60% (Phase II) Design Documentation Report

SR 789 (John Ringling Cswy. / Gulfstream Ave.)

From West of Bird Key Dr. to East of Sunset Dr., Sarasota County, Florida

Prepared for:
FDOT District 1
801 North Broadway
Bartow, FL 33830

Prepared by:
Kimley-Horn and Associates, Inc.
1800 2nd Street, Suite 900
Sarasota, Florida 34236

December 2023

FPID: 445926-1-52-01

TABLE OF CONTENTS

1.0 PROJECT DESCRIPTION

The total project length is approximately 1.25 miles minus 0.60 miles of John Ringling Bridge where no work is anticipated. It consists of drainage improvements at the Sunset Dr./Golden Gate Dr. intersection which is prone to flooding during normal seasonal rain events. John Ringling bridge as an interim condition currently has dedicated transit lanes. The bridge will ultimately be changed to provide (2) travel lanes (1) transit lane and (1 bike lane). This project will match this ultimate lane configuration to provide consistency throughout the corridor. This will require a combination of outside and median widening to attain the desire typical. This project will also include signal and lighting upgrades at both the Bird Key Dr. and Sunset Dr. intersections.

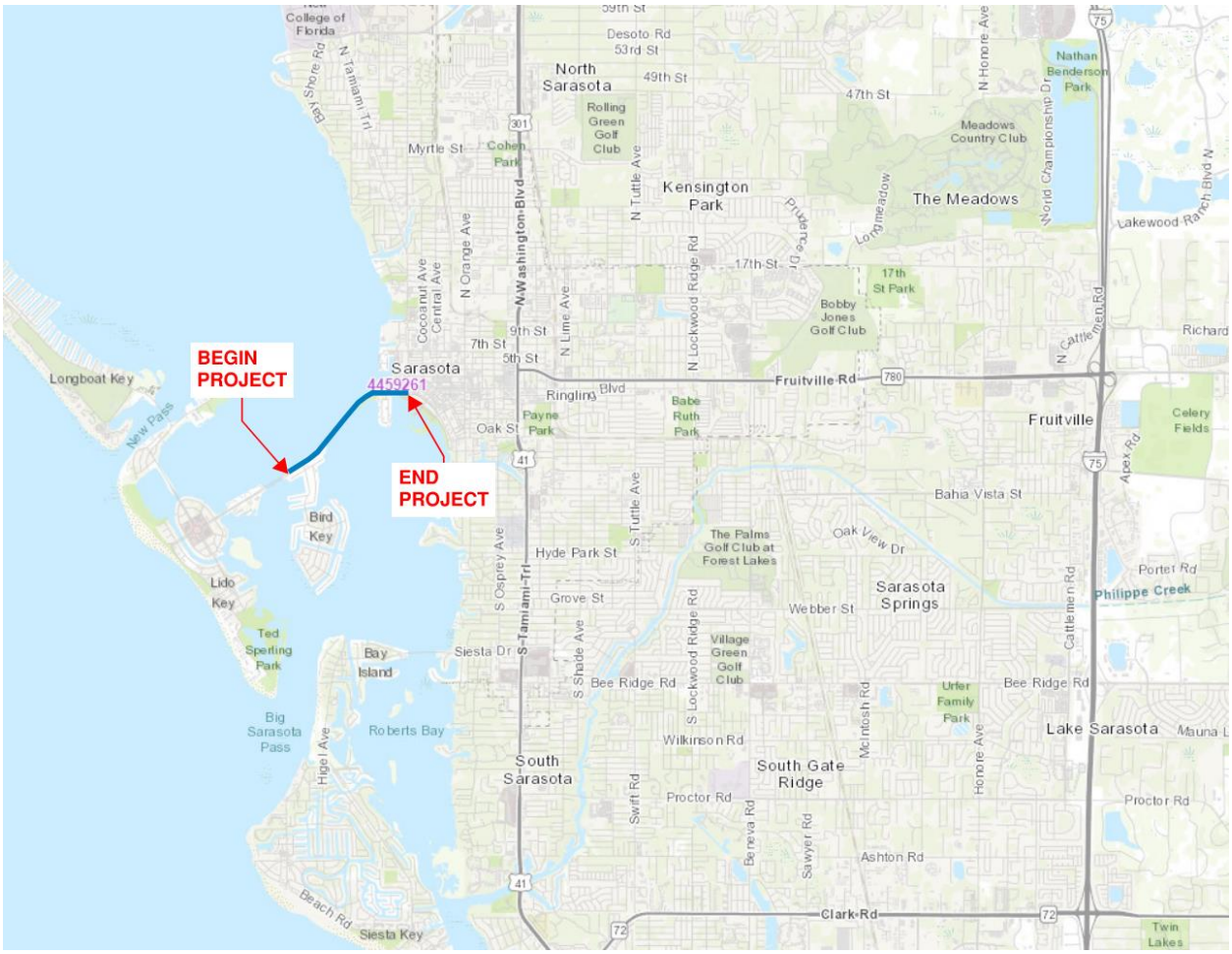
Design Constraints & Considerations

Right of Way: Part of the existing north leg of Sunset Dr. is currently outside the right of way. Right of way acquisition or some form of agreement will be required to complete the proposed construction. An evaluation has been done to see if an alternate design could be implemented that would not require additional right of way. This evaluation yielded no alternative. This is mainly due to the need of raising the grade of the intersection by a foot or so which is essential to correcting the flooding issue. Another area where right of way is constrained is on the north side of the roadway near the end of the project where the shared use path is reduced to 5 feet. This section of shared use path is currently outside the right of way. The current design proposes to increase the width to 10 ft. for consistency. This work can be accomplished by considering this area as maintained right of way. The design holds the existing back of sidewalk as alignment for the proposed wider shared use path.

Bridge Typical: A separate bridge marking project will ultimately be changing the typical section to provide (2) travel lanes (1) transit lane and (1 bike lane). For this project to match this approved typical, widening is necessary on the outside as well as the inside median. The inside widening will reduce the median width which will no longer meet the department minimum width requirement. A design variation memo has been provided.

1.1 Location

This project is located in the City of Sarasota, FL along SR 789 (John Ringling Cswy.) from west of the Bird Key intersection to east of the Sunset Dr/Golden Gate Pt. intersection.



2.0 DESIGN FACTORS

2.1 Design Criteria

A Design Criteria Report was prepared for this project to document the criteria used during design. The project was designed in accordance with applicable local, state, and federal guidelines. The Design Criteria Report, as well as a listing of utilized references, can be found in Appendix A of this document.

2.2 Design Speed

The proposed mainline design for 35 mph is based on design speeds in the approved typical section package.

2.3 Lane Widths

Lane widths are 10.5 ft. (through lanes) 11.0 ft. (transit lanes) and 10.5 ft. (turn lanes).

2.4 Design Vehicle

A WB-50 design vehicle has been accommodated to meet the design criteria.

2.5 Side Slopes

The proposed side slopes within the project area are defined on the proposed typical section and meet the current design criteria.

2.6 Vertical Clearance

Vertical clearance is defined as the elevational difference between the roadway surface and proposed or existing features such as signal heads and overhead signing. Vertical clearance, as proposed in the current design, meets the current design criteria.

2.7 Horizontal Clearance

Horizontal clearance is defined as the lateral distance between the face of curb and any roadside feature. The minimum allowable horizontal clearance for an urban typical section is four feet.

2.8 Border Width

Border width is necessary to accommodate clear zone requirements for roadside features such as drainage elements and signing. A border width also allows for the construction and maintenance of a roadway facility. The required border width for a curb and gutter typical section is 12 feet.

2.9 Drainage

The existing drainage results in the SR-789/Sunset Dr. Golden Gate Dr. intersection to flood during seasonal rain events. This project aims to correct this regular occurrence of flooding by raising the grade of the intersection. The elevations used were derived from the newly completed roundabout project at US 41 (SR 45) and Gulfstream Ave. The addition of a seawall height extension will also reduce/prevent storm surge from the bay.

2.10 Pedestrians, Bicyclist, and Transit Needs

The existing corridor consists of a shared use path on each side, portions of dedicated bike lanes on each side with portions of a shared bike/transit lane. Widening of the roadway will allow for the bike lanes and the transit lanes to be separated to provide for a safer condition. Crossing locations are limited to signalized intersections.

2.11 Utilities

Utility relocations are expected to be few if any. Every effort will be made during the design process limit conflicts.

2.12 Highway Lighting

A Lighting Design Analysis Report was prepared for this project to document the applicable criteria used during design. LED lighting will be placed at intersections only to meet illuminance criteria. Vertical illuminance calculations will be evaluated for the pedestrian crossing movements to ensure compliance with current standards. Some minor adjustments to the existing lighting will also be necessary due to widening of the roadway.

2.13 Design Exceptions and Variations

Every effort has been made to adhere to the applicable design criteria of the governing agencies; however, to accommodate the additional transit lanes, widening of the roadway was required. Due to constraints at the bridge approaches (outside concrete barriers, shared use path and MSE wall) outside widening was not practical, so inside (median) widening was required. The inside widening along with

outside widening will accommodate and match the future lanes widths of the pavement marking project for the John Ringling Bridge (#170176). A Design Variation Memo has been provided for the median width that does not meet the departments minimum width criteria.

APPENDIX A:

Design Criteria Report

References (Latest editions)

- FDOT Design Manual
- FDOT Standard Plans for Road and Bridge Construction
- FDOT Standard Specifications for Road and Bridge Construction
- FDOT Basis of Estimates Manuel
- FDOT Pavement Type Selection Manual
- FDOT Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (Florida Greenbook)
- Southwest Florida Water Management District, Environmental Resource Permit Applicant's Handbook, Volume I and II
- AASHTO Roadside Design Guide
- Manual on Uniform Traffic Control Devices (MUTCD)

DESIGN CRITERIA SUMMARY TABLE (Phase II Submittal)

FDOT FPID: 445926-1-52-01
SR789 (John Ringling Blvd. from East of Bird Key to West of Sunset Dr.)
Widening - 4 lane to 6 Lane Minor Arterial

DESIGN ELEMENT	DESIGN CRITERIA	2024 FDOT DESIGN MANUAL REFERENCE	EXISTING CONDITIONS	PROPOSED DESIGN	VARIATION OR EXCEPTION REQUIRED
GENERAL					
Functional Classification	Minor Arterial	SLD	Minor Arterial	Minor Arterial	No
Context Classification	C3R - Suburban Residential	SLD	C3R - Suburban Residential	C3R - Suburban Residential	No
Posted Speed (MPH)	-	-	35 MPH	35 MPH	No
Design Speed (MPH)	Context Classification C3R - Suburban Residential Minimum and Maximum Range 35 MPH - 55 MPH	Table 201.5.1	35 MPH	35 MPH	No
Design Vehicle/Control Vehicle	WB-50/WB-62FL	Section 201.6	WB-50 WB-62FL (thru lanes)	WB-50 WB-62FL (thru lanes)	No
Traffic and Design Year	20 Years for New Construction and Reconstruction Projects	Section 201.3	-	20 Years	No
Access Classification	5	FDOT Website Table 201.4.2	5	5	No
CROSS SECTION DATA					
Number of Through Lanes	-	-	4 - lanes 2 travel lanes eastbound 2 travel lanes westbound	6 - lanes 2 travel lanes eastbound 2 travel lanes westbound 1 transit lane eastbound 1 transit lane westbound	No
Lane Widths	11' Std. Travel & Auxiliary Lanes 10' Acceptable in constrained areas where truck volumes are low and speeds are ≤ 35 mph 10' travel lanes are typically provided on very low speed roadways (design speed ≤ 35 mph) but should consider wider lanes when transit is present. Turn lane width should be same as travel lane width. May be reduced to 10' with constrained right-of-way	Table 210.2.1	Travel and Turn Lanes vary 11' to 12'	10.5' Travel lane 11' Transit lane 10.5' Turn Lane	No

DESIGN CRITERIA SUMMARY TABLE (Phase II Submittal)

FDOT FPID: 445926-1-52-01
SR789 (John Ringling Blvd. from East of Bird Key to West of Sunset Dr.)
Widening - 4 lane to 6 Lane Minor Arterial

DESIGN ELEMENT	DESIGN CRITERIA	2024 FDOT DESIGN MANUAL REFERENCE	EXISTING CONDITIONS	PROPOSED DESIGN	VARIATION OR EXCEPTION REQUIRED
Traveled Way Cross Slope	0.02 Recommended 0.015 Min. to 0.04 Max.	Figure 210.2.1	Varies	0.02-0.03	No
Shoulder Widths Full / Paved	-	-	Paved 5' Unpaved Varies 1.5' - 5'	Existing shoulder to to changed to curb and gutter.	No
Shoulder Cross Slopes	-	-	Varies	Existing shoulder to to changed to curb and gutter.	No
Median Width	22' Min. 15.5' Min. for DS </= 40mph	Table 210.3.1	Varies 9.9'-21.1'	Varies 9.1'-17.0'	Yes
Curb Type	Type F (Outside) Type E (Median)	Section 210.5	Type "F" - Outside and median, Type "B" - Median	Type "F" - Outside and median, Type "B" - Median	No
Sidewalk Width	5' Min. 6' Min. (adjacent to the curb) 6' Standard (Per Context Classification)	Table 222.1.1	Varies 5' - 10'	10'	No
Sidewalk Horizontal Separation	In order of desirability: 1. Near the Right-of-way 2. Outside the clear zone 3. 2' Min. from back of Curb 4. 0' with 6' sidewalk adjacent to Curb	Section 222.2.1	Varies 0'-"X" '	Sidewalk proposed adjacent to the back of curb	No
Bicycle Lane Width	4' Min. 5' Min. key-hole at right turn lanes 7' Buffered bicycle lane	Section 223.2.1.1	Varies 0'-5'	Varies 4'-5'	No
HORIZONTAL GEOMETRY					
Maximum Deflection Without Horizontal Curve	2^{o} 00' 00" (Flush shoulders and curb roadways)	Section 210.8.1	Lane deflections exist where median widths are transitioning	N/A	No
Maximum Deflection Angle Through Intersection	6° 00' 00"	Table 212.7.1	Varies	1° 00' 00"	No
Roadway Transitions	L = W*S^2/60 Merging L = W*S^2/120 Non-Merging	Section 210.2.5	N/A	N/A	No
Length of Horizontal Curves	525' @ 35mph DS 400' Min., Note (2)	Table 210.8.1	477.71' 1,283.51'	621.96' 1,572.81'	No

DESIGN CRITERIA SUMMARY TABLE (Phase II Submittal)

FDOT FPID: 445926-1-52-01
SR789 (John Ringling Blvd. from East of Bird Key to West of Sunset Dr.)
Widening - 4 lane to 6 Lane Minor Arterial

DESIGN ELEMENT	DESIGN CRITERIA	2024 FDOT DESIGN MANUAL REFERENCE	EXISTING CONDITIONS	PROPOSED DESIGN	VARIATION OR EXCEPTION REQUIRED
Minimum Radius of Horizontal Curve without Superelevation (emax = 0.02)	1146' @ 35mph DS	Table 210.9.2	1,348.14' 1,432.40'	1,755.25' 1,755.25'	No
e (max)	0.05	Section 210.9	Superelevation 0.04	Match existing	No
Turn Lane Lengths	Length of Deceleration = 145' (includes taper) no Queue Minimum length (break to stop distance=75'	Exhibit 212-1	Varies	Signalized: Match Exist. Unsignalized: 155'	No
Superelevation Transition	80% Tangent / 20% Curve	Section 210.9.1	Varies	-	No
Superelevation Transition Rate	1:100	Table 210.9.3	-	-	No
VERTICAL GEOMETRY					
Stopping Sight Distance	250' less than or equal to 2% grade	Table 210.11.1	-	305' min.	No
Maximum Grades	7% (Suburban Arterial)	Table 210.10.1	-	0.40%	No
Maximum Change In Grade Without A Vertical Curve	0.90%	Table 210.10.2	-	0.70%	No
Rounded K Values for Minimum Vertical Curve Lengths	49 (SAG) 47 (CREST)	Table 210.10.3	-	-	No
Minimum Vertical Curve Lengths	105'	Table 210.10.4	-	-	No
Minimum Vertical Clearances	17.5' Traffic Signal and Sign Structure	Section 210.10.3	8 Exist. Signal Structures	8 New Signal Structures	No
Base Clearance	3' Min. 2' Min. with Type B-12.5 (Only)	2024 FDOT Flexible Pavement Design Manual Chapter 5.2.2 & 5.6.2	-	-	No
Minimum Longitudinal Gutter Grade (Curb and Gutter)	0.30% Min.	Section 210.10.1.1	0.30% Min	0.30% Min	No
ROADSIDE SAFETY					
Clear Zone Recoverable Area	Travel Lane-14' Auxiliary Lane-10'	Table 215.2.1	-	Travel Lane-14' min. Auxiliary Lane-10' min.	No

DESIGN CRITERIA SUMMARY TABLE (Phase II Submittal)

FDOT FPID: 445926-1-52-01
SR789 (John Ringling Blvd. from East of Bird Key to West of Sunset Dr.)
Widening - 4 lane to 6 Lane Minor Arterial

DESIGN ELEMENT	DESIGN CRITERIA	2024 FDOT DESIGN MANUAL REFERENCE	EXISTING CONDITIONS	PROPOSED DESIGN	VARIATION OR EXCEPTION REQUIRED
Roadside Slopes	Urban (Curbed): Front Slope: 0-6 ft., 1:2 not flatter than 1:6 >6 ft., 1:3 not flatter than 1:6 Back Slope: 1:2 not flatter than 1:6	Table 215.2.3	Varies	Urban: Front Slopes- 1:2, Back Slopes- 1:3	No
Lateral Offset 1. Above Ground Fixed Object 2. Drop Off Hazards 3. Water Bodies 4. Canal Hazard	1. Clear Zone Width (rural shoulders) 4-ft from face of curb (curbed roadway) 2. Clear Zone Width 3. Clear Zone Width 4. 50-ft	Table 215.2.2	Some fixed objects in clearzone (Trees, etc.)	Will be evaluated to remain or relocate	No

DESIGN CRITERIA SUMMARY TABLE (Phase II Submittal)

FDOT FPID: 445926-1-52-01
SR789 (John Ringling Blvd. from East of Bird Key to West of Sunset Dr.)
Shared Use Path

DESIGN ELEMENT	DESIGN CRITERIA	2024 FDOT DESIGN MANUAL REFERENCE	EXISTING CONDITIONS	PROPOSED DESIGN	VARIATION OR EXCEPTION REQUIRED
GENERAL					
Design Speed	18 MPH for grades ≤ 4%	Section 224.9	-	18 MPH for grades ≤ 4%	No
CROSS SECTION DATA					
Width	Standard 12' 10' limited ROW 8' min. in short sections under constrained conditions	Section 224.4	5' - 10'	10' min.	No
Railings	-	-	-	To be evaluated	No
HORIZONTAL GEOMETRY					
Curve Radius	74' min. NC 86' min. RC	Table 224.10.1	-	74' min. NC 86' min. RC	No
VERTICAL GEOMETRY					
Vertical Clearance	12' desirable 10' min. 8' constrained	Section 224.8	-	10' min.	No
LATERAL OFFSET					
Horizontal Clearance	4' clear area on both sides 2' min. graded area with 1:6 slopes	Section 224.7	-	Travel Lane-14' min. Auxiliary Lane-10' min.	No
Separation from Roadway	5' from face of curb 2' min. from back of curb	Section 224.12	2.5' - 27' from face of curb	2.5 - 24' from face of curb	No

APPENDIX B:

Typical Section Package

STATE OF FLORIDA

DEPARTMENT OF TRANSPORTATION

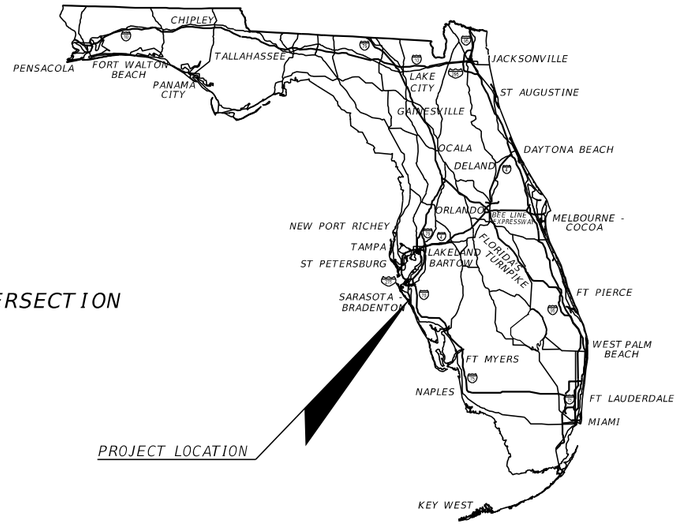
TYPICAL SECTION PACKAGE

FINANCIAL PROJECT ID 445926-1-52-01

SARASOTA COUNTY (17030)

STATE ROAD NO. 789 (JOHN RINGLING CAUSEWAY/GULFSTREAM AVE.)

WIDENING TO ADD TRANSIT LANES AND RECONSTRUCT WEST OF BIRD KEY DR. INTERSECTION AND RECONSTRUCT SUNSET DR./GOLDEN GATE PT. INTERSECTION



PROJECT LOCATION URL:	https://tinyurl.com/yc7dvpe6
PROJECT LIMITS:	BEGIN STA. 122+70.00 – END STA. 133+65.23 BEGIN STA. 164+93.72 – END STA. 184+20.00
EXCEPTIONS:	NONE
BRIDGE LIMITS:	BEGIN STA. 133+65.23 – END STA. 164+93.72
RAILROAD CROSSING:	NONE

FDOT DISTRICT DESIGN ENGINEER

CONCURRING WITH:
TYPICAL SECTION ELEMENTS
TARGET SPEED
DESIGN & POSTED SPEEDS

FDOT DISTRICT TRAFFIC OPERATIONS ENGINEER

CONCURRING WITH:
TARGET SPEED
DESIGN & POSTED SPEEDS

FDOT DISTRICT INTERMODAL SYSTEMS DEVELOPMENT MANAGER

CONCURRING WITH:
CONTEXT CLASSIFICATION
TARGET SPEED

FDOT DISTRICT STRUCTURES DESIGN ENGINEER

CONCURRING WITH:
TYPICAL SECTION ELEMENTS

FHWA TRANSPORTATION ENGINEER

CONCURRING WITH:
TYPICAL SECTION ELEMENTS

LOCAL TRANSPORTATION ENGINEER

CONCURRING WITH:
TYPICAL SECTION ELEMENTS

NOT USED

CONCURRING WITH:

NOT USED

CONCURRING WITH:

APPROVED BY:

GARY J. NADEAU
LICENSE
No 49629
STATE OF FLORIDA
PROFESSIONAL ENGINEER

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY

ON THE DATE ADJACENT TO THE SEAL

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

KIMLEY-HORN AND ASSOCIATES, INC.
1777 MAIN ST., SUITE 200
SARASOTA, FLORIDA 34236
GARY J. NADEAU, P.E. NO. 49629

THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE WITH RULE 61G15-23.004, F.A.C.

INDEX OF SHEETS

SHEET NO. 1

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	( )	C3C : SUBURBAN COMM.
( )	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
(X)	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	( )	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
(X)	MINOR ARTERIAL		

HIGHWAY SYSTEM

- ( ) NATIONAL HIGHWAY SYSTEM
- ( ) STRATEGIC INTERMODAL SYSTEM
- (X) STATE HIGHWAY SYSTEM
- ( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

- ( ) 1 - FREEWAY
- ( ) 2 - RESTRICTIVE w/Service Roads
- ( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
- ( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
- (X) 5 - RESTRICTIVE w/440 ft. Connection Spacing
- ( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
- ( ) 7 - BOTH MEDIAN TYPES

CRITERIA

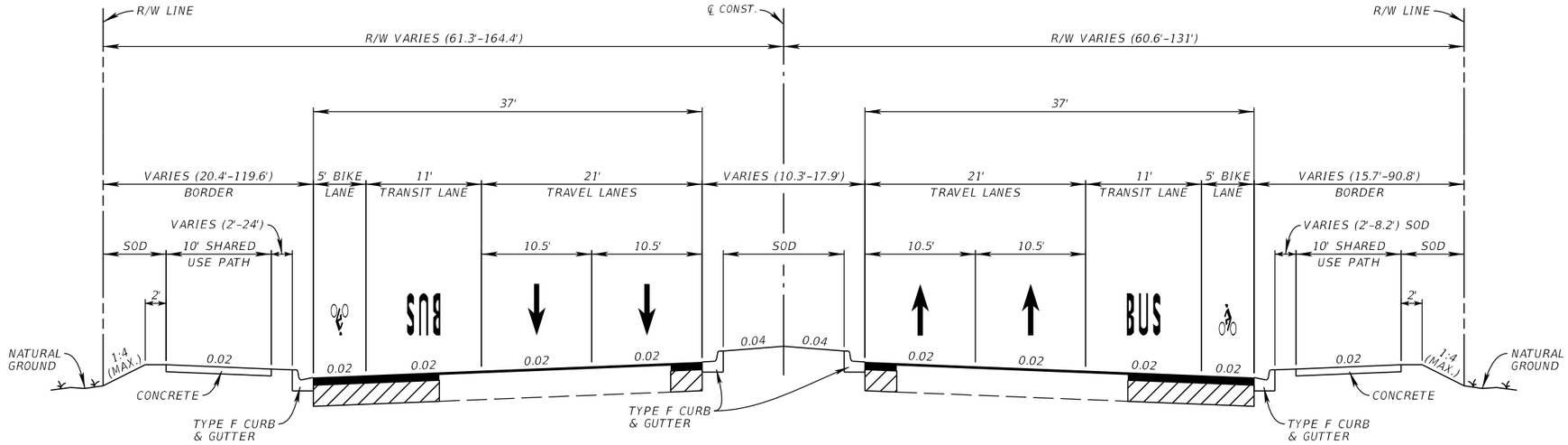
- (X) NEW CONSTRUCTION / RECONSTRUCTION
- ( ) RESURFACING (LA FACILITIES)
- ( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

DESIGN VARIATIONS:
MEDIAN WIDTH VARIATION

TYPICAL SECTION No. 1

NOT TO SCALE



SR 789 (JOHN RINGLING CSWY.)
STA. 122+70.00 TO STA. 133+65.23
SR 789 (JOHN RINGLING CSWY./GULFSTREAM AVE.)
STA. 164+93.72 TO STA. 184+20.00

TRAFFIC DATA

CURRENT YEAR = 2023 AADT = 38110
ESTIMATED OPENING YEAR = 2024 AADT = 39253
ESTIMATED DESIGN YEAR = 2044 AADT = 70896
K = 9.0% D = 52.4% T = 3.7% (24 HOUR)
DESIGN HOUR T = 3.7%
TARGET SPEED = 35 MPH
DESIGN SPEED = 35 MPH
POSTED SPEED = 35 MPH

FINANCIAL PROJECT ID	SHEET NO.
445926-1-52-01	2

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

APPENDIX C:

Pavement Design Report

DISTRICT ONE DESIGN

PAVEMENT DESIGN

FOR

445926-1-52-01
445926-2-52-01

Sarasota

SR 789

0.000 / 0.000
to
0.194 / 1.006

Jeff Mednick
FDOT Project Manager

PAVEMENT DESIGN PACKAGE

FINANCIAL PROJECT ID:	**445926-1-52-01 / 445926-2-52-01**
WPI NO.:	**N/A**
STATE PROJECT NO.:	**N/A**
COUNTY SECTION NO.:	**17030000 / 17030201**
FEDERAL AID PROJECT NO.:	**N/A**
COUNTY:	**Sarasota**
PROJECT NAME:	**SR 789**
FROM:	**East of Bird Key Drive**
TO:	**West of Sunset Drive**

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Appendices

Approved by
Responsible Engineer

Date

Concurrence by
District Design Engineer

Date

FLEXIBLE PAVEMENT DESIGN
QUALITY CONTROL CHECKLIST

State Project Number ID: N/A Federal Aid No.: N/A
Financial Project ID: 445926-1-52-01/ 445926-2-52-01 County: Sarasota

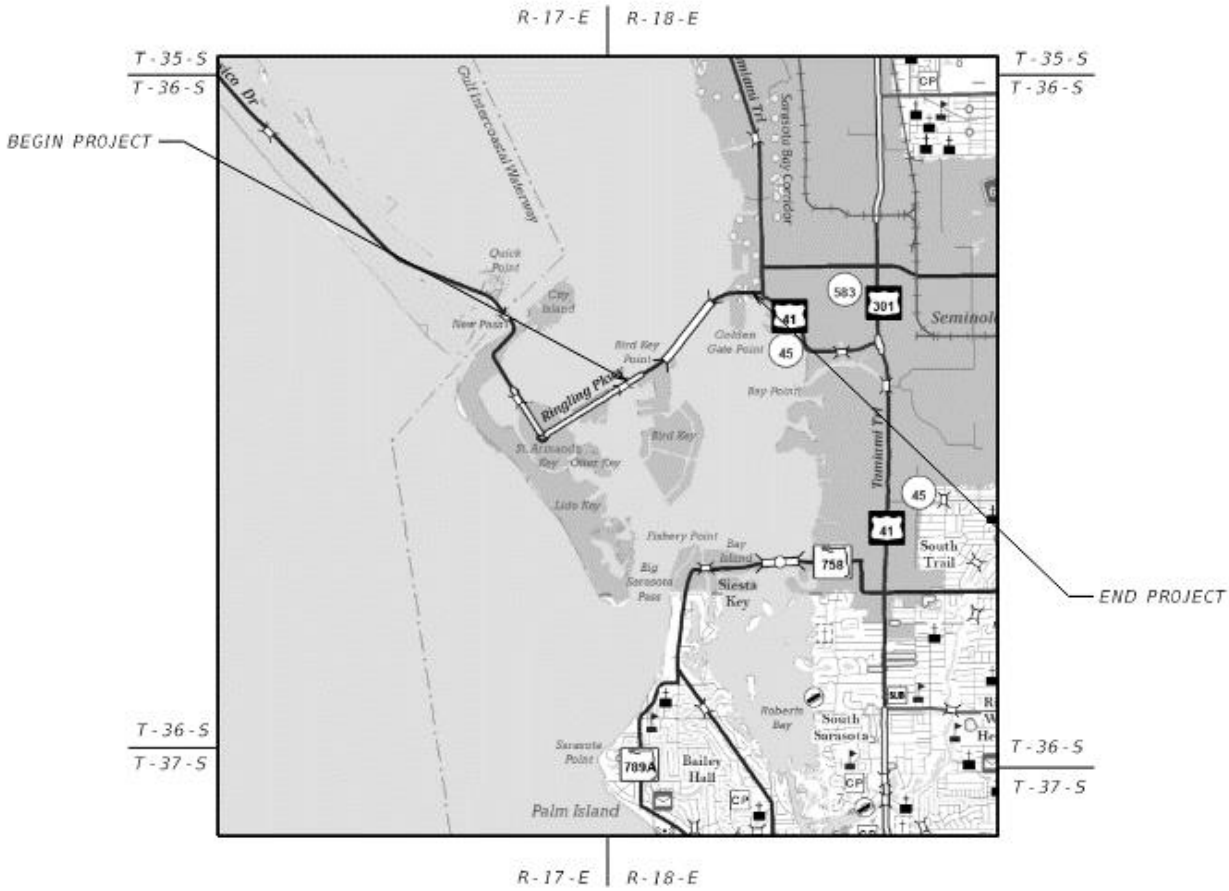
Ref. No.	**Flexible Pavement Design Review**	**Satisfactory Yes/No**
1.	Pavement Design Summary Sheet	YES
2.	Project Location and Description	YES
3.	Traffic Data and ESALD Calculations	YES
4.	Resilient Modulus (MR)	YES
5.	Required Structural Number (SNR) Calculations	YES
6.	Calculated Structural Number (SNC) Calculations	YES
7.	Base Material Selection	YES
8.	Friction Course Selection	YES
9.	Stabilized Subgrade Evaluation.	N/A
10.	Shoulder Design	N/A
11.	Coordination with Other Offices	N/A
12.	Other Special Details	N/A
13.	Final Pavement Design Drawing or Narrative.	YES
	Rehabilitation	
14.	Field Evaluation of Project	N/A
15.	Pavement Coring and Evaluation.	YES
16.	Distress Evaluation	N/A
17.	Existing Cross-Slope and Correction Method.	N/A
18.	Milling Depth and Purpose	N/A
19.	Overlay Structural Number (SNO) Calculations	N/A
20.	Leveling/Overbuild Recommendation	N/A
21.	Composition Report.	N/A
	Projects That Do Not Require Design Calculations	
22.	Existing Pavement Evaluation.	N/A
23.	Existing Cross-Slope and Correction method.	N/A
24.	Asphalt Thickness	N/A
25.	Base Type and Thickness	N/A
26.	Future Milling Considerations	N/A
27.	Structural Evaluation	N/A
	Plans Review	
28.	Plans Conform to Pavement Design.	YES
29.	Cross-Slope correction addressed	N/A
30.	Design Details Adequately Covered	YES
31.	Standard Indexes Properly Referenced.	YES
32.	Project is Constructable with Current Technology.	YES

Comments(by Ref. No.)

QA by: _____ Date: _____

STATE OF FLORIDA

DEPARTMENT OF TRANSPORTATION



LOCATION MAP

FINANCIAL PROJECT ID 445926-1-52-01 / 445926-2-52-01

SARASOTA COUNTY (17030000 / 17030201)

STATE ROAD NO. 789

FROM EAST OF BIRD KEY DRIVE TO WEST OF SUNSET DRIVE

PROJECT MANAGER: JEFF MEDNICK

Project Description

This project is located along State Road 789 (Gulfstream Avenue/John Ringling Causeway) in Sarasota Avenue. The length of the project is 1.2 miles, and the roadway is an Urban Minor Arterial from MP 0.000 to MP 0.194 (Roadway ID 17030000) and from MP 0.000 to MP 1.006 (Roadway ID 17030201). The purpose of this project is to raise the Sunset Drive and Golden Gate Point intersection, reconstruct, mill, resurface, and widen the outside/inside edge of pavement to provide a designated bus lane in each direction. Milling and resurfacing areas will be considered as functional overlays.

FLORIDA DEPARTMENT OF TRANSPORTATION

FLEXIBLE PAVEMENT DESIGN SUMMARY SHEET

Prepared by:	Gary J. Nadeau, P.E	**Date Prepared:**	12/12/23	
Financial Project No.	445926-1-52-01 / 445926-2-52-01	**Project Name:**	SR 789	
WPI No.	N/A	**From:**		
State Project No.	N/A	**To:**		
County Section No.	17030000 / 17030201	**Begin MP:**	0.000 / 0.000	
FAP No.	N/A	**End MP:**	0.194 / 1.006	
County:	Sarasota	**Project Length (Mi)**	1.200	
Type Work:	Reconstruction / Widening			
Opening Year:	2026	**% R:**	90	
Design Year:	2046	**MR:**	7,200**	**PSI**
ESALD - Mainline	5,553,000*	**Design Speed:**	35	**MPH**
ESALD - Shoulder	N/A	**Functional Class:**	Urban Arterial	
SNR - Mainline	4.67**			
SNR - Shoulder	N/A	**Design Seq. No.:**	1	
		Cross Slope	N/A	

DESIGN NOTES:

* Used greater value of the two locations provide for the ESAL counts and rounded to 6,000,000 for calculations.

**Used a 50% reduced resilient modulus of 7,200 PSI for 1-ft base clearance per FDM to calculated SN required.

*** Depth of structural course was provided to match the asphalt structural depth of the adjacent roadway connections for future milling and resurfacing. (approved pavement design, SR 45 – FPID: 438137-1-52-01 – see Appendix F)

Recommended Reconstruction Pavement Design:

Layers	Thickness	Coefficient	SN
Friction Course FC-12.5	1.50	0.44	0.66
Type SP Structural Course (Traffic Level C)	3.00***	0.44	1.32
Optional Base Group 9	10.00	0.18	1.80
Type B Stabilization (LBR 40)	12.00	0.08	0.96
		Proposed Total SN=	4.74
		Design Total SN=	4.67

Approved by Responsible Engineer

Date: _____

FLORIDA DEPARTMENT OF TRANSPORTATION
FLEXIBLE PAVEMENT DESIGN SUMMARY SHEET

Prepared by:	Gary J. Nadeau, P.E	**Date Prepared:**	12/12/23	
Financial Project No.	445926-1-52-01 / 445926-2-52-01	**Project Name:**	SR 789	
WPI No.	N/A	**From:**		
State Project No.	N/A	**To:**		
County Section No.	17030000 / 17030201	**Begin MP:**	0.000 / 0.000	
FAP No.	N/A	**End MP:**	0.194 / 1.006	
County:	Sarasota	**Project Length**	1.200	
Type Work:	Rehabilitation			
Opening Year:	2026	**% R:**	90	
Design Year:	2046	**MR:**	7,200**	**PSI**
ESALD - Mainline	5,553,000*	**Design Speed:**	35	**MPH**
ESALD - Shoulder	N/A	**Functional Class:**	Urban Arterial	
SNR - Mainline	4.67**			
SNR - Shoulder	N/A	**Design Seq. No.:**	2	
		Cross Slope	N/A	

DESIGN NOTES:

* Used greater value of the two locations provided for the ESAL counts and rounded to 6,000,000 for calculations.

** Used a 50% reduced resilient modulus of 7,200 PSI for 1-ft base clearance per FDM to calculated SN required.

*** Thickness and coefficients used are from approved pavement design:
Design Sequence No.2, SR 45 - FPID: 438137-1-52-01 – see Appendix F.

Existing Pavement:

Layers	Thickness	Coefficient	SN
Friction Course FC-12.5	1.30	0.25	0.33
Type SP Structural Course (Traffic Level C)	1.50	0.25	0.38
ABC-2 ***	6.00	0.16	0.96
Type B Stabilization (LBR 40) ***	12.00	0.08	0.96
		Existing Total SN =	2.62
		Remaining SN After Milling (SN_E) =	2.25

Recommended Resurfacing Design:

MILLING RECOMMENDATION: 1.50”

Layers	Thickness	Coefficient	SN
Friction Course FC-12.5	1.50	0.44	0.66
Type SP Structural Course (Traffic Level C)	1.50	0.44	0.66
Type SP Structural Course (Traffic Level C) (Overbuild)	5.50	0.44	2.42
		Proposed Total SN=	5.99
		Design Total SN=	4.67

Approved by Responsible Engineer

Date: _____

PAVEMENT DESIGN SKETCH

(Not to scale)

Financial Project No.	445926-1-52-01 / 445926-2-52-01	Type Work:	Reconstruction/Widening
WPI No.	N/A	Opening Year:	2026
State Project No.	N/A	Design Year:	2046
County Section No.	17030000 / 17030201	%R	90
FAP No.	N/A	Mr	7,200 PSI
County:	Sarasota	Design Speed:	35 MPH
Project Name:	SR 789	Functional Class:	Urban Arterial
From:	East of Bird Key Drive		
To:	West of Sunset Drive	Traffic Level	C
Project Length (Mi)	1.200	Cross Slope Correction	No

Design Seq. No.: 1	Project Name:	SR 789
	Begin MP	0.000 / 0.000
	End MP	0.194 / 1.006
	ESALD	5,553,000

MAINLINE AND TURN LANES

1.50" FRICTION COURSE FC-12.5
3.00" TYPE SP STRUCTURAL COURSE (TRAFFIC LEVEL C)
OPTIONAL BASE GROUP 9
TYPE B STABILIZATION (LBR 40)

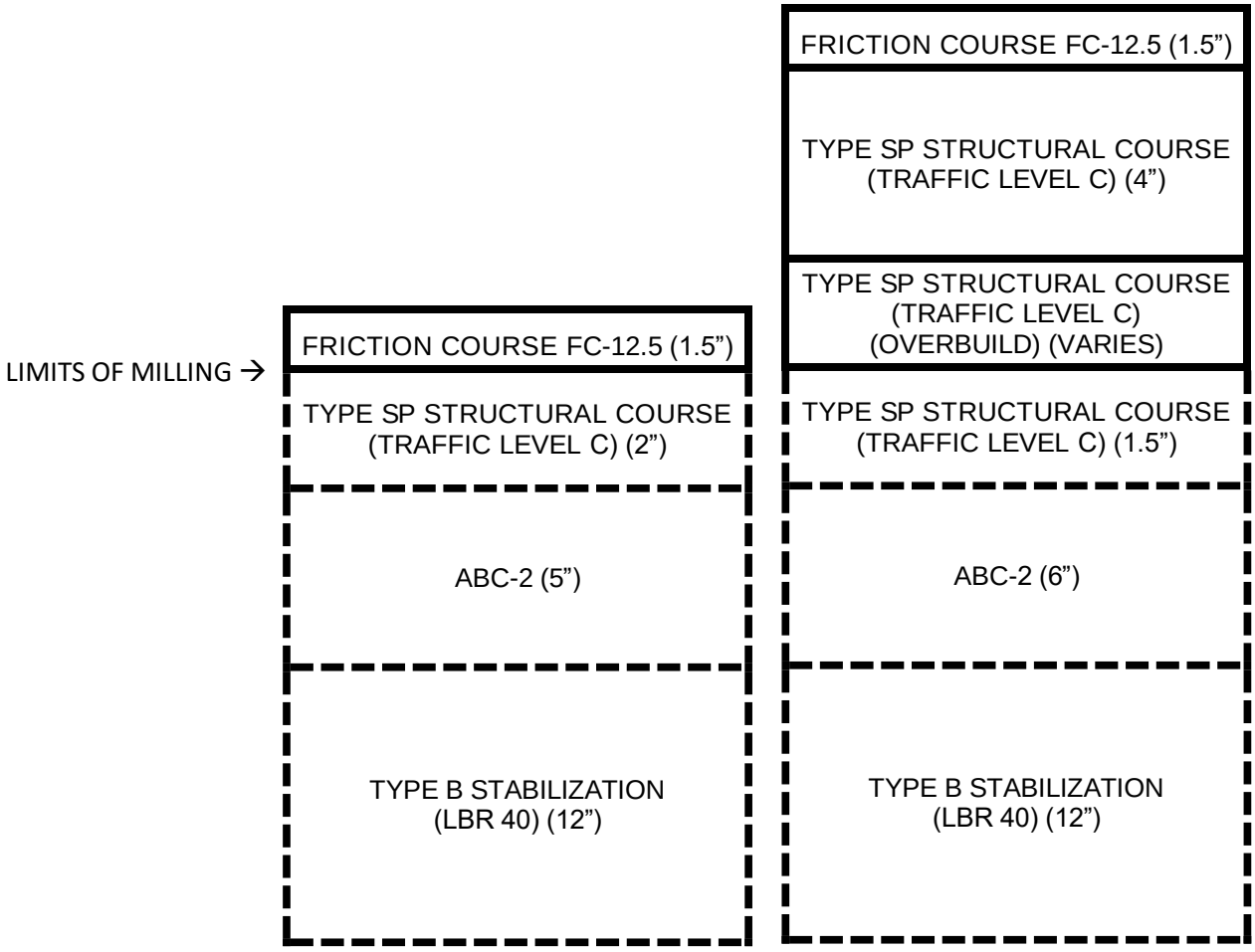
PAVEMENT DESIGN SKETCH

(Not to scale)

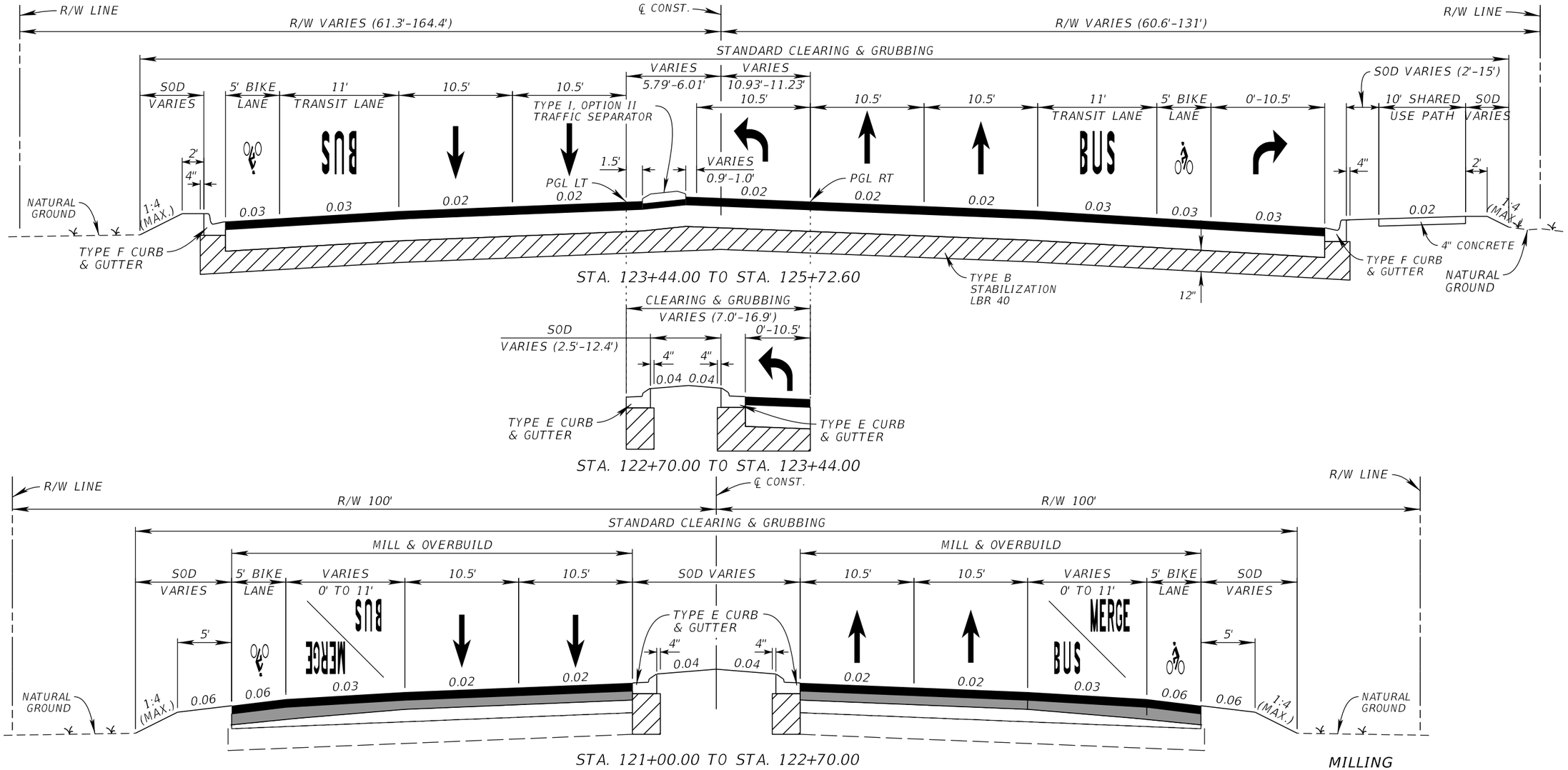
Financial Project No.	445926-1-52-01 / 445926-2-52-01	Type Work:	Rehabilitation
WPI No.	N/A	Opening Year:	2026
State Project No.	N/A	Design Year:	2046
County Section No.	17030000 / 17030201	%R	90
FAP No.	N/A	Mr	7,200 PSI
County:	Sarasota	Design Speed:	35 MPH
Project Name:	SR 789	Functional Class:	Urban Arterial
From:	East of Bird Key Drive		
To:	West of Sunset Drive	Traffic Level	C
Project Length (Mi)	1.200	Cross Slope Correction	No

Design Seq. No.: 2

MILLING, RESURFACING, AND OVERBUILD MAINLINE AND TURN LANES



Appendix A
Typical Section Package



TRAFFIC DATA

CURRENT YEAR = 2023 AADT = 41800
ESTIMATED OPENING YEAR = 2026 AADT = 42800
ESTIMATED DESIGN YEAR = 2046 AADT = 49500
K = 9.0% D = 52.4% T = 5.0% (24 HOUR)
DESIGN HOUR T = 2.5%
TARGET SPEED = 35 MPH
DESIGN SPEED = 35 MPH
POSTED SPEED = 35 MPH

TYPICAL SECTION
SR 789 (JOHN RINGLING CSWY.)
STA. 121+00.00 TO STA. 125+72.60

MILLING
MILL EXISTING ASPHALT PAVEMENT 1.5" DEPTH

RESURFACING
FRICTION COURSE FC-12.5 (TRAFFIC C) (1.5") (PG 76-22)

OVERBUILD
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (VARIES)
FRICTION COURSE FC-12.5 (TRAFFIC C) (1.5") (PG 76-22)

RECONSTRUCTION
OPTIONAL BASE GROUP 9
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (3")
FRICTION COURSE FC-12.5 (TRAFFIC C) (1.5") (PG 76-22)

REVISIONS				ENGINEER OF RECORD	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			TYPICAL SECTION (1)	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	GARY J. NADEAU, P.E. LICENSE NUMBER: 49629 KIMLEY-HORN AND ASSOCIATES, INC. 1800 SECOND STREET, SUITE 900 SARASOTA,, FL 34236	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		4
					SR 789	SARASOTA	445926-1-52-01		

