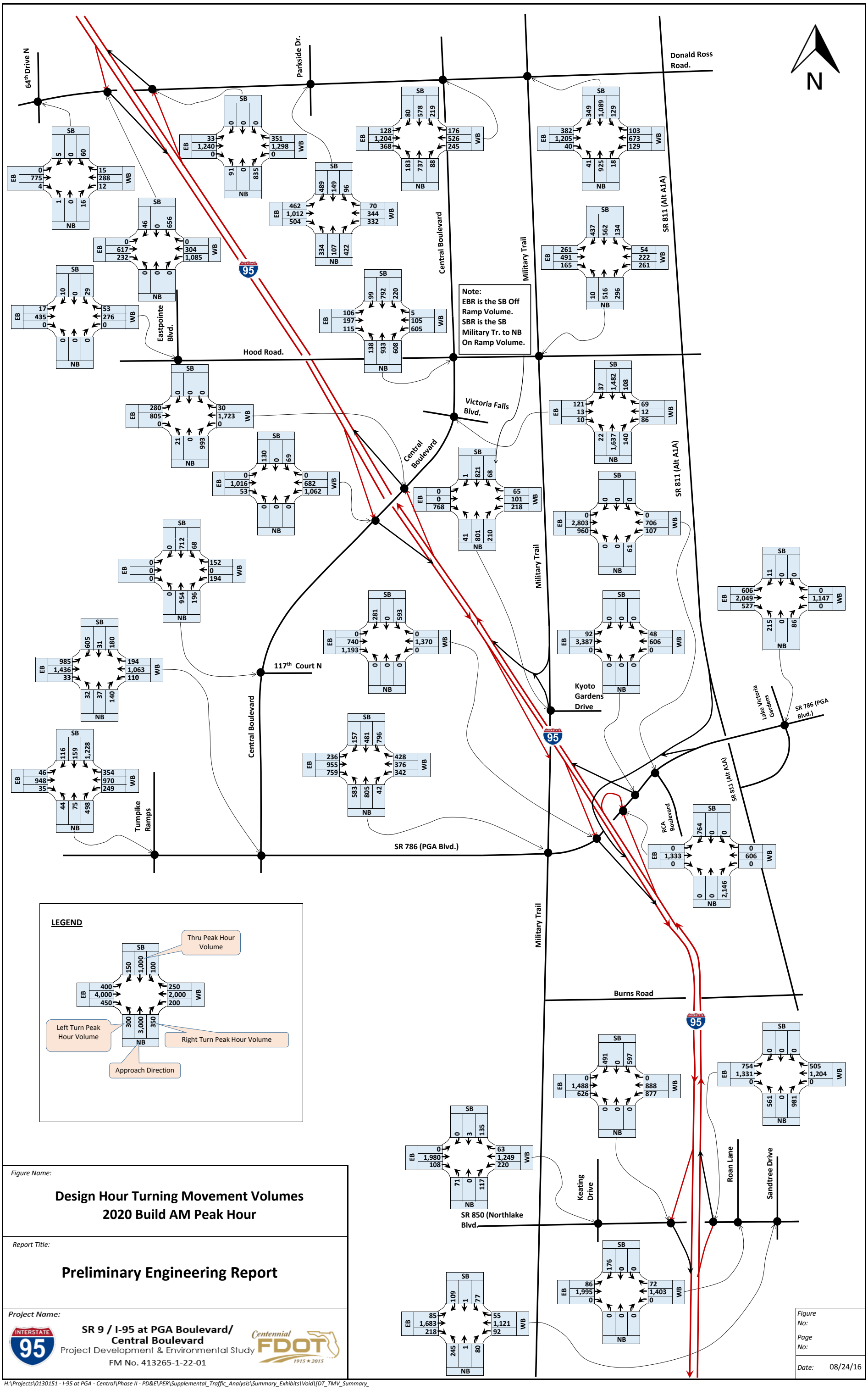


Figure Name:

Design Hour Turning Movement Volumes
2020 Build AM Peak Hour

Report Title:

Preliminary Engineering Report

Project Name:

SR 9 / I-95 at PGA Boulevard/ Central Boulevard
Project Development & Environmental Study
FM No. 413265-1-22-01

Figure No:

Page No:

Date: 08/24/16

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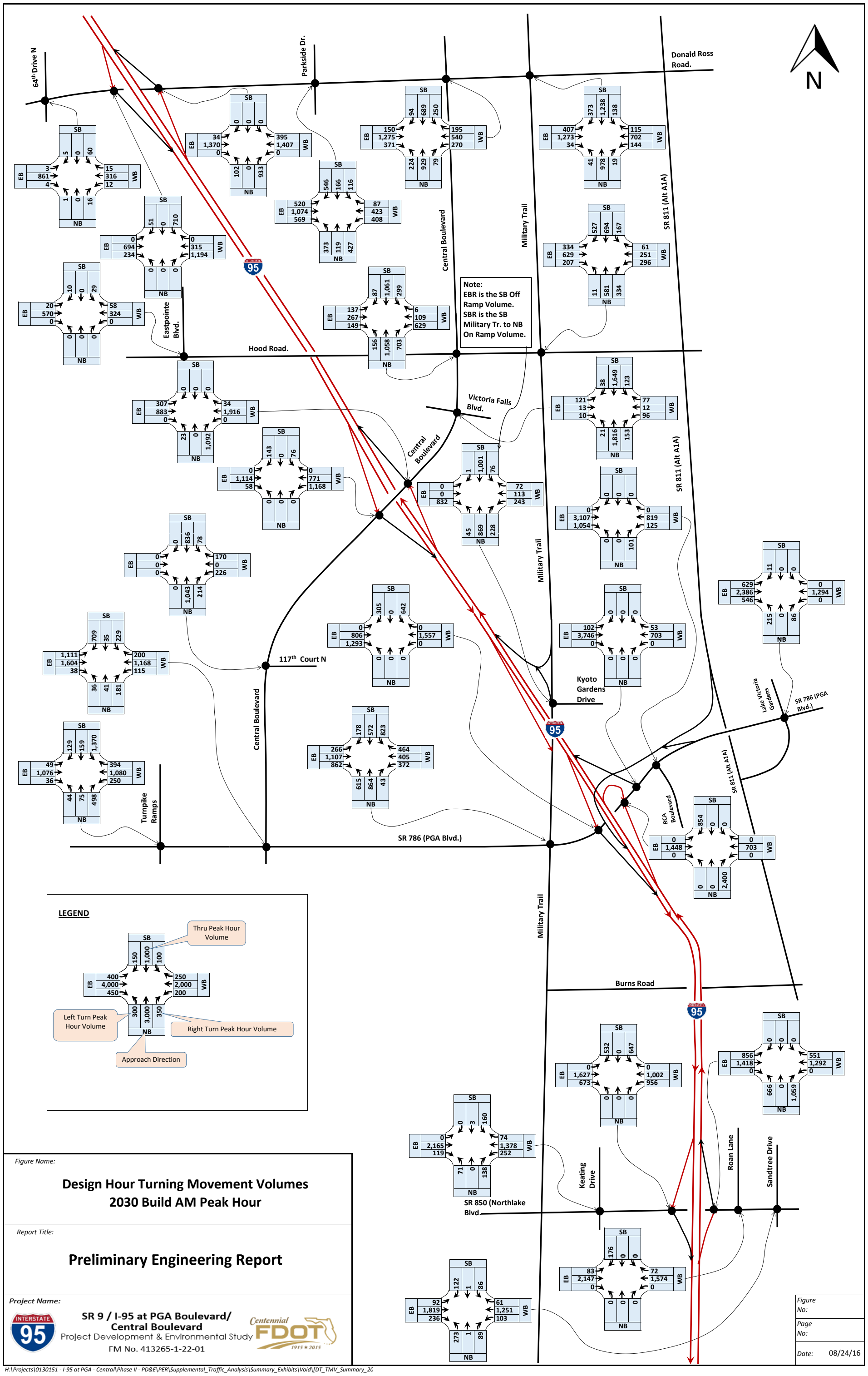


Figure Name:

Design Hour Turning Movement Volumes
2030 Build AM Peak Hour

Report Title:

Preliminary Engineering Report

Project Name:

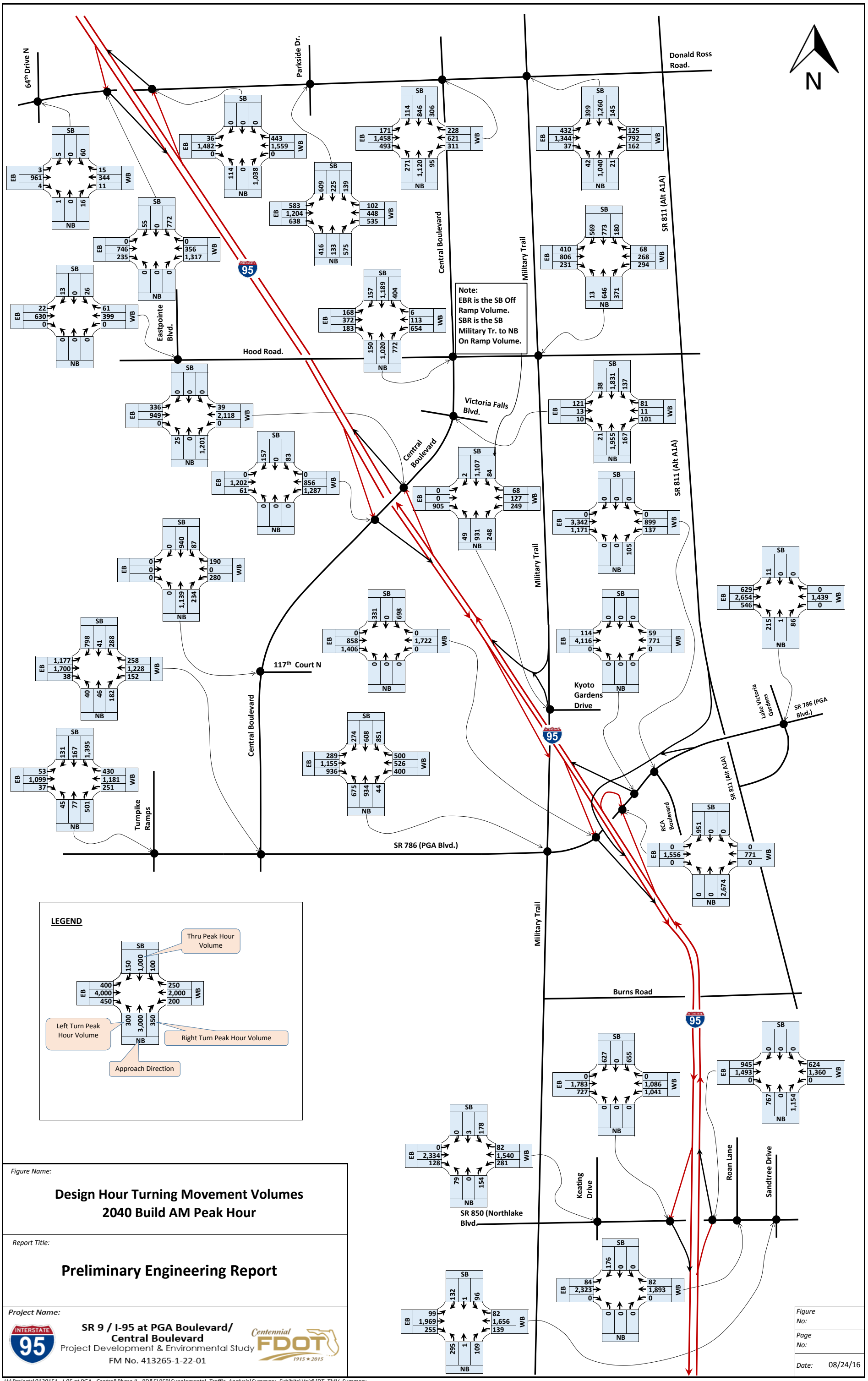
SR 9 / I-95 at PGA Boulevard/
Central Boulevard
Project Development & Environmental Study
FM No. 413265-1-22-01

Figure No:

Page No:

Date: 08/24/16

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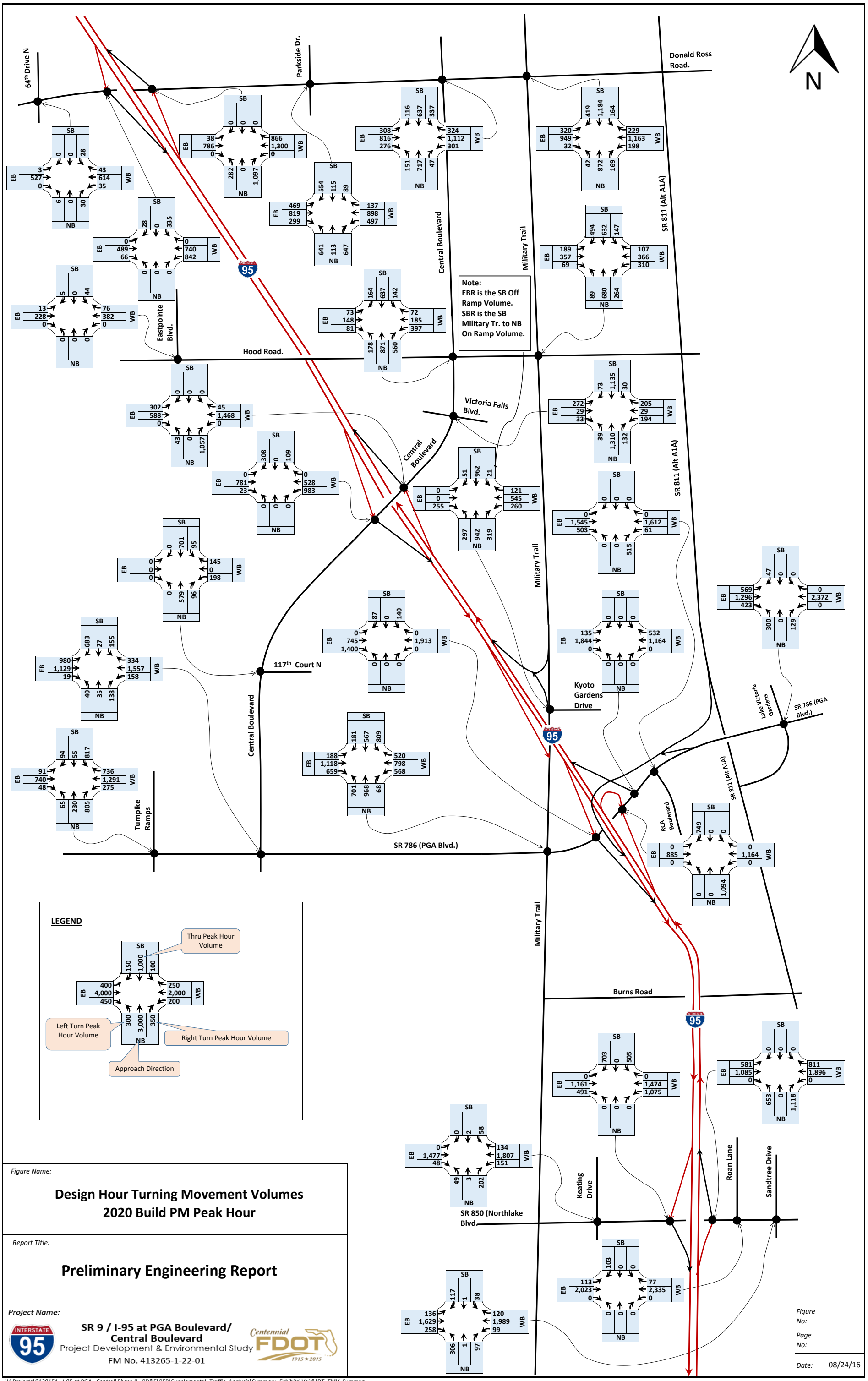


Figure Name:

Design Hour Turning Movement Volumes
2020 Build PM Peak Hour

Report Title:

Preliminary Engineering Report

Project Name:

SR 9 / I-95 at PGA Boulevard/ Central Boulevard
Project Development & Environmental Study
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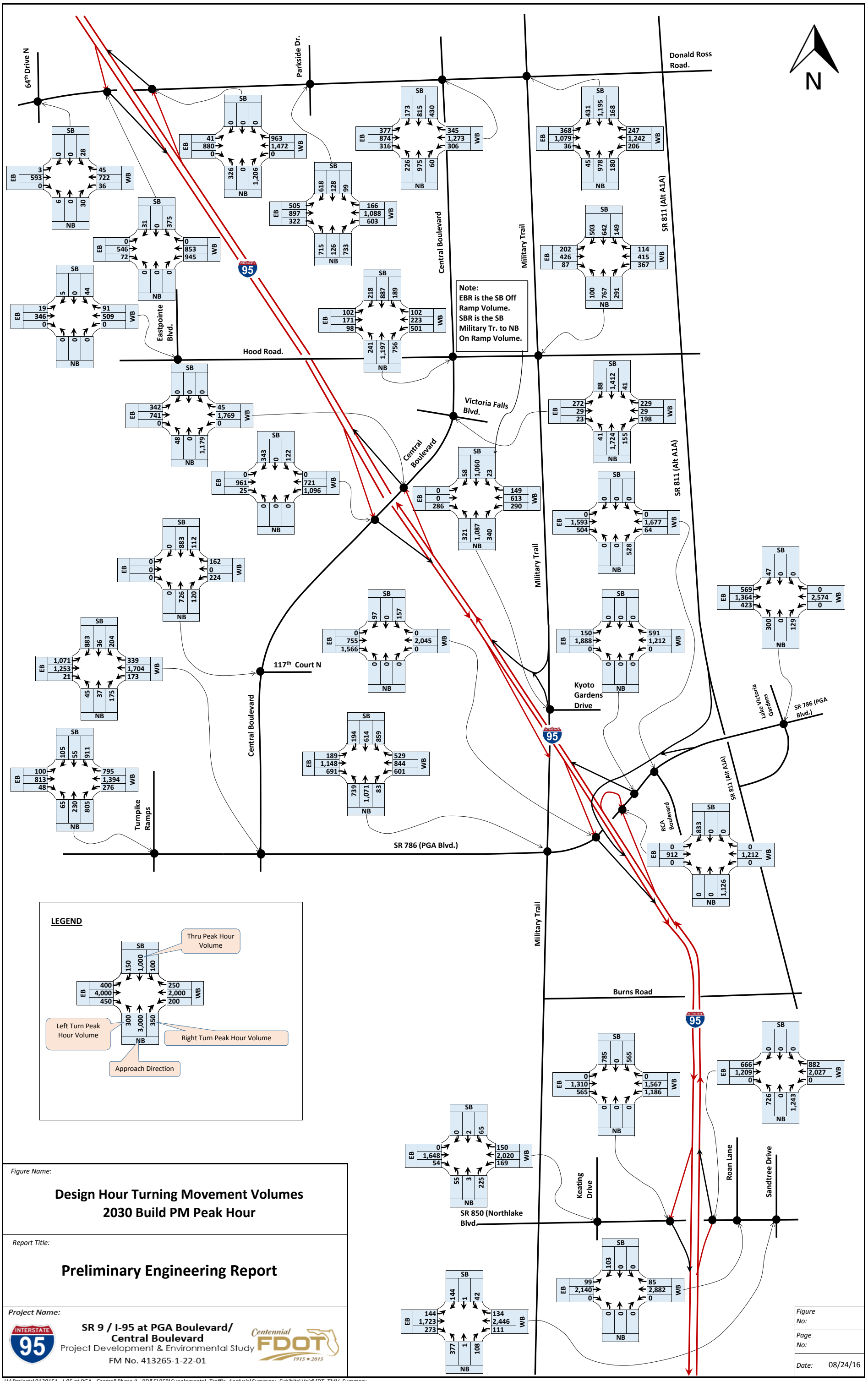


Figure Name:

Design Hour Turning Movement Volumes
2030 Build PM Peak Hour

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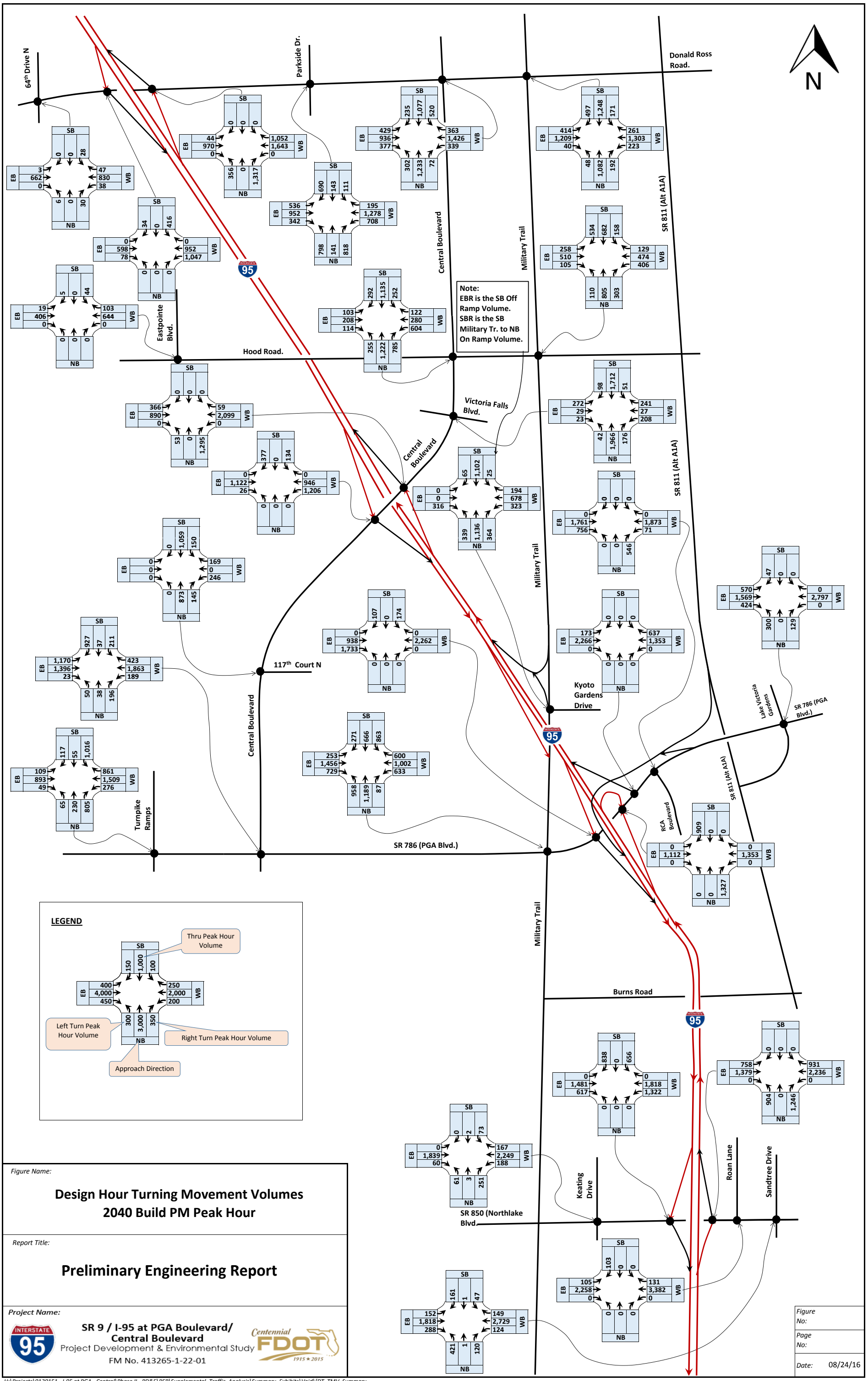


Figure Name:

Design Hour Turning Movement Volumes
2040 Build PM Peak Hour

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Project Name:

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Intersection Level Of Service Analysis Summary

Intersection Level Of Service - 2020

Corridor	Intersection	2020 No-Build Peak Period	2020 No-Build Overall Delay (s/veh)	2020 No-Build LOS	2020 Build Peak Period	2020 Build Overall Delay (s/veh)	2020 Build LOS	2020 Build Vs 2020 No-Build Peak Period	2020 Build Vs 2020 No-Build Overall Delay % Δ	2020 Build Vs 2020 No-Build Δ LOS
CENTRAL BLVD	- Victoria Falls Boulevard	AM	189	-	AM	18.1	B	AM	-90%	-
		PM	1611.3	-	PM	32.5	C	PM	-98%	-
	- I-95 SB Ramps	AM	-	-	AM	27.6	C	AM	-	-
		PM	-	-	PM	17.9	B	PM	-	-
	- I-95 NB Ramps	AM	-	-	AM	33.7	C	AM	-	-
		PM	-	-	PM	31.5	C	PM	-	-
	- 117th Court	AM	11.4	B	AM	12.9	B	AM	13%	Same
		PM	11.9	B	PM	12.7	B	PM	7%	Same
DONALD ROSS ROAD	- 64th Drive NE Pointe Court	AM	1.4	-	AM	1.4	-	AM	-	-
		PM	1.4	-	PM	1.3	-	PM	-	-
	- I-95 West Ramps	AM	37.5	D	AM	28.7	C	AM	-23%	Better
		PM	27.7	C	PM	32	C	PM	16%	Same
	- I-95 East Ramps	AM	23.4	C	AM	20.3	C	AM	-13%	Same
		PM	19.5	B	PM	17.5	B	PM	-10%	Same
	- Parkside Drive	AM	70.9	E	AM	37.5	D	AM	-47%	Better
		PM	67.7	E	PM	51.9	D	PM	-23%	Better
	- Central Boulevard	AM	56.1	E	AM	47.6	D	AM	-15%	Better
		PM	52.3	D	PM	52.4	D	PM	0%	Same
	- N Military Trail	AM	45	D	AM	44.5	D	AM	-1%	Same
		PM	59.9	E	PM	45.2	D	PM	-25%	Better
HOOD ROAD	- East Pointe Boulevard	AM	0.9	-	AM	0.9	-	AM	-	-
		PM	1.1	-	PM	1.1	-	PM	-	-
	- Central Boulevard	AM	36.1	D	AM	38.7	D	AM	7%	Same
		PM	25.2	C	PM	29.3	C	PM	16%	Same
	- N Military Trail	AM	46.6	D	AM	32.3	C	AM	-31%	Better
		PM	43.7	D	PM	37.6	D	PM	-14%	Same
NORTHLAKE BOULEVARD	- Keating Drive	AM	41.9	D	AM	20.6	C	AM	-51%	Better
		PM	23.2	C	PM	19.2	B	PM	-17%	Better
	- I-95 West Ramps	AM	30.8	C	AM	24.9	C	AM	-19%	Same
		PM	48.9	D	PM	25.7	C	PM	-47%	Better
	- I-95 East Ramps	AM	30	C	AM	21	C	AM	-30%	Same
		PM	49.6	D	PM	18.6	B	PM	-63%	Better
	- Roan Lane	AM	2.6	A	AM	2.6	A	AM	0%	Same
		PM	4.4	A	PM	3.9	A	PM	-11%	Same
	- Sandtree Drive	AM	26.5	C	AM	28.6	C	AM	8%	Same
		PM	38.5	D	PM	43.7	D	PM	14%	Same
PGA BOULEVARD	- Florida Turnpike	AM	59.5	E	AM	61.4	E	AM	3%	Same
		PM	50.6	D	PM	78.6	E	PM	55%	Lower
	- Central Boulevard	AM	50.5	D	AM	42.7	D	AM	-15%	Same
		PM	118.1	F	PM	61.7	E	PM	-48%	Better
	- N Military Trail	AM	76.9	E	AM	48.6	D	AM	-37%	Better
		PM	82.4	F	PM	63.2	E	PM	-23%	Better
	- I-95 West Ramps	AM	32	C	AM	8.8	A	AM	-73%	Better
		PM	39	D	PM	7.8	A	PM	-80%	Better
	- I-95 NB Off Ramps	AM	95.5	F	AM	44.6	D	AM	-53%	Better
		PM	24.9	C	PM	10.2	B	PM	-59%	Better
	- NB On Ramps	AM	-	-	AM	-	-	AM	-	-
		PM	-	-	PM	-	-	PM	-	-
	- RCA Boulevard	AM	30.4	-	AM	0	0	AM	-100%	-
		PM	4.1	-	PM	0	0	PM	-100%	-
	- Lake Victoria Gardens	AM	35.2	D	AM	13.5	B	AM	-62%	Better
		PM	90.5	F	PM	31.2	C	PM	-66%	Better
PGA Passage at Lake Victoria Gardens		AM	12.8	B	AM	7.5	A	AM	-41%	Better
		PM	29	C	PM	21.8	C	PM	-25%	Same
MILI-TARY	- Kyoto Gardens Drive	AM	27.2	C	AM	12.5	B	AM	-54%	Better
		PM	28.3	C	PM	15.7	B	PM	-45%	Better

Intersection Level Of Service - 2030

Corridor	Intersection	2030 No-Build			2030 Build			2030 Build Vs 2030 No-Build		
		Peak Period	Overall Delay (s/veh)	LOS	Peak Period	Overall Delay (s/veh)	LOS	Peak Period	Overall Delay % Δ	Δ LOS
CENTRAL BLVD	- Victoria Falls Boulevard	AM	554.8	-	AM	33.9	C	AM	-	-
		PM	n/a*	-	PM	48	D	PM	-	-
	- I-95 SB Ramps	AM	-	-	AM	28.6	C	AM	-	-
		PM	-	-	PM	31.6	C	PM	-	-
	- I-95 NB Ramps	AM	-	-	AM	36.6	D	AM	-	-
		PM	-	-	PM	34.7	C	PM	-	-
	- 117th Court	AM	12.2	B	AM	14.1	B	AM	16%	Same
		PM	12.3	B	PM	13	B	PM	6%	Same
DONALD ROSS ROAD	- 64th Drive NE Pointe Court	AM	-	-	AM	-	-	AM	-	-
		PM	-	-	PM	-	-	PM	-	-
	- I-95 West Ramps	AM	44.3	D	AM	30.8	C	AM	-30%	Better
		PM	34.1	C	PM	25	C	PM	-27%	Same
	- I-95 East Ramps	AM	27.3	C	AM	22.7	C	AM	-17%	Same
		PM	22.1	C	PM	18.8	B	PM	-15%	Better
	- Parkside Drive	AM	67.8	E	AM	52.1	D	AM	-23%	Better
		PM	107.1	F	PM	70.7	E	PM	-34%	Better
	- Central Boulevard	AM	216.5	F	AM	56.2	E	AM	-74%	Better
		PM	77.3	E	PM	77.7	E	PM	1%	Same
	- N Military Trail	AM	63.2	E	AM	46.3	D	AM	-27%	Better
		PM	66.3	E	PM	48.3	D	PM	-27%	Better
HOOD ROAD	- East Pointe Boulevard	AM	0.9	-	AM	-	-	AM	-	-
		PM	1.1	-	PM	-	-	PM	-	-
	- Central Boulevard	AM	30.7	C	AM	54.8	D	AM	79%	Lower
		PM	25.7	C	PM	45	D	PM	75%	Lower
	- N Military Trail	AM	59.5	E	AM	44.9	D	AM	-25%	Better
		PM	42.8	D	PM	42.9	D	PM	0%	Same
NORTHLAKE BOULEVARD	- Keating Drive	AM	45.5	D	AM	33.7	C	AM	-26%	Better
		PM	23.7	C	PM	20.3	C	PM	-14%	Same
	- I-95 West Ramps	AM	38.3	D	AM	33.7	C	AM	-12%	Better
		PM	75.2	E	PM	30.1	C	PM	-60%	Better
	- I-95 East Ramps	AM	39.6	D	AM	25.4	C	AM	-36%	Better
		PM	63.3	E	PM	24.2	C	PM	-62%	Better
	- Roan Lane	AM	2.6	A	AM	2.7	A	AM	4%	Same
		PM	4.5	A	PM	4.5	A	PM	0%	Same
	- Sandtree Drive	AM	30.9	C	AM	33.3	C	AM	8%	Same
		PM	51.5	D	PM	54.5	D	PM	6%	Same
PGA BOULEVARD	- Florida Turnpike	AM	67.6	E	AM	70.4	E	AM	4%	Same
		PM	93.9	F	PM	82	F	PM	-13%	Same
	- Central Boulevard	AM	60.4	E	AM	55	D	AM	-9%	Better
		PM	154.1	F	PM	91.2	F	PM	-41%	Same
	- N Military Trail	AM	86.5	F	AM	57.4	E	AM	-34%	Better
		PM	103.3	F	PM	71.3	E	PM	-31%	Better
	- I-95 West Ramps	AM	34.7	C	AM	9.8	A	AM	-72%	Better
		PM	61.4	E	PM	23.3	C	PM	-62%	Better
	- I-95 NB Off Ramps	AM	138.6	F	AM	72.8	E	AM	-47%	Better
		PM	32.7	C	PM	10.6	B	PM	-68%	Better
	- NB On Ramps	AM	-	-	AM	-	-	AM	-	-
		PM	-	-	PM	-	-	PM	-	-
	- RCA Boulevard	AM	61.6	-	AM	0.6	A	AM	-99%	-
		PM	2.1	-	PM	0.1	A	PM	-95%	-
	- Lake Victoria Gardens	AM	37.1	D	AM	18	B	AM	-51%	Better
		PM	109.6	F	PM	33.7	C	PM	-69%	Better
PGA Passage at Lake Victoria Gardens		AM	13.7	B	AM	12	B	AM	-12%	Same
		PM	29.6	C	PM	18.1	B	PM	-39%	Better
MILI-TARY	- Kyoto Gardens Drive	AM	32.4	C	AM	12.9	B	AM	-60%	Better
		PM	29.3	C	PM	19	B	PM	-35%	Better

Note:

** Delay value not available for unsignalized intersection operations analysis for projected travel demand.*

Intersection Level Of Service - 2040

Corridor	Intersection	2040 No-Build			2040 Build			2040 Build Vs 2040 No-Build		
		Peak Period	Overall Delay (s/veh)	LOS	Peak Period	Overall Delay (s/veh)	LOS	Peak Period	Overall Delay % Δ	Δ LOS
CENTRAL BLVD	- Victoria Falls Boulevard	AM	n/a*	-	AM	34.9	C	AM	-	-
		PM	n/a*	-	PM	53.3	D	PM	-	-
	- I-95 SB Ramps	AM	-	-	AM	33.1	C	AM	-	-
		PM	-	-	PM	36.4	D	PM	-	-
	- I-95 NB Ramps	AM	-	-	AM	40.8	D	AM	-	-
		PM	-	-	PM	42.9	D	PM	-	-
	- 117th Court	AM	13.1	B	AM	16.2	B	AM	24%	Same
		PM	13.4	B	PM	13.9	B	PM	4%	Same
DONALD ROSS ROAD	- 64th Drive NE Pointe Court	AM	1.5	-	AM	1.5	-	AM	-	-
		PM	1.7	-	PM	1.5	-	PM	-	-
	- I-95 West Ramps	AM	53.3	D	AM	34.8	C	AM	-35%	Better
		PM	31.7	C	PM	26	C	PM	-18%	Same
	- I-95 East Ramps	AM	38.2	D	AM	19.8	B	AM	-48%	Better
		PM	29.1	C	PM	9.6	A	PM	-67%	Better
	- Parkside Drive	AM	79.2	E	AM	57.2	E	AM	-28%	Same
		PM	99.5	F	PM	83	F	PM	-17%	Same
	- Central Boulevard	AM	79.6	E	AM	79.2	E	AM	-1%	Same
		PM	108.8	F	PM	115.4	F	PM	6%	Same
	- N Military Trail	AM	51.6	D	AM	48.2	D	AM	-7%	Same
		PM	71.5	E	PM	52.6	D	PM	-26%	Better
HOOD ROAD	- East Pointe Boulevard	AM	1.1	-	AM	0.9	-	AM	-	-
		PM	1.8	-	PM	1.2	-	PM	-	-
	- Central Boulevard	AM	37.7	D	AM	64.2	E	AM	70%	Lower
		PM	33.9	C	PM	53.9	D	PM	59%	Lower
	- N Military Trail	AM	66.3	E	AM	41.7	D	AM	-37%	Better
		PM	54.2	D	PM	41.6	D	PM	-23%	Same
NORTHLAKE BOULEVARD	- Keating Drive	AM	46.4	D	AM	33.7	C	AM	-27%	Better
		PM	34.8	C	PM	17.8	B	PM	-49%	Better
	- I-95 West Ramps	AM	46.4	D	AM	33.9	C	AM	-27%	Better
		PM	105.3	F	PM	36.1	D	PM	-66%	Better
	- I-95 East Ramps	AM	50.5	D	AM	25.8	C	AM	-49%	Better
		PM	87.9	F	PM	40.3	D	PM	-54%	Better
	- Roan Lane	AM	2.6	A	AM	2.9	A	AM	12%	Same
		PM	4.6	A	PM	5.3	A	PM	15%	Same
	- Sandtree Drive	AM	38.6	D	AM	49.7	D	AM	29%	Same
		PM	83.2	F	PM	64.8	E	PM	-22%	Better
PGA BOULEVARD	- Florida Turnpike	AM	80.8	F	AM	72.2	E	AM	-11%	Better
		PM	116.9	F	PM	105.7	F	PM	-10%	Same
	- Central Boulevard	AM	77.6	E	AM	65.6	E	AM	-15%	Same
		PM	188.3	F	PM	111.2	F	PM	-41%	Same
	- N Military Trail	AM	113	F	AM	62.2	E	AM	-45%	Better
		PM	127.2	F	PM	95.8	F	PM	-25%	Same
	- I-95 West Ramps	AM	40.5	D	AM	11.7	B	AM	-71%	Better
		PM	113.9	F	PM	36.8	D	PM	-68%	Better
	- I-95 NB Off Ramps	AM	181.8	F	AM	109.8	F	AM	-40%	Same
		PM	35.8	D	PM	15.2	B	PM	-58%	Better
	- NB On Ramps	AM	-	-	AM	-	-	AM	-	-
		PM	-	-	PM	-	-	PM	-	-
	- RCA Boulevard	AM	201.4	-	AM	0.9	A	AM	-	-
		PM	2.8	-	PM	0.1	A	PM	-	-
	- Lake Victoria Gardens	AM	38	D	AM	19.2	B	AM	-49%	Better
		PM	127.2	F	PM	35.5	D	PM	-72%	Better
PGA Passage at Lake Victoria Gardens		AM	14.2	B	AM	15.7	B	AM	11%	Same
		PM	30.5	C	PM	21.1	C	PM	-31%	Same
MILI-TARY	- Kyoto Gardens Drive	AM	43.5	D	AM	17.7	B	AM	-59%	Better
		PM	32.4	C	PM	19	B	PM	-41%	Better

Note:

** Delay value not available for unsignalized intersection operations analysis for projected travel demand.*

Freeway Highway Capacity Analysis Summaries for the Build Alternative

Alternative 2 2020 HCS Analysis

Freeway Operational Assessment - SR 9 (I-95) Between Northlake Boulevard and Donald Ross Road

Direction	2020 NO-BUILD								2020 Build (Alternative 2)								2020 Build Alt. 2 Vs 2020 No-Build						
		Analysis								Analysis							Peak Period	Change in Density		Change in Speed		Change in LOS?	Significant & Adverse?[2]
	I-95 Segment Description	Type	Limits	Period	DDHV	Density	Speed (MPH)	LOS	I-95 Segment Description	Type	Limits	Period	DDHV	Density	Speed (MPH)	LOS		Δ Value	Δ %[1]	Δ Value	Δ %[1]		
SOUTHBOUND	**At** On-Ramp from Donald Ross EB & WB	Merge	S1 - S2	AM	1,577	26.1	60.0	C	**Between** On-Ramp from Donald Ross EB & WB **and** Off-Ramp to Central Boulevard EB & WB	Weave	S1 - S2	AM	5,046	14.4	63.1	B	AM	(11.7)	-44.8%	3.1	5.2%	Better	No
				PM	1,080	19.1	61.0	B				PM	3,540	10.2	62.6	B	PM	(8.9)	-46.6%	1.6	2.6%	Same	No
	Between On-Ramp from Donald Ross EB & WB **and** Off-Ramp to Military Trail SB	Basic	S2 - S3	AM	5,530	17.0	70.0	B	**Between** Off-Ramp to Central Blvd. EB & WB **and** Off-Ramp to Military Trail/CD Road	Basic	S2 - S3	AM	4,847	14.9	70.0	B	AM	(2.1)	-12.4%	0.0	0.0%	Same	No
				PM	3,899	12.0	70.0	B				PM	3,123	9.6	70.0	A	PM	(2.4)	-20.0%	0.0	0.0%	Better	No
	At Off-Ramp to Military Trail SB	Diverge	S3 - S4	AM	348	20.5	63.0	C	**At** Off-Ramp to Military Trail/CD Road	Diverge	S3 - S4	AM	768	21.4	61.0	C	AM	0.9	4.4%	(2.0)	-3.2%	Same	No
				PM	176	14.8	63.0	B				PM	255	13.7	63.0	B	PM	(1.1)	-7.4%	0.0	0.0%	Same	No
	Between Off-Ramp to Military Trail **and** Off-Ramp to PGA Blvd EB & WB	Basic	S4 - S5	AM	5,182	15.9	70.0	B	**Between** Off-Ramp to Military Trail/CD Road **and** On-Ramp from Central Blvd/CD Road	Basic	S4 - S5	AM	4,079	12.5	70.0	B	AM	(3.4)	-21.4%	0.0	0.0%	Same	No
				PM	3,723	11.4	70.0	B				PM	2,868	8.8	70.0	A	PM	(2.6)	-22.8%	0.0	0.0%	Better	No
	At Off-Ramp to PGA Blvd EB & WB	Diverge	S5 - S6	AM	688	7.0	65.0	A	**Between** On-Ramp from Central Blvd/CD Road **and** Off-Ramp from to PGA Blvd EB & WB	Weave	S5 - S6	AM	5,194	14.7	63.8	B	AM	7.7	110.0%	(1.2)	-1.8%	Lower	No
				PM	267	4.5	66.0	A				PM	3,873	10.8	65.0	B	PM	6.3	140.0%	(1.0)	-1.5%	Lower	No
									CD Road: Between On-Ramp to Military Trail and Off-Ramp to Military Trail	Weave	SC1 - SC2	AM	1,883	18.6	37.2	B						
												PM	1,261	10.6	43.9	A							
	Between Off-Ramp to PGA Blvd EB & WB **and** On-Ramp from WB PGA Blvd	Basic	S6 - S7	AM	4,494	13.8	70.0	B	**Between** Off-Ramp to PGA Blvd EB & WB **and** On-Ramp from WB PGA Blvd	Basic	S6 - S7	AM	4,320	13.3	70.0	B	AM	(0.5)	-3.6%	0.0	0.0%	Same	No
				PM	3,456	10.6	70.0	A				PM	3,646	11.2	70.0	B	PM	0.6	5.7%	0.0	0.0%	Lower	No
	At On-Ramp from PGA Blvd WB	Merge	S7 - S8	AM	1,246	24.8	60.0	C	**At** On-Ramp from PGA Blvd WB	Merge	S7 - S8	AM	1,148	23.6	60.0	C	AM	(1.2)	-4.8%	0.0	0.0%	Same	No
				PM	2,233	30.1	58.0	D				PM	2,094	29.4	58.0	D	PM	(0.7)	-2.3%	0.0	0.0%	Same	No
	Between On-Ramp from WB PGA Blvd **and** On-Ramp from EB PGA Blvd	Basic	S8 - S9	AM	5,740	17.6	70.0	B	**Between** On-Ramp from WB PGA Blvd **and** On-Ramp from EB PGA Blvd	Basic	S8 - S9	AM	5,468	16.8	70.0	B	AM	(0.8)	-4.5%	0.0	0.0%	Same	No
				PM	5,689	17.5	70.0	B				PM	5,740	17.6	70.0	B	PM	0.1	0.6%	0.0	0.0%	Same	No
	At On-Ramp from PGA Blvd EB	Merge	S9 - S10	AM	1,250	27.7	59.0	C	**At** On-Ramp from PGA Blvd EB	Merge	S9 - S10	AM	1,193	26.5	60.0	C	AM	(1.2)	-4.3%	1.0	1.7%	Same	No
				PM	1,574	30.2	58.0	D				PM	1,400	28.9	59.0	D	PM	(1.3)	-4.3%	1.0	1.7%	Same	No
	Between On-Ramp to PGA Blvd EB **and** Off-Ramp to Northlake Boulevard EB & WB	Basic	S10 - S11	AM	6,990	21.8	69.0	C	**Between** On-Ramp to PGA Blvd EB **and** Off-Ramp to Northlake Boulevard EB & WB	Basic	S10 - S11	AM	6,661	20.6	69.0	C	AM	(1.2)	-5.5%	0.0	0.0%	Same	No
				PM	7,263	22.8	69.0	C				PM	7,140	22.3	69.0	C	PM	(0.5)	-2.2%	0.0	0.0%	Same	No
	At Off-Ramp to Northlake Boulevard EB & WB	Diverge	S11 - S12	AM	991	11.4	61.0	B	**At** Off-Ramp to Northlake Boulevard EB & WB	Diverge	S11 - S12	AM	1,088	11.2	61.0	B	AM	(0.2)	-1.8%	0.0	0.0%	Same	No
				PM	1,057	12.2	61.0	B				PM	1,208	12.9	60.0	B	PM	0.7	5.7%	(1.0)	-1.6%	Same	No
NORTHBOUND	**At** On-Ramp from Northlake Boulevard EB & WB	Merge	N1 - N2	AM	1,178	26.0	60.0	C	**At** On-Ramp from Northlake Blvd. EB & WB	Merge	N1 - N2	AM	1,259	26.6	60.0	C	AM	0.6	2.3%	0.0	0.0%	Same	No
				PM	1,480	27.1	59.0	C				PM	1,392	26.6	60.0	C	PM	(0.5)	-1.8%	1.0	1.7%	Same	No
	Between On-Ramp from Northlake Blvd. EB & WB **and** Off-Ramp to PGA Blvd EB	Basic	N2 - N3	AM	6,492	20.0	70.0	C	**Between** On-Ramp from Northlake Blvd. EB & WB **and** Off-Ramp to PGA Blvd EB	Basic	N2 - N3	AM	6,550	20.2	70.0	C	AM	0.2	1.0%	0.0	0.0%	Same	No
				PM	6,132	18.9	70.0	C				PM	6,129	18.8	70.0	C	PM	(0.1)	-0.5%	0.0	0.0%	Same	No
	At Off-Ramp to PGA Blvd. EB	Diverge	N3 - N4	AM	2,405	20.9	59.0	C	**At** Off-Ramp to PGA Blvd. EB	Diverge	N3 - N4	AM	2,146	18.4	59.0	B	AM	(2.5)	-12.0%	0.0	0.0%	Better	No
				PM	1,258	12.1	62.0	B				PM	1,094	10.9	62.0	B	PM	(1.2)	-9.9%	0.0	0.0%	Same	No
	Between Off-Ramp to PGA Blvd EB **and** Off-Ramp to PGA Blvd WB	Basic	N4 - N5	AM	4,087	12.5	70.0	B	**Between** Off-Ramp to PGA Blvd EB **and** Off-Ramp to PGA Blvd WB	Basic	N4 - N5	AM	4,404	13.5	70.0	B	AM	1.0	8.0%	0.0	0.0%	Same	No
				PM	4,874	15.0	70.0	B				PM	5,035	15.4	70.0	B	PM	0.4	2.7%	0.0	0.0%	Same	No
	At Off-Ramp to PGA Blvd. WB	Diverge	N5 - N6	AM	1,038	20.1	55.0	C	**At** Off-Ramp to PGA Blvd. WB	Diverge	N5 - N6	AM	764	19.8	56.0	B	AM	(0.3)	-1.5%	1.0	1.8%	Better	No
				PM	916	22.3	56.0	C				PM	749	22.0	56.0	C	PM	(0.3)	-1.3%	0.0	0.0%	Same	No
	Between Off-Ramp to PGA Blvd WB **and** On-ramp from PGA EB & WB	Basic	N6 - N7	AM	3,049	9.4	70.0	A	**Between** Off-Ramp to PGA Blvd WB **and** On-ramp from PGA EB & WB	Basic	N6 - N7	AM	3,640	11.2	70.0	B	AM	1.8	19.1%	0.0	0.0%	Lower	No
				PM	3,958	12.1	70.0	B				PM	4,286	13.1	70.0	B	PM	1.0	8.3%	0.0	0.0%	Same	No
	At On-ramp from PGA EB & WB	Merge	N7 - N8	AM	134	12.0	62.0	B	**Between** On-ramp from PGA EB & WB **and** Off-ramp to Central Blvd/CD Road	Weave	N7 - N8	AM	3,780	10.6	64.2	B	AM	(1.4)	-11.7%	2.2	3.5%	Same	No
				PM	702	19.0	61.0	B				PM	4,953	15.0	59.9	B	PM	(4.0)	-21.1%	(1.1)	-1.8%	Same	No
	Between On-ramp from PGA EB & WB **and** On-ramp from Military Trail NB & SB	Basic	N8 - N9	AM	3,183	9.8	70.0	A	**Between** Off-ramp to Central Blvd/CD Road **and** On-Ramp From Military Trail/CD Road	Basic	N8 - N9	AM	2,766	8.5	70.0	A	AM	(1.3)	-13.3%	0.0	0.0%	Same	No
				PM	4,660	14.3	70.0	B				PM	3,853	11.8	70.0	B	PM	(2.5)	-17.5%	0.0	0.0%	Same	No
	At On-ramp from Military Trail NB & SB	Merge	N9 - N10	AM	104	12.1	62.0	B	**At** On-Ramp From Military Trail/CD Road	Merge	N9 - N10	AM	143	11.3	62.0	B	AM	(0.8)	-6.6%	0.0	0.0%	Same	No
				PM	539	19.5	61.0	B				PM	893	20.3	61.0	C	PM	0.8	4.1%	0.0	0.0%	Lower	No
	Between On-ramp from Military Trail NB & SB **and** Off-Ramp from Donald Ross EB & WB	Basic	N10 - N11	AM	3,287	10.1	70.0	A	**Between** On-Ramp From Military Trail/CD Road **and** On-Ramp from Central Boulevard EB & WB	Basic	N10 - N11	AM	2,909	8.9	70.0	A	AM	(1.2)	-11.9%	0.0	0.0%	Same	No
				PM	5,199	15.9	70.0	B				PM	4,746	14.6	70.0	B	PM	(1.3)	-8.2%	0.0	0.0%	Same	No
									CD Road: Between On-Ramp From Military Trail and Off-Ramp to I-95	Weave	NC1 -NC2	AM	1,157	9.5	44.6	A						
												PM	1,993	20.4	35.9	B							
	At Off-Ramp to Donald Ross Road EB & WB	Diverge	N11 - N12	AM	1,139	6.6	60.0	A	**Between** On-Ramp from Central Boulevard and Off-Ramp to Donald Ross Road	Weave	N11 - N12	AM	3,219	9.2	63.4	A	AM	2.6	39.4%	3.4	5.7%	Same	No
				PM	1,594	12.6	59.0	B				PM	5,093	14.8	62.1	B	PM	2.2	17.5%	3.1	5.3%	Same	No

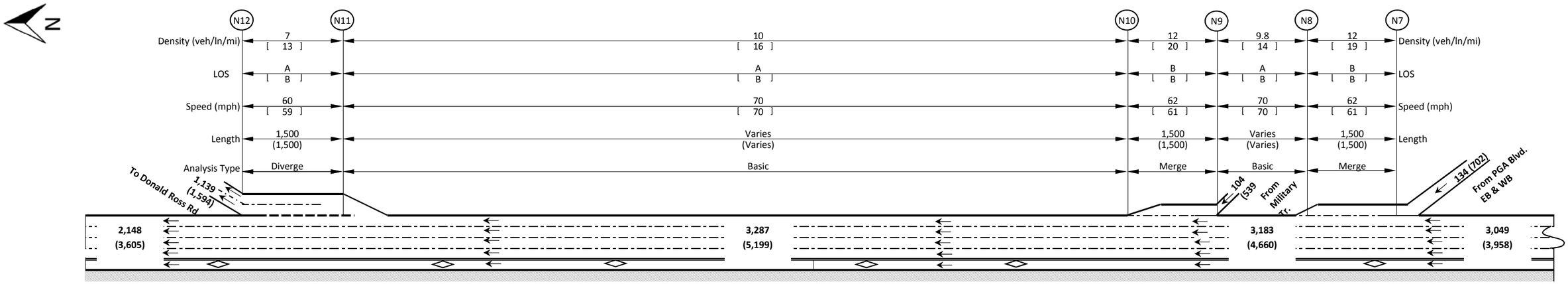
Notes:

1. According to guidelines contained in the 2010 Highway Capacity Manual (HCM), "Chapter 7/Interpreting HCM and Alternative Tool Results" , HCM model inputs and outputs can be expected to be accurate to only within 5% or 10% of the "true value" given the inherent variability of the field data on which they are based. As a consequence, only speed changes that are outside a +/- 10% change when comparing the statistics from the build condition to the no-build condition, were deemed significant taking into account the accuracy levels of model outputs as promulgated by the 2010 HCM.