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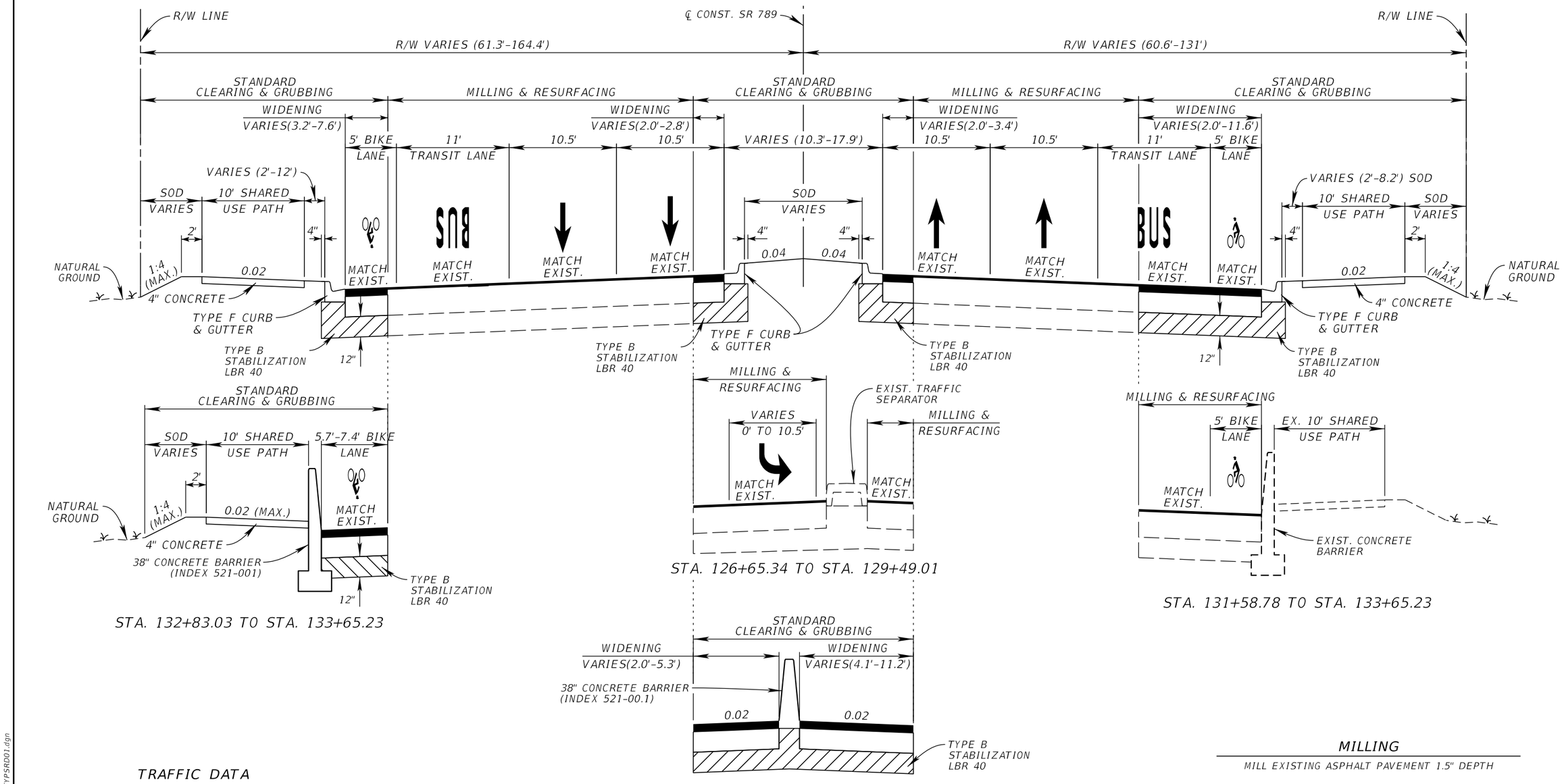


STA. 126+65.34 TO STA. 129+49.01

STA. 132+83.03 TO STA. 133+65.23

STA. 131+58.78 TO STA. 133+65.23

STA. 131+60.53 TO STA. 133+65.23

TRAFFIC DATA

CURRENT YEAR = 2023 AADT = 41800
ESTIMATED OPENING YEAR = 2026 AADT = 42800
ESTIMATED DESIGN YEAR = 2046 AADT = 49500
K = 9.0% D = 52.4% T = 5.0% (24 HOUR)
DESIGN HOUR T = 2.5%
TARGET SPEED = 35 MPH
DESIGN SPEED = 35 MPH
POSTED SPEED = 35 MPH

MILLING

MILL EXISTING ASPHALT PAVEMENT 1.5" DEPTH

RESURFACING

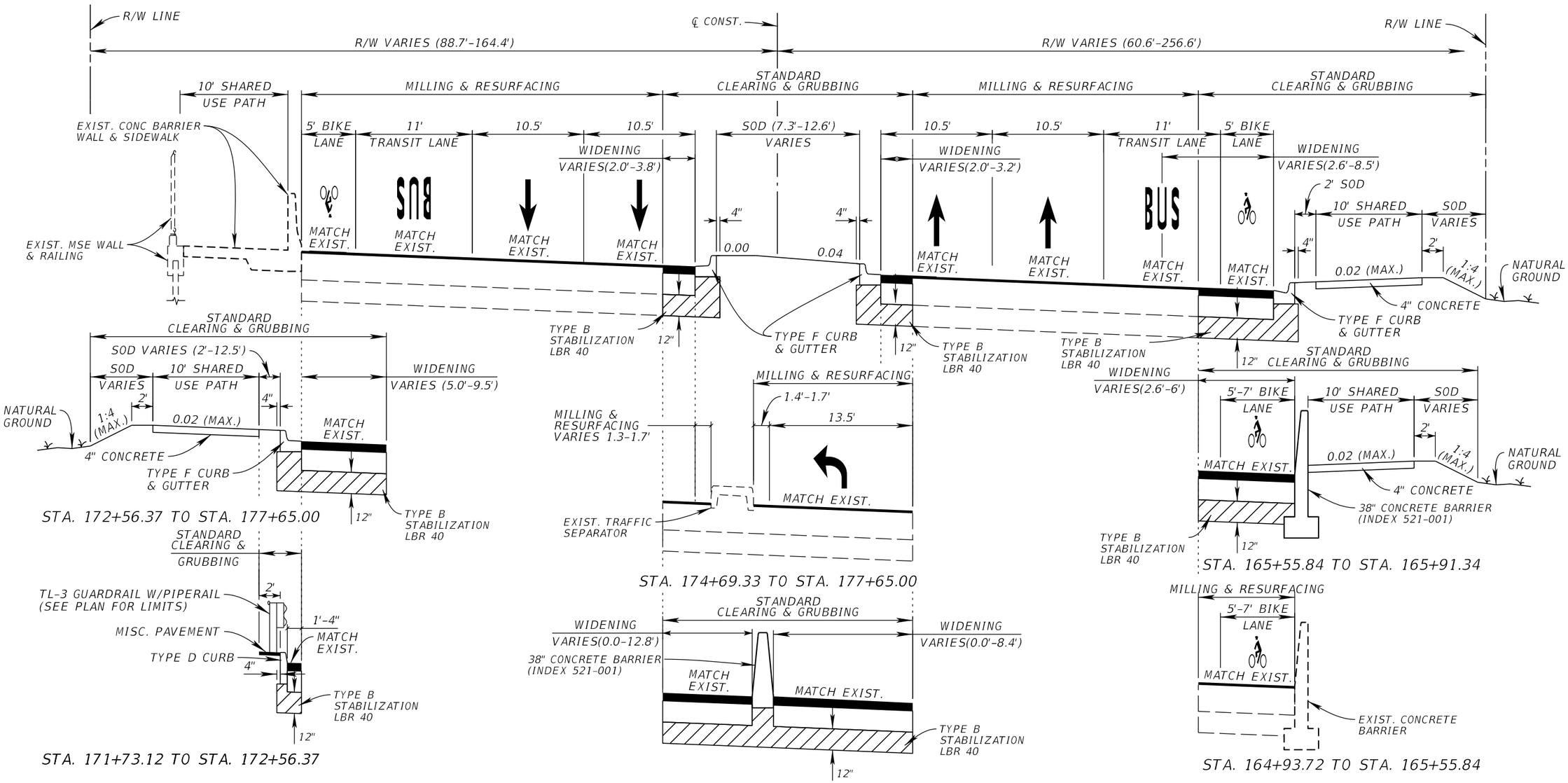
FRICTION COURSE FC-12.5 (TRAFFIC C) (1.5") (PG 76-22)

WIDENING

OPTIONAL BASE GROUP 9
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (3")
FRICTION COURSE FC-12.5 (TRAFFIC C) (1.5") (PG 76-22)

TYPICAL SECTION
SR 789 (JOHN RINGLING CSWY.)
STA. 125+72.60 TO STA. 133+65.23

REVISIONS				ENGINEER OF RECORD	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			TYPICAL SECTION (2)	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	GARY J. NADEAU, P.E. LICENSE NUMBER: 49629 KIMLEY-HORN AND ASSOCIATES, INC. 1800 SECOND STREET, SUITE 900 SARASOTA,, FL 34236	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		5
					SR 789	SARASOTA	445926-1-52-01		



TRAFFIC DATA

CURRENT YEAR = 2023 AADT = 41800
ESTIMATED OPENING YEAR = 2026 AADT = 42800
ESTIMATED DESIGN YEAR = 2046 AADT = 49500
K = 9.0% D = 52.4% T = 5.0% (24 HOUR)
DESIGN HOUR T = 2.5%
TARGET SPEED = 35 MPH
DESIGN SPEED = 35 MPH
POSTED SPEED = 35 MPH

MILLING

MILL EXISTING ASPHALT PAVEMENT 1.5" DEPTH

RESURFACING

FRICTION COURSE FC-12.5 (TRAFFIC C) (1.5") (PG 76-22)

WIDENING

OPTIONAL BASE GROUP 9
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (3")
FRICTION COURSE FC-12.5 (TRAFFIC C) (1.5") (PG 76-22)

TYPICAL SECTION
SR 789 (JOHN RINGLING CSWY.)
STA. 164+93.72 TO STA. 177+65.00

REVISIONS				ENGINEER OF RECORD	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			TYPICAL SECTION (3)	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	GARY J. NADEAU, P.E. LICENSE NUMBER: 49629 KIMLEY-HORN AND ASSOCIATES, INC. 1800 SECOND STREET, SUITE 900 SARASOTA,, FL 34236	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		6
					SR 789	SARASOTA	445926-1-52-01		

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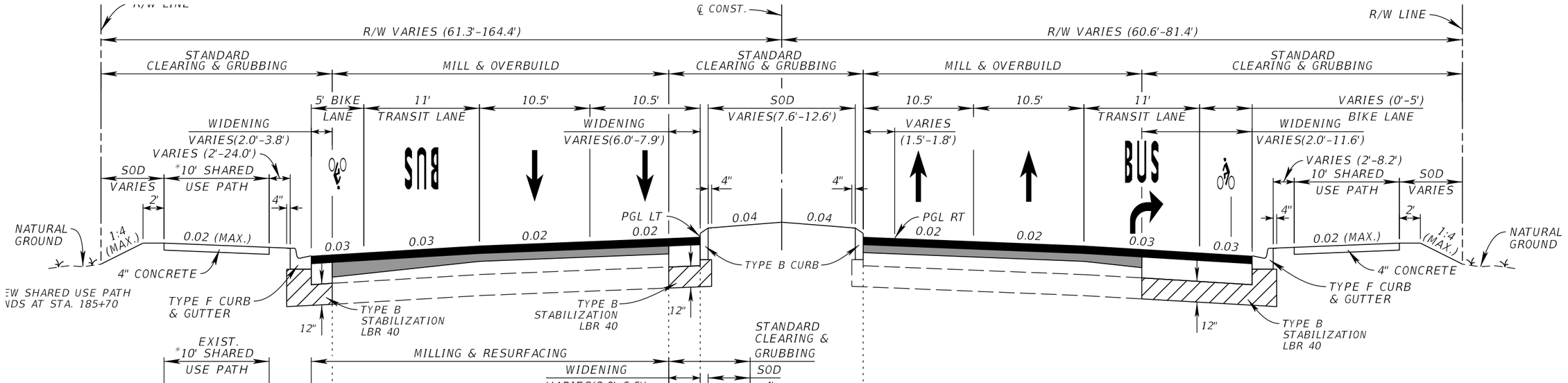
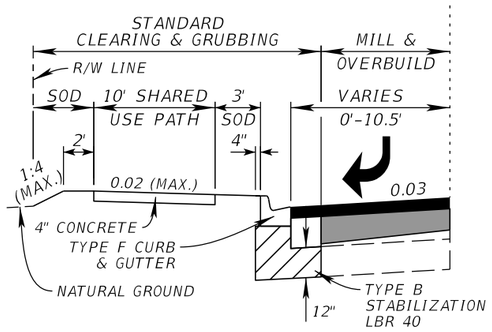
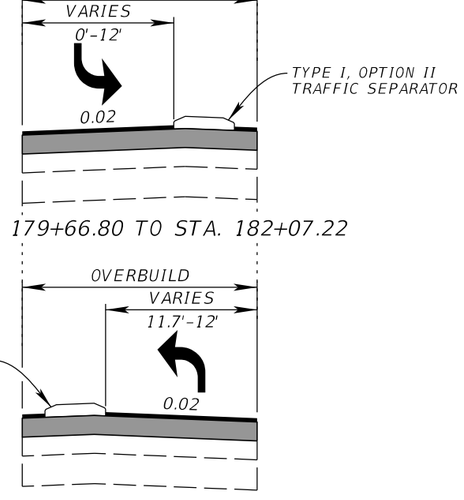


STA. 184+20.00 TO STA. 187+17.00



STA. 179+70.89 TO STA. 182+80.00

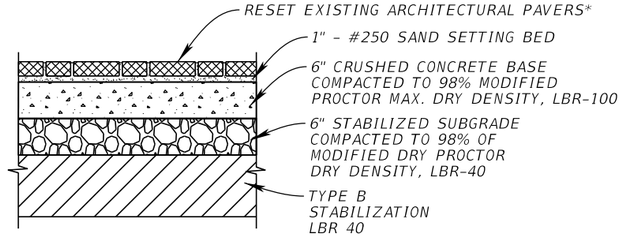


STA. 179+66.80 TO STA. 182+07.22

STA. 177+65.00 TO STA. 178+40.68

TRAFFIC DATA

CURRENT YEAR = 2023 AADT = 41800
ESTIMATED OPENING YEAR = 2026 AADT = 42800
ESTIMATED DESIGN YEAR = 2046 AADT = 49500
K = 9.0% D = 52.4% T = 5.0% (24 HOUR)
DESIGN HOUR T = 2.5%
TARGET SPEED = 35 MPH
DESIGN SPEED = 35 MPH
POSTED SPEED = 35 MPH



SUNSET DR. ARCHITECTURAL PAVER DETAIL

NOT TO SCALE

* REMOVE STORE AND RESET EXISTING ARCHITECTURAL PAVERS. REPLACE IN KIND IF EXIST. QUANTITY IS INSUFFICIENT TO COVER REQUIRED AREA. APPROVE SELECTION OF ANY NEW PAVERS WITH ENGINEER. SEE PLAN FOR LOCATION.

MILLING

MILL EXISTING ASPHALT PAVEMENT 1.5" DEPTH

RESURFACING

FRICTION COURSE FC-12.5 (TRAFFIC C) (1.5") (PG 76-22)

OVERBUILD

TYPE SP STRUCTURAL COURSE (TRAFFIC C) (VARIES)
FRICTION COURSE FC-12.5 (TRAFFIC C) (1.5") (PG 76-22)

WIDENING

OPTIONAL BASE GROUP 9
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (3")
FRICTION COURSE FC-12.5 (TRAFFIC C) (1.5") (PG 76-22)

TYPICAL SECTION
SR 789 (JOHN RINGLING CSWY./GULFSTREAM AVE.)

REVISIONS				ENGINEER OF RECORD	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			TYPICAL SECTION (4)	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	GARY J. NADEAU, P.E. LICENSE NUMBER: 49629 KIMLEY-HORN AND ASSOCIATES, INC. 1800 SECOND STREET, SUITE 900 SARASOTA,, FL 34236	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		7
					SR 789	SARASOTA	445926-1-52-01		

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Appendix B
Design Traffic and 18-KIP Information

Florida Department of Transportation

RON DESANTIS
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

JARED W. PERDUE, P.E.
SECRETARY

MEMORANDUM

Date:	**October 18, 2023**	
To:	**Jeff Mednick**	**EXT 2304**
From:	**Elias Bowne, Traffic Analyst**	
Subject:	**Financial Project No:**	**445926-2-52-01**
	Roadway ID:	**17030000**
	Project Name:	**SR 789**
	County:	**Sarasota**
	Type of Work:	**Pavement Resurfacing and Widening**
	From MP:	**0.000 - 0.194**

Per your request, the attached traffic data forecasts are provided for the above roadway. These estimates were taken from the TRENDS calculated from traffic counts provided by FDOT.

K =	9.0%
D =	52.4%
24 Hour T =	5.0%
Design Hour T =	2.5%
2022 AADT =	41,500
Functional Class =	Urban Minor Art

The attached 18-KIP Equivalent Single Axle Loading Accumulations are based on the above information and have been prepared in accordance with the Central Offices memo of December 1, 2000, reflecting the current Equivalency Factors. We have included the 24-hour traffic counts for site(s) 175031.

The following are existing and/or new traffic monitoring stations that are within or near the project limits. Any installations on a State Facility will need to follow the Specifications and Standard Plan index 695-001:

Cosite	Type	Status	Latitude	Longitude	Owner	Contact
N/A	N/A	N/A	N/A	N/A	N/A	N/A

Please feel free to contact Elias Bowne at extension 2524 if you have any questions.

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

FIN #: 445926-2-52-01
COUNTY: Sarasota
ROADWAYID: 17030000
PROJECT DESCRIPTION: Resurfacing and Widening

LOCATION #: 1

LOCATION DESCRIPTION: SR 789 (MP: 0.000 - 0.194)

GROWTH RATE FORMULA

A: Interpolation
B: Enter Growth Rate
C: Enter All AADTs
D: New Facility

If "A" select an interpolation function
If "B" enter rate as decimals (1%=1.01)
If ""C", or "D" continue to next section

Choose A, B, C, or D here: A

Linear Growth Rate X %
Compounded Growth Rate ____ %
Decaying Growth Rate ____ %
(select one)

DESIGN INFORMATION

		AADT
Existing Year	2022	41500
Opening Year	2026	N/A
Mid-Design Year	2036	N/A
Design Year	2046	49500

Note: AADT values have been rounded to the nearest 100

Daily Direction Split (50% or 100%): 50%
Lanes in One Direction: 2

T24 values
Existing to Opening Year: 5.00%
Opening to Mid-Year: 5.00%
Mid-Year to Design-Year: 5.00%

2000 EQUIVALENCY FACTORS |u(1)|

(selected with an X)	FLEXIBLE PAVEMENT SN = 5/THICK		RIGID PAVEMENT SN = 12/THICK	
RURAL FREEWAY:	1.050	____	1.600	____
URBAN FREEWAY:	0.900	____	1.270	____
RURAL HIGHWAY:	0.960	____	1.350	____
URBAN HIGHWAY:	0.890	X	1.220	____
OTHER (Enter Factor and X):		____		____

(1) Equivalency Factors are based on Updated Pavement Damage Factors Memorandum, dated December 1, 2000.

Lane Factors developed by Copes equation

I have reviewed the 18 kip Equivalent Single Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by:	Elias Bowne	Traffic Analyst		FDOT
	Name	Title		Org. Unit or Firm
	DocuSigned by: Elias Bowne 91B7C32543AE4C4...		10/30/2023 | 1:35 PM EDT	
	Signature		Date	
Reviewed by:	Brittany Nichols	Model Coordinator		FDOT
	Name	Title		Org. Unit or Firm
	DocuSigned by: Brittany Nichols 3491A225DF874FE...		11/01/2023 | 11:32 AM EDT	
	Signature		Date	

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS - LOCATION 1

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

YEARS: *2022 to 2046*

SECTION #: 17030000 **COUNTY:** Sarasota **FIN #:** 445926-2-52-01

FLEXIBLE PAVEMENT URBAN HIGHWAY 0.890

SN=5/THICK Resurfacing and Widening A

YEAR	AADT	ESAL (1000S)	ACCUM (1000s)	D	T	LF	EF
2022	41500	252	0	0.5	5.00%	0.746	0.890
2023	41800	254	0	0.5	5.00%	0.745	0.890
2024	42100	255	0	0.5	5.00%	0.745	0.890
2025	42500	257	0	0.5	5.00%	0.744	0.890
2026	42800	259	259	0.5	5.00%	0.743	0.890
2027	43100	261	520	0.5	5.00%	0.743	0.890
2028	43500	263	783	0.5	5.00%	0.742	0.890
2029	43800	264	1047	0.5	5.00%	0.741	0.890
2030	44100	266	1313	0.5	5.00%	0.741	0.890
2031	44500	268	1581	0.5	5.00%	0.740	0.890
2032	44800	270	1851	0.5	5.00%	0.740	0.890
2033	45100	271	2122	0.5	5.00%	0.739	0.890
2034	45500	273	2395	0.5	5.00%	0.738	0.890
2035	45800	275	2670	0.5	5.00%	0.738	0.890
2036	46100	277	2947	0.5	5.00%	0.737	0.890
2037	46500	279	3226	0.5	5.00%	0.737	0.890
2038	46800	280	3506	0.5	5.00%	0.736	0.890
2039	47100	282	3788	0.5	5.00%	0.735	0.890
2040	47500	284	4072	0.5	5.00%	0.735	0.890
2041	47800	286	4358	0.5	5.00%	0.734	0.890
2042	48100	287	4645	0.5	5.00%	0.734	0.890
2043	48500	289	4934	0.5	5.00%	0.733	0.890
2044	48800	291	5225	0.5	5.00%	0.733	0.890
2045	49100	292	5517	0.5	5.00%	0.732	0.890
2046	49500	295	5812	0.5	5.00%	0.731	0.890

Opening to Mid-Design Year ESAL Accumulation (1000s): 2688

Opening to Design Year ESAL Accumulation (1000s): 5553

I have reviewed the 18 kip Equivalent Single Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by: Elias Bowne | Traffic Analyst | FDOT

Name | Title | Org. Unit or Firm

DocuSigned by: Elias Bowne 91B7C32543AE4C4...

10/30/2023 | 1:35 PM EDT

Signature | Date

Brittany Nichols | Model Coordinator | FDOT

Reviewed by: Name | Title | Org. Unit or Firm

DocuSigned by: Brittany Nichols 3491A225DF874FE...

11/01/2023 | 11:32 AM EDT

Signature | Date

County: 17
Station: 5031
Description: SR 789/GULFSTREAM AVE, WEST OF SR 45/US 41
Start Date: 03/04/2020
Start Time: 0000

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	28	14	14	9	65	18	10	15	7	50	115
0100	9	2	5	3	19	9	4	2	3	18	37
0200	7	4	6	3	20	6	6	7	14	33	53
0300	9	4	4	3	20	2	6	8	9	25	45
0400	7	4	9	17	37	2	9	27	20	58	95
0500	14	31	36	29	110	25	34	51	74	184	294
0600	53	40	72	87	252	66	118	142	202	528	780
0700	131	143	163	191	628	216	267	306	385	1174	1802
0800	239	237	273	276	1025	354	339	363	411	1467	2492
0900	255	281	380	352	1268	359	414	400	405	1578	2846
1000	330	358	324	346	1358	380	434	407	403	1624	2982
1100	363	392	353	330	1438	412	434	414	404	1664	3102
1200	368	344	358	335	1405	446	488	402	440	1776	3181
1300	356	374	328	381	1439	394	380	407	338	1519	2958
1400	413	392	396	438	1639	366	359	360	341	1426	3065
1500	432	466	508	426	1832	337	341	326	355	1359	3191
1600	482	500	485	428	1895	317	320	305	272	1214	3109
1700	446	480	446	350	1722	236	252	283	237	1008	2730
1800	344	310	312	318	1284	259	222	172	193	846	2130
1900	315	197	233	170	915	201	164	203	167	735	1650
2000	158	161	147	128	594	144	155	162	162	623	1217
2100	148	171	134	130	583	168	141	118	132	559	1142
2200	137	137	91	86	451	81	72	80	108	341	792
2300	104	70	44	48	266	56	34	31	21	142	408
24-Hour Totals:					20265					19951	40216

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	845	1192	845	1584	845	2776
P.M.	1530	1916	1200	1776	1530	3234
Daily	1530	1916	1200	1776	1530	3234

Generated by SPS 5.0.49P

County: 17
Station: 5031
Description: SR 789/GULFSTREAM AVE, WEST OF SR 45/US 41
Start Date: 04/06/2021
Start Time: 1200

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	40	22	15	13	90	12	15	9	11	47	137
0100	15	8	14	13	50	11	5	6	2	24	74
0200	5	5	2	6	18	4	4	2	4	14	32
0300	1	4	5	3	13	6	6	6	12	30	43
0400	7	5	7	23	42	7	8	21	27	63	105
0500	16	23	19	34	92	18	18	35	55	126	218
0600	46	52	57	75	230	60	118	158	173	509	739
0700	129	142	157	168	596	208	245	370	434	1257	1853
0800	199	217	252	250	918	432	439	398	478	1747	2665
0900	247	289	275	371	1182	451	467	451	491	1860	3042
1000	308	319	355	365	1347	466	504	523	504	1997	3344
1100	349	382	394	393	1518	473	550	503	472	1998	3516
1200	417	436	378	459	1690	490	481	440	455	1866	3556
1300	413	422	379	416	1630	463	450	437	407	1757	3387
1400	457	453	414	458	1782	479	406	390	402	1677	3459
1500	512	488	523	522	2045	400	330	347	406	1483	3528
1600	515	494	533	516	2058	310	330	363	297	1300	3358
1700	518	529	504	469	2020	294	305	321	261	1181	3201
1800	492	370	330	323	1515	277	308	297	277	1159	2674
1900	294	311	265	261	1131	278	254	242	219	993	2124
2000	333	390	290	187	1200	156	169	154	167	646	1846
2100	204	182	178	166	730	161	104	127	106	498	1228
2200	159	140	148	124	571	80	65	73	65	283	854
2300	145	87	74	41	347	37	26	24	23	110	457
24-Hour Totals:					22815					22625	45440

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	845	1061	845	1847	845	2908
P.M.	1630	2096	1200	1866	1200	3556
Daily	1630	2096	1030	2050	1115	3601

Generated by SPS 5.0.49P

County: 17
Station: 5031
Description: SR 789/GULFSTREAM AVE, WEST OF SR 45/US 41
Start Date: 03/07/2023
Start Time: 1200

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	22	18	10	11	61	16	17	11	8	52	113
0100	21	8	9	7	45	6	1	10	8	25	70
0200	8	0	6	3	17	4	4	7	4	19	36
0300	6	8	7	9	30	4	8	8	8	28	58
0400	3	5	8	9	25	4	16	25	30	75	100
0500	17	31	40	38	126	25	37	69	116	247	373
0600	49	53	54	86	242	130	166	208	266	770	1012
0700	141	143	177	192	653	248	305	354	422	1329	1982
0800	211	224	228	257	920	345	373	406	442	1566	2486
0900	264	274	345	355	1238	423	422	430	447	1722	2960
1000	362	336	390	359	1447	420	404	396	431	1651	3098
1100	355	446	375	438	1614	437	461	465	420	1783	3397
1200	381	372	413	402	1568	464	436	413	361	1674	3242
1300	395	372	422	442	1631	383	373	406	383	1545	3176
1400	406	431	401	449	1687	424	389	378	380	1571	3258
1500	446	473	446	513	1878	375	335	363	375	1448	3326
1600	494	507	472	418	1891	347	329	328	292	1296	3187
1700	408	411	334	321	1474	287	312	296	305	1200	2674
1800	301	306	242	299	1148	275	255	229	213	972	2120
1900	301	245	172	201	919	161	163	147	146	617	1536
2000	157	174	149	158	638	168	158	136	164	626	1264
2100	158	150	142	164	614	158	160	135	121	574	1188
2200	172	143	87	82	484	82	60	55	39	236	720
2300	73	50	33	26	182	36	32	19	18	105	287
24-Hour Totals:					20532					21131	41663

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	845	1140	845	1717	845	2857
P.M.	1545	1986	1200	1674	1530	3374
Daily	1545	1986	1115	1810	1115	3450

Truck Percentage 4.35 4.13 4.24

Classification Summary Database

Dir	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TotTrk	TotVol
E	120	14763	4755	31	575	78	5	185	19	0	0	0	1	0	0	894	20532
W	117	15380	4762	13	529	75	16	217	22	0	0	0	0	0	0	872	21131

Generated by SPS 5.0.0.61

Florida Department of Transportation

RON DESANTIS
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

JARED W. PERDUE, P.E.
SECRETARY

MEMORANDUM

Date:	**October 18, 2023**	
To:	**Jeff Mednick**	**EXT 2304**
From:	**Elias Bowne, Traffic Analyst**	
Subject:	**Financial Project No:**	**445926-2-52-01**
	Roadway ID:	**17030201**
	Project Name:	**SR 789**
	County:	**Sarasota**
	Type of Work:	**Pavement Resurfacing and Widening**
	From MP:	**0.000 - 1.006**

Per your request, the attached traffic data forecasts are provided for the above roadway. These estimates were taken from the TRENDS calculated from traffic counts provided by FDOT.

K =	9.0%
D =	52.4%
24 Hour T =	4.7%
Design Hour T =	2.4%
2022 AADT =	37,000
Functional Class =	Urban Minor Art

The attached 18-KIP Equivalent Single Axle Loading Accumulations are based on the above information and have been prepared in accordance with the Central Offices memo of December 1, 2000, reflecting the current Equivalency Factors. We have included the 24-hour traffic counts for site(s) 170011.

The following are existing and/or new traffic monitoring stations that are within or near the project limits. Any installations on a State Facility will need to follow the Specifications and Standard Plan index 695-001:

Cosite	Type	Status	Latitude	Longitude	Owner	Contact
N/A	N/A	N/A	N/A	N/A	N/A	N/A

Please feel free to contact Elias Bowne at extension 2524 if you have any questions.

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

FIN #: 445926-2-52-01
COUNTY: Sarasota
ROADWAYID: 17030201
PROJECT DESCRIPTION: Resurfacing and Widening

LOCATION #: 2

LOCATION DESCRIPTION: SR 789 (MP: 0.000 - 1.006)

GROWTH RATE FORMULA

A: Interpolation
B: Enter Growth Rate
C: Enter All AADTs
D: New Facility

If "A" select an interpolation function
If "B" enter rate as decimals (1%=1.01)
If ""C", or "D" continue to next section

Choose A, B, C, or D here: A

Linear Growth Rate X %
Compounded Growth Rate ____ %
Decaying Growth Rate ____ %
(select one)

DESIGN INFORMATION

		AADT
Existing Year	2022	37000
Opening Year	2026	N/A
Mid-Design Year	2036	N/A
Design Year	2046	48800

Note: AADT values have been rounded to the nearest 100

Daily Direction Split (50% or 100%): 50%
Lanes in One Direction: 2

T24 values
Existing to Opening Year: 4.70%
Opening to Mid-Year: 4.70%
Mid-Year to Design-Year: 4.70%

2000 EQUIVALENCY FACTORS |u(1)|

(selected with an X)	FLEXIBLE PAVEMENT SN = 5/THICK		RIGID PAVEMENT SN = 12/THICK	
RURAL FREEWAY:	1.050	____	1.600	____
URBAN FREEWAY:	0.900	____	1.270	____
RURAL HIGHWAY:	0.960	____	1.350	____
URBAN HIGHWAY:	0.890	X	1.220	____
OTHER (Enter Factor and X):		____		____

(1) Equivalency Factors are based on Updated Pavement Damage Factors Memorandum, dated December 1, 2000.

Lane Factors developed by Copes equation

I have reviewed the 18 kip Equivalent Single Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by: Elias Bowne — Traffic Analyst — FDOT
Name — Title — Org. Unit or Firm

DocuSigned by: Elias Bowne 91B7C32543AE4C4...
10/30/2023 | 1:35 PM EDT
Signature — Date

Reviewed by: Brittany Nichols — Model Coordinator — FDOT
Name — Title — Org. Unit or Firm

DocuSigned by: Brittany Nichols 3491A225DF874FE...
11/01/2023 | 11:32 AM EDT
Signature — Date

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS - LOCATION 2

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

YEARS: *2022 to 2046*

SECTION #: 17030201 **COUNTY:** Sarasota **FIN #:** 445926-2-52-01

FLEXIBLE PAVEMENT URBAN HIGHWAY 0.890

SN=5/THICK Resurfacing and Widening A

YEAR	AADT	ESAL (1000S)	ACCUM (1000s)	D	T	LF	EF
2022	37000	214	0	0.5	4.70%	0.755	0.890
2023	37400	216	0	0.5	4.70%	0.755	0.890
2024	37900	218	0	0.5	4.70%	0.753	0.890
2025	38400	221	0	0.5	4.70%	0.752	0.890
2026	38900	224	224	0.5	4.70%	0.751	0.890
2027	39400	226	450	0.5	4.70%	0.750	0.890
2028	39900	229	679	0.5	4.70%	0.749	0.890
2029	40400	231	910	0.5	4.70%	0.748	0.890
2030	40900	234	1144	0.5	4.70%	0.747	0.890
2031	41400	236	1380	0.5	4.70%	0.746	0.890
2032	41900	239	1619	0.5	4.70%	0.745	0.890
2033	42400	241	1860	0.5	4.70%	0.744	0.890
2034	42900	244	2104	0.5	4.70%	0.743	0.890
2035	43300	246	2350	0.5	4.70%	0.742	0.890
2036	43800	248	2598	0.5	4.70%	0.741	0.890
2037	44300	251	2849	0.5	4.70%	0.741	0.890
2038	44800	253	3102	0.5	4.70%	0.740	0.890
2039	45300	256	3358	0.5	4.70%	0.739	0.890
2040	45800	258	3616	0.5	4.70%	0.738	0.890
2041	46300	261	3877	0.5	4.70%	0.737	0.890
2042	46800	263	4140	0.5	4.70%	0.736	0.890
2043	47300	266	4406	0.5	4.70%	0.735	0.890
2044	47800	268	4674	0.5	4.70%	0.734	0.890
2045	48300	271	4945	0.5	4.70%	0.733	0.890
2046	48800	273	5218	0.5	4.70%	0.733	0.890

Opening to Mid-Design Year ESAL Accumulation (1000s): 2374

Opening to Design Year ESAL Accumulation (1000s): 4994

I have reviewed the 18 kip Equivalent Single Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by: Elias Bowne | Traffic Analyst | FDOT

Name | Title | Org. Unit or Firm

DocuSigned by: Elias Bowne 91B7C32343AE4C4...

10/30/2023 | 1:35 PM EDT

Signature | Date

Reviewed by: Brittany Nichols | Model Coordinator | FDOT

Name | Title | Org. Unit or Firm

DocuSigned by: Brittany Nichols 3491A225DF874FE...

11/01/2023 | 11:32 AM EDT

Signature | Date

County: 17
Station: 0011
Description: SR-789, RINGLING CAUSEWAY BRIDGE
Start Date: 03/04/2020
Start Time: 0000

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	25	13	14	9	61	15	8	16	8	47	108
0100	9	2	5	2	18	10	4	3	2	19	37
0200	6	5	7	3	21	5	5	5	13	28	49
0300	9	4	1	4	18	2	5	7	7	21	39
0400	6	5	6	16	33	3	8	26	18	55	88
0500	13	29	28	28	98	20	26	51	65	162	260
0600	42	35	63	88	228	61	113	145	193	512	740
0700	118	142	133	191	584	221	269	310	369	1169	1753
0800	207	227	246	244	924	368	330	369	411	1478	2402
0900	246	270	333	292	1141	373	421	410	403	1607	2748
1000	335	328	272	315	1250	322	321	265	322	1230	2480
1100	321	347	320	298	1286	313	276	279	265	1133	2419
1200	341	314	339	305	1299	415	505	419	448	1787	3086
1300	287	366	337	360	1350	413	396	418	357	1584	2934
1400	407	377	363	414	1561	364	356	362	326	1408	2969
1500	431	416	439	366	1652	362	341	340	358	1401	3053
1600	464	478	479	387	1808	331	323	270	287	1211	3019
1700	449	437	409	345	1640	236	237	284	249	1006	2646
1800	321	301	301	319	1242	252	217	164	195	828	2070
1900	309	224	223	179	935	202	157	205	155	719	1654
2000	153	165	148	131	597	138	144	152	156	590	1187
2100	155	180	131	131	597	164	141	109	126	540	1137
2200	132	137	97	83	449	77	73	72	87	309	758
2300	99	69	40	51	259	52	28	31	17	128	387
24-Hour Totals:					19051					18972	38023

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	845	1093	845	1615	845	2708
P.M.	1600	1808	1200	1787	1530	3099
Daily	1600	1808	1200	1787	1530	3099

Truck Percentage 4.01 3.76 3.88

Classification Summary Database

Dir	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TotTrk	TotVol
E	113	14512	3663	23	408	82	5	231	13	1	0	0	0	0	0	763	19051
W	100	14616	3542	50	377	31	16	232	6	0	1	0	1	0	0	714	18972

Generated by SPS 5.0.49P

County: 17
Station: 0011
Description: SR-789, RINGLING CAUSEWAY BRIDGE
Start Date: 04/06/2021
Start Time: 1200

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	36	21	13	14	84	12	11	8	9	40	124
0100	12	5	13	13	43	10	4	4	1	19	62
0200	4	5	2	6	17	5	4	1	5	15	32
0300	1	4	6	3	14	5	5	6	9	25	39
0400	6	5	5	12	28	6	8	19	23	56	84
0500	16	18	21	28	83	14	16	30	52	112	195
0600	51	44	52	65	212	54	111	152	159	476	688
0700	115	129	140	148	532	183	236	336	410	1165	1697
0800	189	202	213	232	836	411	392	388	427	1618	2454
0900	232	265	259	326	1082	422	444	406	484	1756	2838
1000	280	278	331	314	1203	423	457	497	508	1885	3088
1100	331	355	371	379	1436	467	526	490	461	1944	3380
1200	376	409	352	417	1554	459	469	443	421	1792	3346
1300	359	382	399	366	1506	459	448	406	397	1710	3216
1400	434	425	440	418	1717	454	382	370	384	1590	3307
1500	491	482	450	476	1899	392	324	357	352	1425	3324
1600	481	448	483	487	1899	303	323	340	287	1253	3152
1700	507	462	489	459	1917	285	292	318	241	1136	3053
1800	423	353	326	320	1422	280	297	309	278	1164	2586
1900	331	274	304	239	1148	249	252	220	201	922	2070
2000	369	364	307	189	1229	149	176	137	154	616	1845
2100	216	181	183	173	753	154	89	121	103	467	1220
2200	156	138	148	122	564	74	63	66	57	260	824
2300	146	88	69	35	338	37	23	22	17	99	437
24-Hour Totals:					21516					21545	43061

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	845	988	845	1699	845	2687
P.M.	1645	1945	1200	1792	1200	3346
Daily	1645	1945	1030	1998	1115	3417

Truck Percentage 3.85 3.99 3.92

Classification Summary Database

Dir	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TotTrk	TotVol
E	202	15916	4570	26	465	72	2	240	19	2	0	0	2	0	0	828	21516
W	178	15823	4685	10	463	53	21	294	16	2	0	0	0	0	0	859	21545

Generated by SPS 5.0.49P

County: 17
Station: 0011
Description: SR-789, RINGLING CAUSEWAY BRIDGE
Start Date: 03/08/2022
Start Time: 0000

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	24	34	15	13	86	15	22	8	6	51	137
0100	10	15	11	8	44	11	6	3	1	21	65
0200	8	3	6	3	20	6	4	5	5	20	40
0300	4	7	10	6	27	4	3	16	7	30	57
0400	4	3	14	13	34	6	9	23	30	68	102
0500	12	20	28	31	91	23	33	45	78	179	270
0600	47	39	52	82	220	71	113	156	208	548	768
0700	97	120	160	195	572	201	248	403	398	1250	1822
0800	177	214	214	222	827	381	395	379	449	1604	2431
0900	234	278	318	274	1104	419	451	467	485	1822	2926
1000	307	320	354	349	1330	480	432	502	462	1876	3206
1100	352	322	318	324	1316	376	462	500	478	1816	3132
1200	375	440	398	378	1591	420	380	402	421	1623	3214
1300	347	407	405	426	1585	393	396	418	398	1605	3190
1400	469	443	478	430	1820	334	314	375	368	1391	3211
1500	494	418	487	470	1869	386	379	345	352	1462	3331
1600	461	572	480	482	1995	340	309	344	303	1296	3291
1700	459	569	330	481	1839	270	216	251	353	1090	2929
1800	409	307	288	336	1340	294	285	204	210	993	2333
1900	392	268	234	182	1076	173	204	225	200	802	1878
2000	216	217	179	151	763	169	115	131	149	564	1327
2100	206	192	153	160	711	127	129	112	114	482	1193
2200	168	143	127	115	553	146	95	87	39	367	920
2300	84	84	63	37	268	38	20	28	23	109	377
24-Hour Totals:					21081					21069	42150

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	845	1052	845	1786	845	2838
P.M.	1600	1995	1245	1628	1530	3336
Daily	1600	1995	945	1899	1530	3336

Truck Percentage 3.56 3.85 3.71

Classification Summary Database

Dir	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TotTrk	TotVol
E	149	16670	3511	13	405	77	11	226	16	3	0	0	0	0	0	751	21081
W	138	16669	3451	6	411	72	14	287	18	2	1	0	0	0	0	811	21069

Generated by SPS 5.0.55P

Appendix C
Resilient Modulus Information

Florida Department of Transportation
RICK SCOTT
GOVERNOR
605 Suwannee Street
Tallahassee, FL 32399-0450
MIKE DEW
SECRETARY

MEMORANDUM

DATE: September 13, 2017

TO: Teresa Puckett, District Geotechnical Materials Engineer

FROM: David Horhota, State Geotechnical Materials Engineer

SUBJECT: Embankment Resilient Modulus Pavement Design
District 1, Sarasota County
FPN 438137-1: US-41 at Gulfstream

Three (3), 2-bag samples were received by the State Materials Office (SMO) for determination of an embankment (roadbed) resilient modulus for pavement design. After visual observation of the three samples, it was determined that the material from each 2-bag sample looked visually similar and the material from each of the bags were combined to form one sample from each location. After combining materials from the bags, samples from each location were obtained for classification tests (Atterberg limits, particle size analysis, and organic content), Proctor density, and resilient modulus. The classification test results are reported in Tables 1 and 2. Information provided for this project by Tierra, Inc. indicated all samples were collected from between 0.0 and 2.0 feet in depth.

Table 1. Summary of Initial Soil Gradation Results

Sample ID	Passing 3/4" (%)	Passing 1/2" (%)	Passing 3/8" (%)	Passing No. 4 (%)	Passing No. 10 (%)	Passing No. 40 (%)	Passing No. 60 (%)	Passing No. 100 (%)	Passing No. 200 (%)
SH-97R	100.0	92.9	86.9	81.3	73.1	59.4	51.8	39.0	7.3
SH-93	100.0	100.0	100.0	99.9	99.8	82.1	48.5	23.3	5.8
SH-85L	98.8	96.9	95.0	91.3	87.8	73.4	56.1	40.3	5.8

Table 2. Summary of Soil Classification and Organic Content Results

Sample ID	Easting	Northing	Soil Class.	Organic Content (%)	LL/PI
SH-97R	347034	3024478	A-3	1.0	N.P.
SH-93	347004	3024589	A-3	1.8	N.P.
SH-85L	346848	3024594	A-3	1.0	N.P.

In addition to the classification testing, the following test program was conducted:

(1) Standard Proctor, AASHTO T 99
(2) Resilient Modulus (M_R), AASHTO T 307.

A summary of laboratory test results is included in Table 3. The resilient modulus values listed in this table were obtained using the relationship developed from each individual test (resilient modulus versus bulk stress - with bulk stress, **Θ,** defined as $\Theta = \sigma_1 + \sigma_2 + \sigma_3$), and using a bulk stress of 11 psi, which is the recommendation from Dr. Ping's research work in modeling the embankment in-situ stresses for Florida pavement conditions. Two results are listed for each location because two samples were prepared for each location and they represent the individual test result from each sample tested. The resilient modulus samples were compacted to within 1 pound per cubic foot (pcf) of the maximum density and 0.5 percent of the optimum moisture content as determined by AASHTO T99.

Table 3. Summary of T-99 and M_R Test Results

Sample ID	Passing No. 200 (%)	Standard Proctor Density (pcf)	Optimum Moisture Content (%)	Resilient Modulus @ Θ=11psi (psi)	Average Resilient Modulus (psi)
SH-97R	7	118.8	10.5	14,028	14,433
				14,839	
SH-93	6	112.4	11.3	15,688	15,149
				14,610	
SH-85L	6	113.4	11.2	14,238	14,880
				15,523	

For this set of samples, the minimum number of samples called for in the Soils and Foundations Handbook were not satisfied. This resulted in an inability to perform a true 90% method of analysis due to a lack of the required number of test values.

For those reasons, it is recommended that the lowest average resilient modulus be used for the design. Based on the results for sample SH-97R, a design **M_R of 14,400 psi** would be recommended for this project.

Appendix D
Pavement Survey and Evaluation Report

Florida Department of
TRANSPORTATION

Pavement Survey and Evaluation Report

State Road 789

Sarasota County

Financial Project Number 445926-2

Milepost 0.000/0.000 to 0.194/1.006

District 1 & 7 Materials

Authors
Marlene Hebert
Taylor F. Smith, PE

Date of Report
May 24, 2023

PAVEMENT SURVEY AND EVALUATION REPORT
SR 789 FROM SR 45 (US 41) TAMIAMI TRAIL TO BIRD KEY DRIVE

INTRODUCTION

In response to your request, the District Materials Office conducted a pavement survey and evaluation on SR 789 in Sarasota County for the subject project. We understand this project involves milling and resurfacing from SR 45 (US 41) Tamiami Trail to Bird Key Drive.

The objective of this work was to identify the existing pavement composition, assess the pavement conditions, and to make recommendations for the milling depth and resurfacing plan. This work involves a field review, pavement coring, data analysis, and reporting.

FIELD REVIEW

The objective of the field review is to gain a good understanding of the overall pavement condition, and to help determine the layout of the core locations. This review was performed on March 6, 2023, by Anthony Brown, Materials Pavement Assessment Specialist with Madrid Engineering Group, and the results of this review are included in Appendix 1.

Typical Section

The typical section consists of four-lane divided asphalt pavement structure with paved shoulders, turn lanes and curb & gutter.

Pavement Condition

The pavement has a dense-graded friction course. The overall condition of this section is fair with light to moderate cracking and minimal rutting.

The 2023 pavement condition survey was performed by the State Materials Office and the results are included in the table below.

Section ID	Mile Post	Age	Crack	Ride	Rut
17030000	0.000 – 0.194	4	NA	NA	NA
17030201	0.000 – 0.267	14	7.0	6.6	8.0
17030201	0.867 – 1.006	14	7.0	NA	9.0

CORING INFORMATION

The pavement coring was performed on April 3, 2023 by Roberts Consulting, Inc according to Section 3.2 of the Materials Manual- *Flexible Pavement Coring and Evaluation*.

A total of forty-five (45) cores were extracted, twenty-four (24) from the mainline, twelve (12) cores from the shoulders, five (5) cores from the turn lanes, and four (4) from the side streets. The core layout and the coring data, including cross slope and the type of base materials, are presented in Appendix 2. Pictures of core samples and locations are presented in Appendix 3.

REHABILITATION RECOMMENDATIONS

Considering the existing pavement conditions, we render the following recommendations for milling and resurfacing.

MAINLINE

- Mill 3.50 inches
- Resurface with 2.00 inches of SP-12.5 and 1.50 inches of FC-12.5.

SHOULDERS, TURN LANES AND SIDE STREETS

- Mill 1.50 inches
- Resurface with 1.50 inches of FC-12.5.

Appendix 4 provides an illustration of the milling and resurfacing recommendations.

COMMENTS AND GENERAL NOTES

In addition to the recommendations made within this report, the following items should be considered when preparing the contract documents for the subject project:

<u>Notes to the Designer</u>

1. Due to the variable asphalt pavement thickness, and the frequency in which the preliminary pavement cores were taken, isolated areas of the base may be exposed. Areas of exposed base material should be cared in accordance with FDOT specification prior to the application of the bituminous material.

2. Milling may need to be adjusted at the beginning and end of the project, side streets, bridge deck, approach/departure slabs or areas in which constraints dictate. Appropriate plan details need to be illustrated in the plans in accordance with the FDOT Flexible Pavement Design Manual (FPDM).

If the recommendations in this report are not used within three years, please contact this office as the milling depth/proposed pavement structure may increase.

The identification of the different pavement layers is based on visual classification as well as familiarity with the site. The actual classification may be different due to variability in asphalt mixes and roadway construction. The information in this report is based on the conditions specific only at the locations cored at the time of the investigation. The Engineer shall notify the District Materials Office if the work proposed for the project changes and/or existing conditions change prior to the letting of the project. This report is based on the understanding that the project will be designed and constructed in accordance with Department standards and requirements unless stated otherwise within this report.

Please contact this office if additional service is required or if there are any questions regarding this report at D1-D7Pavement@dot.state.fl.us

Marlene Hebert

Marlene Hebert
District Materials Pavement Coordinator

Taylor F. Smith, PE 88746
District Pavement Evaluations Engineer

APPENDIX

1. Field Review Findings

2. Core Data and Layout

3. Core Sample and Location Pictures

4. Illustration of Milling and Resurfacing Recommendations

5. Asphalt Survey Request

APPENDIX 1

Field Review Findings

445926-2

Sarasota, Sarasota County

SR 789 from E of Sunset Dr to Bird Key Dr

17030000 – MP 0.000 to 0.194

17030201 – MP 0.000 to 1.006

4 Lane Urban Minor Arterial Roadway

Inspected by: Anthony Brown 3/6/23

Rdwy Id # - 17030000
MP 0.000 – 0.194
MPH - 40
Age - 4
No PCS Info Available

Rdwy Id # - 17030201
MP 0.000 – 0.267
MPH - 40
Age - 14
Cracking - 7.0
Ride - 6.6
Rutting - 8.0

Rdwy Id # - 17030201
MP 0.867 – 1.006
MPH - 40
Age - 14
Cracking - 7.0
Ride - N/A
Rutting - 9.0

Lane Width: 12'
Inside C&G: Y
Outside C&G: Y
Inside Paved Shoulder: N
Outside Paved Shoulder: Y
Median: Y, Concrete & Grass
Sidestreets: Y, 6 total
Turn Lanes: Y, 8 total
Cross overs: N
Center Turn Lane: N

Note: Right roadway for both roadway ID's travels from east to west.