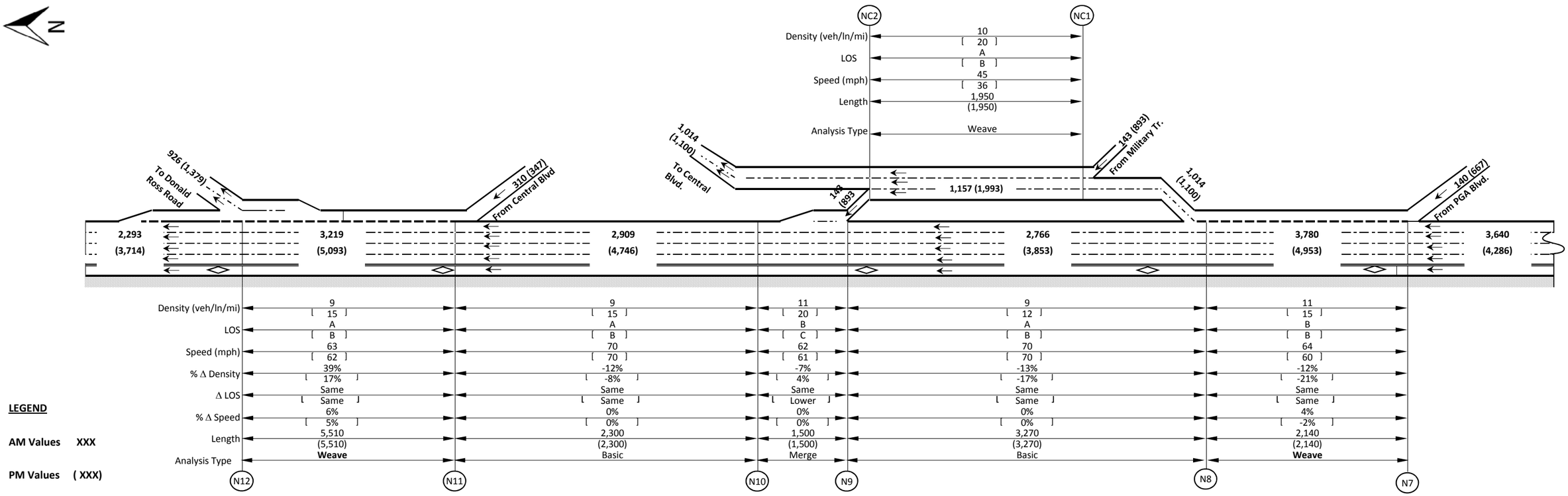
*2. Impacts were considered to be "Significant & Adverse" when comparing the Build Alternate to the No-Build Alternate only if there was a degradation in speed that exceeded -10% **and** the level of service fell below the adopted LOS "D" threshold which is the minimum adopted level of service standard for I-95 within the study area according to Florida Rule 14-94.003 Statewide Minimum Level of Service Standard.*

NORTHBOUND

2020 NO-BUILD



2020 BUILD



LEGEND

AM Values XXX

PM Values (XXX)

Project Name:

SR 9 / I-95 at PGA Boulevard/ Central Boulevard
Project Development & Environmental Study
FM No. 413265-1-22-01

Figure Name:

2020 Freeway Operations Analysis Alternate 2 vs No-Build (Northbound - North Section: PGA Blvd to Donald Ross)

Report Title:

Preliminary Engineering Report

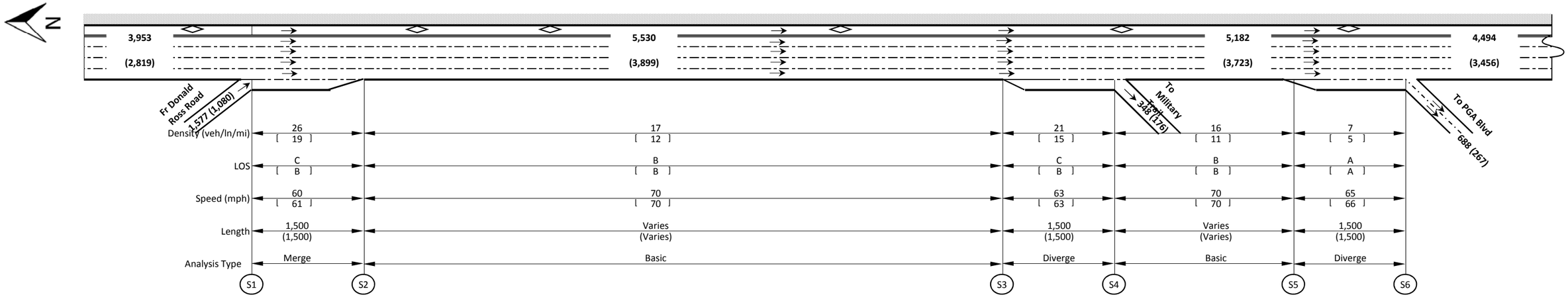
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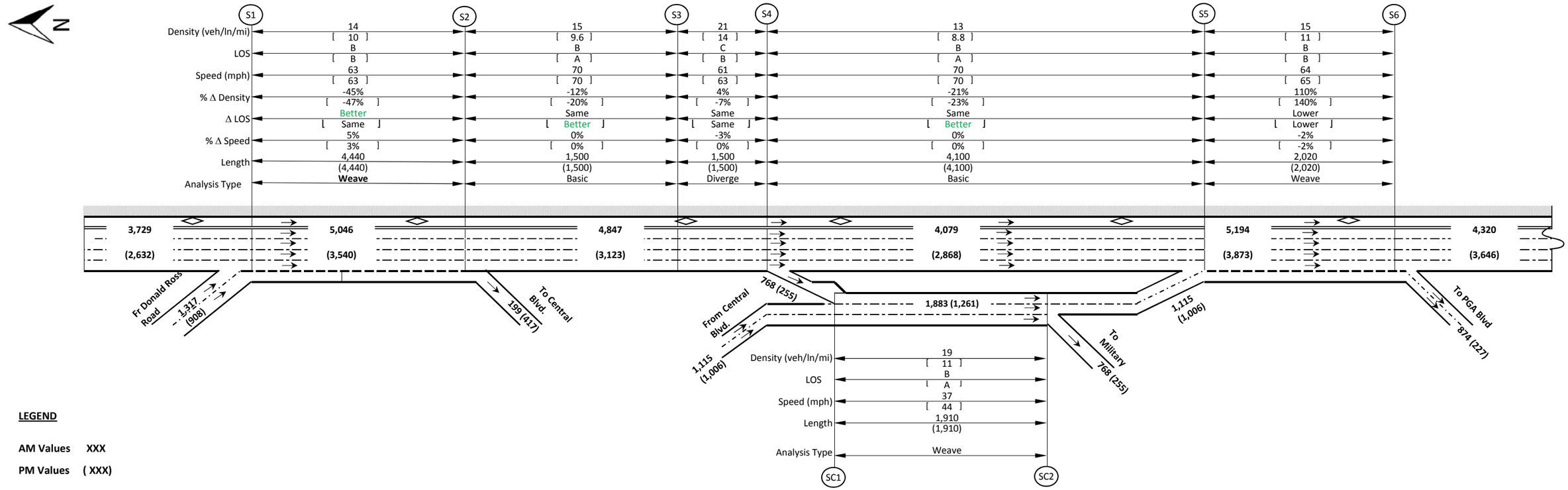
Date: 05/02/16

SOUTHBOUND

2020 NO-BUILD



2020 BUILD



LEGEND

AM Values XXX

PM Values (XXX)

Project Name: SR 9 / I-95 at PGA Boulevard/ Central Boulevard Project Development & Environmental Study FM No. 413265-1-22-01	*Figure Name:* **2020 Freeway Operations Analysis Alternate 2 vs No-Build (Southbound - North Section: PGA Blvd to Donald Ross)**	*Report Title:* **Preliminary Engineering Report**	*Figure No.* *Page No.* *Date:* 05/02/16

Alternative 2 2030 HCS Analysis

Freeway Operational Assessment - SR 9 (I-95) Between Northlake Boulevard and Donald Ross Road

Direction	2030 NO-BUILD								2030 Build (Alternative 2)								2030 Build Alt. 2 Vs 2030 No-Build						
		Analysis								Analysis							Peak Period	Change in Density		Change in Speed		Change in LOS?	Significant & Adverse?[2]
	I-95 Segment Description	Type	Limits	Period	DDHV	Density	Speed (MPH)	LOS	I-95 Segment Description	Type	Limits	Period	DDHV	Density	Speed (MPH)	LOS		Δ Value	Δ %[1]	Δ Value	Δ %[1]		
SOUTHBOUND	**At** On-Ramp from Donald Ross EB & WB	Merge	S1 - S2	AM	1,710	28.0	59.0	D	**Between** On-Ramp from Donald Ross EB & WB **and** Off-Ramp to Central Boulevard EB & WB	Weave	S1 - S2	AM	5,470	15.8	62.6	B	AM	(12.2)	-43.6%	3.6	6.1%	Better	No
				PM	1,209	21.0	61.0	C				PM	3,963	11.5	62.1	B	PM	(9.5)	-45.2%	1.1	1.8%	Better	No
	Between On-Ramp from Donald Ross EB & WB **and** Off-Ramp to Military Trail SB	Basic	S2 - S3	AM	5,995	18.4	70.0	C	**Between** Off-Ramp to Central Blvd. EB & WB **and** Off-Ramp to Military Trail/CD Road	Basic	S2 - S3	AM	5,251	16.1	70.0	B	AM	(2.3)	-12.5%	0.0	0.0%	Better	No
				PM	4,364	13.4	70.0	B				PM	3,498	10.7	70.0	A	PM	(2.7)	-20.1%	0.0	0.0%	Better	No
	At Off-Ramp to Military Trail SB	Diverge	S3 - S4	AM	377	22.3	62.0	C	**At** Off-Ramp to Military Trail/CD Road	Diverge	S3 - S4	AM	832	22.2	61.0	C	AM	(0.1)	-0.4%	(1.0)	-1.6%	Same	No
				PM	197	16.6	63.0	B				PM	286	15.4	62.7	B	PM	(1.2)	-7.2%	(0.3)	-0.5%	Same	No
	Between Off-Ramp to Military Trail **and** Off-Ramp to PGA Blvd EB & WB	Basic	S4 - S5	AM	5,618	17.2	70.0	B	**Between** Off-Ramp to Military Trail/CD Road **and** On-Ramp from Central Blvd/CD Road	Basic	S4 - S5	AM	4,419	13.6	70.0	B	AM	(3.6)	-20.9%	0.0	0.0%	Same	No
				PM	4,167	12.8	70.0	B				PM	3,212	9.9	70.0	A	PM	(2.9)	-22.7%	0.0	0.0%	Better	No
	At Off-Ramp to PGA Blvd EB & WB	Diverge	S5 - S6	AM	746	8.4	65.0	A	**Between** On-Ramp from Central Blvd/CD Road **and** Off-Ramp from to PGA Blvd EB & WB	Weave	S5 - S6	AM	5,646	16.1	63.5	B	AM	7.7	91.7%	(1.5)	-2.3%	Lower	No
				PM	299	4.6	66.0	A				PM	4,333	12.1	64.7	B	PM	7.5	163.0%	(1.3)	-2.0%	Lower	No
									CD Road: Between On-Ramp to Military Trail and Off-Ramp to Military Trail	Weave	SC1 - SC2	AM	2,058	20.9	36.2	B							
												PM	1,407	12.0	43.0	A							
	Between Off-Ramp to PGA Blvd EB & WB **and** On-Ramp from WB PGA Blvd	Basic	S6 - S7	AM	4,872	14.9	70.0	B	**Between** Off-Ramp to PGA Blvd EB & WB **and** On-Ramp from WB PGA Blvd	Basic	S6 - S7	AM	4,699	14.4	70.0	B	AM	(0.5)	-3.4%	0.0	0.0%	Same	No
				PM	3,868	11.9	70.0	B				PM	4,079	12.5	70.0	B	PM	0.6	5.0%	0.0	0.0%	Same	No
	At On-Ramp from PGA Blvd WB	Merge	S7 - S8	AM	1,351	26.6	59.0	C	**At** On-Ramp from PGA Blvd WB	Merge	S7 - S8	AM	1,245	25.3	60.0	C	AM	(1.3)	-4.9%	1.0	1.7%	Same	No
				PM	2,500	33.3	56.0	D				PM	2,344	32.6	56.0	D	PM	(0.7)	-2.1%	0.0	0.0%	Same	No
	Between On-Ramp from WB PGA Blvd **and** On-Ramp from EB PGA Blvd	Basic	S8 - S9	AM	6,223	19.1	70.0	C	**Between** On-Ramp from WB PGA Blvd **and** On-Ramp from EB PGA Blvd	Basic	S8 - S9	AM	5,944	18.2	70.0	C	AM	(0.9)	-4.7%	0.0	0.0%	Same	No
				PM	6,368	19.6	70.0	C				PM	6,423	19.8	70.0	C	PM	0.2	1.0%	0.0	0.0%	Same	No
	At On-Ramp from PGA Blvd EB	Merge	S9 - S10	AM	1,355	29.2	59.0	D	**At** On-Ramp from PGA Blvd EB	Merge	S9 - S10	AM	1,293	28.6	59.0	D	AM	(0.6)	-2.1%	0.0	0.0%	Same	No
				PM	1,761	32.8	57.0	D				PM	1,566	31.4	58.0	D	PM	(1.4)	-4.3%	1.0	1.8%	Same	No
	Between On-Ramp to PGA Blvd EB **and** Off-Ramp to Northlake Boulevard EB & WB	Basic	S10 - S11	AM	7,578	24.0	68.0	C	**Between** On-Ramp to PGA Blvd EB **and** Off-Ramp to Northlake Boulevard EB & WB	Basic	S10 - S11	AM	7,237	22.7	69.0	C	AM	(1.3)	-5.4%	1.0	1.5%	Same	No
				PM	8,129	26.2	67.0	D				PM	7,989	25.6	67.0	C	PM	(0.6)	-2.3%	0.0	0.0%	Better	No
	At Off-Ramp to Northlake Boulevard EB & WB	Diverge	S11 - S12	AM	1,074	13.1	61.0	B	**At** Off-Ramp to Northlake Boulevard EB & WB	Diverge	S11 - S12	AM	1,179	12.9	60.0	B	AM	(0.2)	-1.5%	(1.0)	-1.6%	Same	No
				PM	1,182	14.8	60.0	B				PM	1,350	15.6	60.0	B	PM	0.8	5.4%	0.0	0.0%	Same	No
NORTHBOUND	**At** On-Ramp from Northlake Boulevard EB & WB	Merge	N1 - N2	AM	1,317	28.8	59.0	D	**At** On-Ramp from Northlake Blvd. EB & WB	Merge	N1 - N2	AM	1,407	29.4	59.0	D	AM	0.6	2.1%	0.0	0.0%	Same	No
				PM	1,646	29.5	59.0	D				PM	1,548	28.9	59.0	D	PM	(0.6)	-2.0%	0.0	0.0%	Same	No
	Between On-Ramp from Northlake Blvd. EB & WB **and** Off-Ramp to PGA Blvd EB	Basic	N2 - N3	AM	7,259	22.8	69.0	C	**Between** On-Ramp from Northlake Blvd. EB & WB **and** Off-Ramp to PGA Blvd EB	Basic	N2 - N3	AM	7,324	23.0	68.0	C	AM	0.2	0.9%	(1.0)	-1.4%	Same	No
				PM	6,814	21.1	69.0	C				PM	6,811	21.1	69.0	C	PM	0.0	0.0%	0.0	0.0%	Same	No
	At Off-Ramp to PGA Blvd. EB	Diverge	N3 - N4	AM	2,689	23.6	58.0	C	**At** Off-Ramp to PGA Blvd. EB	Diverge	N3 - N4	AM	2,400	21.7	59.0	C	AM	(1.9)	-8.1%	1.0	1.7%	Same	No
				PM	1,398	13.7	61.0	B				PM	1,216	12.4	62.0	B	PM	(1.3)	-9.5%	1.0	1.6%	Same	No
	Between Off-Ramp to PGA Blvd EB **and** Off-Ramp to PGA Blvd WB	Basic	N4 - N5	AM	4,570	14.0	70.0	B	**Between** Off-Ramp to PGA Blvd EB **and** Off-Ramp to PGA Blvd WB	Basic	N4 - N5	AM	4,924	15.1	70.0	B	AM	1.1	7.9%	0.0	0.0%	Same	No
				PM	5,416	16.6	70.0	B				PM	5,595	17.2	70.0	B	PM	0.6	3.6%	0.0	0.0%	Same	No
	At Off-Ramp to PGA Blvd. WB	Diverge	N5 - N6	AM	1,160	22.5	55.0	C	**At** Off-Ramp to PGA Blvd. WB	Diverge	N5 - N6	AM	854	22.2	56.0	C	AM	(0.3)	-1.3%	1.0	1.8%	Same	No
				PM	1,018	23.7	55.0	C				PM	833	23.4	56.0	C	PM	(0.3)	-1.3%	1.0	1.8%	Same	No
	Between Off-Ramp to PGA Blvd WB **and** On-ramp from PGA EB & WB	Basic	N6 - N7	AM	3,410	10.5	70.0	A	**Between** Off-Ramp to PGA Blvd WB **and** On-ramp from PGA EB & WB	Basic	N6 - N7	AM	4,070	12.5	70.0	B	AM	2.0	19.0%	0.0	0.0%	Lower	No
				PM	4,398	13.5	70.0	B				PM	4,762	14.6	70.0	B	PM	1.1	8.1%	0.0	0.0%	Same	No
	At On-ramp from PGA EB & WB	Merge	N7 - N8	AM	149	13.1	62.0	B	**Between** On-ramp from PGA EB & WB **and** Off-ramp to Central Blvd/CD Road	Weave	N7 - N8	AM	4,225	12.0	63.8	B	AM	(1.1)	-8.4%	1.8	2.9%	Same	No
				PM	780	20.8	61.0	C				PM	5,503	16.8	59.1	B	PM	(4.0)	-19.2%	(1.9)	-3.1%	Better	No
	Between On-ramp from PGA EB & WB **and** On-ramp from Military Trail NB & SB	Basic	N8 - N9	AM	3,559	10.9	70.0	A	**Between** Off-ramp to Central Blvd/CD Road **and** On-Ramp From Military Trail/CD Road	Basic	N8 - N9	AM	3,110	9.5	70.0	A	AM	(1.4)	-12.8%	0.0	0.0%	Same	No
				PM	5,178	15.9	70.0	B				PM	4,276	13.1	70.0	B	PM	(2.8)	-17.6%	0.0	0.0%	Same	No
	At On-ramp from Military Trail NB & SB	Merge	N9 - N10	AM	116	13.2	62.0	B	**At** On-Ramp From Military Trail/CD Road	Merge	N9 - N10	AM	159	12.4	61.8	B	AM	(0.8)	-6.1%	(0.2)	-0.3%	Same	No
				PM	599	21.0	61.0	C				PM	992	22.2	61.0	C	PM	1.2	5.7%	0.0	0.0%	Same	No
	Between On-ramp from Military Trail NB & SB **and** Off-Ramp from Donald Ross EB & WB	Basic	N10 - N11	AM	3,675	11.3	70.0	B	**Between** On-Ramp From Military Trail/CD Road **and** On-Ramp from Central Boulevard EB & WB	Basic	N10 - N11	AM	3,269	10.0	70.0	A	AM	(1.3)	-11.5%	0.0	0.0%	Better	No
				PM	5,777	17.7	70.0	B				PM	5,268	16.2	70.0	B	PM	(1.5)	-8.5%	0.0	0.0%	Same	No
									CD Road: Between On-Ramp From Military Trail and Off-Ramp to I-95	Weave	NC1 -NC2	AM	1,274	10.4	45.2	A							
												PM	2,219	23.7	34.4	B							
	At Off-Ramp to Donald Ross Road EB & WB	Diverge	N11 - N12	AM	1,273	8.5	60.0	A	**Between** On-Ramp from Central Boulevard and Off-Ramp to Donald Ross Road	Weave	N11 - N12	AM	2,610	10.4	63.0	B	AM	1.9	22.4%	3.0	5.0%	Lower	No
				PM	1,771	15.0	59.0	B				PM	5,655	16.6	61.5	B	PM	1.6	10.7%	2.5	4.2%	Same	No

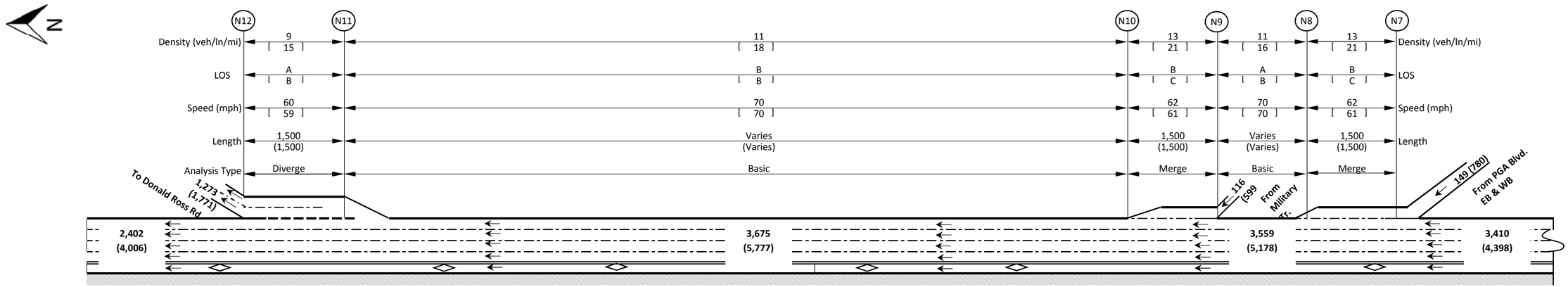
Notes:

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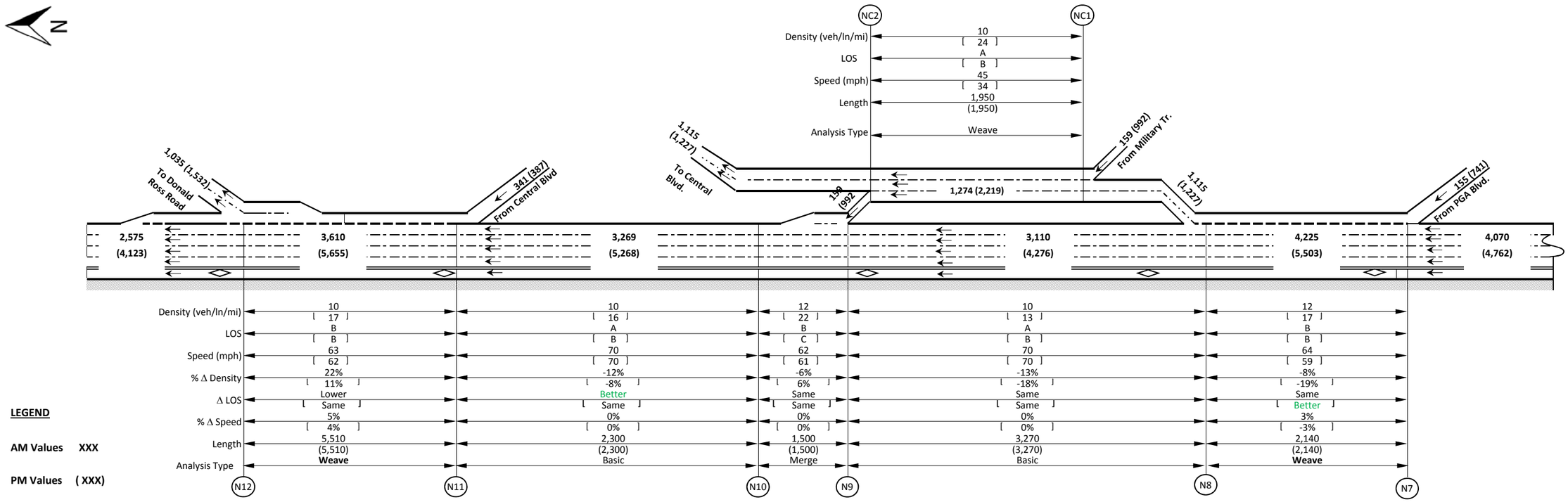
*2. Impacts were considered to be "Significant & Adverse" when comparing the Build Alternate to the No-Build Alternate only if there was a degradation in speed that exceeded -10% **and** the level of service fell below the adopted LOS "D" threshold which is the minimum adopted level of service standard for I-95 within the study area according to Florida Rule 14-94.003 Statewide Minimum Level of Service Standard.*

NORTHBOUND

2030 NO-BUILD



2030 BUILD



LEGEND

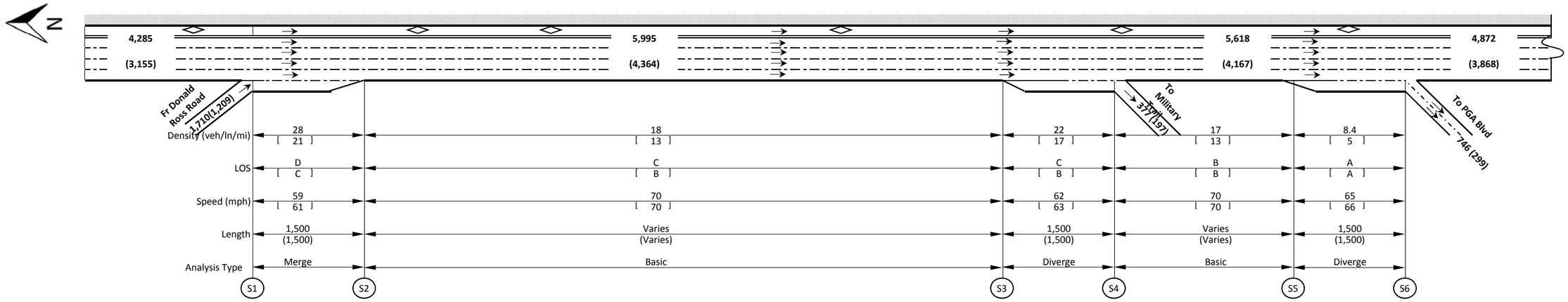
AM Values XXX

PM Values (XXX)

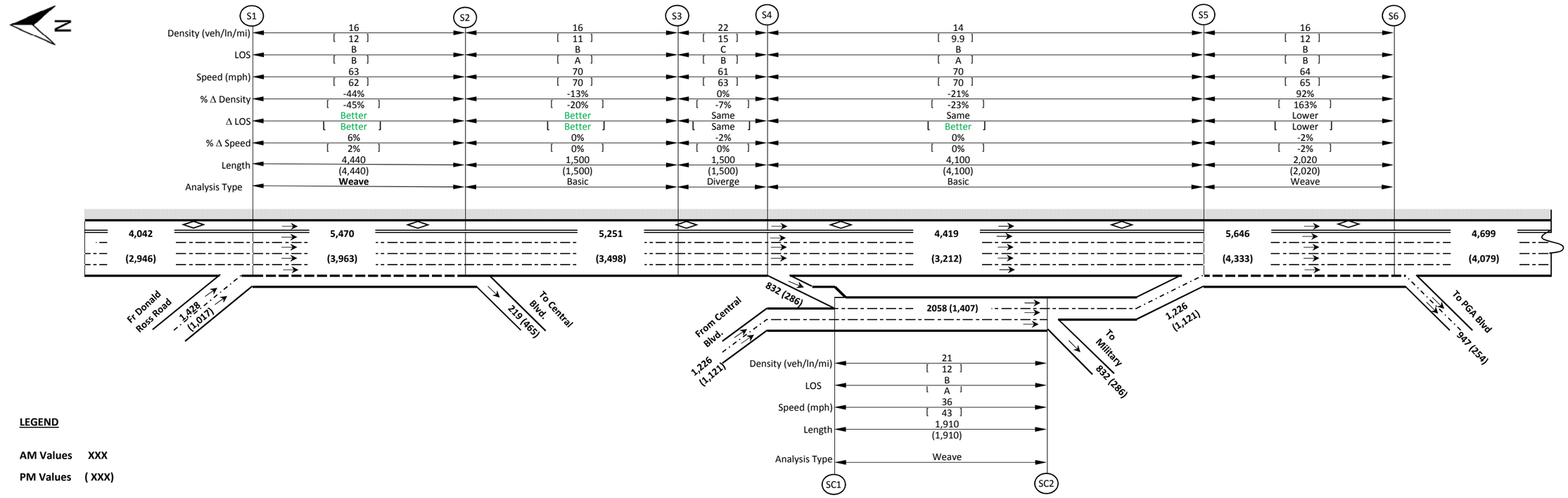
Project Name: SR 9 / I-95 at PGA Boulevard/ Central Boulevard Project Development & Environmental Study FM No. 413265-1-22-01	*Figure Name:* **2030 Freeway Operations Analysis Alternate 2 vs No-Build (Northbound - North Section: PGA Blvd to Donald Ross)**	*Report Title:* **Preliminary Engineering Report**	*Figure No.* *Page No.* *Date:* 05/02/16

SOUTHBOUND

2030 NO-BUILD



2030 BUILD



LEGEND

AM Values XXX

PM Values (XXX)

Project Name: SR 9 / I-95 at PGA Boulevard/ Central Boulevard Project Development & Environmental Study FM No. 413265-1-22-01	*Figure Name:* **2030 Freeway Operations Analysis Alternate 2 vs No-Build (Southbound - North Section: PGA Blvd to Donald Ross)**	*Report Title:* **Preliminary Engineering Report**	*Figure No.* *Page No.* *Date:* 05/02/16

Alternative 2 2040 HCS Analysis

Freeway Operational Assessment - SR 9 (I-95) Between Northlake Boulevard and Donald Ross Road

Direction	2040 NO-BUILD								2040 Build (Alternative 2)								2040 Build Alt. 2 Vs 2040 No-Build						
		Analysis								Analysis								Change in Density		Change in Speed			
	I-95 Segment Description	Type	Limits[1]	Period	DDHV	Density	Speed (MPH)	LOS	I-95 Segment Description	Type	Limits	Period	DDHV	Density	Speed (MPH)	LOS	Peak Period	Δ Value	Δ %[1]	Δ Value	Δ %[1]	Change in LOS?	Significant & Adverse?[2]
SOUTHBOUND	**At** On-Ramp from Donald Ross EB & WB	Merge	S1 - S2	AM	1,858	30.2	58.0	D	**Between** On-Ramp from Donald Ross EB & WB **and** Off-Ramp to Central Boulevard EB & WB	Weave	S1 - S2	AM	5,942	17.3	62.1	B	AM	(12.9)	-42.7%	4.1	7.0%	Better	No
				PM	1,338	22.9	61.0	C				PM	4,385	12.9	61.6	B	PM	(10.0)	-43.7%	0.6	0.0%	Better	No
	Between On-Ramp from Donald Ross EB & WB **and** Off-Ramp to Military Trail SB	Basic	S2 - S3	AM	6,512	20.1	70.0	C	**Between** Off-Ramp to Central Blvd. EB & WB **and** Off-Ramp to Military Trail/CD Road	Basic	S2 - S3	AM	5,702	17.5	70.0	B	AM	(2.6)	-12.9%	0.0	0.0%	Better	No
				PM	4,829	14.8	70.0	B				PM	3,874	11.9	70.0	B	PM	(2.9)	-19.6%	0.0	0.0%	Same	No
	At Off-Ramp to Military Trail SB	Diverge	S3 - S4	AM	410	24.2	62.0	C	**At** Off-Ramp to Military Trail/CD Road	Diverge	S3 - S4	AM	905	24.1	61.0	C	AM	(0.1)	-0.4%	(1.0)	-1.6%	Same	No
				PM	218	18.4	63.0	B				PM	316	15.5	63.0	B	PM	(2.9)	-15.8%	0.0	0.0%	Same	No
	Between Off-Ramp to Military Trail **and** Off-Ramp to PGA Blvd EB & WB	Basic	S4 - S5	AM	6,102	18.8	70.0	C	**Between** Off-Ramp to Military Trail/CD Road **and** On-Ramp from Central Blvd/CD Road	Basic	S4 - S5	AM	4,797	14.7	70.0	B	AM	(4.1)	-21.8%	0.0	0.0%	Better	No
				PM	4,611	14.1	70.0	B				PM	3,558	10.9	70.0	A	PM	(3.2)	-22.7%	0.0	0.0%	Better	No
	At Off-Ramp to PGA Blvd EB & WB	Diverge	S5 - S6	AM	810	9.9	65.0	A	**Between** On-Ramp from Central Blvd/CD Road **and** Off-Ramp from to PGA Blvd EB & WB	Weave	S5 - S6	AM	6,145	17.6	63.1	B	AM	7.7	77.8%	(1.9)	-2.9%	Lower	No
				PM	331	6.1	66.0	A				PM	4,790	13.4	64.3	B	PM	7.3	119.7%	(1.7)	-2.6%	Lower	No
									CD Road: Between On-Ramp to Military Trail and Off-Ramp to Military Trail	Weave	SC1 - SC2	AM	2,253	22.6	35.4	B						
												PM	1,548	12.9	42.8	B							
	Between Off-Ramp to PGA Blvd EB & WB **and** On-Ramp from WB PGA Blvd	Basic	S6 - S7	AM	5,292	16.2	70.0	B	**Between** Off-Ramp to PGA Blvd EB & WB **and** On-Ramp from WB PGA Blvd	Basic	S6 - S7	AM	5,116	15.7	70.0	B	AM	(0.5)	-3.1%	0.0	0.0%	Same	No
				PM	4,280	13.1	70.0	B				PM	4,509	13.8	70.0	B	PM	0.7	5.3%	0.0	0.0%	Same	No
	At On-Ramp from PGA Blvd WB	Merge	S7 - S8	AM	1,467	28.3	59.0	D	**At** On-Ramp from PGA Blvd WB	Merge	S7 - S8	AM	1,351	27.3	59.0	C	AM	(1.0)	-3.5%	0.0	0.0%	Better	No
				PM	2,766	36.6	52.0	E				PM	2,593	35.7	53.0	E	PM	(0.9)	-2.5%	1.0	1.9%	Same	No
	Between On-Ramp from WB PGA Blvd **and** On-Ramp from EB PGA Blvd	Basic	S8 - S9	AM	6,759	20.9	69.0	C	**Between** On-Ramp from WB PGA Blvd **and** On-Ramp from EB PGA Blvd	Basic	S8 - S9	AM	6,467	20.0	70.0	C	AM	(0.9)	-4.3%	1.0	1.4%	Same	No
				PM	7,046	22.0	69.0	C				PM	7,102	22.2	69.0	C	PM	0.2	0.9%	0.0	0.0%	Same	No
	At On-Ramp from PGA Blvd EB	Merge	S9 - S10	AM	1,473	31.4	58.0	D	**At** On-Ramp from PGA Blvd EB	Merge	S9 - S10	AM	1,406	30.2	58.0	D	AM	(1.2)	-3.8%	0.0	0.0%	Same	No
				PM	1,949	35.6	54.0	E				PM	1,733	34.0	56.0	D	PM	(1.6)	-4.5%	2.0	3.7%	Better	No
	Between On-Ramp to PGA Blvd EB **and** Off-Ramp to Northlake Boulevard EB & WB	Basic	S10 - S11	AM	8,232	26.7	66.0	D	**Between** On-Ramp to PGA Blvd EB **and** Off-Ramp to Northlake Boulevard EB & WB	Basic	S10 - S11	AM	7,873	25.2	67.0	C	AM	(1.5)	-5.6%	1.0	1.5%	Better	No
				PM	8,995	30.3	64.0	D				PM	8,835	29.5	64.0	D	PM	(0.8)	-2.6%	0.0	0.0%	Same	No
	At Off-Ramp to Northlake Boulevard EB & WB	Diverge	S11 - S12	AM	1,167	15.1	60.0	B	**At** Off-Ramp to Northlake Boulevard EB & WB	Diverge	S11 - S12	AM	1,282	14.9	60.0	B	AM	(0.2)	-1.3%	0.0	0.0%	Same	No
				PM	1,308	17.3	60.0	B				PM	1,494	18.2	59.0	B	PM	0.9	5.2%	(1.0)	-1.7%	Same	No
NORTHBOUND	**At** On-Ramp from Northlake Boulevard EB & WB	Merge	N1 - N2	AM	1,468	31.0	58.0	D	**At** On-Ramp from Northlake Blvd. EB & WB	Merge	N1 - N2	AM	1,569	31.8	57.0	D	AM	0.8	2.6%	(1.0)	-1.7%	Same	No
				PM	1,796	31.9	57.0	D				PM	1,689	31.3	58.0	D	PM	(0.6)	-1.9%	1.0	1.8%	Same	No
	Between On-Ramp from Northlake Blvd. EB & WB **and** Off-Ramp to PGA Blvd EB	Basic	N2 - N3	AM	8,086	26.0	67.0	D	**Between** On-Ramp from Northlake Blvd. EB & WB **and** Off-Ramp to PGA Blvd EB	Basic	N2 - N3	AM	8,159	26.4	67.0	D	AM	0.4	1.5%	0.0	0.0%	Same	No
				PM	7,438	23.4	68.0	C				PM	7,434	23.4	68.0	C	PM	0.0	0.0%	0.0	0.0%	Same	No
	At Off-Ramp to PGA Blvd. EB	Diverge	N3 - N4	AM	2,996	27.3	57.0	C	**At** Off-Ramp to PGA Blvd. EB	Diverge	N3 - N4	AM	2,674	25.2	58.0	C	AM	(2.1)	-7.7%	1.0	1.8%	Same	No
				PM	1,526	15.8	61.0	B				PM	1,327	14.4	62.0	B	PM	(1.4)	-8.9%	1.0	1.6%	Same	No
	Between Off-Ramp to PGA Blvd EB **and** Off-Ramp to PGA Blvd WB	Basic	N4 - N5	AM	5,090	15.6	70.0	B	**Between** Off-Ramp to PGA Blvd EB **and** Off-Ramp to PGA Blvd WB	Basic	N4 - N5	AM	5,485	16.8	70.0	B	AM	1.2	7.7%	0.0	0.0%	Same	No
				PM	5,912	18.2	70.0	C				PM	6,107	18.8	70.0	C	PM	0.6	3.3%	0.0	0.0%	Same	No
	At Off-Ramp to PGA Blvd. WB	Diverge	N5 - N6	AM	1,292	25.1	54.0	C	**At** Off-Ramp to PGA Blvd. WB	Diverge	N5 - N6	AM	951	23.6	55.0	C	AM	(1.5)	-6.0%	1.0	1.9%	Same	No
				PM	1,111	25.9	55.0	C				PM	909	25.5	56.0	C	PM	(0.4)	-1.5%	1.0	1.8%	Same	No
	Between Off-Ramp to PGA Blvd WB **and** On-ramp from PGA EB & WB	Basic	N6 - N7	AM	3,798	11.7	70.0	B	**Between** Off-Ramp to PGA Blvd WB **and** On-ramp from PGA EB & WB	Basic	N6 - N7	AM	4,534	13.9	70.0	B	AM	2.2	18.8%	0.0	0.0%	Same	No
				PM	4,801	14.7	70.0	B				PM	5,198	15.9	70.0	B	PM	1.2	8.2%	0.0	0.0%	Same	No
	At On-ramp from PGA EB & WB	Merge	N7 - N8	AM	166	14.2	62.0	B	**Between** On-ramp from PGA EB & WB **and** Off-ramp to Central Blvd/CD Road	Weave	N7 - N8	AM	4,707	13.4	63.3	B	AM	(0.8)	-5.6%	1.3	2.1%	Same	No
				PM	852	22.4	61.0	C				PM	6,008	18.6	58.3	B	PM	(3.8)	-17.0%	(2.7)	-4.4%	Better	No
	Between On-ramp from PGA EB & WB **and** On-ramp from Military Trail NB & SB	Basic	N8 - N9	AM	3,964	12.2	70.0	B	**Between** Off-ramp to Central Blvd/CD Road **and** On-Ramp From Military Trail/CD Road	Basic	N8 - N9	AM	3,481	10.7	70.0	A	AM	(1.5)	-12.3%	0.0	0.0%	Better	No
				PM	5,653	17.3	70.0	B				PM	4,660	14.3	70.0	B	PM	(3.0)	-17.3%	0.0	0.0%	Same	No
	At On-ramp from Military Trail NB & SB	Merge	N9 - N10	AM	130	14.4	62.0	B	**At** On-Ramp From Military Trail/CD Road	Merge	N9 - N10	AM	178	13.5	62.0	B	AM	(0.9)	-6.3%	0.0	0.0%	Same	No
				PM	653	22.6	61.0	C				PM	1,082	23.9	60.0	C	PM	1.3	5.8%	(1.0)	-1.6%	Same	No
	Between On-ramp from Military Trail NB & SB **and** Off-Ramp from Donald Ross EB & WB	Basic	N10 - N11	AM	4,094	12.6	70.0	B	**Between** On-Ramp From Military Trail/CD Road **and** On-Ramp from Central Boulevard EB & WB	Basic	N10 - N11	AM	3,659	11.2	70.0	B	AM	(1.4)	-11.1%	0.0	0.0%	Same	No
				PM	6,306	19.4	70.0	C				PM	5,742	17.6	70.0	B	PM	(1.8)	-9.3%	0.0	0.0%	Better	No
									CD Road: Between On-Ramp From Military Trail and Off-Ramp to I-95	Weave	NC1 -NC2	AM	1,404	11.1	44.9	A						
												PM	2,430	25.8	33.5	C							
	At Off-Ramp to Donald Ross Road EB & WB	Diverge	N11 - N12	AM	1,418	9.6	60.0	A	**Between** On-Ramp from Central Boulevard and Off-Ramp to Donald Ross Road	Weave	N11 - N12	AM	4,034	11.7	62.6	B	AM	2.1	21.9%	2.6	4.3%	Lower	No
				PM	1,933	17.2	58.0	B				PM	6,167	18.3	60.9	B	PM	1.1	6.4%	2.9	5.0%	Same	No

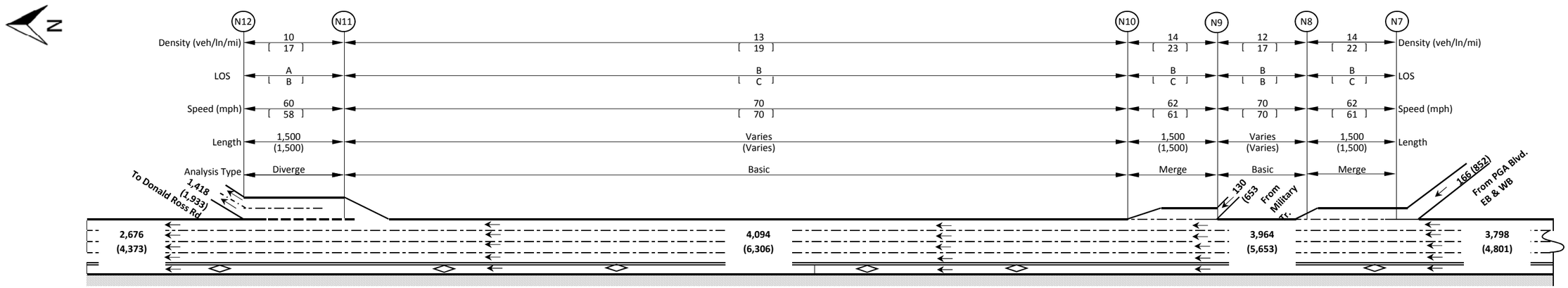
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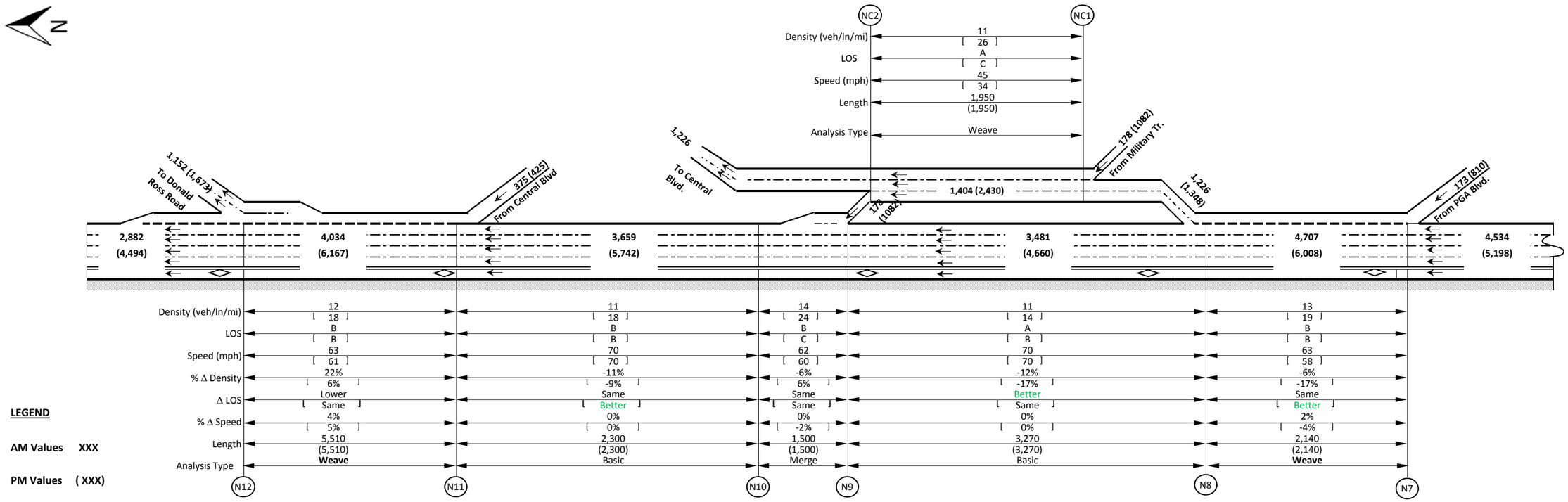
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NORTHBOUND

2040 NO-BUILD



2040 BUILD



LEGEND

AM Values XXX

PM Values (XXX)

Project Name:

SR 9 / I-95 at PGA Boulevard/ Central Boulevard
Project Development & Environmental Study
FM No. 413265-1-22-01

Figure Name:

2040 Freeway Operations Analysis Alternate 2 vs No-Build (Northbound - North Section: PGA Blvd to Donald Ross)

Report Title:

Preliminary Engineering Report

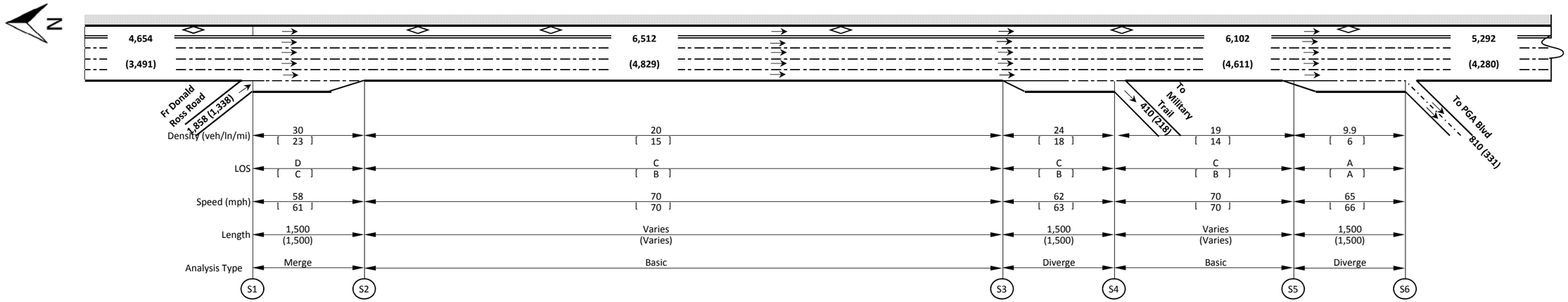
Figure No.