17030000 – MP 0.000 to 0.194

Right Roadway

R1

MP 0.000 – 0.194 is in mostly fair condition. There is gouging on the pavement where it appears old striping was removed. This area appears to have some newer pavement and currently under construction.

R2

MP 0.000 – 0.194 is in mostly fair condition. There is gouging on the pavement where it appears old striping was removed. This area appears to have some newer pavement and currently under construction.

Turn Lanes

The turn lanes are in fair condition.

Left Roadway

L1

MP 0.194 – 0.000 is in mostly fair condition. There is gouging on the pavement where it appears old striping was removed. This area appears to have some newer pavement and currently under construction.

L2

MP 0.194 – 0.000 is in mostly fair condition. There is gouging on the pavement where it appears old striping was removed. This area appears to have some newer pavement and currently under construction.

Turn Lanes

The turn lanes are in fair condition.

17030201 – MP 0.000 to 1.006

Right Roadway

R1

MP 0.000 – 0.278 has intermittent light longitudinal and transverse cracking.
MP 0.278 – 0.864 is a concrete bridge deck.
MP 0.864 – 0.932 has intermittent light longitudinal cracking.
MP 0.932 – 0.947 is a patch that is in fair condition.
MP 0.947 – 1.006 has infrequent light longitudinal cracking.

R2

MP 0.000 – 0.087 has light to moderate longitudinal **(Picture 1)** and branch cracking.
MP 0.087 – 0.278 has intermittent light longitudinal and branch cracking.
MP 0.278 – 0.864 is a concrete bridge deck.
MP 0.864 – 0.932 has light branch cracking.
MP 0.932 – 0.947 is a patch that is in fair condition.

MP 0.947 – 1.006 has intermittent light longitudinal cracking.

Outside Shoulder
The shoulder has intermittent light longitudinal cracking.

Turn Lanes
The turn lanes are in fair condition.

Left Roadway

L1
MP 1.006 – 0.864 is in mostly fair condition with some infrequent light transverse cracking.
MP 0.864 – 0.278 is a concrete bridge deck.
MP 0.278 – 0.000 is in mostly fair condition with some light transverse cracking at MP 0.133.

L2
MP 1.006 – 0.864 has intermittent light transverse cracking.
MP 0.864 – 0.278 is a concrete bridge deck.
MP 0.278 – 0.000 has intermittent light longitudinal cracking.

Outside Shoulder
The outside shoulder is in mostly fair condition with infrequent light transverse cracking.

Turn Lanes
The turn lanes are in fair condition.

FIELD REVIEW PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr to Bird Key Dr	
REVIEWED BY: Anthony Brown	DATE: 3/6/2023	BEGIN MP: Multi.	END MP: Multi.	COUNTY / ROADWAY ID: Sarasota / 17030000, 17030201

Pic 01

APPENDIX 2

Core Data and Layout

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PAVEMENT EVALUATION CORING AND CONDITION DATA

Cored By: RCS | Coring Completion Date: 4/3/2023 | Typical Section: 1: 17030000

W.P.I. No.:				Name:	SR 789					Lanes:	4 Lane Urban Minor Arterial Roadway
Fin. Proj. ID:	445926-2			From:	E of Sunset Dr.					Shoulder Type and Condition:	
F.A. Project No.:		Roadway ID:	17030000	To:	Bird Key Dr.					Inside:	None
County:	Sarasota	SR No.:	789	Beg MP:	0.000	End MP:	0.194	Length:	0.194	Outside:	Paved
Overall Pavement Condition (from DMO field review):		Fair		Median Curbed (Y/N):	Y	Paved: Y		Lawn: Y	Other:	Curb & Gutter (Y/N):	Y

Mainline

CORE NO.	MILE POST [2]	LANE TYPE	LANE	WP (Y/N)	PAVEMENT LAYER (IN.)										TOTAL ASPHALT THICKNESS (IN.)	BASE				STABILIZED SUBGRADE [3]	CRACK				PAVEMENT CONDITION	RUT DEPTH - LWP (IN.)	RUT DEPTH - RWP (IN.)	CROSS SLOPE (%) [4]	COMMENTS
					FC9.5	FC12.5	SP12.5	SP9.5	S	T1	S2	BIND				LR	BRCK	ABC-2	CONC		DEPTH (IN.)	TYPE	CLASS	EXTENT					
5	0.154	ML	L1	N		1.3		2.8			0.9	1.5			6.5	10.3									F	0.0	0.0	3.30	
6	0.104	ML	L2	N		1.7		0.9			1.2	1.5			5.3	12.1									P	0.0	0.3	5.10	
3	0.171	ML	L2	Y		1.2		2.4			1.2	1.2			6.0	10.5				12.0					F	0.0	0.0	4.40	
12	0.122	ML	R2	N		1.8		1.4			1.5	1.8			6.5	11.0				12.0	2.8	C	III	M	F	0.0	0.0	5.20	
AVERAGE						***1.50***		***1.88***			***1.20***	***1.50***			***6.08***	***10.98***				***12.00***	***2.80***					***0.0***	***0.1***	***4.50***	
MAX						***1.80***		***2.80***			***1.50***	***1.80***			***6.50***	***12.10***				***12.00***	***2.80***					***0.0***	***0.3***	***5.20***	
MIN						***1.20***		***0.90***			***0.90***	***1.20***			***5.30***	***10.30***				***12.00***	***2.80***					***0.0***	***0.0***	***3.30***	
LAYER COEF.					***0.25***	***0.25***	***0.25***	***0.25***	***0.25***	***0.23***	***0.25***	***0.20***				***0.18***	***UNKW***	***0.16***	***UNKW***	***0.08***									

Notes:

1. The data presented on this table is specific only at the locations cored at the time of the investigation. Should questions arise regarding the pavement composition, it is incumbent upon those raising the question to perform additional exploration as necessary.
2. Mile posts are approximate based on field recorded measurements using a Distance Measuring Instrument (DMI) or a GPS unit.
3. Stabilization thickness was checked on 10% of the coring locations. For pavement design, assume 12 inches of thickness for stabilization.
4. The cross slope is approximate and measured in the center of the lane.
5. A blank cell indicates measurement was not recorded.
6. A value of "UNK" indicates material was encountered but the total thickness was not determined.

Lane Designations - Decreasing MP	Lane Designations - Increasing MP	Lane Type		Crack Type	Crack Rating	Extent	Pavement Condition
OL/IL - Outside/Inside Shoulder	OR/IR - Outside/Inside Shoulder	ML - Mainline	S - Shoulder	A - Alligator	Class IB - Hairline cracks that are ≤ 1/8 inch wide	L - Light	G - Good
L1 - 1st Lane Left of Centerline	R1 - 1st Lane Right of Centerline	TL - Turn Lane	SS - Side Street	B - Block	Class II - Cracks > than 1/8 inch and ≤ 1/4 inch	M - Moderate	F - Fair
LL/LR - Left/Right Turn Lane	RL/RR - Left/Right Turn Lane	CO - Crossover	BR - Bridge Approach/Departure	C - Combination	Class III - Cracks > 1/4 inch	S - Severe	P - Poor

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PAVEMENT EVALUATION CORING AND CONDITION DATA

Cored By: RCS | Coring Completion Date: 4/3/2023 | Typical Section: 2: 17030201

W.P.I. No.:				Name:	SR 789					Lanes:	4 Lane Urban Minor Arterial Roadway		
Fin. Proj. ID:	445926-2			From:	E of Sunset Dr.					Shoulder Type and Condition:			
F.A. Project No.:		Roadway ID:	17030201	To:	Bird Key Dr.					Inside:	Paved		
County:	Sarasota	SR No.:	789	Beg MP:	0.000	End MP:	1.006	Length:	1.006	Outside:	Paved		
Overall Pavement Condition (from DMO field review):		Fair		Median Curbed (Y/N):	Y	Paved: Y		Lawn: Y	Other:	Curb & Gutter (Y/N):	Y		

Mainline

CORE NO.	MILE POST [2]	LANE TYPE	LANE	WP (Y/N)	PAVEMENT LAYER (IN.)										TOTAL ASPHALT THICKNESS (IN.)	BASE				STABILIZED SUBGRADE [3]	CRACK				PAVEMENT CONDITION	RUT DEPTH - LWP (IN.)	RUT DEPTH - RWP (IN.)	CROSS SLOPE (%) [4]	COMMENTS
					FC9.5	FC12.5	SP12.5	SP9.5	S	T1	S2	BIND				LR	BRCK	ABC-2	CONC		DEPTH (IN.)	TYPE	CLASS	EXTENT					
28	0.059	ML	L1	N		1.4		2.3							3.7			5.9		8.9					F	0.0	0.0	3.80	
25	0.172	ML	L1	Y		1.7		1.8							3.5			5.0			3.5	C	II	M	P	0.0	0.1	2.80	Base crack
9	0.892	ML	L1	Y		1.6		1.4							3.0			6.0			3.0	C	III	M	P	0.1	0.1	3.10	Base crack
8	0.924	ML	L1	Y		1.5		2.0							3.5			5.9			3.5	C	III	M	P	0.1	0.9	0.50	Base crack
43	0.966	ML	L1	Y		1.4	1.1	2.1							4.6			6.8							F	0.0	0.0	0.30	
26	0.114	ML	L2	Y		1.7		1.7							3.4			4.8		13.4	3.4	C	III	S	P	0.0	0.1	2.30	Base crack
23	0.231	ML	L2	Y		1.6		1.6							3.2			6.9							P	0.0	0.0	3.30	
10	0.867	ML	L2	Y		1.5		2.1							3.6			7.2							F	0.0	0.0	1.60	
44	0.935	ML	L2	Y		1.9		2.3							4.2			5.0		10.8	3.0	C	III	S	P	0.1	0.2	2.10	
41	0.986	ML	L2	Y		1.6		3.0	1.0						5.6			6.7			3.8	C	III	M	P	0.0	0.2	2.40	
17	0.131	ML	R1	N		1.5		1.3							2.8			5.9			2.6	C	II	S	P	0.1	0.0	3.00	Base crack
21	0.259	ML	R1	N		1.7		2.0							3.7			6.7							F	0.0	0.0	0.80	
31	0.895	ML	R1	N		2.0		2.0							4.0			5.4							F	0.0	0.0	4.20	
11	0.937	ML	R1	N		1.4		2.1							3.5			5.0							P	0.0	0.0	2.60	Patch area
36	0.975	ML	R1	N		1.6		1.6	3.4	1.0	2.0	1.7			11.3		3.0								F	0.2	0.4	2.30	
15	0.072	ML	R2	Y		1.5		1.6							3.1			6.0			3.0	C	III	M	P	0.0	0.0	3.30	Base crack
18	0.185	ML	R2	Y		1.6		2.2							3.8			5.0		12.0					F	0.0	0.0	1.80	
30	0.886	ML	R2	Y		2.2		1.8							4.0			5.5			4.0	C	II	M	P	0.0	0.1	3.00	
32	0.927	ML	R2	Y		2.0		1.8							3.8			5.7			3.4	C	III	M	P	0.0	0.0	2.10	
34	0.970	ML	R2	Y		1.1		2.7							3.8			5.9			3.8	C	II	M	P	0.0	0.1	1.20	
AVERAGE						***1.63***	***1.10***	***1.97***	***2.20***	***1.00***	***2.00***	***1.70***			***4.11***		***3.00***	***5.86***		***11.28***	***3.36***					***0.0***	***0.1***	***2.33***	
MAX						***2.20***	***1.10***	***3.00***	***3.40***	***1.00***	***2.00***	***1.70***			***11.30***		***3.00***	***7.20***		***13.40***	***4.00***					***0.2***	***0.9***	***4.20***	
MIN						***1.10***	***1.10***	***1.30***	***1.00***	***1.00***	***2.00***	***1.70***			***2.80***		***3.00***	***4.80***		***8.90***	***2.60***					***0.0***	***0.0***	***0.30***	
LAYER COEF.					***0.25***	***0.25***	***0.25***	***0.25***	***0.25***	***0.23***	***0.25***	***0.20***				***0.18***	***UNKW***	***0.16***	***UNKW***	***0.08***									

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PAVEMENT EVALUATION CORING AND CONDITION DATA

Cored By: RCS | Coring Completion Date: 4/3/2023 | Typical Section: 2: 17030201

W.P.I. No.:				Name:	SR 789					Lanes:	4 Lane Urban Minor Arterial Roadway
Fin. Proj. ID:	445926-2			From:	E of Sunset Dr.					Shoulder Type and Condition:	
F.A. Project No.:		Roadway ID:	17030201	To:	Bird Key Dr.					Inside:	Paved
County:	Sarasota	SR No.:	789	Beg MP:	0.000	End MP:	1.006	Length:	1.006	Outside:	Paved
Overall Pavement Condition (from DMO field review):		Fair		Median Curbed (Y/N):	Y	Paved: Y	Lawn: Y	Other:		Curb & Gutter (Y/N):	Y

Mainline

CORE NO.	MILE POST [2]	LANE TYPE	LANE	WP (Y/N)	PAVEMENT LAYER (IN.)										TOTAL ASPHALT THICKNESS (IN.)	BASE				STABILIZED SUBGRADE [3]	CRACK				PAVEMENT CONDITION	RUT DEPTH - LWP (IN.)	RUT DEPTH - RWP (IN.)	CROSS SLOPE (%) [4]	COMMENTS
					FC9.5	FC12.5	SP12.5	SP9.5	S	T1	S2	BIND				LR	BRCK	ABC-2	CONC		DEPTH (IN.)	TYPE	CLASS	EXTENT					

Notes:

1. The data presented on this table is specific only at the locations cored at the time of the investigation. Should questions arise regarding the pavement composition, it is incumbent upon those raising the question to perform additional exploration as necessary.
2. Mile posts are approximate based on field recorded measurements using a Distance Measuring Instrument (DMI) or a GPS unit.
3. Stabilization thickness was checked on 10% of the coring locations. For pavement design, assume 12 inches of thickness for stabilization.
4. The cross slope is approximate and measured in the center of the lane.
5. A blank cell indicates measurement was not recorded.
6. A value of "UNK" indicates material was encountered but the total thickness was not determined.

Lane Designations - Decreasing MP	Lane Designations - Increasing MP	Lane Type		Crack Type	Crack Rating	Extent	Pavement Condition
OL/IL - Outside/Inside Shoulder	OR/IR - Outside/Inside Shoulder	ML - Mainline	S - Shoulder	A - Alligator	Class IB - Hairline cracks that are ≤ 1/8 inch wide	L - Light	G - Good
L1 - 1st Lane Left of Centerline	R1 - 1st Lane Right of Centerline	TL - Turn Lane	SS - Side Street	B - Block	Class II - Cracks > than 1/8 inch and ≤ 1/4 inch	M - Moderate	F - Fair
LL/LR - Left/Right Turn Lane	RL/RR - Left/Right Turn Lane	CO - Crossover	BR - Bridge Approach/Departure	C - Combination	Class III - Cracks > 1/4 inch	S - Severe	P - Poor

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PAVEMENT EVALUATION CORING AND CONDITION DATA

Cored By: RCS | Coring Completion Date: 4/3/2023 | Typical Section: 1: 17030000

W.P.I. No.:				Name:	SR 789					Lanes:	4 Lane Urban Minor Arterial Roadway
Fin. Proj. ID:	445926-2			From:	E of Sunset Dr.					Shoulder Type and Condition:	
F.A. Project No.:		Roadway ID:	17030000	To:	Bird Key Dr.					Inside:	None
County:	Sarasota	SR No.:	789	Beg MP:	0.000	End MP:	0.194	Length:	0.194	Outside:	Paved
Overall Pavement Condition (from DMO field review):		Fair		Median Curbed (Y/N):	Y	Paved: Y		Lawn: Y	Other:	Curb & Gutter (Y/N):	Y

Shoulders

CORE NO.	MILE POST [2]	LANE TYPE	LANE	WP (Y/N)	PAVEMENT LAYER (IN.)										TOTAL ASPHALT THICKNESS (IN.)	BASE				STABILIZED SUBGRADE [3]	CRACK				PAVEMENT CONDITION	RUT DEPTH - LWP (IN.)	RUT DEPTH - RWP (IN.)	CROSS SLOPE (%) [4]	COMMENTS
					FC9.5	FC12.5	SP12.5	SP9.5	S	T1	S2	BIND				LR	BRCK	ABC-2	CONC		DEPTH (IN.)	TYPE	CLASS	EXTENT					
4	0.171	S	OL	N		1.3		2.2			1.4	1.6			6.5	10.3									F	0.0	0.0	4.70	Core seperated at SP layer.
AVERAGE						***1.30***		***2.20***			***1.40***	***1.60***			***6.50***	***10.30***										***0.0***	***0.0***	***4.70***	
MAX						***1.30***		***2.20***			***1.40***	***1.60***			***6.50***	***10.30***										***0.0***	***0.0***	***4.70***	
MIN						***1.30***		***2.20***			***1.40***	***1.60***			***6.50***	***10.30***										***0.0***	***0.0***	***4.70***	
LAYER COEF.					***0.25***	***0.25***	***0.25***	***0.25***	***0.25***	***0.23***	***0.25***	***0.20***				***0.18***	***UNKW***	***0.16***	***UNKW***	***0.08***									

Notes:

1. The data presented on this table is specific only at the locations cored at the time of the investigation. Should questions arise regarding the pavement composition, it is incumbent upon those raising the question to perform additional exploration as necessary.
2. Mile posts are approximate based on field recorded measurements using a Distance Measuring Instrument (DMI) or a GPS unit.
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4. The cross slope is approximate and measured in the center of the lane.
5. A blank cell indicates measurement was not recorded.
6. A value of "UNK" indicates material was encountered but the total thickness was not determined.

Lane Designations - Decreasing MP	Lane Designations - Increasing MP	Lane Type		Crack Type	Crack Rating	Extent	Pavement Condition
OL/IL - Outside/Inside Shoulder	OR/IR - Outside/Inside Shoulder	ML - Mainline	S - Shoulder	A - Alligator	Class IB - Hairline cracks that are ≤ 1/8 inch wide	L - Light	G - Good
L1 - 1st Lane Left of Centerline	R1 - 1st Lane Right of Centerline	TL - Turn Lane	SS - Side Street	B - Block	Class II - Cracks > than 1/8 inch and ≤ 1/4 inch	M - Moderate	F - Fair
LL/LR - Left/Right Turn Lane	RL/RR - Left/Right Turn Lane	CO - Crossover	BR - Bridge Approach/Departure	C - Combination	Class III - Cracks > 1/4 inch	S - Severe	P - Poor

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PAVEMENT EVALUATION CORING AND CONDITION DATA

Cored By: RCS | Coring Completion Date: 4/3/2023 | Typical Section: 2: 17030201

W.P.I. No.:				Name:	SR 789					Lanes:	4 Lane Urban Minor Arterial Roadway		
Fin. Proj. ID:	445926-2			From:	E of Sunset Dr.					Shoulder Type and Condition:			
F.A. Project No.:		Roadway ID:	17030201	To:	Bird Key Dr.					Inside:	Paved		
County:	Sarasota	SR No.:	789	Beg MP:	0.000	End MP:	1.006	Length:	1.006	Outside:	Paved		
Overall Pavement Condition (from DMO field review):		Fair		Median Curbed (Y/N):	Y	Paved: Y	Lawn: Y	Other:		Curb & Gutter (Y/N):	Y		

Shoulders

CORE NO.	MILE POST [2]	LANE TYPE	LANE	WP (Y/N)	PAVEMENT LAYER (IN.)										TOTAL ASPHALT THICKNESS (IN.)	BASE				STABILIZED SUBGRADE [3]	CRACK				PAVEMENT CONDITION	RUT DEPTH - LWP (IN.)	RUT DEPTH - RWP (IN.)	CROSS SLOPE (%) [4]	COMMENTS
					FC9.5	FC12.5	SP12.5	SP9.5	S	T1	S2	BIND				LR	BRCK	ABC-2	CONC		DEPTH (IN.)	TYPE	CLASS	EXTENT					
22	0.259	S	IR	N		2.0		1.4							3.4			5.4		11.2					F			4.20	
27	0.114	S	OL	N		1.2		2.1							3.3			5.4		4.3					F			3.70	
24	0.231	S	OL	N		1.3		1.5							2.8			6.4							F			2.80	
45	0.935	S	OL	N		2.0		2.0							4.0			5.7		9.8					F			1.70	
42	0.986	S	OL	N		1.7		2.3	1.4						5.4			6.4		12.0					F			2.50	
39	1.006	S	OL	N		2.1		2.2	1.5						5.8			7.3							F			2.30	Beyond the End MP
16	0.072	S	OR	N		1.3		1.8							3.1			5.8							F			4.00	
19	0.185	S	OR	N		1.5		1.8							3.3			5.3							F			3.10	
33	0.927	S	OR	N		1.8		2.2							4.0			5.7		12.0					F			2.30	
35	0.970	S	OR	N		0.9		3.6							4.5			6.5			3.5	C	III	S	P			1.60	
38	1.006	S	OR	N		1.6		2.0	3.1						6.7			7.4							F			2.80	Beyond the End MP
AVERAGE						***1.58***		***2.08***	***2.00***						***4.21***			***6.12***		***9.86***	***3.50***							***2.82***	
MAX						***2.10***		***3.60***	***3.10***						***6.70***			***7.40***		***12.00***	***3.50***							***4.20***	
MIN						***0.90***		***1.40***	***1.40***						***2.80***			***5.30***		***4.30***	***3.50***							***1.60***	
LAYER COEF.					***0.25***	***0.25***	***0.25***	***0.25***	***0.25***	***0.23***	***0.25***	***0.20***				***0.18***	***UNKW***	***0.16***	***UNKW***	***0.08***									

Notes:

1. The data presented on this table is specific only at the locations cored at the time of the investigation. Should questions arise regarding the pavement composition, it is incumbent upon those raising the question to perform additional exploration as necessary.
2. Mile posts are approximate based on field recorded measurements using a Distance Measuring Instrument (DMI) or a GPS unit.
3. Stabilization thickness was checked on 10% of the coring locations. For pavement design, assume 12 inches of thickness for stabilization.
4. The cross slope is approximate and measured in the center of the lane.
5. A blank cell indicates measurement was not recorded.
6. A value of "UNK" indicates material was encountered but the total thickness was not determined.

Lane Designations - Decreasing MP	Lane Designations - Increasing MP	Lane Type		Crack Type	Crack Rating	Extent	Pavement Condition
OL/IL - Outside/Inside Shoulder	OR/IR - Outside/Inside Shoulder	ML - Mainline	S - Shoulder	A - Alligator	Class IB - Hairline cracks that are ≤ 1/8 inch wide	L - Light	G - Good
L1 - 1st Lane Left of Centerline	R1 - 1st Lane Right of Centerline	TL - Turn Lane	SS - Side Street	B - Block	Class II - Cracks > than 1/8 inch and ≤ 1/4 inch	M - Moderate	F - Fair
LL/LR - Left/Right Turn Lane	RL/RR - Left/Right Turn Lane	CO - Crossover	BR - Bridge Approach/Departure	C - Combination	Class III - Cracks > 1/4 inch	S - Severe	P - Poor

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PAVEMENT EVALUATION CORING AND CONDITION DATA

Cored By: RCS | Coring Completion Date: 4/3/2023 | Typical Section: 1: 17030000

W.P.I. No.:				Name:	SR 789					Lanes:	4 Lane Urban Minor Arterial Roadway
Fin. Proj. ID:	445926-2			From:	E of Sunset Dr.					Shoulder Type and Condition:	
F.A. Project No.:		Roadway ID:	17030000	To:	Bird Key Dr.					Inside:	None
County:	Sarasota	SR No.:	789	Beg MP:	0.000	End MP:	0.194	Length:	0.194	Outside:	Paved
Overall Pavement Condition (from DMO field review):		Fair		Median Curbed (Y/N):	Y	Paved: Y	Lawn: Y	Other:		Curb & Gutter (Y/N):	Y

Turn Lanes

CORE NO.	MILE POST [2]	LANE TYPE	LANE	WP (Y/N)	PAVEMENT LAYER (IN.)										TOTAL ASPHALT THICKNESS (IN.)	BASE				STABILIZED SUBGRADE [3]	CRACK				PAVEMENT CONDITION	RUT DEPTH - LWP (IN.)	RUT DEPTH - RWP (IN.)	CROSS SLOPE (%) [4]	COMMENTS
					FC9.5	FC12.5	SP12.5	SP9.5	S	T1	S2	BIND				LR	BRCK	ABC-2	CONC		DEPTH (IN.)	TYPE	CLASS	EXTENT					
7	0.090	TL	LR	N		1.3	1.7					1.4			4.4	12.7									F	0.0	0.0	5.20	
14	0.169	TL	RL	N		1.5		0.5			1.3	1.7			5.0	6.9									F	0.1	0.1	2.60	Base: outside LR / inside ABC-2.
13	0.157	TL	RR	N		1.6		2.9							4.5			6.2							F	0.0	0.0	1.80	
AVERAGE						***1.47***	***1.70***	***1.70***			***1.30***	***1.55***			***4.63***	***9.80***		***6.20***								***0.0***	***0.0***	***3.20***	
MAX						***1.60***	***1.70***	***2.90***			***1.30***	***1.70***			***5.00***	***12.70***		***6.20***								***0.1***	***0.1***	***5.20***	
MIN						***1.30***	***1.70***	***0.50***			***1.30***	***1.40***			***4.40***	***6.90***		***6.20***								***0.0***	***0.0***	***1.80***	
LAYER COEF.					***0.25***	***0.25***	***0.25***	***0.25***	***0.25***	***0.23***	***0.25***	***0.20***				***0.18***	***UNKW***	***0.16***	***UNKW***	***0.08***									

Notes:

1. The data presented on this table is specific only at the locations cored at the time of the investigation. Should questions arise regarding the pavement composition, it is incumbent upon those raising the question to perform additional exploration as necessary.
2. Mile posts are approximate based on field recorded measurements using a Distance Measuring Instrument (DMI) or a GPS unit.
3. Stabilization thickness was checked on 10% of the coring locations. For pavement design, assume 12 inches of thickness for stabilization.
4. The cross slope is approximate and measured in the center of the lane.
5. A blank cell indicates measurement was not recorded.
6. A value of "UNK" indicates material was encountered but the total thickness was not determined.

Lane Designations - Decreasing MP	Lane Designations - Increasing MP	Lane Type		Crack Type	Crack Rating	Extent	Pavement Condition
OL/IL - Outside/Inside Shoulder	OR/IR - Outside/Inside Shoulder	ML - Mainline	S - Shoulder	A - Alligator	Class IB - Hairline cracks that are ≤ 1/8 inch wide	L - Light	G - Good
L1 - 1st Lane Left of Centerline	R1 - 1st Lane Right of Centerline	TL - Turn Lane	SS - Side Street	B - Block	Class II - Cracks > than 1/8 inch and ≤ 1/4 inch	M - Moderate	F - Fair
LL/LR - Left/Right Turn Lane	RL/RR - Left/Right Turn Lane	CO - Crossover	BR - Bridge Approach/Departure	C - Combination	Class III - Cracks > 1/4 inch	S - Severe	P - Poor

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PAVEMENT EVALUATION CORING AND CONDITION DATA

Cored By: RCS | Coring Completion Date: 4/3/2023 | Typical Section: 2: 17030201

W.P.I. No.:				Name:	SR 789						Lanes:	4 Lane Urban Minor Arterial Roadway	
Fin. Proj. ID:	445926-2			From:	E of Sunset Dr.						Shoulder Type and Condition:		
F.A. Project No.:		Roadway ID:	17030201	To:	Bird Key Dr.						Inside:	Paved	
County:	Sarasota	SR No.:	789	Beg MP:	0.000	End MP:	1.006	Length:	1.006		Outside:	Paved	
Overall Pavement Condition (from DMO field review):		Fair		Median Curbed (Y/N):	Y	Paved: Y		Lawn: Y		Other:	Curb & Gutter (Y/N):	Y	

Turn Lanes

CORE NO.	MILE POST [2]	LANE TYPE	LANE	WP (Y/N)	PAVEMENT LAYER (IN.)										TOTAL ASPHALT THICKNESS (IN.)	BASE				STABILIZED SUBGRADE [3]	CRACK				PAVEMENT CONDITION	RUT DEPTH - LWP (IN.)	RUT DEPTH - RWP (IN.)	CROSS SLOPE (%) [4]	COMMENTS
					FC9.5	FC12.5	SP12.5	SP9.5	S	T1	S2	BIND				LR	BRCK	ABC-2	CONC		DEPTH (IN.)	TYPE	CLASS	EXTENT					
29	0.038	TL	LL	Y		1.4		4.1							5.5			6.2		11.3					F	0.0	0.0	3.50	
37	0.980	TL	RL	N		1.6		1.4	2.2		3.2	2.9			11.3	10.7									F	0.0	0.1	1.00	
AVERAGE						***1.50***		***2.75***	***2.20***		***3.20***	***2.90***			***8.40***	***10.70***		***6.20***		***11.30***						***0.0***	***0.1***	***2.25***	
MAX						***1.60***		***4.10***	***2.20***		***3.20***	***2.90***			***11.30***	***10.70***		***6.20***		***11.30***						***0.0***	***0.1***	***3.50***	
MIN						***1.40***		***1.40***	***2.20***		***3.20***	***2.90***			***5.50***	***10.70***		***6.20***		***11.30***						***0.0***	***0.0***	***1.00***	
LAYER COEF.					***0.25***	***0.25***	***0.25***	***0.25***	***0.25***	***0.23***	***0.25***	***0.20***				***0.18***	***UNKW***	***0.16***	***UNKW***	***0.08***									

Notes:

1. The data presented on this table is specific only at the locations cored at the time of the investigation. Should questions arise regarding the pavement composition, it is incumbent upon those raising the question to perform additional exploration as necessary.
2. Mile posts are approximate based on field recorded measurements using a Distance Measuring Instrument (DMI) or a GPS unit.
3. Stabilization thickness was checked on 10% of the coring locations. For pavement design, assume 12 inches of thickness for stabilization.
4. The cross slope is approximate and measured in the center of the lane.
5. A blank cell indicates measurement was not recorded.
6. A value of "UNK" indicates material was encountered but the total thickness was not determined.

Lane Designations - Decreasing MP	Lane Designations - Increasing MP	Lane Type		Crack Type	Crack Rating	Extent	Pavement Condition
OL/IL - Outside/Inside Shoulder	OR/IR - Outside/Inside Shoulder	ML - Mainline	S - Shoulder	A - Alligator	Class IB - Hairline cracks that are ≤ 1/8 inch wide	L - Light	G - Good
L1 - 1st Lane Left of Centerline	R1 - 1st Lane Right of Centerline	TL - Turn Lane	SS - Side Street	B - Block	Class II - Cracks > than 1/8 inch and ≤ 1/4 inch	M - Moderate	F - Fair
LL/LR - Left/Right Turn Lane	RL/RR - Left/Right Turn Lane	CO - Crossover	BR - Bridge Approach/Departure	C - Combination	Class III - Cracks > 1/4 inch	S - Severe	P - Poor

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PAVEMENT EVALUATION CORING AND CONDITION DATA

Cored By: RCS | Coring Completion Date: 4/3/2023 | Typical Section: 1: 17030000

W.P.I. No.:				Name:	SR 789					Lanes:	4 Lane Urban Minor Arterial Roadway
Fin. Proj. ID:	445926-2			From:	E of Sunset Dr.					Shoulder Type and Condition:	
F.A. Project No.:		Roadway ID:	17030000	To:	Bird Key Dr.					Inside:	None
County:	Sarasota	SR No.:	789	Beg MP:	0.000	End MP:	0.194	Length:	0.194	Outside:	Paved
Overall Pavement Condition (from DMO field review):		Fair		Median Curbed (Y/N):	Y	Paved: Y	Lawn: Y	Other:		Curb & Gutter (Y/N):	Y

Side Street

CORE NO.	MILE POST [2]	LANE TYPE	LANE	WP (Y/N)	PAVEMENT LAYER (IN.)										TOTAL ASPHALT THICKNESS (IN.)	BASE				STABILIZED SUBGRADE [3]	CRACK				PAVEMENT CONDITION	RUT DEPTH - LWP (IN.)	RUT DEPTH - RWP (IN.)	CROSS SLOPE (%) [4]	COMMENTS
					FC9.5	FC12.5	SP12.5	SP9.5	S	T1	S2	BIND				LR	BRCK	ABC-2	CONC		DEPTH (IN.)	TYPE	CLASS	EXTENT					
1	0.194	SS	NA	N	0.6			1.1		0.8					2.5	12.5			7.8		2.5	C	III	M	P	0.0	0.0	2.60	Golden Gate. Base: outside CONC / inside LR.
2	0.194	SS	NA	N		1.4		1.9							3.3			5.6						F	0.0	0.0	0.30	Sunset Dr.
AVERAGE					***0.60***	***1.40***		***1.50***		***0.80***					***2.90***	***12.50***		***5.60***	***7.80***		***2.50***					***0.0***	***0.0***	***1.45***	
MAX					***0.60***	***1.40***		***1.90***		***0.80***					***3.30***	***12.50***		***5.60***	***7.80***		***2.50***					***0.0***	***0.0***	***2.60***	
MIN					***0.60***	***1.40***		***1.10***		***0.80***					***2.50***	***12.50***		***5.60***	***7.80***		***2.50***					***0.0***	***0.0***	***0.30***	
LAYER COEF.					***0.25***	***0.25***	***0.25***	***0.25***	***0.25***	***0.23***	***0.25***	***0.20***				***0.18***	***UNKW***	***0.16***	***UNKW***	***0.08***									

Notes:

1. The data presented on this table is specific only at the locations cored at the time of the investigation. Should questions arise regarding the pavement composition, it is incumbent upon those raising the question to perform additional exploration as necessary.
2. Mile posts are approximate based on field recorded measurements using a Distance Measuring Instrument (DMI) or a GPS unit.
3. Stabilization thickness was checked on 10% of the coring locations. For pavement design, assume 12 inches of thickness for stabilization.
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Lane Designations - Decreasing MP	Lane Designations - Increasing MP	Lane Type		Crack Type	Crack Rating	Extent	Pavement Condition
OL/IL - Outside/Inside Shoulder	OR/IR - Outside/Inside Shoulder	ML - Mainline	S - Shoulder	A - Alligator	Class IB - Hairline cracks that are ≤ 1/8 inch wide	L - Light	G - Good
L1 - 1st Lane Left of Centerline	R1 - 1st Lane Right of Centerline	TL - Turn Lane	SS - Side Street	B - Block	Class II - Cracks > than 1/8 inch and ≤ 1/4 inch	M - Moderate	F - Fair
LL/LR - Left/Right Turn Lane	RL/RR - Left/Right Turn Lane	CO - Crossover	BR - Bridge Approach/Departure	C - Combination	Class III - Cracks > 1/4 inch	S - Severe	P - Poor

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PAVEMENT EVALUATION CORING AND CONDITION DATA

Cored By: RCS | Coring Completion Date: 4/3/2023 | Typical Section: 2: 17030201

W.P.I. No.:				Name:	SR 789					Lanes:	4 Lane Urban Minor Arterial Roadway
Fin. Proj. ID:	445926-2			From:	E of Sunset Dr.					Shoulder Type and Condition:	
F.A. Project No.:		Roadway ID:	17030201	To:	Bird Key Dr.					Inside:	Paved
County:	Sarasota	SR No.:	789	Beg MP:	0.000	End MP:	1.006	Length:	1.006	Outside:	Paved
Overall Pavement Condition (from DMO field review):		Fair		Median Curbed (Y/N):	Y	Paved: Y	Lawn: Y	Other:		Curb & Gutter (Y/N):	Y

Side Street

CORE NO.	MILE POST [2]	LANE TYPE	LANE	WP (Y/N)	PAVEMENT LAYER (IN.)										TOTAL ASPHALT THICKNESS (IN.)	BASE				STABILIZED SUBGRADE [3]	CRACK				PAVEMENT CONDITION	RUT DEPTH - LWP (IN.)	RUT DEPTH - RWP (IN.)	CROSS SLOPE (%) [4]	COMMENTS
					FC9.5	FC12.5	SP12.5	SP9.5	S	T1	S2	BIND				LR	BRCK	ABC-2	CONC		DEPTH (IN.)	TYPE	CLASS	EXTENT					
20	1.006	SS	NA	N		1.0		2.8			1.4	2.0			7.2	9.8									F	0.1	0.1	3.10	Bird Key Dr.
40	1.006	SS	NA	N		1.2			2.4	7.5					11.1				6.9						F			2.10	Bird Key Dr.
AVERAGE						***1.10***		***2.80***	***2.40***	***7.50***	***1.40***	***2.00***			***9.15***	***9.80***			***6.90***							***0.1***	***0.1***	***2.60***	
MAX						***1.20***		***2.80***	***2.40***	***7.50***	***1.40***	***2.00***			***11.10***	***9.80***			***6.90***							***0.1***	***0.1***	***3.10***	
MIN						***1.00***		***2.80***	***2.40***	***7.50***	***1.40***	***2.00***			***7.20***	***9.80***			***6.90***							***0.1***	***0.1***	***2.10***	
LAYER COEF.					***0.25***	***0.25***	***0.25***	***0.25***	***0.25***	***0.23***	***0.25***	***0.20***				***0.18***	***UNKW***	***0.16***	***UNKW***	***0.08***									

Notes:

1. The data presented on this table is specific only at the locations cored at the time of the investigation. Should questions arise regarding the pavement composition, it is incumbent upon those raising the question to perform additional exploration as necessary.
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OL/IL - Outside/Inside Shoulder	OR/IR - Outside/Inside Shoulder	ML - Mainline	S - Shoulder	A - Alligator	Class IB - Hairline cracks that are ≤ 1/8 inch wide	L - Light	G - Good
L1 - 1st Lane Left of Centerline	R1 - 1st Lane Right of Centerline	TL - Turn Lane	SS - Side Street	B - Block	Class II - Cracks > than 1/8 inch and ≤ 1/4 inch	M - Moderate	F - Fair
LL/LR - Left/Right Turn Lane	RL/RR - Left/Right Turn Lane	CO - Crossover	BR - Bridge Approach/Departure	C - Combination	Class III - Cracks > 1/4 inch	S - Severe	P - Poor

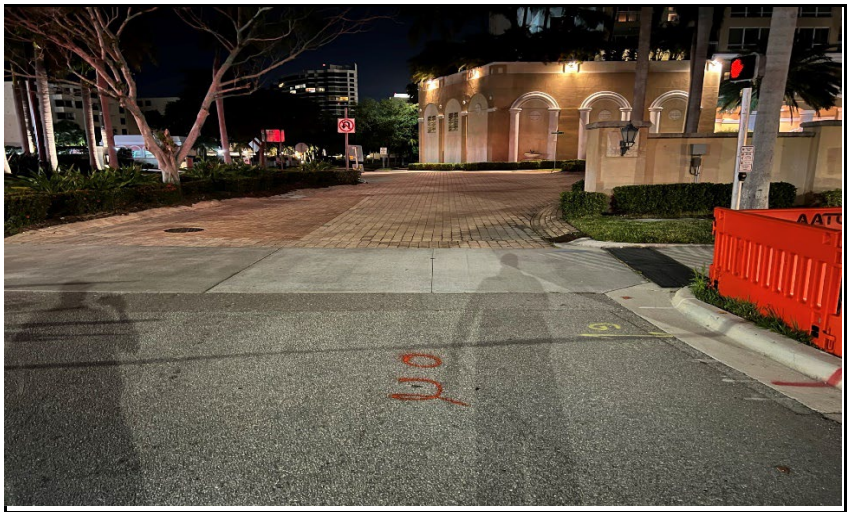
APPENDIX 3

Core Sample and Location Pictures

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 1

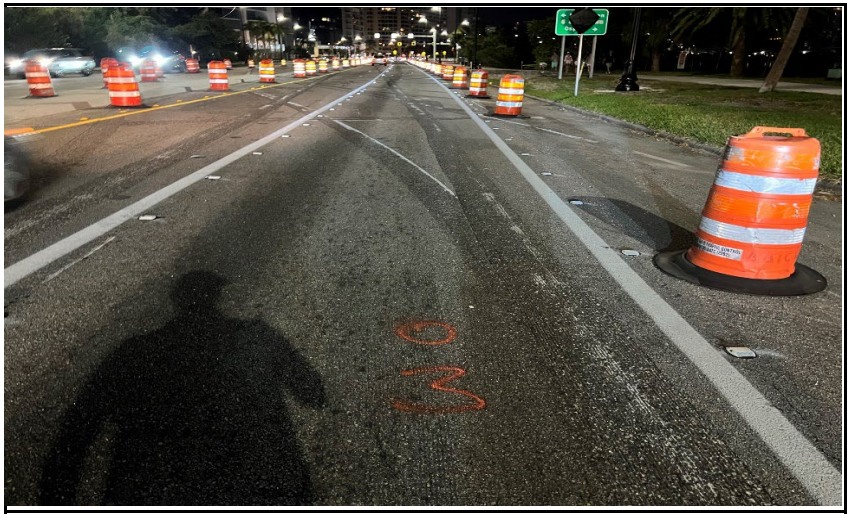
Core Photo 1



Field Photo 2

Core Photo 2

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY:	**DATE:**	**BEGIN MP:**	**END MP:**	**COUNTY / ROADWAY ID:**
RCS	4/3/2023	0.000 & 0.000	1.006 & 0.194	Sarasota / 17030201 & 17030000



Field Photo 3

Core Photo 3

Field Photo 4

Core Photo 4

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 5

Core Photo 5

Field Photo 6

Core Photo 6

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 7

Core Photo 7

Field Photo 8

Core Photo 8

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 9

Core Photo 9

Field Photo 10

Core Photo 10

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 11

Core Photo 11

Field Photo 12

Core Photo 12

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 13

Core Photo 13

Field Photo 14

Core Photo 14

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 15

Core Photo 15

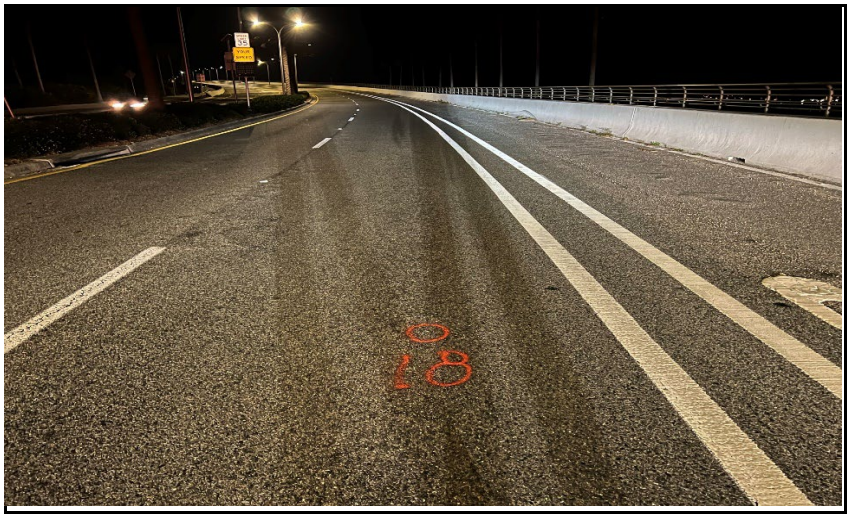
Field Photo 16

Core Photo 16

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 17

Core Photo 17



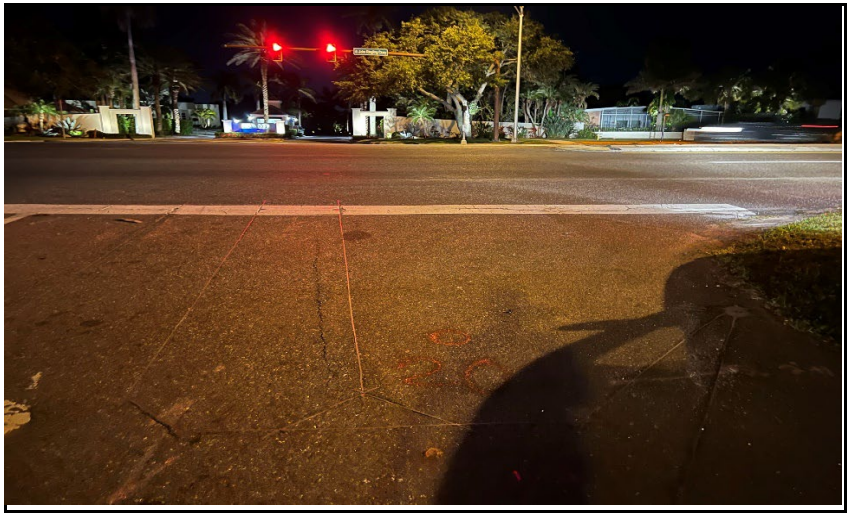
Field Photo 18

Core Photo 18

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 19

Core Photo 19



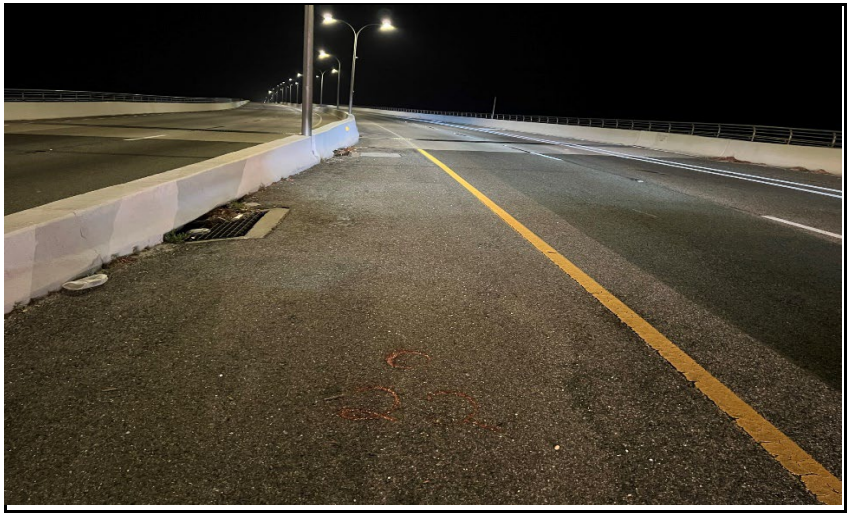
Field Photo 20

Core Photo 20

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 21

Core Photo 21



Field Photo 22

Core Photo 22

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 23

Core Photo 23

Field Photo 24

Core Photo 24

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 25

Core Photo 25

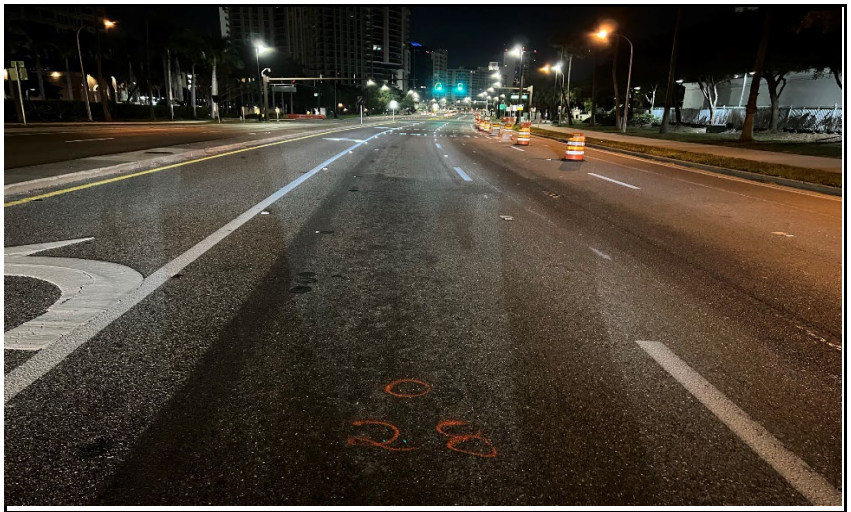
Field Photo 26

Core Photo 26

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 27

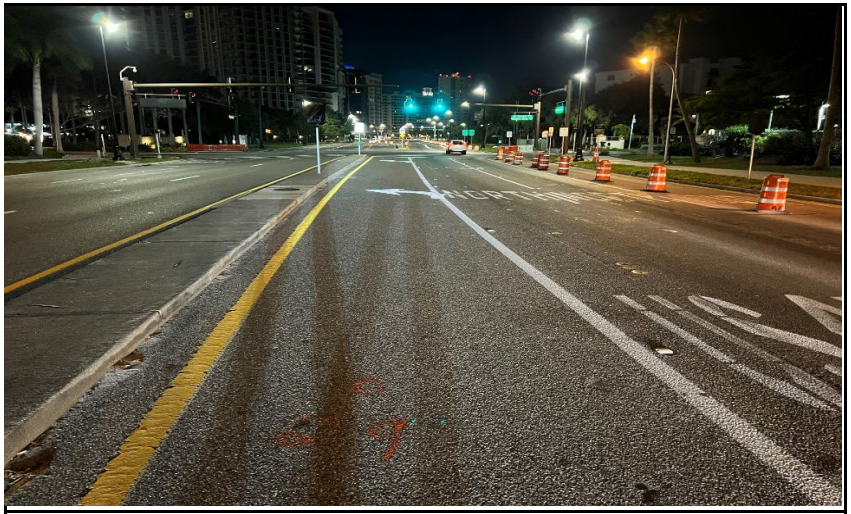
Core Photo 27



Field Photo 28

Core Photo 28

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000



Field Photo 29

Core Photo 29

Field Photo 30

Core Photo 30

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 31

Core Photo 31

Field Photo 32

Core Photo 32

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 33

Core Photo 33

Field Photo 34

Core Photo 34

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 35

Core Photo 35

Field Photo 36

Core Photo 36

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 37

Core Photo 37

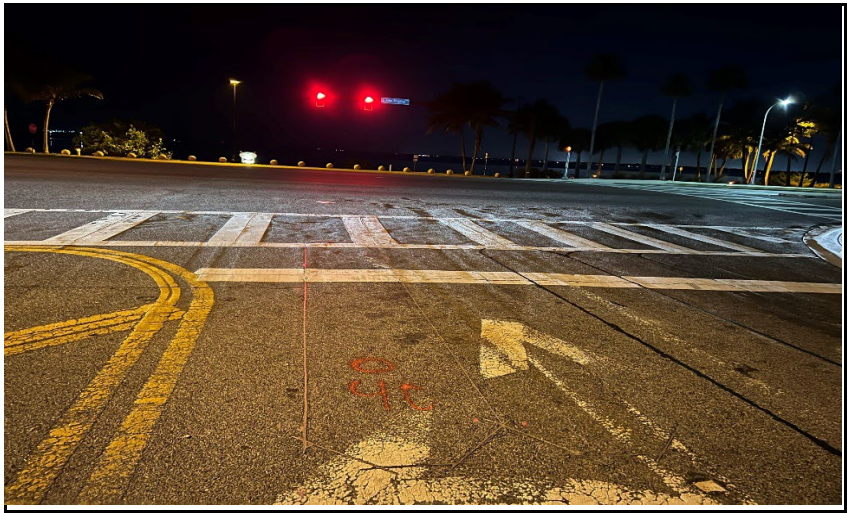
Field Photo 38

Core Photo 38

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 39

Core Photo 39



Field Photo 40

Core Photo 40

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 41

Core Photo 41

Field Photo 42

Core Photo 42

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 43

Core Photo 43

Field Photo 44

Core Photo 44

PAVEMENT CORE PHOTO PAGES		FPID: 445926-2	PROJECT DESCRIPTION: SR 789 from E of Sunset Dr. to Bird Key Dr.	
CORED BY: RCS	DATE: 4/3/2023	BEGIN MP: 0.000 & 0.000	END MP: 1.006 & 0.194	COUNTY / ROADWAY ID: Sarasota / 17030201 & 17030000

Field Photo 45

Core Photo 45

APPENDIX 4

Illustration of Milling and Resurfacing Recommendations

Illustration of Milling and Resurfacing Recommendation

Design Sketch Not Drawn To Scale

<table>
<tr><th>MILL 3.50”</th><th>MILL 1.50”</th></tr>
<tr><td>FC-12.5 / 1.50”</td><td>FC-12.5 / 1.50”</td></tr>
<tr><td>SP-12.5 / 2.00”</td><td rowspan="2">Remaining
Asphalt After
Milling</td></tr>
<tr><td>Remaining Asphalt After Milling</td></tr>
<tr><td colspan="2">Existing Base</td></tr>
<tr><td colspan="2">Subgrade</td></tr>
</table>

Note:

- **Structural requirements were not calculated in this design.**
- **If the depicted pavement design will not be adequate based on structural calculations, overbuild thickness should be adjusted to meet the required structural number and/or other constructability purposes. If modification to the milling depth will be necessary to meet the required structural number contact this office for a revised recommendation.**

APPENDIX 5

Pavement Survey Request

Florida Department of Transportation

RON DESANTIS
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

JARED W. PERDUE, P.E.
SECRETARY

MEMORANDUM

Date: 2/14/2023
To: Pavement Evaluations
From: Jeffrey Mednick
Subject: Request for Asphalt Survey
FM No.: 445926-2
County/Section: Sarasota
Begin MP: 0 End MP: .194
Description: SR 789 EAST OF SUNSET DRIVE TO BIRD KEY DRIVE **Coring Scope Responsibility:** Design Consultant
Responsible Consultant for Coring Scope: Gary Nadeau - Kimley-Horn

---

These attached items are for your information in obtaining the necessary asphalt data needed for our preparation of the pavement design package: Scope, Concept Report and/or PPR/LRE;

Please specify if the project has any realignment involved and/or locations of widening/reconstruction:

Review of Project by Project Manager: Jeffrey Mednick
Letting Date: 07/2024
Friction Course Type:

Areas of Concern:

In addition to standard core locations:

- We need to core the shoulders west of Bird Key- it is likely this will have a thinner pavement section
- The drive north of Bird Key - in case we end up milling some of that driveway
- Both eastbound and westbound approach at Ringling Bridge including the wide shoulder area east of the bridge on the north side - there might be a thinner pavement section here because of the shoulder.