Page No.

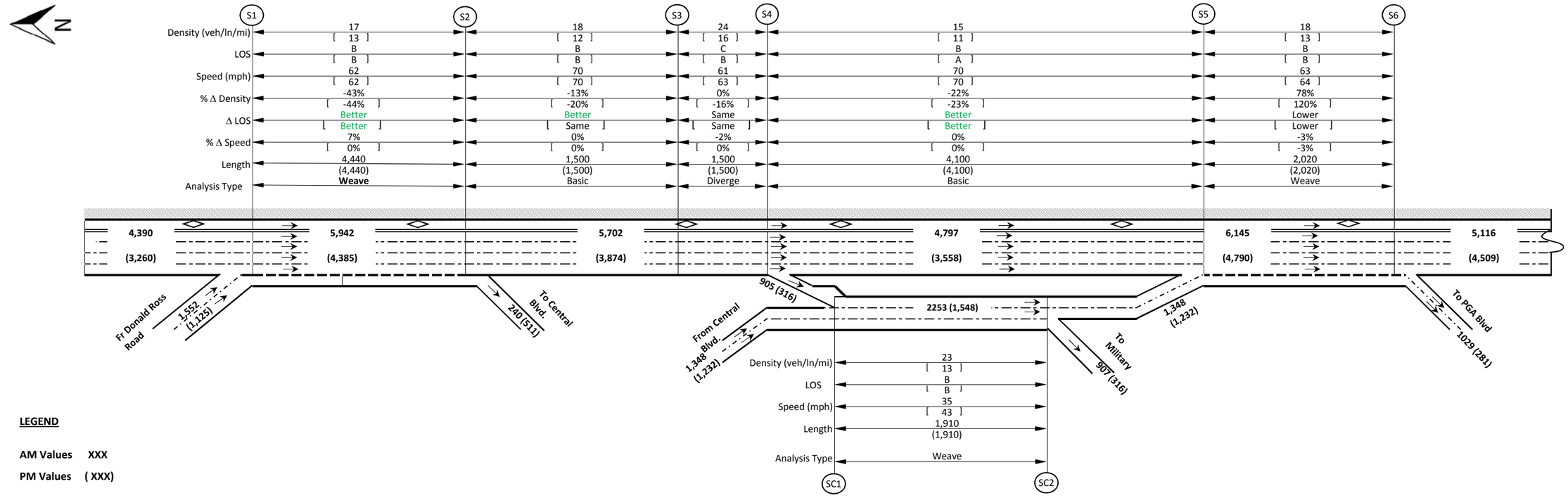
Date: 05/02/16

SOUTHBOUND

2040 NO-BUILD



2040 BUILD



LEGEND

AM Values XXX

PM Values (XXX)

Project Name: SR 9 / I-95 at PGA Boulevard/ Central Boulevard Project Development & Environmental Study FM No. 413265-1-22-01	*Figure Name:* **2040 Freeway Operations Analysis Alternate 2 vs No-Build (Southbound - North Section: PGA Blvd to Donald Ross)**	*Report Title:* **Preliminary Engineering Report**	*Figure No.* *Page No.* *Date:* 05/02/16

Diverging Diamond Interchange Analysis Summary

MEMORANDUM

To: Bing Wang, P.E. / FDOT Project Manager

From: Jose A. Muñoz, P.E. / BCC Project Manager

cc: Anthony Jorges, P.E. / BCC Roadway Engineer
Lorin R.C. Brissett, P.E. / BCC Transportation Engineer

Date: April 29, 2016

Subject: **Diverging Diamond Interchange Concept Assessment**
Project Development & Environmental (PD&E)
SR 9/I-95 at PGA Boulevard/Central Boulevard
Palm Beach Gardens, Florida
FM 413265-1-22-01

Pursuant to the original scope of services for the SR 9 / I-95 at Central Boulevard PD&E Study, BCC Engineering has performed a concept assessment of the feasibility of implementing a diverging diamond Interchange (DDI) configuration for the proposed interchange on I-95 at Central Boulevard.

This memorandum documents the projected traffic operations of a potential DDI at I-95 at Central Boulevard compared to the projected operations from the tight diamond urban interchange (TDUI) configuration currently proposed in the 2015 Interchange Justification Report (IJR). The IJR was approved by the Federal Highway Administration (FHWA) in November 2015. Consistent with the approved 2015 IJR, future conditions for the DDI configuration were analyzed for the year 2040.

Based on the findings of this analysis, a DDI configuration is projected to result in an improvement in operational performance compared to the operations of the tight diamond interchange configuration currently proposed in the approved 2015 IJR. However, the DDI configuration will require additional right-of-way around the interchange as well as the construction of a dual bridge span over I-95 thus more than doubling the interchange cost compared to the TDUI. The remainder of this memorandum documents the details of this assessment including a conclusion and recommended configuration for the proposed I-95 at Central Boulevard Interchange.

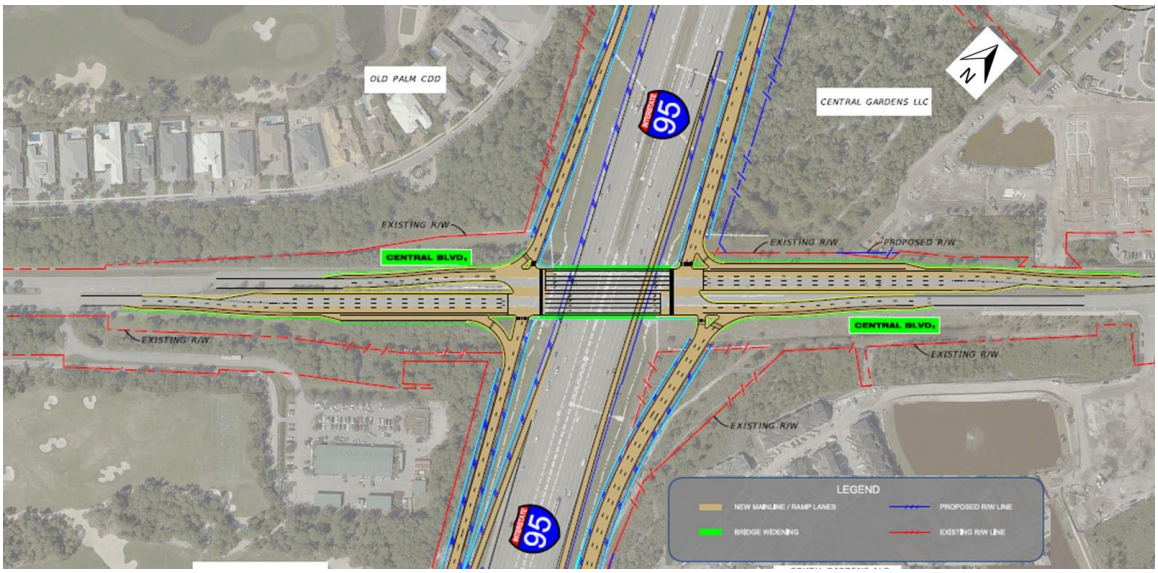
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1.0 REVIEW OF INTERCHANGE CONCEPTS

Tight Diamond Urban Interchange (TDUI)

The approved 2015 IJR contained a Diamond Interchange configuration providing full access to and from I-95 and Central Boulevard. **Figure 1-1** shows the previously approved diamond configuration.

Figure 1-1: Diamond Interchange Configuration – Approved IJR



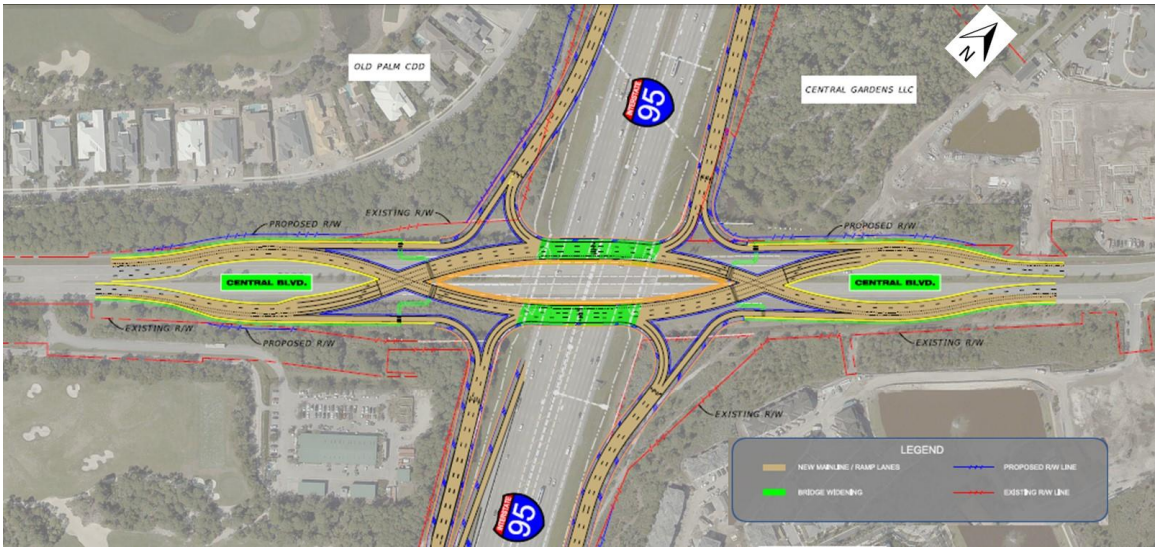
This tight diamond interchange configuration will maintain a grade separation between I-95 and Central Boulevard (i.e. bridge on Central Boulevard over I-95). With travel along I-95 approaching the proposed interchange from either the southbound of northbound direction, the respective off-ramps will diverge slightly from the freeway elevating up to connect with Central Boulevard. Conversely, on-ramps from Central Boulevard will approach and merge with the I-95 freeway mainline at relative narrow angles. The on/off ramp terminals on Central Boulevard are proposed to be signalized and operate in a coordinated manner with each other. This interchange configuration is expected to have the least right-of-way impact. The planning level cost for the TDUI is estimated at approximately $8,400,000.

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Diverging Diamond Interchange (DDI)

As per the project scope, a Diverging Diamond Interchange (DDI) configuration was evaluated for the proposed interchange at I-95 and Central Boulevard in lieu of the aforementioned conventional TDUI configuration. **Figure 1-2** illustrates the DDI concept for the new interchange at I-95 and Central Boulevard.

Figure 1-2: DDI Configuration



The DDI is regarded as an alternative to the conventional diamond interchange that should be considered on interchange construction projects. A DDI differs from a conventional diamond interchange with respect to the design of directional crossovers on either side of the interchange. In a DDI, the directions of traffic on the non-freeway road (such as Central Boulevard) will cross to the opposite side on both sides of the bridge over the freeway. This design is unique in that it would require traffic on the Central Boulevard overpass to drive on the opposite side of the road (i.e. typical direction of travel) for a short duration. This alternative traffic circulation pattern would eliminate the need for left-turning vehicles (from Central Boulevard on to I-95) to cross the paths of approaching through vehicles. By shifting cross street traffic to the left side of the street between the signalized crossover intersections, vehicles on the crossroad making a left turn on to or off of ramps would not conflict with vehicles approaching from the other directions. The proposed DDI concept was designed assuming a 45 mph speed through the interchange. However, relative to the aforementioned tight diamond interchange concept, more right-of-way will be required including the likely need to construct a dual bridge span for Central Boulevard over I-95. The planning level cost for the DDI is estimated at approximately $19,630,000.

2.0 DESIGN HOUR TRAFFIC VOLUMES

The 2040 design hour volume estimates from the approved IJR were used to analyze the change in operations between the Diamond Interchange and DDI concepts.

Figures 2-1 through **2-4** on the following pages**,** show the 2040 build peak hour design hour volumes for the Diamond Interchange and DDI concepts. **Figures 2-1** and **2-2** which depict the AM design hour volumes for the Diamond Interchange and DDI concept, respectively. The volumes depicted in **Figures 2-3** and **2-4**, depict the PM design hour volumes for the Diamond Interchange and DDI concept, respectively.

Figure 3-1: Diamond Interchange Concept 2040 Build AM Peak Hour

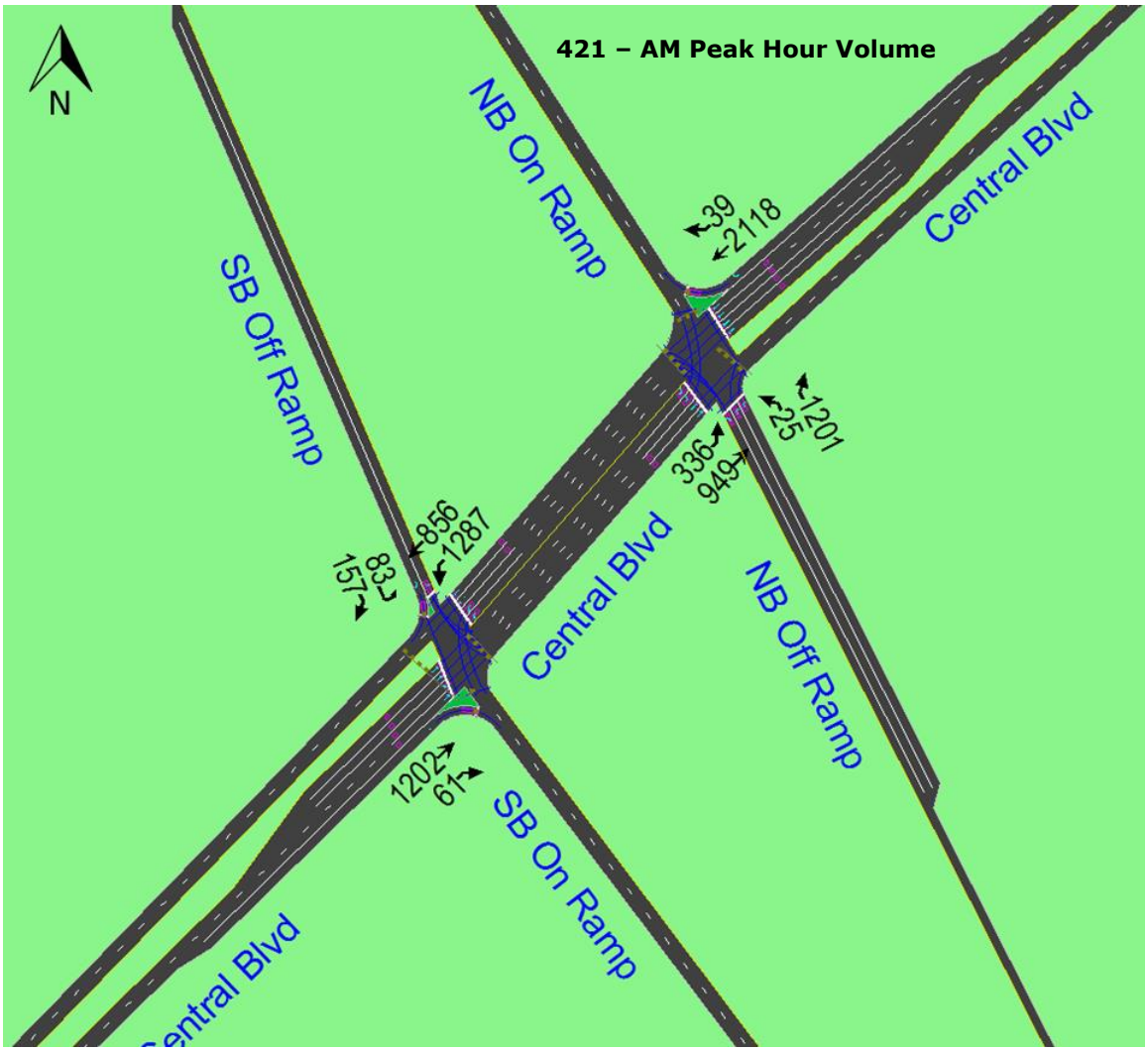
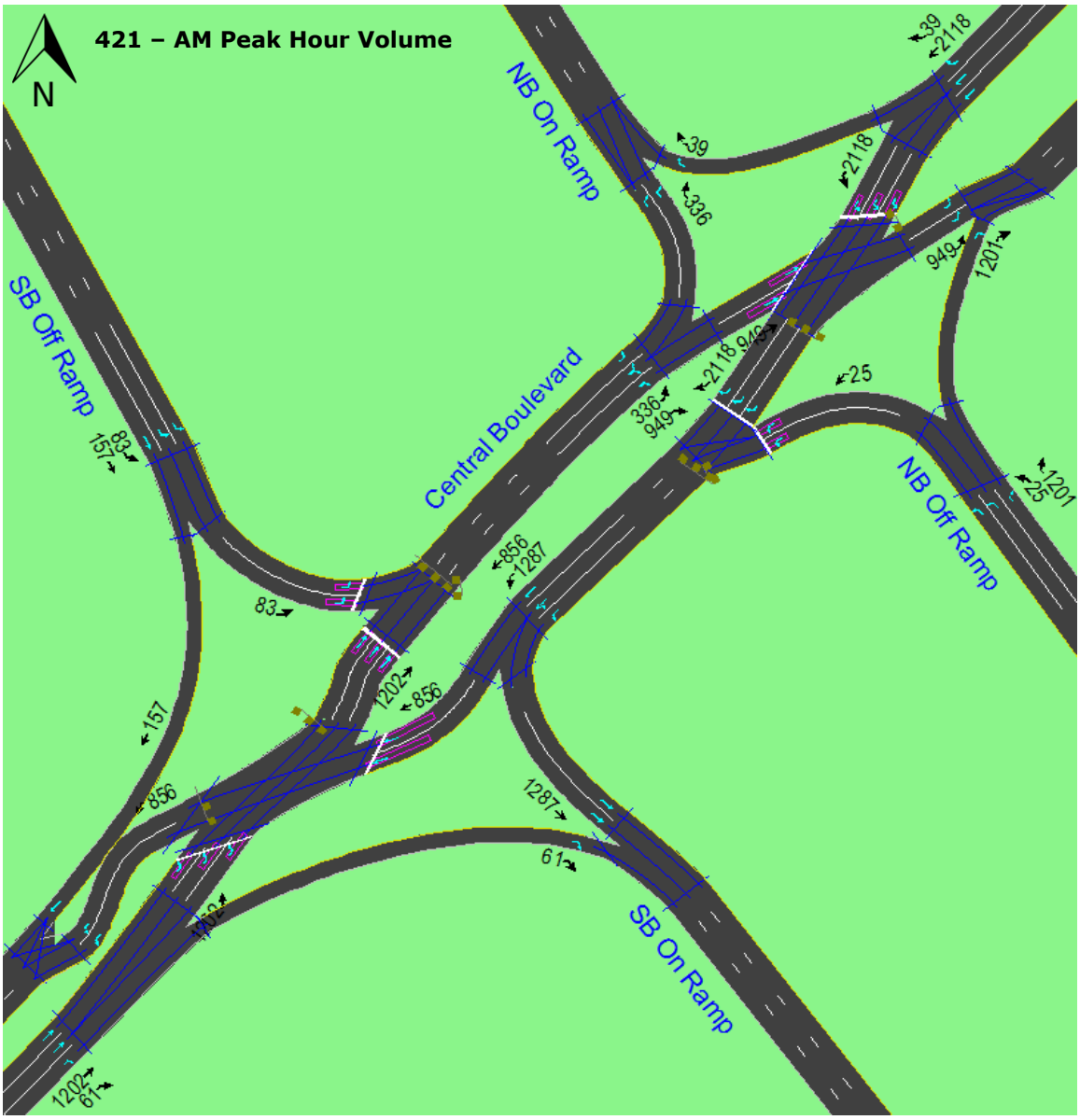
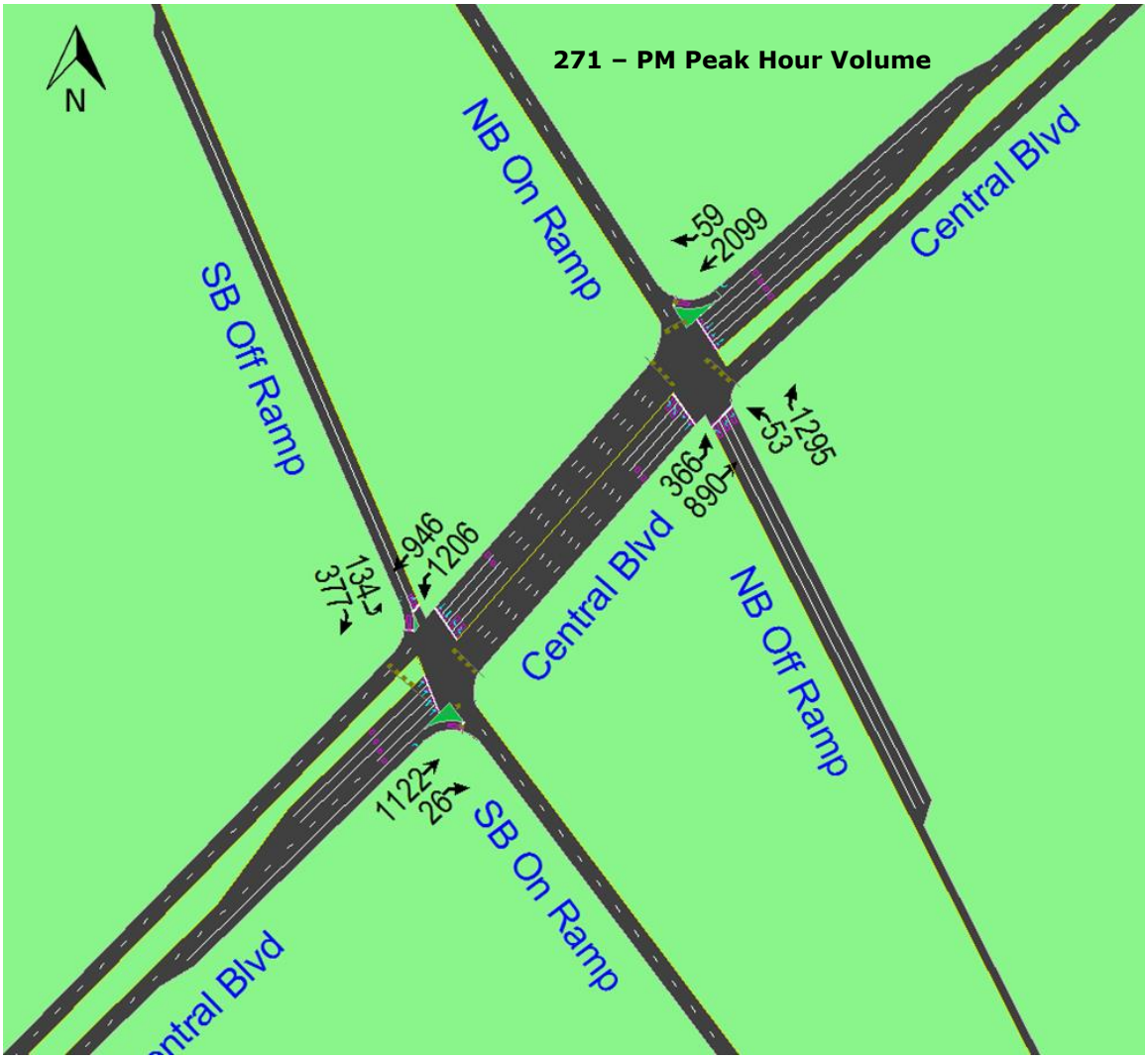


Figure 3-2: DDI Concept 2040 Build AM Peak Hour Volume



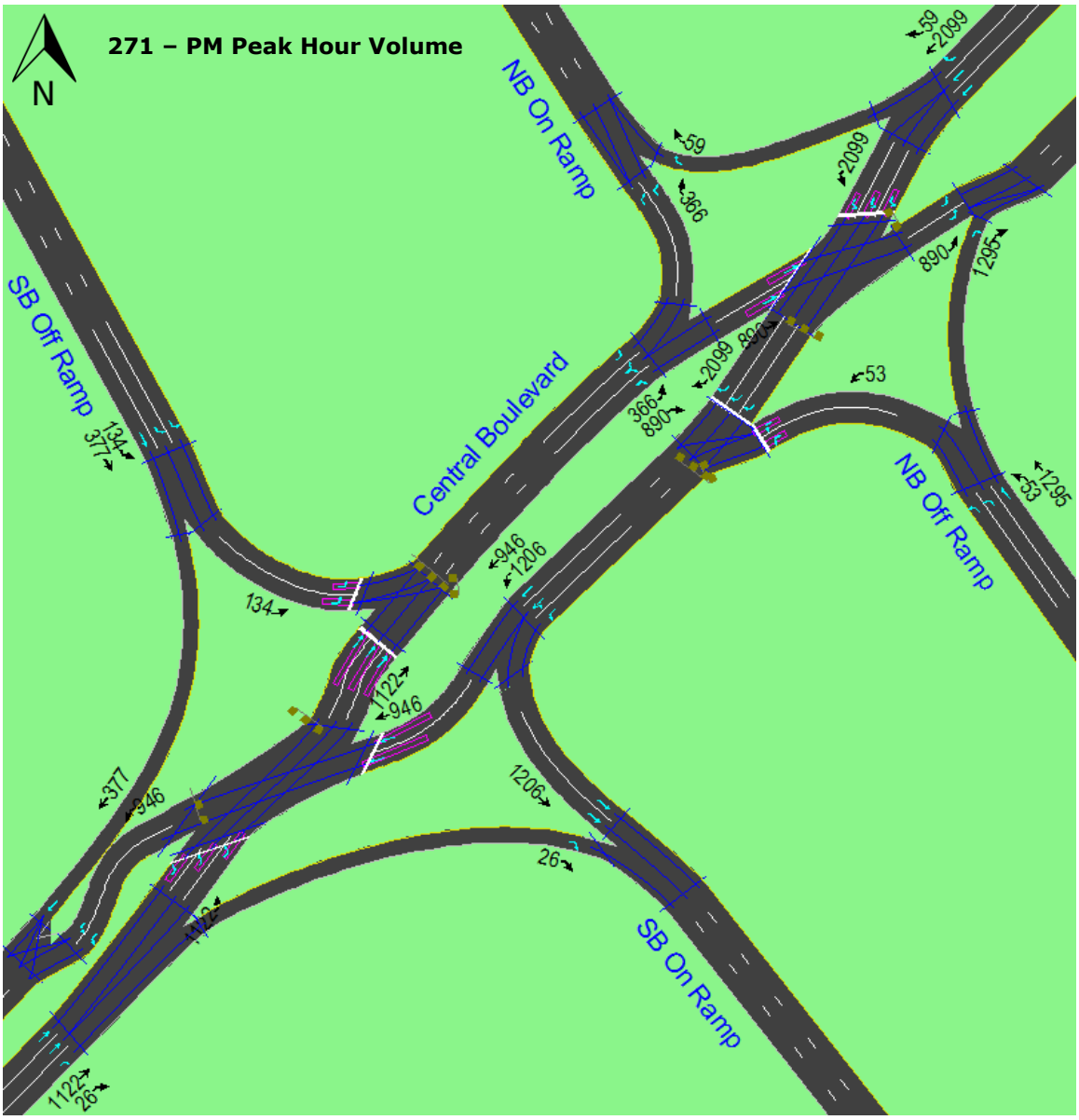
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Figure 3-3: Diamond Interchange Concept 2040 Build PM Peak Hour



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Figure 3-4: DDI Concept 2040 Build PM Peak Hour Volume



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3.0 OPERATIONAL ANALYSIS

Operational analyses were performed at the proposed signalized I-95 ramp terminals on Central Boulevard. The analyses of the signalized I-95 ramp terminals on Central Boulevard were conducted using the *SYNCHRO 8* software. The operational analysis utilized the design hour traffic estimates presented in **Figures 3-1** through **3-4**.

The primary Measures of Effectiveness (MOEs) used to assess the relative performance of the intersection ramp terminals at the Central Boulevard interchange were total intersection delay in seconds per vehicle and Level of Service (LOS) on a scale of 'A' to 'F' where LOS 'A' represents the best LOS that can be achieved and 'F' being the worst LOS attainable.

The signal timings at the proposed signalized intersections were optimized to accommodate the projected demand and traffic circulation for the Diamond Interchange and DDI configurations, respectively. **Table 3-1** below, presents a summary of the intersection operational analysis for the ramp terminals.

Table 3-1: Operational Analysis Summary – Central Blvd.Ramp

	Tight Diamond MOEs[1]						Diverging Diamond Interchange (DDI) MOEs[2]						DDI vs Tight Diamond	
		By Intersection			Overall Interchange			By Intersection			Overall Interchange			
Peak Period	Intersection	Volume[3] (veh/hr)	Delay (s/veh)	LOS	Delay (s/veh)[4]	LOS	Intersection	Volume[3] (veh/hr)	Delay (s/veh)	LOS	Delay (s/veh)[4]	LOS	% Δ Delay	Δ LOS
AM PEAK PERIOD	I-95 SB Ramps	3646	22.8	C	26.8	C	Central Blvd West	2058	16.1	B	24.7	C	-7.8%	Same
							SB Off Ramp NE Bound	1285	6.3	A				
	I-95 NB Ramps	4668	30.0	C			NB Off Ramp SW Bound	2143	51.6	D				
							Central Blvd East	3067	19.4	C				
PM PEAK PERIOD	I-95 SB Ramps	3811	18.0	B	26.4	C	Central Blvd West	2068	15.0	B	16.2	B	-38.6%	Better
							SB Off Ramp NE Bound	1256	5.5	A				
	I-95 NB Ramps	4762	33.2	C			NB Off Ramp SW Bound	2152	21.1	C				
							Central Blvd East	2989	18.1	B				

Notes:

1. Cycle Lengths for Tight Diamond Interchange at all intersections: AM Peak period - 100 sec, PM Peak period - 90 sec.

2. Cycle lengths for Diverging Diamond Interchange for both AM and PM Peak periods at all intersections - 50 sec.

3. Total volume on signalized approaches.

4. Represents weighted average delay calculation based on total approach volumes at signalized intersections.

As can be seen from **Table 3-1**, with the DDI configuration, the average future traffic delay at the proposed I-95 at Central Boulevard Interchange are projected to improve compared to the projected operations at the subject intersection considering the Diamond Interchange configuration for both peak periods. The SYNCHRO output MOE reports are included in **Attachment "A".**

4.0 COMPARISON SUMMARY OF DDI VERSUS TDUI

Further comparisons of the DDI configuration to the TDUI configuration were made in order to assess the relative advantages and disadvantages considering the two interchange concepts for the project location as follows:

Tight Diamond Urban Interchange (TDUI):

- Less capacity but operates satisfactorily with the projected design year demand with adequate reserve capacity.
- Traditional configuration more familiar to drivers.
- Traditional pedestrian and bicycle movements.
- More conflict points including 26 versus 14 (for the DDI).
- Relatively lower cost.
- Less Right-of-way impacts
- More accepted by the public.

Diverging Diamond Interchange (DDI):

- Can accommodate higher turning movement volumes (particularly left turns).
- Better traffic operations compared to the TDUI.
- Non-Traditional pedestrian and bicycle movements.
- Less conflict points including 14 versus 26 (for the TDUI).
- Relatively higher cost.
- More Right-of-way impacts
- General public is not as familiar with the operations of this interchange configuration.

5.0 CONCLUSION & RECOMMENDATION

A Diverging Diamond Interchange (DDI) configuration for the proposed interchange at I-95 and Central Boulevard is projected to perform better from a traffic operations perspective compared to a conventional diamond interchange in future years. However, a DDI configuration would likely require more right-of-way as well as a dual bridge span construction to provide the geometry necessary for the comparatively better operations.

Given that the Tight Urban Diamond Interchange is projected to operate satisfactorily through the design year (with additional capacity to spare) at significantly lower cost and potential right-of-way impacts compared to the DDI, the TDUI interchange concept is the recommend alternative for further design and ultimate construction in the I-95 at Central Boulevard Interchange PD&E Study.

JM/lrcb

Attachments

- Synchro Outputs

2040 SYNCHRO OUPUTS

(Diamond Interchange – Excerpt from IJR)

AM PEAK

Build Alternative 2040 AM

29: Central Blvd & SB On Ramp & SB Off Ramp Corridor: Central Boulevard

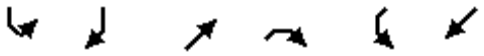


Movement	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Volume (vph)	83	0	157	0	0	0	1202	61	1287	856	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0				4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00				0.86	1.00	0.97	0.95	
Frt	1.00		0.85				1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770		1583				6408	1583	3433	3539	
Flt Permitted	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770		1583				6408	1583	3433	3539	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	87	0	165	0	0	0	1265	64	1355	901	0
RTOR Reduction (vph)	0	0	50	0	0	0	0	44	0	0	0
Lane Group Flow (vph)	87	0	115	0	0	0	1265	20	1355	901	0
Turn Type	Prot		custom				NA	Prot	Prot	NA	
Protected Phases	1		1				2 4	2 4	3	3 4	
Permitted Phases			3 4								
Actuated Green, G (s)	9.4		69.4				30.6	30.6	44.0	60.0	
Effective Green, g (s)	9.4		69.4				30.6	30.6	44.0	60.0	
Actuated g/C Ratio	0.09		0.69				0.31	0.31	0.44	0.60	
Clearance Time (s)	4.0		4.0						4.0		
Vehicle Extension (s)	3.0		3.0						3.0		
Lane Grp Cap (vph)	166		1161				1960	484	1510	2123	
v/s Ratio Prot	c0.05		0.01				c0.20	0.01	c0.39	0.25	
v/s Ratio Perm			0.06								
v/c Ratio	0.52		0.10				0.65	0.04	0.90	0.42	
Uniform Delay, d1	43.2		5.0				30.0	24.4	25.9	10.7	
Progression Factor	1.00		1.00				1.00	1.00	0.89	0.26	
Incremental Delay, d2	3.0		0.0				0.7	0.0	6.0	0.1	
Delay (s)	46.1		5.1				30.7	24.4	29.2	2.9	
Level of Service	D		A				C	C	C	A	
Approach Delay (s)		19.2		0.0			30.4			18.7	
Approach LOS		B		A			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Build Alternative 2040 AM

29: Central Blvd & SB On Ramp & SB Off Ramp Corridor: Central Boulevard



Lane Group	SBL2	SBR	NET	NER	SWL	SWT
Lane Group Flow (vph)	87	165	1265	64	1355	901
v/c Ratio	0.52	0.11	0.65	0.10	0.90	0.42
Control Delay	54.2	0.2	22.0	0.3	29.9	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	54.2	0.2	22.0	0.3	29.9	3.3
Queue Length 50th (ft)	53	0	146	0	198	26
Queue Length 95th (ft)	102	0	174	0	#299	32
Internal Link Dist (ft)			967			394
Turn Bay Length (ft)		800		450	190	
Base Capacity (vph)	194	1460	1959	612	1510	2123
Starvation Cap Reductn	0	0	0	0	0	269
Spillback Cap Reductn	0	0	20	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.11	0.65	0.10	0.90	0.49

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Build Alternative 2040 AM

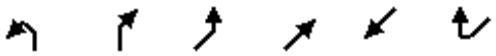
24: Central Blvd & NB Off Ramp/NB On Ramp Corridor: Central Boulevard

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	25	0	1201	0	0	0	336	949	0	0	2118	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0				4.0	4.0			4.0	4.0
Lane Util. Factor	1.00		0.88				0.97	0.95			0.86	1.00
Frt	1.00		0.85				1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		2787				3433	3539			6408	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		2787				3433	3539			6408	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	0	1264	0	0	0	354	999	0	0	2229	41
RTOR Reduction (vph)	0	0	196	0	0	0	0	0	0	0	0	22
Lane Group Flow (vph)	26	0	1068	0	0	0	354	999	0	0	2229	19
Turn Type	Prot		custom				Prot	NA			NA	Prot
Protected Phases	6		6 11				5 7	13			8	8
Permitted Phases												
Actuated Green, G (s)	22.0		45.6				15.4	36.4			46.6	46.6
Effective Green, g (s)	22.0		45.6				15.4	36.4			46.6	46.6
Actuated g/C Ratio	0.22		0.46				0.15	0.36			0.47	0.47
Clearance Time (s)	4.0							4.0			4.0	4.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	389		1270				528	1288			2986	737
v/s Ratio Prot	0.01		c0.38				c0.10	c0.28			c0.35	0.01
v/s Ratio Perm												
v/c Ratio	0.07		0.84				0.67	0.78			0.75	0.03
Uniform Delay, d1	30.9		24.0				39.9	28.2			21.9	14.4
Progression Factor	1.00		1.00				0.43	1.68			1.00	1.00
Incremental Delay, d2	0.1		5.2				2.6	2.3			1.7	0.1
Delay (s)	30.9		29.2				19.7	49.6			23.6	14.5
Level of Service	C		C				B	D			C	B
Approach Delay (s)		29.2			0.0			41.7			23.4	
Approach LOS		C			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	30.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Build Alternative 2040 AM

24: Central Blvd & NB Off Ramp/NB On Ramp Corridor: Central Boulevard



Lane Group	NBL	NBR	NEL	NET	SWT	SWR
Lane Group Flow (vph)	26	1264	354	999	2229	41
v/c Ratio	0.07	0.86	0.67	0.78	0.75	0.05
Control Delay	31.6	23.6	15.5	52.9	24.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.6	23.6	15.5	52.9	24.1	0.1
Queue Length 50th (ft)	13	284	48	303	328	0
Queue Length 95th (ft)	35	378	97	#368	386	0
Internal Link Dist (ft)				394	829	
Turn Bay Length (ft)		550	160			450
Base Capacity (vph)	389	1574	583	1287	2983	813
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	14	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.80	0.61	0.78	0.75	0.05

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

PM PEAK

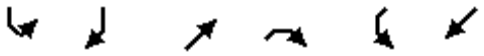
Build Alternative 2040 PM

29: Central Blvd & SB On Ramp & SB Off Ramp Corridor: Central Boulevard

Movement	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Volume (vph)	134	0	377	0	0	0	1122	26	1206	946	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0				4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00				0.86	1.00	0.97	0.95	
Frt	1.00		0.85				1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770		1583				6408	1583	3433	3539	
Flt Permitted	0.95		1.00				1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770		1583				6408	1583	3433	3539	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	141	0	397	0	0	0	1181	27	1269	996	0
RTOR Reduction (vph)	0	0	270	0	0	0	0	19	0	0	0
Lane Group Flow (vph)	141	0	127	0	0	0	1181	8	1269	996	0
Turn Type	Prot		Perm				NA	Prot	Prot	NA	
Protected Phases	1						2 4	2 4	3	3 4	
Permitted Phases			1								
Actuated Green, G (s)	12.9		12.9				28.1	28.1	37.0	49.0	
Effective Green, g (s)	12.9		12.9				28.1	28.1	37.0	49.0	
Actuated g/C Ratio	0.14		0.14				0.31	0.31	0.41	0.54	
Clearance Time (s)	4.0		4.0						4.0		
Vehicle Extension (s)	3.0		3.0						3.0		
Lane Grp Cap (vph)	253		226				2000	494	1411	1926	
v/s Ratio Prot	0.08						c0.18	0.01	c0.37	c0.28	
v/s Ratio Perm			c0.08								
v/c Ratio	0.56		0.56				0.59	0.02	0.90	0.52	
Uniform Delay, d1	35.9		35.9				26.1	21.4	24.8	13.0	
Progression Factor	1.00		1.00				1.00	1.00	0.24	0.29	
Incremental Delay, d2	2.7		3.2				0.5	0.0	6.1	0.1	
Delay (s)	38.5		39.1				26.6	21.4	12.0	4.0	
Level of Service	D		D				C	C	B	A	
Approach Delay (s)		39.0		0.0			26.5			8.4	
Approach LOS		D		A			C			A	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	SBL2	SBR	NET	NER	SWL	SWT
Lane Group Flow (vph)	141	397	1181	27	1269	996
v/c Ratio	0.56	0.80	0.59	0.04	0.90	0.52
Control Delay	43.7	21.5	28.2	0.2	13.2	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	43.7	21.5	28.2	0.2	13.2	4.6
Queue Length 50th (ft)	76	43	161	0	42	33
Queue Length 95th (ft)	127	140	217	0	#90	56
Internal Link Dist (ft)			967			394
Turn Bay Length (ft)		800		450	190	
Base Capacity (vph)	354	568	2003	603	1411	1926
Starvation Cap Reductn	0	0	0	0	0	134
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.70	0.59	0.04	0.90	0.56

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Build Alternative 2040 PM

24: Central Blvd & NB Off Ramp/NB On Ramp Corridor: Central Boulevard

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	53	0	1295	0	0	0	366	890	0	0	2099	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0				4.0	4.0			4.0	4.0
Lane Util. Factor	1.00		0.88				0.97	0.95			0.86	1.00
Frt	1.00		0.85				1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		2787				3433	3539			6408	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		2787				3433	3539			6408	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	56	0	1363	0	0	0	385	937	0	0	2209	62
RTOR Reduction (vph)	0	0	194	0	0	0	0	0	0	0	0	35
Lane Group Flow (vph)	56	0	1169	0	0	0	385	937	0	0	2209	27
Turn Type	Prot		custom				Prot	NA			NA	Prot
Protected Phases	6		6 11				5 7	13			8	8
Permitted Phases												
Actuated Green, G (s)	23.0		40.0				12.0	32.0			39.0	39.0
Effective Green, g (s)	23.0		40.0				12.0	32.0			39.0	39.0
Actuated g/C Ratio	0.26		0.44				0.13	0.36			0.43	0.43
Clearance Time (s)	4.0							4.0			4.0	4.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	452		1238				457	1258			2776	685
v/s Ratio Prot	0.03		c0.42				c0.11	0.26			c0.34	0.02
v/s Ratio Perm												
v/c Ratio	0.12		0.94				0.84	0.74			0.80	0.04
Uniform Delay, d1	25.8		23.9				38.1	25.4			22.1	14.7
Progression Factor	1.00		1.00				1.34	1.34			1.00	1.00
Incremental Delay, d2	0.1		14.2				11.2	2.0			2.5	0.1
Delay (s)	25.9		38.2				62.1	36.0			24.5	14.8
Level of Service	C		D				E	D			C	B
Approach Delay (s)		37.7			0.0			43.6			24.3	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	NBL	NBR	NEL	NET	SWT	SWR
Lane Group Flow (vph)	56	1363	385	937	2209	62
v/c Ratio	0.12	0.95	0.84	0.74	0.80	0.08
Control Delay	26.8	33.7	44.5	37.9	24.7	0.2
Queue Delay	0.0	0.0	0.0	0.3	0.1	0.0
Total Delay	26.8	33.7	44.5	38.2	24.8	0.2
Queue Length 50th (ft)	25	328	108	308	306	0
Queue Length 95th (ft)	55	#514	#140	371	355	0
Internal Link Dist (ft)				394	809	
Turn Bay Length (ft)		550	160			450
Base Capacity (vph)	452	1432	457	1258	2776	775
Starvation Cap Reductn	0	0	0	58	0	0
Spillback Cap Reductn	0	0	0	0	36	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.95	0.84	0.78	0.81	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

2040 SYNCHRO OUPUTS

(Diverging Diamond Interchange)

AM PEAK



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NEL	NER
Lane Configurations										
Volume (vph)	0	0	0	0	856	0	0	0	1202	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0				4.0	
Lane Util. Factor					0.95				0.94	
Frt					1.00				1.00	
Flt Protected					1.00				0.95	
Satd. Flow (prot)					3539				4990	
Flt Permitted					1.00				0.95	
Satd. Flow (perm)					3539				4990	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	930	0	0	0	1307	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	930	0	0	0	1307	0
Turn Type					NA				Prot	
Protected Phases					1				2	
Permitted Phases										
Actuated Green, G (s)					26.0				16.0	
Effective Green, g (s)					26.0				16.0	
Actuated g/C Ratio					0.52				0.32	
Clearance Time (s)					4.0				4.0	
Lane Grp Cap (vph)					1840				1596	
v/s Ratio Prot					c0.26				c0.26	
v/s Ratio Perm										
v/c Ratio					0.51				0.82	
Uniform Delay, d1					7.8				15.7	
Progression Factor					1.20				1.00	
Incremental Delay, d2					0.6				4.8	
Delay (s)					10.0				20.5	
Level of Service					B				C	
Approach Delay (s)		0.0			10.0		0.0		20.5	
Approach LOS		A			B		A		C	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Volume (vph)	83	0	0	1202	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		
Lane Util. Factor	0.97			0.91		
Frt	1.00			1.00		
Flt Protected	0.95			1.00		
Satd. Flow (prot)	3433			5085		
Flt Permitted	0.95			1.00		
Satd. Flow (perm)	3433			5085		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	0	0	1307	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	90	0	0	1307	0	0
Turn Type	Prot			NA		
Protected Phases	1			2		
Permitted Phases						
Actuated Green, G (s)	26.0			16.0		
Effective Green, g (s)	26.0			16.0		
Actuated g/C Ratio	0.52			0.32		
Clearance Time (s)	4.0			4.0		
Lane Grp Cap (vph)	1785			1627		
v/s Ratio Prot	c0.03			c0.26		
v/s Ratio Perm						
v/c Ratio	0.05			0.80		
Uniform Delay, d1	5.9			15.6		
Progression Factor	1.00			0.25		
Incremental Delay, d2	0.1			2.4		
Delay (s)	6.0			6.3		
Level of Service	A			A		
Approach Delay (s)	6.0			6.3	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL	SWR
Lane Configurations										
Volume (vph)	0	949	0	0	0	0	0	0	2118	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0							4.0	
Lane Util. Factor		0.95							0.94	
Frt		1.00							1.00	
Flt Protected		1.00							0.95	
Satd. Flow (prot)		3539							4990	
Flt Permitted		1.00							0.95	
Satd. Flow (perm)		3539							4990	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1032	0	0	0	0	0	0	2302	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1032	0	0	0	0	0	0	2302	0
Turn Type		NA							Prot	
Protected Phases		2							1	
Permitted Phases										
Actuated Green, G (s)		16.0							26.0	
Effective Green, g (s)		16.0							26.0	
Actuated g/C Ratio		0.32							0.52	
Clearance Time (s)		4.0							4.0	
Lane Grp Cap (vph)		1132							2594	
v/s Ratio Prot		c0.29							c0.46	
v/s Ratio Perm										
v/c Ratio		0.91							0.89	
Uniform Delay, d1		16.3							10.7	
Progression Factor		1.17							1.00	
Incremental Delay, d2		8.6							5.0	
Delay (s)		27.6							15.7	
Level of Service		C							B	
Approach Delay (s)		27.6			0.0		0.0		15.7	
Approach LOS		C			A		A		B	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	146.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Volume (vph)	25	0	0	2118	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		
Lane Util. Factor	0.97			0.76		
Frt	1.00			0.85		
Flt Protected	0.95			1.00		
Satd. Flow (prot)	3433			3610		
Flt Permitted	0.95			1.00		
Satd. Flow (perm)	3433			3610		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	0	0	2302	0	0
RTOR Reduction (vph)	0	0	0	862	0	0
Lane Group Flow (vph)	27	0	0	1440	0	0
Turn Type	Prot			Prot		
Protected Phases	6			5		
Permitted Phases						
Actuated Green, G (s)	12.0			30.0		
Effective Green, g (s)	12.0			30.0		
Actuated g/C Ratio	0.24			0.60		
Clearance Time (s)	4.0			4.0		
Lane Grp Cap (vph)	823			2166		
v/s Ratio Prot	c0.01			c0.40		
v/s Ratio Perm						
v/c Ratio	0.03			0.66		
Uniform Delay, d1	14.6			6.7		
Progression Factor	1.00			7.71		
Incremental Delay, d2	0.1			0.7		
Delay (s)	14.6			52.0		
Level of Service	B			D		
Approach Delay (s)	14.6		52.0		0.0	
Approach LOS	B		D		A	

Intersection Summary			
HCM 2000 Control Delay	51.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	130.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

PM PEAK



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NEL	NER
Lane Configurations										
Volume (vph)	0	0	0	0	946	0	0	0	1122	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0				4.0	
Lane Util. Factor					0.95				0.94	
Frt					1.00				1.00	
Flt Protected					1.00				0.95	
Satd. Flow (prot)					3539				4990	
Flt Permitted					1.00				0.95	
Satd. Flow (perm)					3539				4990	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1028	0	0	0	1220	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1028	0	0	0	1220	0
Turn Type					NA				Prot	
Protected Phases					1				2	
Permitted Phases										
Actuated Green, G (s)					26.0				16.0	
Effective Green, g (s)					26.0				16.0	
Actuated g/C Ratio					0.52				0.32	
Clearance Time (s)					4.0				4.0	
Lane Grp Cap (vph)					1840				1596	
v/s Ratio Prot					c0.29				c0.24	
v/s Ratio Perm										
v/c Ratio					0.56				0.76	
Uniform Delay, d1					8.1				15.3	
Progression Factor					1.19				1.00	
Incremental Delay, d2					0.8				3.5	
Delay (s)					10.4				18.8	
Level of Service					B				B	
Approach Delay (s)		0.0			10.4		0.0		18.8	
Approach LOS		A			B		A		B	

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Volume (vph)	134	0	0	1122	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		
Lane Util. Factor	0.97			0.91		
Frt	1.00			1.00		
Flt Protected	0.95			1.00		
Satd. Flow (prot)	3433			5085		
Flt Permitted	0.95			1.00		
Satd. Flow (perm)	3433			5085		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	146	0	0	1220	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	146	0	0	1220	0	0
Turn Type	Prot			NA		
Protected Phases	1			2		
Permitted Phases						
Actuated Green, G (s)	26.0			16.0		
Effective Green, g (s)	26.0			16.0		
Actuated g/C Ratio	0.52			0.32		
Clearance Time (s)	4.0			4.0		
Lane Grp Cap (vph)	1785			1627		
v/s Ratio Prot	c0.04			c0.24		
v/s Ratio Perm						
v/c Ratio	0.08			0.75		
Uniform Delay, d1	6.0			15.2		
Progression Factor	1.00			0.23		
Incremental Delay, d2	0.1			2.0		
Delay (s)	6.1			5.5		
Level of Service	A			A		
Approach Delay (s)	6.1			5.5	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL	SWR
Lane Configurations										
Volume (vph)	0	890	0	0	0	0	0	0	2099	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0							4.0	
Lane Util. Factor		0.95							0.94	
Frt		1.00							1.00	
Flt Protected		1.00							0.95	
Satd. Flow (prot)		3539							4990	
Flt Permitted		1.00							0.95	
Satd. Flow (perm)		3539							4990	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	967	0	0	0	0	0	0	2282	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	967	0	0	0	0	0	0	2282	0
Turn Type		NA							Prot	
Protected Phases		2							1	
Permitted Phases										
Actuated Green, G (s)		16.0							26.0	
Effective Green, g (s)		16.0							26.0	
Actuated g/C Ratio		0.32							0.52	
Clearance Time (s)		4.0							4.0	
Lane Grp Cap (vph)		1132							2594	
v/s Ratio Prot		c0.27							c0.46	
v/s Ratio Perm										
v/c Ratio		0.85							0.88	
Uniform Delay, d1		15.9							10.6	
Progression Factor		1.16							1.00	
Incremental Delay, d2		6.2							4.7	
Delay (s)		24.6							15.3	
Level of Service		C							B	
Approach Delay (s)		24.6			0.0		0.0		15.3	
Approach LOS		C			A		A		B	

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	150.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



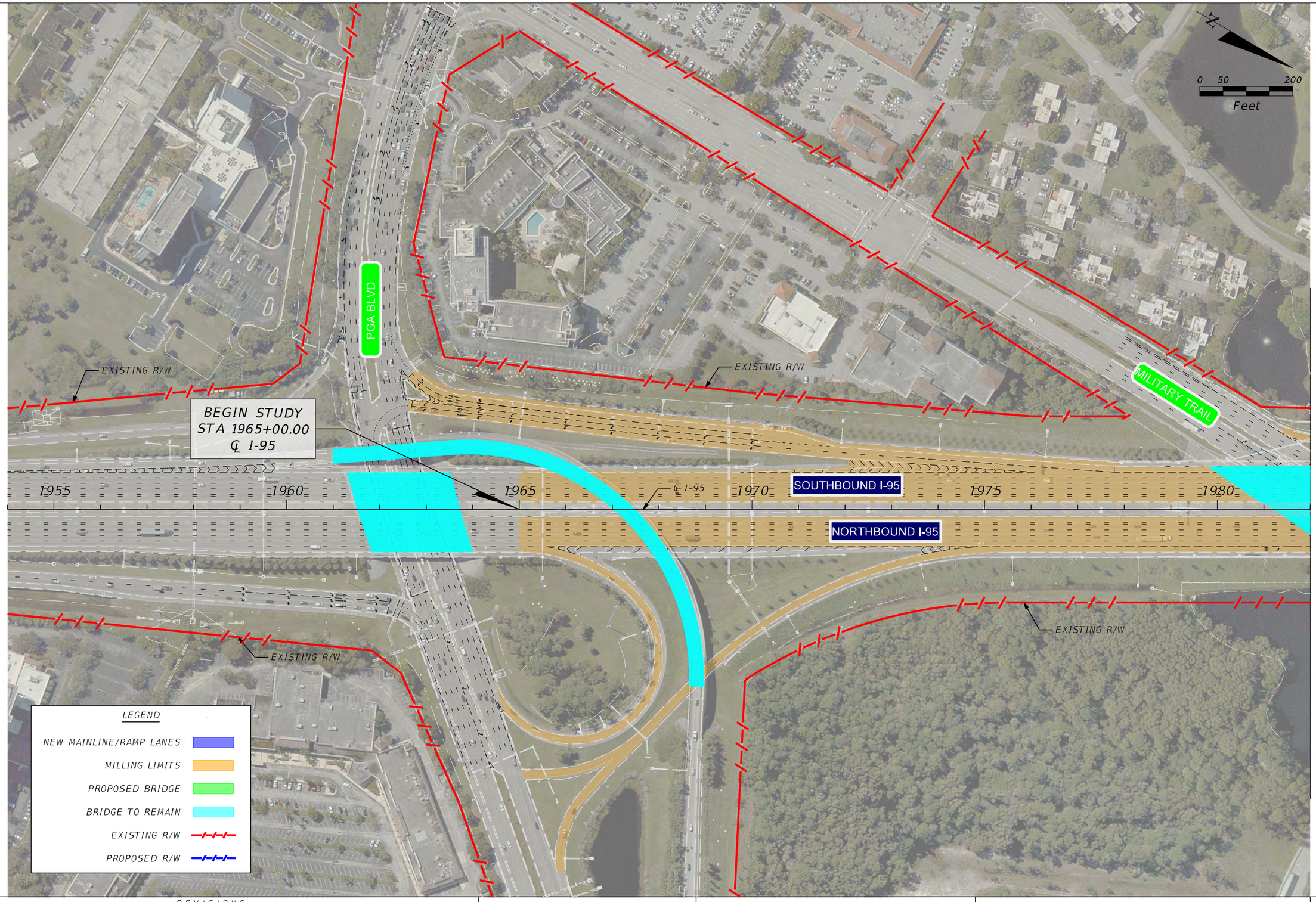
Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Volume (vph)	53	0	0	2099	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		
Lane Util. Factor	0.97			0.76		
Frt	1.00			0.85		
Flt Protected	0.95			1.00		
Satd. Flow (prot)	3433			3610		
Flt Permitted	0.95			1.00		
Satd. Flow (perm)	3433			3610		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	58	0	0	2282	0	0
RTOR Reduction (vph)	0	0	0	619	0	0
Lane Group Flow (vph)	58	0	0	1663	0	0
Turn Type	Prot			Prot		
Protected Phases	6			5		
Permitted Phases						
Actuated Green, G (s)	10.0			32.0		
Effective Green, g (s)	10.0			32.0		
Actuated g/C Ratio	0.20			0.64		
Clearance Time (s)	4.0			4.0		
Lane Grp Cap (vph)	686			2310		
v/s Ratio Prot	c0.02			c0.46		
v/s Ratio Perm						
v/c Ratio	0.08			0.72		
Uniform Delay, d1	16.3			6.0		
Progression Factor	1.00			3.39		
Incremental Delay, d2	0.2			0.9		
Delay (s)	16.5			21.2		
Level of Service	B			C		
Approach Delay (s)	16.5		21.2		0.0	
Approach LOS	B		C		A	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	123.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX B

ALTERNATIVE CONCEPT PLANS AND PROFILES



REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

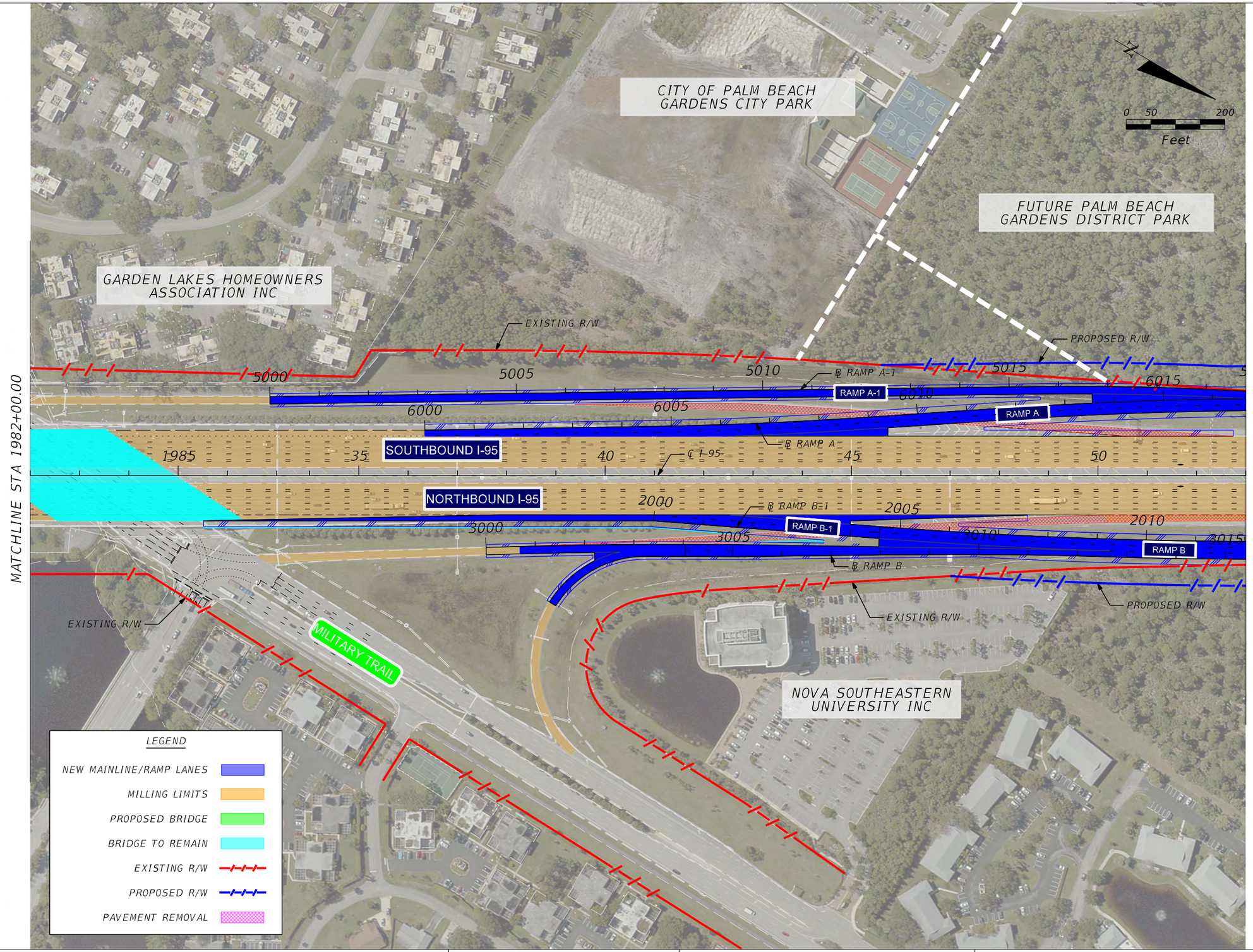
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 2)

SHEET NO. 1

mbrloso 6/15/2016 8:58:42 AM H:\CADD\413265\2201\roadway\planrd05-bcc-ALT2.dgn



REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 2)

SHEET NO. 2

mbrloso 6/15/2016 8:58:53 AM H:\CADD\413265122O1\roadway\planrd06-bcc-ALT2.dgn

FUTURE PALM BEACH GARDENS DISTRICT PARK

OLD PALM GOLF CLUB INC

PALOMA HOA INC

SOUTH GARDENS LLC

N

0 50 200

Feet

MATCHLINE STA 53+00.00

MATCHLINE STA 80+80.00

PROPOSED R/W

EXISTING R/W

℄ RAMP A

RAMP A

6020 6025 6030 6035 6040

7000 7005 7010

RAMP A-2

℄ RAMP A-2

55 60 65 70 75 80

SOUTHBOUND I-95

℄ I-95

NORTHBOUND I-95

4000 4005 4010

℄ RAMP B-2

RAMP B-2

3020 3025 3030 3035 3040

RAMP B

℄ RAMP B

EXISTING R/W

PROPOSED R/W

LEGEND

- NEW MAINLINE/RAMP LANES
- MILLING LIMITS
- PROPOSED BRIDGE
- BRIDGE TO REMAIN
- EXISTING R/W
- PROPOSED R/W
- PAVEMENT REMOVAL

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

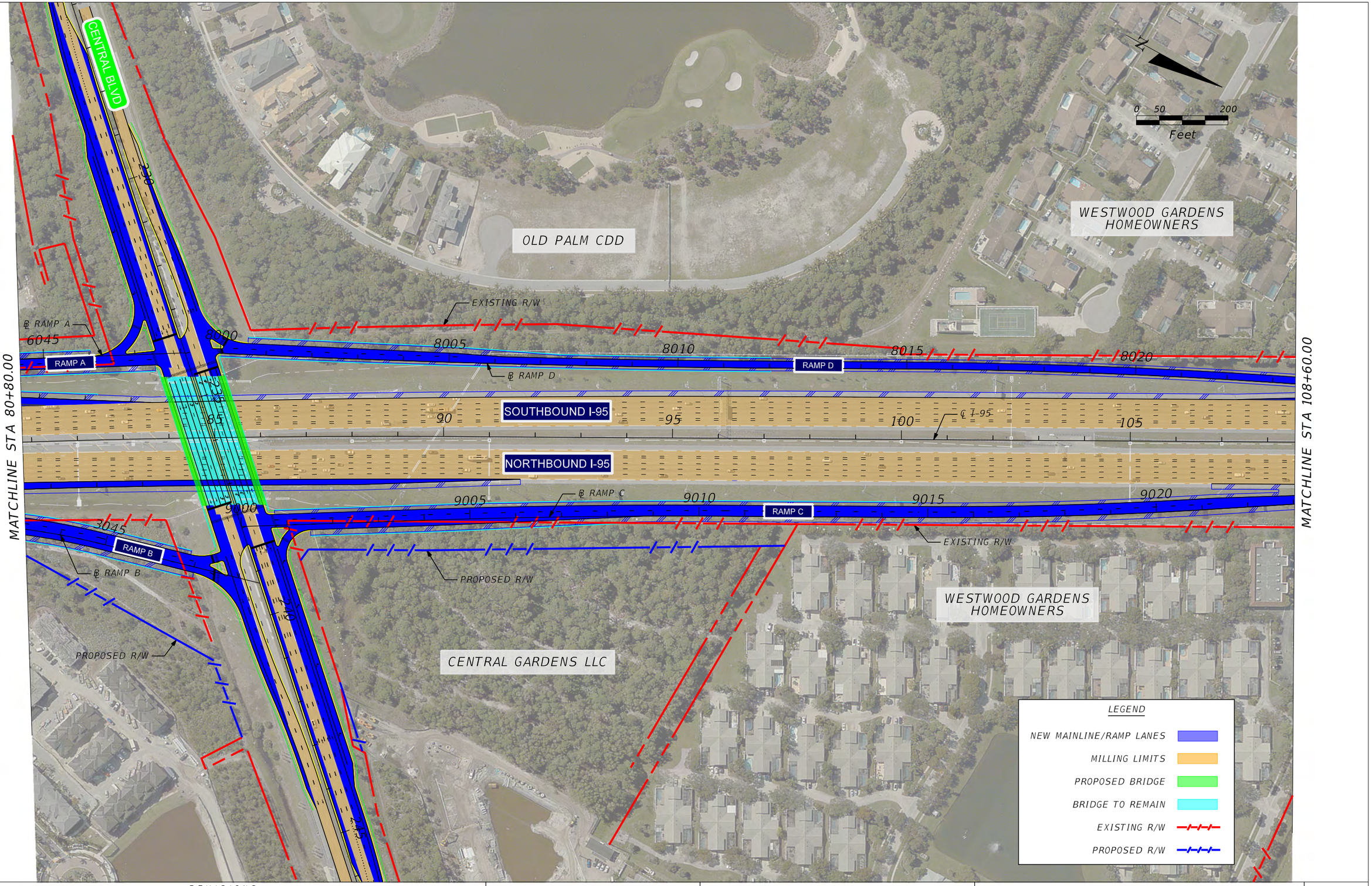
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 2)

SHEET NO. 3

mbrloso 6/15/2016 8:59:04 AM H:\CADD\413265122001\roadway\planrd07-bcc-ALT2.dgn



REVISIONS					
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SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

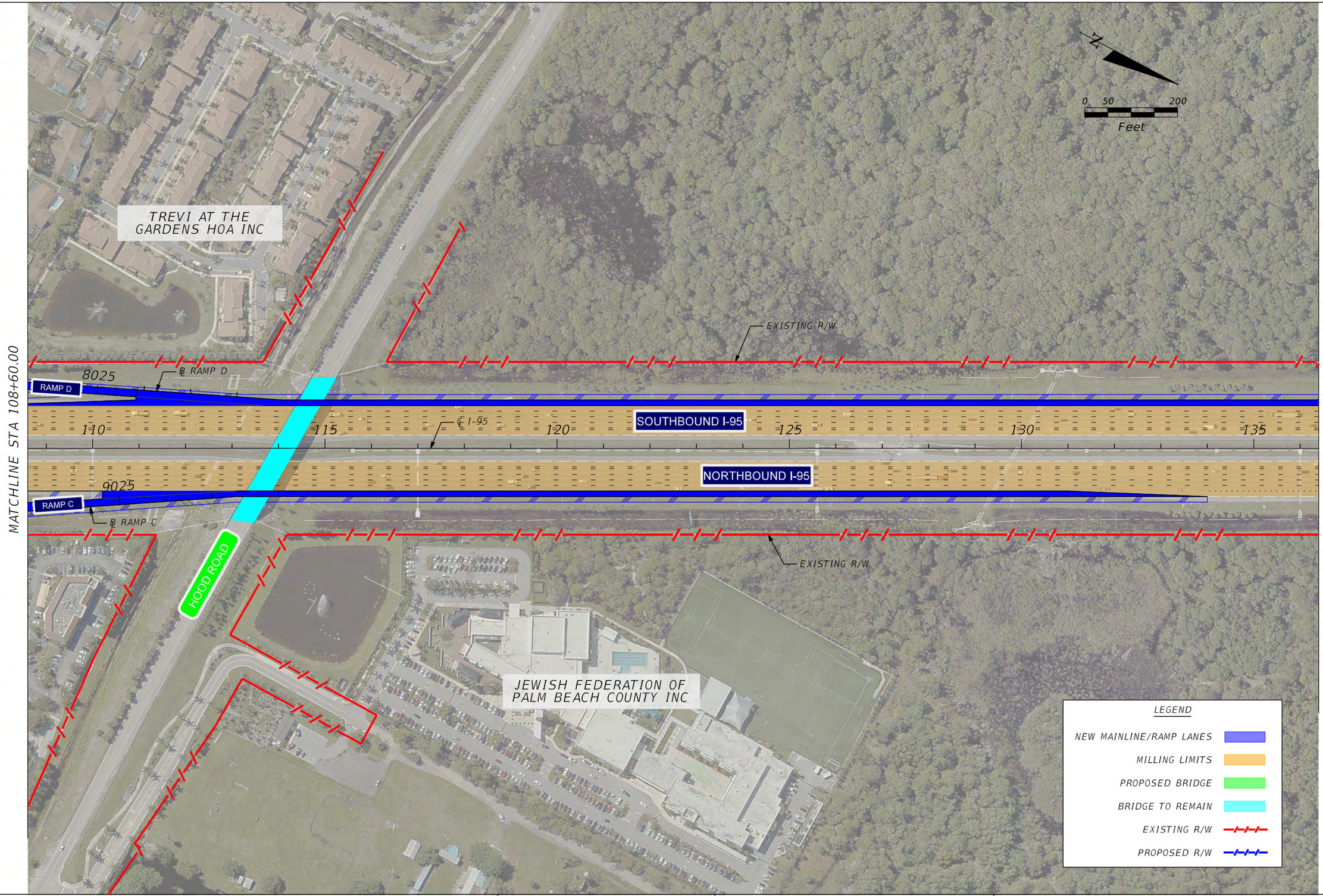
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 2)

SHEET NO. 4

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REVISIONS					
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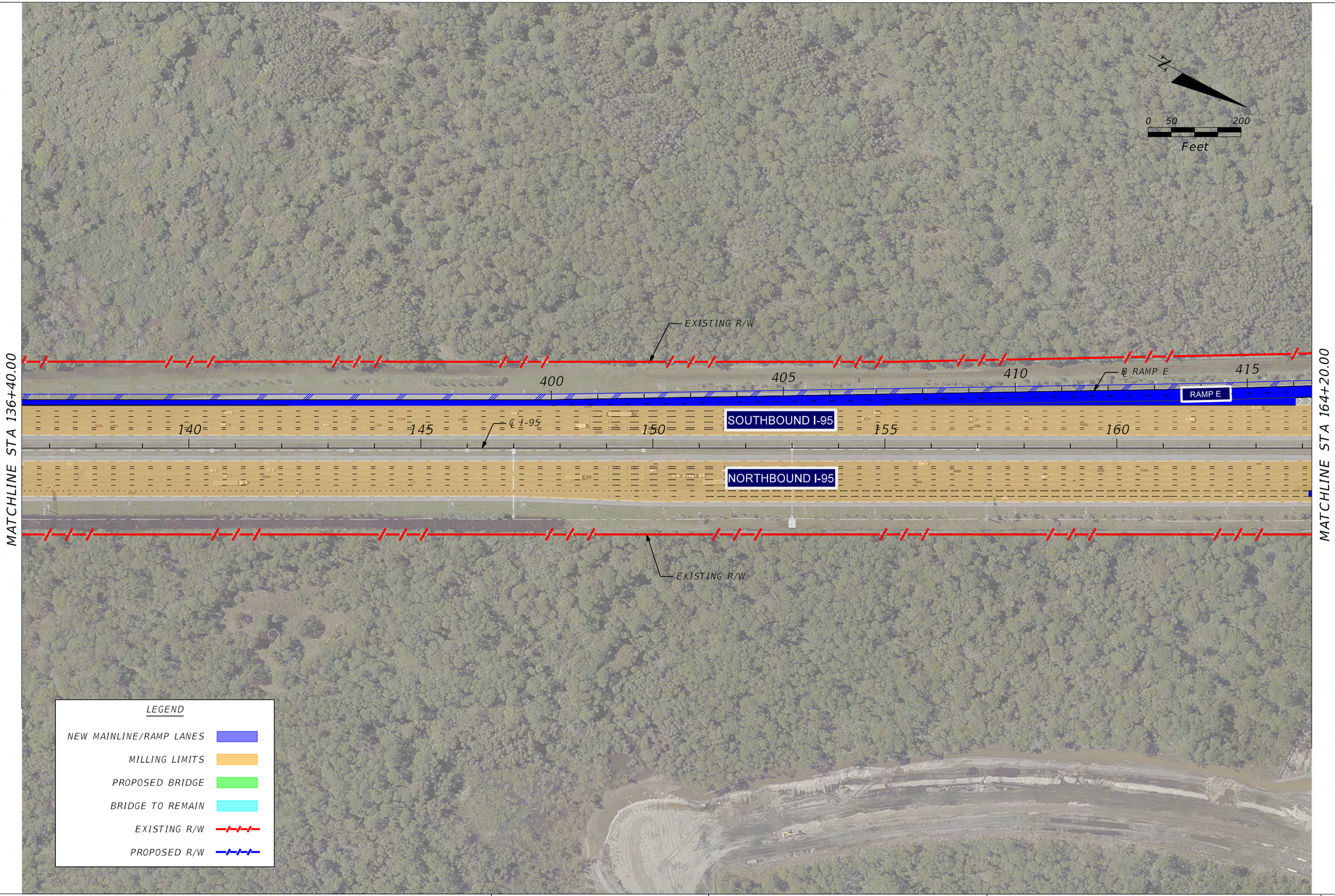
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 2)

SHEET NO. 5

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REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 2)

SHEET NO. 6

mbrloso 6/15/2016 8:59:34 AM H:\CADD\4132651220\roadway\planrd10-bcc-ALT2.dgn

MATCHLINE STA 164+20.00

0 50 200
Feet

EXISTING R/W

420

℄ RAMP E

425

RAMP E

END STUDY
STA 190+00.00
℄ I-95

165 170 ℄ I-95 175 180 185 190

SOUTHBOUND I-95

NORTHBOUND I-95

RAMP F

EXISTING R/W

DONALD ROSS RD

LEGEND

- NEW MAINLINE/RAMP LANES
- MILLING LIMITS
- PROPOSED BRIDGE
- BRIDGE TO REMAIN
- EXISTING R/W
- PROPOSED R/W

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

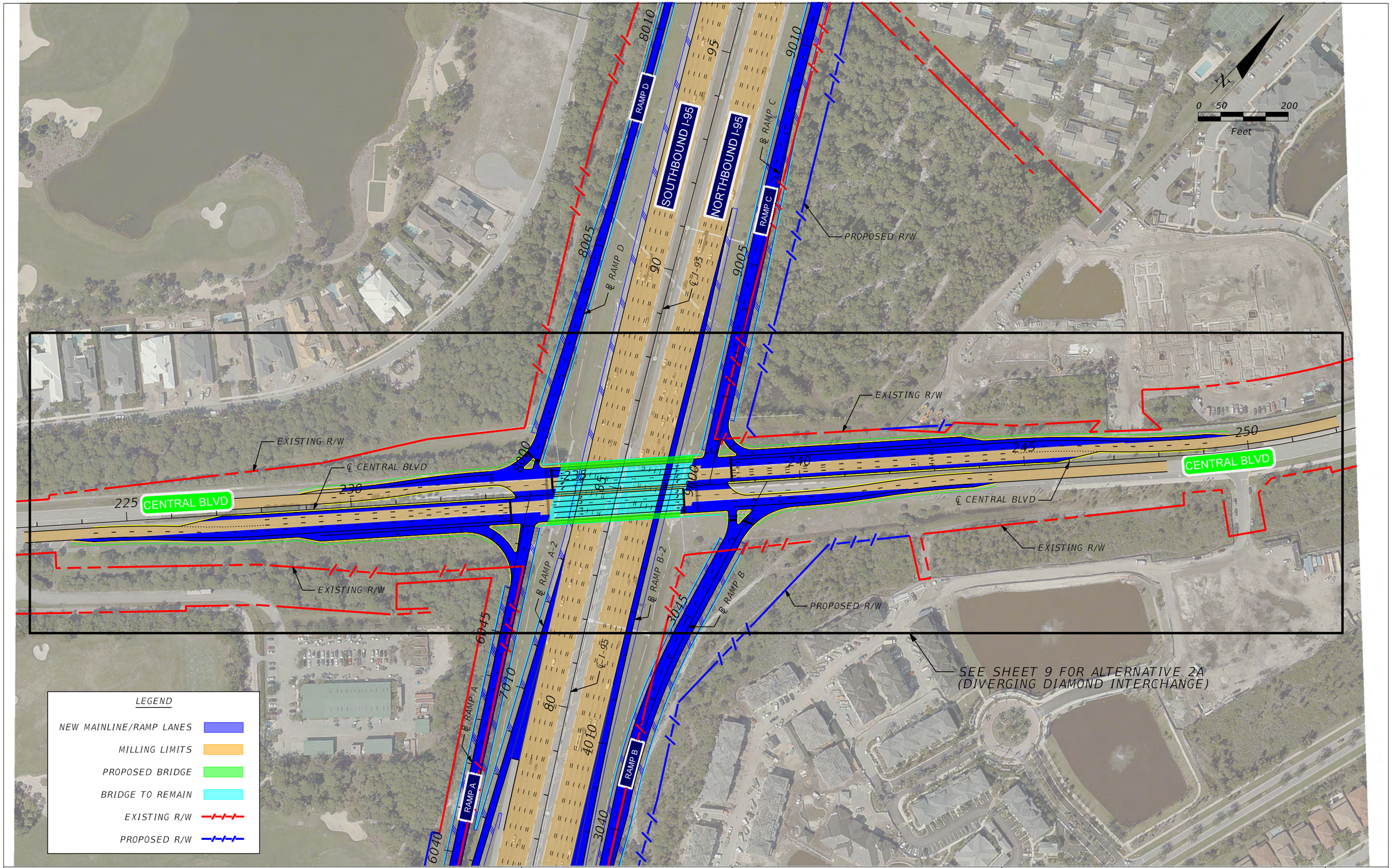
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 2)

SHEET NO. 7

6/15/2016 8:59:46 AM H:\CADD\4132651220\roadway\plnrdll-bcc-ALT2.dgn



REVISIONS					
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SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

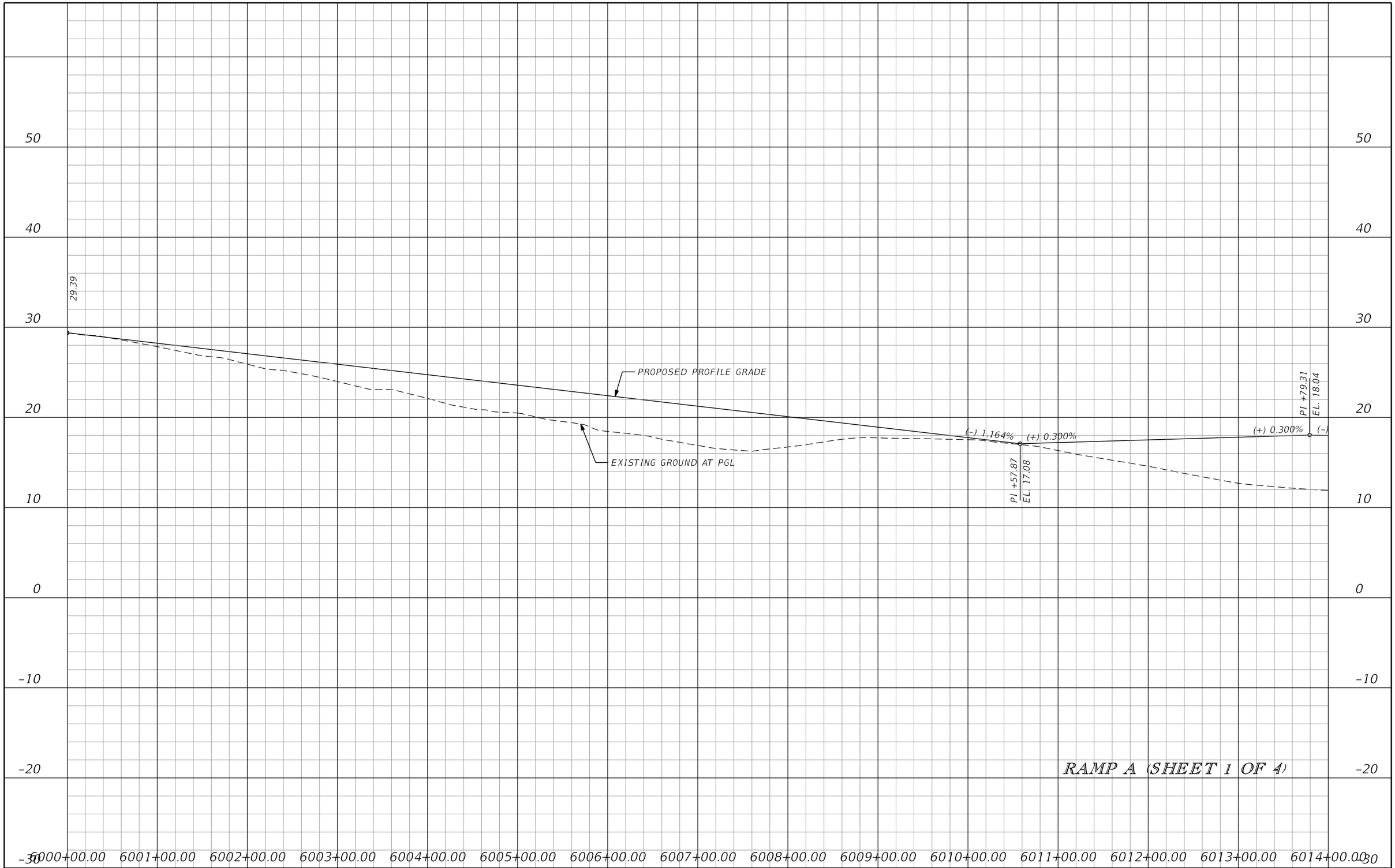
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 2)

SHEET NO. 8

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RAMP A (SHEET 1 OF 4)

REVISIONS			
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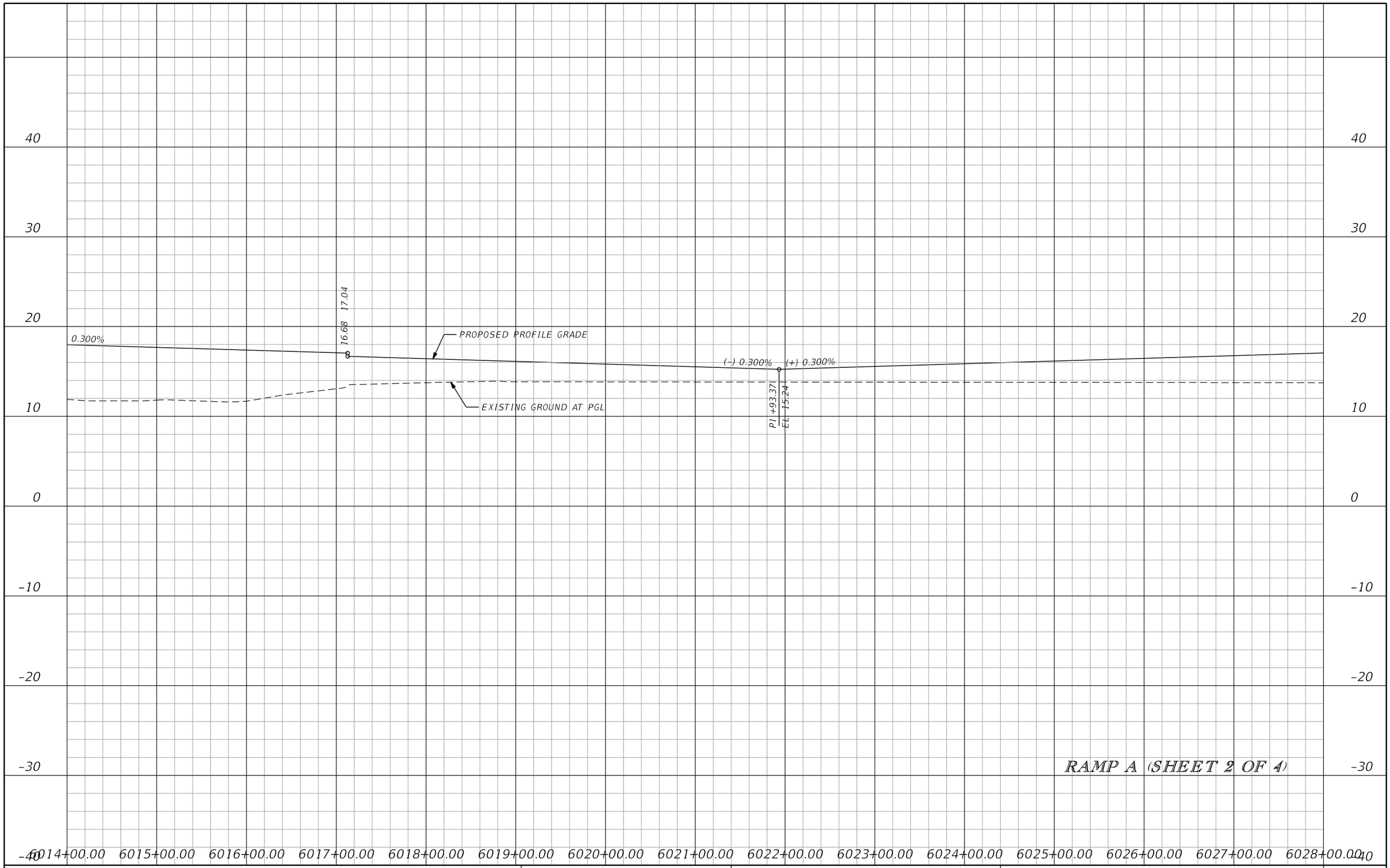
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE ALTERNATIVE 2

SHEET NO. 1

mbrioso 6/15/2016 10:11:17 AM H:\CADD\41326512201\roadway\profrd18.dgn



RAMP A (SHEET 2 OF 4)

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

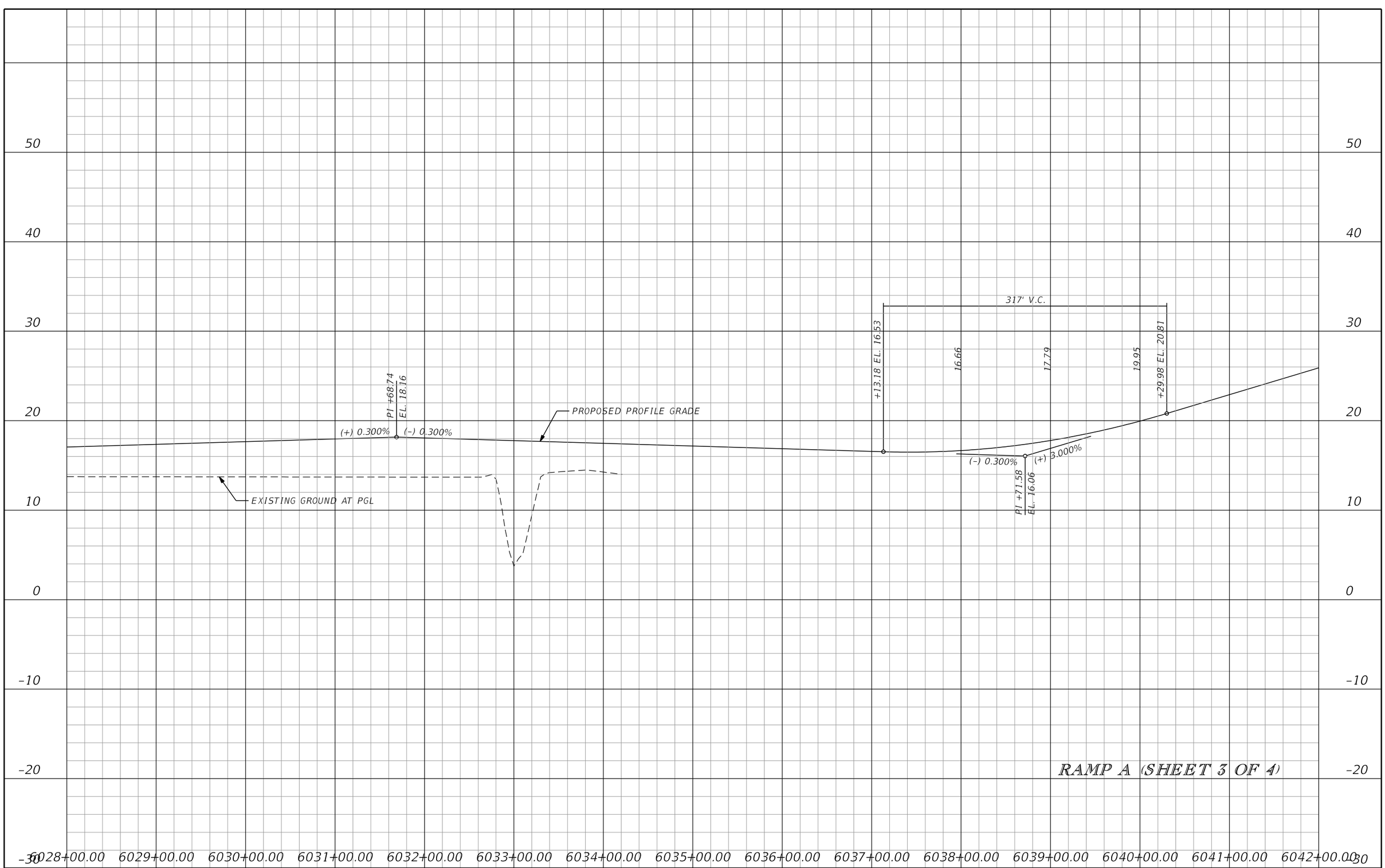
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 2

SHEET NO. 2

mbrioso 6/15/2016 10:11:23 AM H:\CADD\41326512201\roadway\profrd19.dgn



REVISIONS			
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SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

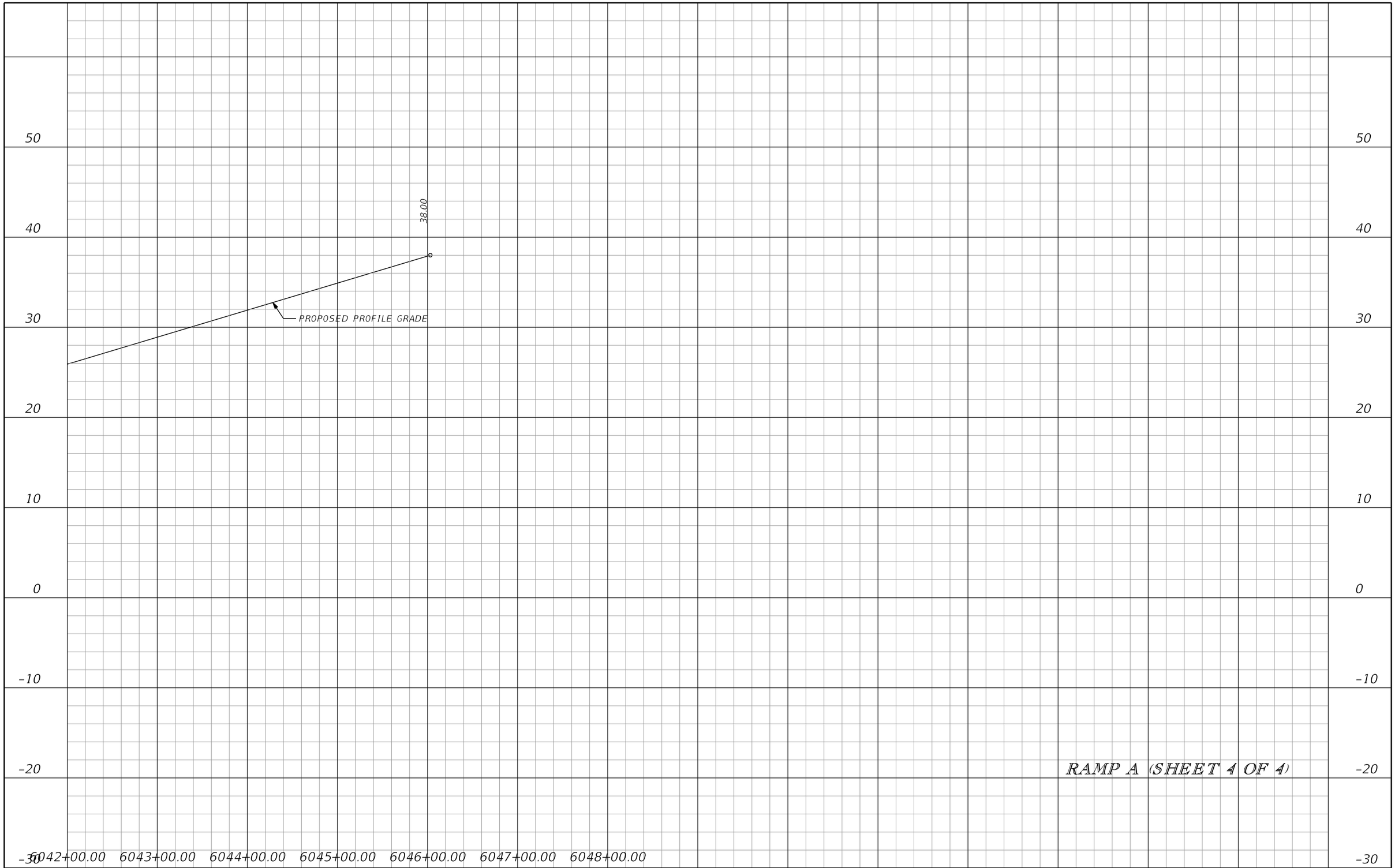
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE ALTERNATIVE 2

SHEET NO. 3

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RAMP A (SHEET 4 OF 4)

REVISIONS			
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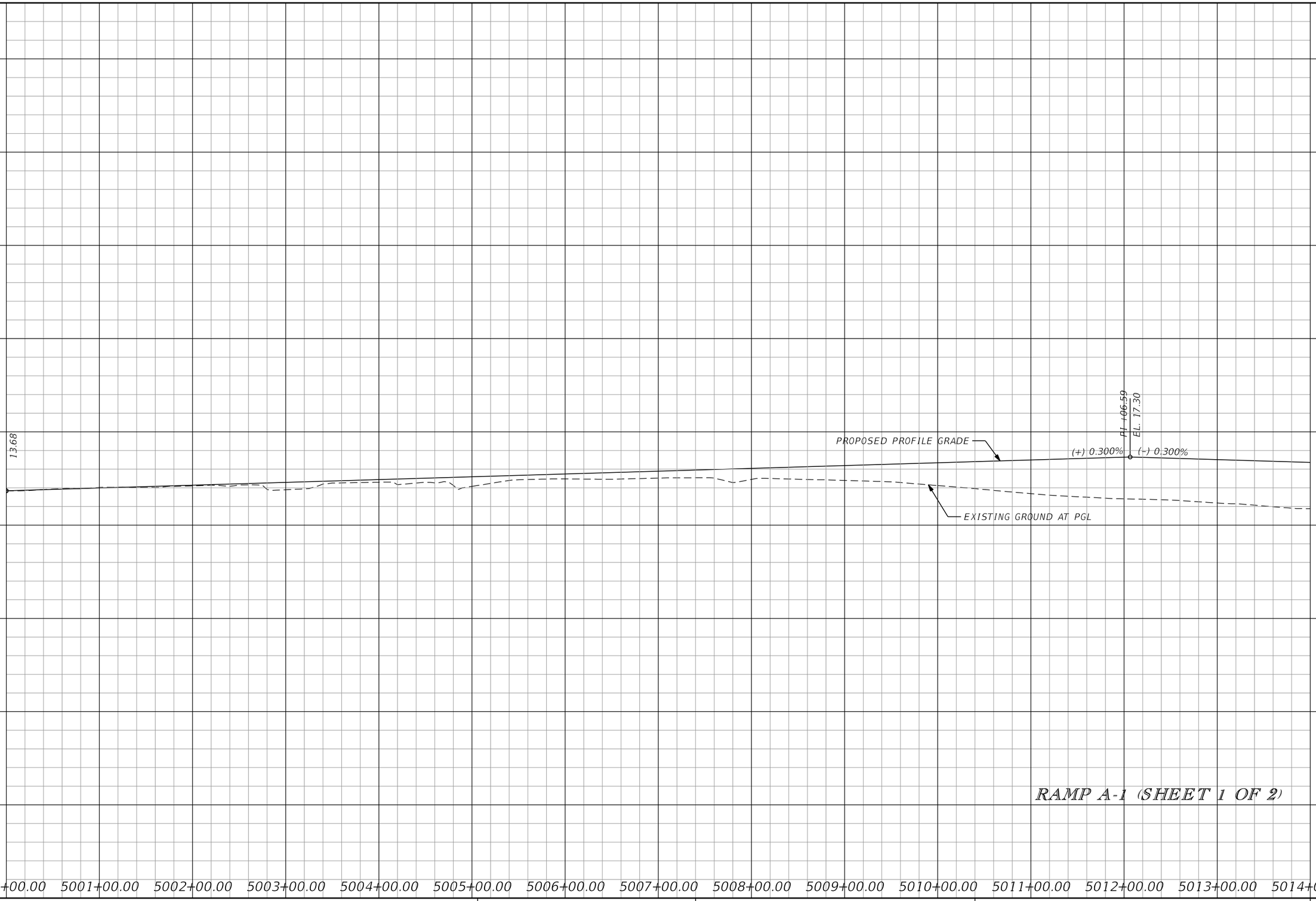
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 2

SHEET NO. 4

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RAMP A-1 (SHEET 1 OF 2)

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 2

SHEET NO. 5

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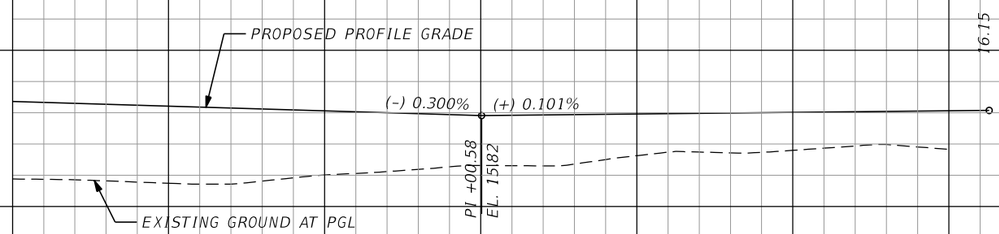
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RAMP A-1 (SHEET 2 OF 2)