Is this a 'Goes With' project? No If so, Lead Project Number:
To keep our project on schedule, we are requesting a return date of: 5/15/2023
If you have any questions, please contact me at: Jeffrey.Mednick@dot.state.fl.us

Appendix E
Design Calculations

Kimley-Horn and Associates, Inc.

Project	State Road 789	Computed		Date	12/13/2023
Subject	Reconstruction / Widening Design	Checked		Date	12/13/2023
Task	445926-1-52-01 / 445926-2-52-01	Sheet		Of	

$ESAL_D$ =	**6,000,000**	(From Report)
M_R =	**7,200**	psi (From report)
Design Speed =	**35**	mph (given)
Number of lanes (total) =	**6**	
Facility Type =	**Urban Arterial**	(New Construction)
Friction Course =	FC-12.5 or FC-9.5	(Page 4-2, Flexible Pavement Design Manual)
Friction Course Structural No. (SN_{FC}) =	0.44	(Page 5-13 Flexible Pavement Design Manual)
Traffic Level =	C	(Page 2-4, Flexible Pavement Design Manual)
Percent Reliablilty (%R) =	80% - 90%	USE = **90%** (Page 5-8, Flexible Pavement Design Manual)
Req'd Structural No. (SN_R) =	4.67	(From Tables A.1A to A.10B using $ESAL_D$, M_R and %R)

Proposed Friction Course and Stabilization

New Material	Thickness (inches)	Coeffecient (New)	SN_E
FC-12.5 or FC-9.5	**1.5**	0.44	0.66
Type B Stab. (LBR 40)	**12**	0.08	0.96
		Friction Course & Stabilization No. =	1.62
		Req'd Structural No. (SN_R) =	4.67
		Min. Structural & Base Course No. (in.) =	**3.05**

= Use table below to find Opt. Base Group and Structural Course thickness

Combined Structural & Base Course No. (Table 5.9)

Opt. base group	0	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1		1.12	1.38									
2		1.34	1.56									
3		1.43	1.65	1.87								
4		1.52	1.74	1.96	2.18							
5		1.70	1.92	2.14	2.36	2.58						
6		1.88	2.10	2.32	2.54	2.76	2.98					
7			2.16	2.41	2.63	2.85	3.04					
8			2.37	2.59	2.81	3.03	3.25	3.47	3.69			
9					2.90	3.12	3.34	3.56	3.78			
10						3.30	3.52	3.74	3.96	4.18		
11						3.48	3.70	3.92	4.14	4.36	4.58	
12							3.79	4.01	4.23	4.45	4.67	4.89
13								4.19	4.41	4.63	4.85	5.07
14								4.28	4.50	4.72	4.94	5.16
15								4.46	4.68	4.90	5.12	5.34

Minimum Structural and Base Group (Table 5.5)

18 kip ESAL, 20 yr period	Structural Course (in.)	Base Group
Limited Access	4	9
> 3,500,000	3	9
3,500,000 to 300,000	2	6
< 300,000	1.5	3
Limited Access Shoulder	1.5	1
Residential Streets, Parking Areas, Shoulders and Bike Paths	1	1

Friction Course Spread Rates

FC-4.75	80 lb/yd^2
FC-9.5	110 lb/yd^2
FC-12.5	165 lb/yd^2

Optional Base Group	Structural Course thickness (in.)	Combined Struct. & Base Course (in.)	Friction Course & Stabilization (in.)	Final Structural No.		
9	**3**	3.12	1.62	4.74	= 102 %	of required

See tables 5.11 (pages 5-31) for min & max. Type SP structural course lift thicknesses.
Verify binder type in Structural Course (page 5-11): PG 67-22 or PG 76-22

Kimley-Horn
and Associates, Inc.

Project	State Road 789	Computed		Date	12/13/2023
Subject	Resurfacing Pavement Design (Overbuild)	Checked		Date	12/13/2023
Task	445926-1-52-01 / 445926-2-52-01	Sheet		Of	

$ESAL_D$ =	6,000,000	(From Report)
M_R =	7,200	psi (From report)
Design Speed =	35	mph (given)
Number of lanes (total) =	6	
Facility Type =	Urban Arterial	(Rehabilitation)
Friction Course =	FC-12.5 or FC-9.5	(Page 4-3, Flexible Pavement Design Manual)
Friction Course Structural No. (SN_{FC}) =	0.44	
Traffic Level =	C	(Page 2-5 Flexible Pavement Design Manual)
Percent Reliability (%R) =	90% - 97%	→ USE = 90% Reliability
Req'd Structural No. (SN_R) =	4.67	(From Tables A.1A to A.10B using $ESAL_D$, M_R and %R)

"Existing" Structural No. (SN_E):

Thickness milled = 1.5 inches

Existing Material from Core Logs	Thickness (inches)	Pav't Condition	Coefficient	SN_E	Inches Milled
FC-12.5	1.3	fair	0.25	0.33	1.5
Type SP	1.5	fair	0.25	0.38	0
ABC-2	6	fair	0.16	0.96	0
Type B Stab. (LBR 40)	12	fair	0.08	0.96	0
N/A			0.00	0.00	0
N/A			0.00	0.00	0
				2.62	

Reduction of SN_E due to milling = 0.38

Remaining Structural No. after milling (SN_E) = 2.25

$SN_O = SN_R - SN_E - SN_{FC}$
$SN_O = 4.668 - 2.25 - 0.66$
$SN_O = 1.76$

Structural Course Depth (D_S) = SN_O / Type S or SP Coefficient
$D_S = 1.758 / 0.44$
$D_S = 4.00$ in
Therefore, $D_S = 4.00$ in (rounded to nearest 0.5")

Friction Course Spread Rates

FC-5	80 lb/yd^2
FC-9.5	110 lb/yd^2
FC-12.5	160 lb/yd^2

"Proposed" Structural Number

New Material	Thickness (inches)	Pav't Condition	Coefficient	SN_E
FC-12.5	1.5	new	0.44	0.66
Type SP	4	new	0.44	1.76
Type SP	3	new	0.44	1.32
N/A			0.00	0.00
N/A			0.00	0.00
N/A			0.00	0.00
			Remaining Structural No. after milling (SN_E) =	2.25
			Final Structural Number =	5.99

= 128 % of required

PROFILE IS HIGHER

See tables 5.11 (pages 5-32) for min & max. Type SP structural course lift thicknesses.
Verify binder type in Structural Course (page 5-12): PG 67-22 or PG 76-22

Appendix F

Approved Pavement Design

SR 45 FPID: 438137-1-52-01

DISTRICT ONE DESIGN

PAVEMENT DESIGN

FOR

438137-1-52-01

Sarasota

US 41

SR 45

18.491
to
18.756

Walter Breuggman,P.E.
FDOT Project Manager

PAVEMENT DESIGN PACKAGE

FINANCIAL PROJECT ID:	**438137-1-52-01**
WPI NO.:	**N/A**
STATE PROJECT NO.:	**N/A**
COUNTY SECTION NO.:	**17020000**
FEDERAL AID PROJECT NO.:	**N/A**
COUNTY:	**Sarasota**
PROJECT NAME:	**SR 45 (US 41)**
FROM:	**at SR 789 (Gulfstream Avenue)**
TO:	

Table of Contents

Appendices

Approved by
Responsible Engineer

Concurrence by
District Design Engineer

Date

Date

FLEXIBLE PAVEMENT DESIGN
QUALITY CONTROL CHECKLIST

State Project Number ID: N/A Federal Aid No.: N/A
Financial Project ID: 438137-1-52-01 County: Sarasota

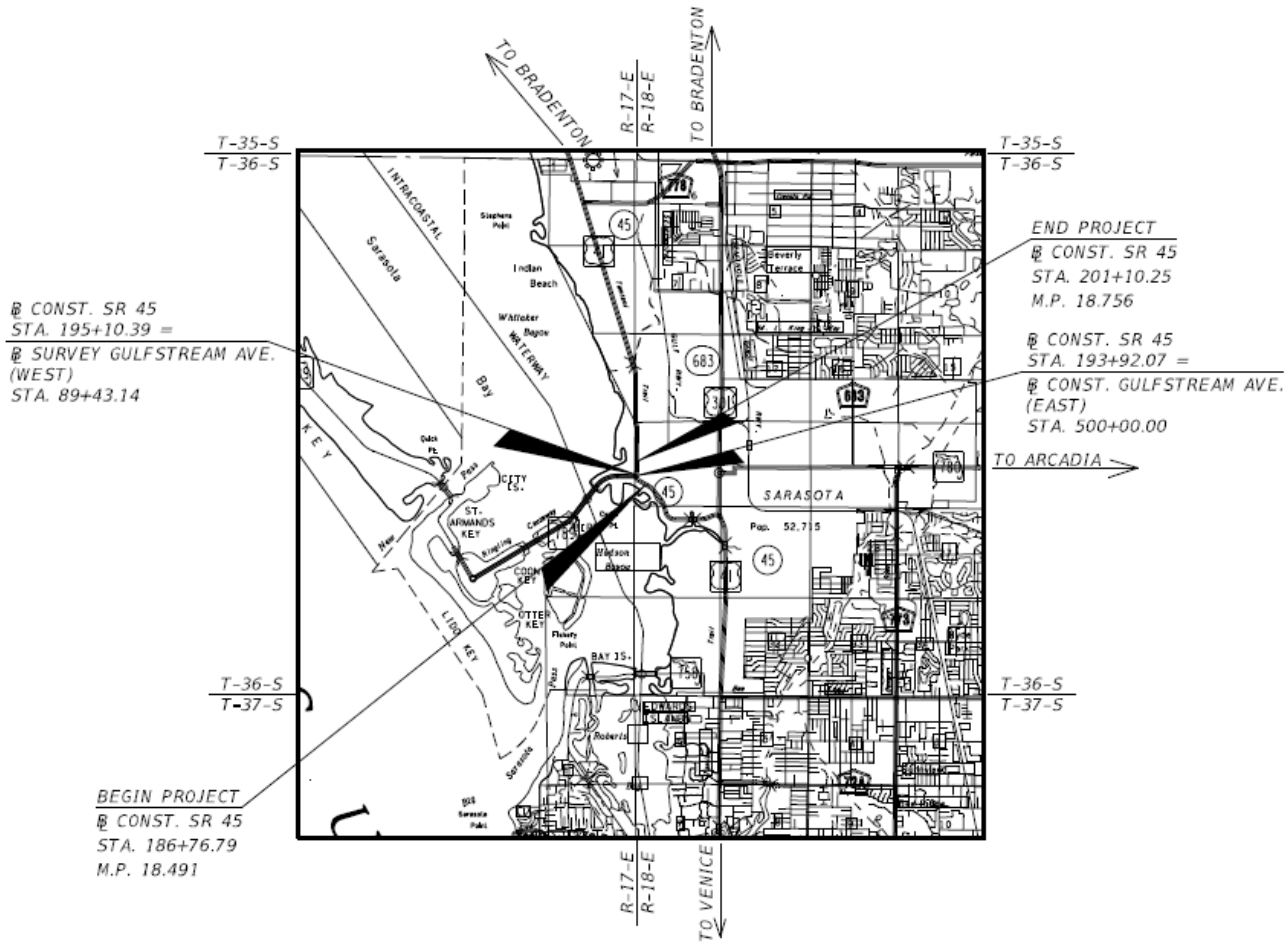
Ref.		**Satisfactory**
No.	**Flexible Pavement Design Review**	**Yes/No**
1.	Pavement Design Summary Sheet	YES
2.	Project Location and Description	YES
3.	Traffic Data and ESALD Calculations	YES
4.	Resilient Modulus (MR).	YES
5.	Required Structural Number (SNR) Calculations	YES
6.	Calculated Structural Number (SNC) Calculations	YES
7.	Base Material Selection	YES
8.	Friction Course Selection	YES
9.	Stabilized Subgrade Evaluation.	N/A
10.	Shoulder Design	N/A
11.	Coordination with Other Offices	YES
12.	Other Special Details	NA
13.	Final Pavement Design Drawing or Narrative.	YES
	Rehabilitation	
14.	Field Evaluation of Project	NA
15.	Pavement Coring and Evaluation.	NA
16.	Distress Evaluation	NA
17.	Existing Cross-Slope and Correction Method.	NA
18.	Milling Depth and Purpose	NA
19.	Overlay Structural Number (SNO) Calculations	NA
20.	Leveling/Overbuild Recommendation	NA
21.	Composition Report.	YES
	Projects That Do Not Require Design Calculations	
22.	Existing Pavement Evaluation.	NA
23.	Existing Cross-Slope and Correction method.	NA
24.	Asphalt Thickness	NA
25.	Base Type and Thickness	NA
26.	Future Milling Considerations	NA
27.	Structural Evaluation	NA
	Plans Review	
28.	Plans Conform to Pavement Design.	YES
29.	Cross-Slope correction addressed	NA
30.	Design Details Adequately Covered	YES
31.	Standard Indexes Properly Referenced.	YES
32.	Project is Constructable with Current Technology.	YES

Comments(by Ref. No.)

QA by: _____ Date: _____

STATE OF FLORIDA

DEPARTMENT OF TRANSPORTATION



LOCATION MAP

FINANCIAL PROJECT ID 438137-1-52-01

SARASOTA COUNTY (17020000)

STATE ROAD NO. 45

AT SR 789 (GULFSTREAM AVENUE)

PROJECT MANAGER: WALTER BREUGGMAN,P.E.

Project Description

This project is located on State Road 45 (US 41) at State Road 789 (Gulfstream Avenue) in Sarasota Avenue. The length of the project is 0.265 miles and the roadway is an Urban Principal Arterial from MP 18.491 to MP 18.756. The purpose of this project is to modify the intersection by constructing a roundabout.

FLORIDA DEPARTMENT OF TRANSPORTATION
FLEXIBLE PAVEMENT DESIGN SUMMARY SHEET

Prepared by:	Shari K Barnwell, P.E	**Date Prepared:**	3/12/18	
Financial Project No.	438137-1-52-01	**Project Name:**	SR 45	
WPI No.	N/A	**From:**		
State Project No.	N/A	**To:**		
County Section No.	17020000	**Begin MP:**	18.491	
FAP No.	N/A	**End MP:**	18.756	
County:	Sarasota	**Project Length**	0.265	
Type Work:	New Construction			
Opening Year:	2018	**% R:**	90	
Design Year:	2039	**MR:**	7,200**	**PSI**
ESALD - Mainline	3,874,000*	**Design Speed:**	40	**MPH**
ESALD - Shoulder	N/A	**Functional Class:**	Urban Principal Arterial	
SNR - Mainline	4.40**			
SNR - Shoulder	N/A	**Design Seq. No.:**	1	
		Cross Slope	N/A	

DESIGN NOTES:

* Used greater value of the three locations provide for the ESAL counts and rounded to 4,000,000 for calculations.

**Used a 50% reduced resilient modulus of 7,200 PSI for 1-ft base clearance per FDM to calculated SN required.

*** Depth of structural course was provided to match the asphalt structural depth of the adjacent roadway connections for future milling and resurfacing. (approved pavement design, SR 45 – FPID: 431311-1-52-01 – see Appendix E)

Recommended Thru Lane and Turn Lane New Construction Pavement Design:

Layers	Thickness	Coefficient	SN
Friction Course FC-12.5	1.50	0.44	0.66
Type SP Structural Course (Traffic Level C)	3.00***	0.44	1.32
Optional Base Group 11	12.00	0.18	2.16
Type B Stabilization (LBR 40)	12.00	0.08	0.96
		Proposed Total SN=	5.10
		Design Total SN=	4.40

Approved by Responsible Engineer

Date: _____

FLORIDA DEPARTMENT OF TRANSPORTATION
FLEXIBLE PAVEMENT DESIGN SUMMARY SHEET

Prepared by:	Shari K Barnwell, P.E	**Date Prepared:**	3/12/18	
Financial Project No.	438137-1-52-01	**Project Name:**	SR 45	
WPI No.	N/A	**From:**		
State Project No.	N/A	**To:**		
County Section No.	17020000	**Begin MP:**	18.491	
FAP No.	N/A	**End MP:**	18.756	
County:	Sarasota	**Project Length**	0.265	
Type Work:	New Construction			
Opening Year:	2018	**% R:**	90	
Design Year:	2039	**M_R:**	7,200**	**PSI**
ESALD - Mainline	3,874,000*	**Design Speed:**	40	**MPH**
ESALD - Shoulder	N/A	**Functional Class:**	Urban Principal Arterial	
SN_R - Mainline	4.40**			
SN_R - Shoulder	N/A	**Design Seq. No.:**	2	
		Cross Slope	N/A	

DESIGN NOTES:

* Used greater value of the three locations provide for the ESAL counts and rounded to 4,000,000 for calculations.

** Used a 50% reduced resilient modulus of 7,200 PSI for 1-ft base clearance per FDM to calculated SN required.

*** Thickness and coefficients used are from approved pavement design:
Design Sequence No.3, SR 45 - FPID: 431311-1-52-01 – see Appendix E.

THRU LANE AND TURN LANES **MILLING 1.50”**
(milling and resurfacing is included to provide for a smooth surface for permanent restriping of the roadway after all traffic control lane shifts are complete.)

Mainline and Turn Lane Resurfacing Design:

Layers	Thickness	Coefficient	SN
Friction Course FC-12.5	1.50	0.44	0.66
Type SP Structural Course (Traffic Level C)	2.00	0.44	0.88
AC Type 1 ***	0.82	0.15	0.12
Binder ***	1.55	0.15	0.23
Lime Rock ***	9.13	0.18	1.64
Type B Stabilization (LBR 40) ***	12.00	0.08	0.96
		Proposed Total SN=	4.49
		Design Total SN=	4.40

Approved by Responsible Engineer

Date: _____

PAVEMENT DESIGN SKETCH

(Not to scale)

Financial Project No.	438137-1-52-01	Type Work:	New Construction
WPI No.	N/A	Opening Year:	2019
State Project No.	N/A	Design Year:	2039
County Section No.	17020000	%R	90
FAP No.	N/A	Mr	7,200 PSI
County:	Sarasota	Design Speed:	40 MPH
Project Name:	SR 45 (US 41)	Functional Class:	Urban Principal Material
From:	at SR 789 (Gulfstream Avenue)		
To:		Traffic Level	C
Project Length (Mi)	0.265	Cross Slope Correction	No

Design Seq. No.:	1	Project Name:	SR 45 (US 41)
		Begin MP	18.491
		End MP	18.756
		ESALD	3,874,000

MAINLINE AND TURN LANES

1.50" FRICTION COURSE FC-12.5
3.00" TYPE SP STRUCTURAL COURSE (TRAFFIC LEVEL C)
OPTIONAL BASE GROUP 11
TYPE B STABILIZATION (LBR 40)

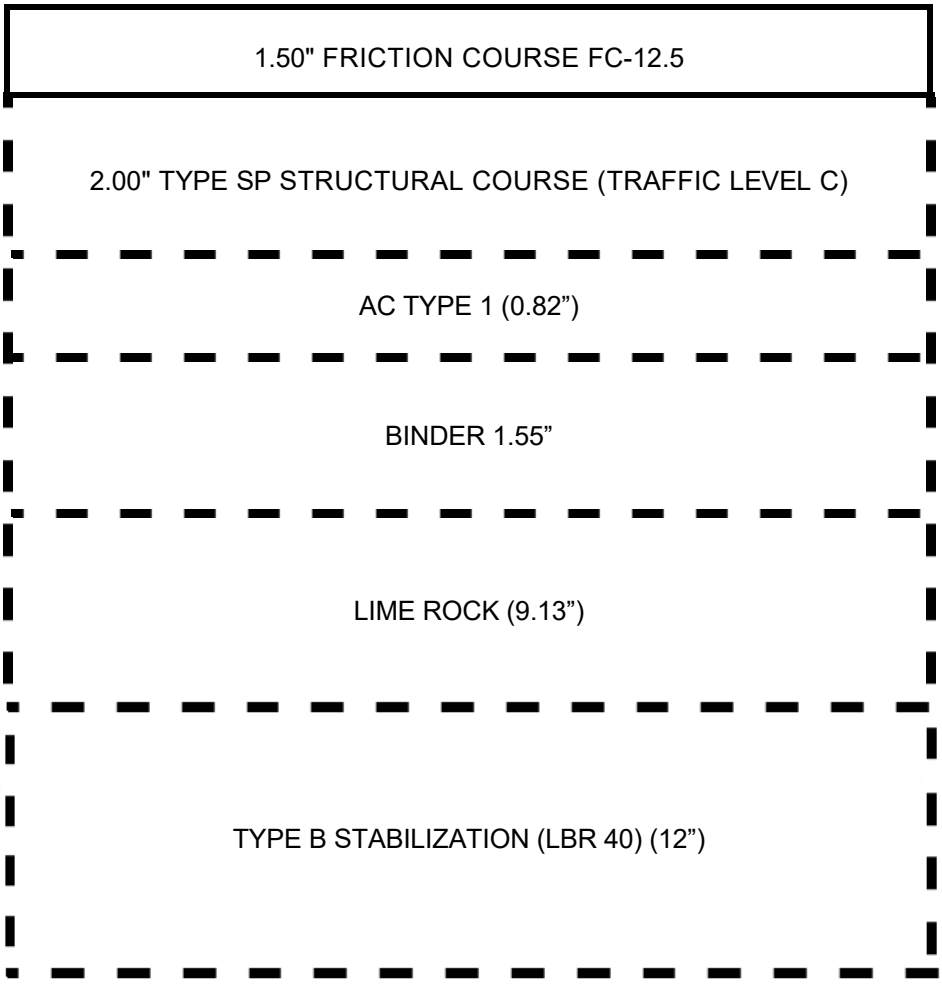
PAVEMENT DESIGN SKETCH

(Not to scale)

Financial Project No.	438137-1-52-01	Type Work:	New Construction
WPI No.	N/A	Opening Year:	2019
State Project No.	N/A	Design Year:	2039
County Section No.	17020000	%R	90
FAP No.	N/A	Mr	7,200 PSI
County:	Sarasota	Design Speed:	40 MPH
Project Name:	SR 45 (US 41)	Functional Class:	Urban Principal Material
From:	at SR 789 (Gulfstream Avenue)		
To:		Traffic Level	C
Project Length (Mi)	0.265	Cross Slope Correction	No

Design Seq. No.: 2

MILLING AND RESURFACING MAINLINE AND TURN LANES



Appendix A
Typical Section Package

STATE OF FLORIDA

DEPARTMENT OF TRANSPORTATION

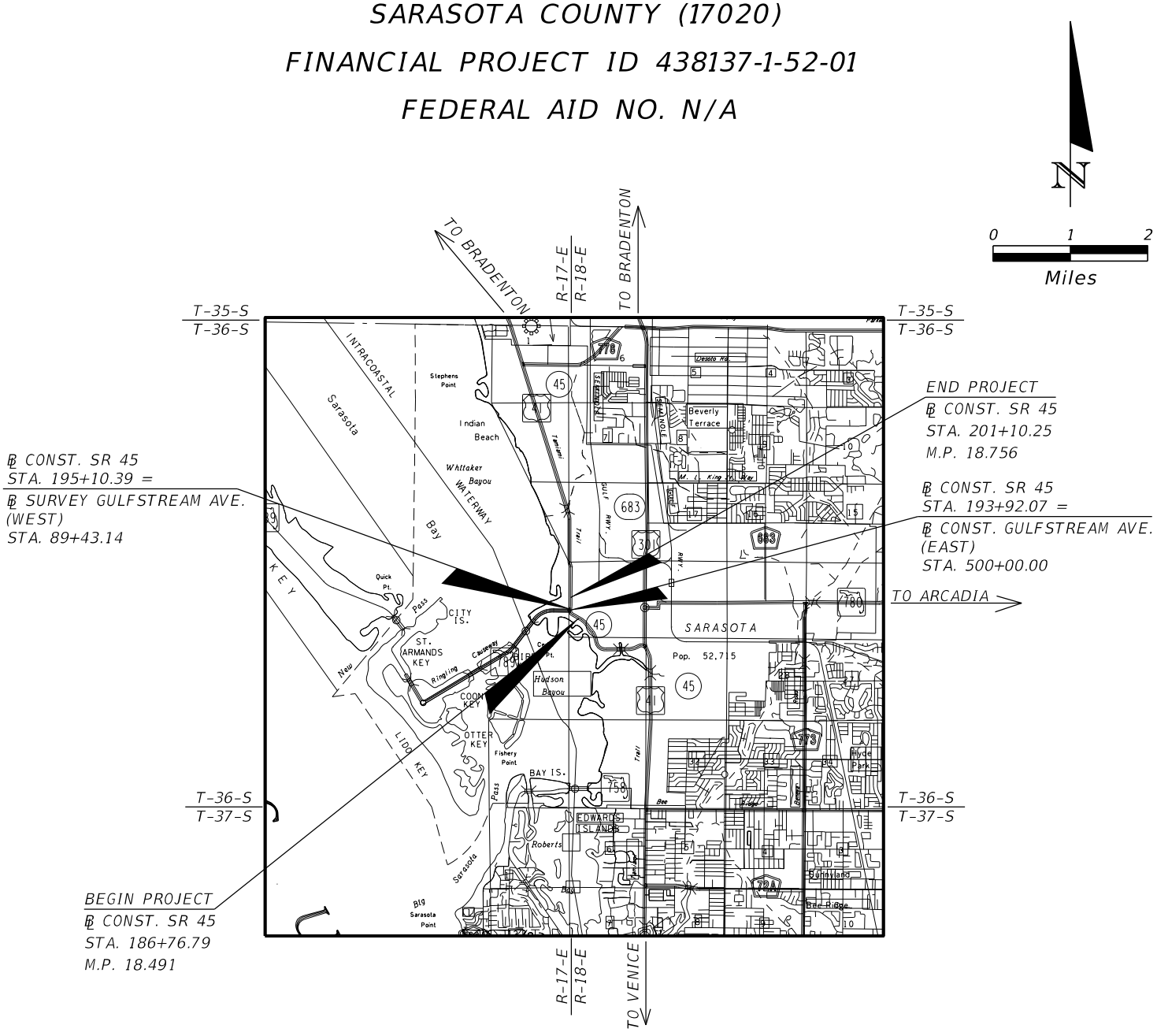
TYPICAL SECTION PACKAGE

SR 45 (US 41) AT SR 789 (GULFSTREAM AVE.)

SARASOTA COUNTY (17020)

FINANCIAL PROJECT ID 438137-1-52-01

FEDERAL AID NO. N/A



LOCATION MAP

PROJECT IDENTIFICATION

FINANCIAL PROJECT ID: 438137-1-52-01 COUNTY (SECTION): SARASOTA COUNTY (17020)

PROJECT DESCRIPTION: SR 45 (US 41) AT SR 789 (GULFSTREAM AVE.)

PROJECT CONTROLS

FUNCTIONAL CLASSIFICATION

( ) RURAL

(X) URBAN

( )	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

( ) 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

(X) 7 - BOTH MEDIAN TYPES

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)

TRAFFIC

	YEAR	AADT
CURRENT	2017	38,800
OPENING	2019	39,200
DESIGN	2039	43,000

DESIGN SPEED: 40

POSTED SPEED: 40

DISTRIBUTION

K = 9.00 %

D = 52.5 %

T_{24} = 3.10 %

LIST ANY POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION ELEMENTS:

VARIATIONS

- CROSS SLOPE
- BIKE LANE WIDTH

EXCEPTIONS

- N/A

LIST MAJOR STRUCTURES LOCATION/DESCRIPTION - REQUIRING INDEPENDENT STRUCTURE DESIGN:

LIST MAJOR UTILITIES WITHIN PROJECT CORRIDOR:

CITY OF SARASOTA UTILITIES
COMCASE CABLE
FIBERNET DIRECT
FPL SARASOTA
FPL SUBAQUEOUS
FRONTIER COMMUNICATIONS
LEVEL 3 COMMUNICATIONS
SARASOTA COUNTY TRAFFIC
TECO PEOPLES GAS

LIST OTHER INFORMATION PERTINENT TO DESIGN OF PROJECT:

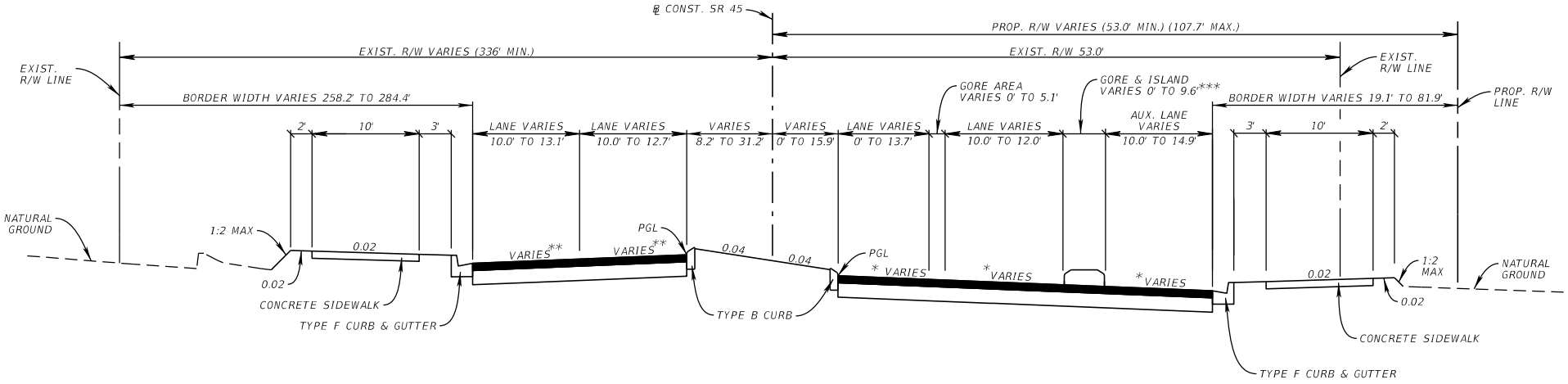
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID: 438137-1-52-01 | FEDERAL AID PROJECT NO.: N/A | COUNTY NAME: SARASOTA

SECTION NO.: 17020 | ROAD DESIGNATION: US 41 (SR 45) | LIMITS/MILEPOST: MP 18.491 TO MP 18.756

PROJECT DESCRIPTION: SR 45 (US 41) AT SR 789 (GULFSTREAM AVE.) INTERSECTION IMPROVEMENT – MULTI-LANE ROUNDABOUT

PROPOSED ROADWAY TYPICAL SECTION



DESIGN SPEED = 40 MPH

TYPICAL SECTION (SOUTH OF ROUNDABOUT)
SR 45 (US 41)
STA. 186+76.79 TO STA. 194+28.27 RT
STA. 189+84.53 TO STA. 194+28.27 LT

* CROSS SLOPE VARIES -2.0% TO 2.0%

** CROSS SLOPE VARIES 1.0% TO 2.9%

*** ISLAND FROM STA. 192+14.15 TO STA. 193+17.33

APPROVED BY: Gary J. Nadeau, P.E.	FDOT CONCURRENCE	FHWA CONCURRENCE
Engineer Of Record Signature and Date	Bernie A. Masing, P.E. FDOT District Design Engineer Date	N/A FHWA Transportation Engineer Date

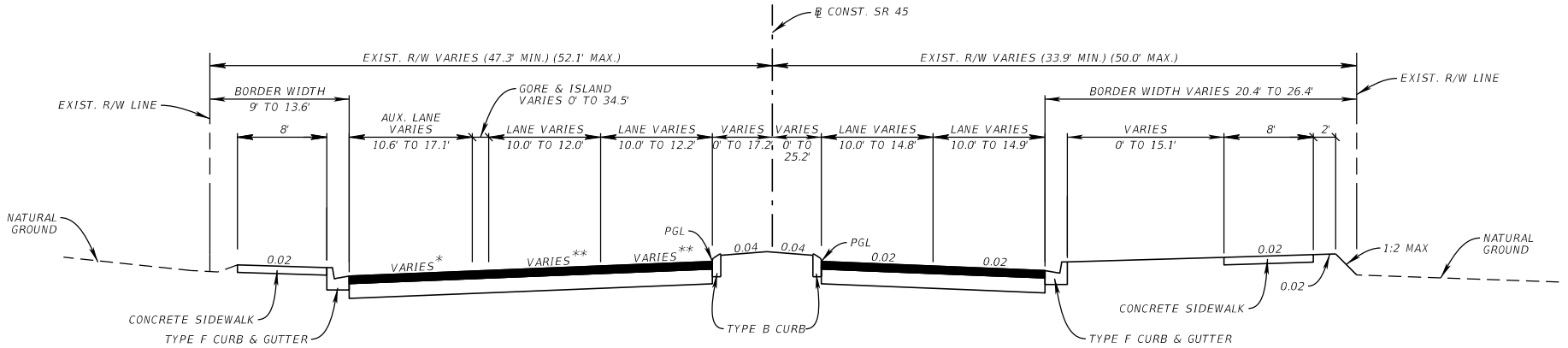
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID: 438137-1-52-01 | FEDERAL AID PROJECT NO.: N/A | COUNTY NAME: SARASOTA

SECTION NO.: 17020 | ROAD DESIGNATION: US 41 (SR 45) | LIMITS/MILEPOST: MP 18.491 TO MP 18.756

PROJECT DESCRIPTION: SR 45 (US 41) AT SR 789 (GULFSTREAM AVE.) INTERSECTION IMPROVEMENT – MULTI-LANE ROUNDABOUT

PROPOSED ROADWAY TYPICAL SECTION



DESIGN SPEED = 40 MPH

TYPICAL SECTION (NORTH OF ROUNDABOUT)
SR 45 (US 41)
STA. 194+28.27 TO STA. 201+10.25 RT
STA. 194+28.27 TO STA. 198+97.60 LT

* CROSS SLOPE VARIES 2.0% TO 4.5%

** CROSS SLOPE VARIES 2.0% TO 2.8%

APPROVED BY: Gary J. Nadeau, P.E.	FDOT CONCURRENCE	FHWA CONCURRENCE
Engineer Of Record Signature and Date	Bernie A. Masing, P.E. FDOT District Design Engineer Date	N/A FHWA Transportation Engineer Date

everett.loving 9/5/2017 10:42:34 AM K:\SAR_Roadway\149748001 - Gulfstream and US41 Round\43813713201\roadway\TYPDRD01.DGN

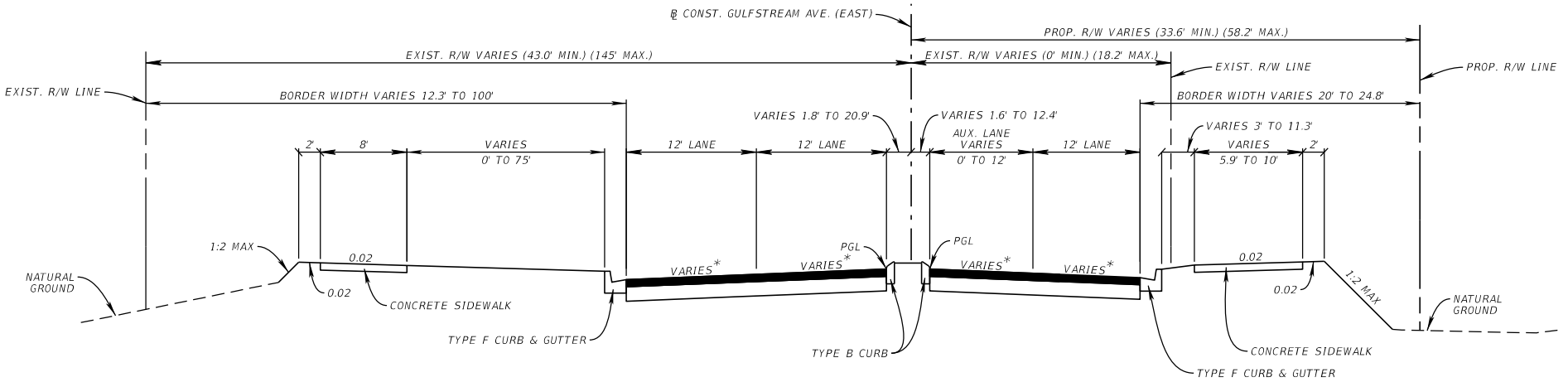
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID: 438137-1-52-01 | FEDERAL AID PROJECT NO.: N/A | COUNTY NAME: SARASOTA

SECTION NO.: 17030 | ROAD DESIGNATION: SR 789 (GULFSTREAM AVE.) | LIMITS/MILEPOST: MP 18.491 TO MP 18.756

PROJECT DESCRIPTION: SR 45 (US 41) AT SR 789 (GULFSTREAM AVE.) INTERSECTION IMPROVEMENT – MULTI-LANE ROUNDABOUT

PROPOSED ROADWAY TYPICAL SECTION



DESIGN SPEED = 30 MPH

TYPICAL SECTION (EAST OF ROUNDABOUT)
SR 789 (GULFSTREAM AVE.)
STA. 500+92.20 TO STA. 504+23.70 RT
STA. 500+98.64 TO STA. 504+23.70 LT

*CROSS SLOPE VARIES 1.0% TO 2.0%

APPROVED BY: Gary J. Nadeau, P.E.	FDOT CONCURRENCE	FHWA CONCURRENCE
Engineer Of Record Signature and Date	Bernie A. Masing, P.E. FDOT District Design Engineer Date	N/A FHWA Transportation Engineer Date

everett.loving 9/5/2017 10:42:34 AM K:\SAR_Roadway\149748001 - Gulfstream and US41 Round\43813713201\roadway\TYPDRD01.DGN

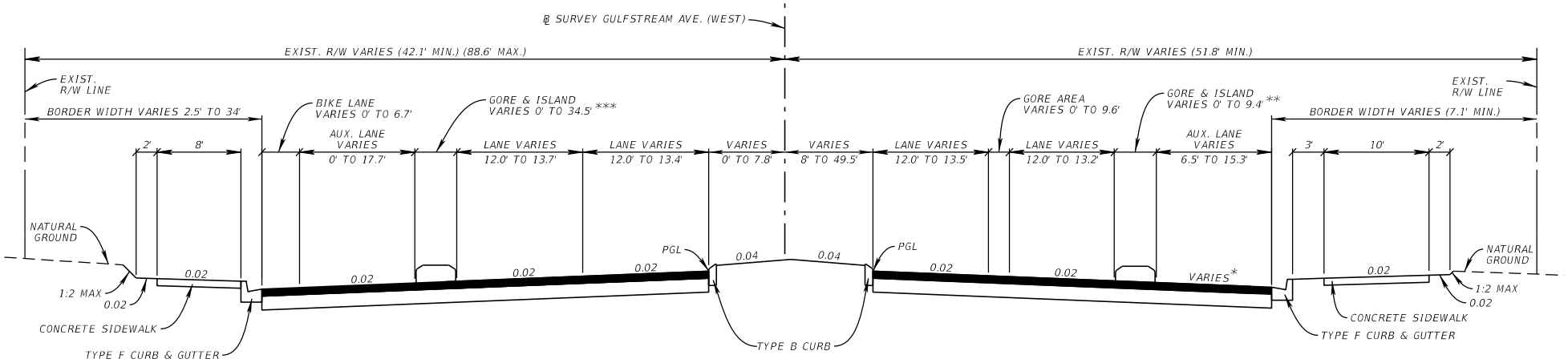
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID: 438137-1-52-01 | FEDERAL AID PROJECT NO.: N/A | COUNTY NAME: SARASOTA

SECTION NO.: 17030 | ROAD DESIGNATION: SR 789 (GULFSTREAM AVE.) | LIMITS/MILEPOST: MP 18.491 TO MP 18.756

PROJECT DESCRIPTION: SR 45 (US 41) AT SR 789 (GULFSTREAM AVE.) INTERSECTION IMPROVEMENT - MULTI-LANE ROUNDABOUT

PROPOSED ROADWAY TYPICAL SECTION



DESIGN SPEED = 40 MPH

TYPICAL SECTION (WEST OF ROUNDABOUT)
SR 789 (GULFSTREAM AVE.)
STA. 81+58.92 TO STA. 88+50.79 RT
STA. 79+79.07 TO STA. 88+67.84 LT

* CROSS SLOPE VARIES 2.5% TO 3.1%

** ISLAND FROM STA. 87+42.49 TO STA. 88+50.79

*** ISLAND FROM STA. 85+98.41 TO STA. 88+67.84

APPROVED BY: Gary J. Nadeau, P.E.	FDOT CONCURRENCE	FHWA CONCURRENCE
Engineer Of Record Signature and Date	Bernie A. Masing, P.E. FDOT District Design Engineer Date	N/A FHWA Transportation Engineer Date

everett.loving 9/5/2017 10:42:34 AM K:\SAR_Roadway\149748001 - Gulfstream and US41 Round\43813713201\roadway\TYPDRD01.DGN

Appendix B
Design Traffic and 18-KIP Information

Florida Department of Transportation

RICK SCOTT
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

JIM BOXOLD
SECRETARY

MEMORANDUM

Date: December 9, 2016

To: Walter Breuggeman, P.E. — EXT 2451
Project Management — MS 1-29

From: Kyle Purvis, GIS Coordinator/Traffic Analyst

Subject: Financial Project No: 438137-1-52-01
Roadway ID: 17020000
Project Name: US 41 at Gulfstream
County: Sarasota
Type of Work: Intersection Improvements
From MP: 18.559 to MP: 7.45

Per your request, the attached traffic data forecasts are provided for the above roadway. These estimates were taken from trends calculated from traffic counts provided by FDOT.

K	=	9.00 %
D	=	52.5%
24 hour T	=	3.10%
Design Hour T	=	1.55 %
2015 AADT	=	38500
Functional Class	=	URBAN PRIN ART OTHER

The attached 18-KIP Equivalent Single Axle Loading Accumulations are based on the above information, and have been prepared in accordance with the Central Offices memo of December 1, 2000, reflecting the current Equivalency Factors.

As requested, we have included the 24-hour traffic count for sites 175030, 175033, and 175031.

Please feel free to contact Kyle Purvis at extension 2395 if you have any questions.