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

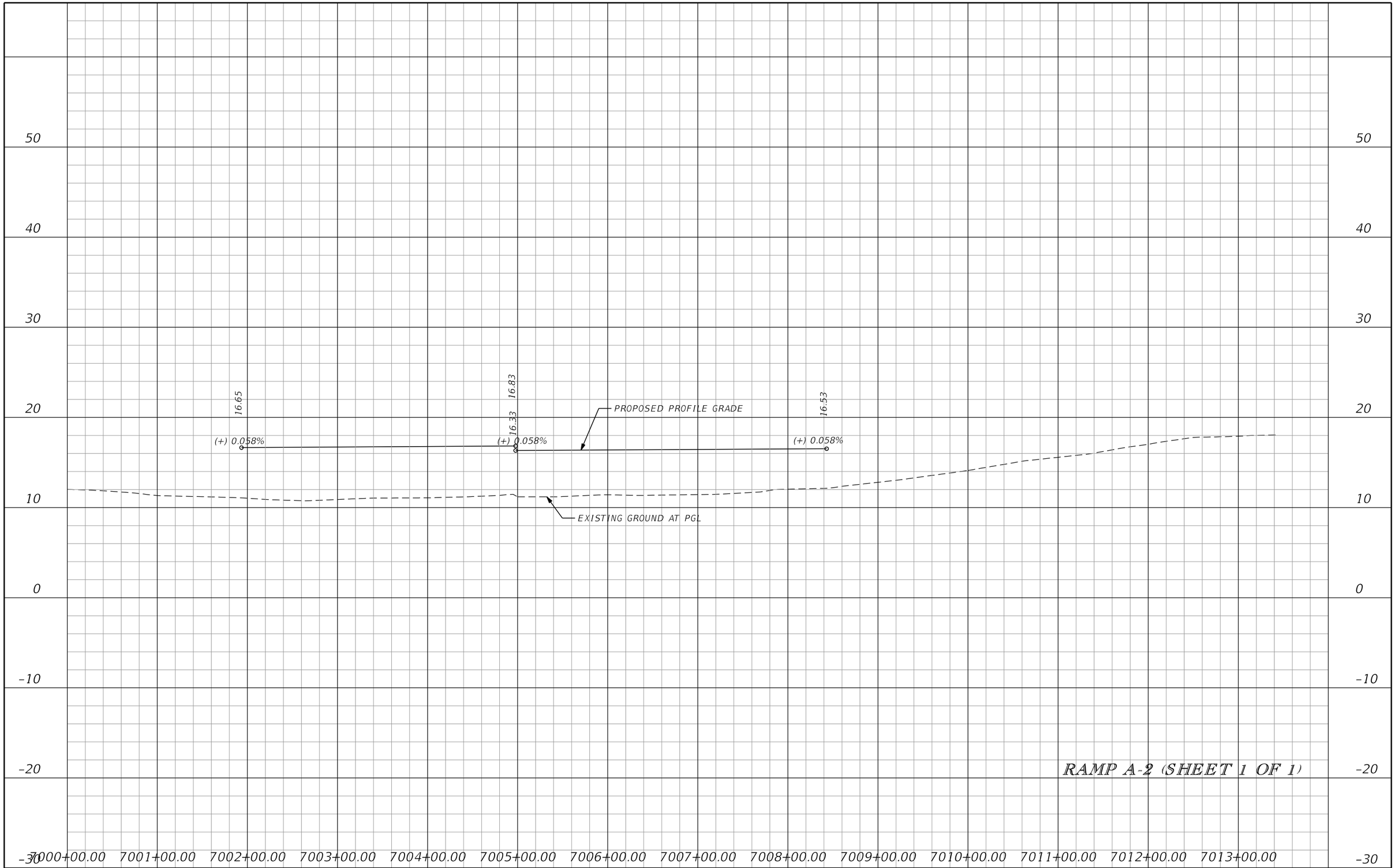
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 2

SHEET NO. 6

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RAMP A-2 (SHEET 1 OF 1)

REVISIONS			
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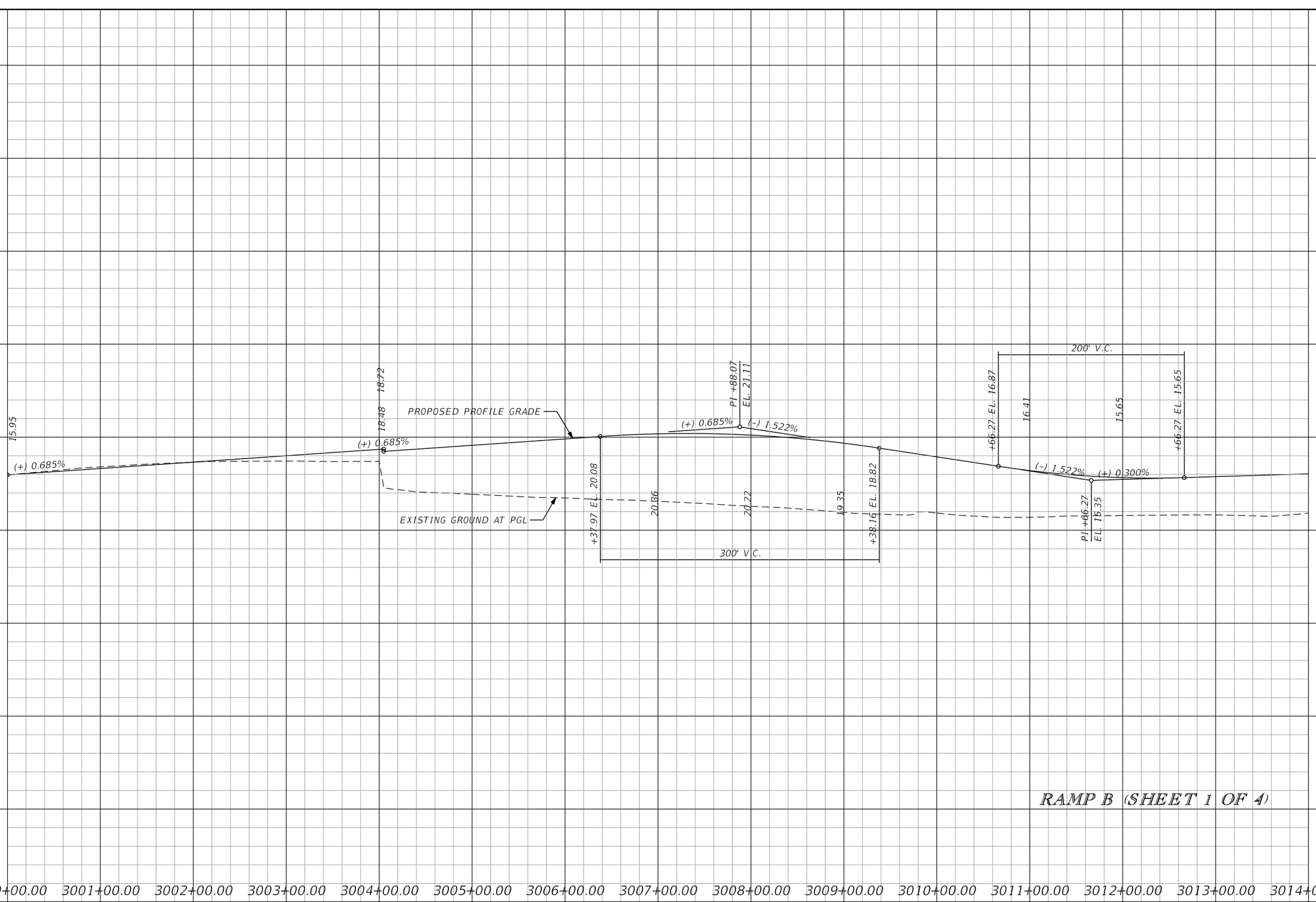
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 2

SHEET NO. 7

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RAMP B (SHEET 1 OF 4)

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

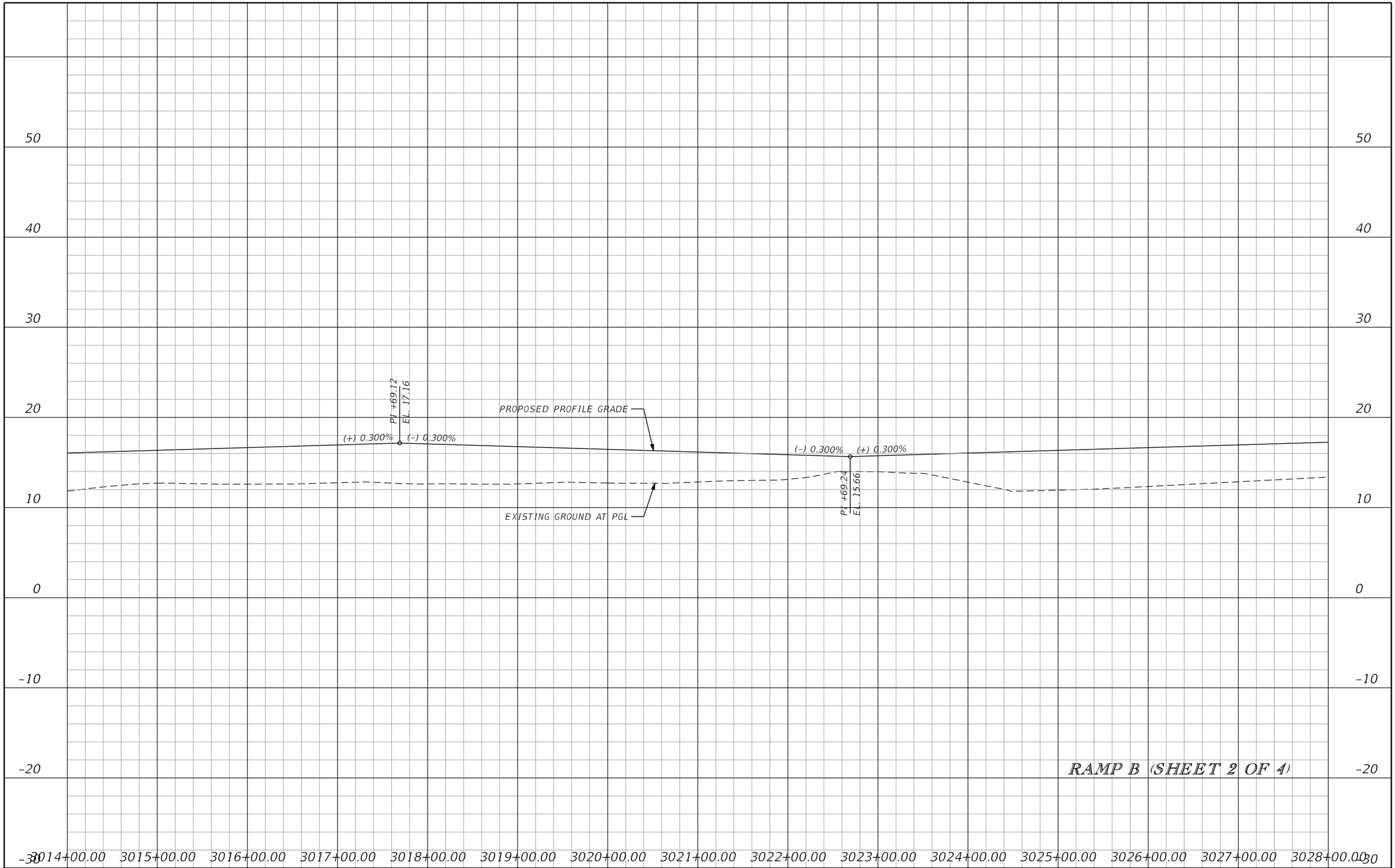
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE ALTERNATIVE 2

SHEET NO. 8

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RAMP B (SHEET 2 OF 4)

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

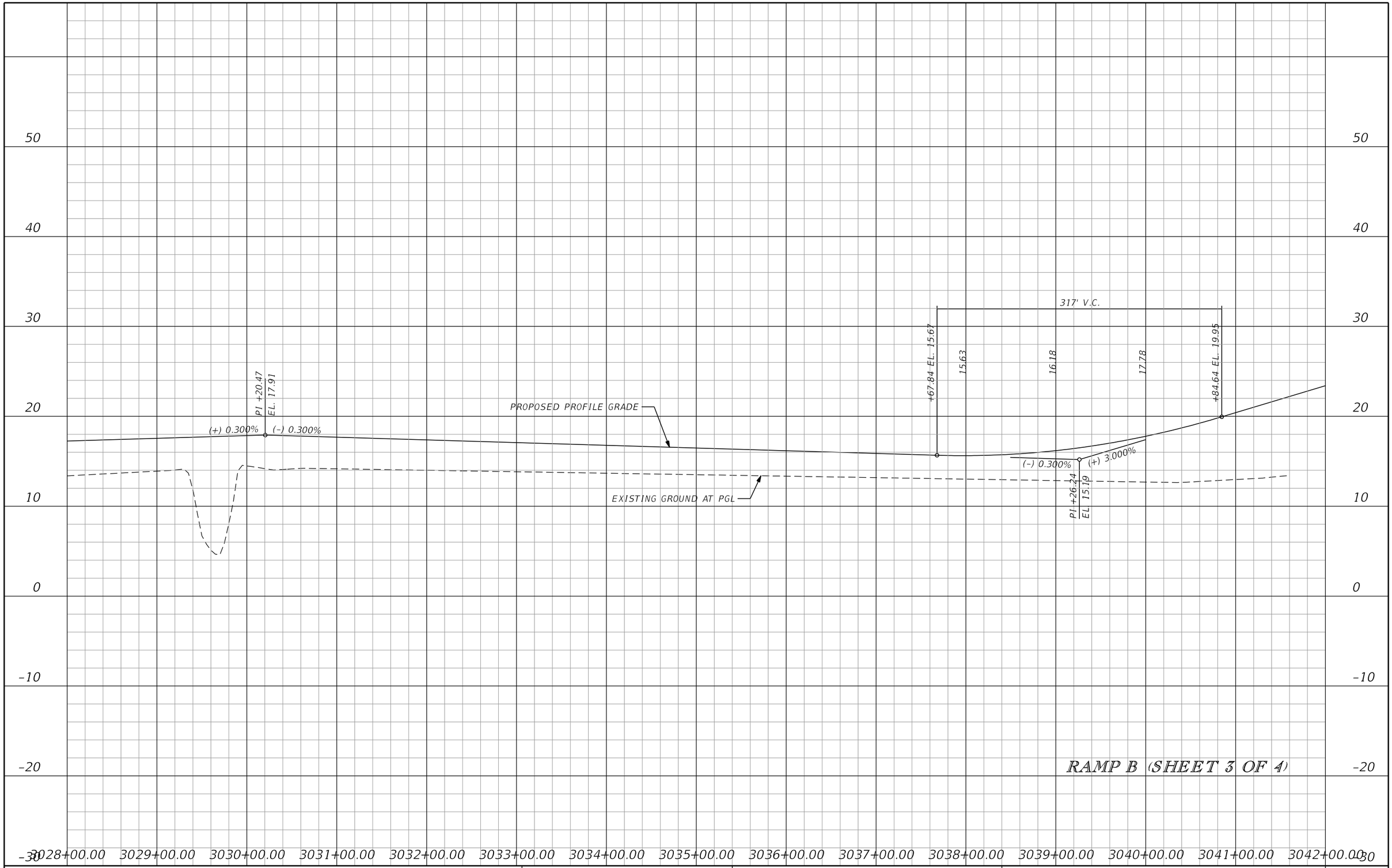
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 2

SHEET NO. 9

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

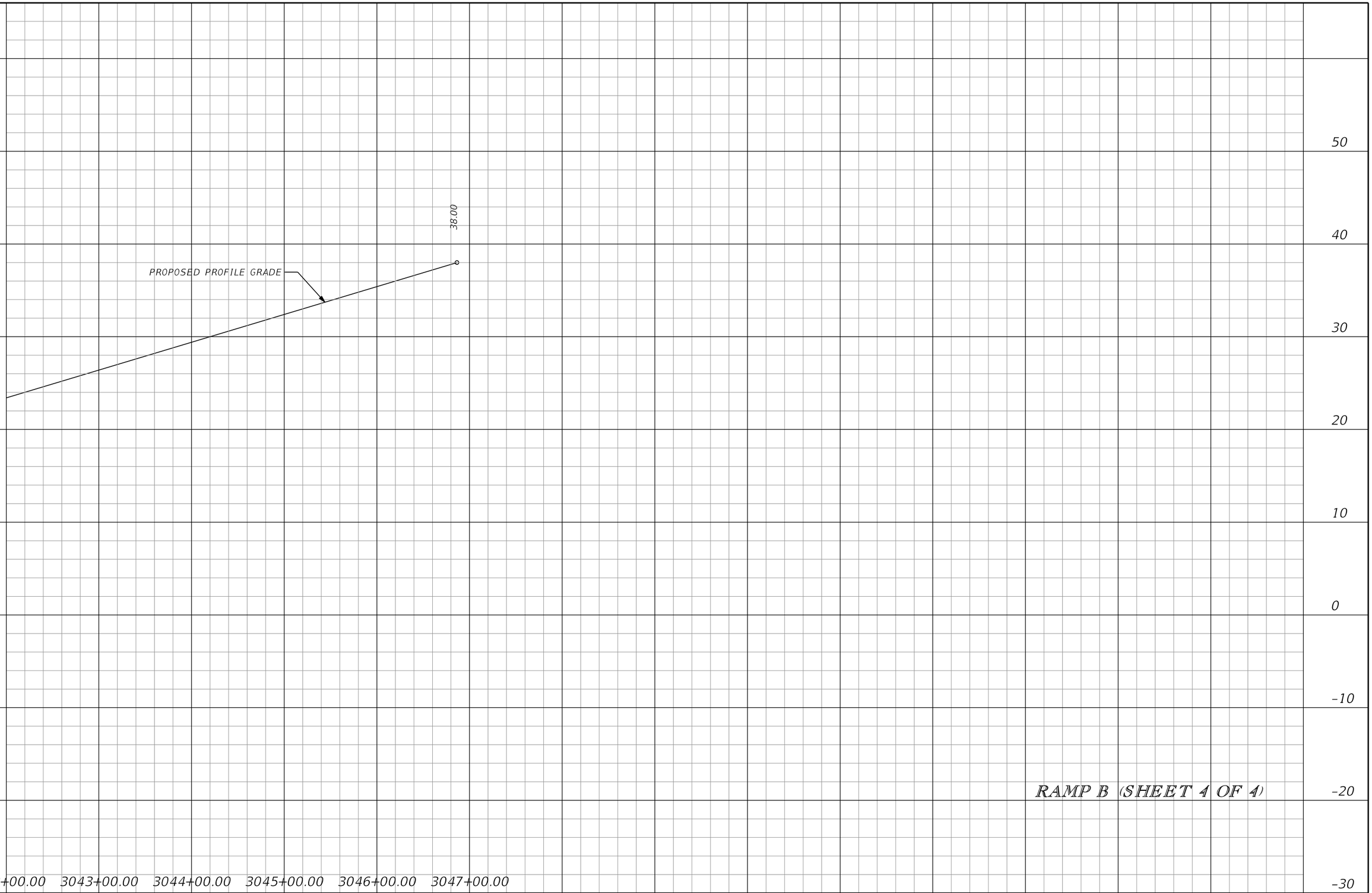
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE ALTERNATIVE 2

SHEET NO. 10

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RAMP B (SHEET 4 OF 4)

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE ALTERNATIVE 2

SHEET NO. 11

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RAMP B-1 (SHEET 1 OF 1)

REVISIONS			
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SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

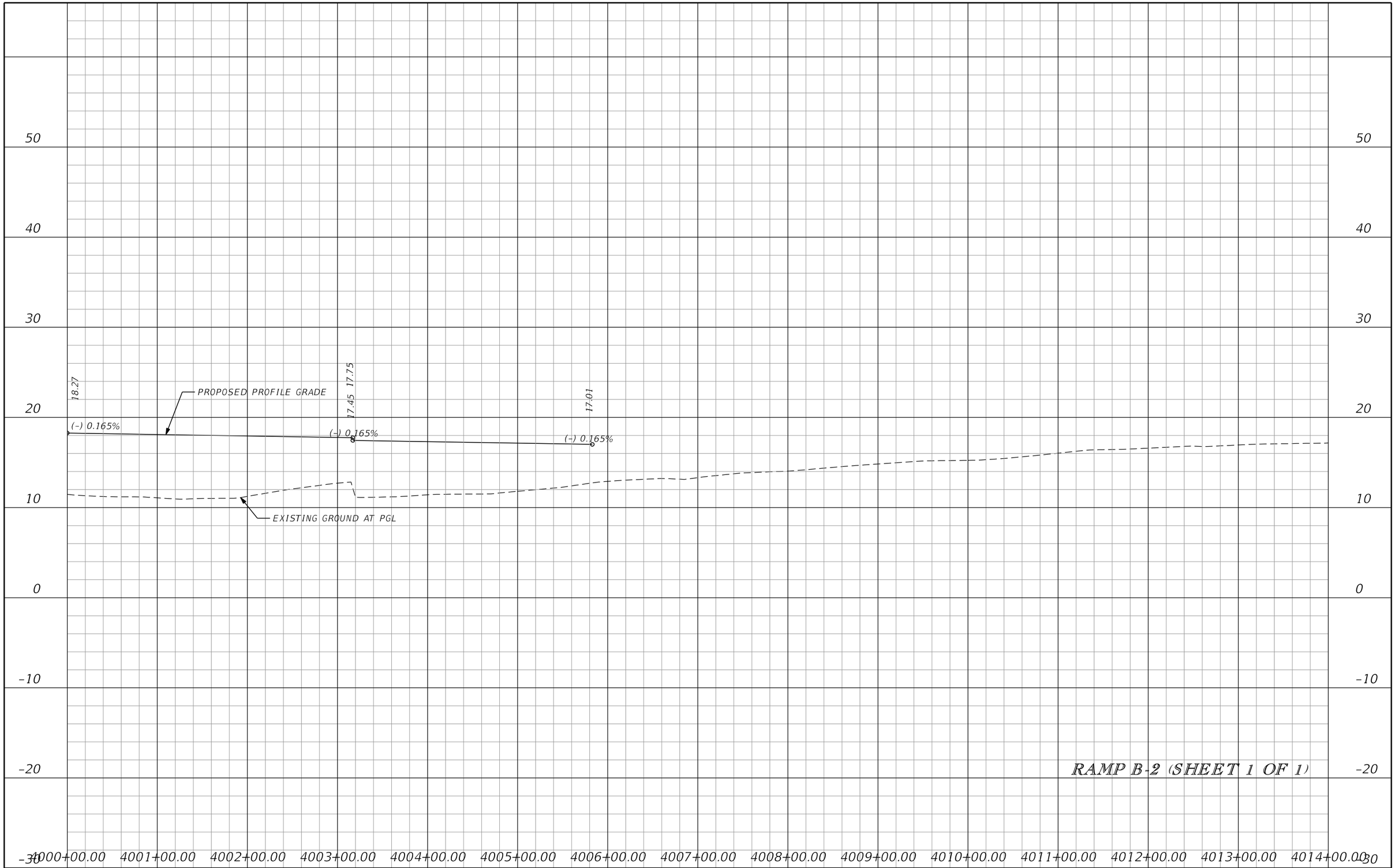
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 2

SHEET NO. 12

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RAMP B-2 (SHEET 1 OF 1)

REVISIONS			
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SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

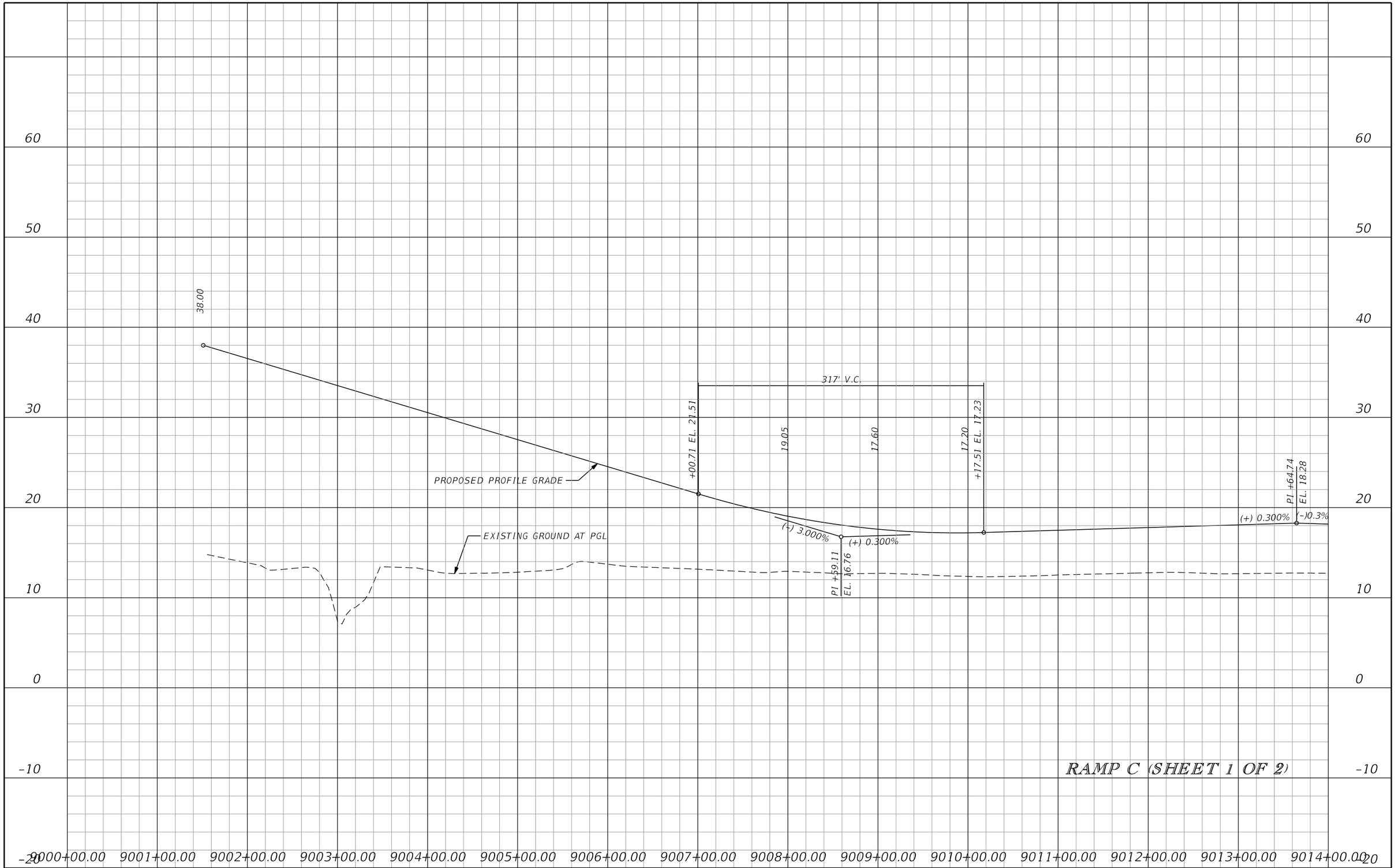
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 2

SHEET NO. 13

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RAMP C (SHEET 1 OF 2)

REVISIONS			
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SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

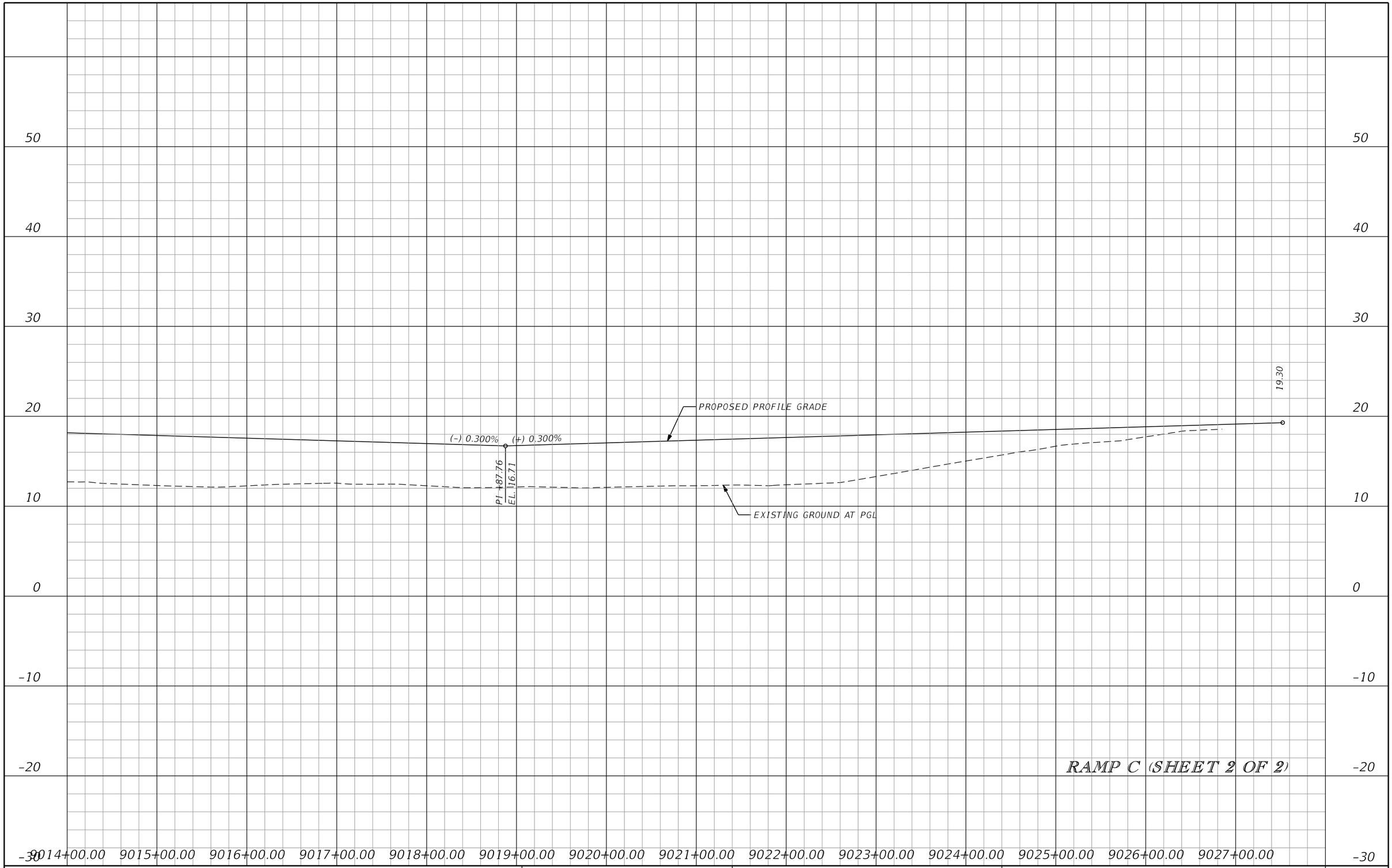
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 2

SHEET NO. 14

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RAMP C (SHEET 2 OF 2)

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

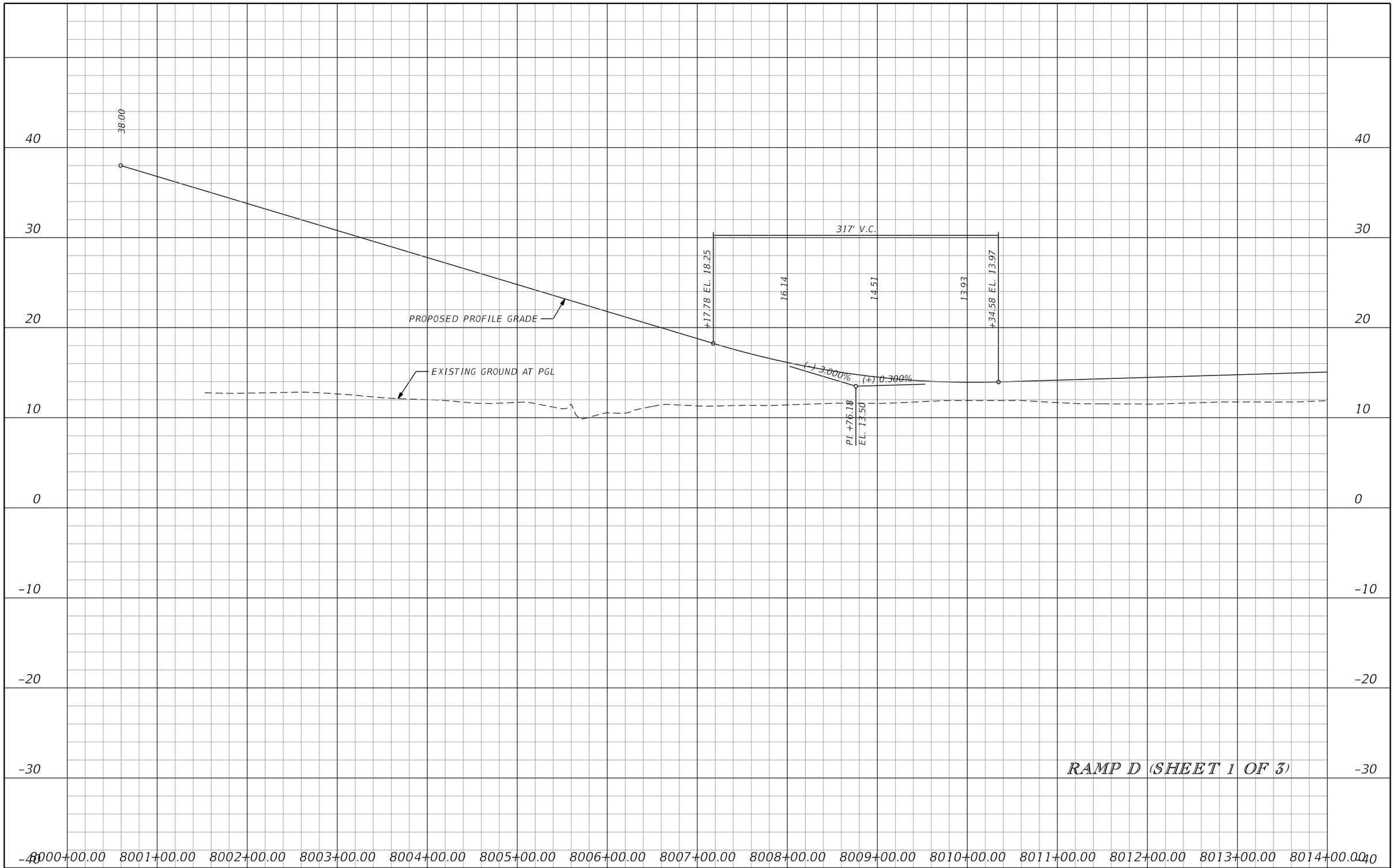
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 2

SHEET NO. 15

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RAMP D (SHEET 1 OF 3)

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

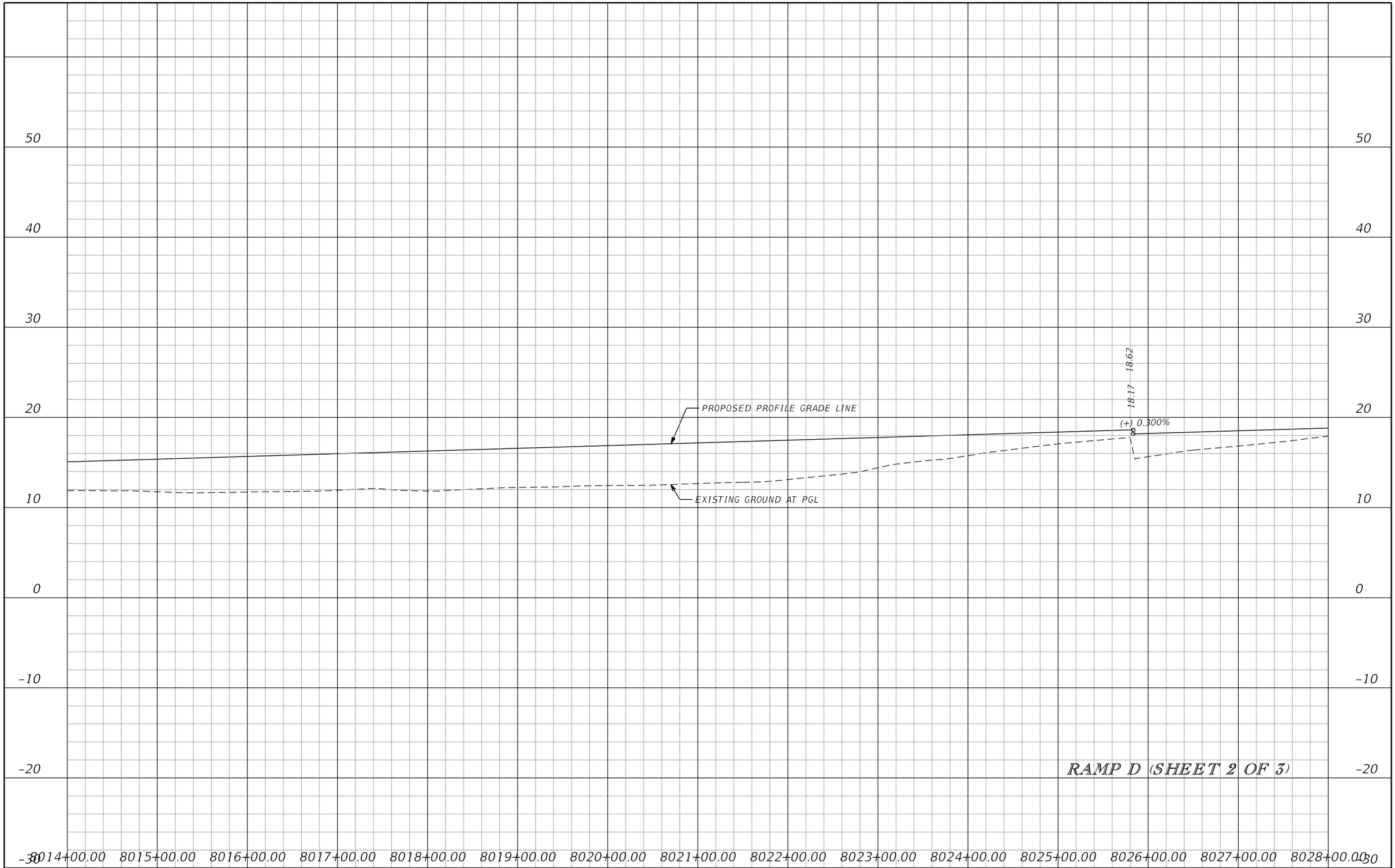
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 2

SHEET NO. 16

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RAMP D (SHEET 2 OF 3)

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 2

SHEET NO. 17

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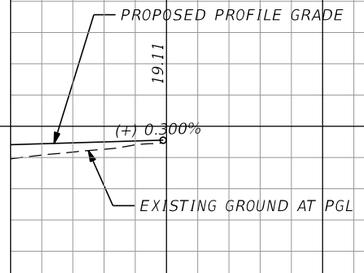
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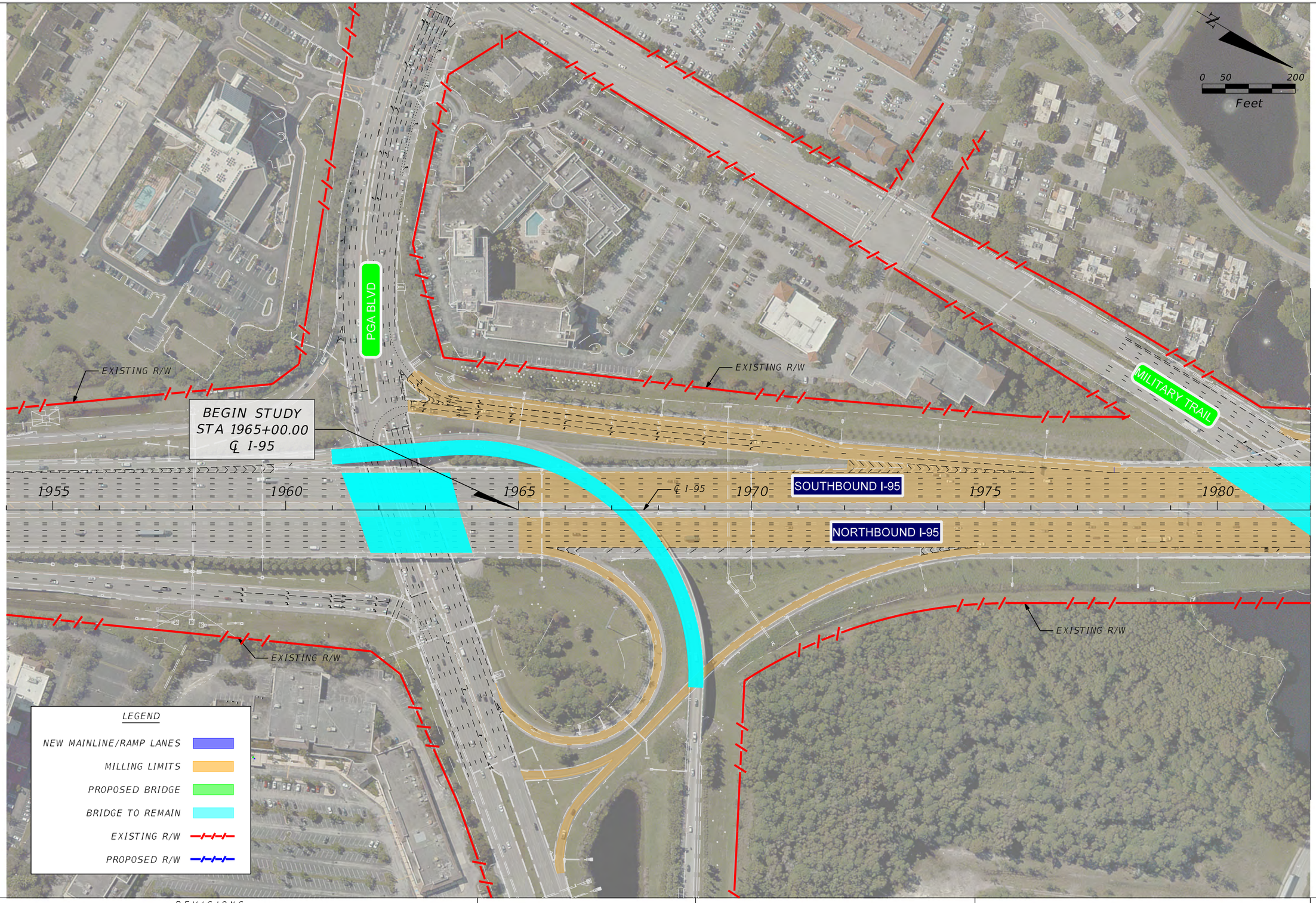


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RAMP D (SHEET 3 OF 3)

REVISIONS				SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			ROADWAY PROFILE ALTERNATIVE 2	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		18
					SR 9	PALM BEACH	413265-1-22-01		

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REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

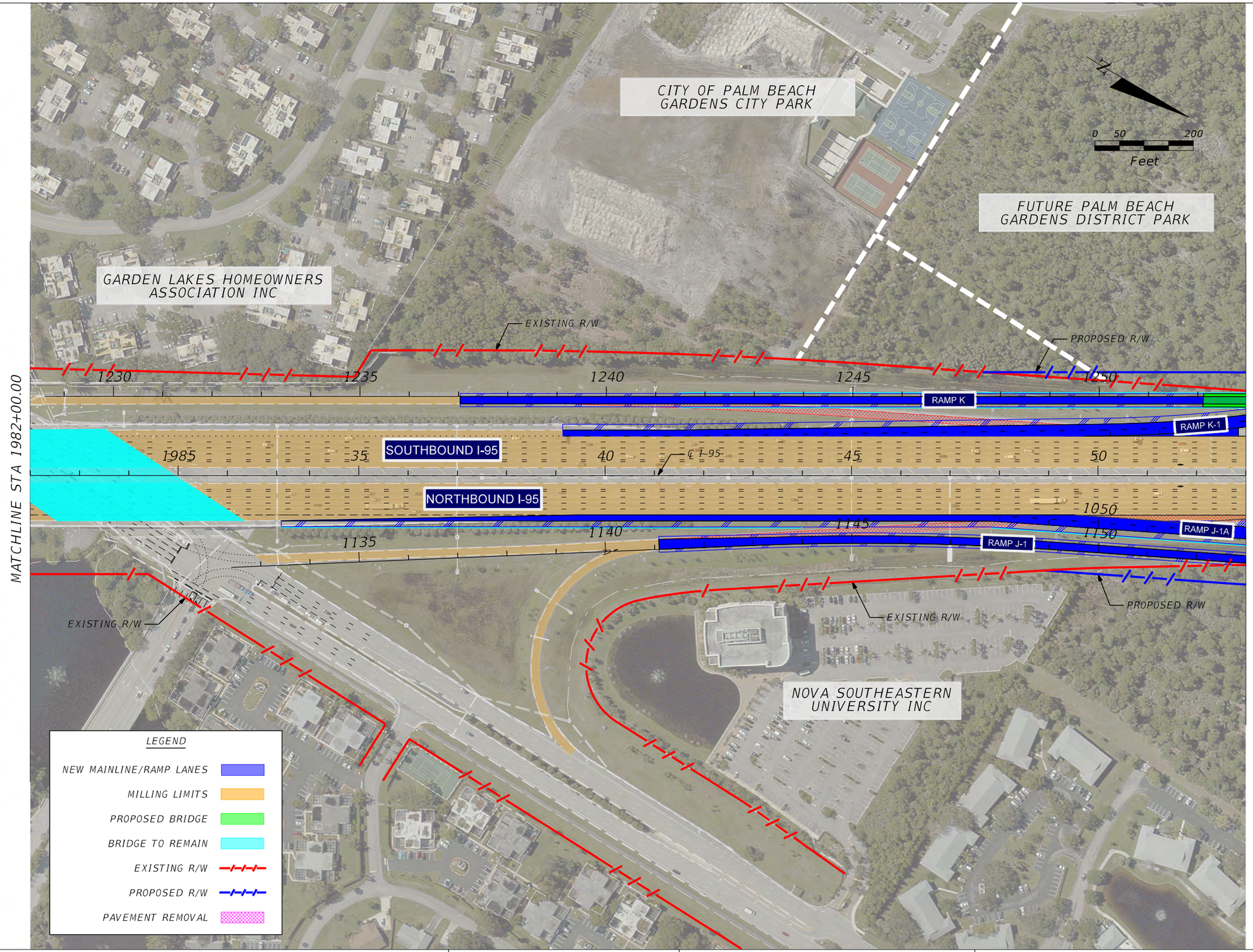
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 3)

SHEET NO. 1

mbrloso 6/15/2016 9:02:42 AM H:\CADD\413265\2201\roadway\planrd05-bcc-ALT3.dgn



REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

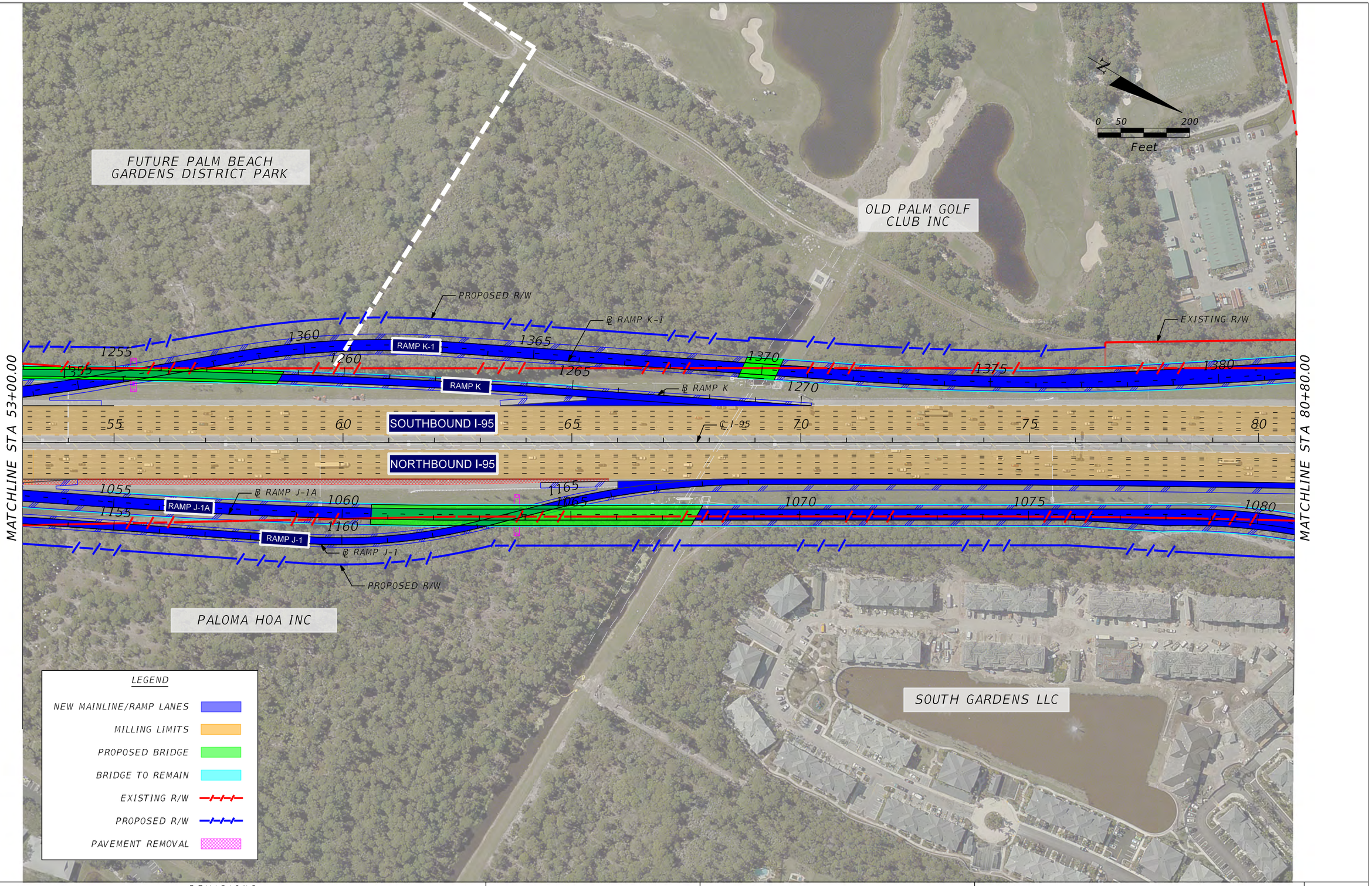
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 3)

SHEET NO. 2

mbrloso 6/15/2016 9:02:52 AM H:\CADD\413265122O1\roadway\planrd06-bcc-ALT3.dgn



REVISIONS					
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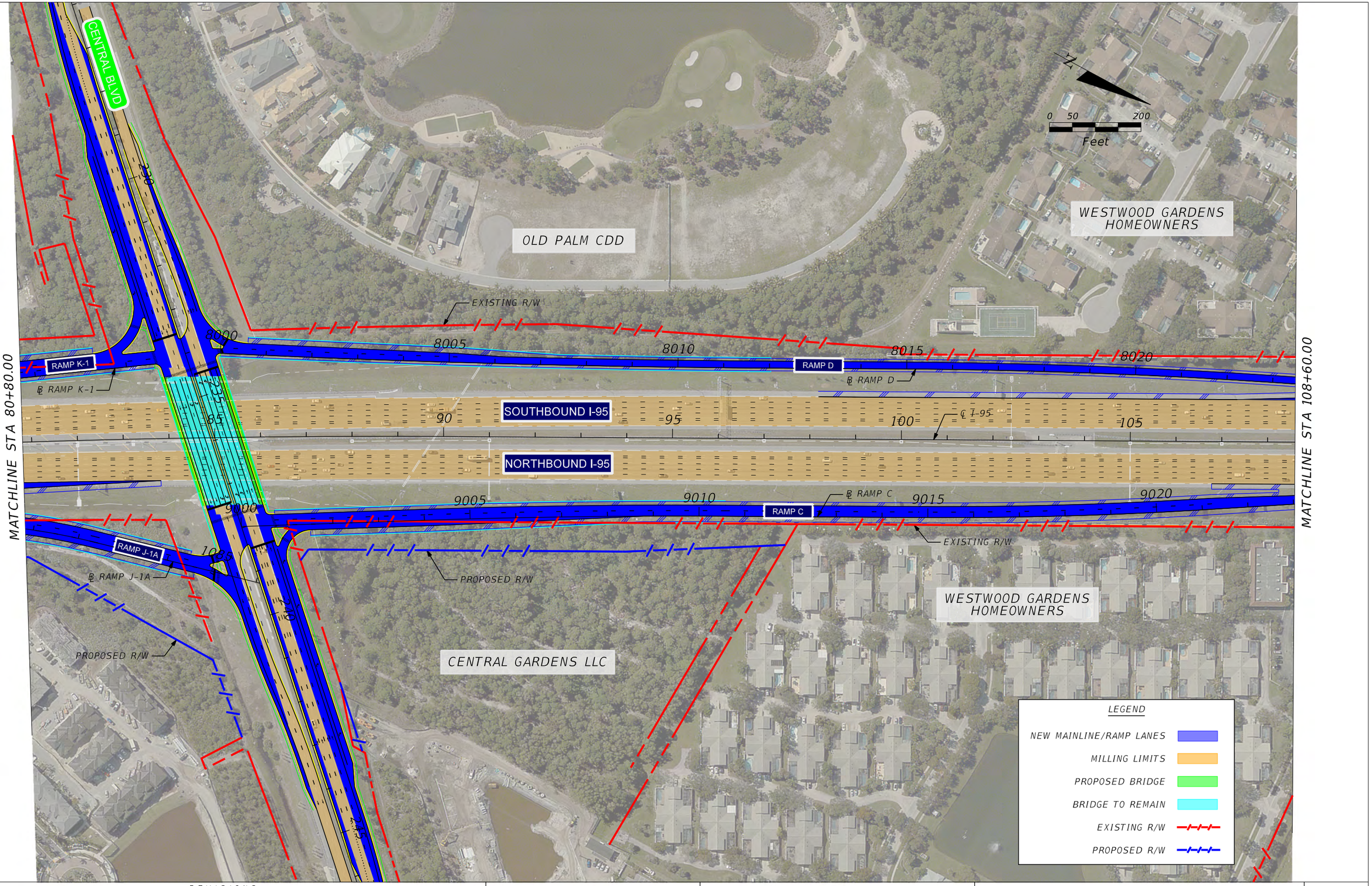
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 3)

SHEET NO. 3

mbrloso 6/15/2016 9:03:01 AM H:\CADD\413265122001\roadway\planrd07-bcc-ALT3.dgn



REVISIONS					
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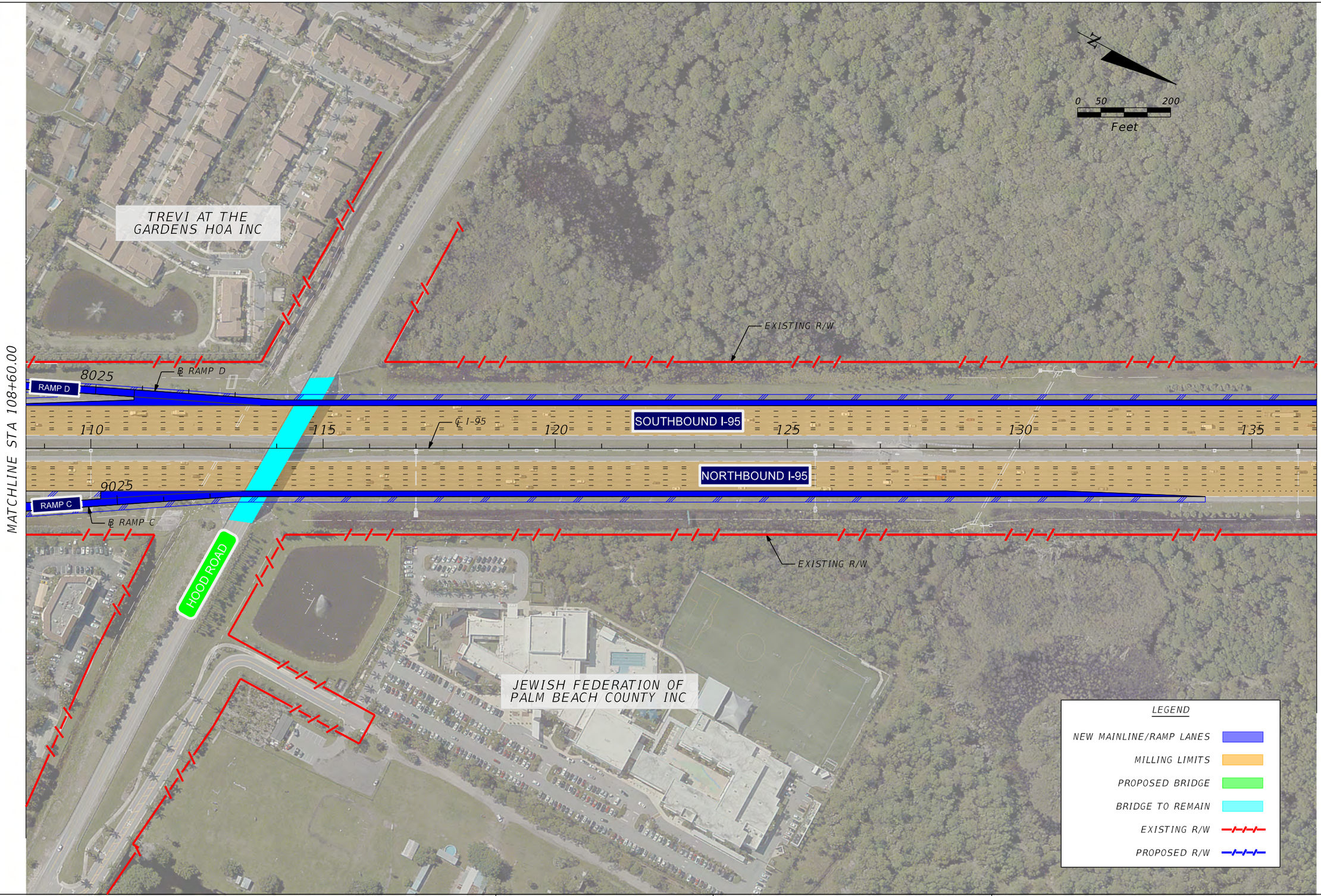
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 3)

SHEET NO. 4

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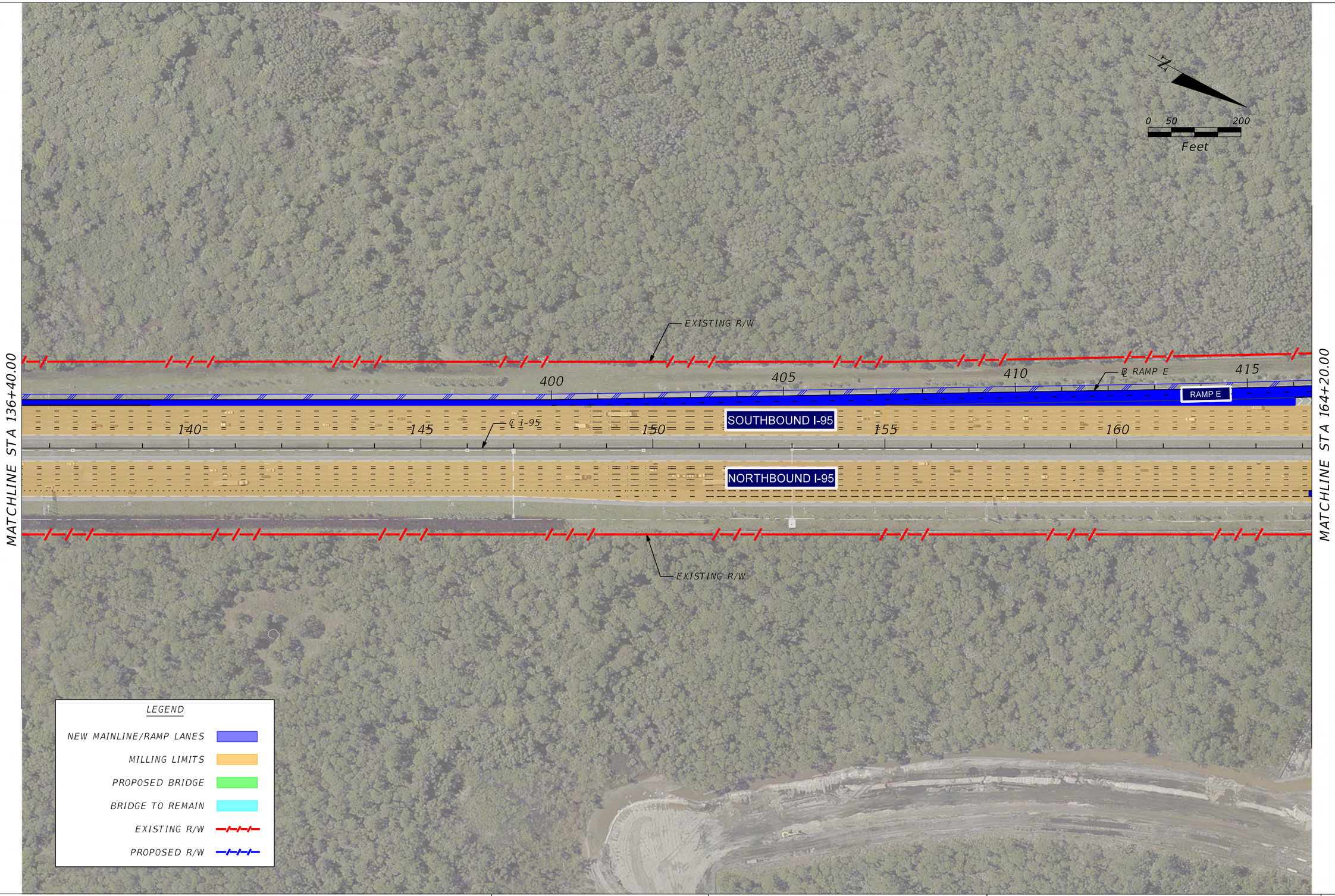
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 3)

SHEET NO. 5

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SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 3)

SHEET NO. 6

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MATCHLINE STA 164+20.00

0 50 200
Feet

EXISTING R/W

℄ RAMP E

420

425

RAMP E

END STUDY
STA 190+00.00
℄ I-95

165 170 175 180 185 190

℄ I-95

SOUTHBOUND I-95

NORTHBOUND I-95

RAMP F

EXISTING R/W

DONALD ROSS RD

LEGEND

- NEW MAINLINE/RAMP LANES
- MILLING LIMITS
- PROPOSED BRIDGE
- BRIDGE TO REMAIN
- EXISTING R/W
- PROPOSED R/W

REVISIONS					
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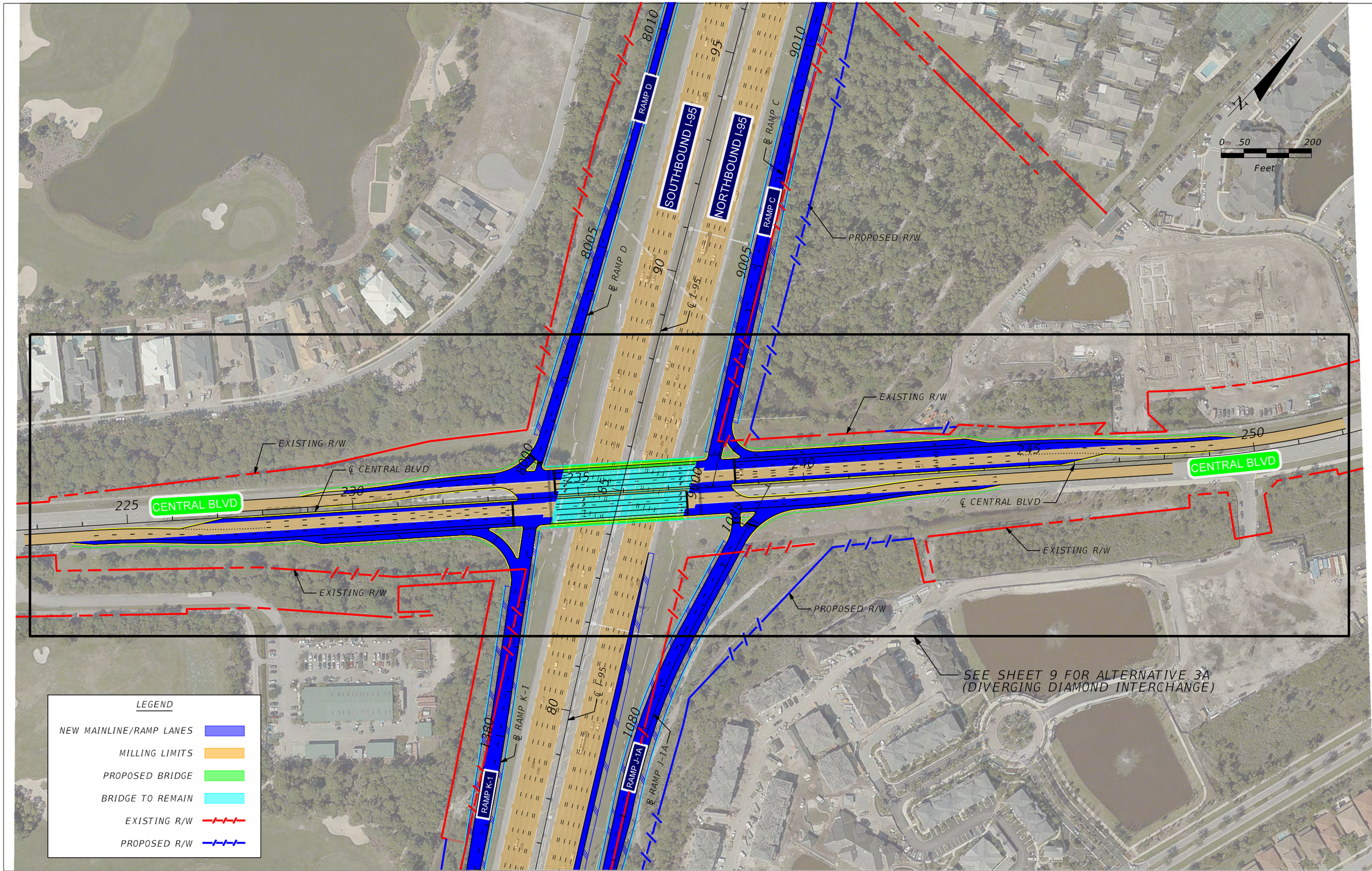
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 3)

SHEET NO. 7

6/15/2016 9:03:38 AM H:\CADD\4132651220\roadway\plnrdll-bcc-ALT3.dgn



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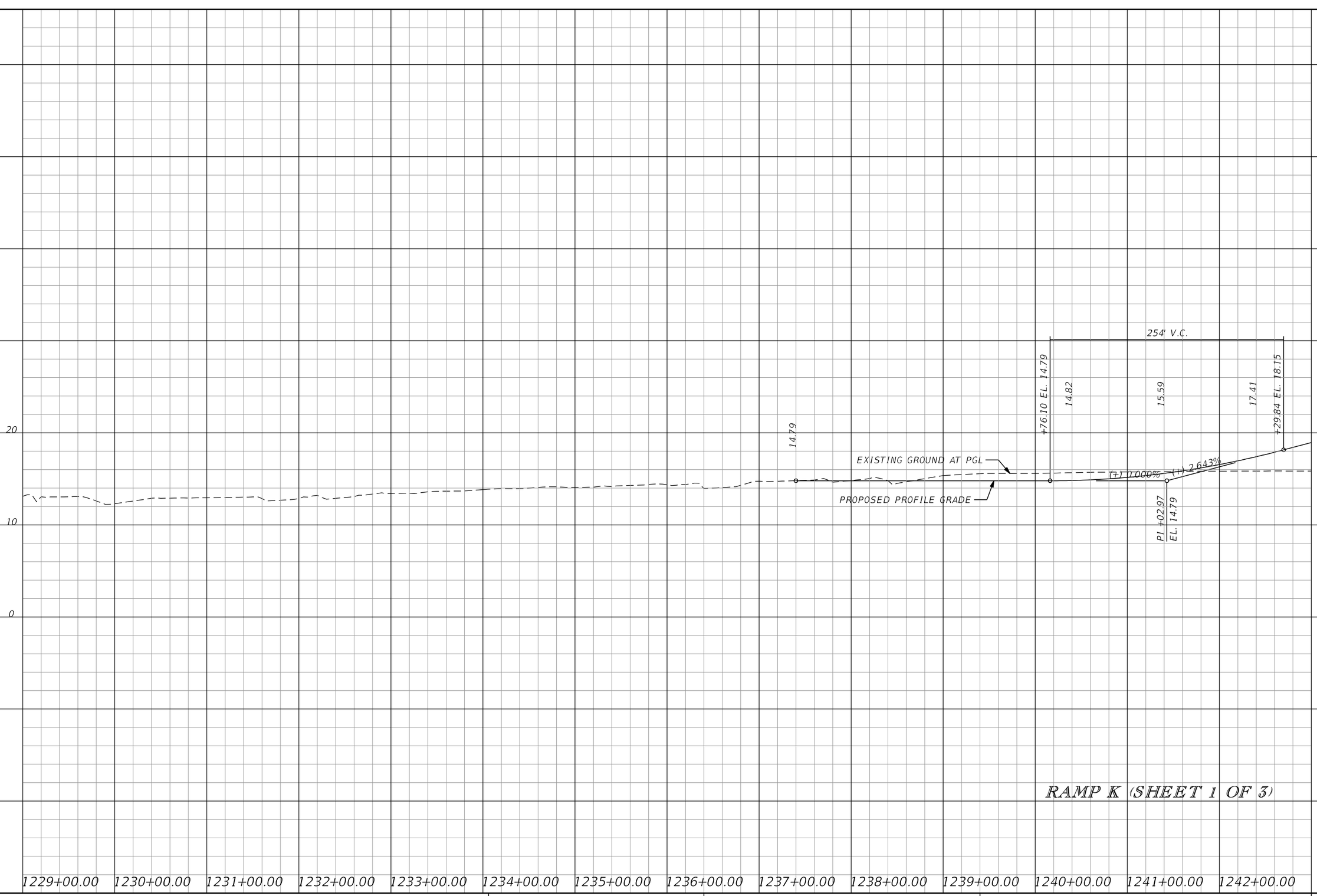
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD. (ALT 3)

SHEET NO. 8

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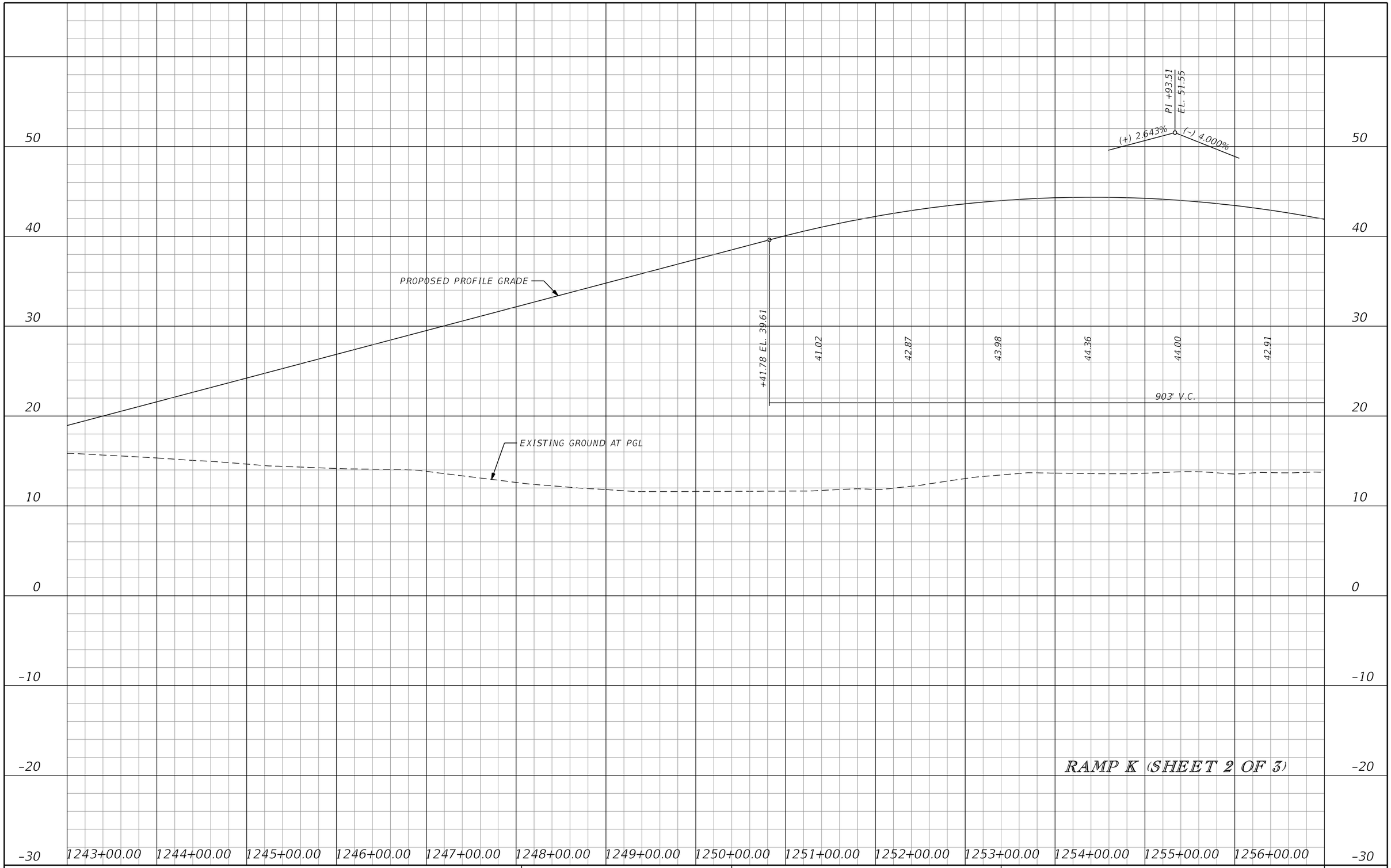
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE ALTERNATIVE 3

SHEET NO. 1

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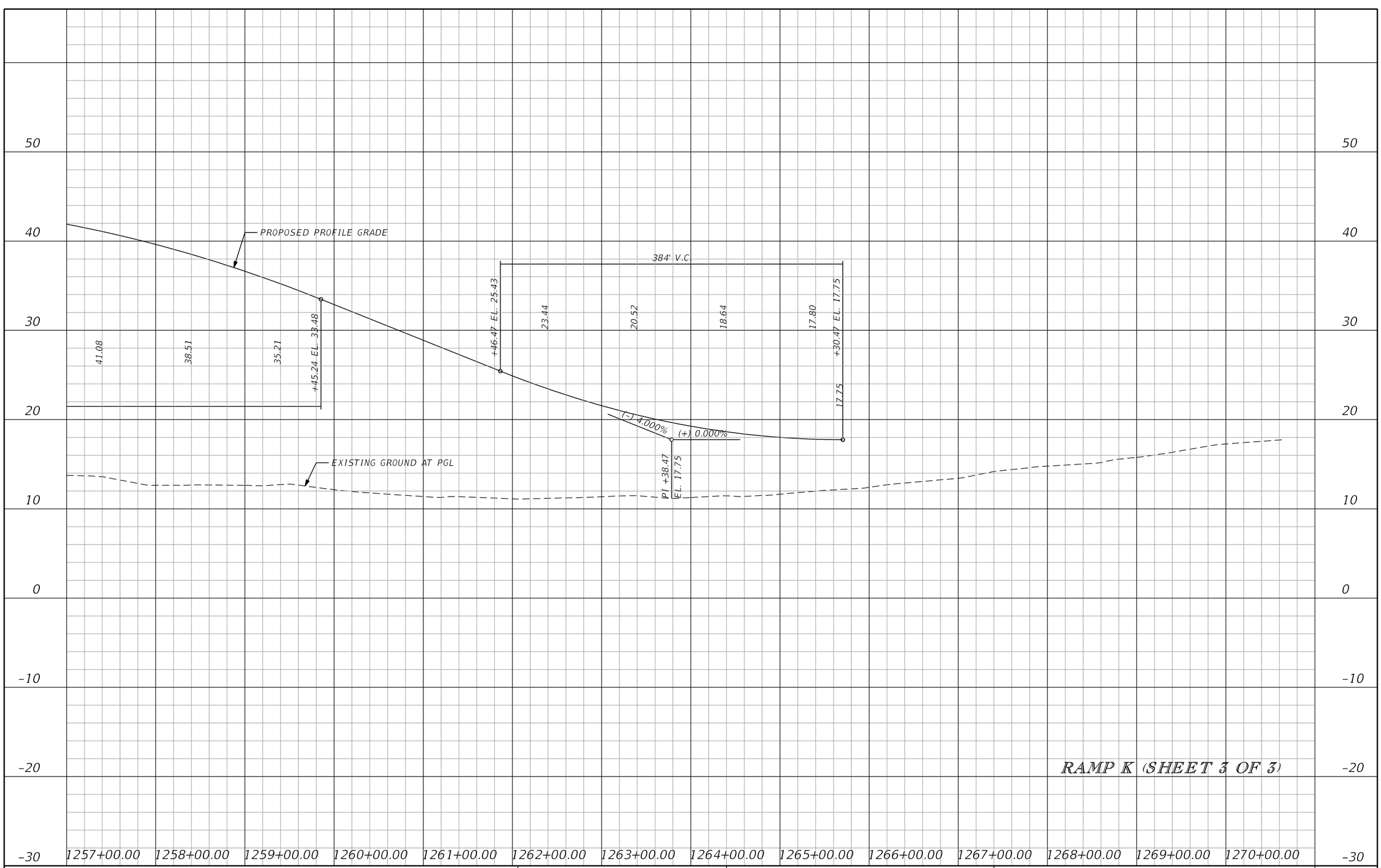
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE ALTERNATIVE 3

SHEET NO. 2

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RAMP K (SHEET 3 OF 3)

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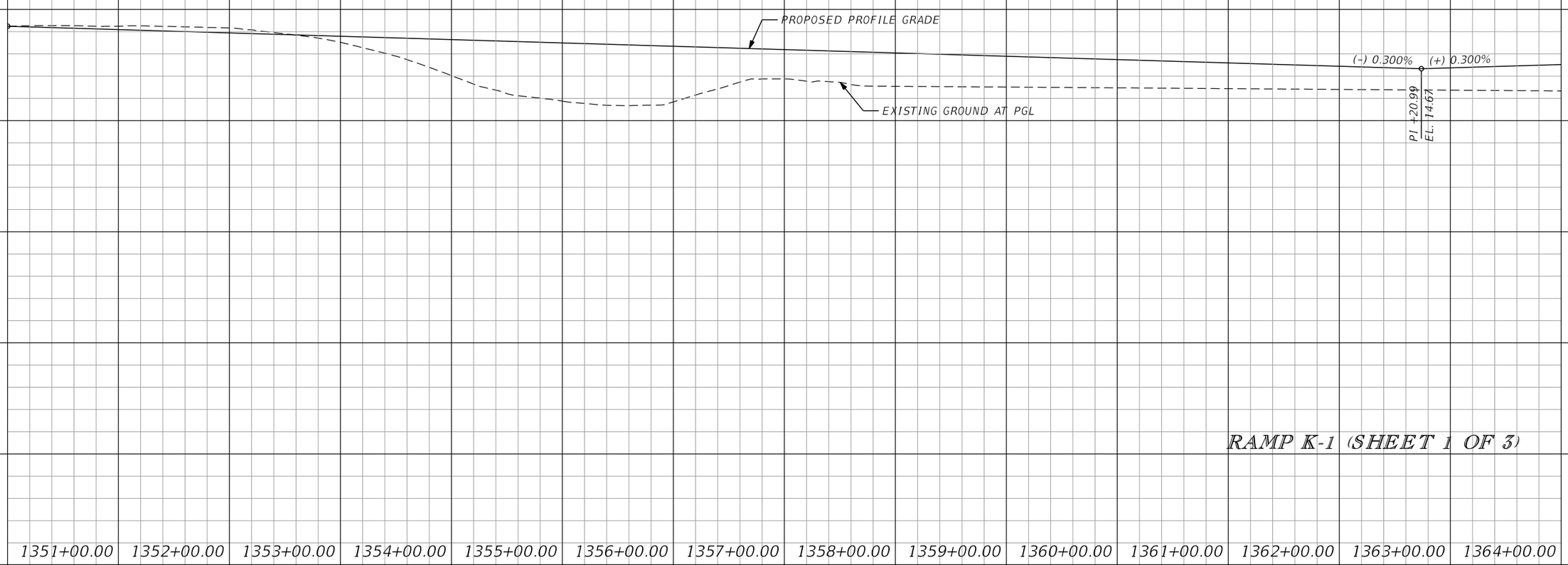
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 3

SHEET NO. 3

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RAMP K-1 (SHEET 1 OF 3)

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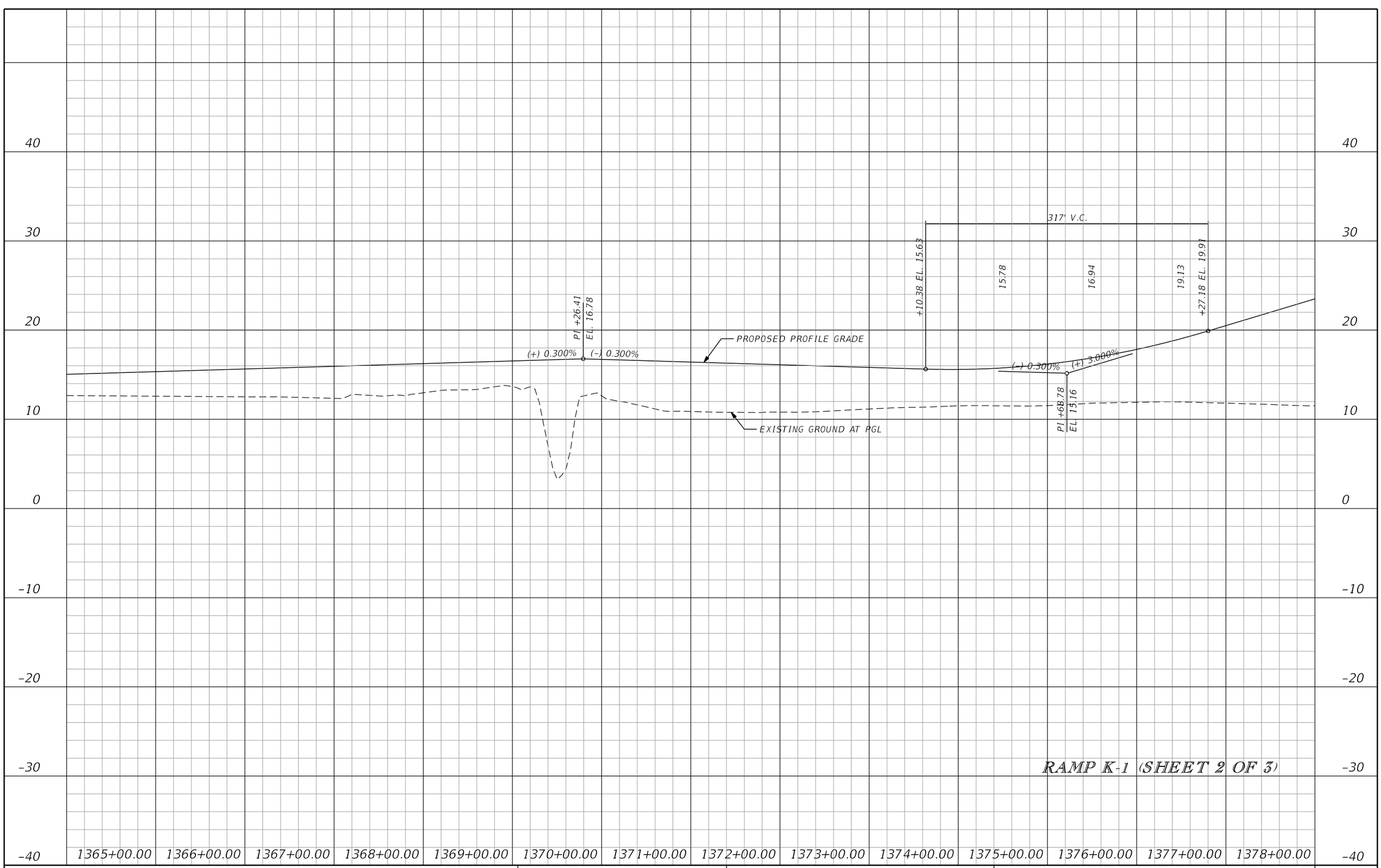
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE ALTERNATIVE 3

SHEET NO. 4

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RAMP K-1 (SHEET 2 OF 3)

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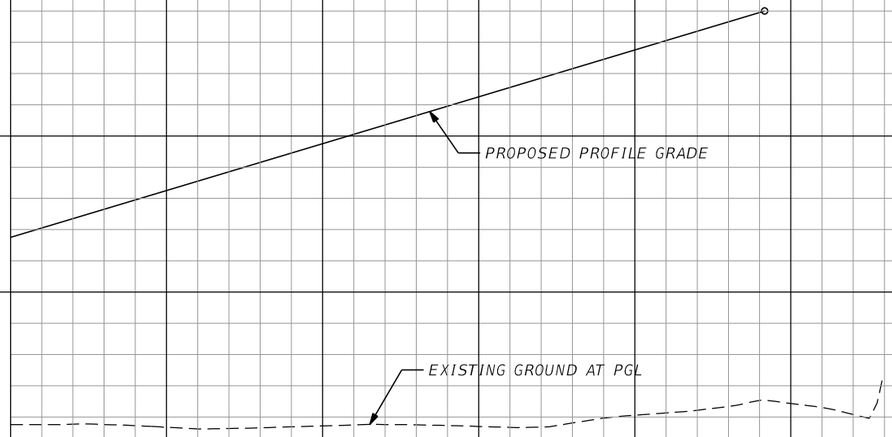
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 3

SHEET NO. 5

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1379+00.00 | 1380+00.00 | 1381+00.00 | 1382+00.00 | 1383+00.00 | 1384+00.00

RAMP K-1 (SHEET 3 OF 3)

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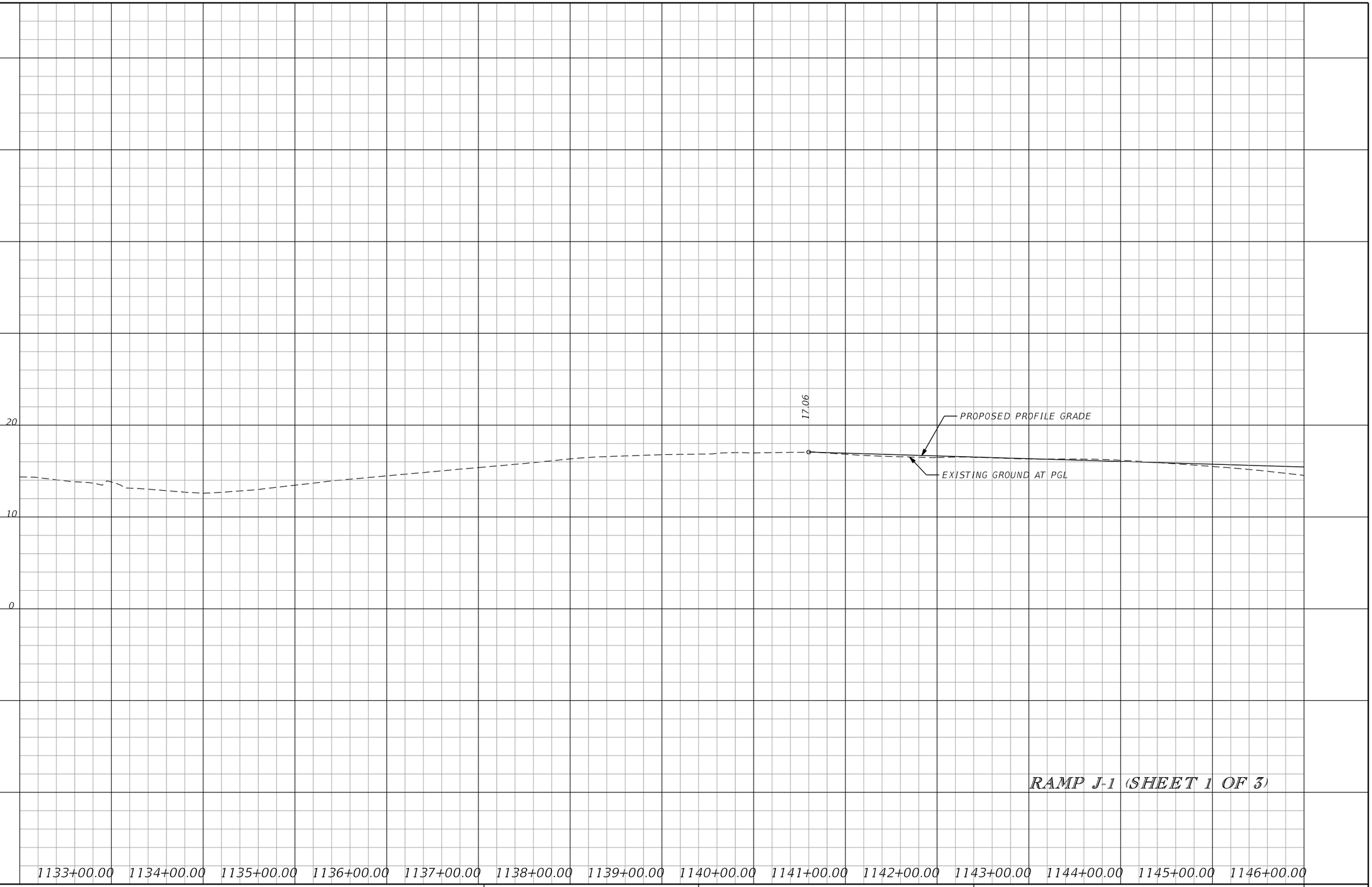
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 3

SHEET NO. 6

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RAMP J-1 (SHEET 1 OF 3)

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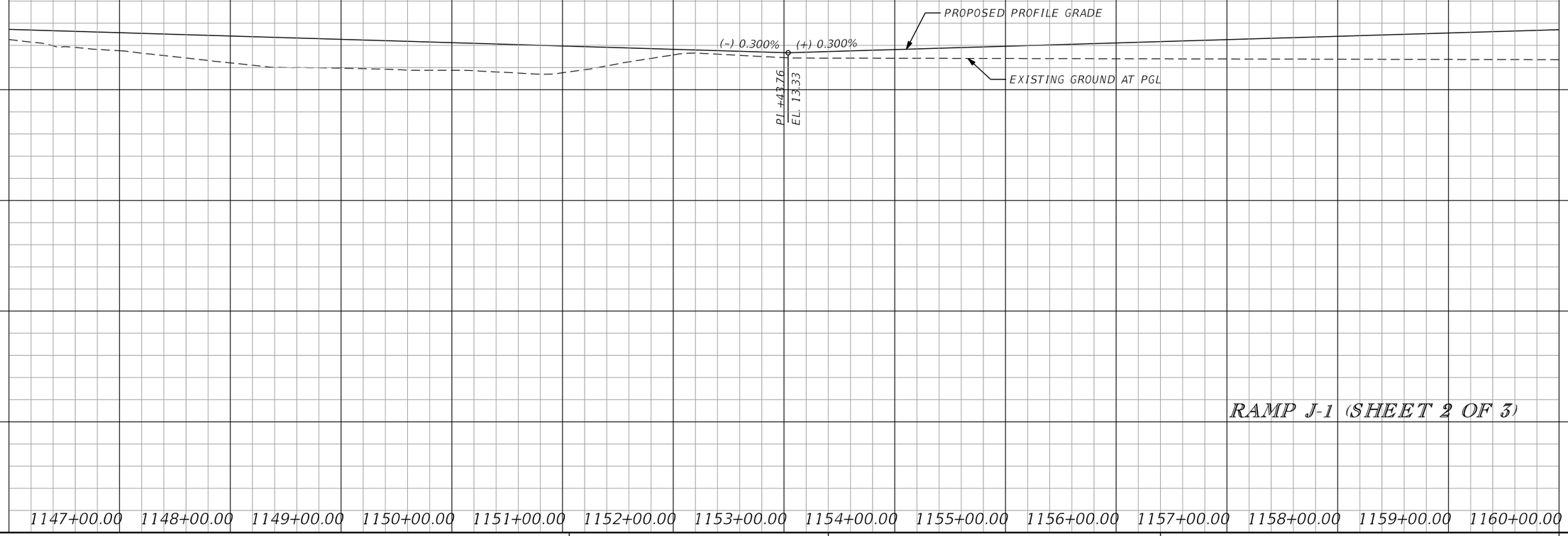
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE ALTERNATIVE 3

SHEET NO. 7

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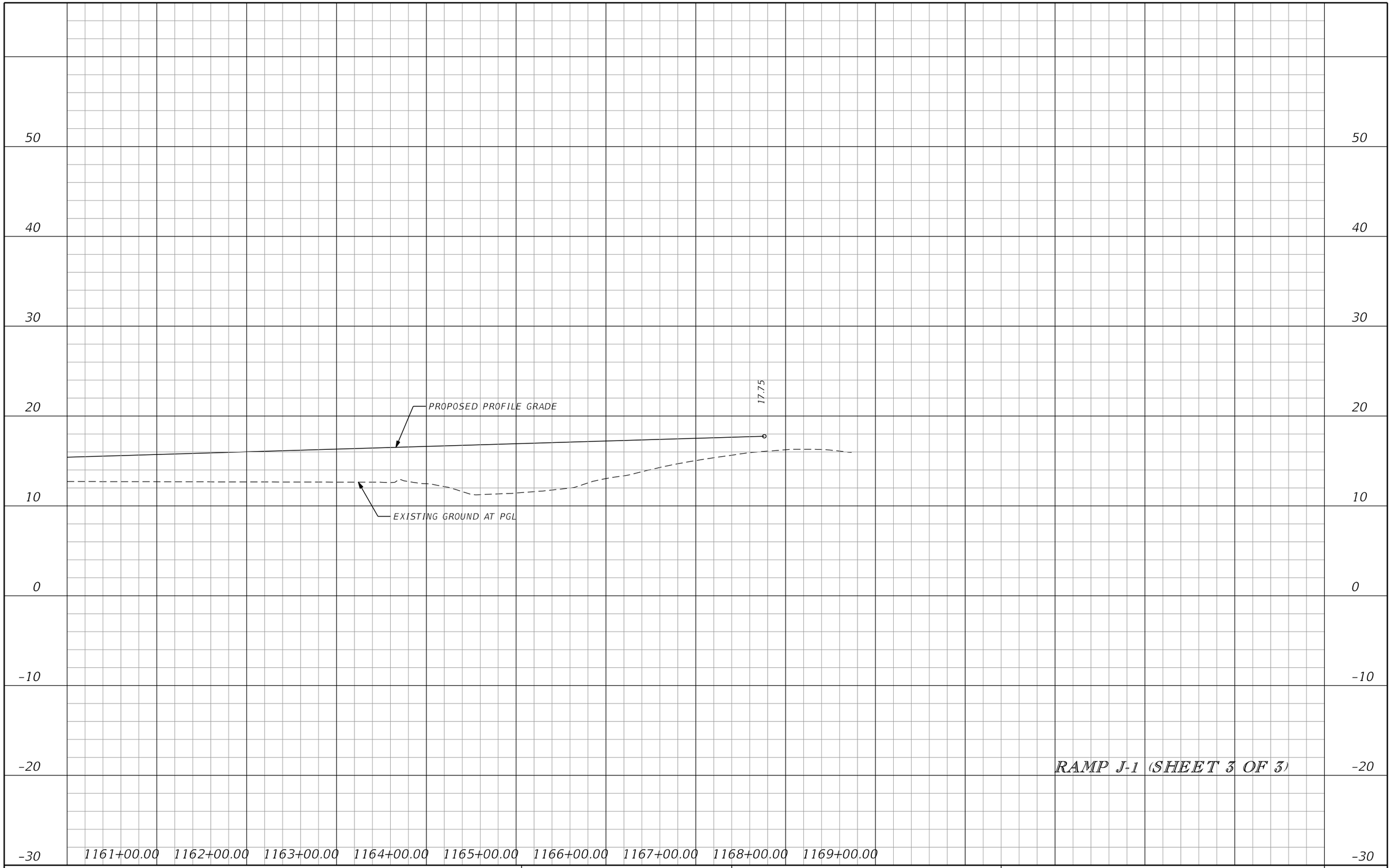
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE ALTERNATIVE 3

SHEET NO. 8

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RAMP J-1 (SHEET 3 OF 3)

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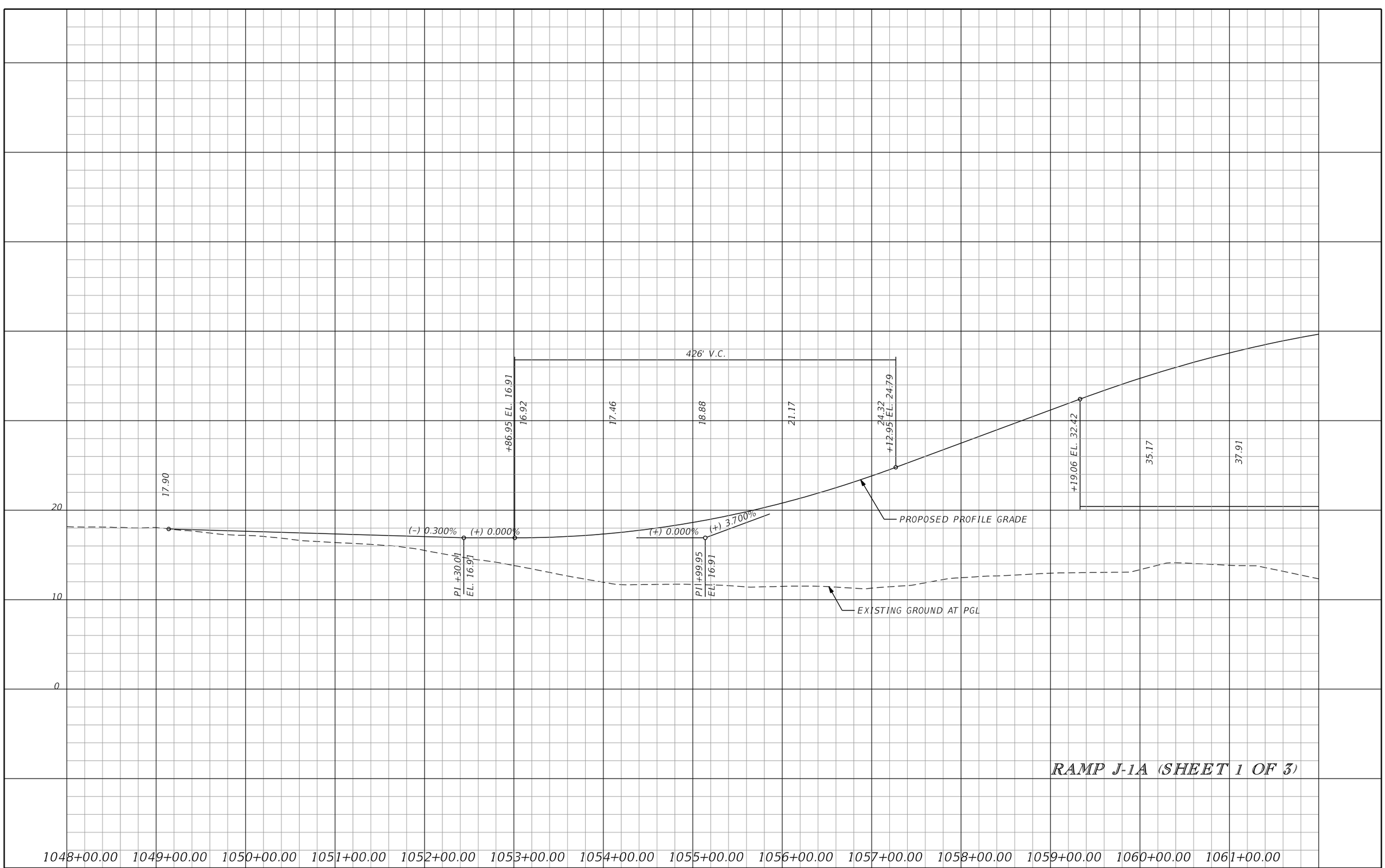
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 3

SHEET NO. 9

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RAMP J-1A (SHEET 1 OF 3)