District One – Traffic Operations
801 North Broadway Avenue * Post Office Box 1249 * Bartow, FL 33831-1249
(863) 519-2553 * (863) 534-0915 (Fax) * MS 1-8
www.dot.state.fl.us

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

FIN #: 438137-1-52-01
COUNTY: Sarasota
ROADWAYID: 17020000
PROJECT DESCRIPTION: Intersection Improvments

LOCATION #: 3

LOCATION DESCRIPTION: MP: 18.623 to MP: 20.307

GROWTH RATE FORMULA

A: Interpolation
B: Enter Growth Rate
C: Enter All AADTs
D: New Facility

If "A" select an interpolation function
If "B" enter rate as decimals (1%=1.01)
If ""C", or "D" continue to next section

Choose A, B, C, or D here: A

Linear Growth Rate X %
Compounded Growth Rate ____ %
Decaying Growth Rate ____ %
(select one)

DESIGN INFORMATION

		AADT
Existing Year	2015	38500
Opening Year	2019	N/A
Mid-Design Year	2029	N/A
Design Year	2039	43000

Note: AADT values have been rounded to the nearest 100

Daily Direction Split (50% or 100%): 50%
Lanes in One Direction: 2

T24 values

Existing to Opening Year	3.10%
Opening to Mid-Year	3.10%
Mid-Year to Design-Year	3.10%

2000 EQUIVALENCY FACTORS |u(1)|

(selected with an X)	FLEXIBLE PAVEMENT SN = 5/THICK		RIGID PAVEMENT SN = 12/THICK	
RURAL FREEWAY:	1.050	____	1.600	____
URBAN FREEWAY:	0.900	____	1.270	____
RURAL HIGHWAY:	0.960	____	1.350	____
URBAN HIGHWAY:	0.890	X	1.220	____
OTHER (Enter Factor and X):		____		____

(1) Equivalency Factors are based on Updated Pavement Damage Factors Memorandum, dated December 1, 2000.
Lane Factors developed by Copes equation

I have reviewed the 18 kip Equivalent Single Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by: Kyle Purvis — Name
Traffic Count Analyst — Title
FDOT — Org. Unit or Firm

12-9-16 — Date
Signature

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS - LOCATION 3

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

YEARS: *2015 to 2039*

SECTION #: 17020000 **COUNTY:** Sarasota **FIN #:** 438137-1-52-01

FLEXIBLE PAVEMENT URBAN HIGHWAY 0.890

SN=5/THICK Intersection Improvments A

YEAR	AADT	ESAL (1000S)	ACCUM (1000s)	D	T	LF	EF
2015	38500	146	0	0.5	3.10%	0.752	0.890
2016	38600	147	0	0.5	3.10%	0.752	0.890
2017	38800	147	0	0.5	3.10%	0.751	0.890
2018	39000	148	0	0.5	3.10%	0.751	0.890
2019	39200	149	149	0.5	3.10%	0.751	0.890
2020	39400	149	298	0.5	3.10%	0.750	0.890
2021	39600	150	448	0.5	3.10%	0.750	0.890
2022	39800	151	599	0.5	3.10%	0.749	0.890
2023	40000	151	750	0.5	3.10%	0.749	0.890
2024	40100	152	902	0.5	3.10%	0.749	0.890
2025	40300	152	1054	0.5	3.10%	0.748	0.890
2026	40500	153	1207	0.5	3.10%	0.748	0.890
2027	40700	154	1361	0.5	3.10%	0.748	0.890
2028	40900	154	1515	0.5	3.10%	0.747	0.890
2029	41100	155	1670	0.5	3.10%	0.747	0.890
2030	41300	156	1826	0.5	3.10%	0.746	0.890
2031	41500	156	1982	0.5	3.10%	0.746	0.890
2032	41600	157	2139	0.5	3.10%	0.746	0.890
2033	41800	157	2296	0.5	3.10%	0.745	0.890
2034	42000	158	2454	0.5	3.10%	0.745	0.890
2035	42200	159	2613	0.5	3.10%	0.745	0.890
2036	42400	159	2772	0.5	3.10%	0.744	0.890
2037	42600	160	2932	0.5	3.10%	0.744	0.890
2038	42800	161	3093	0.5	3.10%	0.743	0.890
2039	43000	161	3254	0.5	3.10%	0.743	0.890

Opening to Mid-Design Year ESAL Accumulation (1000s): 1521

Opening to Design Year ESAL Accumulation (1000s): 3105

I have reviewed the 18 kip Equivalent Single Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by: Kyle Purvis Traffic Count Analyst FDOT

Name Title Org. Unit or Firm

Signature 12-9-16

Date

County: 17
Station: 5030
Description: SR 45/US 41, NORTH OF SR 789/GULFSTREAM AVE
Start Date: 05/05/2016
Start Time: 0100

	Direction: N					Direction: S					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	70	56	46	31	203	39	45	34	20	138	341
0100	21	21	18	22	82	20	23	18	14	75	157
0200	19	24	24	22	89	15	12	5	10	42	131
0300	12	14	15	8	49	10	9	19	20	58	107
0400	15	24	24	25	88	22	27	35	42	126	214
0500	28	29	54	47	158	43	45	78	92	258	416
0600	53	74	88	110	325	112	187	272	323	894	1219
0700	136	207	244	222	809	290	354	381	443	1468	2277
0800	223	222	257	250	952	426	393	401	414	1634	2586
0900	254	249	255	257	1015	374	360	292	330	1356	2371
1000	281	266	253	264	1064	314	272	285	298	1169	2233
1100	317	267	261	270	1115	265	308	317	331	1221	2336
1200	286	290	300	347	1223	305	313	350	309	1277	2500
1300	339	315	361	375	1390	256	273	294	303	1126	2516
1400	338	351	363	351	1403	319	321	339	312	1291	2694
1500	362	419	469	405	1655	246	299	278	280	1103	2758
1600	421	475	414	466	1776	291	379	348	323	1341	3117
1700	473	478	452	430	1833	339	323	305	340	1307	3140
1800	317	339	342	295	1293	281	251	276	245	1053	2346
1900	317	230	215	192	954	217	191	230	187	825	1779
2000	255	209	211	229	904	162	154	130	141	587	1491
2100	184	205	220	195	804	102	153	172	173	600	1404
2200	177	159	156	116	608	237	114	130	74	555	1163
2300	143	102	83	73	401	105	83	45	45	278	679
24-Hour Totals:					20193					19782	39975

Peak Volume Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	830	1010	745	1663	745	2587
P.M.	1645	1869	1615	1389	1615	3217
Daily	1645	1869	745	1663	1615	3217

Generated by SPS 5.0.48P

County: 17
Station: 5030
Description: SR 45/US 41, NORTH OF SR 789/GULFSTREAM AVE
Start Date: 07/01/2015
Start Time: 0000

	Direction: N					Direction: S					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	54	51	44	35	184	39	59	41	20	159	343
0100	34	28	19	16	97	19	14	18	19	70	167
0200	12	7	8	10	37	16	18	10	15	59	96
0300	14	11	16	7	48	5	16	9	20	50	98
0400	8	11	14	35	68	19	17	31	37	104	172
0500	19	19	34	47	119	36	35	75	84	230	349
0600	52	61	109	110	332	98	166	209	300	773	1105
0700	130	162	199	226	717	268	362	445	483	1558	2275
0800	198	214	193	237	842	404	406	408	401	1619	2461
0900	198	230	236	207	871	282	318	318	297	1215	2086
1000	228	255	263	208	954	259	290	278	297	1124	2078
1100	273	281	274	218	1046	303	280	275	266	1124	2170
1200	303	274	286	330	1193	303	295	281	291	1170	2363
1300	278	273	289	305	1145	264	289	284	268	1105	2250
1400	255	293	297	299	1144	260	258	300	271	1089	2233
1500	339	371	353	360	1423	276	274	283	227	1060	2483
1600	389	376	396	361	1522	229	294	262	272	1057	2579
1700	447	459	407	319	1632	311	288	282	270	1151	2783
1800	306	256	228	190	980	215	231	210	176	832	1812
1900	206	223	186	173	788	178	168	172	181	699	1487
2000	160	175	166	195	696	155	133	129	107	524	1220
2100	188	184	186	135	693	136	106	155	119	516	1209
2200	157	152	124	107	540	108	74	96	90	368	908
2300	113	87	53	53	306	56	56	43	51	206	512
24-Hour Totals:					17377					17862	35239

Peak Volume Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	845	901	730	1738	730	2575
P.M.	1645	1674	1200	1170	1645	2827
Daily	1645	1674	730	1738	1645	2827
Truck Percentage	2.96		3.19		3.08	

Classification Summary Database

Dir	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TotTrk	TotVol
N	125	13771	2966	14	249	31	5	202	13	1	0	0	0	0	0	515	17377
S	116	14380	2796	8	232	97	16	193	23	0	0	0	1	0	0	570	17862

Generated by SPS 5.0.48P

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

FIN #: 438137-1-52-01
COUNTY: Sarasota
ROADWAYID: 17020000
PROJECT DESCRIPTION: Intersection Improvments

LOCATION #: 2

LOCATION DESCRIPTION: MP: 17.567 to MP: 18.623

GROWTH RATE FORMULA

A: Interpolation
B: Enter Growth Rate
C: Enter All AADTs
D: New Facility

If "A" select an interpolation function
If "B" enter rate as decimals (1%=1.01)
If ""C", or "D" continue to next section

Choose A, B, C, or D here: A

Linear Growth Rate X %
Compounded Growth Rate ____ %
Decaying Growth Rate ____ %
(select one)

DESIGN INFORMATION

		AADT
Existing Year	2015	34500
Opening Year	2019	N/A
Mid-Design Year	2029	N/A
Design Year	2039	35400

Note: AADT values have been rounded to the nearest 100

Daily Direction Split (50% or 100%)	50%
Lanes in One Direction	2
T24 values	
Existing to Opening Year	3.00%
Opening to Mid-Year	3.00%
Mid-Year to Design-Year	3.00%

2000 EQUIVALENCY FACTORS |u(1)|

(selected with an X)	FLEXIBLE PAVEMENT SN = 5/THICK		RIGID PAVEMENT SN = 12/THICK	
RURAL FREEWAY:	1.050	___	1.600	___
URBAN FREEWAY:	0.900	___	1.270	___
RURAL HIGHWAY:	0.960	___	1.350	___
URBAN HIGHWAY:	0.890	X	1.220	___
OTHER (Enter Factor and X):		___		___

(1) Equivalency Factors are based on Updated Pavement Damage Factors Memorandum, dated December 1, 2000.
Lane Factors developed by Copes equation

I have reviewed the 18 kip Equivalent Single Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by: Kyle Purvis — Traffic Count Analyst — FDOT
Name — Title — Org. Unit or Firm

Signature — 12-9-16 Date

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS - LOCATION 2

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

YEARS: *2015 to 2039*

SECTION #: 17020000 **COUNTY:** Sarasota **FIN #:** 438137-1-52-01

FLEXIBLE PAVEMENT URBAN HIGHWAY 0.890

SN=5/THICK Intersection Improvments A

YEAR	AADT	ESAL (1000S)	ACCUM (1000s)	D	T	LF	EF
2015	34500	128	0	0.5	3.00%	0.761	0.890
2016	34500	128	0	0.5	3.00%	0.761	0.890
2017	34500	128	0	0.5	3.00%	0.761	0.890
2018	34600	129	0	0.5	3.00%	0.761	0.890
2019	34600	129	129	0.5	3.00%	0.761	0.890
2020	34600	129	258	0.5	3.00%	0.761	0.890
2021	34700	129	387	0.5	3.00%	0.761	0.890
2022	34700	129	516	0.5	3.00%	0.761	0.890
2023	34800	129	645	0.5	3.00%	0.760	0.890
2024	34800	129	774	0.5	3.00%	0.760	0.890
2025	34800	129	903	0.5	3.00%	0.760	0.890
2026	34900	130	1033	0.5	3.00%	0.760	0.890
2027	34900	130	1163	0.5	3.00%	0.760	0.890
2028	34900	130	1293	0.5	3.00%	0.760	0.890
2029	35000	130	1423	0.5	3.00%	0.760	0.890
2030	35000	130	1553	0.5	3.00%	0.760	0.890
2031	35100	130	1683	0.5	3.00%	0.760	0.890
2032	35100	130	1813	0.5	3.00%	0.760	0.890
2033	35100	130	1943	0.5	3.00%	0.760	0.890
2034	35200	131	2074	0.5	3.00%	0.760	0.890
2035	35200	131	2205	0.5	3.00%	0.760	0.890
2036	35200	131	2336	0.5	3.00%	0.760	0.890
2037	35300	131	2467	0.5	3.00%	0.759	0.890
2038	35300	131	2598	0.5	3.00%	0.759	0.890
2039	35400	131	2729	0.5	3.00%	0.759	0.890

Opening to Mid-Design Year ESAL Accumulation (1000s): 1294

Opening to Design Year ESAL Accumulation (1000s): 2600

I have reviewed the 18 kip Equivalent Single Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by: Kyle Purvis Traffic Count Analyst FDOT

Name Title Org. Unit or Firm

Kyle Purvis 12-9-16

Signature Date

County: 17
Station: 5033
Description: SR 45/US 41, W OF PALM AVE - SARASOTA
Start Date: 05/03/2016
Start Time: 1700

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	36	26	24	26	112	21	16	16	11	64	176
0100	19	10	13	12	54	19	9	13	16	57	111
0200	17	13	6	7	43	7	8	8	7	30	73
0300	4	7	16	16	43	8	8	13	7	36	79
0400	8	22	18	35	83	14	11	33	19	77	160
0500	28	21	42	66	157	27	25	45	42	139	296
0600	68	98	153	169	488	69	121	122	131	443	931
0700	207	236	295	279	1017	195	239	274	261	969	1986
0800	308	279	215	261	1063	306	290	305	333	1234	2297
0900	246	248	216	232	942	239	306	261	224	1030	1972
1000	222	190	185	227	824	208	190	181	163	742	1566
1100	163	169	180	148	660	199	186	172	213	770	1430
1200	178	188	313	213	892	190	185	208	183	766	1658
1300	191	280	224	239	934	179	191	208	235	813	1747
1400	278	259	269	272	1078	206	278	224	223	931	2009
1500	302	253	285	260	1100	272	280	270	302	1124	2224
1600	294	274	276	312	1156	327	273	285	354	1239	2395
1700	328	397	339	272	1336	340	373	327	279	1319	2655
1800	263	290	251	240	1044	266	292	203	243	1004	2048
1900	198	174	200	224	796	177	213	193	183	766	1562
2000	153	195	172	152	672	161	144	145	155	605	1277
2100	171	150	134	114	569	115	109	117	105	446	1015
2200	154	131	98	69	452	101	78	63	46	288	740
2300	74	58	47	43	222	51	51	53	34	189	411
24-Hour Totals:					15737					15081	30818

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	730	1161	800	1234	800	2297
P.M.	1645	1376	1645	1394	1645	2770
Daily	1645	1376	1645	1394	1645	2770

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County: 17
Station: 5033
Description: SR 45/US 41, W OF PALM AVE - SARASOTA
Start Date: 06/03/2015
Start Time: 2200

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	53	43	29	25	150	26	17	21	23	87	237
0100	27	19	14	9	69	21	11	14	13	59	128
0200	14	9	7	17	47	10	19	20	14	63	110
0300	3	11	9	9	32	8	8	17	7	40	72
0400	16	12	16	22	66	12	11	19	29	71	137
0500	16	32	43	61	152	27	28	37	49	141	293
0600	60	75	150	149	434	70	105	115	148	438	872
0700	158	208	242	265	873	162	201	254	305	922	1795
0800	241	220	229	255	945	298	275	314	309	1196	2141
0900	214	240	206	239	899	275	201	257	265	998	1897
1000	266	244	217	248	975	250	243	237	292	1022	1997
1100	229	253	291	296	1069	272	233	260	278	1043	2112
1200	275	277	276	274	1102	244	276	297	285	1102	2204
1300	280	292	282	266	1120	243	261	246	260	1010	2130
1400	322	303	291	299	1215	251	245	263	249	1008	2223
1500	307	294	361	308	1270	333	307	292	312	1244	2514
1600	304	353	327	276	1260	328	290	245	316	1179	2439
1700	385	363	329	269	1346	335	358	301	269	1263	2609
1800	261	262	275	215	1013	262	264	266	233	1025	2038
1900	158	151	133	196	638	220	201	222	186	829	1467
2000	180	180	193	188	741	169	160	145	134	608	1349
2100	242	210	187	149	788	147	125	119	114	505	1293
2200	173	108	109	76	466	103	96	69	56	324	790
2300	97	87	48	44	276	50	51	47	46	194	470
24-Hour Totals:					16946					16371	33317

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	730	968	800	1196	745	2147
P.M.	1645	1353	1645	1310	1645	2663
Daily	1645	1353	1645	1310	1645	2663
Truck Percentage	2.76		3.00		2.88	

Classification Summary Database

Dir	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TotTrk	TotVol
E	120	13418	2940	3	216	16	1	211	21	0	0	0	0	0	0	468	16946
W	116	12674	3090	2	239	44	1	186	17	0	1	0	1	0	0	491	16371

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18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

FIN #: 438137-1-52-01
COUNTY: Sarasota
ROADWAYID: 17030000
PROJECT DESCRIPTION: Intersection Improvments

LOCATION #: 1

LOCATION DESCRIPTION: MP: 0.000 to MP: 0.194

GROWTH RATE FORMULA

A: Interpolation
B: Enter Growth Rate
C: Enter All AADTs
D: New Facility

If "A" select an interpolation function
If "B" enter rate as decimals (1%=1.01)
If ""C", or "D" continue to next section

Choose A, B, C, or D here: A

Linear Growth Rate X %
Compounded Growth Rate ____ %
Decaying Growth Rate ____ %
(select one)

DESIGN INFORMATION

		AADT
Existing Year	2015	36000
Opening Year	2019	N/A
Mid-Design Year	2029	N/A
Design Year	2039	37000

Note: AADT values have been rounded to the nearest 100

Daily Direction Split (50% or 100%): 50%
Lanes in One Direction: 2

T24 values
Existing to Opening Year: 4.10%
Opening to Mid-Year: 4.10%
Mid-Year to Design-Year: 4.10%

2000 EQUIVALENCY FACTORS |u(1)|

(selected with an X)	FLEXIBLE PAVEMENT SN = 5/THICK		RIGID PAVEMENT SN = 12/THICK	
RURAL FREEWAY:	1.050	___	1.600	___
URBAN FREEWAY:	0.900	___	1.270	___
RURAL HIGHWAY:	0.960	___	1.350	___
URBAN HIGHWAY:	0.890	X	1.220	___
OTHER (Enter Factor and X):		___		___

(1) Equivalency Factors are based on Updated Pavement Damage Factors Memorandum, dated December 1, 2000.
Lane Factors developed by Copes equation

I have reviewed the 18 kip Equivalent Single Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by: Kyle Purvis — Traffic Count Analyst — FDOT
Name — Title — Org. Unit or Firm

Signature — 12-9-16 Date

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS - LOCATION 1

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

YEARS: *2015 to 2039*

SECTION #: 17030000 **COUNTY:** Sarasota **FIN #:** 438137-1-52-01

FLEXIBLE PAVEMENT URBAN HIGHWAY 0.890

SN=5/THICK Intersection Improvments A

YEAR	AADT	ESAL (1000S)	ACCUM (1000s)	D	T	LF	EF
2015	36000	182	0	0.5	4.10%	0.758	0.890
2016	36000	182	0	0.5	4.10%	0.758	0.890
2017	36000	182	0	0.5	4.10%	0.758	0.890
2018	36100	183	0	0.5	4.10%	0.757	0.890
2019	36100	183	183	0.5	4.10%	0.757	0.890
2020	36200	183	366	0.5	4.10%	0.757	0.890
2021	36200	183	549	0.5	4.10%	0.757	0.890
2022	36200	183	732	0.5	4.10%	0.757	0.890
2023	36300	183	915	0.5	4.10%	0.757	0.890
2024	36300	183	1098	0.5	4.10%	0.757	0.890
2025	36400	184	1282	0.5	4.10%	0.757	0.890
2026	36400	184	1466	0.5	4.10%	0.757	0.890
2027	36500	184	1650	0.5	4.10%	0.757	0.890
2028	36500	184	1834	0.5	4.10%	0.757	0.890
2029	36500	184	2018	0.5	4.10%	0.757	0.890
2030	36600	185	2203	0.5	4.10%	0.756	0.890
2031	36600	185	2388	0.5	4.10%	0.756	0.890
2032	36700	185	2573	0.5	4.10%	0.756	0.890
2033	36700	185	2758	0.5	4.10%	0.756	0.890
2034	36700	185	2943	0.5	4.10%	0.756	0.890
2035	36800	186	3129	0.5	4.10%	0.756	0.890
2036	36800	186	3315	0.5	4.10%	0.756	0.890
2037	36900	186	3501	0.5	4.10%	0.756	0.890
2038	36900	186	3687	0.5	4.10%	0.756	0.890
2039	37000	187	3874	0.5	4.10%	0.755	0.890

Opening to Mid-Design Year ESAL Accumulation (1000s): 1835

Opening to Design Year ESAL Accumulation (1000s): 3691

I have reviewed the 18 kip Equivalent Single Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by: Kyle Purvis Traffic Count Analyst FDOT

Name Title Org. Unit or Firm

Kyle Purvis 12-9-16

Signature Date

County: 17
Station: 5031
Description: SR 789/GULFSTREAM AVE, WEST OF SR 45/US 41
Start Date: 05/24/2016
Start Time: 0000

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	40	23	12	7	82	13	11	12	4	40	122
0100	13	4	9	9	35	9	5	5	9	28	63
0200	6	10	5	5	26	7	4	6	5	22	48
0300	5	3	2	3	13	1	14	18	11	44	57
0400	9	8	11	10	38	12	19	54	27	112	150
0500	15	8	18	23	64	17	37	44	77	175	239
0600	35	42	63	73	213	77	129	165	218	589	802
0700	113	144	150	152	559	270	291	432	505	1498	2057
0800	175	192	235	229	831	444	438	503	614	1999	2830
0900	195	242	266	269	972	443	449	541	452	1885	2857
1000	238	290	269	311	1108	432	430	437	355	1654	2762
1100	336	296	301	307	1240	393	398	430	446	1667	2907
1200	340	338	326	299	1303	334	337	311	311	1293	2596
1300	333	323	379	358	1393	212	207	185	211	815	2208
1400	362	356	382	413	1513	227	219	240	199	885	2398
1500	410	385	372	392	1559	182	212	231	230	855	2414
1600	376	398	371	319	1464	198	239	187	225	849	2313
1700	414	508	341	295	1558	206	207	223	197	833	2391
1800	251	278	197	228	954	182	148	192	174	696	1650
1900	189	189	202	136	716	151	185	182	165	683	1399
2000	174	216	239	189	818	151	164	142	125	582	1400
2100	168	195	174	124	661	107	122	87	114	430	1091
2200	129	107	114	93	443	77	66	69	43	255	698
2300	109	69	49	47	274	27	43	37	20	127	401
24-Hour Totals:					17837					18016	35853

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	845	932	845	2047	845	2979
P.M.	1630	1612	1200	1293	1200	2596
Daily	1630	1612	845	2047	845	2979

Generated by SPS 5.0.48P

County: 17
Station: 5031
Description: SR 789/GULFSTREAM AVE, WEST OF SR 45/US 41
Start Date: 06/02/2015
Start Time: 2200

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	29	24	26	11	90	10	29	10	12	61	151
0100	7	14	11	9	41	7	6	5	4	22	63
0200	5	9	4	8	26	4	9	7	6	26	52
0300	4	11	10	7	32	5	9	10	3	27	59
0400	4	9	10	12	35	7	7	22	13	49	84
0500	10	12	24	22	68	16	21	38	66	141	209
0600	44	48	51	64	207	58	107	126	199	490	697
0700	85	106	116	153	460	198	258	349	377	1182	1642
0800	166	190	204	209	769	357	334	372	402	1465	2234
0900	209	231	236	240	916	324	306	311	388	1329	2245
1000	219	247	260	251	977	320	305	258	308	1191	2168
1100	255	269	297	273	1094	325	296	335	368	1324	2418
1200	241	357	320	335	1253	322	318	335	299	1274	2527
1300	321	311	392	331	1355	294	278	260	313	1145	2500
1400	337	360	341	345	1383	253	258	307	296	1114	2497
1500	382	365	446	395	1588	272	285	256	303	1116	2704
1600	450	411	424	375	1660	280	297	295	299	1171	2831
1700	371	435	296	243	1345	272	270	289	296	1127	2472
1800	317	254	202	217	990	214	229	208	215	866	1856
1900	241	203	166	148	758	205	199	225	165	794	1552
2000	181	190	211	220	802	169	130	150	136	585	1387
2100	235	194	172	141	742	127	101	114	79	421	1163
2200	114	89	95	81	379	73	79	55	33	240	619
2300	87	63	56	30	236	28	34	22	28	112	348
24-Hour Totals:					17206					17272	34478

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	845	885	800	1465	830	2257
P.M.	1530	1702	1200	1274	1545	2855
Daily	1530	1702	800	1465	1545	2855

Truck Percentage 4.15 4.32 4.23

Classification Summary Database

Dir	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TotTrk	TotVol
E	126	13355	3011	9	326	79	5	279	16	0	0	0	0	0	0	714	17206
W	116	13134	3276	6	370	60	9	277	22	0	0	0	2	0	0	746	17272

Generated by SPS 5.0.48P

TRAFFIC PROJECTION FROM FSUTMS	ESAL LOCATION NUMBER 1	ESAL LOCATION NUMBER 2	ESAL LOCATION NUMBER 3
FM Number:	438137-1-52-01	438137-1-52-01	438137-1-52-01
Road name/number:	SR 789/17030000	US 41/17020000	US 41/17020000
Project Beg MP		18.559	18.559
Project End MP		18.745	18.745
TRAFFIC COUNT LOCATION NUMBER	175031	175033	175030
LOCATION DESCRIPTION: FROM	0	17.567	18.623
LOCATION DESCRIPTION: TO	0.194	18.623	20.307
CURRENT YEAR	2015	2015	2015
CURRENT AADT	36000	34500	38500
OPENING YEAR	2019	2019	2019
DESIGN YEAR	2039	2039	2039
MODEL YEAR	2040	2040	2040
PSWADT	47641	36776	30578
MOCF	0.9	0.9	0.9
MODEL AADT (PSWADT X MOCF)	42877	33098	27520
MODEL AADT minus CURRENT AADT	6877	-1402	-10980
# YEARS FROM CURRENT TO MODEL YEAR	25	25	25
ANNUAL GROWTH FROM CURRENT TO MODEL YEAR	275	-56	-439
# YEARS FROM CURRENT TO DESIGN YEAR	24	24	24
DESIGN YEAR AADT (MODEL)	**42602**	**33154**	**27959**
DESIGN YEAR AADT (TRENDS)	36900	35400	43000
MODEL/TRENDS AVG. DESIGN AADT	39751	34277	35480
K	9	9	9
D	52.3	52.5	52.5
T	4.1	3	3.1
Functional Classification	URBAN MINOR ART	URBAN PRIN ART OTHER	URBAN PRIN ART OTHER
Flexible Pavement			
Opening to Mid-Design Year ESAL Accumulation (1000s)	1835	1294	1521
Opening to Design Year ESAL Accumulation (1000s)	3691	2600	3105
Rigid Pavement			
Opening to Mid-Design Year ESAL Accumulation (1000s)			
Opening to Design Year ESAL Accumulation (1000s)			

Appendix C
Resilient Modulus Information

TABLE 5.3 - Example Design Table (From Appendix A, Table A.4A)

REQUIRED STRUCTURAL NUMBER (SN_R)
90% RELIABILITY (%R)
RESILIENT MODULUS (M_R) RANGE 4,000 PSI TO 18,000 PSI

RESILIENT MODULUS (M_R), (PSI x 1000)

$ESAL_D$	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
100 000	3.02	2.77	2.59	2.44	2.31	2.21	2.12	2.04	1.97	1.91	1.86	1.81	1.76	1.72	1.68
150 000	3.23	2.97	2.77	2.61	2.47	2.36	2.27	2.19	2.11	2.05	1.99	1.94	1.89	1.84	1.80
200 000	3.39	3.11	2.90	2.73	2.60	2.48	2.38	2.30	2.22	2.15	2.09	2.03	1.98	1.94	1.89
250 000	3.52	3.23	3.01	2.84	2.69	2.57	2.47	2.38	2.30	2.23	2.17	2.11	2.06	2.01	1.97
300 000	3.62	3.33	3.10	2.92	2.78	2.65	2.55	2.46	2.37	2.30	2.24	2.18	2.12	2.07	2.03
350 000	3.71	3.41	3.18	3.00	2.85	2.72	2.61	2.52	2.44	2.36	2.30	2.23	2.18	2.13	2.08
400 000	3.79	3.49	3.25	3.07	2.91	2.78	2.67	2.58	2.49	2.42	2.35	2.29	2.23	2.18	2.13
450 000	3.87	3.56	3.32	3.13	2.97	2.84	2.73	2.63	2.54	2.46	2.39	2.33	2.27	2.22	2.17
500 000	3.93	3.62	3.38	3.18	3.02	2.89	2.77	2.67	2.59	2.51	2.44	2.37	2.31	2.26	2.21
600 000	4.05	3.73	3.48	3.28	3.12	2.98	2.86	2.76	2.67	2.58	2.51	2.45	2.39	2.33	2.28
700 000	4.14	3.82	3.57	3.36	3.20	3.05	2.93	2.83	2.73	2.65	2.58	2.51	2.45	2.39	2.34
800 000	4.23	3.90	3.64	3.44	3.27	3.12	3.00	2.89	2.80	2.71	2.63	2.57	2.50	2.44	2.39
900 000	4.31	3.97	3.71	3.51	3.33	3.18	3.06	2.95	2.85	2.76	2.69	2.62	2.55	2.49	2.44
1 000 000	4.38	4.04	3.78	3.57	3.39	3.24	3.11	3.00	2.90	2.81	2.73	2.66	2.60	2.54	2.48
1 500 000	4.65	4.30	4.03	3.81	3.62	3.46	3.33	3.21	3.10	3.01	2.92	2.85	2.78	2.71	2.65
2 000 000	4.85	4.50	4.21	3.99	3.79	3.63	3.49	3.36	3.25	3.16	3.07	2.99	2.91	2.85	2.78
2 500 000	5.01	4.65	4.36	4.13	3.93	3.76	3.62	3.49	3.38	3.27	3.18	3.10	3.02	2.95	2.89
3 000 000	5.14	4.77	4.48	4.25	4.05	3.88	3.73	3.60	3.48	3.37	3.28	3.19	3.12	3.04	2.98
3 500 000	5.25	4.88	4.59	4.35	4.14	3.97	3.82	3.69	3.57	3.46	3.36	3.28	3.20	3.12	3.06
4 000 000	5.35	4.98	4.68	4.44	4.23	4.06	3.90	3.77	3.65	3.54	3.44	3.35	3.27	3.19	3.12
4 500 000	5.44	5.06	4.76	4.52	4.31	4.13	3.98	3.84	3.72	3.61	3.51	3.42	3.33	3.26	3.19
5 000 000	5.52	5.14	4.83	4.59	4.38	4.20	4.04	3.90	3.78	3.67	3.57	3.47	3.39	3.31	3.24
6 000 000	5.66	5.27	4.96	4.71	4.50	4.32	4.16	4.02	3.89	3.78	3.67	3.58	3.49	3.41	3.34
7 000 000	5.78	5.38	5.07	4.82	4.61	4.42	4.26	4.12	3.99	3.87	3.77	3.67	3.58	3.50	3.43
8 000 000	5.88	5.48	5.17	4.91	4.70	4.51	4.35	4.20	4.07	3.95	3.85	3.75	3.66	3.58	3.50
9 000 000	5.97	5.57	5.26	5.00	4.78	4.59	4.43	4.28	4.15	4.03	3.92	3.82	3.73	3.65	3.57
10 000 000	6.06	5.65	5.33	5.07	4.85	4.66	4.50	4.35	4.22	4.10	3.99	3.89	3.79	3.71	3.63
15 000 000	6.39	5.97	5.64	5.37	5.14	4.95	4.77	4.62	4.48	4.36	4.25	4.14	4.05	3.96	3.88
20 000 000	6.63	6.20	5.86	5.59	5.35	5.15	4.98	4.82	4.68	4.55	4.44	4.33	4.23	4.14	4.06
25 000 000	6.82	6.38	6.04	5.76	5.52	5.32	5.14	4.98	4.84	4.71	4.59	4.48	4.38	4.29	4.20
30 000 000	6.98	6.53	6.18	5.90	5.66	5.45	5.27	5.11	4.96	4.83	4.71	4.60	4.50	4.41	4.32
35 000 000	7.12	6.66	6.31	6.02	5.78	5.57	5.38	5.22	5.07	4.94	4.82	4.71	4.61	4.51	4.42
40 000 000	7.24	6.78	6.42	6.13	5.88	5.67	5.48	5.32	5.17	5.04	4.91	4.80	4.70	4.60	4.51
45 000 000	7.34	6.88	6.52	6.22	5.97	5.76	5.57	5.41	5.26	5.12	5.00	4.88	4.78	4.68	4.59
50 000 000	7.44	6.97	6.61	6.31	6.06	5.84	5.65	5.49	5.34	5.20	5.07	4.96	4.85	4.76	4.66
60 000 000	7.61	7.13	6.76	6.46	6.21	5.99	5.79	5.62	5.47	5.33	5.21	5.09	4.98	4.88	4.79
70 000 000	7.76	7.27	6.90	6.59	6.33	6.11	5.91	5.74	5.59	5.45	5.32	5.20	5.09	4.99	4.90
80 000 000	7.88	7.40	7.01	6.70	6.44	6.22	6.02	5.85	5.69	5.55	5.42	5.30	5.19	5.09	4.99
90 000 000	8.00	7.51	7.12	6.80	6.54	6.31	6.11	5.94	5.78	5.64	5.51	5.39	5.28	5.17	5.08
100 000 000	8.10	7.60	7.21	6.90	6.63	6.40	6.20	6.02	5.86	5.72	5.59	5.47	5.35	5.25	5.15

Step 1 (4.44 - 4.24) / 1000 = 0.0021

Step 2 0.0021 * 200 = 0.042

Step 3 4.44 - 0.042 = 4.398 round-up SN = 4.40

Florida Department of Transportation
RICK SCOTT
GOVERNOR
605 Suwannee Street
Tallahassee, FL 32399-0450
MIKE DEW
SECRETARY

MEMORANDUM

DATE: September 13, 2017

TO: Teresa Puckett, District Geotechnical Materials Engineer

FROM: David Horhota, State Geotechnical Materials Engineer

SUBJECT: Embankment Resilient Modulus Pavement Design
District 1, Sarasota County
FPN 438137-1: US-41 at Gulfstream

Three (3), 2-bag samples were received by the State Materials Office (SMO) for determination of an embankment (roadbed) resilient modulus for pavement design. After visual observation of the three samples, it was determined that the material from each 2-bag sample looked visually similar and the material from each of the bags were combined to form one sample from each location. After combining materials from the bags, samples from each location were obtained for classification tests (Atterberg limits, particle size analysis, and organic content), Proctor density, and resilient modulus. The classification test results are reported in Tables 1 and 2. Information provided for this project by Tierra, Inc. indicated all samples were collected from between 0.0 and 2.0 feet in depth.

Table 1. Summary of Initial Soil Gradation Results

Sample ID	Passing 3/4" (%)	Passing 1/2" (%)	Passing 3/8" (%)	Passing No. 4 (%)	Passing No. 10 (%)	Passing No. 40 (%)	Passing No. 60 (%)	Passing No. 100 (%)	Passing No. 200 (%)
SH-97R	100.0	92.9	86.9	81.3	73.1	59.4	51.8	39.0	7.3
SH-93	100.0	100.0	100.0	99.9	99.8	82.1	48.5	23.3	5.8
SH-85L	98.8	96.9	95.0	91.3	87.8	73.4	56.1	40.3	5.8

Table 2. Summary of Soil Classification and Organic Content Results

Sample ID	Easting	Northing	Soil Class.	Organic Content (%)	LL/PI
SH-97R	347034	3024478	A-3	1.0	N.P.
SH-93	347004	3024589	A-3	1.8	N.P.
SH-85L	346848	3024594	A-3	1.0	N.P.

In addition to the classification testing, the following test program was conducted:

(1) Standard Proctor, AASHTO T 99
(2) Resilient Modulus (M_R), AASHTO T 307.

A summary of laboratory test results is included in Table 3. The resilient modulus values listed in this table were obtained using the relationship developed from each individual test (resilient modulus versus bulk stress - with bulk stress, **Θ,** defined as $\Theta = \sigma_1 + \sigma_2 + \sigma_3$), and using a bulk stress of 11 psi, which is the recommendation from Dr. Ping's research work in modeling the embankment in-situ stresses for Florida pavement conditions. Two results are listed for each location because two samples were prepared for each location and they represent the individual test result from each sample tested. The resilient modulus samples were compacted to within 1 pound per cubic foot (pcf) of the maximum density and 0.5 percent of the optimum moisture content as determined by AASHTO T99.

Table 3. Summary of T-99 and M_R Test Results

Sample ID	Passing No. 200 (%)	Standard Proctor Density (pcf)	Optimum Moisture Content (%)	Resilient Modulus @ Θ=11psi (psi)	Average Resilient Modulus (psi)
SH-97R	7	118.8	10.5	14,028	14,433
				14,839	
SH-93	6	112.4	11.3	15,688	15,149
				14,610	
SH-85L	6	113.4	11.2	14,238	14,880
				15,523	

For this set of samples, the minimum number of samples called for in the Soils and Foundations Handbook were not satisfied. This resulted in an inability to perform a true 90% method of analysis due to a lack of the required number of test values.

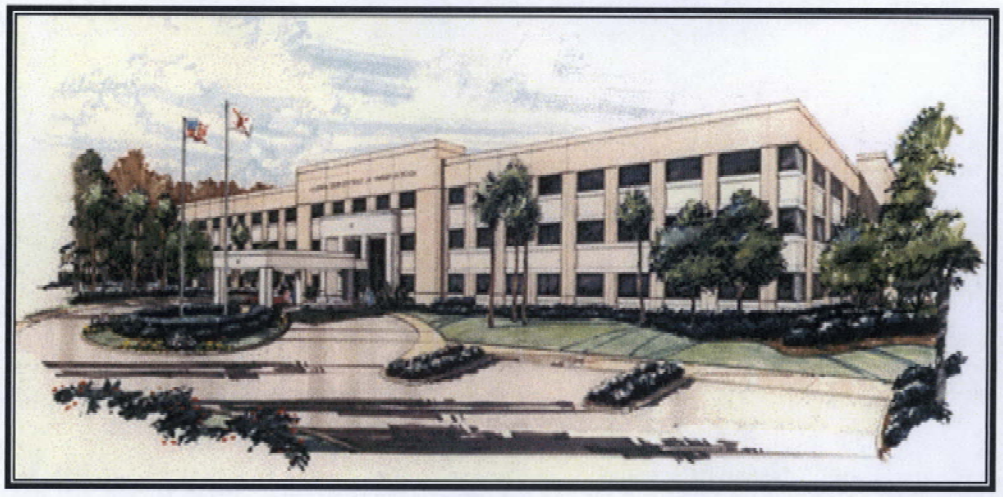
For those reasons, it is recommended that the lowest average resilient modulus be used for the design. Based on the results for sample SH-97R, a design **M_R of 14,400 psi** would be recommended for this project.

Appendix D
Design Calculations

Appendix E

Approved Pavement Design

SR 45 FPID: 431311-1-52-01



DISTRICT ONE DESIGN

PAVEMENT DESIGN

FOR

431311-1-52-01

Sarasota

SR 45

17.208 to 19.236

Christopher Zeigler
Project Manager

FLEXIBLE PAVEMENT DESIGN
QUALITY CONTROL CHECKLIST

State Proj. No. 431311-1-52-01 Federal Aid No. NA
FP ID No. NA County SARASOTA

Flexible Pavement Design Review	Satisfactory Yes/No/NA
Pavement Design Summary Sheet.	YES
Project Location and Description	YES
Traffic Data and $ESAL_D$ Calculations	YES
Resilient Modulus (M_R)	YES
Required Structural Number (SN_R) Calculations. . .	YES
Calculated Structural Number (SN_C) Calculations. .	YES
Base Material Selection.	NA
Friction Course Selection.	YES
Stabilized Subgrade Evaluation	NA
Shoulder Design.	YES
Coordination with Other Offices.	YES
Other Special Details.	NA
Final Pavement Design Drawing or Narrative	YES
Rehabilitation	
Field Evaluation of Project.	YES
Pavement Coring and Evaluation	YES
Distress Evaluation.	NA

Existing Cross-Slope and Correction method . . . . YES

Milling Depth and Purpose. . . . . YES

Overlay Structural Number (SN_0) Calculations . . . YES

Leveling/Overbuild Recommendation. . . . . NA

Composition Report . . . . . NA

Projects That Do Not Require Design Calculations

Existing Pavement Evaluation . . . . . NA

Existing Cross-Slope and Correction method . . . . NA

Asphalt Thickness. . . . . NA

Base Type and Thickness. . . . . NA

Future Milling Considerations. . . . . NA

Structural Evaluation. . . . . NA

Plans Review

Plans Conform to Pavement Design . . . . . YES

Cross-Slope correction addressed . . . . . NA

Design Details Adequately Covered. . . . . YES

Standard Indexes Properly Referenced . . . . . NA

Project is Constructable with Current Technology. YES

Comments

QA by MARLENE HEBERT Date 10-22-13

FLEXIBLE PAVEMENT DESIGN
QUALITY CONTROL CHECKLIST

Financial Project ID: 431311-1 Federal Aid No.: NA

WPI No.: NA County: Sarasota

Ref. No.	Flexible Pavement Design Review	Satisfactory Yes/No	
1.	Pavement Design Summary Sheet	X	
2.	Project Location and Description	X	
3.	Traffic Data and ESALD Calculations	X	
4.	Resilient Modulus (MR)	X	
5.	Required Structural Number (SNR) Calculations	X	
6.	Calculated Structural Number (SNC) Calculations	X	
7.	Base Material Selection	N/A	
8.	Friction Course Selection	X	
9.	Stabilized Subgrade Evaluation.	N/A	
10.	Shoulder Design	N/A	
11.	Coordination with Other Offices	X	
12.	Other Special Details	N/A	
13.	Final Pavement Design Drawing or Narrative.	X	
	Rehabilitation		
14.	Field Evaluation of Project	X	
15.	Pavement Coring and Evaluation.	X	
16.	Distress Evaluation	X	
17.	Existing Cross-Slope and Correction Method.	X	
18.	Milling Depth and Purpose	X	
19.	Overlay Structural Number (SNO) Calculations	X	
20.	Leveling/Overbuild Recommendation	N/A	
21.	Composition Report.	X	M&R to exceed 5000 TN criteria Report to be prepared by FDOT
	Projects That Do Not Require Design Calculations		
22.	Existing Pavement Evaluation.	N/A	
23.	Existing Cross-Slope and Correction method.	N/A	
24.	Asphalt Thickness	N/A	
25.	Base Type and Thickness	N/A	
26.	Future Milling Considerations	N/A	
27.	Structural Evaluation	N/A	
	Plans Review		
28.	Plans Conform to Pavement Design.		Phase II plans in process
29.	Cross-Slope correction addressed	N/A	
30.	Design Details Adequately Covered		Phase II plans in process
31.	Standard Indexes Properly Referenced.	N/A	
32.	Project is Constructable with Current Technology.	X	

Comments(by Ref. No.)

QA by: David Reed, P.E. Date: 10/1/13

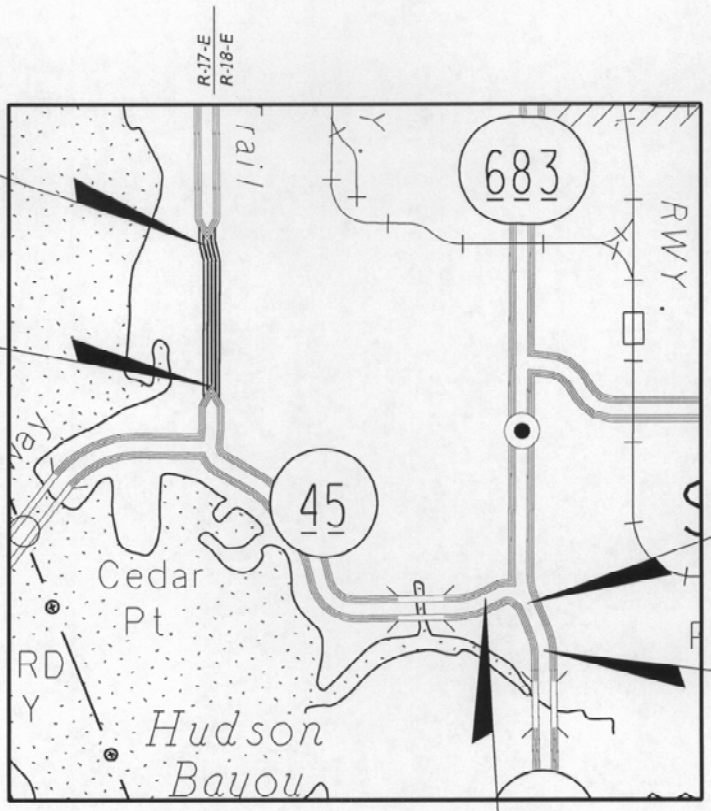
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
PROJECT LOCATION MAP

SR 45 (US 41)

FROM BROWNING STREET TO 10TH STREET

FINANCIAL PROJECT ID: 431311-1-52-01

SARASOTA COUNTY (17020)



END PROJECT
STA. 26+38.28
MP 19.236

EQ:
STA. 88+55.72 BK. =
STA. 0+00.00 AH.

T-36-S

EQ:
STA. 920+38.56 BK. =
STA. 161+29.42 AH.

BEGIN PROJECT
STA. 912+42.56
MP 17.208

EQ:
STA. 156+59.62 BK. =
STA. 156+59.48 AH.

N

0 1 2
Miles

PROTEAN DESIGN GROUP
100 EAST PINE STREET, SUITE 600
ORLANDO, FL 32801
CERTIFICATE OF AUTHORIZATION
NUMBER 7865

PAVEMENT DESIGN PACKAGE

FINANCIAL PROJECT ID :	**431311-1**
WPI NO.:	**NA**
STATE PROJECT NO.:	**NA**
COUNTY SECTION NO.:	**17020**
FEDERAL AID PROJECT NO.:	**NA**
COUNTY:	**Sarasota**
PROJECT NAME:	**SR 45**
FROM:	**Browning St.**
TO:	**10th St.**

Table of Contents

Karen M. Van Den Avont LICENSED No. 44794 STATE OF FLORIDA PROFESSIONAL ENGINEER

Approved by
Karen Van den Avont, P.E.
10/4/13
Date

Concurrence by
Bernie A. Masing, P.E.
10-25-13
Date

Project Description

State Road 45 (US 41) is classified as an urban other principal arterial and extends from Browning Street (MP 17.208) to 10th Street (MP 19.236). The project includes milling and resurfacing of the existing pavement, minor drainage improvements and ADA/sidewalk improvements. The roadway is a divided urban section with curb and gutter and a closed drainage system. The typical section varies throughout the corridor and consists of 4 lane, 5 lane and 6 lane sections with a raised median and a 5 lane section with a bi-directional turn lane. The posted speed is 35 and 40 mph and the design speed is 40 and 45 mph.

The existing pavement's condition is fair to poor with fatigue cracking in the asphalt. Pavement designs have been prepared for the milling and resurfacing of the travel lanes and auxiliary lanes.

Design Notes:

1. The asphalt overlay on the existing curb & gutter is to be removed.

2. Due to substantial variation in the existing pavement section discovered during coring activities, it is noted that base exposure may occur during milling.

3. The auxiliary lane cores were included in the travel lane analysis because the existing pavement design is consistent across the roadway.

4. For MP 17.208 - MP 18.518 (Segment 1 and 2) Northbound, the resilient modulus for the travel lanes and auxiliary lanes is 25,000 psi.

5. For MP 17.208 - MP 18.518 (Segment 1 and 2) Southbound, the resilient modulus for the travel lanes and auxiliary lanes is 19,000 psi.

6. For MP 18.518 - MP 19.236 (Segment 3 and 4), the resilient modulus for the travel lanes and auxiliary lanes is 13,000 psi.

7. Concrete base exists at the north end of the project. A structural number analysis does not apply, and therefore, design sequence number 7 is included only to show the 1.5" asphalt overlay as recommended in the PSER.

8. Cores 22 and 28 are ignored because brick base appears to be in very short sections.

9. Both limerock and shell bases exist between MP 18.518 to MP 19.397. Both bases have the same coefficient of 0.18, and their depths were averaged for the design calculations.

10. There are sections of substandard cross slope. The cross slope cannot be corrected without substantial reconstruction. There is also no crash history that can be attributed to the substandard cross slope. Therefore, a design exception will be acquired.