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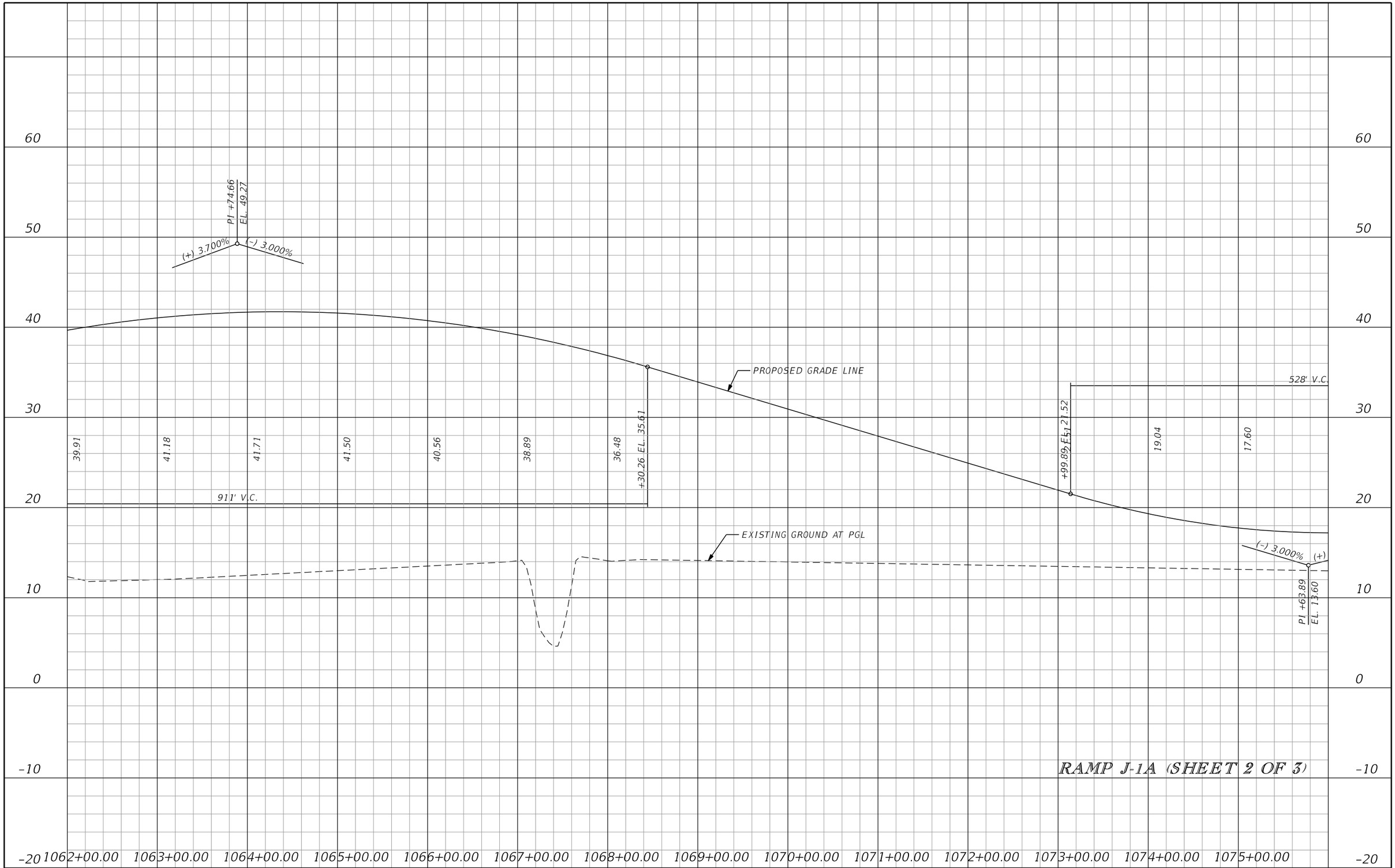
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE ALTERNATIVE 3

SHEET NO. 10

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RAMP J-1A (SHEET 2 OF 3)

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 3

SHEET NO. 11

mbrioso 6/15/2016 10:10:49 AM H:\CADD\41326512201\roadway\profrd13.dgn

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17.85

19.54

+27.89 EL. 20.20

38.00

2.500%

PROPOSED PROFILE GRADE

EXISTING GROUND AT PGL

1076+00.00 1077+00.00 1078+00.00 1079+00.00 1080+00.00 1081+00.00 1082+00.00 1083+00.00 1084+00.00 1085+00.00 1086+00.00

RAMP J-1A (SHEET 3 OF 3)

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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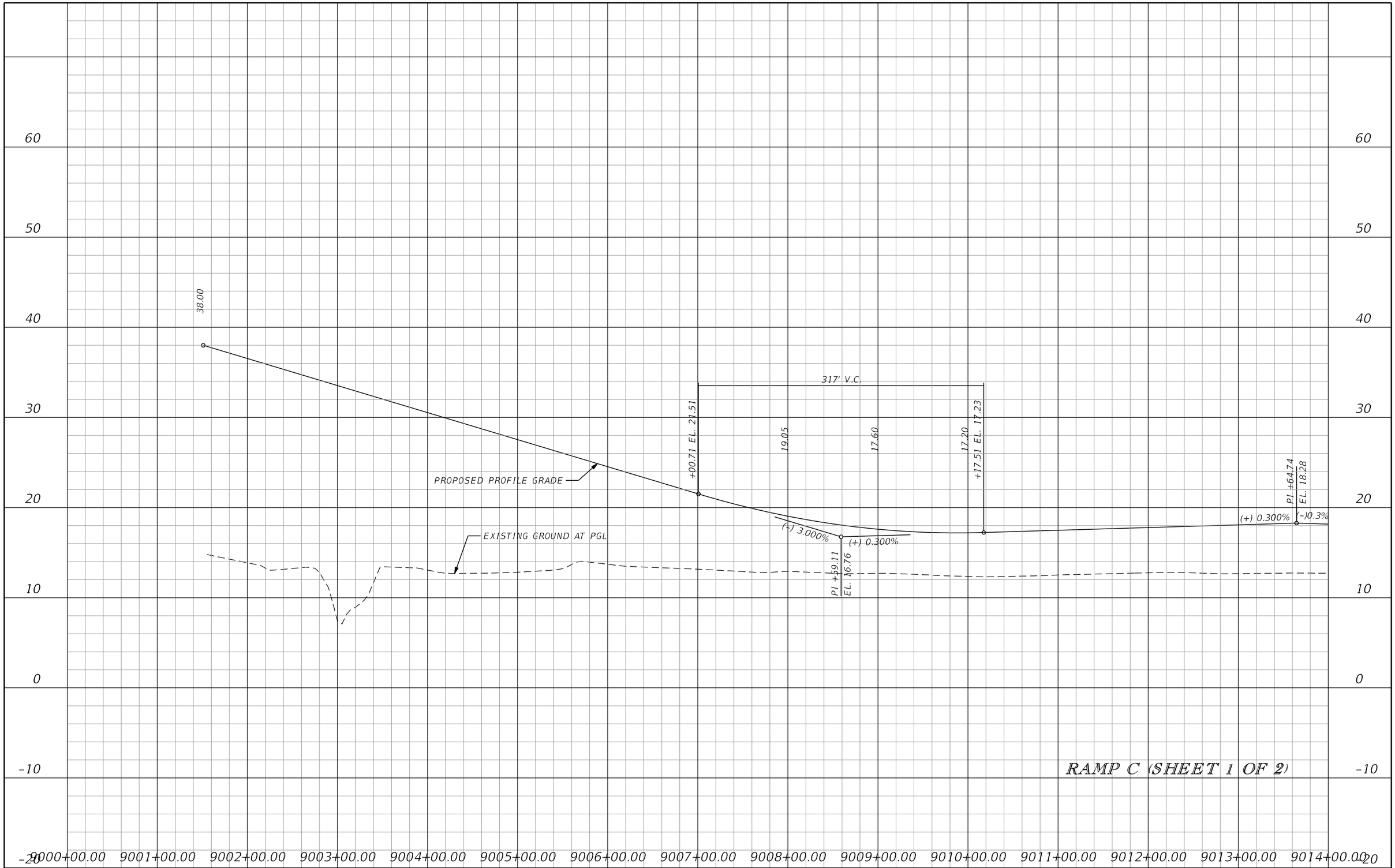
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 3

SHEET NO. 12

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RAMP C (SHEET 1 OF 2)

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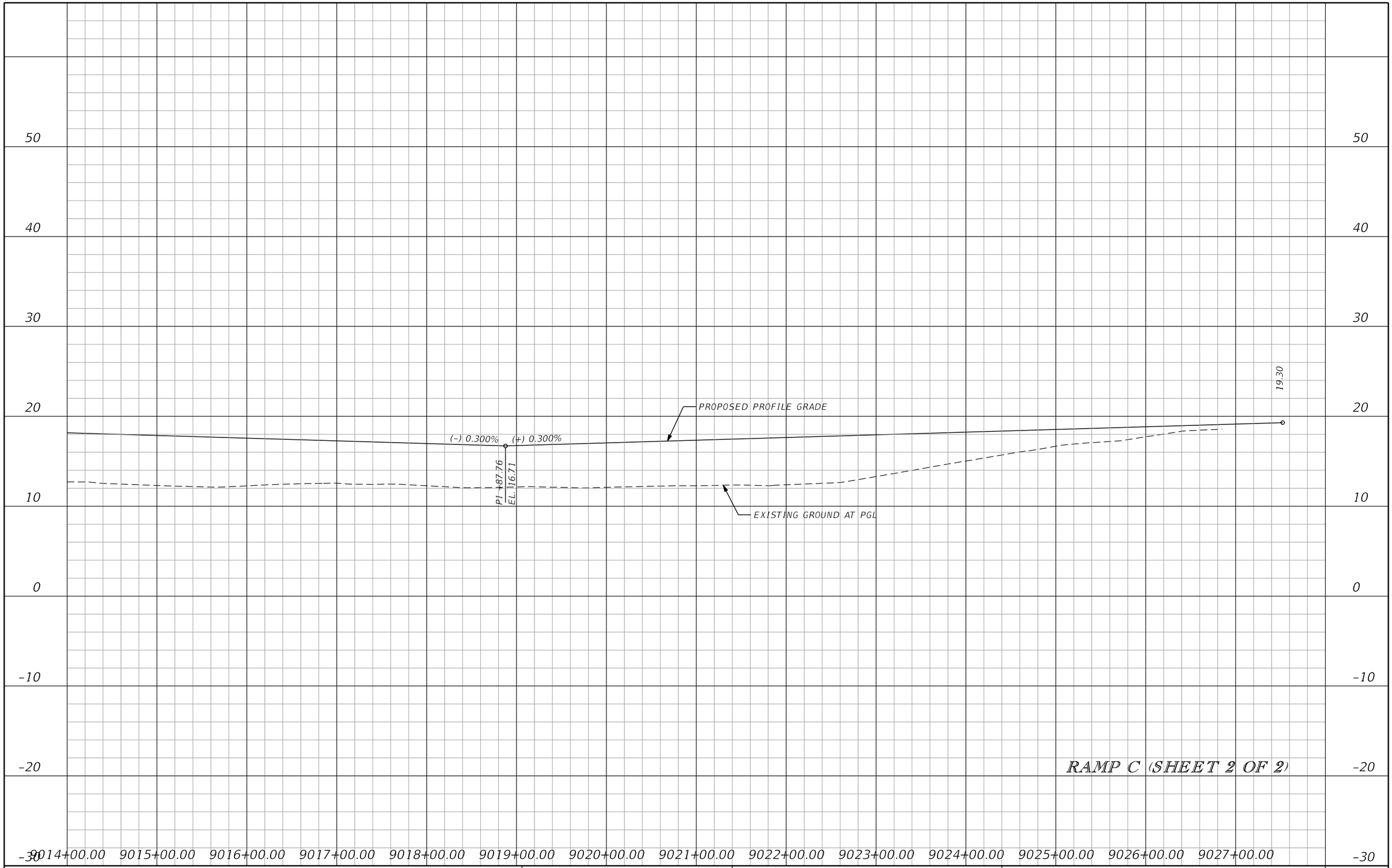
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 3

SHEET NO. 13

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RAMP C (SHEET 2 OF 2)

REVISIONS			
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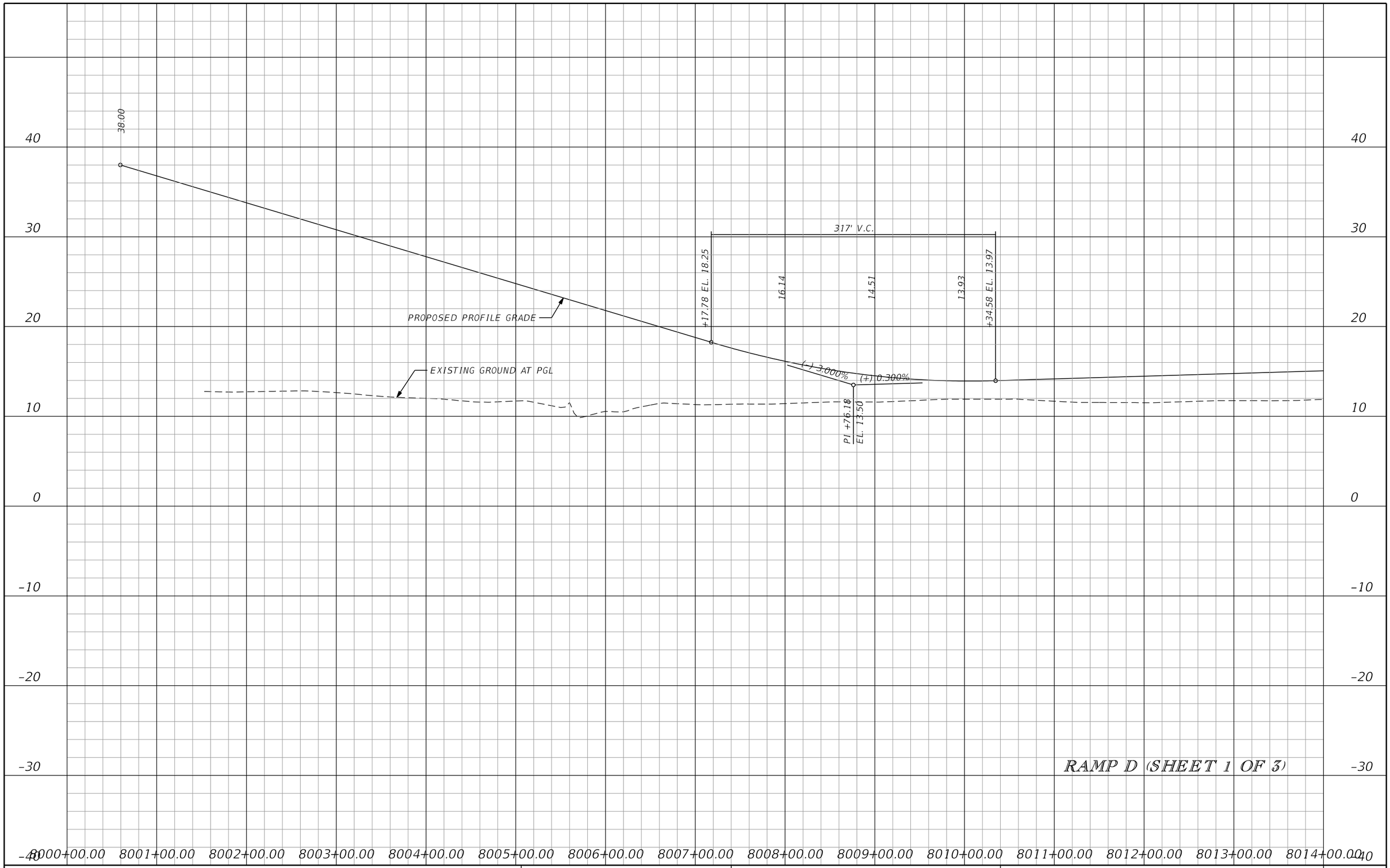
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 3

SHEET NO. 14

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RAMP D (SHEET 1 OF 3)

REVISIONS			
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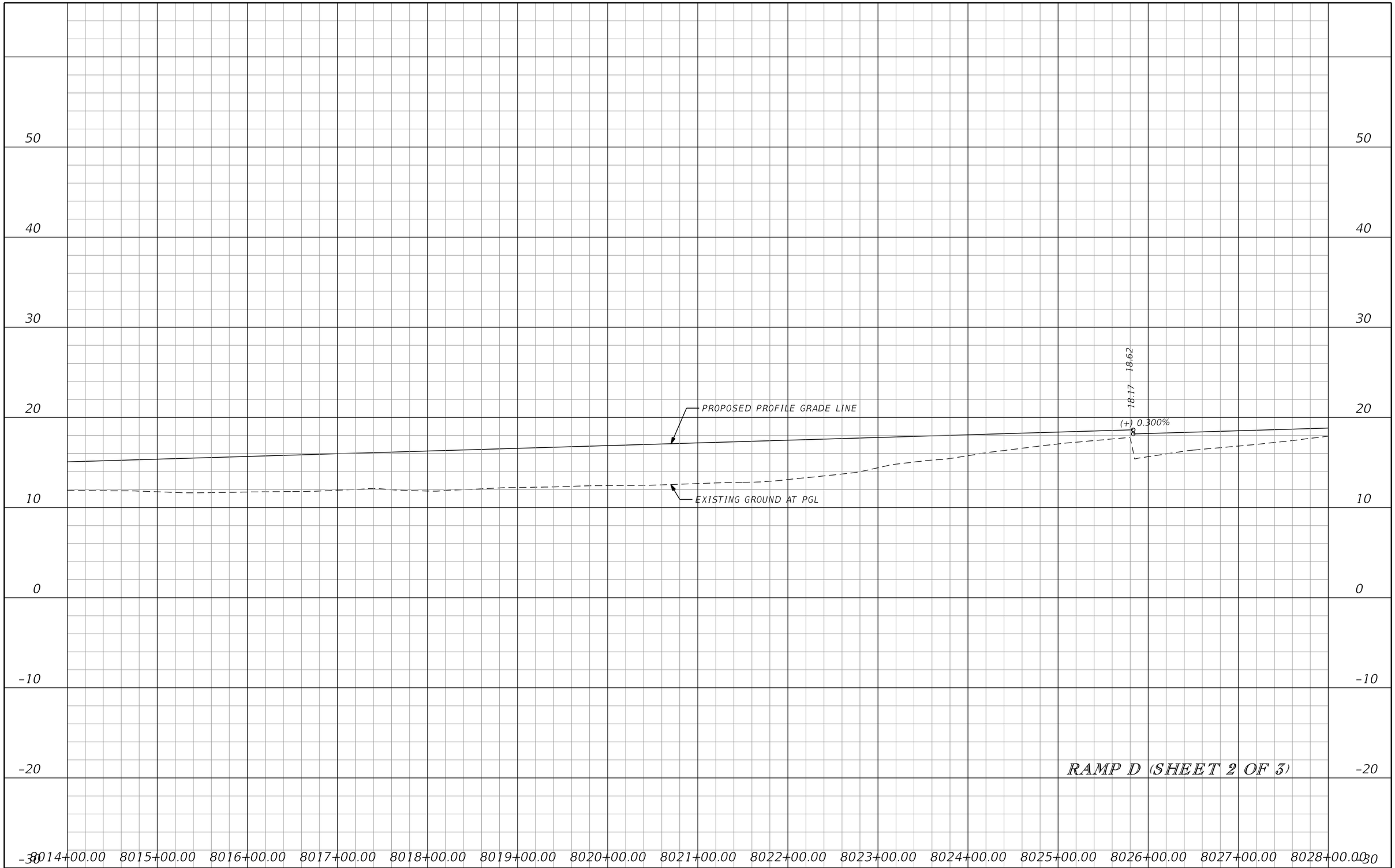
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 3

SHEET NO. 15

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RAMP D (SHEET 2 OF 3)

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

ROADWAY PROFILE
ALTERNATIVE 3

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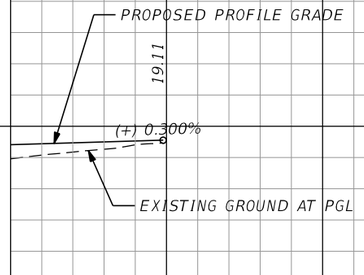
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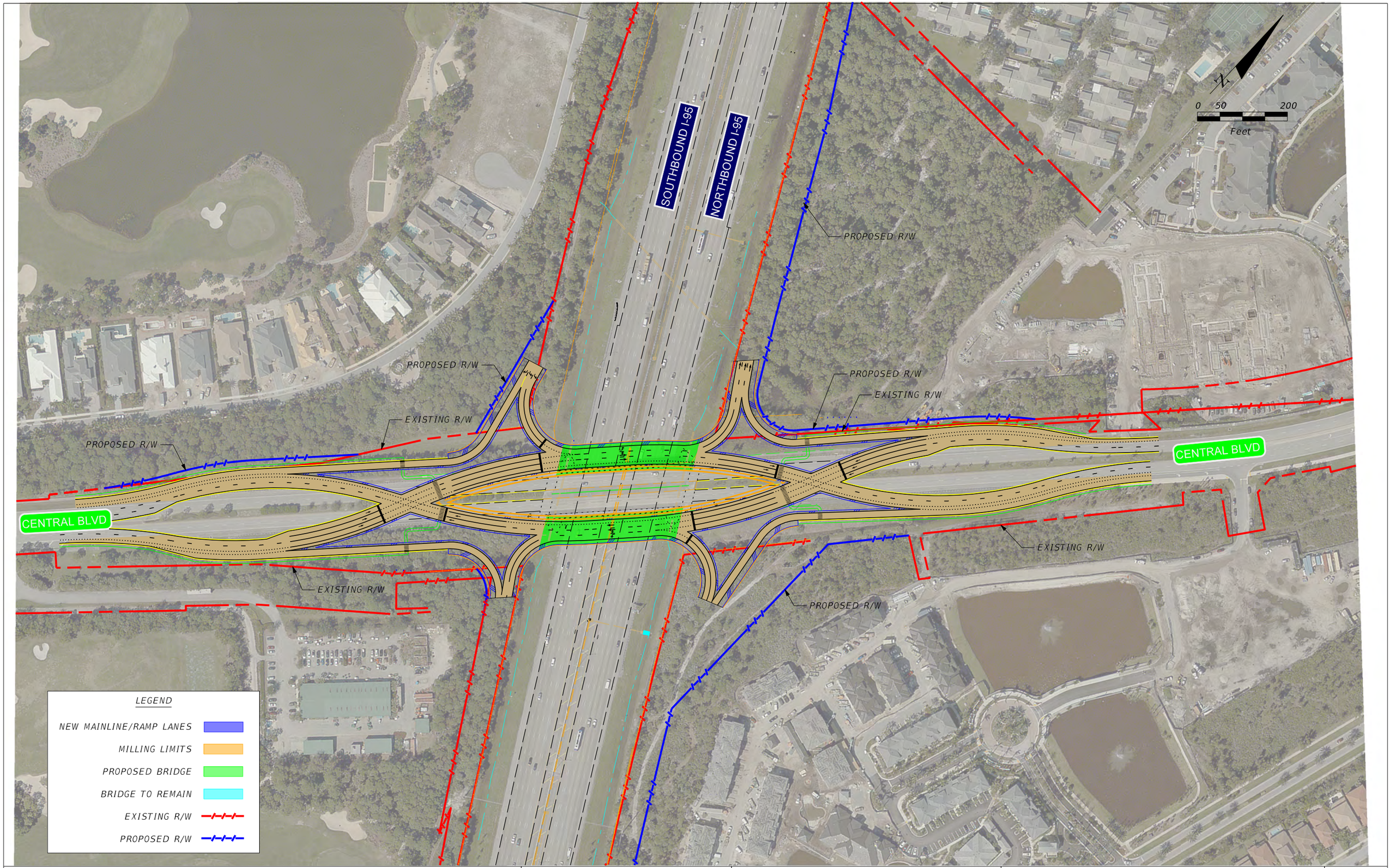


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RAMP D (SHEET 3 OF 3)

REVISIONS				SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			ROADWAY PROFILE ALTERNATIVE 3	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
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REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

SR 9/I-95 AT CENTRAL BLVD. INTERCHANGE PD&E STUDY

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	PALM BEACH	413265-1-22-01

I-95 FROM PGA BLVD. TO DONALD ROSS RD.

SHEET NO. 9

mbrloso 6/20/2016 10:57:02 AM H:\CADD\413265122O1\roadway\planrd12-bcc-DD1.dgn

APPENDIX C

COST ESTIMATES

ALTERNATIVE 2 (RECOMMENDED ALTERNATIVE) COST ESTIMATE

FDOT Long Range Estimating System - Production
Alternative 2 - Collector/Distibutor Roads with Tight Diamond Interchange

Project: 413265-1-52-01
Description: SR-9/I-95 @ PGA BOULEVARD/CENTRAL BOULEVARD
District: 04 **County:** 93 PALM BEACH
Project Manager: BING WANG

Alternative 2 Project Grand Total **$33,914,045.00**

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount
102-1	MAINTENANCE OF TRAFFIC	5.00			$1,334,673.16
101-1	MOBILIZATION	10.00			$2,802,813.64
104-10-3	SEDIMENT BARRIER	66,792.00	LF	$1.40	$93,508.80
104-11	FLOATING TURBIDITY BARRIER	550.00	LF	$9.66	$5,313.00
104-12	STAKED TURBIDITY BARRIER- NYL REINF PVC	550.00	LF	$5.19	$2,854.50
104-15	SOIL TRACKING PREVENTION DEVICE	6.00	EA	$1,872.75	$11,236.50
107-1	LITTER REMOVAL	39.98	AC	$48.62	$1,943.83
107-2	MOWING	39.98	AC	$87.70	$3,506.25
110-1-1	CLEARING & GRUBBING	70.00	AC	$23,610.28	$1,652,719.60
120-6	EMBANKMENT	224,891.00	CY	$15.96	$3,589,260.36
160-4	TYPE B STABILIZATION	138,358.00	SY	$4.96	$686,255.68
285-702	OPTIONAL BASE,BASE GROUP 02	46,271.00	SY	$12.52	$579,312.92
285-709	OPTIONAL BASE,BASE GROUP 09	79,432.00	SY	$24.81	$1,970,707.92
327-70-11	MILLING EXIST ASPH PAVT,2 1/4" AVG DEPTH	446,039.00	SY	$2.65	$1,182,003.35
334-1-12	SUPERPAVE ASPHALTIC CONC, TRAFFIC B	3,818.00	TN	$114.62	$437,619.16
334-1-14	SUPERPAVE ASPHALTIC CONC, TRAFFIC D	8,738.00	TN	$109.60	$957,684.80
334-1-24	SUPERPAVE ASPH CONC, TRAF D, PG76-22,PMA	45,536.00	TN	$108.08	$4,921,530.88
337-7-22	ASPH CONC FC,INC BIT,FC-5,PG76-22,PMA	21,300.00	TN	$143.38	$3,053,994.00
400-2-2	CONC CLASS II, ENDWALLS	99.00	CY	$2,160.00	$213,840.00
430-174-124	PIPE CULV, OPT MATL, ROUND,24"SD	4,400.00	LF	$147.06	$647,064.00
430-175-136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	440.00	LF	$137.93	$60,689.20
430-984-129	MITERED END SECT, OPTIONAL RD, 24" SD	220.00	EA	$2,351.18	$517,259.60
520-1-10	CONCRETE CURB & GUTTER, TYPE F	7,852.00	LF	$25.05	$196,692.60
522-1	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	2,235.00	SY	$42.87	$95,814.45

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount
570-1-1	PERFORMANCE TURF	3,872.00	SY	$1.40	$5,420.80
570-1-2	PERFORMANCE TURF, SOD	203,414.00	SY	$2.86	$581,764.04
630-2-11	CONDUIT, F& I, OPEN TRENCH	4,000.00	LF	$7.12	$28,480.00
635-2-11	PULL & SPLICE BOX, F&I, 13" X 24"	20.00	EA	$541.91	$10,838.20
700-1-11	SINGLE POST SIGN, F&I GM,	11.00	AS	$412.92	$4,542.12
700-1-12	SINGLE POST SIGN, F&I GM, 12-20 SF	132.00	AS	$1,129.66	$149,115.12
700-1-50	SINGLE POST SIGN, RELOCATE	11.00	AS	$198.08	$2,178.88
700-1-60	SINGLE POST SIGN, REMOVE	132.00	AS	$29.09	$3,839.88
700-2-14	MULTI- POST SIGN, F&I GM, 31-50 SF	11.00	AS	$4,359.45	$47,953.95
700-2-60	MULTI- POST SIGN, REMOVE	11.00	AS	$493.80	$5,431.80
700-4-112	OVERHEAD STATIC SS, F&I, CANTILEVER, 21-30FT	8.00	EA	$71,303.33	$570,426.64
700-4-127	OVERHEAD STATIC SS, F&I, SPAN, 152-200 FT	4.00	EA	$239,960.24	$959,840.96
711-15-101	THERMOPLASTIC, STD-OP, WHITE, SOLID, 6"	28.00	GM	$4,417.32	$123,684.96
711-15-131	THERMOPLASTIC, STD-OP, WHITE, SKIP, 6"	60.00	GM	$1,317.49	$79,049.40
711-15-201	THERMOPLASTIC, STD-OP,YELLOW, SOLID, 6"	11.00	GM	$4,398.46	$48,383.06
715-1-13	LIGHTING CONDUCTORS, F&I, INSUL, NO.4-2	12,000.00	LF	$2.39	$28,680.00
715-4-122	LIGHT POLE COMP, F&I, WS130, 45'	20.00	EA	$4,822.19	$96,443.80
715-500-1	POLE CABLE DIST SYS, CONVENTIONAL	20.00	EA	$553.11	$11,062.20
*	BRIDGE REMOVAL	2,960.00	SF	$60.00	$177,600.00
*	BRIDGE WIDENING (SIMPLE SPAN FIB)	11,544.00	SF	$160.00	$1,847,040.00
*	RETAINING WALLS (CONTINUOUS STEEL)	73,634.00	SF	$14	$1,030,876.00
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID) INCLUDES PROJECT UNKNOWNS	10.00			$3,083,095.00

Alternative 2 Project Grand Total **$33,914,045.00**

*Obtained from Structures Design Guidelines BDR Bridge Cost Estimating

ALTERNATIVE 2A COST ESTIMATE

FDOT Long Range Estimating System - Production
Alternative 2A - Collector/Distributor Roads with Diverging Diamond Interchange

Project: 413265-1-52-01
Description: SR-9/I-95 @ PGA BOULEVARD/CENTRAL BOULEVARD
District: 04 **County:** 93 PALM BEACH
Project Manager: BING WANG

Alternative 2A Project Grand Total **$43,741,804.77**

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount
102-1	MAINTENANCE OF TRAFFIC	5.00			$1,721,440.57
101-1	MOBILIZATION	10.00			$3,615,025.19
104-10-3	SEDIMENT BARRIER	66,792.00	LF	$1.40	$93,508.80
104-11	FLOATING TURBIDITY BARRIER	550.00	LF	$9.66	$5,313.00
104-12	STAKED TURBIDITY BARRIER- NYL REINF PVC	550.00	LF	$5.19	$2,854.50
104-15	SOIL TRACKING PREVENTION DEVICE	6.00	EA	$1,872.75	$11,236.50
107-1	LITTER REMOVAL	39.98	AC	$48.62	$1,943.83
107-2	MOWING	39.98	AC	$87.70	$3,506.25
110-1-1	CLEARING & GRUBBING	74.00	AC	$23,610.28	$1,747,160.72
120-6	EMBANKMENT	262,373.00	CY	$15.96	$4,187,473.08
160-4	TYPE B STABILIZATION	154,681.00	SY	$4.96	$767,217.76
285-702	OPTIONAL BASE,BASE GROUP 02	49,966.00	SY	$12.52	$625,574.32
285-709	OPTIONAL BASE,BASE GROUP 09	91,806.00	SY	$24.81	$2,277,706.86
327-70-11	MILLING EXIST ASPH PAVT,2 1/4" AVG DEPTH	437,928.00	SY	$2.65	$1,160,509.20
334-1-12	SUPERPAVE ASPHALTIC CONC, TRAFFIC B	4,123.00	TN	$114.62	$472,578.26
334-1-14	SUPERPAVE ASPHALTIC CONC, TRAFFIC D	10,100.00	TN	$109.60	$1,106,960.00
334-1-24	SUPERPAVE ASPH CONC, TRAF D, PG76-22,PMA	46,228.00	TN	$108.08	$4,996,322.24
337-7-22	ASPH CONC FC,INC BIT,FC-5,PG76-22,PMA	21,471.00	TN	$143.38	$3,078,511.98
400-2-2	CONC CLASS II, ENDWALLS	99.00	CY	$2,160.00	$213,840.00
430-174-124	PIPE CULV, OPT MATL, ROUND,24"SD	4,400.00	LF	$147.06	$647,064.00
430-175-136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	440.00	LF	$137.93	$60,689.20
430-984-129	MITERED END SECT, OPTIONAL RD, 24" SD	220.00	EA	$2,351.18	$517,259.60
520-1-10	CONCRETE CURB & GUTTER, TYPE F	6,154.00	LF	$25.05	$154,157.70
522-1	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	2,835.00	SY	$42.87	$121,536.45

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount
570-1-1	PERFORMANCE TURF	3,872.00	SY	$1.40	$5,420.80
570-1-2	PERFORMANCE TURF, SOD	255,407.00	SY	$2.86	$730,464.02
630-2-11	CONDUIT, F& I, OPEN TRENCH	4,000.00	LF	$7.12	$28,480.00
635-2-11	PULL & SPLICE BOX, F&I, 13" X 24"	20.00	EA	$541.91	$10,838.20
700-1-11	SINGLE POST SIGN, F&I GM,	11.00	AS	$412.92	$4,542.12
700-1-12	SINGLE POST SIGN, F&I GM, 12-20 SF	132.00	AS	$1,129.66	$149,115.12
700-1-50	SINGLE POST SIGN, RELOCATE	11.00	AS	$198.08	$2,178.88
700-1-60	SINGLE POST SIGN, REMOVE	132.00	AS	$29.09	$3,839.88
700-2-14	MULTI- POST SIGN, F&I GM, 31-50 SF	11.00	AS	$4,359.45	$47,953.95
700-2-60	MULTI- POST SIGN, REMOVE	11.00	AS	$493.80	$5,431.80
700-4-112	OVERHEAD STATIC SS, F&I, CANTILEVER, 21-30FT	8.00	EA	$71,303.33	$570,426.64
700-4-127	OVERHEAD STATIC SS, F&I, SPAN, 152-200 FT	4.00	EA	$239,960.24	$959,840.96
711-15-101	THERMOPLASTIC, STD-OP, WHITE, SOLID, 6"	29.00	GM	$4,417.32	$128,102.28
711-15-131	THERMOPLASTIC, STD-OP, WHITE, SKIP, 6"	64.00	GM	$1,317.49	$84,319.36
711-15-201	THERMOPLASTIC, STD-OP,YELLOW, SOLID, 6"	11.00	GM	$4,398.46	$48,383.06
715-1-13	LIGHTING CONDUCTORS, F&I, INSUL, NO.4-2	12,000.00	LF	$2.39	$28,680.00
715-4-122	LIGHT POLE COMP, F&I, WS130, 45'	20.00	EA	$4,822.19	$96,443.80
715-500-1	POLE CABLE DIST SYS, CONVENTIONAL	20.00	EA	$553.11	$11,062.20
*	BRIDGE REMOVAL	31,080.00	SF	$60.00	$1,864,800.00
*	NEW BRIDGE (SIMPLE SPAN FIB)	34,446.00	SF	$160.00	$5,511,360.00
*	RETAINING WALLS (CONTINUOUS STEEL)	134,586.00	SF	$14	$1,884,204.00
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID) INCLUDES PROJECT UNKNOWNS	10.00			$3,976,527.71

Alternative 2A Project Grand Total **$43,741,804.77**

*Obtained from Structures Design Guidelines BDR Bridge Cost Estimating

ALTERNATIVE 3A COST ESTIMATE

ALTERNATIVE 3 COST ESTIMATE

FDOT Long Range Estimating System - Production
Alternative 3 - Braided Ramps with Tight Diamond Interchange

Project: 413265-1-52-01
Description: SR-9/I-95 @ PGA BOULEVARD/CENTRAL BOULEVARD
District: 04 **County:** 93 PALM BEACH
Project Manager: BING WANG

Alternative 3 Project Grand Total **$47,269,786.75**

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount
102-1	MAINTENANCE OF TRAFFIC	5.00			$1,860,282.83
101-1	MOBILIZATION	10.00			$3,906,593.95
104-10-3	SEDIMENT BARRIER	66,792.00	LF	$1.40	$93,508.80
104-11	FLOATING TURBIDITY BARRIER	550.00	LF	$9.66	$5,313.00
104-12	STAKED TURBIDITY BARRIER- NYL REINF PVC	550.00	LF	$5.19	$2,854.50
104-15	SOIL TRACKING PREVENTION DEVICE	6.00	EA	$1,872.75	$11,236.50
107-1	LITTER REMOVAL	39.98	AC	$48.62	$1,943.83
107-2	MOWING	39.98	AC	$87.70	$3,506.25
110-1-1	CLEARING & GRUBBING	70.00	AC	$23,610.28	$1,652,719.60
120-6	EMBANKMENT	359,451.00	CY	$15.96	$5,736,837.96
160-4	TYPE B STABILIZATION	125,131.00	SY	$4.96	$620,649.76
285-702	OPTIONAL BASE,BASE GROUP 02	43,533.00	SY	$12.52	$545,033.16
285-709	OPTIONAL BASE,BASE GROUP 09	70,161.00	SY	$24.81	$1,740,694.41
327-70-11	MILLING EXIST ASPH PAVT,2 1/4" AVG DEPTH	457,645.00	SY	$2.65	$1,212,759.25
334-1-12	SUPERPAVE ASPHALTIC CONC, TRAFFIC B	3,592.00	TN	$114.62	$411,715.04
334-1-14	SUPERPAVE ASPHALTIC CONC, TRAFFIC D	7,718.00	TN	$109.60	$845,892.80
334-1-24	SUPERPAVE ASPH CONC, TRAF D, PG76-22,PMA	45,474.00	TN	$108.08	$4,914,829.92
337-7-22	ASPH CONC FC,INC BIT,FC-5,PG76-22,PMA	21,354.00	TN	$143.38	$3,061,736.52
400-2-2	CONC CLASS II, ENDWALLS	99.00	CY	$2,160.00	$213,840.00
425-1-891	INLETS, BARRIER WALL <10'	74.00	EA	$4,882.45	$361,301.30
430-174-124	PIPE CULV, OPT MATL, ROUND,24"SD	12,930.00	LF	$147.06	$1,901,485.80
430-175-136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	440.00	LF	$137.93	$60,689.20
430-984-129	MITERED END SECT, OPTIONAL RD, 24" SD	220.00	EA	$2,351.18	$517,259.60
520-1-10	CONCRETE CURB & GUTTER, TYPE F	7,852.00	LF	$25.05	$196,692.60

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount
522-1	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	2,235.00	SY	$42.87	$95,814.45
570-1-1	PERFORMANCE TURF	3,872.00	SY	$1.40	$5,420.80
570-1-2	PERFORMANCE TURF, SOD	185,496.00	SY	$2.86	$530,518.56
630-2-11	CONDUIT, F& I, OPEN TRENCH	4,000.00	LF	$7.12	$28,480.00
635-2-11	PULL & SPLICE BOX, F&I, 13" X 24"	20.00	EA	$541.91	$10,838.20
700-1-11	SINGLE POST SIGN, F&I GM,	22.00	AS	$412.92	$9,084.24
700-1-12	SINGLE POST SIGN, F&I GM, 12-20 SF	132.00	AS	$1,129.66	$149,115.12
700-1-50	SINGLE POST SIGN, RELOCATE	11.00	AS	$198.08	$2,178.88
700-1-60	SINGLE POST SIGN, REMOVE	132.00	AS	$29.09	$3,839.88
700-2-14	MULTI- POST SIGN, F&I GM, 31-50 SF	22.00	AS	$4,359.45	$95,907.90
700-2-60	MULTI- POST SIGN, REMOVE	11.00	AS	$493.80	$5,431.80
700-4-112	OVERHEAD STATIC SS, F&I, CANTILEVER, 21-30FT	8.00	EA	$71,303.33	$570,426.64
700-4-127	OVERHEAD STATIC SS, F&I, SPAN, 152-200 FT	4.00	EA	$239,960.24	$959,840.96
711-15-101	THERMOPLASTIC, STD-OP, WHITE, SOLID, 6"	29.00	GM	$4,417.32	$128,102.28
711-15-131	THERMOPLASTIC, STD-OP, WHITE, SKIP, 6"	63.00	GM	$1,317.49	$83,001.87
711-15-201	THERMOPLASTIC, STD-OP,YELLOW, SOLID, 6"	11.00	GM	$4,398.46	$48,383.06
715-1-13	LIGHTING CONDUCTORS, F&I, INSUL, NO.4-2	44,000.00	LF	$2.39	$105,160.00
715-4-122	LIGHT POLE COMP, F&I, WS130, 45'	74.00	EA	$4,822.19	$356,842.06
715-500-1	POLE CABLE DIST SYS, CONVENTIONAL	74.00	EA	$553.11	$40,930.14
*	BRIDGE REMOVAL	2,960.00	SF	$60.00	$177,600.00
*	BRIDGE WIDENING (SIMPLE SPAN FIB)	11,544.00	SF	$160.00	$1,847,040.00
*	NEW BRIDGE (CONTINUOUS STEEL)	32,115.00	SF	$170.00	$5,459,550.00
*	RETAINING WALLS (CONTINUOUS STEEL)	169,975.00	SF	$14	$2,379,650.00
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID) INCLUDES PROJECT UNKNOWNS	10.00			$4,297,253.34

Alternative 3 Project Grand Total **$47,269,786.75**

*Obtained from Structures Design Guidelines BDR Bridge Cost Estimating

FDOT Long Range Estimating System - Production
Alternative 3A - Braided Ramps with Diverging Diamond Interchange

Project: 413265-1-52-01
Description: SR-9/I-95 @ PGA BOULEVARD/CENTRAL BOULEVARD
District: 04 **County:** 93 PALM BEACH
Project Manager: BING WANG

Alternative 3A Project Grand Total **$57,407,532.23**

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount
102-1	MAINTENANCE OF TRAFFIC	10.00			$2,259,249.60
101-1	MOBILIZATION	10.00			$4,744,424.15
104-10-3	SEDIMENT BARRIER	66,792.00	LF	$1.40	$93,508.80
104-11	FLOATING TURBIDITY BARRIER	550.00	LF	$9.66	$5,313.00
104-12	STAKED TURBIDITY BARRIER- NYL REINF PVC	550.00	LF	$5.19	$2,854.50
104-15	SOIL TRACKING PREVENTION DEVICE	6.00	EA	$1,872.75	$11,236.50
107-1	LITTER REMOVAL	39.98	AC	$48.62	$1,943.83
107-2	MOWING	39.98	AC	$87.70	$3,506.25
110-1-1	CLEARING & GRUBBING	74.00	AC	$23,610.28	$1,747,160.72
120-6	EMBANKMENT	419,360.00	CY	$15.96	$6,692,985.60
160-4	TYPE B STABILIZATION	141,454.00	SY	$4.96	$701,611.84
285-702	OPTIONAL BASE,BASE GROUP 02	47,228.00	SY	$12.52	$591,294.56
285-709	OPTIONAL BASE,BASE GROUP 09	82,535.00	SY	$24.81	$2,047,693.35
327-70-11	MILLING EXIST ASPH PAVT,2 1/4" AVG DEPTH	449,534.00	SY	$2.65	$1,191,265.10
334-1-12	SUPERPAVE ASPHALTIC CONC, TRAFFIC B	3,897.00	TN	$114.62	$446,674.14
334-1-14	SUPERPAVE ASPHALTIC CONC, TRAFFIC D	9,079.00	TN	$109.60	$995,058.40
334-1-24	SUPERPAVE ASPH CONC, TRAF D, PG76-22,PMA	46,165.00	TN	$108.08	$4,989,513.20
337-7-22	ASPH CONC FC,INC BIT,FC-5,PG76-22,PMA	21,524.00	TN	$143.38	$3,086,111.12
400-2-2	CONC CLASS II, ENDWALLS	99.00	CY	$2,160.00	$213,840.00
425-1-891	INLETS, BARRIER WALL <10'	74.00	EA	$4,882.45	$361,301.30
430-174-124	PIPE CULV, OPT MATL, ROUND,24"SD	12,930.00	LF	$147.06	$1,901,485.80
430-175-136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	440.00	LF	$137.93	$60,689.20
430-984-129	MITERED END SECT, OPTIONAL RD, 24" SD	220.00	EA	$2,351.18	$517,259.60
520-1-10	CONCRETE CURB & GUTTER, TYPE F	6,154.00	LF	$25.05	$154,157.70

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount
522-1	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	2,835.00	SY	$42.87	$121,536.45
570-1-1	PERFORMANCE TURF	3,872.00	SY	$1.40	$5,420.80
570-1-2	PERFORMANCE TURF, SOD	200,998.00	SY	$2.86	$574,854.28
630-2-11	CONDUIT, F& I, OPEN TRENCH	4,000.00	LF	$7.12	$28,480.00
635-2-11	PULL & SPLICE BOX, F&I, 13" X 24"	20.00	EA	$541.91	$10,838.20
700-1-11	SINGLE POST SIGN, F&I GM,	22.00	AS	$412.92	$9,084.24
700-1-12	SINGLE POST SIGN, F&I GM, 12-20 SF	132.00	AS	$1,129.66	$149,115.12
700-1-50	SINGLE POST SIGN, RELOCATE	11.00	AS	$198.08	$2,178.88
700-1-60	SINGLE POST SIGN, REMOVE	132.00	AS	$29.09	$3,839.88
700-2-14	MULTI- POST SIGN, F&I GM, 31-50 SF	22.00	AS	$4,359.45	$95,907.90
700-2-60	MULTI- POST SIGN, REMOVE	11.00	AS	$493.80	$5,431.80
700-4-112	OVERHEAD STATIC SS, F&I, CANTILEVER, 21-30FT	8.00	EA	$71,303.33	$570,426.64
700-4-127	OVERHEAD STATIC SS, F&I, SPAN, 152-200 FT	4.00	EA	$239,960.24	$959,840.96
711-15-101	THERMOPLASTIC, STD-OP, WHITE, SOLID, 6"	30.00	GM	$4,417.32	$132,519.60
711-15-131	THERMOPLASTIC, STD-OP, WHITE, SKIP, 6"	60.00	GM	$1,317.49	$79,049.40
711-15-201	THERMOPLASTIC, STD-OP,YELLOW, SOLID, 6"	11.00	GM	$4,398.46	$48,383.06
715-1-13	LIGHTING CONDUCTORS, F&I, INSUL, NO.4-2	44,000.00	LF	$2.39	$105,160.00
715-4-122	LIGHT POLE COMP, F&I, WS130, 45'	74.00	EA	$4,822.19	$356,842.06
715-500-1	POLE CABLE DIST SYS, CONVENTIONAL	74.00	EA	$553.11	$40,930.14
*	BRIDGE REMOVAL	31,080.00	SF	$60.00	$1,864,800.00
*	NEW BRIDGE (CONTINUOUS STEEL)	32,115.00	SF	$170.00	$5,459,550.00
*	NEW BRIDGE (SIMPLE SPAN FIB)	34,446.00	SF	$160.00	$5,511,360.00
*	RETAINING WALLS (CONTINUOUS STEEL)	230,927.00	SF	$14	$3,232,978.00
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)	10.00			$5,218,866.57

Alternative 3A Project Grand Total **$57,407,532.23**

*Obtained from Structures Design Guidelines BDR Bridge Cost Estimating

APPENDIX D

RECOMMENDED ALTERNATIVE TYPICAL SECTION PACKAGE

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION PACKAGE

FINANCIAL PROJECT ID 413265-1-22-01

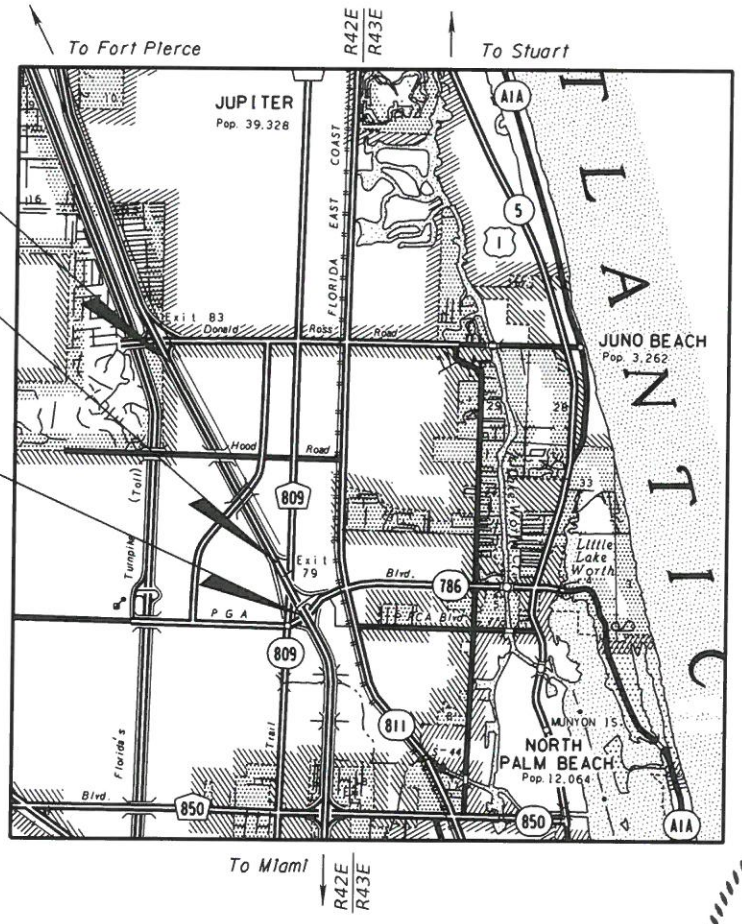
PALM BEACH COUNTY (93220)
STATE ROAD NO. 9

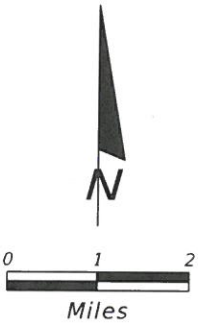
SR 9/I-95 FROM NORTH OF PGA BOULEVARD
TO DONALD ROSS ROAD

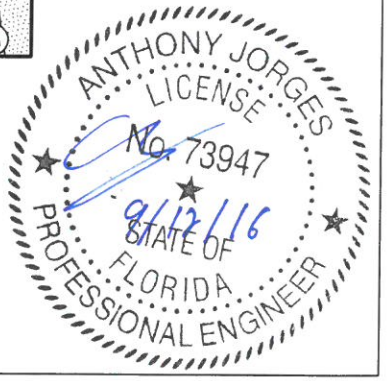
END PROJECT
STA 190+00.00
MP 40.163

℄ & ℄ I-95 EQUATION
POT STA 1987+44.75 BK =
POT STA 33+78.26 AH

BEGIN PROJECT
STA 1965+00.00
MP 36.783







PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 413265-1-22-01 COUNTY (SECTION) PALM BEACH COUNTY (93220)

PROJECT DESCRIPTION SR 9/I-95 FROM NORTH OF PGA BOULEVARD TO DONALD ROSS ROAD

PROJECT CONTROLS

FUNCTIONAL CLASSIFICATION

( ) RURAL

(X) URBAN

(X) FREEWAY/EXPWY. ( ) MAJOR COLL.