FLORIDA DEPARTMENT OF TRANSPORTATION
FLEXIBLE PAVEMENT DESIGN SUMMARY SHEET

Prepared by:	Karen Van den Avont, P.E.	**Date Prepared:**	10/4/13
Financial Project No.	431311-1	**Project Name:**	SR 45
WPI No.	NA	**From:**	Browning St.
State Project No.	NA	**To:**	10th St.
County Section No.	17020	**Begin MP:**	17.208
FAP No.	NA	**End MP:**	19.236
County:	Sarasota	**Project Length (Mi)**	2.028
Type Work:	Mill and Resurface		
Opening Year:	2015	**% R:**	95
Design Year:	2035	**M_R:**	25,000 **PSI**
$ESAL_D$ - Mainline	4,100,000	**Design Speed:**	40 - 45 **MPH**
$ESAL_D$ - Shoulder	NA	**Functional Class:**	Urban Other Principal Arterial
SN_R - Mainline	2.94		
SN_R - Shoulder	NA	**Design Seq. No.:**	1
		Cross Slope Correction	No

NORTHBOUND THRU LANES (MP 17.208 to MP 17.373) (Core 1) (Poor Condition)

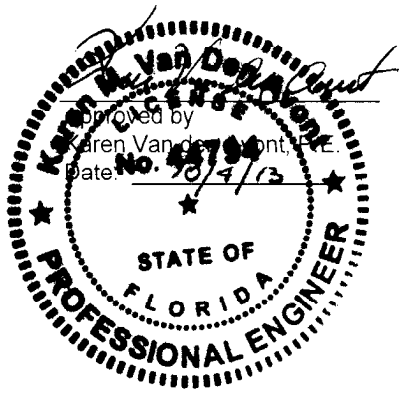
Existing Mainline & Auxiliary Lanes :

Layer	Thickness	Coef.	SN
Stabilization	12.00	0.08	0.96
LR	8.50	0.18	1.53
Binder	0.80	0.15	0.12
AC Type I	1.90	0.15	0.29
AC Type S	1.70	0.15	0.26
Friction Course (FC-4)	1.00	0.12	0.12
		Existing Total SN=	3.27

Mainline and Auxiliary Lanes Resurfacing Pavement Design: **MILLING 3.50**

Layer	Thickness	Coef.	SN
Milling Friction Course	-1.00	0.12	-0.12
Milling AC Type S	-1.70	0.15	-0.26
Milling AC Type I	-0.80	0.15	-0.12
Superpave (TL-C)	2.00	0.44	0.88
FC-12.5 (TL-C) (PG 76-22) (PMA)	1.50	0.44	0.66
		Existing Total SN=	3.27
		Design Total SN=	4.32

Req'd SN Difference From Design SN: 1.37



Approved by
Karen Van den Avont, P.E.
Date: 10/4/13

FLORIDA DEPARTMENT OF TRANSPORTATION
FLEXIBLE PAVEMENT DESIGN SUMMARY SHEET

Prepared by:	Karen Van den Avont, P.E.	**Date Prepared:**	10/4/13
Financial Project No.	431311-1	**Project Name:**	SR 45
WPI No.	NA	**From:**	Browning St.
State Project No.	NA	**To:**	10th St.
County Section No.	17020	**Begin MP:**	17.208
FAP No.	NA	**End MP:**	19.236
County:	Sarasota	**Project Length (Mi)**	2.028
Type Work:	Mill and Resurface		
Opening Year:	2015	**% R:**	95
Design Year:	2035	**M_R:**	19,000 **PSI**
$ESAL_D$ - Mainline	4,100,000	**Design Speed:**	40 - 45 **MPH**
$ESAL_D$ - Shoulder	NA	**Functional Class:**	Urban Other Principal Arterial
SN_R - Mainline	3.27		
SN_R - Shoulder	NA	**Design Seq. No.:**	2
		Cross Slope Correction	No

SOUTHBOUND THRU LANES (MP 17.208 to MP 17.373) (Core 7) (Poor Condition)

Existing Mainline & Auxiliary Lanes :

Layer	Thickness	Coef.	SN
Stabilization	12.00	0.08	0.96
LR	9.00	0.18	1.62
Binder	1.50	0.15	0.23
AC Type I	2.00	0.15	0.30
AC Type S	1.50	0.15	0.23
Friction Course (FC-4)	1.00	0.12	0.12
		Existing Total SN=	3.45

Mainline and Auxiliary Lanes Resurfacing Pavement Design: **MILLING 3.50**

Layer	Thickness	Coef.	SN
Milling Friction Course	-1.00	0.12	-0.12
Milling AC Type S	-1.50	0.15	-0.23
Milling AC Type I	-1.00	0.15	-0.15
Superpave (TL-C)	2.00	0.44	0.88
FC-12.5 (TL-C) (PG 76-22) (PMA)	1.50	0.44	0.66
		Existing Total SN=	3.45
		Design Total SN=	4.50
		Req'd SN Difference From Design SN:	1.22

Approved by
Karen Van den Avont, P.E.
Date: 10/4/13

STATE OF FLORIDA PROFESSIONAL ENGINEER

FLORIDA DEPARTMENT OF TRANSPORTATION
FLEXIBLE PAVEMENT DESIGN SUMMARY SHEET

Prepared by:	Karen Van den Avont, P.E.	**Date Prepared:**	10/4/13
Financial Project No.	431311-1	**Project Name:**	SR 45
WPI No.	NA	**From:**	Browning St.
State Project No.	NA	**To:**	10th St.
County Section No.	17020	**Begin MP:**	17.208
FAP No.	NA	**End MP:**	19.236
County:	Sarasota	**Project Length (Mi)**	2.028
Type Work:	Mill and Resurface		
Opening Year:	2015	**% R:**	95
Design Year:	2035	**M_R:**	25,000 **PSI**
$ESAL_D$ - Mainline	2,820,000	**Design Speed:**	40 - 45 **MPH**
$ESAL_D$ - Shoulder	NA	**Functional Class:**	Urban Other Principal Arterial
SN_R - Mainline	2.76		
SN_R - Shoulder	NA	**Design Seq. No.:**	3
		Cross Slope Correction	No

NORTHBOUND THRU LANES (MP 17.373 to MP 18.518) (Cores 2, 3, 4, 13, 14 & 16)
(Poor Condition)

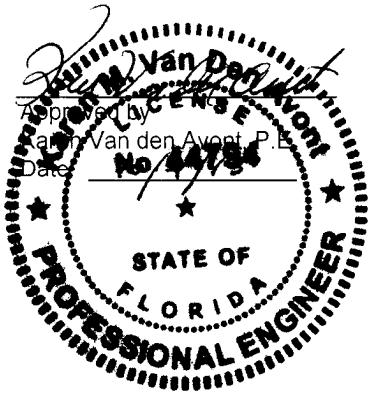
Existing Mainline & Auxiliary Lanes :

Layer	Thickness	Coef.	SN
Stabilization	12.00	0.08	0.96
LR	9.13	0.18	1.64
Binder	1.55	0.15	0.23
AC Type I	1.10	0.15	0.17
AC Type S	2.30	0.15	0.35
Friction Course (FC-4)	0.92	0.12	0.11
		Existing Total SN=	3.46

Mainline and Auxiliary Lanes Resurfacing Pavement Design: **MILLING 3.50**

Layer	Thickness	Coef.	SN
Milling Friction Course	-0.92	0.12	-0.11
Milling AC Type S	-2.30	0.15	-0.35
Milling AC Type I	-0.28	0.15	-0.04
Superpave (TL-C)	2.00	0.44	0.88
FC-12.5 (TL-C) (PG 76-22) (PMA)	1.50	0.44	0.66
		Existing Total SN=	3.46
		Design Total SN=	4.50

Req'd SN Difference From Design SN: 1.74



Approved by:
Karen Van den Avont, P.E.
Date:

FLORIDA DEPARTMENT OF TRANSPORTATION
FLEXIBLE PAVEMENT DESIGN SUMMARY SHEET

Prepared by:	Karen Van den Avont, P.E.	**Date Prepared:**	10/4/13
Financial Project No.	431311-1	**Project Name:**	SR 45
WPI No.	NA	**From:**	Browning St.
State Project No.	NA	**To:**	10th St.
County Section No.	17020	**Begin MP:**	17.208
FAP No.	NA	**End MP:**	19.236
County:	Sarasota	**Project Length (Mi)**	2.028
Type Work:	Mill and Resurface		
Opening Year:	2015	**% R:**	95
Design Year:	2035	**M_R:**	19,000 **PSI**
$ESAL_D$ - Mainline	2,820,000	**Design Speed:**	40 - 45 **MPH**
$ESAL_D$ - Shoulder	NA	**Functional Class:**	Urban Other Principal Arterial
SN_R - Mainline	3.07		
SN_R - Shoulder	NA	**Design Seq. No.:**	4
		Cross Slope Correction	No

SOUTHBOUND THRU LANES (MP 17.373 to MP 18.518) (Cores 8, 9, 10 & 17)
(Fair Condition)

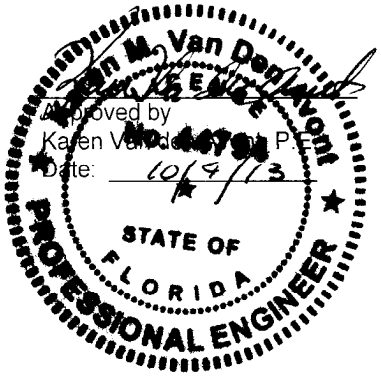
Existing Mainline & Auxiliary Lanes :

Layer	Thickness	Coef.	SN
Stabilization	12.00	0.08	0.96
LR	9.25	0.18	1.67
Binder	1.55	0.20	0.31
AC Type I	2.25	0.23	0.52
AC Type S	2.10	0.25	0.53
Friction Course (FC-4)	0.85	0.15	0.13
		Existing Total SN=	4.11

Mainline and Auxiliary Lanes Resurfacing Pavement Design: **MILLING** **3.50**

Layer	Thickness	Coef.	SN
Milling Friction Course	-0.85	0.15	-0.13
Milling AC Type S	-2.10	0.25	-0.53
Milling AC Type I	-0.55	0.23	-0.13
Superpave (TL-C)	2.00	0.44	0.88
FC-12.5 (TL-C) (PG 76-22)(PMA)	1.50	0.44	0.66
		Existing Total SN=	4.11
		Design Total SN=	4.87

Req'd SN Difference From Design SN: 1.80



Approved by
Karen Van den Avont, P.E.
Date: 10/9/13

FLORIDA DEPARTMENT OF TRANSPORTATION
FLEXIBLE PAVEMENT DESIGN SUMMARY SHEET

Prepared by:	Karen Van den Avont, P.E.	**Date Prepared:**	10/4/13
Financial Project No.	431311-1	**Project Name:**	SR 45
WPI No.	NA	**From:**	Browning St.
State Project No.	NA	**To:**	10th St.
County Section No.	17020	**Begin MP:**	17.208
FAP No.	NA	**End MP:**	19.236
County:	Sarasota	**Project Length (Mi)**	2.028
Type Work:	Mill and Resurface		
Opening Year:	2015	**% R:**	95
Design Year:	2035	**M_R:**	13,000 **PSI**
$ESAL_D$ - Mainline	2,820,000	**Design Speed:**	40 - 45 **MPH**
$ESAL_D$ - Shoulder	NA	**Functional Class:**	Urban Other Principal Arterial
SN_R - Mainline	3.55		
SN_R - Shoulder	NA	**Design Seq. No.:**	5
		Cross Slope Correction	No

THRU LANES (MP 18.518 to MP 19.003) (Cores 5, 11, 15, 18, 19, 20 & 21)
(Fair Condition)

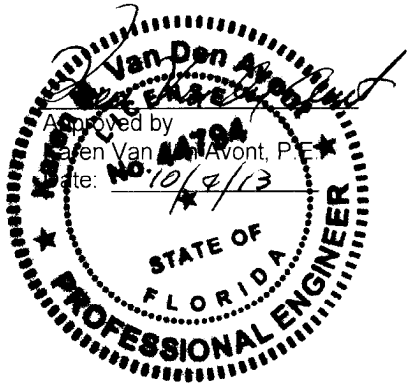
Existing Mainline & Auxiliary Lanes :

Layer	Thickness	Coef.	SN
Stabilization	12.00	0.08	0.96
LR/Shell	8.00	0.18	1.44
Binder	1.53	0.20	0.31
AC Type I	3.41	0.23	0.79
AC Type S	2.29	0.25	0.57
Friction Course (FC-4)	0.99	0.15	0.15
		Existing Total SN=	4.21

Mainline and Auxiliary Lanes Resurfacing Pavement Design: **MILLING 3.50**

Layer	Thickness	Coef.	SN
Milling Friction Course	-0.99	0.15	-0.15
Milling AC Type S	-2.29	0.25	-0.57
Milling AC Type I	-0.22	0.23	-0.05
Superpave (TL-C)	2.00	0.44	0.88
FC-12.5 (TL-C) (PG 76-22) (PMA)	1.50	0.44	0.66
		Existing Total SN=	4.21
		Design Total SN=	4.98

Req'd SN Difference From Design SN: 1.43



Approved by
Karen Van den Avont, P.E.
Date: 10/4/13

FLORIDA DEPARTMENT OF TRANSPORTATION
FLEXIBLE PAVEMENT DESIGN SUMMARY SHEET

Prepared by:	Karen Van den Avont, P.E.	**Date Prepared:**	10/4/13
Financial Project No.	431311-1	**Project Name:**	SR 45
WPI No.	NA	**From:**	Browning St.
State Project No.	NA	**To:**	10th St.
County Section No.	17020	**Begin MP:**	17.208
FAP No.	NA	**End MP:**	19.236
County:	Sarasota	**Project Length (Mi)**	2.028
Type Work:	Mill and Resurface		
Opening Year:	2015	**% R:**	95
Design Year:	2035	**M_R:**	13,000 **PSI**
$ESAL_D$ - Mainline	2,820,000	**Design Speed:**	40 - 45 **MPH**
$ESAL_D$ - Shoulder	NA	**Functional Class:**	Urban Other Principal Arterial
SN_R - Mainline	3.55		
SN_R - Shoulder	NA	**Design Seq. No.:**	6
		Cross Slope Correction	No

THRU LANE L2 (MP 19.003 to MP 19.236) (Core 12) (Fair Condition)

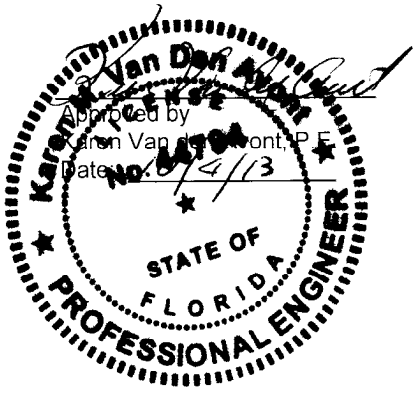
Existing Mainline & Auxiliary Lanes :

Layer	Thickness	Coef.	SN
Stabilization	12.00	0.08	0.96
Shell	12.00	0.18	2.16
AC Type I	2.00	0.23	0.46
AC Type S	1.50	0.25	0.38
Friction Course (FC-4)	1.20	0.15	0.18
		Existing Total SN=	4.14

Mainline and Auxiliary Lanes Resurfacing Pavement Design: **MILLING 1.50**

Layer	Thickness	Coef.	SN
Milling Friction Course	-1.20	0.15	-0.18
Milling AC Type S	-0.30	0.25	-0.08
FC-12.5 (TL-C) (PG 76-22)(PMA)	1.50	0.44	0.66
		Existing Total SN=	4.14
		Design Total SN=	4.54

Req'd SN Difference From Design SN: 0.99



Approved by
Karen Van den Avont, P.E.
Date: 10/4/13

FLORIDA DEPARTMENT OF TRANSPORTATION
FLEXIBLE PAVEMENT DESIGN SUMMARY SHEET

Prepared by:	Karen Van den Avont, P.E.	**Date Prepared:**	10/4/13
Financial Project No.	431311-1	**Project Name:**	SR 45
WPI No.	NA	**From:**	Browning St.
State Project No.	NA	**To:**	10th St.
County Section No.	17020	**Begin MP:**	17.208
FAP No.	NA	**End MP:**	19.236
County:	Sarasota	**Project Length (Mi)**	2.028
Type Work:	Mill and Resurface		
Opening Year:	2015	**% R:**	95
Design Year:	2035	**M_R:**	13,000 **PSI**
$ESAL_D$ - Mainline	2,820,000	**Design Speed:**	40 - 45 **MPH**
$ESAL_D$ - Shoulder	NA	**Functional Class:**	Urban Other Principal Arterial
SN_R - Mainline	3.55		
SN_R - Shoulder	NA	**Design Seq. No.:**	7
		Cross Slope Correction	No

THRU LANES L1, R1 (MP 19.003 to MP 19.236) (Cores 6, 23, 26, 27 & 29)
R2 (MP 19.003 to MP 19.232) (Fair Condition)

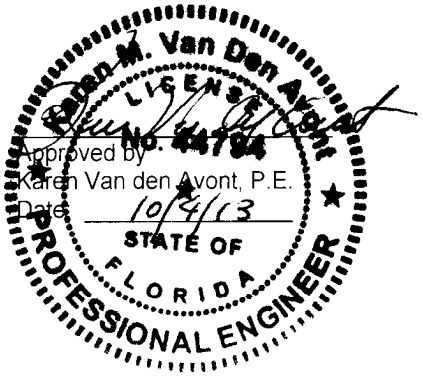
This section is concrete pavement overlaid with asphalt. A structural number analysis does not apply. The layers are listed for informational purposes only.

Existing Mainline & Auxiliary Lanes :

Layer	Thickness	Coef.	SN
Stabilization	12.00	0.08	0.96
Concrete	6.00	NA	0.00
AC Type I	1.30	0.23	0.30
AC Type S	1.78	0.25	0.45
Friction Course (FC-4)	0.80	0.15	0.12
		Existing Total SN=	1.82

Mainline and Auxiliary Lanes Resurfacing Pavement Design: **MILLING 1.50**

Layer	Thickness	Coef.	SN
Milling Friction Course	-0.80	0.15	-0.12
Milling AC Type S	-0.70	0.25	-0.18
FC-12.5 (TL-C) (PG 76-22) (PMA)	1.50	0.44	0.66
		Existing Overlay SN=	1.82
		Design Overlay SN=	2.19



Approved by
Karen Van den Avont, P.E.
Date 10/4/13

FLORIDA DEPARTMENT OF TRANSPORTATION
FLEXIBLE PAVEMENT DESIGN SUMMARY SHEET

Prepared by:	Karen Van den Avont, P.E.	**Date Prepared:**	10/4/13
Financial Project No.	431311-1	**Project Name:**	SR 45
WPI No.	NA	**From:**	Browning St.
State Project No.	NA	**To:**	10th St.
County Section No.	17020	**Begin MP:**	17.208
FAP No.	NA	**End MP:**	19.236
County:	Sarasota	**Project Length (Mi)**	2.028
Type Work:	Mill and Resurface		
Opening Year:	2015	**% R:**	95
Design Year:	2035	**M_R:**	13,000 **PSI**
$ESAL_D$ - Mainline	2,820,000	**Design Speed:**	40 - 45 **MPH**
$ESAL_D$ - Shoulder	NA	**Functional Class:**	Urban Other Principal Arterial
SN_R - Mainline	3.55		
SN_R - Shoulder	NA	**Design Seq. No.:**	8
		Cross Slope Correction	No

THRU LANE R2 (MP 19.232 to MP 19.236) (Cores 24 & 25)
(Fair Condition)

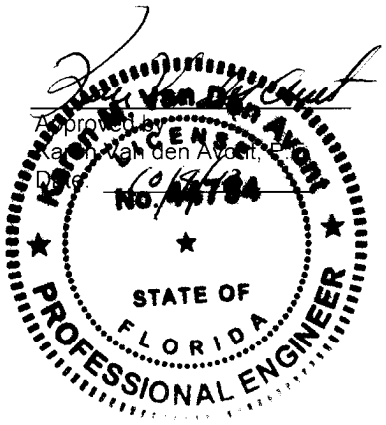
Existing Mainline & Auxiliary Lanes :

Layer	Thickness	Coef.	SN
Stabilization	12.00	0.08	0.96
LR	8.00	0.18	1.44
AC Type I	1.90	0.23	0.44
AC Type S	1.85	0.25	0.46
Friction Course (FC-4)	1.25	0.15	0.19
		Existing Total SN=	3.49

Mainline and Auxiliary Lanes Resurfacing Pavement Design: **MILLING 1.50**

Layer	Thickness	Coef.	SN
Milling Friction Course	-1.25	0.15	-0.19
Milling AC Type S	-0.25	0.25	-0.06
FC-12.5 (TL-C) (PG 76-22) (PMA)	1.50	0.44	0.66
		Existing Total SN=	3.49
		Design Total SN=	3.90

Req'd SN Difference From Design SN: 0.35



Approved by:
Karen Van den Avont, P.E.
Date: 10/4/13

DESIGN SKETCH

(Not Drawn To Scale)

FPID: 431311-1 **DATE: 10/4/2013**

SNR Required:	**2.94**	
SNR Provided:	**4.32**	

Roadway Resurfacing - Mill 3.50"

Design Seq. No. 1
(MP 17.208 - MP 17.373) Northbound

Existing Mainline & Aux. Lanes	Mill & Resurfaced Mainline & Aux. Lanes
Friction Course FC-4 1.00"	Friction Course FC-12.5 (TL-C) 1.50" (PG 76-22) (PMA)
1.00"	1.50"
AC Type S 1.70"	Superpave (TL-C) SP 2.00"
2.70"	
AC Type I 1.90"	Depth of Milling 3.50"
	AC Type I 1.10"
4.60"	4.60"
Binder 0.80"	Binder 0.80"
5.40"	5.40"
LR 8.50"	LR 8.50"
13.90"	13.90"
Stabilization 12.00" (Not Drawn to Scale)	Stabilization 12.00" (Not Drawn to Scale)
25.90"	25.90"

DESIGN SKETCH

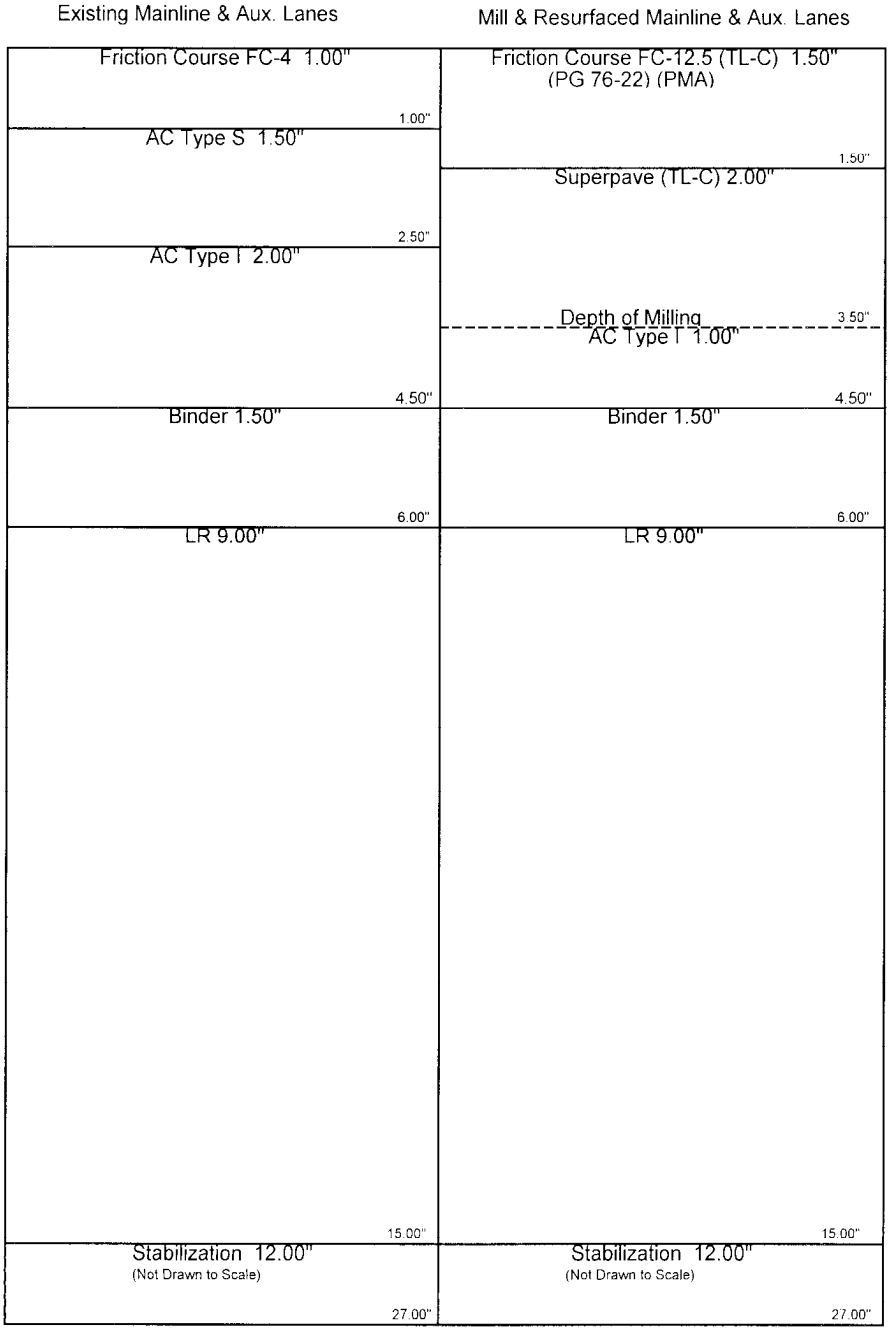
(Not Drawn To Scale)

FPID: 431311-1 **DATE:** **10/4/2013**

SNR Required:	**3.27**	
SNR Provided:	**4.50**	

Roadway Resurfacing - Mill 3.50"

Design Seq. No. 2
(MP 17.208 - MP 17.373) Southbound



DESIGN SKETCH

(Not Drawn To Scale)

FPID: 431311-1 **DATE: 10/4/2013**

SNR Required:	**2.76**	
SNR Provided:	**4.50**	

Roadway Resurfacing - Mill 3.50"

Design Seq. No. 3
(MP 17.373 - MP 18.518) Northbound

Existing Mainline & Aux. Lanes	Mill & Resurfaced Mainline & Aux. Lanes
Friction Course FC-4 0.92"	Friction Course FC-12.5 (TL-C) 1.50" (PG 76-22) (PMA)
0.92"	1.50"
AC Type S 2.30"	Superpave (TL-C) 2.00"
3.22"	Depth of Milling 3.50"
AC Type I 1.10"	AC Type I 0.72"
4.32"	4.32"
Binder 1.55"	Binder 1.55"
5.87"	5.87"
LR 9.13"	LR 9.13"
15.00"	15.00"
Stabilization 12.00" (Not Drawn to Scale)	Stabilization 12.00" (Not Drawn to Scale)
27.00"	27.00"

DESIGN SKETCH

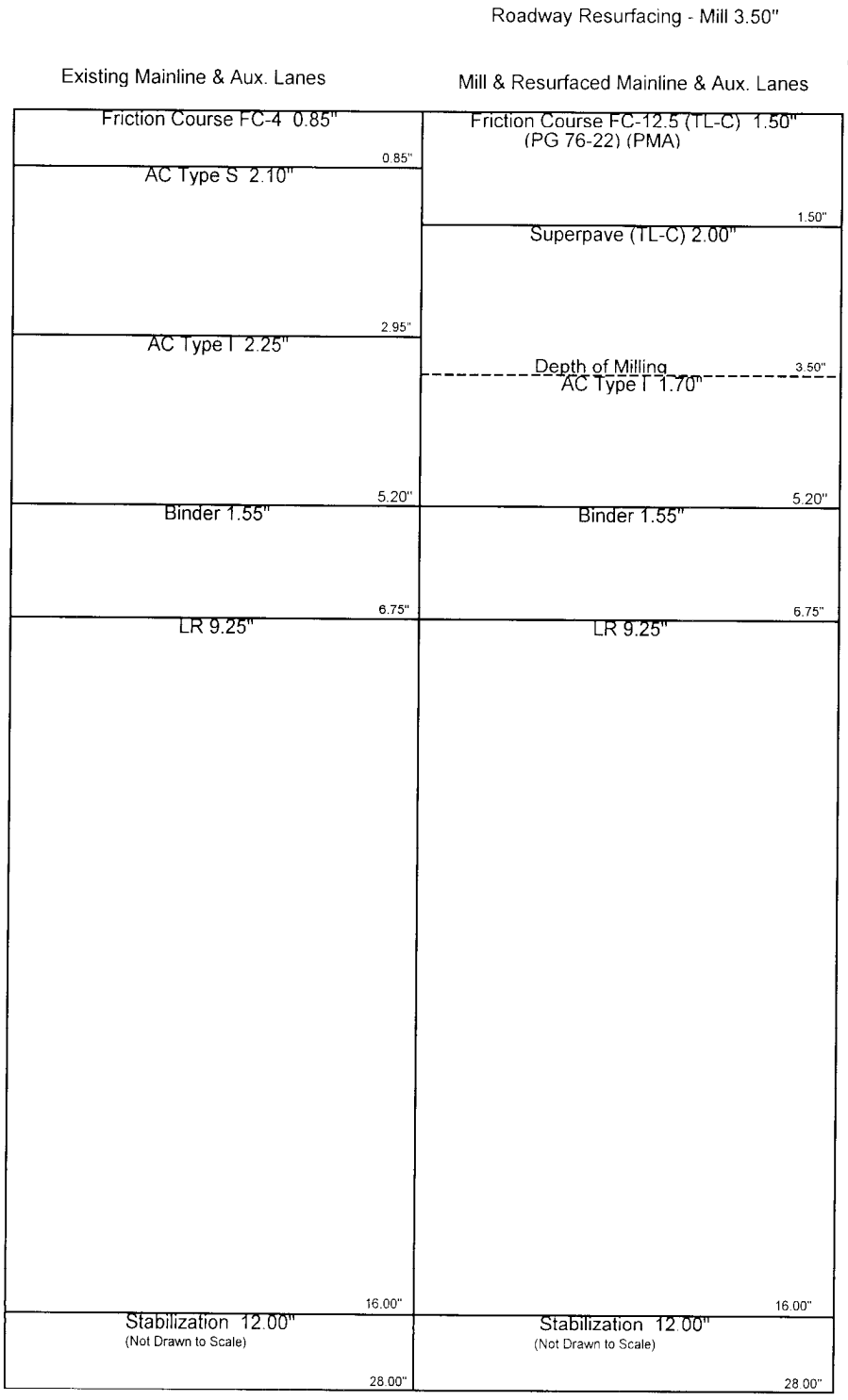
(Not Drawn To Scale)

FPID: 431311-1 **DATE: 10/4/2013**

SNR Required:	**3.07**	
SNR Provided:	**4.87**	

Roadway Resurfacing - Mill 3.50"

Design Seq. No. 4
(MP 17.373 - MP 18.518) Southbound



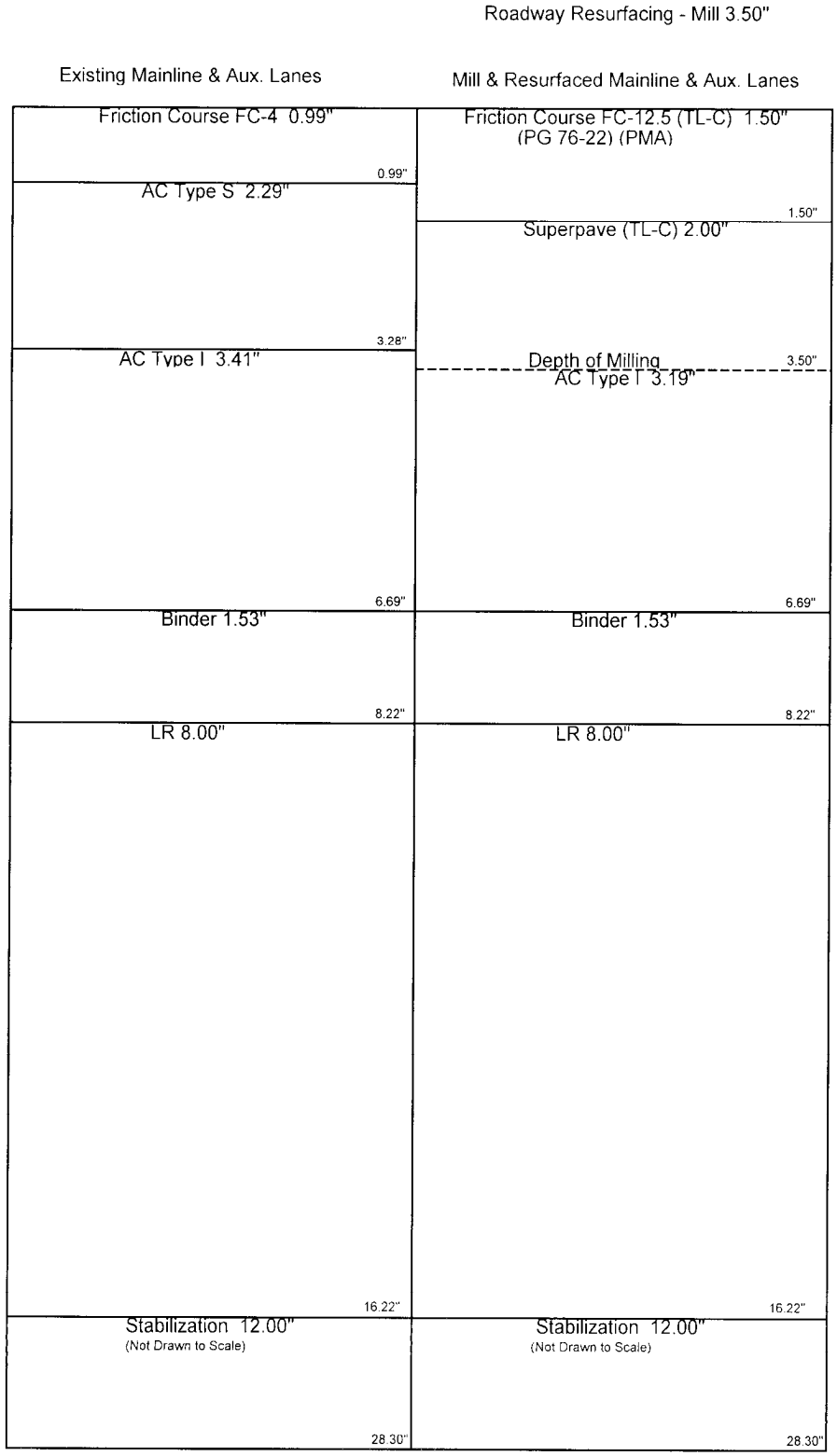
DESIGN SKETCH

(Not Drawn To Scale)

FPID: 431311-1		DATE:	10/4/2013
SNR Required:	3.55		
SNR Provided:	4.98		

Roadway Resurfacing - Mill 3.50"

Design Seq. No. 5
(MP 18.518 - MP 19.003)



DESIGN SKETCH

(Not Drawn To Scale)

FPID: 431311-1 **DATE: 10/4/2013**

SNR Required:	**3.55**	
SNR Provided:	**4.54**	

Roadway Resurfacing - Mill 1.50"

Design Seq. No. 6
(MP 19.003 - MP 19.236) L2

Existing Mainline & Aux. Lanes	Mill & Resurfaced Mainline & Aux. Lanes
Friction Course FC-4 1.20" 1.20"	Friction Course FC-12.5 (TL-C) 1.50" (PG 76-22) (PMA)
AC Type S 1.50" 2.70"	Depth of Milling 1.50"
	AC Type S 1.20" 2.70"
AC Type I 2.00" 4.70"	AC Type I 2.00" 4.70"
Shell 12.00" 16.70"	LR 12.00" 16.70"
Stabilization 12.00" (Not Drawn to Scale) 25.58"	Stabilization 12.00" (Not Drawn to Scale) 25.58"

DESIGN SKETCH

(Not Drawn To Scale)

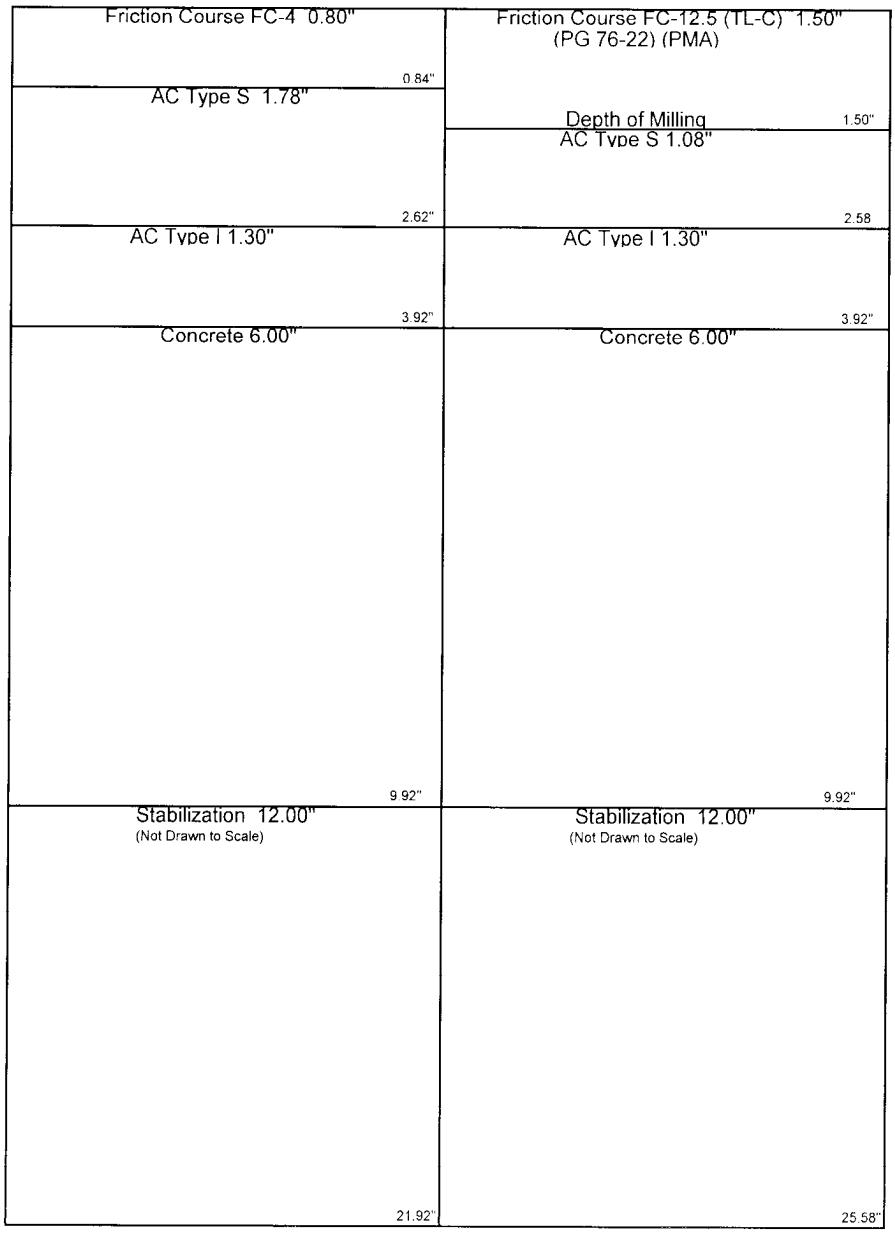
FPID: 431311-1 **DATE: 10/4/2013**

SNR Required:	**3.55**	
Overlay SNR Provided:	**2.42**	

This is concecrete pavement overlaid with asphalt. SN calculations for asphalt pavement do not apply.

Roadway Resurfacing - Mill 1.50"

Design Seq. No. 7
(MP 19.003 - MP 19.232) R2
(MP 19.003 - MP 19.236) L1, R1



DESIGN SKETCH

(Not Drawn To Scale)

FPID: 431311-1 **DATE: 10/4/2013**

SNR Required:	**3.55**	
SNR Provided:	**3.90**	

Roadway Resurfacing - Mill 1.50"

Design Seq. No. 8
(MP 19.232 - MP 19.236 R2)

Existing Mainline & Aux. Lanes	Mill & Resurfaced Mainline & Aux. Lanes
Friction Course FC-4 1.25" 1.25"	Friction Course FC-12.5 (TL-C) 1.50" (PG 76-22) (PMA)
AC Type S 1.85" 3.10"	Depth of Milling 1.50" AC Type S 1.60" 3.10"
AC Type I 1.90" 5.00"	AC Type I 1.90" 5.00"
LR 8.00" 13.00"	LR 8.00" 13.00"
Stabilization 12.00" (Not Drawn to Scale) 26.00"	Stabilization 12.00" (Not Drawn to Scale) 26.00"

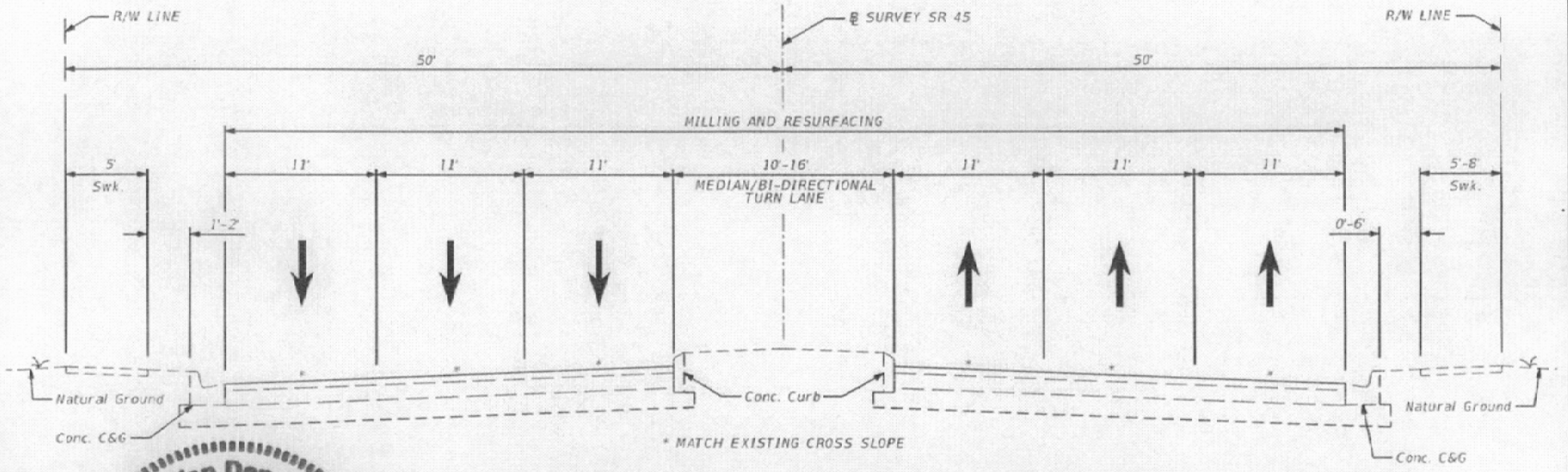
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 431311-1-52-01 FEDERAL AID PROJECT NO. _____ COUNTY NAME SARASOTA

SECTION NO. 17020 ROAD DESIGNATION SR 45 (US 41) LIMITS/MILEPOST MP 17.208 TO MP 19.236

PROJECT DESCRIPTION MILLING AND RESURFACING, ADA IMPROVEMENTS, DRAINAGE IMPROVEMENTS, SIGNING AND PAVEMENT MARKINGS AND SIGNAL IMPROVEMENTS ON SR 45 FROM BROWNING ST. TO 10TH ST.

PROPOSED ROADWAY TYPICAL SECTION



TYPICAL SECTION (1)

MP 17.208 TO MP 17.311 STA. 912+42.56 TO STA. 917+86.40

MP 17.567 TO MP 17.851 STA. 135+30.24 TO STA. 150+29.76

APPROVED BY: KAREN VAN DEN AVONT, P.E.	FDOT CONCURRENCE	FHWA CONCURRENCE
Karen Van Den Avont Engineer of Record	for B.A. Masing 10-8-13 BERNIE A. MASING, P.E. FDOT District Design Engineer Date	N/A FHWA Transportation Engineer Date

Karen M. Van Den Avont LICENSE No. 44794 STATE OF FLORIDA PROFESSIONAL ENGINEER

$USERS $TIMES $FILES

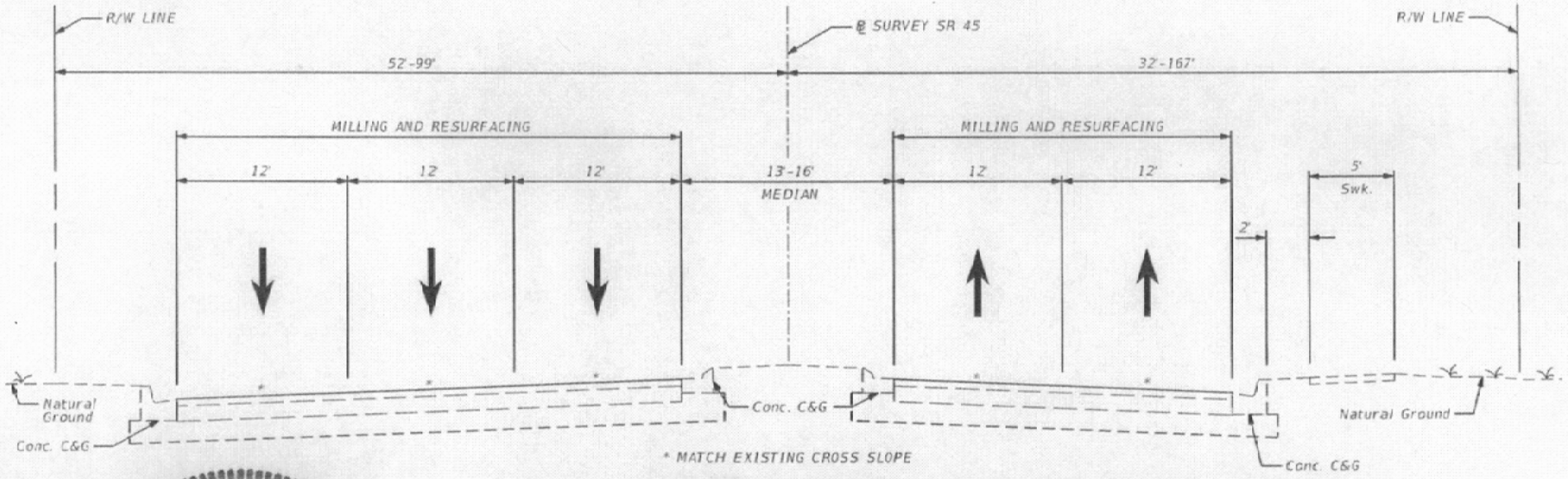
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 431311-1-52-01 FEDERAL AID PROJECT NO. _____ COUNTY NAME SARASOTA

SECTION NO. 17020 ROAD DESIGNATION SR 45 (US 41) LIMITS/MILEPOST MP 17.208 TO MP 19.236

PROJECT DESCRIPTION MILLING AND RESURFACING, ADA IMPROVEMENTS, DRAINAGE IMPROVEMENTS, SIGNING AND PAVEMENT MARKINGS AND SIGNAL IMPROVEMENTS ON SR 45 FROM BROWNING ST. TO 10TH ST.

PROPOSED ROADWAY TYPICAL SECTION



TYPICAL SECTION (2)

MP 17.311 TO MP 17.567

STA. 917+86.40 TO STA. 920+38.56
STA. 150+29.76 TO STA. 156+59.48
STA. 156+59.62 TO STA. 161+29.42

APPROVED BY: KAREN VAN DEN AVONT, P.E.	FDOT CONCURRENCE	FHWA CONCURRENCE
Engineer of Record	B.A. Masing 10-8-13	N/A
	BERNIE A. MASING, P.E. Date	Date
	FDOT District Design Engineer	FHWA Transportation Engineer

Karen M. Van Den Avont LICENSE No. 44794 STATE OF FLORIDA PROFESSIONAL ENGINEER

$USER$ $FILE$

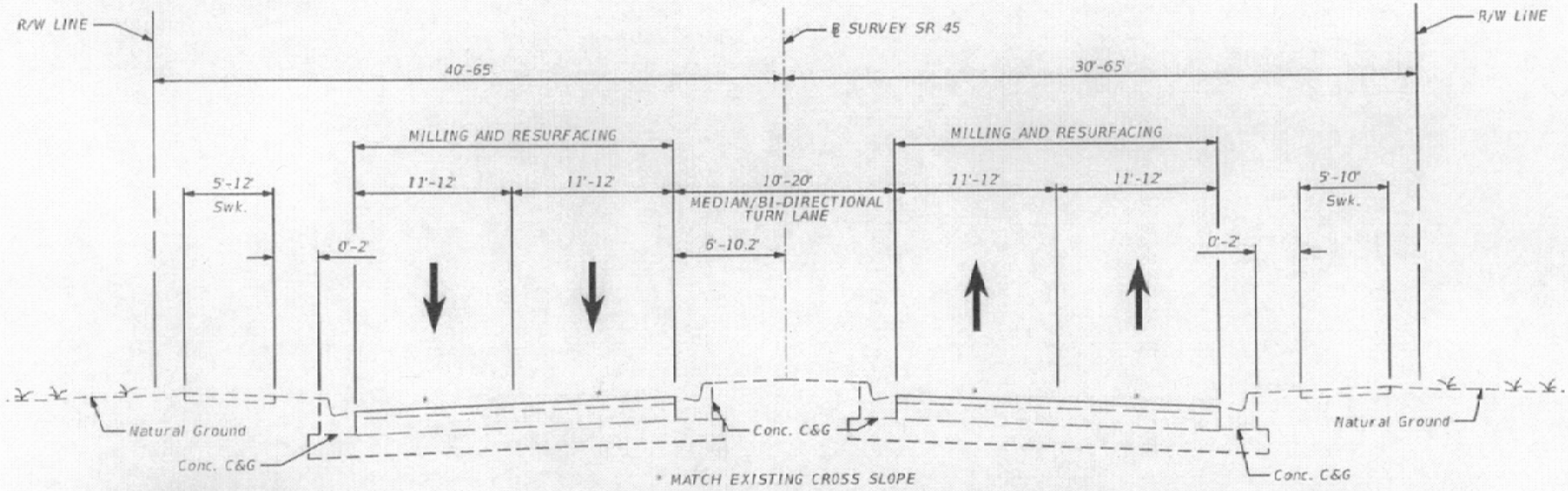
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 431311-1-52-01 FEDERAL AID PROJECT NO. _____ COUNTY NAME SARASOTA

SECTION NO. 17020 ROAD DESIGNATION SR 45 (US 41) LIMITS/MILEPOST MP 17.208 TO MP 19.236

PROJECT DESCRIPTION MILLING AND RESURFACING, ADA IMPROVEMENTS, DRAINAGE IMPROVEMENTS, SIGNING AND PAVEMENT MARKINGS AND SIGNAL IMPROVEMENTS ON SR 45 FROM BROWNING ST. TO 10TH ST.

PROPOSED ROADWAY TYPICAL SECTION



TYPICAL SECTION (3)

MP 17.851 TO MP 19.236 STA. 88+55.72 TO STA. 135+30.24

STA. 0+00.00 TO STA. 26+38.28

APPROVED BY: KAREN VAN DEN AVONT, P.E.	FDOT CONCURRENCE	FHWA CONCURRENCE
Karen Van Den Avont Engineer of Record	B.A. Masing JAB BERNIE A. MASING, P.E. FDOT District Design Engineer	10-8-13 Date	N/A FHWA Transportation Engineer	Date

Karen M. Van Den Avont LICENSE 48756 STATE OF FLORIDA PROFESSIONAL ENGINEER

$USERS $FILES

Appendix A

Design Traffic and 18-KIP Information

Florida Department of Transportation

RICK SCOTT
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

ANANTH PRASAD, P.E.
SECRETARY

MEMORANDUM

Date: October 12th, 2012

To: James E Watts — EXT 2542
Design — MS 1-28

From: George Martin, GIS Coordinator/Traffic Counts Supervisor GMM

Copies: Rovindra Churaman, Robin LaManna

Subject:
Financial Project No: 431311-1
Roadway ID: 17020000
Project Name: SR 45 (US 41)
County: SARASOTA
Type of Work: Resurfacing
From Browning St – Mound St
MP 17.200 – MP 17.310 Location1

Per your request, the attached traffic data forecasts are provided for the above roadway. These estimates were taken from trends calculated from traffic counts provided by FDOT.

K =	9.0 %
D =	52.0 %
24 hour T =	2.9 %
Design Hour T =	1.5 %
2011 AADT =	61,000
Functional Class =	URBAN OTHER PRIN ART
	Urban Prin Art Other (Proposed)

The attached 18-KIP Equivalent Single Axle Loading Accumulations are based on the above information, and have been prepared in accordance with the Central Office memo of December 1, 2000, reflecting the current Equivalency Factors.

As requested, we have included 24-hour traffic count for site 170031.

Please feel free to contact Rovindra Churaman at extension 2352 if you have any questions.