(X) PRINCIPAL ART. ( ) MINOR COLL.

( ) MINOR ART. ( ) LOCAL

HIGHWAY SYSTEM

Yes	No	
(X)	( )	NATIONAL HIGHWAY SYSTEM
(X)	( )	STRATEGIC INTERMODAL SYSTEM
(X)	( )	STATE HIGHWAY SYSTEM
( )	(X)	OFF STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY

( ) 2 - RESTRICTIVE w/Service Roads

( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing

( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing

( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing

( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing

( ) 7 - BOTH MEDIAN TYPES

TRAFFIC

	YEAR	AADT
CURRENT	2020	99,711
OPENING	2030	109,978
DESIGN	2040	120,578

DESIGN SPEED 70 MPH

POSTED SPEED 70 MPH

DISTRIBUTION

K = 9 %

D = 57 %

T_{24} = 4 %

DESIGN SPEED APPROVALS

HOWARD WEBB, P.E.
DISTRICT DESIGN ENGINEER — DATE 10/12/2016

MARK PLASS, P.E.
DISTRICT TRAFFIC OPERATIONS ENGINEER — DATE 10/11/16

CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION

( ) RRR INTERSTATE / FREEWAY

( ) RRR NON-INTERSTATE / FREEWAY

( ) TDLC / NEW CONSTRUCTION / RECONSTRUCTION

( ) TDLC / RRR

( ) MANUAL OF UNIFORM MINIMUM STANDARDS (FLORIDA GREENBOOK) (OFF-STATE HIGHWAY SYSTEM ONLY)

LIST ANY POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION ELEMENTS:

DESIGN VARIATION: BORDER WIDTH

LIST MAJOR STRUCTURES LOCATION/DESCRIPTION - REQUIRING INDEPENDENT STRUCTURE DESIGN:

EXISTING STRUCTURES AFFECTED: 930379 (CENTRAL BLVD OVER I-95)

LIST MAJOR UTILITIES WITHIN PROJECT CORRIDOR:

COMMUNICATIONS: AT&T, AT&T DISTRIBUTION, BELCAN ENGINEERING GROUP, CENTURYLINK, COMCAST PBG, FIBERLIGHT LLC FPL FIBERNET LLC, LEVEL 3 COMMUNICATIONS, MCI (VERIZON), SPRINT NEXTEL, WINDSTREAM COMMUNICATIONS

ELECTRICAL: FDOT PALM BEACH, FPL PALM BEACH, FPL SUBAQUEOUS, FPL TRANSMISSION, SYSTEMS INTEGRATION & MAINTENANCE INC

GAS: FLORIDA GAS TRANSMISSION WPB, TECO PEOPLES GAS PALM BEACH

MUNICIPAL: PALM BEACH COUNTY TRAFFIC OPERATIONS, SEACOAST UTILITY AUTHORITY, TOWN OF JUPITER/JUPITER WATER SYSTEMS

LIST OTHER INFORMATION PERTINENT TO DESIGN OF PROJECT:

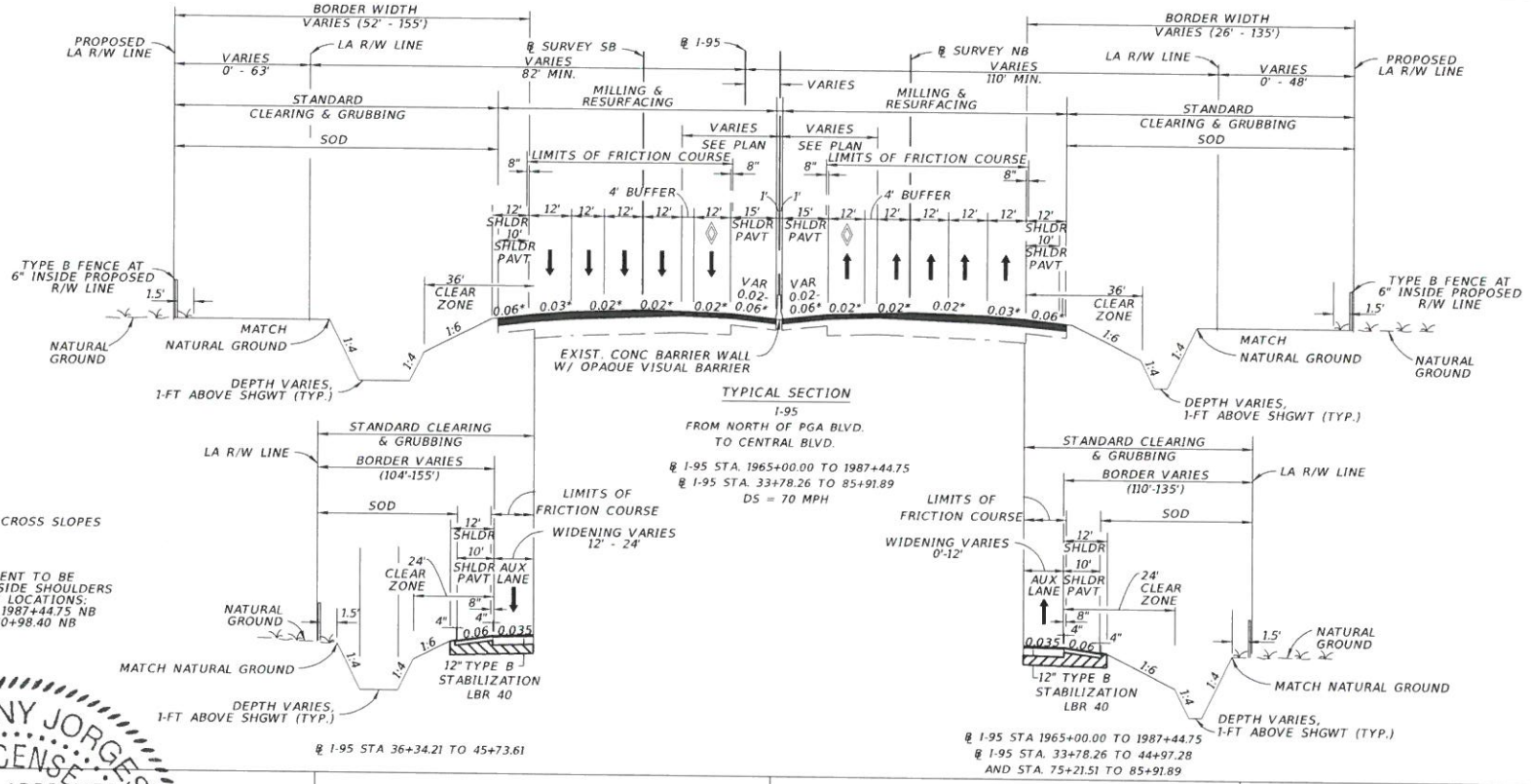
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID: 413265-1-22-01 | FEDERAL AID PROJECT NO. | COUNTY NAME: PALM BEACH

SECTION NO.: 93220 | ROAD DESIGNATION: SR 9/I-95 | LIMITS/MILEPOST: 36.783 - 40.163

PROJECT DESCRIPTION: SR 9/I-95 FROM NORTH OF PGA BOULEVARD TO DONALD ROSS ROAD

PROPOSED ROADWAY TYPICAL SECTION



2

APPROVED BY	FHWA CONCURRENCE	FDOT CONCURRENCE	RECOMMENDED BY
9/12/16 Date	Date	10/12/2016 Date	10/12/16 Date
Anthony Jorges, No. 73947 BCC Engineering, INC. 4901 NW 17th Way, Suite 506 Fort Lauderdale, FL 33309	Andrew DeTizio, P.E. FHWA Major Projects Coordinator	Howard Webb, P.E. FDOT District IV Design Engineer	Scott Peterson, P.E. FDOT District IV Project Development Manager

ANTHONY JORGES LICENSE No. 73947 STATE OF FLORIDA PROFESSIONAL ENGINEER

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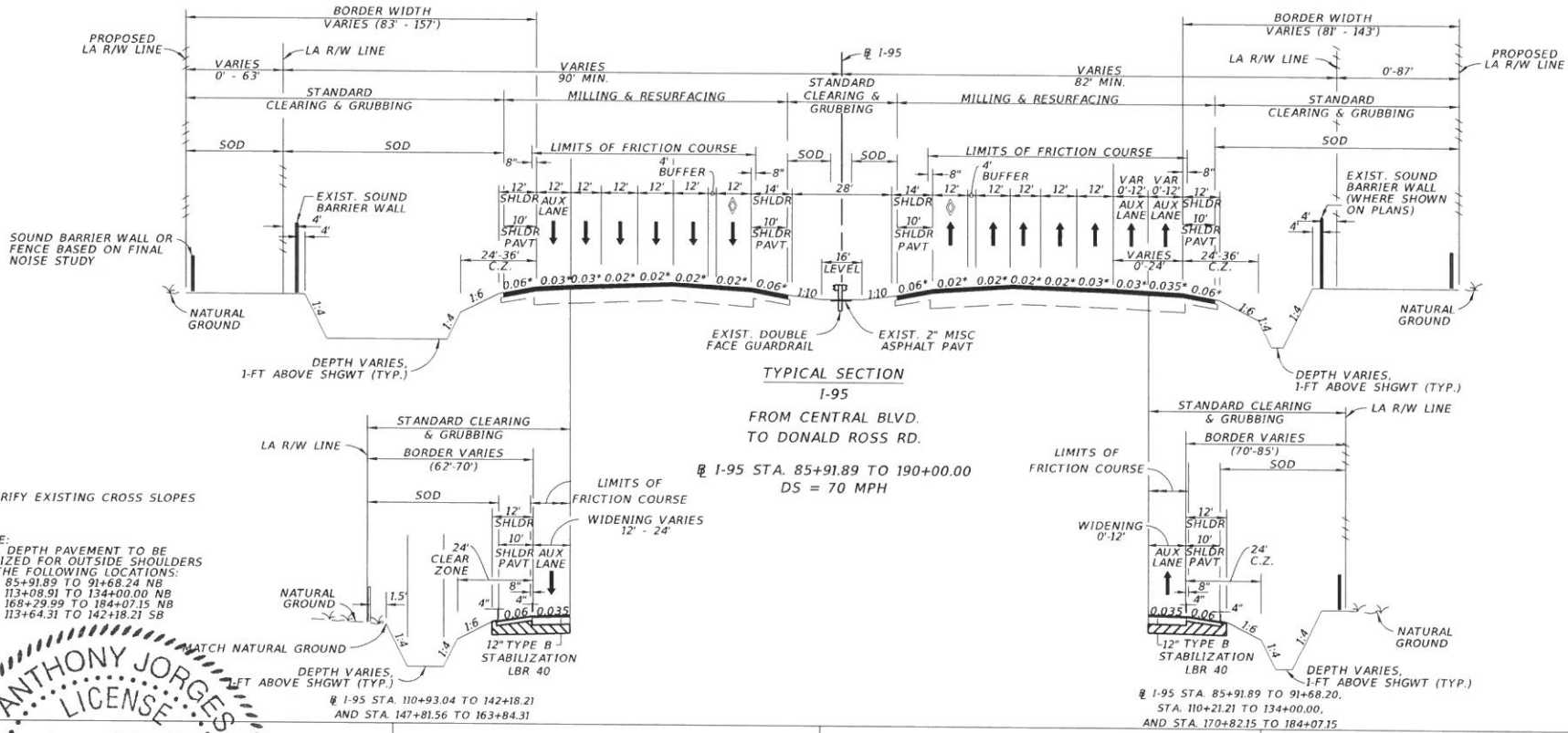
PROJECT IDENTIFICATION

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SECTION NO.: 93220 | ROAD DESIGNATION: SR 9/I-95 | LIMITS/MILEPOST: 36.783 - 40.163

PROJECT DESCRIPTION: SR 9/I-95 FROM NORTH OF PGA BOULEVARD TO DONALD ROSS ROAD

PROPOSED ROADWAY TYPICAL SECTION



TYPICAL SECTION
I-95
FROM CENTRAL BLVD.
TO DONALD ROSS RD.

℄ I-95 STA. 85+91.89 TO 190+00.00
DS = 70 MPH

℄ I-95 STA. 110+93.04 TO 142+18.21
AND STA. 147+81.56 TO 163+84.31

℄ I-95 STA. 85+91.89 TO 91+68.20,
STA. 110+21.21 TO 134+00.00,
AND STA. 170+82.15 TO 184+07.15

* VERIFY EXISTING CROSS SLOPES

NOTE:
FULL DEPTH PAVEMENT TO BE UTILIZED FOR OUTSIDE SHOULDERS AT THE FOLLOWING LOCATIONS:
STA. 85+91.89 TO 91+68.24 NB
STA. 113+08.91 TO 134+00.00 NB
STA. 168+29.99 TO 184+07.15 NB
STA. 113+64.31 TO 142+18.21 SB

ANTHONY JORGES LICENSE No. 73947 STATE OF FLORIDA PROFESSIONAL ENGINEER

APPROVED BY	FHWA CONCURRENCE	FDOT CONCURRENCE	RECOMMENDED BY
Anthony Jorges, No. 73947 BC Engineering, Inc. 1951 NW 19th Ave. Suite 206 Fort Lauderdale, FL 33309 9/17/16 Date	Andrew DeTizio, P.E. FHWA Major Projects Coordinator Date	Howard Webb, P.E. FDOT District IV Design Engineer 10/12/2016 Date	Scott Peterson, P.E. FDOT District IV Project Development Manager 10/12/16 Date

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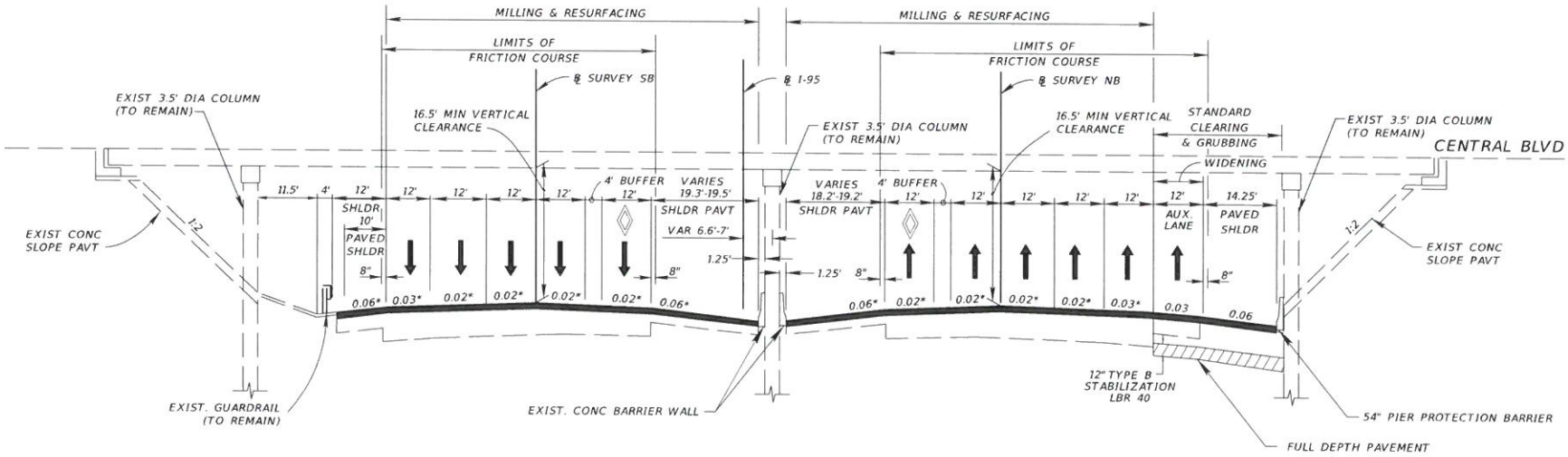
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SECTION NO.: 93220 | ROAD DESIGNATION: SR 9/I-95 | LIMITS/MILEPOST: 36.783 - 40.163

PROJECT DESCRIPTION: SR 9/I-95 FROM NORTH OF PGA BOULEVARD TO DONALD ROSS ROAD

PROPOSED ROADWAY TYPICAL SECTION



TYPICAL SECTION

BRIDGE UNDER PASS SECTION
I-95 UNDER CENTRAL BOULEVARD
℄ I-95 STA. 84+24.13 TO 85+66.44

VERIFY EXISTING CROSS SLOPES

ANTHONY JORGES LICENSE No. 73947 STATE OF FLORIDA PROFESSIONAL ENGINEER

APPROVED BY	FHWA CONCURRENCE	FDOT CONCURRENCE	RECOMMENDED BY
Anthony Jorges, No. 73947 BCC Engineering, INC. 4901 NW 17th Way - Suite 505 Fort Lauderdale, FL 33309	Andrew DeTizio, P.E. FHWA Major Projects Coordinator	Howard Webb, P.E. FDOT District IV Design Engineer	Scott Peterson, P.E. FDOT District IV Project Development Manager
Date: 9/12/16	Date:	Date: 10/12/2016	Date: 10/12/16

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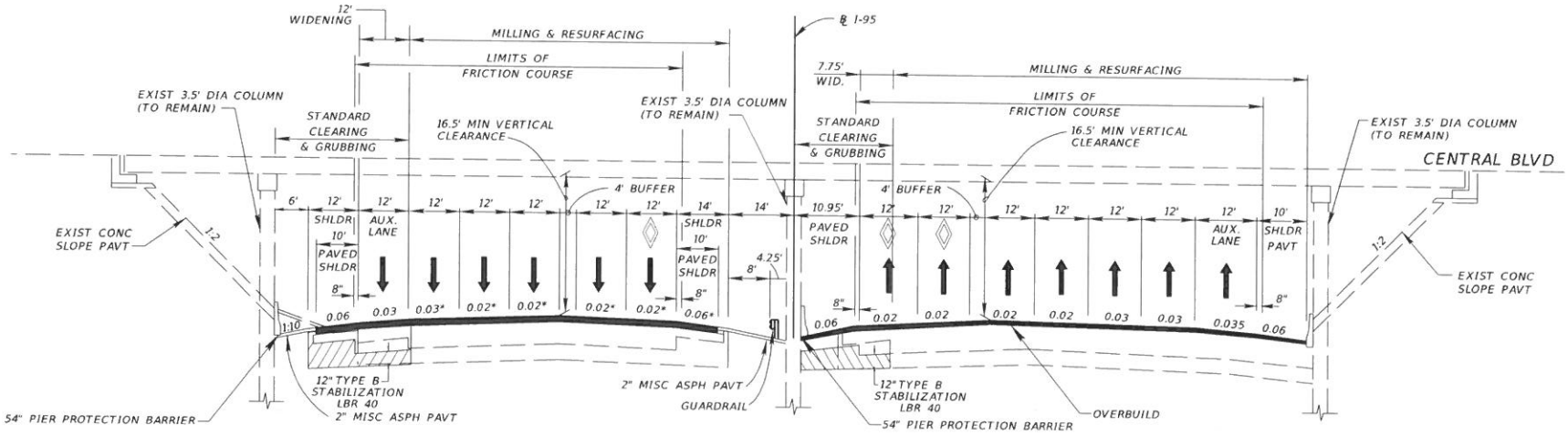
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SECTION NO.: 93220 | ROAD DESIGNATION: SR 9/I-95 | LIMITS/MILEPOST: 36.783 - 40.163

PROJECT DESCRIPTION: SR 9/I-95 FROM NORTH OF PGA BOULEVARD TO DONALD ROSS ROAD

PROPOSED ROADWAY TYPICAL SECTION



TYPICAL SECTION

BRIDGE UNDER PASS SECTION
I-95 UNDER CENTRAL BOULEVARD (ULTIMATE)
℄ I-95 STA. 84+24.13 TO 85+66.44

* VERIFY EXISTING CROSS SLOPES

ULTIMATE TYPICAL SECTION PROVIDED FOR INFORMATION ONLY

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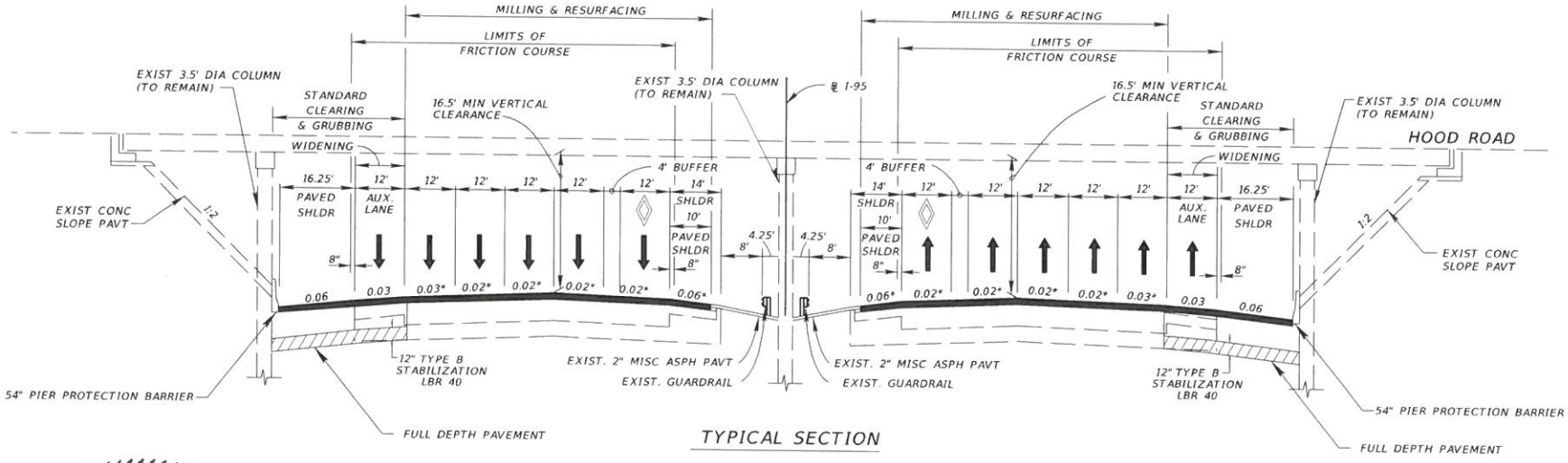
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SECTION NO.: 93220 | ROAD DESIGNATION: SR 9/I-95 | LIMITS/MILEPOST: 36.783 - 40.163

PROJECT DESCRIPTION: SR 9/I-95 FROM NORTH OF PGA BOULEVARD TO DONALD ROSS ROAD

PROPOSED ROADWAY TYPICAL SECTION



TYPICAL SECTION

BRIDGE UNDER PASS SECTION
I-95 UNDER HOOD ROAD
℄ I-95 STA. 113+88.00 TO 114+38.00

* VERIFY EXISTING CROSS SLOPE

ANTHONY JORGES LICENSE No. 73947 STATE OF FLORIDA PROFESSIONAL ENGINEER

	FHWA CONCURRENCE	FDOT CONCURRENCE	RECOMMENDED BY
APPROVED BY			
Anthony Jorges, No. 73947 BCC Engineering, INC. 4901 NW 17th Way, Suite 506 Fort Lauderdale, FL 33309	Andrew DeTizio, P.E. FHWA Major Projects Coordinator	Howard Webb, P.E. FDOT District IV Design Engineer	Scott Peterson, P.E. FDOT District IV Project Development Manager
9/12/16 Date	Date	10/12/2016 Date	10/12/16 Date

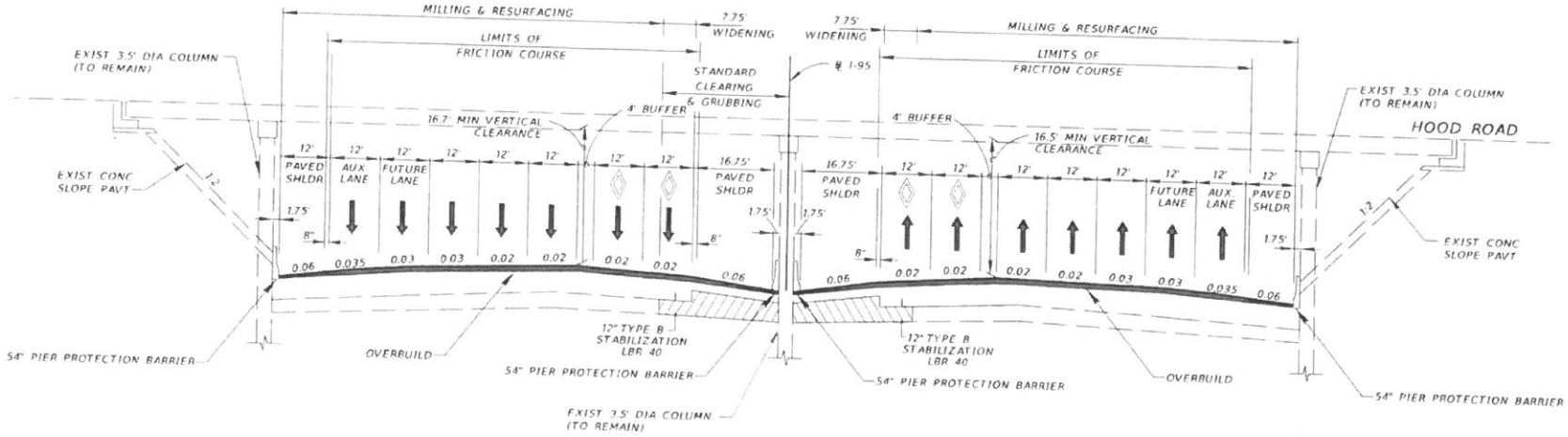
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PROJECT IDENTIFICATION

FINANCIAL PROJECT ID: 413265-1-22-01
FEDERAL AID PROJECT NO.:
COUNTY NAME: PALM BEACH
SECTION NO.: 93220
ROAD DESIGNATION: SR 9/I-95
LIMITS/MILEPOST: 36.783 - 40.163
PROJECT DESCRIPTION: SR 9/I-95 FROM NORTH OF PGA BOULEVARD TO DONALD ROSS ROAD

PROPOSED ROADWAY TYPICAL SECTION



TYPICAL SECTION

BRIDGE UNDER PASS SECTION
I-95 UNDER HOOD ROAD (ULTIMATE)
℄ I-95 STA. 113+88.00 TO 114+38.00

* VERIFY EXISTING CROSS SLOPES

ULTIMATE TYPICAL SECTION PROVIDED FOR INFORMATION ONLY

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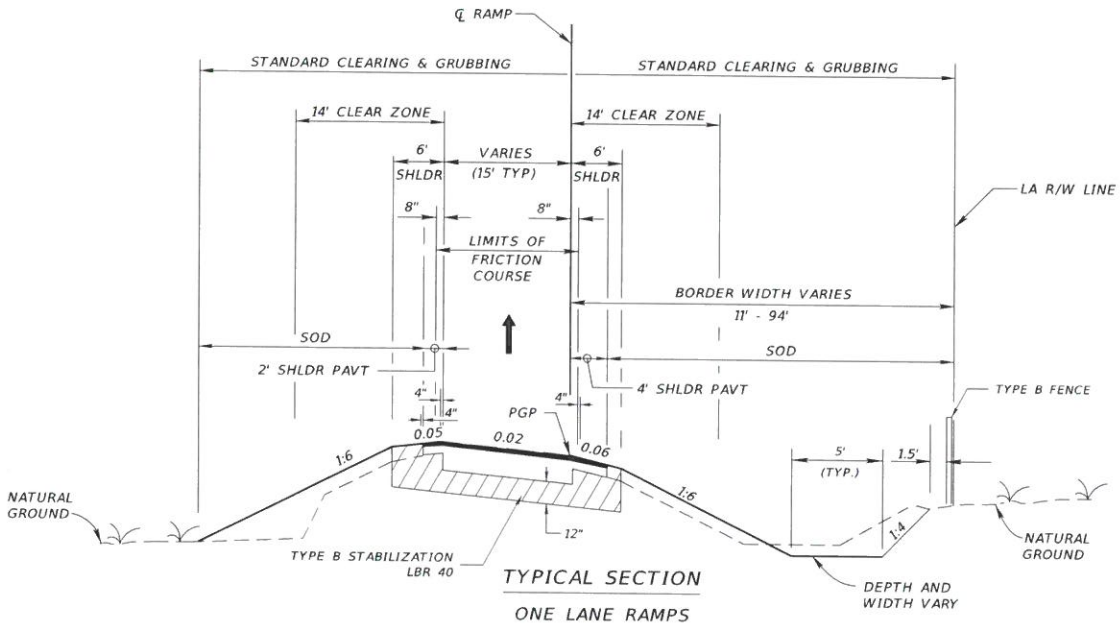
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SECTION NO.: 93220 | ROAD DESIGNATION: SR 9/I-95 | LIMITS/MILEPOST: 36.783 - 40.163

PROJECT DESCRIPTION: SR 9/I-95 FROM NORTH OF PGA BOULEVARD TO DONALD ROSS ROAD

PROPOSED ROADWAY TYPICAL SECTION



TYPICAL SECTION

ONE LANE RAMPS

RAMP A-1 STA. 5000+00.00 TO STA. 5020+25.81
RAMP A-2 STA. 7000+00.00 TO STA. 7013+44.43
RAMP B-2 STA. 4000+00.00 TO STA. 4014+52.43
RAMP D STA. 8006+18.23 TO STA. 8025+83.39
DS = 50 MPH

ANTHONY JORGES LICENSE No. 73947 STATE OF FLORIDA PROFESSIONAL ENGINEER

APPROVED BY

Anthony Jorges, P.E. No. 73947
BCC Engineering, Inc.
4907 NW 17th Way - Suite 500
Fort Lauderdale, FL 33309

9/13/16
Date

FHWA CONCURRENCE

Andrew DeTizio, P.E.
FHWA Major Projects Coordinator

Date

FDOT CONCURRENCE

Howard Webb, P.E.
FDOT District IV Design Engineer

10/12/2016
Date

RECOMMENDED BY

Scott Peterson, P.E.
FDOT District IV Project Development Manager

10/12/16
Date

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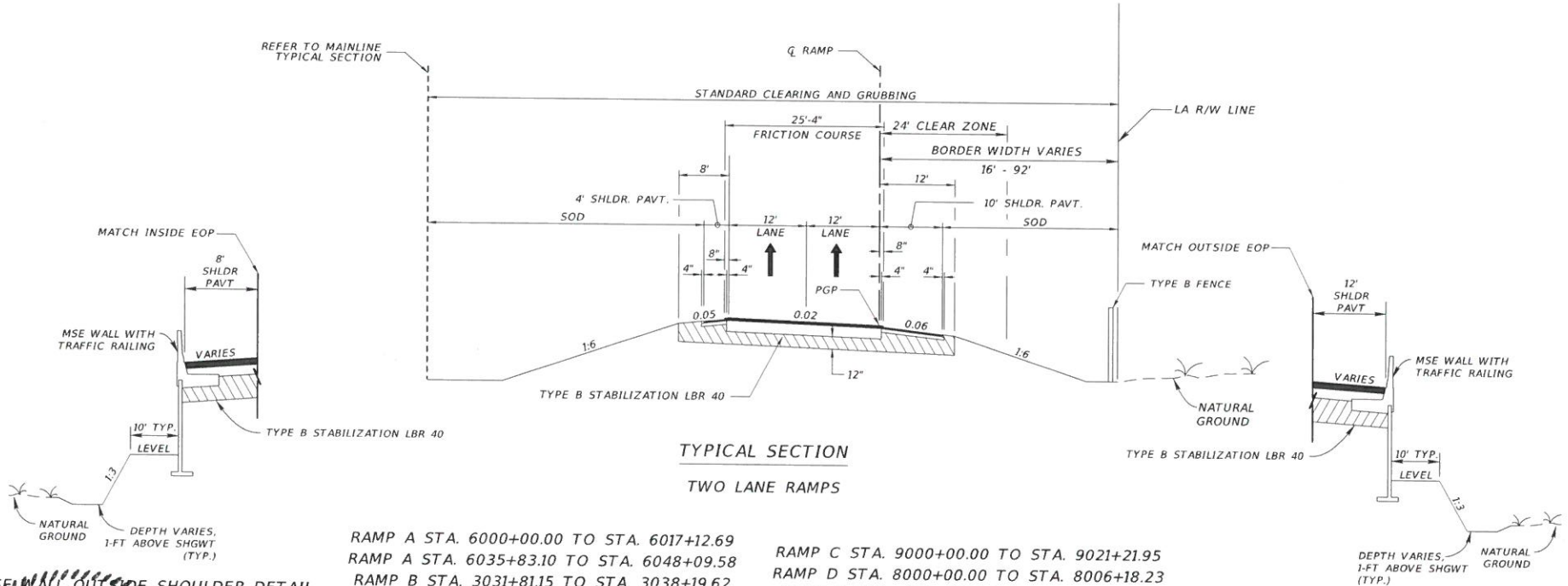
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SECTION NO.: 93220 | ROAD DESIGNATION: SR 9/I-95 | LIMITS/MILEPOST: 36.783 - 40.163

PROJECT DESCRIPTION: SR 9/I-95 FROM NORTH OF PGA BOULEVARD TO DONALD ROSS ROAD

PROPOSED ROADWAY TYPICAL SECTION



TYPICAL SECTION

TWO LANE RAMPS

MSE WALL OUTSIDE SHOULDER DETAIL

RAMP A STA. 6000+00.00 TO STA. 6017+12.69
RAMP A STA. 6035+83.10 TO STA. 6048+09.58
RAMP B STA. 3031+81.15 TO STA. 3038+19.62
RAMP B-1 STA. 2000+00.00 TO STA. 2009+27.09

RAMP C STA. 9000+00.00 TO STA. 9021+21.95
RAMP D STA. 8000+00.00 TO STA. 8006+18.23
RAMP E STA. 400+00.00 TO STA. 429+54.95

DS = 50 MPH

MSE WALL OUTSIDE SHOULDER DETAIL

9

APPROVED BY	FHWA CONCURRENCE	FDOT CONCURRENCE	RECOMMENDED BY
Date: 9/12/16	Andrew DeTizio, P.E. FHWA Major Projects Coordinator Date	Howard Webb, P.E. FDOT District IV Design Engineer Date: 10/12/2016	Scott Peterson, P.E. FDOT District IV Project Development Manager Date: 10/12/16

ANTHONY JORGES LICENSE No. 73947 STATE OF FLORIDA PROFESSIONAL ENGINEER

Anthony Jorges, No. 73947
BCC Engineering, INC.
4901 NW 17th Way - Suite 506
Fort Lauderdale, FL 33309

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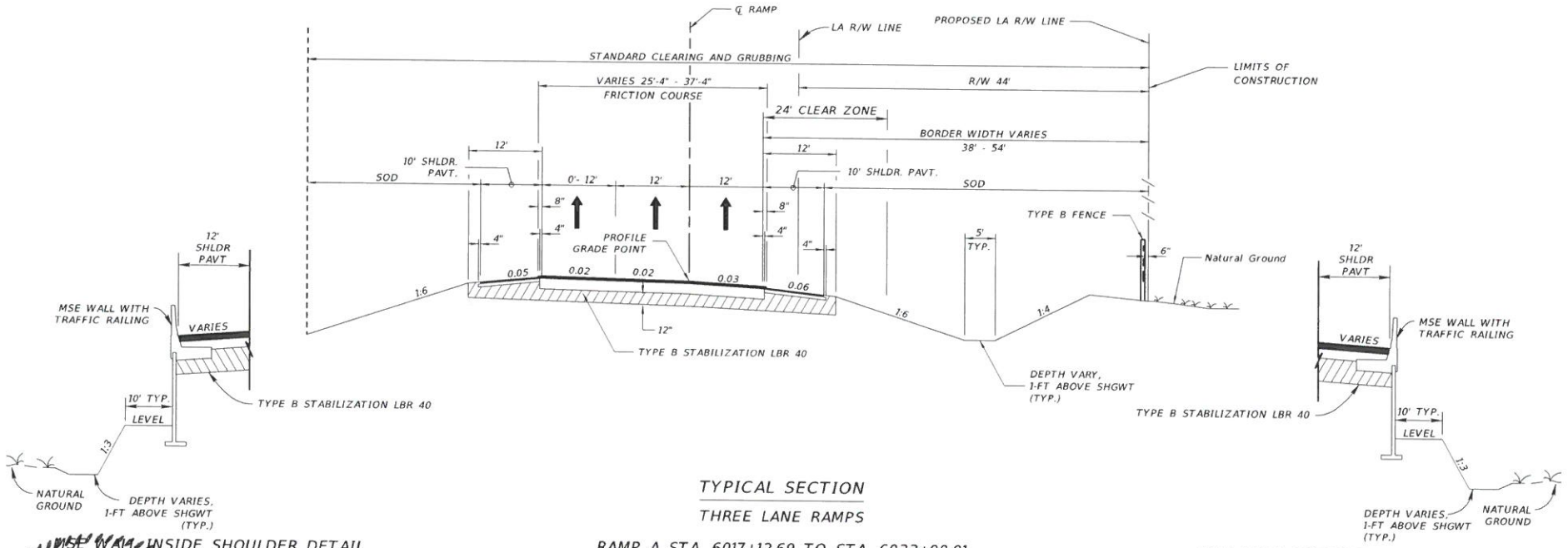
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID: 413265-1-22-01 | FEDERAL AID PROJECT NO.: | COUNTY NAME: PALM BEACH

SECTION NO.: 93220 | ROAD DESIGNATION: SR 9/I-95 | LIMITS/MILEPOST: 36.783 - 40.163

PROJECT DESCRIPTION: SR 9/I-95 FROM NORTH OF PGA BOULEVARD TO DONALD ROSS ROAD

PROPOSED ROADWAY TYPICAL SECTION



MSE WALL INSIDE SHOULDER DETAIL

TYPICAL SECTION

THREE LANE RAMPS

RAMP A STA. 6017+12.69 TO STA. 6033+90.91
RAMP B STA. 3012+65.96 TO STA. 3031+81.15
DS = 50 MPH

MSE WALL OUTSIDE SHOULDER DETAIL

10

APPROVED BY	FHWA CONCURRENCE	FDOT CONCURRENCE	RECOMMENDED BY
Date: 9/12/16	Andrew DeTizio, P.E. FHWA Major Projects Coordinator Date:	Howard Webb, P.E. FDOT District IV Design Engineer Date: 10/12/2016	Scott Peterson, P.E. FDOT District IV Project Development Manager Date: 10/12/16

ANTHONY JORGES LICENSE No. 73947 STATE OF FLORIDA PROFESSIONAL ENGINEER

Anthony Jorges. No. 73947
BCC Engineering, INC.
4901 NW 17th Way - Suite 506
Fort Lauderdale, FL 33309

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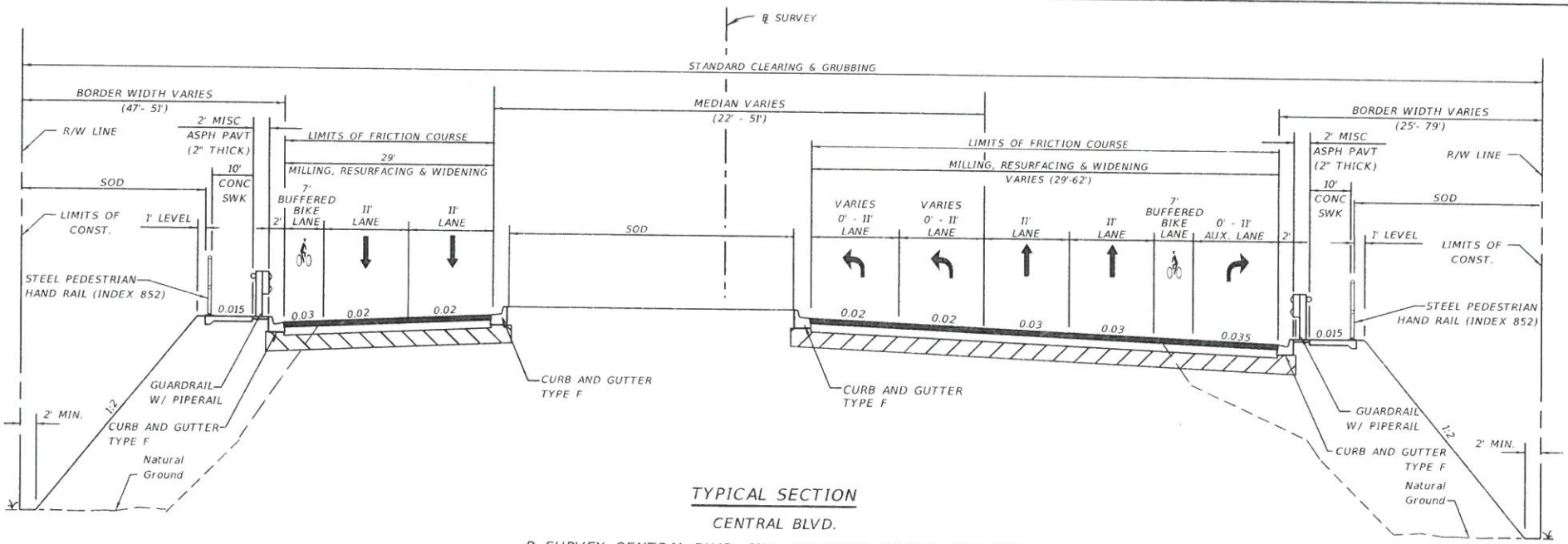
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SECTION NO.: 93220 | ROAD DESIGNATION: SR 9/I-95 | LIMITS/MILEPOST: 36.783 - 40.163

PROJECT DESCRIPTION: SR 9/I-95 FROM NORTH OF PGA BOULEVARD TO DONALD ROSS ROAD

PROPOSED ROADWAY TYPICAL SECTION



TYPICAL SECTION

CENTRAL BLVD.

℄ SURVEY CENTRAL BLVD. STA. 223+72.78 TO STA. 234+52.11

DS = 45 MPH

11

ANTHONY JORGES LICENSE No. 73947 STATE OF FLORIDA PROFESSIONAL ENGINEER

Anthony Jorges, PE 73947
BCC Engineering, INC.
4901 NW 17th Way, Suite 306
Fort Lauderdale, FL 33309

APPROVED BY

10/12/16
Date

FDOT CONCURRENCE

Howard Webb, P.E.
FDOT District IV Design Engineer

10/12/2016
Date

PALM BEACH COUNTY CONCURRENCE FOR AREAS OUTSIDE THE I-95 LIMITED ACCESS BOUNDARY

Omelio A. Fernandez, P.E.
PBC, Director, Roadway Production Division

10/11/16
Date

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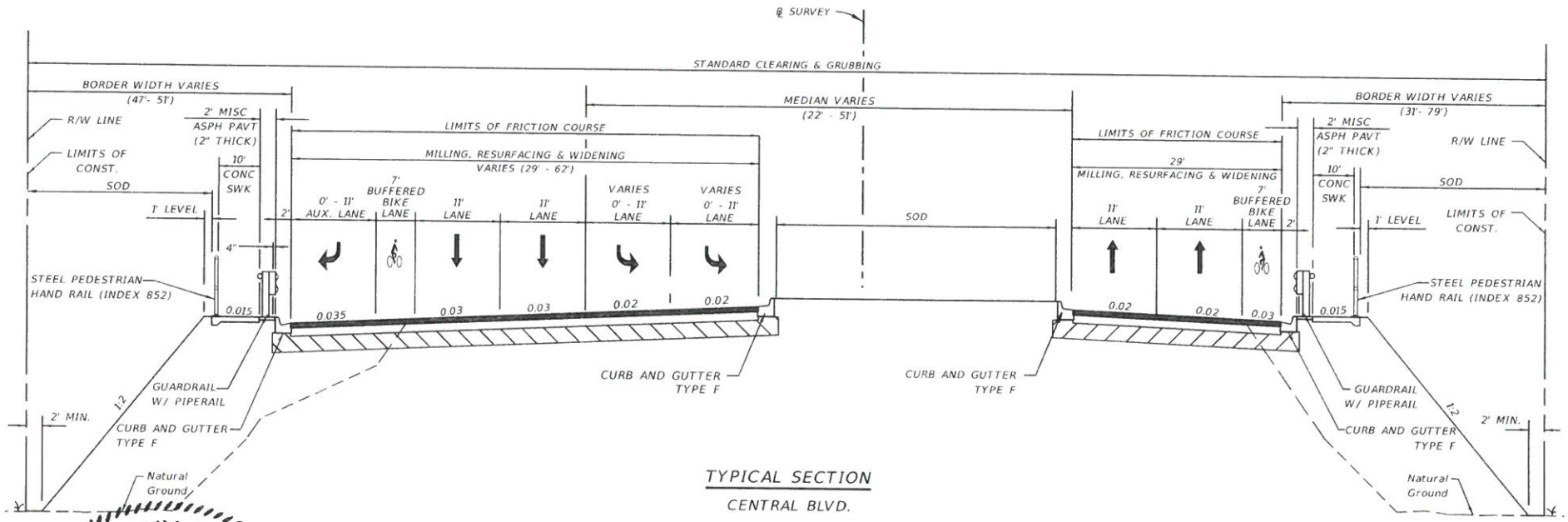
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FINANCIAL PROJECT ID: 413265-1-22-01 | FEDERAL AID PROJECT NO.: | COUNTY NAME: PALM BEACH

SECTION NO.: 93220 | ROAD DESIGNATION: SR 9/I-95 | LIMITS/MILEPOST: 36.783 - 40.163

PROJECT DESCRIPTION: SR 9/I-95 FROM NORTH OF PGA BOULEVARD TO DONALD ROSS ROAD

PROPOSED ROADWAY TYPICAL SECTION



TYPICAL SECTION

CENTRAL BLVD.

℄ SURVEY CENTRAL BLVD. STA. 237+47.94 TO STA. 252+07.94

DS = 45 MPH

12

ANTHONY JORGES LICENSE No. 73947 STATE OF FLORIDA PROFESSIONAL ENGINEER

Anthony Jorges, No. 73947
BCC Engineering
4901 NW 17th Way, Suite 306
Fort Lauderdale, FL 33309

APPROVED BY

10/12/16
Date

FDOT CONCURRENCE

Howard Webb, P.E.
FDOT District IV Design Engineer

10/12/2016
Date

PALM BEACH COUNTY CONCURRENCE FOR AREAS OUTSIDE THE I-95 LIMITED ACCESS BOUNDARY

Omelio A. Fernandez, P.E.
PBC, Director, Roadway Production Division

10/11/16
Date

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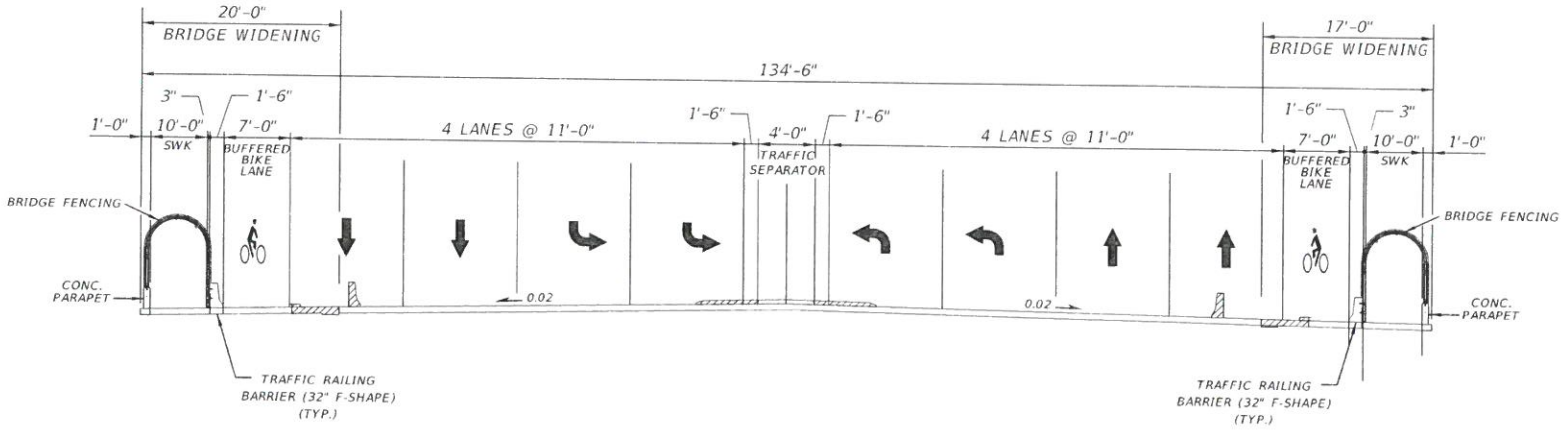
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID: 413265-1-22-01 | FEDERAL AID PROJECT NO. | COUNTY NAME: PALM BEACH

SECTION NO.: 93220 | ROAD DESIGNATION: SR 9/I-95 | LIMITS/MILEPOST: 36.783 - 40.163

PROJECT DESCRIPTION: SR 9/I-95 FROM NORTH OF PGA BOULEVARD TO DONALD ROSS ROAD

PROPOSED STRUCTURE TYPICAL SECTION



TYPICAL SECTION

CENTRAL BLVD.

℄ SURVEY CENTRAL BLVD. STA. 234+52.11 TO STA. 237+47.94

DS = 45 MPH

LEGEND:

REMOVAL OF EXISTING BRIDGE COMPONENTS

13

APPROVED BY	FDOT CONCURRENCE	PALM BEACH COUNTY CONCURRENCE FOR AREAS OUTSIDE THE I-95 LIMITED ACCESS BOUNDARY
Anthony Jorges, P.E. No. 73947 BCC Engineering, INC. 4901 NW 17th Way, Suite 506 Fort Lauderdale, FL 33309 10/12/16 Date	Howard Webb, P.E. FDOT District IV Design Engineer 10/12/2016 Date	Omelio A. Fernandez, P.E. PBC, Director, Roadway Production Division 10/11/16 Date

ANTHONY JORGES LICENSE No. 73947 STATE OF FLORIDA PROFESSIONAL ENGINEER

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