District One – Traffic Operations
801 North Broadway Avenue * Post Office Box 1249 * Bartow, FL 33831-1249
(863) 519-2553 * (863) 534-0915 (Fax) * MS 1-8
www.dot.state.fl.us

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

FIN #: 431311-1
COUNTY: SARASOTA
ROADWAYID: 17020000
PROJECT DESCRIPTION: SR 45 (US 41) - Mill and resurface

LOCATION DESCRIPTION: From N of Browning St to Mound St

LOCATION #: 1

GROWTH RATE FORMULA

A: Interpolation
B: Enter Growth Rate
C: Enter All AADTs
D: New Facility

If "A" select an interpolation function
If "B" enter rate as decimals (1%=1.01)
If ""C", or "D" continue to next section

Choose A, B, C, or D here: A

Linear Growth Rate X %
Compounded Growth Rate ____ %
Decaying Growth Rate ____ %
(select one)

DESIGN INFORMATION

		AADT
Existing Year	2011	61000
Opening Year	2015	N/A
Mid-Design Year	2025	N/A
Design Year	2035	85700

Note: AADT values have been rounded to the nearest 100

Daily Direction Split (50% or 100%)	50%
Lanes in One Direction	3
T24 values	
Existing to Opening Year	2.90%
Opening to Mid-Year	2.90%
Mid-Year to Design-Year	2.90%

2000 EQUIVALENCY FACTORS |u(1)|

(selected with an X)	FLEXIBLE PAVEMENT SN = 5/THICK		RIGID PAVEMENT SN = 12/THICK	
RURAL FREEWAY:	1.050	____	1.600	____
URBAN FREEWAY:	0.900	____	1.270	____
RURAL HIGHWAY:	0.960	____	1.350	____
URBAN HIGHWAY:	0.890	X	1.220	____
OTHER (Enter Factor and X):		____		____

(1) Equivalency Factors are based on Updated Pavement Damage Factors Memorandum, dated December 1, 2000.

Lane Factors developed by Copes equation

I have reviewed the 18 kip Equivalent Single Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by: Rovindra Churaman, P.E. — Traffic Count Analyst — FDOT
Name — Title — Org. Unit or Firm

Rovindra Churaman — 10-12-12
Signature — Date

Reviewed by: George Martin, GIS Coordinator/Traffic Count Supervisor — FDOT
Name — Title — Org. Unit or Firm

George C. Martin — 10-15-12
Signature — Date

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS - LOCATION 1

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

YEARS: *2011 to 2035*

SECTION #: 17020000 **COUNTY:** SARASOTA **FIN #:** 431311-1

FLEXIBLE PAVEMENT URBAN HIGHWAY 0.890

SN=5/THICK SR 45 (US 41) - Mill and resurface A

YEAR	AADT	ESAL (1000S)	ACCUM (1000s)	D	T	LF	EF
2011	61000	170	0	0.5	2.90%	0.590	0.890
2012	62000	173	0	0.5	2.90%	0.589	0.890
2013	63000	175	0	0.5	2.90%	0.588	0.890
2014	64000	177	0	0.5	2.90%	0.586	0.890
2015	65100	180	180	0.5	2.90%	0.585	0.890
2016	66100	182	362	0.5	2.90%	0.584	0.890
2017	67100	185	547	0.5	2.90%	0.583	0.890
2018	68200	187	734	0.5	2.90%	0.581	0.890
2019	69200	190	924	0.5	2.90%	0.580	0.890
2020	70200	192	1116	0.5	2.90%	0.579	0.890
2021	71200	194	1310	0.5	2.90%	0.578	0.890
2022	72300	197	1507	0.5	2.90%	0.576	0.890
2023	73300	199	1706	0.5	2.90%	0.575	0.890
2024	74300	201	1907	0.5	2.90%	0.574	0.890
2025	75400	204	2111	0.5	2.90%	0.573	0.890
2026	76400	206	2317	0.5	2.90%	0.572	0.890
2027	77400	209	2526	0.5	2.90%	0.571	0.890
2028	78400	211	2737	0.5	2.90%	0.570	0.890
2029	79500	213	2950	0.5	2.90%	0.569	0.890
2030	80500	216	3166	0.5	2.90%	0.568	0.890
2031	81500	218	3384	0.5	2.90%	0.567	0.890
2032	82600	220	3604	0.5	2.90%	0.565	0.890
2033	83600	223	3827	0.5	2.90%	0.564	0.890
2034	84600	225	4052	0.5	2.90%	0.563	0.890
2035	85700	228	4280	0.5	2.90%	0.562	0.890

Opening to Mid-Design Year ESAL Accumulation (1000s): 1931

Opening to Design Year ESAL Accumulation (1000s): 4100

I have reviewed the 18 kip Equivalent Single Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by: Rovindra Churaman, P.E. Traffic Count Analyst FDOT

Name Title Org. Unit or Firm

Signature 10·12·12 Date

Reviewed by: George Martin, GIS Coordinator/Traffic Count Supervisor FDOT

Name Title Org. Unit or Firm

Signature 10-15-12 Date

County: 17
Station: 0031
Description: SR 45/US 41, NORTH OF BAHIA VISTA STREET SARAS
Start Date: 06/20/2012
Start Time: 0000

	Direction: N					Direction: S					Combined
ime	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	56	51	38	34	179	52	61	62	44	219	398
0100	29	34	28	22	113	40	26	29	27	122	235
0200	14	26	14	17	71	30	32	26	23	111	182
0300	17	15	18	24	74	17	18	14	6	55	129
0400	20	29	33	51	133	17	20	47	48	132	265
0500	53	68	103	118	342	45	47	58	82	232	574
0600	133	192	225	310	860	96	158	237	243	734	1594
0700	319	395	536	667	1917	257	265	361	415	1298	3215
0800	555	589	606	584	2334	370	442	377	434	1623	3957
0900	535	498	529	547	2109	416	443	411	411	1681	3790
1000	436	483	501	571	1991	421	413	463	504	1801	3792
1100	582	549	483	524	2138	442	443	483	519	1887	4025
1200	542	522	491	590	2145	529	565	525	509	2128	4273
1300	553	557	546	536	2192	515	515	502	567	2099	4291
1400	480	576	523	547	2126	517	522	511	521	2071	4197
1500	551	487	557	543	2138	544	570	569	577	2260	4398
1600	514	512	507	477	2010	551	609	610	568	2338	4348
1700	522	488	497	474	1981	702	689	671	549	2611	4592
1800	457	458	352	370	1637	558	538	480	450	2026	3663
1900	281	323	305	279	1188	418	380	276	259	1333	2521
2000	245	255	235	273	1008	212	263	266	240	981	1989
2100	235	229	181	175	820	223	255	236	225	939	1759
2200	164	156	152	117	589	176	179	163	141	659	1248
2300	112	92	80	79	363	164	117	80	88	449	812
24-Hour Totals:					30458					29789	60247

Peak Volume Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	745	2417	845	1704	745	4021
P.M.	1245	2246	1645	2630	1645	4614
Daily	745	2417	1645	2630	1645	4614

Generated by SPS 5.0.26

Florida Department of Transportation

RICK SCOTT
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

ANANTH PRASAD, P.E.
SECRETARY

MEMORANDUM

Date: January 2nd, 2013

To: James E Watts — EXT 2542
Design — MS 1-28

From: for George Martin, GIS Coordinator/Traffic Counts Supervisor

Copies: Rovindra Churaman, Robin LaManna

Subject: Financial Project No: 431311-1
Roadway ID: 17020000
Project Name: SR 45 (US 41)
County: SARASOTA
Type of Work: Resurfacing
Location 2:
From US 301 –11th Street
MP 17.373 – MP 19.390

Per your request, the attached traffic data forecasts are provided for the above roadway. These estimates were taken from trends calculated from traffic counts provided by FDOT.

K =	9.0 %
D =	52.0 %
24 hour T =	3.2 %
Design Hour T =	1.6 %
2011 AADT =	40,000
Functional Class =	URBAN OTHER PRIN ART URBAN PRIN ART OTHER (PROPOSED)

The attached 18-KIP Equivalent Single Axle Loading Accumulations are based on the above information, and have been prepared in accordance with the Central Office memo of December 1, 2000, reflecting the current Equivalency Factors.

As requested, we have included 24-hour traffic count for site 175030.

Please feel free to contact Rovindra Churaman at extension 2352 if you have any questions.

District One – Traffic Operations
801 North Broadway Avenue * Post Office Box 1249 * Bartow, FL 33831-1249
(863) 519-2553 * (863) 534-0915 (Fax) * MS 1-8
www.dot.state.fl.us

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

FIN #: 431311-1
COUNTY: SARASOTA
ROADWAYID: 17020000
PROJECT DESCRIPTION: SR 45 (US 41) - Mill and resurface

LOCATION #: 2

LOCATION DESCRIPTION: From US 301 to 11th Street

GROWTH RATE FORMULA

A: Interpolation
B: Enter Growth Rate
C: Enter All AADTs
D: New Facility

If "A" select an interpolation function
If "B" enter rate as decimals (1%=1.01)
If ""C", or "D" continue to next section

Choose A, B, C, or D here: A

Linear Growth Rate X %
Compounded Growth Rate ____ %
Decaying Growth Rate ____ %
(select one)

DESIGN INFORMATION

		AADT
Existing Year	2011	40000
Opening Year	2015	N/A
Mid-Design Year	2025	N/A
Design Year	2035	46300

Note: AADT values have been rounded to the nearest 100

Daily Direction Split (50% or 100%)	50%
Lanes in One Direction	3
T24 values	
Existing to Opening Year	3.20%
Opening to Mid-Year	3.20%
Mid-Year to Design-Year	3.20%

2000 EQUIVALENCY FACTORS |u(1)|

(selected with an X)	FLEXIBLE PAVEMENT SN = 5/THICK		RIGID PAVEMENT SN = 12/THICK	
RURAL FREEWAY:	1.050	____	1.600	____
URBAN FREEWAY:	0.900	____	1.270	____
RURAL HIGHWAY:	0.960	____	1.350	____
URBAN HIGHWAY:	0.890	X	1.220	____
OTHER (Enter Factor and X):		____		____

(1) Equivalency Factors are based on Updated Pavement Damage Factors Memorandum, dated December 1, 2000.

Lane Factors developed by Copes equation

I have reviewed the 18 kip Equivalent Singie Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by: Rovindra Churaman, P.E. — Traffic Count Analyst — FDOT
Name — Title — Org. Unit or Firm
Signature — 1.2.2013 — Date

for George Martin, GIS Coordinator/Traffic Count Supervisor — FDOT
Reviewed by: Name — Title — Org. Unit or Firm
Signature — 01.02.2013 — Date

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS - LOCATION 2

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

YEARS: *2011 to 2035*

SECTION #: 17020000 **COUNTY:** SARASOTA **FIN #:** 431311-1

FLEXIBLE PAVEMENT URBAN HIGHWAY 0.890

SN=5/THICK SR 45 (US 41) - Mill and resurface

A

YEAR	AADT	ESAL (1000S)	ACCUM (1000s)	D	T	LF	EF
2011	40000	131	0	0.5	3.20%	0.625	0.890
2012	40200	131	0	0.5	3.20%	0.625	0.890
2013	40500	132	0	0.5	3.20%	0.624	0.890
2014	40700	132	0	0.5	3.20%	0.624	0.890
2015	41000	133	133	0.5	3.20%	0.623	0.890
2016	41300	134	267	0.5	3.20%	0.623	0.890
2017	41500	135	402	0.5	3.20%	0.622	0.890
2018	41800	136	538	0.5	3.20%	0.622	0.890
2019	42100	136	674	0.5	3.20%	0.621	0.890
2020	42300	137	811	0.5	3.20%	0.621	0.890
2021	42600	138	949	0.5	3.20%	0.620	0.890
2022	42800	138	1087	0.5	3.20%	0.620	0.890
2023	43100	139	1226	0.5	3.20%	0.619	0.890
2024	43400	140	1366	0.5	3.20%	0.619	0.890
2025	43600	141	1507	0.5	3.20%	0.618	0.890
2026	43900	141	1648	0.5	3.20%	0.618	0.890
2027	44200	142	1790	0.5	3.20%	0.617	0.890
2028	44400	143	1933	0.5	3.20%	0.617	0.890
2029	44700	144	2077	0.5	3.20%	0.616	0.890
2030	44900	144	2221	0.5	3.20%	0.616	0.890
2031	45200	145	2366	0.5	3.20%	0.615	0.890
2032	45500	146	2512	0.5	3.20%	0.615	0.890
2033	45700	146	2658	0.5	3.20%	0.614	0.890
2034	46000	147	2805	0.5	3.20%	0.614	0.890
2035	46300	148	2953	0.5	3.20%	0.613	0.890

Opening to Mid-Design Year ESAL Accumulation (1000s): 1374

Opening to Design Year ESAL Accumulation (1000s): 2820

I have reviewed the 18 kip Equivalent Single Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by: Ravindra Churaman, P.E. Traffic Count Analyst FDOT

Name Title Org. Unit or Firm

Signature 1.2.2013 Date

Reviewed by: for George Martin, GIS Coordinator/Traffic Count Supervisor FDOT

Name Title Org. Unit or Firm

Signature 01.02.2013 Date

County: 17
Station: 5030
Description: SR 45/US 41, NORTH OF SR 789/GULFSTREAM AVE
Start Date: 04/19/2012
Start Time: 0000

Time	Direction: N 1st	2nd	3rd	4th	Total	Direction: S 1st	2nd	3rd	4th	Total	Combined Total
0000	47	36	29	33	145	35	31	28	23	117	262
0100	35	23	12	19	89	18	13	15	14	60	149
0200	19	32	27	16	94	10	15	9	12	46	140
0300	20	4	13	12	49	13	13	16	12	54	103
0400	9	14	26	22	71	18	12	22	32	84	155
0500	31	33	60	46	170	28	47	63	70	208	378
0600	58	67	94	125	344	85	126	172	253	636	980
0700	147	206	225	210	788	239	269	420	431	1359	2147
0800	237	247	224	283	991	393	431	432	459	1715	2706
0900	297	231	206	240	974	328	326	337	361	1352	2326
1000	243	266	324	288	1121	249	308	328	343	1228	2349
1100	271	233	271	283	1058	322	325	336	353	1336	2394
1200	306	292	284	262	1144	300	322	321	327	1270	2414
1300	310	282	342	304	1238	341	338	291	294	1264	2502
1400	290	333	334	333	1290	299	245	318	308	1170	2460
1500	337	352	345	334	1368	299	310	332	350	1291	2659
1600	400	359	388	402	1549	354	326	348	314	1342	2891
1700	410	402	348	338	1498	389	339	300	295	1323	2821
1800	277	254	219	261	1011	284	291	277	231	1083	2094
1900	242	286	255	240	1023	244	180	191	198	813	1836
2000	209	186	174	215	784	205	201	183	182	771	1555
2100	205	189	172	184	750	160	149	155	149	613	1363
2200	188	138	122	125	573	236	157	100	103	596	1169
2300	115	100	85	68	368	73	88	80	62	303	671
24-Hour Totals:					18490					20034	38524

Peak Volume Information

	Direction: N Hour	Volume	Direction: S Hour	Volume	Combined Directions Hour	Volume
A.M.	815	1051	800	1715	800	2706
P.M.	1630	1602	1630	1390	1630	2992
Daily	1630	1602	800	1715	1630	2992

Truck Percentage 3.11 3.11 3.11

Classification Summary Database

Dir	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TotTrk	TotVol
N	102	14651	3162	25	320	80	2	135	13	0	0	0	0	0	0	575	18490
S	78	16396	2937	22	278	28	70	198	27	0	0	0	0	0	0	623	20034

Generated by SPS 5.0.26

Appendix B

rL.B.R./S.S.V or Resilient Modulus Information

Florida Department of Transportation

RICK SCOTT
GOVERNOR

STATE MATERIALS OFFICE
5007 Northeast 39th Avenue, Gainesville, Florida 32609
Telephone: (352) 955-6341, Fax: (352) 955-6345

ANANTH PRASAD, P.E.
SECRETARY

TO: Debbie Childs, Project Manager

FROM: Joseph Reiter, Pavement Performance Consultant

DATE: August 16, 2012

COPIES: Patrick Upshaw, Pavement Performance Engineer
Hyung Lee, Nondestructive Testing Engineer

SUBJECT: Resilient Modulus Recommendation

Project Description:	SR 45/US 41 MP 17.025 to 19.928
Project Number:	17020
FIN No.:	431311-1
County:	Sarasota

On August 8, 2012 deflection tests were conducted in the northbound and southbound traffic lanes of SR 45/US 41. Evaluation of the data and resulting deflection plots indicate the following Resilient Modulus values are representative of the existing pavement system and are hereby recommended for this project. There are several locations with high deflections in the northbound and southbound traffic lanes that indicate the potential for a weak pavement system.

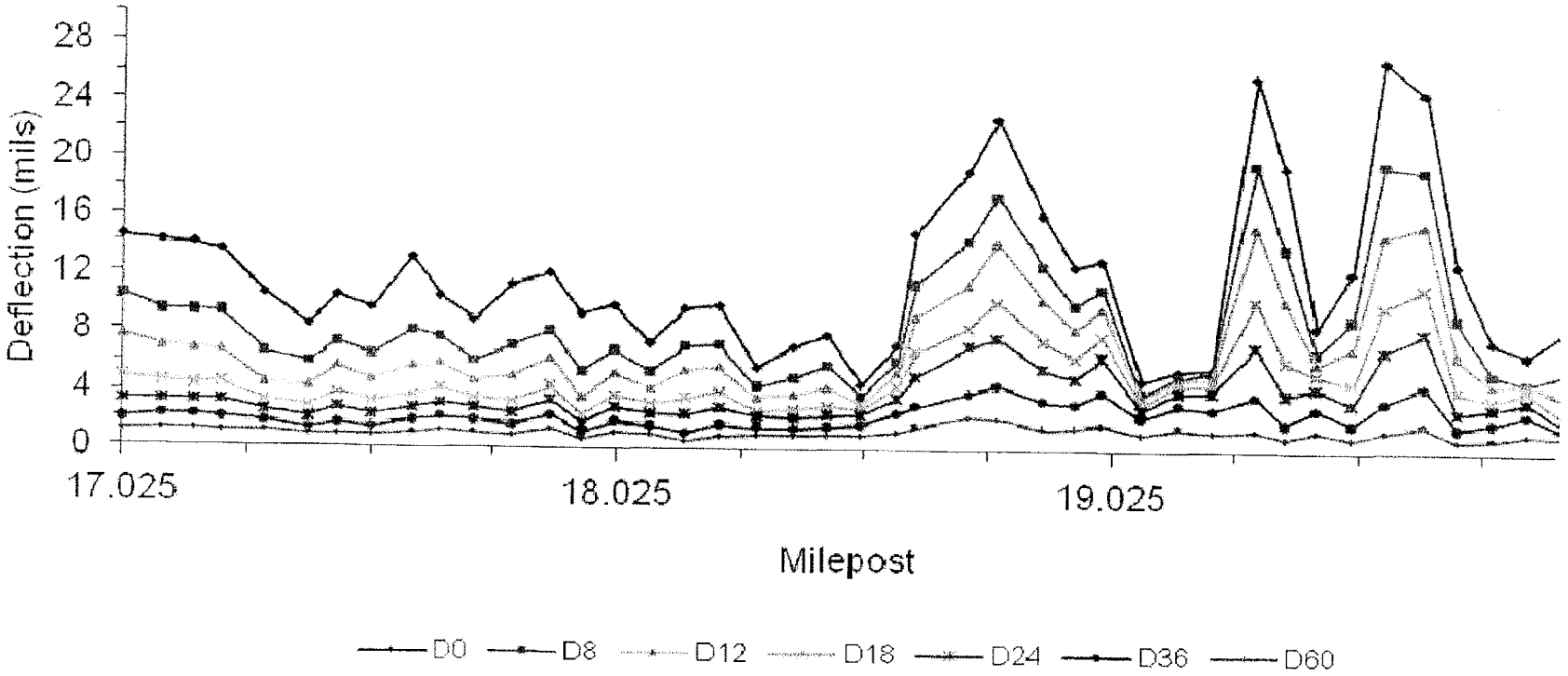
Travel Direction	Beginning Milepost	Ending Milepost	Modulus (psi)	Modulus (MPa)
Northbound	17.025	18.518	25,000	172
Southbound	17.025	18.518	19,000	131
Northbound/Southbound	18.518	19.928	13,000	90

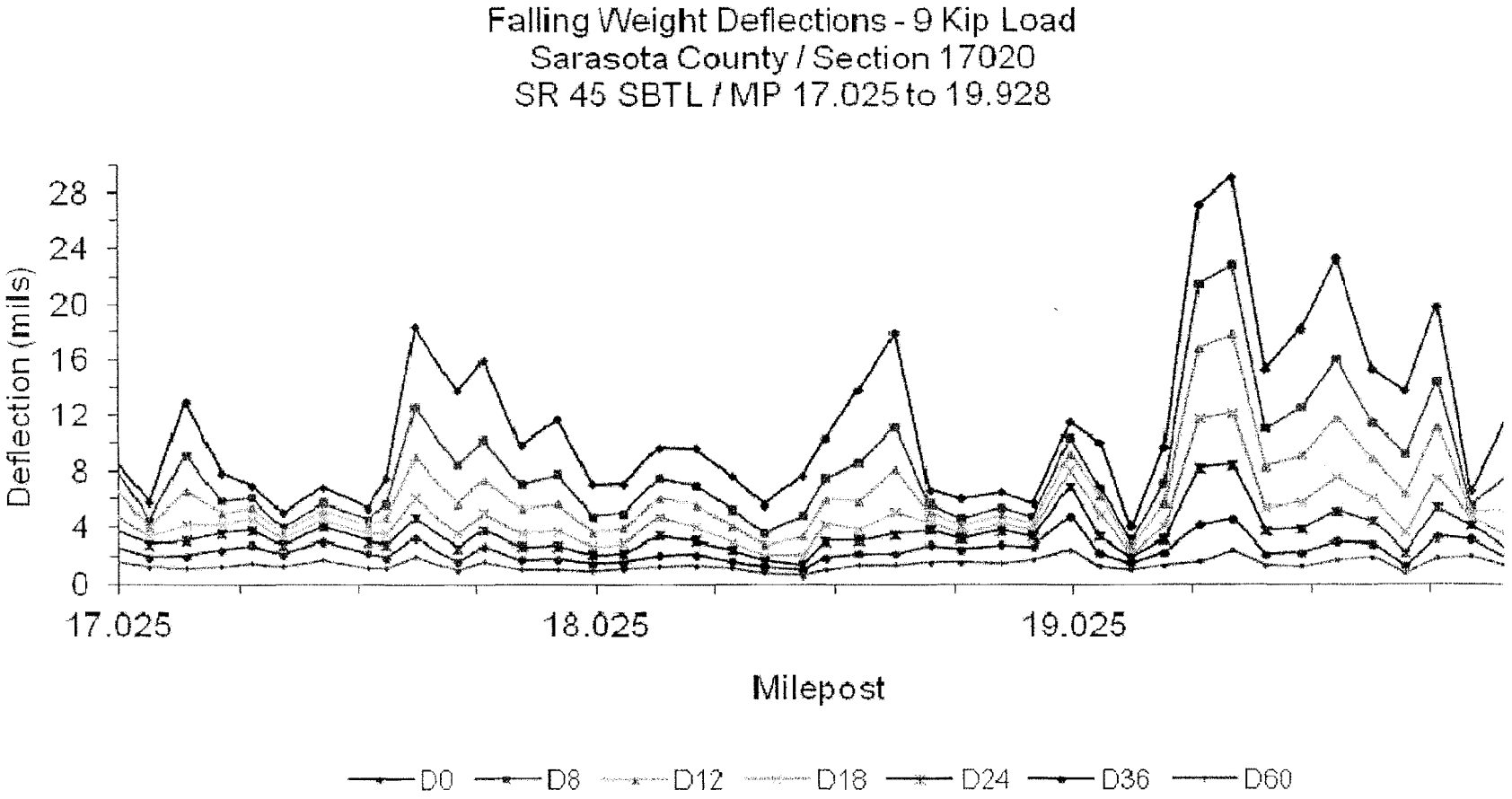
Please let me know if you need further assistance.

HSL/jbr

Attachment: Deflection Plots

Falling Weight Deflections - 9 Kip Load
Sarasota County / Section 17020
SR 45 NBTL / MP 17.025 to 19.928




Falling Weight Deflections - 9 Kip Load
Sarasota County / Section 17020
SR 45 SBTL / MP 17.025 to 19.928
Deflection (mils)
28
24
20
16
12
8
4
0
17.025
18.025
19.025
Milepost
D0
D8
D12
D18
D24
D36
D60

SUMMARY OF PAVEMENT SURVEY

COUNTY	Sarasota	GPR Test Date	8-Jan-13
PROJECT NO.	17020	MPSV Test Date	5-Sep-12
PFN	431311-1		
STATE ROAD	45		
MILEPOST LIMITS (SLMP)	17.011 to 19.928		

PAVEMENT TYPE

Milepost		Lanes			
From	To	L1	R1	L2	R2
17.011	19.928	F			

Legend:
F = Flexible, R = Rigid, B = Composite (HMA / PCC) and W = Composite (PCC/HMA)

Notes:

Please type your notes here.

SUMMARY STATISTICS & PLOT SETTINGS *(Please use the menu in this block to modify the settings.)*

Display: ☑ Statistics ☑ Plots

Data: ◉ Thickness for ◉ HMA ○ PCC
○ Cross Slope
○ Rut Depth

Lanes: ☑ All or ☑ L1R1 ☑ L2R2 ☑ L3R3 ☐ L4R4 ☐ L5R5 ☐ L6R6

Limits:

	Minimum	Maximum	Maj. Unit	Min. Unit
x	17.011	19.928	0.5	0.10
y	0.0	19.0	2.0	1.00

or [redacted]

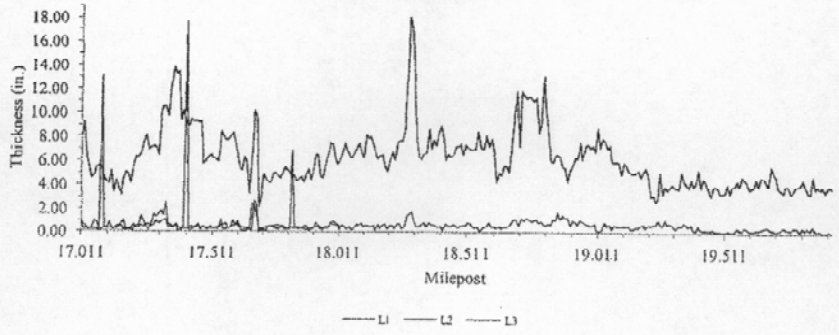
SUMMARY STATISTICS

Units: in.

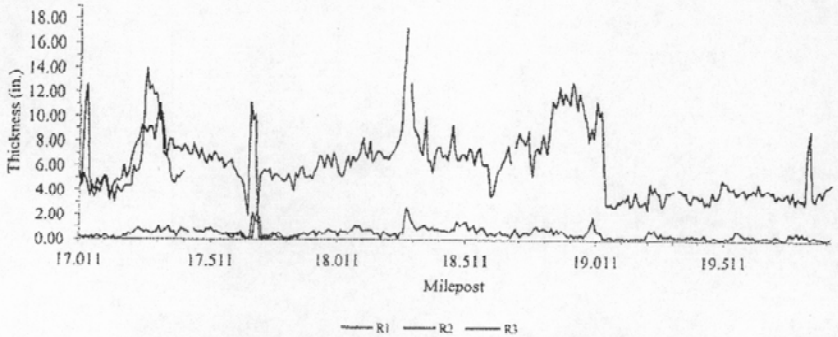
Lane #	L-Direction				R-Direction			
	Average	Stdev	Max.	Min.	Average	Stdev	Max.	Min.
1	6.23	2.4	18.07	2.16	6.06	2.43	17.27	1.92
2	0.5	0.34	2.47	0.05	0.52	0.37	2.59	0.02
3	0.83	2.18	17.62	0.01	3.83	3.84	13.89	0.02

PLOTS

Ground Penetrating Radar Pavement Thickness Survey
Sarasota County / Section 17020
SR 45 / MP 17.011 to 19.928



Ground Penetrating Radar Pavement Thickness Survey
Sarasota County / Section 17020
SR 45 / MP 17.011 to 19.928



Appendix C

Asphalt/Milling Recommendations and Pavement Cores

DISTRICT I&VII MATERIALS

PAVEMENT SURVEY AND EVALUATION REPORT

FOR

STATE ROAD (SR) 45 (US 41)
SARASOTA COUNTY

Financial Project Number 431311-1

Milepost (MP) 17.200 TO Milepost (MP) 19.397

PAVEMENT SURVEY AND EVALUATION REPORT

FOR

STATE ROAD (SR) 45 (US 41)
SARASOTA COUNTY

Financial Project Number 431311-1

MP 17.200 MP 19.397
SECTION # 17020
FROM BROWNING STREET TO 11TH STREET

January 28, 2013

PREPARED BY
TIMOTHY L. CROUSE
ASPHALT FIELD INVESTIGATION COORDINATOR
MARLENE HEBERT
PAVEMENT DESIGN AND PERFORMANCE COORDINATOR

PAVEMENT SURVEY AND EVALUATION REPORT
SR 45 (US 41) FROM BROWNING STREET TO 11TH STREET

INTRODUCTION

This report represents an analysis of information collected during the above referenced pavement survey and evaluation. The 2.197 mile project, located in Sarasota County on SR 45 (US 41), begins at Browning Street and ends at 11th Street.

DESCRIPTION OF EXISTING TYPICAL SECTIONS

The typical section consists of four/six lane divided asphalt pavement roadway with curb and gutter shoulder.

CORING INFORMATION

24 cores were taken along the mainline and 5 cores were taken along the turn lanes. The coring layout is illustrated in appendix 3.

The coring location and information was obtained according to Section 3.2 of the 2006 Flexible Pavement Coring and Evaluation of the Materials Manual-Bituminous Materials. The data for the individual core samples is included in Appendix 1 (Pavement Evaluation Core and Condition Data).

ROADWAY SURFACE CONDITION

The overall condition of this section is fair with light to high severity fatigue cracking with low to high severity of patch areas. Cracking is the most serious distress identified during our pavement evaluation. Visibly top down cracks. The average asphalt depth in the travel lanes was 5.9 inches with minimum and maximum depths at 2.3 inches and 10.0 inches, respectively. The average asphalt depth in the turn lanes was 5.5 inches with minimum and maximum depths at 3.4 inches and 10.3 inches, respectively.

The latest pavement condition survey shows the pavement cracking index to be as shown below.

	LEFT ROADWAY		RIGHT ROADWAY	
Mile Post	Cracking	Pavement Age	Cracking	Pavement Age
17.173 – 17.940			8	19
17.173 – 18.604	9	19		
17.940 – 18.604			9.5	17
18.604 – 19.236	9	12		
18.604 – 19.257			7	12

Cross slope measurements were taken in specific locations and should not be considered the actual cross slope typical of this roadway. Cross slopes in specific locations can be found in Appendix 1.

BASE CONDITION

The material encountered in the mainline and turn lanes varied between limerock, shell, concrete and brick base.

REHABILITATION RECOMMENDATIONS

To develop a pavement design for the project we recommend milling the pavement as follows:

MAINLINE AND TURN LANES (SEE EXCEPTION BELOW)

- Mill 3.50" from the entire width and length of the existing asphalt pavement.

MAINLINE MP 19.003± to MP 19.260±

- Mill 1.50" from the entire width and length of the existing asphalt pavement.

We recommend utilizing overbuild to correct the existing cross slope if it is necessary. Do not use milling to achieve desired cross slope. It is the intent of this office to mill for the entire width and length of the project.

Appendix 2 provides a detail of the assumed pavement design used to develop the milling recommendation.

COMMENTS AND GENERAL NOTES

In addition to the recommendations made within this report, the following items should be considered when preparing the contract documents for the subject project:

Notes to the Designer

1. We recommend that all asphalt overlaying the existing curb and gutter be removed.

2. Due to the allowable construction tolerances specified in Section 327-4 of the Specifications and the frequency in which the preliminary pavement cores were taken, isolated areas of the base may be exposed.

3. Milling may need to be adjusted at the beginning and end of the project, side streets, bridge deck, approach slabs or areas in which constraints dictate. Appropriate plan details need to be illustrated in the plans in accordance with the Plans Preparation Manual (PPM).

Pay Item/Typical Section/General Notes

1. Existing asphalt and base that conflicts with the construction of widening or shoulders shall be removed.

2. The contractor should anticipate isolated areas could be exposed during the milling operation and shall require a prime cover prior to paving.

If this report is not used within three years, please contact this office.

Our identification of the differing pavement layers is based on visual classification as well as familiarity with the site. The actual classification may be different because of differential in asphalt mixes and how the roadway was previously constructed. The information in this report is based on the conditions found at the time of our investigation. The engineer shall notify us if the type of work proposed for the project changes and/or existing conditions change prior to the letting of the project. This report is based on the fact the project will be designed and constructed in accordance with the Standard Specifications, Roadway Design Standard Index, Flexible Pavement Design Manual and other available information unless stated otherwise within this report.
Please contact this office if additional service or have any questions regarding this report.

1-30-13

Robert D Lopes, P.E. 68427
District Bituminous Engineer

NORTH BOUND


01/04/2013


01/04/2013


01/04/2013


01/04/2013


01/04/2013


01/04/2013


01/04/2013


CHASE
01/04/2013

SOUTH BOUND


01/04/2013


01/04/2013


01/04/2013


01/04/2013


01/04/2013


01/04/2013


01/04/2013


01/04/2013

APPENDIX

1. Pavement Evaluation Core and Condition Data

2. Assumed Pavement Design Used To Determine Milling Depths

3. Pavement Coring Layout

4. Asphalt Survey Request

5. Project Location Map

APPENDIX 1

Pavement Evaluation Core and Condition Data

PAVEMENT EVALUATION CORING AND CONDITION DATA

FIN PROJ: 431311-1-31-01
TYP SECT: 01

FA PROJ:
COUNTY: SARASOTA
SR NUMBER: SR 45

MEDIAN: 02 TRAFFIC SEPARATOR/CONCRETE CRB
CURBED: YES

NAME: US 41
FROM: BROWNING ST
TO: 11TH ST

BEG MP: 17.20
END MP: 19.39 LENGTH: 2.19

PROJECT MEASUREMENT: ENGLISH

CORED BY: TIM
DATE: 2013-01-16
LANES: 4 @ 12 FEET

SHOULDER TYPE
INSIDE: 6 CURB&
OUTSIDE: 6 CURB&
CURB & GUTTER: YES

PAVEMENT EVALUATION CORING AND CONDITION DATA

CORE NO.	MILE POST	VFY	LN	W P	--TOP	PAVEMENT LAYER				CORE LNGTH	BASE	SUB	CRACK DEPTH	CRACK TYP	CRACK CLSS	CRACK EXT	PMT CND	RUT DPTH	CROSS SLOPE		COMMENTS
					FC6	S	T1	BIND	SAHM		LR	STAB									
1	17.229	N	R1	Y	1.00	1.70	1.90	.80		5.40	8.5	12.0		C	IB	L	P	.30	1.80		
2	17.635	N	R2	Y	1.00	1.80	1.40	1.50		5.70	9.0	12.0		C	IB	M	P	.30	2.20		
3	18.000	N	R1	N	.70	2.80	.80	1.50		5.80	8.0	12.0		C	IB	L	F	.30	2.20		
4	18.373	N	R2	N	1.10	3.10	1.50	1.30		7.00	9.5	12.0		C	IB	L	P	.30			
					FC6	S	T1	BIND	SAHM		SHEL	STAB									
5	18.739	N	R1	N	1.20	1.60	1.70	.80	1.50	6.80	5.0	12.0	6.80	C	IB	L	F	.30	1.90		
					FC6	S	T1	BIND	SAHM		CONC	STAB									
6	19.150	N	R2	N	1.00	.80	.90			2.70	5.8	12.0	2.70	C	IB	L	P	.20	1.90		
					FC6	S	T1	BIND	SAHM		LR	STAB									
7	17.275	N	L1	Y	1.00	1.50	2.00	1.50		6.00	9.0	12.0		C	IB	S	P	.10	1.80		
8	17.641	N	L2	Y	1.00	1.30	3.30	1.80		7.40	10.0	12.0		C	IB	L	F	.30	I 1.90		
9	18.007	N	L1	N	.50	2.50	.80	1.70		5.50	10.0	12.0	5.50	C	IB	L	F	.30	1.80		
10	18.362	N	L2	N	.90	2.60	3.50	1.30		8.30	8.5	12.0		C	IB	L	F	.30	1.90		
					FC6	S	T1	BIND	SAHM		BRCK	STAB									
11	18.739	N	L1	N	.90	3.00	4.00	2.10		10.00	3.0	12.0		C	IB	L	F	.30	1.90		
					FC6	S	T1	BIND	SAHM		SHEL	STAB									
12	19.150	N	L2	N	1.20	1.50	2.00			4.70	12.0	12.0		C	IB	L	F	.30	1.90		
13	17.611	N	R1	N	.90	2.50				3.40	12.0	12.0		C	IB	L	F	.30	1.90		LT TURN
					FC6	S	T1	BIND	SAHM		ABC	STAB									
14	18.249	N	R1	N	.90	2.50				3.40	8.0	12.0		C	IB	S	P	.30	1.90		LT TURN
					FC6	S	T1	BIND	SAHM		SHEL	STAB									
15	18.739	N	R1	N	.80	4.20	2.00	1.50	1.80	10.30	4.0	12.0		C	IB	L	F	.30	1.90		LT TURN
					FC6	S	T1	BIND	SAHM		LR	STAB									
16	17.747	N	R3	N	.90	1.10	.70	1.90		4.60	10.0	12.0		C	IB	L	F	.30	1.90		RT TURN
17	18.362	N	L2	N	1.00	2.00	1.40	1.40		5.80	8.5	12.0		C	IB	L	P				RT TURN
18	18.866	N	L3	N	1.10	.50	1.50	1.70		4.80	10.0	12.0		C	IB	L	F				
					FC6	S	T1	BIND			SHEL	STAB									
19	18.804	N	R2	N	1.10	1.50	6.00			8.60	10.0	12.0		C	IB	M	P				
					FC6	S	T1	BIND			LR	STAB									
20	18.927	N	R2	N	1.00	2.00	3.70			6.70	10.0	12.0		C	IB	L	P				
21	19.042	N	R2	N	.80	3.20	5.00			9.00	9.0	12.0		C	IB	L	F				
					FC6	S	T1	BIND			BRCK	STAB									
22	19.057	N	R2	N	.80	1.30	4.50			6.60	2.3	12.0		C	IB	M	F				
					FC6	S	T1	BIND			CONC	STAB									
23	19.066	N	R2	N	.80	2.50	2.00			5.30	6.4	12.0		C	IB	L	F				
					FC6	S	T1	BIND			LR	STAB									
24	19.232	N	R2	N	1.50	1.70	3.00			6.20	8.0	12.0		C	IB	L	F				
25	19.341	N	R2	N	1.00	2.00	.80			3.80	8.0	12.0		C	IB	L	F				
					FC6	S	T1	BIND			CONC	STAB									
26	19.223	N	L1	N	.70	2.00				2.70	5.8	12.0		C	IB	L	F				
					FC6	S	T1	BIND			SHEL	STAB									
27	19.210	N	L1	N	.70	1.60				2.30	2.0	12.0		C	IB	L	F				
					FC6	S	T1	BIND			BRCK	STAB									
28	19.050	N	R1	N	1.10	1.50	3.00			5.60	2.3	12.0		C	IB	S	P				
					FC6	S	T1	BIND			CONC	STAB									
29	19.066	N	R1	N	.80	2.00	1.00			3.80	6.0	12.0		C	IB	L	F				

CODE DESCRIPTIONS

CRACK TYPE	TYPE DESCRIPTION
A	ALLIGATORING IN WHEELPATH
B	BLOCK CRACKING
C	COMBINATION OF TYPES

CRACK EXTNT	EXTENT DESCRIPTION
L	LIGHT
M	MEDIUM
S	SEVERE

CRACK CLASS	CLASS DESCRIPTION
IB	UNKNOWN
II	UNKNOWN
III	UNKNOWN

CODE DESCRIPTIONS

SURFACE LAYER CODE	DESCRIPTION
ARMI	ASPHALT RUBBER MEMBRANE INTERL
BIND	ASPHALT BINDER COURSE
BRCK	BRICK PAVERS
CONC	PORTLAND CEMENT CONCRETE
CRL	CRACK RELIEF LAYER
FAB	PAVEMENT OVERLAY FABRIC
FC	FRICTION COURSE
FC1	FRICTION COURSE 1
FC2	FRICTION COURSE 2
FC3	FRICTION COURSE 3
FC4	FRICTION COURSE 4
FC5	FRICTION COURSE 5
FC5B	FRICTION COURSE 5 BONDED
FC6	FRICTION COURSE 6
F12M	FRIC. COURSE 12.5 MODIFIED
F125	FRICTION COURSE 12.5
F95	FRICTION COURSE 9.5
F95M	FRIC. COURSE 9.5 MODIFIED
S	TYPE S ASPHALTIC CONCRETE
SAHM	SAND ASPHALT HOT MIX
SP1C	9.5 SUPERPAVE COARSE GRADED
SP1F	9.5 SUPERPAVE FINE GRADED
SP2C	12.5 SUPERPAVE COARSE GRADED
SP2F	12.5 SUPERPAVE FINE GRADED
SP3C	19.0 SUPERPAVE COARSE GRADED
SP3F	19.0 SUPERPAVE FINE GRADED
ST	SURFACE TREATMENT
S1	TYPE S-I ASPHALTIC CONCRETE
S2	TYPE S-II ASPHALTIC CONCRETE
S3	TYPE S-III ASPHALTIC CONCRETE
T1	TYPE I ASPHALTIC CONCRETE
T2	TYPE II ASPHALTIC CONCRETE
T3	TYPE III ASPHALTIC CONCRETE
UNIM	UNIMPROVED SURFACE
UNKW	UNKNOWN
WC	WEARING COURSE
WC1	WEARING COURSE 1
WC2	WEARING COURSE 2
WC3	WEARING COURSE 3
WC4	WEARING COURSE 4
WC5	WEARING COURSE 5
WC6	WEARING COURSE 6
WC7	WEARING COURSE 7
WC8	WEARING COURSE 8

APPENDIX 2

Assumed Pavement Design Used To Determine Milling Depths

Assumed Pavement Design Used To Determine Milling Depths

Design Sketch Not Drawn To Scale

<table>
<tr><th colspan="2">MAINLINE AND TURN LANES</th><th>MP 19.003 – 19.260</th></tr>
<tr><td colspan="2">FC -12.5/ 1.5”</td><td>FC-12.5/ 1.5”
Mill 1.5”</td></tr>
<tr><td colspan="2" rowspan="2">SP-12.5 – 2.0”
Mill 3.5”</td><td>Remaining Asphalt</td></tr>
<tr><td rowspan="3">Existing Base – Brick or Concrete</td></tr>
<tr><td>Remaining Asphalt after milling</td><td>Remaining Asphalt after milling</td></tr>
<tr><td>Existing Base</td><td>Existing Base</td></tr>
<tr><td>Subgrade</td><td>Subgrade</td><td>Subgrade</td></tr>
</table>

Note:

- **Structural requirements were not calculated in this design.**
- **In the event that the depicted pavement design will not be adequate based on structural calculations, overbuild thickness should be adjusted to meet the required structural number and/or other constructability purposes. If modification to the milling depth will be necessary to meet the required structural number contact this office for a revised recommendation.**

APPENDIX 3

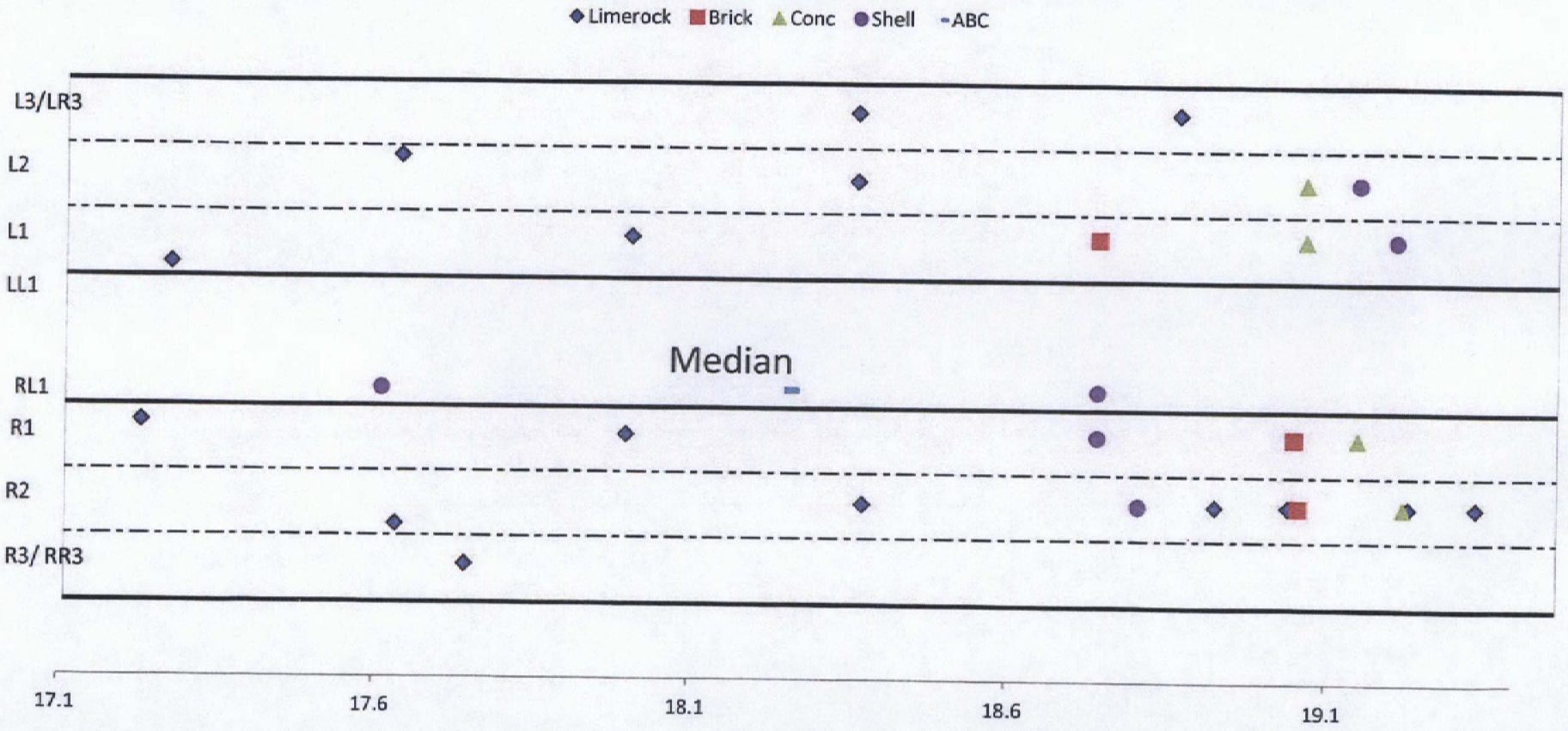
Section Map & Coring Layout

431311-1 SR 45 (US 41) SARASOTA COUNTY

MAINLINE									TOTAL ASPHALT THICKNESS	SUB-BASE					
CORE	MP	LANE	W/P	FC4	S	T1	BIND	SAHM		BRICK	CONC	SHEL	LR	STAB	COMMENTS
1	17.229	R1	Y	1	1.7	1.9	0.8		5.4				8.5	12	
2	17.635	R2	Y	1	1.8	1.4	1.5		5.7				9	12	
3	18.000	R1	N	0.7	2.8	0.8	1.5		5.8				8	12	
4	18.373	R2	N	1.1	3.1	1.5	1.3		7				9.5	12	
5	18.739	R1	N	1.2	1.6	1.7	0.8	1.5	6.8			5		12	
6	19.150	R2	N	1	0.8	0.9			2.7		5.8			12	
7	17.275	L1	Y	1	1.5	2	1.5		6				9	12	
8	17.641	L2	Y	1	1.3	3.3	1.8		7.4				10	12	
9	18.007	L1	N	0.5	2.5	0.8	1.7		5.5				10	12	
10	18.362	L2	N	0.9	2.6	3.5	1.3		8.3				8.5	12	
11	18.739	L1	N	0.9	3	4	2.1		10	3				12	
12	19.150	L2	N	1.2	1.5	2			4.7			12		12	
18	18.866	L3	N	1.1	0.5	1.5	1.7		4.8				10	12	
19	18.804	R2	N	1.1	1.5	6			8.6			10		12	
20	18.927	R2	N	1	2	3.7			6.7				10	12	
21	19.042	R2	N	0.8	3.2	5			9				9	12	
22	19.057	R2	N	0.8	1.3	4.5			6.6	2.3				12	
23	19.066	R2	N	0.8	2.5	2			5.3		6.4			12	
24	19.232	R2	N	1.5	1.7	3			6.2				8	12	
25	19.341	R2	N	1	2	0.8			3.8				8	12	
26	19.223	L1	N	0.7	2				2.7		5.8			12	
27	19.210	L1	N	0.7	1.6				2.3			2		12	
28	19.050	R1	N	1.1	1.5	3			5.6	2.3				12	
29	19.066	R1	N	0.8	2	1			3.8		6			12	
AVG				0.954	1.917	2.468	1.455	1.500	5.863	2.533	6.000	7.250	9.038	12.000	

TURN LANES/CROSSOVERS									TOTAL ASPHALT THICKNESS	SUB-BASE					
CORE	MP	LANE	W/P	FC4	S	T1	BIND	SAHM			ABC	SHEL	LR	STAB	COMMENTS
13	17.611	RL1	N	0.9	2.5				3.4			12		12	
14	18.249	RL1	N	0.9	2.5				3.4		8			12	
15	18.739	RL1	N	0.8	4.2	2	1.5	1.8	10.3			4		12	
16	17.747	RR3	N	0.9	1.1	0.7	1.9		4.6				10	12	
17	18.362	LR3	N	1	2	1.4	1.4		5.8				8.5	12	
AVG				**0.900**	**2.460**	**1.367**	**1.600**	**1.800**	**5.500**		**8.000**	**8.000**	**9.250**	**12.000**	

PAVEMENT CORING LAYOUT



APPENDIX 4

Pavement Survey Request

Florida Department of Transportation

RICK SCOTT
GOVERNOR

ANANTH PRASAD
SECRETARY

MEMORANDUM

Date: **December 5, 2012**

To **Marlene Hebert: MS 1-9**

From: **James E. Watts, Project Manager**

Copies: **File**

Subject: **REQUEST FOR ASPHALT SURVEY**
FM No.: **431311-1**
State Project No.: **45 (US 41)**
County/Section: **Sarasota / 17020-000**
Description: **From Browning St. To 11th St.**
Begin MP **17.200** End MP **17.310**

BACKGROUND INFORMATION: Skid Hazard **RRR** Intersection Safety
(Shoulder/Widening)
Scope of Project: ~~Resurfacing~~

Review of Project by Project Manager: _____

Typical Section: *Urban Rural Spec Year:* _____ *Friction Course Type: FC-5 FC-12.5 or 9.5*

Traffic Data: *ESAL* _____ *(M_R)* _____ *Traffic Level: A B C D*

Cracking: *Longitudinal Horizontal Alligator*

Pavement Condition: *Rutting Cracking Shoving Spalling*

Change in Pavement: *Sections with noticeable change Mile Post/Lane* _____
Major patches/repairs to Roadway Mile Post/Lane _____
Pavement Depressions Mile Post/Lane _____

Structures: *Bridges Manholes Tractor Crossings Cross Drain*

Areas of Concern: *Additional cores should be taken at:* _____

These attached items are for your information in obtaining the necessary asphalt data needed for our preparation of the pavement design package:

Location Map **X** Plan and Profile Sheet___ Proposed Typical Sections___ Old Pavement Typical

Is this a "Goes With" project? If so, Lead Project Number _____

In your signed and sealed report please provide the types of asphalt and their thicknesses, the type of base and thickness, the type of stabilization and thickness, the condition of the roadway surface, and a milling recommendation.

Charge to Financial Project ID **431311-1-31-01** for all preliminary engineering work performed on this project. In order to keep our project on schedule, we are requesting a return ~~date of~~ **~~Feb. 1, 2013~~**

If you have any questions, please contact me at **James E. Watts (863) 519-2542**

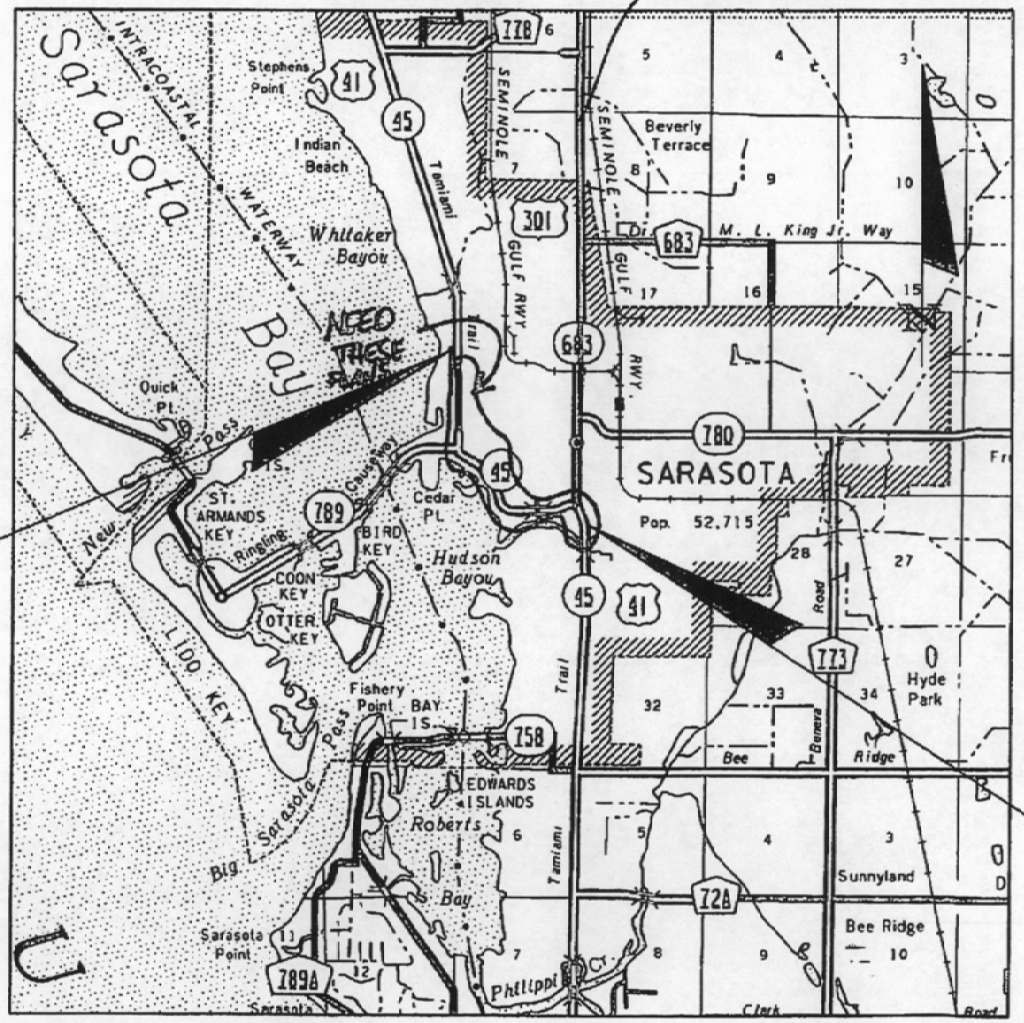
APPENDIX 5

Project Location Map

SR 45/US 41
SECTION 17020
FPID 431311-1

R 17 E
R 18 E

THESE PLANS WERE SENT



END PROJECT
11TH ST.
MP 19.390

T 36 S
T 37 S

BEGIN PROJECT
(BROWNING ST.)
MP 17.200

FLORIDA DEPARTMENT OF TRANSPORTATION

ALL SYSTEM PAVEMENT CONDITION FORECAST

PAVEMENT IMPROVEMENT PROJECTS IN FM WPA TENTATIVE PLAN -- 2013 - 2018, EXTRACTED ON 09/28/2012

SORT BY RDWYID MILEPOST R ASCENDING L DESCENDING

DISTRICT = 1 COUNTY = SARASOTA

RDWYID / SR / US / INTERSECT AT (MP|SIDE) / ITMSEG-P / CONTRACTOR (AGE_ONE_YEAR) / ITMSEG-F	BMP / G_BMP / W_BMP	EMP / G_EMP / W_EMP	RW / LN / FY-P / FY-F	SYS / %T / SURFTYPE / ASTYPE / WKMX-P / WKMX-F	TYP SPD / AADT	DISTRESS RATINGS	SURVEYED YEAR 1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	FUTURE 2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2017 (FAST)
17010000 45 SALFORD BLVD(0.2C) 1980241 BETTER ROADS INC	0.000 0.000 (2000)	4.270 4.320	L 2 C 1999	1 3.1 FC5 0012 SPRIDE	1 45 29500 0012	CRACKING RIDE CRACKING RIDE	10.0 8.3 10.0 8.6	10.0 8.6 10.0 8.8	10.0 8.2 10.0 8.8	9.4 8.3 10.0 8.5	10.0 8.3 9.0 7.9	7.0 8.4 9.0 7.9	7.0 8.5 9.0 7.3	7.0 8.5 9.0 7.9	7.0 8.7 9.0 7.8	7.0 8.5 9.0 7.7	7.0 8.6 9.0 7.8	7.0 8.6 9.0 7.8	7.0 8.1 9.0 7.7	7.0 8.1 5.0* 7.4
17020000 45 CR 772 VENICE AVE E(0.0R) 1980051 GLF CONSTRUCTION CORPORATI	0.000 0.000 (2006)	0.585 0.685	R 2 C 2000	1 3.6 FC3 0002 S	1 40 15300 0002	CRACKING RIDE CRACKING RIDE	10.0 8.3	10.0 8.4	10.0 8.0 9.5 7.2	10.0 8.3	10.0 7.9	10.0 8.3	10.0 8.1 10.0 7.4	10.0 7.3 10.0 7.0	10.0 8.1 9.0 7.0	10.0 7.5 9.0 7.1	10.0 7.8 9.0 7.2	10.0 8.0 9.0 7.3	10.0 8.5 9.0 7.1	7.5 6.9
17020000 45 TURNOUT(0.6R) (2010)	0.585 	3.700 	R 3 	1 4.4 FC5 	1 45 36500 	CRACKING RIDE CRACKING RIDE	9.4 8.2 10.0 8.0	9.4 8.2 10.0 8.0	9.4 7.6 9.5 8.1	5.5* 7.6 9.5 7.8	4.0* 7.4 9.5 7.6	0.0* 6.6 8.0 7.5	10.0 8.1 7.5 7.4	10.0 8.2	10.0 8.6	10.0 8.4	10.0 8.5 10.0 8.0	10.0 8.5 10.0 7.6	10.0 8.1 10.0 7.6	9.0 7.4
17020000 45 UNSIGNED(4.0R) 1980441 APAC-FLORIDA INC	3.700 3.911 (2003)	4.258 4.253	R 3 C 2002	1 4.3 FC5 0012 SPRIDE	1 55 34500 0012	CRACKING RIDE CRACKING RIDE	10.0 8.2 4.5* 7.7	10.0 8.1 4.5* 8.0	9.4 7.5 4.5* 7.8	9.4 8.3 10.0 8.4	10.0 8.2 10.0 7.7	9.0 8.1 10.0 7.8	9.0 7.6 10.0 8.0	9.0 8.2 10.0 7.8	9.0 7.6 10.0 7.7	6.5 7.6 10.0 8.0	6.5 7.6 10.0 8.0	6.5 7.6 10.0 7.8	4.5* 7.7 10.0 7.6	7.5 7.3
17020000 45 GULF AVE(4.3R) 1979872 APAC-SOUTHEAST, INC	4.258 4.244 (2011)	7.350 7.350	R 2 C 2009	1 4.3 FC4 0012 	1 55 34500 0012	CRACKING RIDE CRACKING RIDE	9.4 8.5 10.0 8.4	9.4 8.5 9.5 8.4	8.4 8.4 8.0 8.5	7.3 7.9 6.5 8.2	3.5* 7.9 6.5 7.8	0.0* 6.6 6.5 7.8	10.0 7.9 6.5 7.6	10.0 8.7 6.5 7.6	10.0 8.6 4.5* 7.3	10.0 8.2 4.5* 7.0	10.0 8.3	10.0 8.8 10.0 7.6	10.0 8.5 10.0 7.5	8.5 7.4
17020000 45 BAY ST(7.4C) 1978372 APAC-SOUTHEAST, INC	7.350 9.680 (2010)	9.680 9.680	R 2 C 2009	1 2.6 FC125 0012 	1 55 34000 0012	CRACKING RIDE CRACKING RIDE	9.4 8.5 10.0 8.5	9.4 8.5 9.5 8.4	8.4 8.4 8.0 8.5	7.3 7.9 6.5 8.2	3.5* 7.9 6.5 7.8	0.0* 6.6 6.5 7.8	 6.5 7.6	10.0 8.8 6.5 7.6	10.0 8.6 4.5* 7.3	10.0 8.5 4.5* 7.0	10.0 8.6 10.0 8.4	10.0 8.7 10.0 8.4	10.0 8.6 10.0 8.4	9.0 8.2
17020000 45 ENT SARA SQ MALL(9.9R) 1979741 GATOR ASPHALT CO 4291311	9.680 7.355 (1994) 9.620	12.138 12.130 12.147	R 2 C 1992 C 2014	1 2.3 FC2 0220 S 0012	1 45 31068 0012	CRACKING RIDE CRACKING RIDE	9.4 8.5 10.0 8.5	9.4 8.5 9.5 8.4	8.4 8.4 8.0 8.5	7.3 7.9 6.5 8.2	3.5* 7.9 6.5 7.8	0.0* 6.6 6.5 7.8	 6.5 7.6	10.0 8.8 6.5 7.6	10.0 8.6 4.5* 7.3	10.0 8.5 4.5* 7.0	10.0 8.6 4.5* 7.5	10.0 8.7 4.5* 7.3	10.0 8.6 3.5* 7.3	1.0* 7.0
17020000 45 MOBILE ESTATES DR S(12.2R) 1979551 PCL CIVIL CONSTRUCTORS INC	12.138 12.567 (1997)	15.230 15.247	R 3 C 1993	1 2.9 FC4 0005 S	1 45 44500 0005	CRACKING RIDE CRACKING RIDE	8.7 7.1 10.0 8.0	8.7 7.2 10.0 8.0	7.7 6.7 10.0 8.3	8.7 7.1 10.0 7.6	7.0 7.1 10.0 7.6	7.5 7.4 10.0 7.6	9.0 7.3 10.0 7.7	9.0 7.2 10.0 7.8	9.0 7.6 10.0 7.5	 10.0 7.4	10.0 8.5 10.0 7.4	10.0 8.4 10.0 7.3	10.0 8.1 9.5 7.3	8.0 7.1
17020000 45 BAY RD(15.3R) 4218301 AJAX PAVING INDUSTRIES, IN	15.230 15.248 (2010)	17.173 17.206	R 3 C 2008	1 2.9 0012	1 45 60000 0012	CRACKING RIDE CRACKING RIDE	9.4 7.7 9.0 7.6	9.4 7.2 9.0 7.5	8.4 7.1 10.0 7.4	8.4 7.4 10.0 7.0	7.0 7.2 10.0 6.9	6.5 6.6 10.0 6.8	9.0 6.7 10.0 7.0	9.0 6.6 9.0 7.0	9.0 6.6 9.0 7.0	9.0 6.5 9.0 6.6	9.0 7.2 10.0 8.3	9.0 7.6 10.0 8.2	9.0 7.7 10.0 7.9	9.0 7.7
17020000 45 BROWNING ST(17.2R) (1994) 4313111	17.173 17.200	17.940 19.397	R 2 C 2016	1 2.5 0012	1 40 37000 	CRACKING RIDE CRACKING RIDE	9.4 7.3 10.0 7.4	9.4 6.8 10.0 7.2	9.4 7.0 10.0 7.1	9.4 7.2 10.0 7.2	10.0 7.0 10.0 6.8	10.0 7.6 10.0 6.7	10.0 7.5 10.0 6.7	10.0 7.6 10.0 6.8	10.0 7.3 10.0 6.8	10.0 7.9 10.0 6.2	10.0 7.5 9.5 6.2	10.0 8.2 9.5 6.2	10.0 7.4 8.0 6.1	6.5 5.9
17020000 45 GULFSTREAM AVE S(18.1R) (1996) 4313111	17.940 17.200	18.604 19.397	R 2 C 2016	1 2.5 0012	1 40 37000 	CRACKING RIDE CRACKING RIDE	9.4 7.3 10.0 7.8	9.4 6.8 10.0 7.5	9.4 7.0 10.0 7.4	9.4 7.2 10.0 7.0	10.0 7.0 10.0 7.2	10.0 7.6 10.0 7.2	 10.0 7.1	10.0 8.2 10.0 6.9	10.0 8.2 10.0 7.0	10.0 7.9 10.0 6.8	10.0 8.3 10.0 7.0	10.0 8.2 9.5 7.0	10.0 7.9 9.5 6.9	8.0 6.7

"**" INDICATES PAVEMENT DEFICIENT (ANY RATING <=6); START 2006, RIDE RATING OF 6 NOT CONSIDERED DEFICIENT WHEN SPEED LIMIT < 50 MPH.
"**" INDICATES PAVEMENT DEFICIENT (ANY RATING <=6); START 2002, RIDE RATING OF 6 NOT CONSIDERED DEFICIENT WHEN SPEED LIMIT < 45 MPH.
"@" INDICATES G1 PROJECT LENGTH SHORTER THAN ROADWAY SEGMENT 1 MILE OR MORE.
2017 FORECASTED BY FLORIDA'S ANALYSIS SYSTEM FOR TARGETS (FAST).

FLORIDA DEPARTMENT OF TRANSPORTATION

ALL SYSTEM PAVEMENT CONDITION FORECAST

PAVEMENT IMPROVEMENT PROJECTS IN FM WPA TENTATIVE PLAN -- 2013 - 2018, EXTRACTED ON 09/28/2012

SORT BY RDWYID MILEPOST R ASCENDING L DESCENDING

DISTRICT = 1 COUNTY = SARASOTA

RDWYID BMP EMP RW SYS TYP SPD	DISTRESS	SURVEYED YEAR													FUTURE
SR US G_BMP G_EMP LN %T AADT	RATINGS	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	
INTERSECT AT (MP|SIDE) SURFTYPE	========														
ITMSEG-P W_BMP W_EMP RW FY-P WKMX-P															
CONTRACTOR (AGE ONE YEAR) ASTYPE		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2017
ITMSEG-F W_BMP W_EMP RW FY-F WKMX-F															(FAST)
17020000 18.604 19.257 R 1 1 40	CRACKING	7.0	7.0	7.0	7.0	7.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	6.5	
45 41 2 2.7 40500	RIDE	5.9*	6.3*	6.5	5.8*	6.9	5.3*	5.9*	4.8*	4.8*	5.1*	5.1*	5.2*	4.2*	
GULFSTREAM AVE(18.6R) FC3															
1980341 18.643 19.283 C 1999 0012	CRACKING	6.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	8.5	8.5	7.0	7.0	5.5*
GATOR ASPHALT PAVING, INC.(2001) S	RIDE	3.9*	8.2	7.3	6.8	5.9	6.6	6.2	6.1	6.2	5.9	5.5	5.5	5.2*	5.0*
4313111 17.200 19.397 C 2016 0012															
17020000 19.257 22.085 R 1 1 45	CRACKING	9.4	9.4	8.7	10.0	10.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	
45 41 2 2.2 37500	RIDE	8.6	7.4	7.9	7.8	7.5	7.1	7.1	7.0	7.4	7.2	7.4	7.3	6.2*	
TENTH ST(19.3R) FC125															
1977672 19.357 22.048 R 2004 0012	CRACKING	9.0	9.0	9.0	9.0	9.0	9.0	7.5	10.0	10.0	10.0	10.0	10.0	10.0	8.5
AJAX PAVING INDUSTRIES, IN(2007)	RIDE	6.3*	6.6	6.3*	6.0*	5.9*	5.8*	5.7	7.6	7.5	7.4	7.4	7.3	7.2	7.0
17020000 22.085 22.390 R 1 1 45	CRACKING	9.4	9.4	8.7	10.0	10.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	
45 41 3 2.7 38500	RIDE	8.6	7.4	7.9	7.8	7.5	7.1	7.1	7.0	7.4	7.2	7.4	7.3	6.2*	
GEN SPAATZ BLVD(22.2R) FC4															
1977671 19.275 22.406 C 1983 0216	CRACKING	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	7.5
MACASPHALT A DIVISION OF (1986)	RIDE	6.3*	6.6	7.4	7.0	6.4*	6.8	6.6	7.0	6.8	6.6	6.7	6.6	6.5	6.3
17020000 22.045 22.390 L 1 1 45	CRACKING	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
45 41 3 2.7 38500	RIDE	8.2	7.5	7.1	7.6	7.0	7.9	7.7	8.2	8.0	8.0	8.0	8.1	6.5	
COLLEGE DR(22.2L)															
	CRACKING	9.0	9.0	10.0	10.0	10.0	10.0	10.0	10.0	9.0	9.0	9.0	9.0	9.0	7.5
(1992)	RIDE	6.2*	6.3*	7.9	7.6	7.4	7.6	7.6	7.3	7.2	7.3	7.3	7.5	7.3	7.1
17020000 19.236 22.045 L 1 1 45	CRACKING	10.0	10.0	10.0	10.0	10.0	9.0	9.0	9.0		10.0	10.0	10.0	10.0	
45 41 2 2.7 40500	RIDE	8.2	7.5	7.1	7.6	7.0	7.1	6.9	6.8		7.1	7.2	7.2	6.5	
10TH ST(19.3L) FC125															
1977672 19.357 22.047 L 2004 0012	CRACKING	9.0	9.0	9.0	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0	10.0	10.0	8.0
AJAX PAVING INDUSTRIES, IN(2007)	RIDE	6.2*	6.3*	6.0*	5.7*	5.5*	5.6*	5.5	7.3	6.5	7.4	7.3	7.3	7.0	6.7
17020000 18.604 19.236 L 1 1 40	CRACKING	8.4	8.4	8.4	10.0	10.0	10.0	9.0	10.0	10.0	10.0	10.0	10.0	9.0	
45 41 2 2.7 40500	RIDE	7.2	6.3*	6.5	7.6	7.2	6.9	6.6	5.2*	5.2*	5.8*	6.1*	6.3*	4.8*	
JOHN RINGLING BLVD(18.6L) FC3															
1980341 18.643 19.283 C 1999 0012	CRACKING	9.0	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.0	9.0	9.0	9.0	7.5
GATOR ASPHALT PAVING, INC.(2001) S	RIDE	4.6*	7.1	6.7	6.4	6.1	6.6	6.6	6.4	6.3	6.5	6.7	5.7	5.6	5.4*
4313111 17.200 19.397 C 2016 0012															
17020000 17.173 18.604 L 1 1 40	CRACKING	9.4	9.4	9.4	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	
45 41 2 2.5 37000	RIDE	7.6	6.8	7.1	7.6	7.2	6.9		7.7	8.2	8.2	8.4	8.3	8.2	
BAY ST(17.3L)															
	CRACKING	10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	7.5
(1994)	RIDE	8.1	7.3	7.3	7.1	6.7	6.7	6.7	6.3	6.3	6.4	6.5	6.6	6.8	6.6
4313111 17.200 19.397 C 2016 0012															
17020000 15.250 17.173 L 1 1 45	CRACKING	8.7	8.7	7.7	7.0	3.5*	3.5*	6.5	6.5	6.5	6.5	6.5	10.0	10.0	
45 41 3 2.9 60000	RIDE	6.8	6.3*	6.8	7.1	6.6	6.1*	6.0*	5.7*	5.7*	5.7*	6.7	7.1	7.1	
SR758/BAY RD(15.3L)															
4218301 15.248 17.206 C 2008 0012	CRACKING	10.0	10.0	9.0	9.0	9.0	9.0	9.0	8.0	8.0	8.0	10.0	10.0	10.0	9.0
AJAX PAVING INDUSTRIES, IN(2010)	RIDE	7.6	7.5	7.5	7.4	7.0	6.9	6.8	7.5	6.7	6.7	8.3	8.2	8.2	8.0
17020000 12.138 15.250 L 1 1 45	CRACKING	7.0	7.0	7.0	6.2*	3.5*	3.5*	5.5*	4.5*	4.5*		10.0	10.0	10.0	
45 41 3 2.9 44500	RIDE	7.6	6.9	7.1	7.3	7.2	6.8	6.5	6.8	6.2*		8.6	8.5	8.3	
BAYWOOD DR(12.1L) FC4															
1979551 12.567 15.247 C 1993 0005	CRACKING	10.0	10.0	9.0	9.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	6.5
PCL CIVIL CONSTRUCTORS INC(1997) S	RIDE	7.6	7.5	7.5	7.4	7.0	6.9	6.8	7.5	6.7	6.7	7.9	7.8	7.9	7.7
17020000 9.685 12.138 L 1 1 45	CRACKING	9.4	9.4	8.4	5.5*	3.5*	0.0*		10.0	10.0	10.0	10.0	10.0	10.0	
45 41 2 2.3 31068	RIDE	8.4	8.2	7.5	7.8	7.5	6.2*		8.9	8.8	8.5	8.9	8.7	8.6	
PELICAN OFFICE(9.9L) FC2															
1979741 7.355 12.130 C 1992 0220	CRACKING	10.0	9.5	9.5	9.0	9.0	7.5	6.5	3.5*	3.5*	3.5*	3.5*	3.5*	3.5*	1.0*
GATOR ASPHALT CO (1994) S	RIDE	8.6	8.5	8.6	8.4	8.0	8.0	7.8	7.8	7.3	7.5	7.8	7.7	7.7	7.4
4291311 9.620 12.147 C 2014 0012															
17020000 7.350 9.685 L 1 1 55	CRACKING	9.4	9.4	8.4	5.5*	3.5*	0.0*		10.0	10.0	10.0	10.0	10.0	10.0	
45 41 2 2.6 34000	RIDE	8.4	8.2	7.5	7.8	7.5	6.2*		8.9	8.8	8.5	8.9	8.7	8.6	
BAY ST(7.4C) FC125															
1978372 7.350 9.680 C 2009 0012	CRACKING	10.0	9.5	9.5	9.0	9.0	7.5	6.5	3.5*	3.5*	3.5*	10.0	10.0	10.0	9.0
APAC-SOUTHEAST, INC (2010)	RIDE	8.6	8.5	8.6	8.4	8.0	8.0	7.8	7.8	7.3	7.5	8.5	8.4	8.4	8.2

"*" INDICATES PAVEMENT DEFICIENT (ANY RATING <=6); START 2006, RIDE RATING OF 6 NOT CONSIDERED DEFICIENT WHEN SPEED LIMIT < 50 MPH.
"*" INDICATES PAVEMENT DEFICIENT (ANY RATING <=6); START 2002, RIDE RATING OF 6 NOT CONSIDERED DEFICIENT WHEN SPEED LIMIT < 45 MPH.
"@" INDICATES G1 PROJECT LENGTH SHORTER THAN ROADWAY SEGMENT 1 MILE OR MORE.
2017 FORECASTED BY FLORIDA'S ANALYSIS SYSTEM FOR TARGETS (FAST).

Appendix D

Miscellaneous Design Backup

CHAPTER 4

FRICTION COURSE POLICY

4.1 FRICTION COURSE OPTIONS

There are two general types of friction courses currently in use by the Department, dense graded and open graded. Their thickness is shown on the plans with spread rates determined by specification formula and paid for by the ton.

The Maximum Spread rate used for estimating quantities is as follows:

FC-9.5	110 lb/yd^2
FC-12.5	165 lb/yd^2
FC-5	80 lb/yd^2

Actual pay quantities will be based on the actual maximum specific gravity of the mixture used. Friction Course, FC-12.5 and FC-9.5 are dense graded mixes which are placed 1 1/□"and 1" thick respectively. These Friction Courses provide smooth riding surfaces with adequate friction numbers for skid resistance.

The FC-9.5 fine graded mix will allow a one-inch lift of friction course. On some projects this thinner lift may allow room for an additional structural or overbuild lift, as in some curb and gutter sections, without milling into the base or filling up the gutter.

The other friction course, FC-5, consists of an open graded material.

FC-5 is placed and shown on the typical section as approximately 3/4" thick. FC-5 provides a skid resistant surface. The open graded texture of the mix provides for the rapid removal of water from between the tire and the pavement to reduce the potential for hydroplaning at higher speeds.

A friction course will be placed on all roads with a design speed of 35 mph or higher, except for low volume two lane roads having a five year projected AADT from the opening year of 3000 vehicles per day or less. On multi lane roadways with a design speed of 50 mph or greater, FC-5 will be used. On all other roadways FC-12.5 or FC-9.5 will normally be used. When traffic level D or E structural mixture is used, call for PG 76-22 in the friction course. Table 4.1 summarizes these requirements.

TABLE 4.1

ASPHALT CONCRETE FRICTION COURSE SELECTION

The Following Asphalt Concrete Friction Course Selection Chart Is Required For Design Speed Of 35 mph or Greater.

All Projects

	Two Lane	Multi Lane
35 thru 45 mph	FC-12.5 or FC-9.5	FC-12.5 or FC-9.5
50 mph Or Greater	FC-12.5 or FC-9.5	FC-5

Low Volume Two Lane Roads

- Type SP Structural Course without a friction course may be used if the five years projected AADT from the opening year is less than 3000 vehicles per day.

4.2 FRICTION COURSE 12.5 AND FC-9.5

The following are some of the features of the use of FC-12.5 and FC-9.5:

- FC-12.5 and FC-9.5 are allowed directly on top of any structural course mix.

- FC-12.5 and FC-9.5 are considered part of the structural layer and may be considered as both a structural and friction course.

4.3 FRICTION COURSE 5 (FC-5)

The following are some of the limitations on the use of FC-5:

- Open graded friction courses such as FC-2 and FC-5 normally should not be overlaid (due to its potential to allow water into the pavement system) except when recommended by the District Materials Engineer.

- FC-5 should not sit after construction for more than four (4) months before being opened to traffic. If necessary, the FC-5 may need to be let under a separate contract.

- FC-5 can be used safely in all areas. If the majority of a project is FC-5 and the quantity of FC-12.5 or FC-9.5 would be less than 1000 tons, FC-5 can be used throughout the project.

- On multi lane non-limited access facilities, the District Bituminous Engineer may recommend to place FC-5 at intermediate median crossovers (see Figure 4.1 and 4.2) or in median areas of low volume intersections (see Figure 4.3) having a five year projected AADT from the opening year of 3000 or less.

TABLE 5.4

STRUCTURAL COEFFICIENTS FOR DIFFERENT PAVEMENT LAYERS

Group	Layer Type	Layer Coef. Per unit Thickness	Spec. Sect.
Friction Courses	FC-5	0.00	337
	FC-12.5, FC-9.5	0.44	337
Structural Courses	Superpave Type SP (SP-9.5, SP-12.5, SP-19.0)	0.44	334
Base Courses (General use)	Limerock (LBR 100)	0.18	200
	Cemented Coquina (LBR 100)	0.18	250
	Shell Rock (LBR 100)	0.18	250
	Bank Run Shell (LBR 100)	0.18	250
	Graded Aggregate (LBR 100)	0.15	204
	Type B-12.5	0.30	280
Base Courses (Limited use)	Limerock Stab. (LBR 70)	0.12	230
	Shell Stab. (LBR 70)	0.10	260
	Sand Clay (LBR 75)	0.12	240
	Soil Cement (500 psi)	0.20	270
	Soil Cement (300 psi)	0.15	270
Stabilization	Type B Stab. (LBR 40)	0.08	160-2
	Type B Stab. (LBR 30)	0.06	160-2
	Type C Stab.	0.06	160-2
Subgrade	Cement Treated (300 psi)	0.12	170
	Lime Treated	0.08	165

TABLE 5.5

RECOMMENDED MINIMUM THICKNESS FOR NEW CONSTRUCTION

In order to avoid the possibility of producing an impractical design, the following minimum thicknesses are recommended for New Construction. It is assumed that a 12"stabilized subgrade is to be constructed.

18-kip ESAL's 20 year period	Minimum Structural Course	Minimum Base Group
Limited Access	4"	9
Greater than 3,500,000	3"	9
Ramp	2"	9
300,000 to 3,500,000	2"	6
Less than 300,000	1 1/2"	3
Limited Access Shoulder	1 1/2"	1
Residential Streets, Parking Areas, Shoulder Pavement, Bike Paths	1"	1

FC-12.5 and FC-9.5 can be considered as structural courses and are sufficient for single layer shoulder pavement.

FC-5 has no structural value and is always shown as 3/4" thick. Also assume that a 12"Stabilized Subgrade (LBR-40) is to be used in order to establish a satisfactory working platform.

5.5.5 TRAFFIC LEVELS

TRAFFIC LEVELS FOR DESIGN EQUIVALENT SINGLE AXLE LOADS ($ESAL_D$) RANGE FOR SUPERPAVE ASPHALT CONCRETE STRUCTURAL COURSES

The following are the Traffic Levels for the Design Equivalent Single Axle Loads ($ESAL_D$) ranges for Superpave Asphalt Concrete Structural Courses

AASHTO DESIGN $ESAL_D$ RANGE (MILLION)	TRAFFIC LEVEL
< 0.3	A
0.3 to < 3	B
3 to < 10	C
10 to < 30	D
>= 30	E

TABLE 6.1

REDUCED STRUCTURAL COEFFICIENTS OF ASPHALT MATERIALS PER UNIT THICKNESS

Recommended Criteria

Good - No Cracking, minor rutting/distortion
Fair - Crack Rated 8 or higher, minor rutting and / or distortion
Poor - Cracking or Rutting rated 7 or less

Layer coefficients for granular base, subbase, and stabilizing are not reduced. Use the values shown in Table 5.4.

	Original	Pavement Condition		
Layer	**Design**	**Good**	**Fair**	**Poor**
FC-2 or FC-5	0			
FC-1 or FC-4	0.20	0.17	0.15	0.12
FC-3	0.22	0.20	0.17	0.15
FC-12.5 or FC-9.5	0.44	0.34	0.25	0.15
Type S or SP	0.44	0.34	0.25	0.15
Type I	0.37	0.30	0.23	0.15
Type II	0.20	0.17	0.15	0.12
Type III	0.30	0.25	0.20	0.15
Binder	0.30	0.25	0.20	0.15
ABC-1	0.20	0.17	0.14	0.10
ABC-2	0.25	0.20	0.16	0.12
ABC-3	0.30	0.25	0.20	0.15
Type B-12.5	0.30	0.25	0.20	0.15
SAHM	0.15	0.13	0.11	0.08
SBRM	0.15	0.13	0.11	0.08

5.5.6 LAYER THICKNESS

SPECIFICATION REQUIREMENTS ON LAYER THICKNESS FOR TYPE SP STRUCTURAL COURSES

The layer thickness must be consistent with the following thickness ranges:

FINE MIXES

Type Mix	Minimum	Maximum
SP-9.5	1"	1 ½"
SP-12.5	1 ½"	2 ½"
SP-19.0	2"	3"

In addition to the minimum and maximum thickness requirements, the following restrictions are placed on the respective material when used as a structural course:

SP-9.5 Limited to the top two structural layers, two layers maximum.

SP-9.5 May not be used on Traffic Level D and E applications.

SP-19.0 May not be used in the final (top) structural layer.

COARSE MIXES

Type Mix	Minimum	Maximum
SP- 9.5	1½"	2"
SP-12.5	2"	3"
SP-19.0	3"	3½"

In addition to the minimum and maximum thickness requirements,

SP-19.0 May not be used in the final (top) structural layer.

Above restrictions do not apply to overbuild and leveling.

Cracked pavement should be milled out where possible to avoid reflective cracking in the overlay. It is usually desirable to leave at least 3/4"of asphalt over the base throughout the project to protect it from traffic and rain. However, the entire asphalt structure can be milled out as long as contract provisions provide for maintenance of traffic and protection of the base, such as placement of the first lift of structural asphalt the same day of the milling operation, or the use of prime coat.

Consideration should also be given to underlying layers that may consist of potentially unstable materials that could cause problems if exposed by milling (such as some old low asphalt content binder courses or low Marshall Stability mixes). If these situations exist, they should be carefully discussed with the District Bituminous Engineer and the Roadway Design Engineer.

Special Provisions may be needed to limit the exposure of these layers to traffic until adequate structural thickness is placed.

Distress in an overlay due to reflective cracking is not fully modeled in the structural number calculations. Research is being done to better evaluate reflective cracking potential using computer modeling.

If it is not practical to mill out most of the cracked pavement, an Asphalt Rubber Membrane Interlayer (ARMI) and/or additional overlay thickness should be considered. Generally it is not practical to mill to a depth greater than 5"Use of Asphalt Rubber Membrane Interlayer (ARMI) is discussed further in section 6.8.5.

Milling is not the solution when the base or subgrade is the problem. An evaluation should be made of the base or subgrade to determine if reconstruction is necessary.

6.8.2 LEVELING AND OVERBUILD

The District Materials Office should be consulted for recommendations with respect to leveling and overbuild, taking into consideration existing pavement condition and cross slope. The following minimum values recommended by the State Materials Office are;

- Leveling by specification is placed by a motor grader and is used to provide a level surface prior to placing the structural course.
- Overbuild by specification is placed by a paving machine and is used to provide proper cross-slope and longitudinal profile. Only fine SP mixes are allowed.
- SP-9.5 Overbuild, minimum average uniform thickness with or without a structural course is 1".
- SP-9.5 Leveling, minimum average thickness is ½" and not more than 3/4" per layer.
- For Overbuild greater than 1 1/2", Type SP-12.5 may be used.
- Use the minimum and maximum layer thickness as noted in section 5.5.6 for uniform thickness overbuild layers.
- All overbuild layers shall be Type SP Asphalt Concrete. On variable thickness overbuild layers, the minimum allowable thickness may be reduced by 1/2"and the maximum allowable thickness may be increased 1/2"

TABLE A.7A

REQUIRED STRUCTURAL NUMBER (SN_R)
95% RELIABILITY (%R)
RESILIENT MODULUS (M_R) RANGE 4000 PSI TO 18000 PSI

RESILIENT MODULUS (M_R), (PSI x 1000)

$ESAL_D$	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
100 000	3.22	2.95	2.75	2.59	2.46	2.35	2.26	2.18	2.10	2.04	1.98	1.93	1.88	1.83	1.79
150 000	3.44	3.16	2.94	2.77	2.63	2.52	2.42	2.33	2.25	2.18	2.12	2.06	2.01	1.97	1.92
200 000	3.60	3.31	3.09	2.91	2.76	2.64	2.54	2.44	2.36	2.29	2.23	2.17	2.11	2.06	2.02
250 000	3.74	3.43	3.20	3.02	2.87	2.74	2.63	2.54	2.45	2.38	2.31	2.25	2.19	2.14	2.10
300 000	3.85	3.54	3.30	3.11	2.96	2.83	2.71	2.61	2.53	2.45	2.38	2.32	2.26	2.21	2.16
350 000	3.94	3.63	3.39	3.19	3.03	2.90	2.78	2.68	2.59	2.52	2.44	2.38	2.32	2.27	2.22
400 000	4.03	3.71	3.46	3.26	3.10	2.96	2.85	2.74	2.65	2.57	2.50	2.43	2.37	2.32	2.27
450 000	4.10	3.78	3.53	3.33	3.16	3.02	2.90	2.80	2.70	2.62	2.55	2.48	2.42	2.36	2.31
500 000	4.17	3.84	3.59	3.39	3.22	3.07	2.95	2.85	2.75	2.67	2.59	2.53	2.46	2.41	2.35
600 000	4.29	3.96	3.70	3.49	3.32	3.17	3.04	2.93	2.84	2.75	2.67	2.60	2.54	2.48	2.43
700 000	4.39	4.05	3.79	3.58	3.40	3.25	3.12	3.01	2.91	2.82	2.74	2.67	2.61	2.55	2.49
800 000	4.48	4.14	3.87	3.66	3.48	3.32	3.19	3.08	2.98	2.89	2.80	2.73	2.66	2.60	2.55
900 000	4.56	4.22	3.95	3.73	3.54	3.39	3.25	3.14	3.03	2.94	2.86	2.78	2.72	2.65	2.60
1 000 000	4.63	4.28	4.01	3.79	3.60	3.45	3.31	3.19	3.09	2.99	2.91	2.83	2.76	2.70	2.64
1 500 000	4.91	4.56	4.27	4.04	3.85	3.68	3.54	3.41	3.30	3.20	3.11	3.03	2.96	2.89	2.83
2 000 000	5.12	4.75	4.46	4.23	4.03	3.86	3.71	3.58	3.46	3.36	3.26	3.18	3.10	3.03	2.96
2 500 000	5.28	4.91	4.62	4.37	4.17	4.00	3.84	3.71	3.59	3.48	3.39	3.30	3.22	3.14	3.08
3 000 000	5.42	5.04	4.74	4.50	4.29	4.11	3.96	3.82	3.70	3.59	3.49	3.40	3.32	3.24	3.17
3 500 000	5.53	5.15	4.85	4.60	4.39	4.21	4.05	3.92	3.79	3.68	3.58	3.49	3.40	3.32	3.25
4 000 000	5.64	5.25	4.94	4.69	4.48	4.30	4.14	4.00	3.87	3.76	3.66	3.56	3.48	3.40	3.32
4 500 000	5.73	5.33	5.03	4.77	4.56	4.38	4.22	4.07	3.95	3.83	3.73	3.63	3.54	3.46	3.39
5 000 000	5.81	5.41	5.10	4.85	4.63	4.45	4.28	4.14	4.01	3.90	3.79	3.69	3.61	3.52	3.45
6 000 000	5.95	5.55	5.24	4.98	4.76	4.57	4.41	4.26	4.13	4.01	3.90	3.80	3.71	3.63	3.55
7 000 000	6.07	5.67	5.35	5.09	4.87	4.68	4.51	4.36	4.23	4.11	4.00	3.90	3.81	3.72	3.64
8 000 000	6.18	5.77	5.45	5.18	4.96	4.77	4.60	4.45	4.32	4.19	4.08	3.98	3.89	3.80	3.72
9 000 000	6.28	5.86	5.54	5.27	5.05	4.85	4.68	4.53	4.39	4.27	4.16	4.06	3.96	3.87	3.79
10 000 000	6.36	5.95	5.62	5.35	5.12	4.93	4.75	4.60	4.46	4.34	4.23	4.12	4.03	3.94	3.86
15 000 000	6.70	6.27	5.93	5.65	5.42	5.22	5.04	4.88	4.74	4.61	4.50	4.39	4.29	4.20	4.11
20 000 000	6.95	6.51	6.16	5.88	5.64	5.43	5.25	5.09	4.94	4.81	4.69	4.58	4.48	4.39	4.30
25 000 000	7.15	6.70	6.34	6.05	5.81	5.60	5.41	5.25	5.10	4.97	4.85	4.74	4.63	4.54	4.45
30 000 000	7.32	6.86	6.49	6.20	5.95	5.74	5.55	5.39	5.24	5.10	4.98	4.86	4.76	4.66	4.57
35 000 000	7.46	6.99	6.62	6.33	6.07	5.86	5.67	5.50	5.35	5.21	5.09	4.97	4.87	4.77	4.68
40 000 000	7.58	7.11	6.74	6.44	6.18	5.96	5.77	5.60	5.45	5.31	5.19	5.07	4.96	4.86	4.77
45 000 000	7.69	7.21	6.84	6.53	6.28	6.06	5.86	5.69	5.54	5.40	5.27	5.15	5.05	4.95	4.85
50 000 000	7.79	7.31	6.93	6.62	6.36	6.14	5.95	5.77	5.62	5.48	5.35	5.23	5.12	5.02	4.93
60 000 000	7.97	7.48	7.09	6.78	6.52	6.29	6.09	5.92	5.76	5.62	5.49	5.37	5.26	5.15	5.06
70 000 000	8.12	7.62	7.23	6.91	6.65	6.42	6.22	6.04	5.88	5.73	5.60	5.48	5.37	5.27	5.17
80 000 000	8.26	7.75	7.35	7.03	6.76	6.53	6.32	6.14	5.98	5.84	5.70	5.58	5.47	5.36	5.27
90 000 000	8.38	7.86	7.46	7.14	6.86	6.63	6.42	6.24	6.08	5.93	5.80	5.67	5.56	5.45	5.35
100 000 000	8.48	7.96	7.56	7.23	6.95	6.72	6.51	6.33	6.16	6.01	5.88	5.75	5.64	5.53	5.43

TABLE A.7B

REQUIRED STRUCTURAL NUMBER (SN_R)
95% RELIABILITY (%R)
RESILIENT MODULUS (M_R) RANGE 18000 PSI TO 32000 PSI

RESILIENT MODULUS (M_R), (PSI x 1000)

$ESAL_D$	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
100 000	1.79	1.75	1.72	1.68	1.65	1.62	1.59	1.57	1.54	1.52	1.49	1.47	1.45	1.43	1.41
150 000	1.92	1.88	1.84	1.81	1.77	1.74	1.71	1.68	1.66	1.63	1.61	1.58	1.56	1.54	1.52
200 000	2.02	1.98	1.94	1.90	1.86	1.83	1.80	1.77	1.74	1.72	1.69	1.67	1.64	1.62	1.60
250 000	2.10	2.05	2.01	1.97	1.94	1.90	1.87	1.84	1.81	1.78	1.76	1.73	1.71	1.69	1.66
300 000	2.16	2.12	2.07	2.03	2.00	1.96	1.93	1.90	1.87	1.84	1.81	1.79	1.76	1.74	1.72
350 000	2.22	2.17	2.13	2.09	2.05	2.01	1.98	1.95	1.92	1.89	1.86	1.84	1.81	1.79	1.77
400 000	2.27	2.22	2.18	2.14	2.10	2.06	2.03	1.99	1.96	1.93	1.91	1.88	1.86	1.83	1.81
450 000	2.31	2.26	2.22	2.18	2.14	2.10	2.07	2.03	2.00	1.97	1.95	1.92	1.89	1.87	1.84
500 000	2.35	2.30	2.26	2.22	2.18	2.14	2.10	2.07	2.04	2.01	1.98	1.95	1.93	1.90	1.88
600 000	2.43	2.38	2.33	2.29	2.24	2.21	2.17	2.14	2.10	2.07	2.04	2.02	1.99	1.96	1.94
700 000	2.49	2.44	2.39	2.35	2.30	2.26	2.23	2.19	2.16	2.13	2.10	2.07	2.04	2.01	1.99
800 000	2.55	2.49	2.44	2.40	2.36	2.32	2.28	2.24	2.21	2.18	2.14	2.12	2.09	2.06	2.04
900 000	2.60	2.54	2.49	2.45	2.40	2.36	2.32	2.29	2.25	2.22	2.19	2.16	2.13	2.10	2.08
1 000 000	2.64	2.59	2.54	2.49	2.44	2.40	2.36	2.33	2.29	2.26	2.23	2.20	2.17	2.14	2.11
1 500 000	2.83	2.77	2.71	2.66	2.62	2.57	2.53	2.49	2.45	2.42	2.38	2.35	2.32	2.29	2.26
2 000 000	2.96	2.90	2.85	2.79	2.74	2.70	2.65	2.61	2.57	2.54	2.50	2.47	2.43	2.40	2.37
2 500 000	3.08	3.01	2.95	2.90	2.85	2.80	2.75	2.71	2.67	2.63	2.59	2.56	2.53	2.49	2.46
3 000 000	3.17	3.10	3.04	2.99	2.93	2.88	2.84	2.79	2.75	2.71	2.67	2.64	2.60	2.57	2.54
3 500 000	3.25	3.19	3.12	3.06	3.01	2.96	2.91	2.87	2.82	2.78	2.74	2.71	2.67	2.64	2.61
4 000 000	3.32	3.26	3.19	3.13	3.08	3.03	2.98	2.93	2.89	2.84	2.80	2.77	2.73	2.70	2.66
4 500 000	3.39	3.32	3.26	3.20	3.14	3.09	3.04	2.99	2.94	2.90	2.86	2.82	2.79	2.75	2.72
5 000 000	3.45	3.38	3.31	3.25	3.19	3.14	3.09	3.04	3.00	2.95	2.91	2.87	2.83	2.80	2.76
6 000 000	3.55	3.48	3.41	3.35	3.29	3.24	3.18	3.13	3.09	3.04	3.00	2.96	2.92	2.88	2.85
7 000 000	3.64	3.57	3.50	3.44	3.38	3.32	3.27	3.21	3.17	3.12	3.08	3.04	3.00	2.96	2.92
8 000 000	3.72	3.65	3.58	3.51	3.45	3.39	3.34	3.29	3.24	3.19	3.15	3.10	3.06	3.03	2.99
9 000 000	3.79	3.72	3.65	3.58	3.52	3.46	3.40	3.35	3.30	3.25	3.21	3.17	3.12	3.09	3.05
10 000 000	3.86	3.78	3.71	3.64	3.58	3.52	3.46	3.41	3.36	3.31	3.27	3.22	3.18	3.14	3.10
15 000 000	4.11	4.03	3.96	3.89	3.82	3.76	3.70	3.64	3.59	3.54	3.49	3.44	3.40	3.36	3.32
20 000 000	4.30	4.22	4.14	4.07	4.00	3.94	3.87	3.82	3.76	3.71	3.66	3.61	3.56	3.52	3.48
25 000 000	4.45	4.36	4.29	4.21	4.14	4.08	4.01	3.95	3.90	3.84	3.79	3.74	3.70	3.65	3.61
30 000 000	4.57	4.49	4.41	4.33	4.26	4.19	4.13	4.07	4.01	3.96	3.90	3.85	3.81	3.76	3.71
35 000 000	4.68	4.59	4.51	4.43	4.36	4.29	4.23	4.17	4.11	4.05	4.00	3.95	3.90	3.85	3.81
40 000 000	4.77	4.68	4.60	4.52	4.45	4.38	4.32	4.25	4.20	4.14	4.08	4.03	3.98	3.94	3.89
45 000 000	4.85	4.76	4.68	4.60	4.53	4.46	4.39	4.33	4.27	4.21	4.16	4.11	4.06	4.01	3.96
50 000 000	4.93	4.84	4.75	4.68	4.60	4.53	4.47	4.40	4.34	4.28	4.23	4.18	4.12	4.08	4.03
60 000 000	5.06	4.97	4.88	4.80	4.73	4.66	4.59	4.52	4.46	4.40	4.35	4.29	4.24	4.19	4.15
70 000 000	5.17	5.08	4.99	4.91	4.84	4.76	4.69	4.63	4.57	4.51	4.45	4.40	4.34	4.29	4.25
80 000 000	5.27	5.17	5.09	5.01	4.93	4.86	4.79	4.72	4.66	4.60	4.54	4.49	4.43	4.38	4.33
90 000 000	5.35	5.26	5.17	5.09	5.01	4.94	4.87	4.80	4.74	4.68	4.62	4.57	4.51	4.46	4.41
100 000 000	5.43	5.34	5.25	5.17	5.09	5.02	4.94	4.88	4.81	4.75	4.69	4.64	4.58	4.53	4.48

APPENDIX D:

Design Variations

DESIGN VARIATION MEMORANDUM FOR MEDIAN WIDTH

SR 789
From Bird Key Drive to Sunset Drive
FPID: 445926-1-52-01
Sarasota County (17030)
Contract No. C9Q14

October 20, 2023

Prepared for:

Florida Department of Transportation
District One
801 N. Broadway Ave.
Bartow, FL 33830

Prepared by:

Kimley-Horn and Associates, Inc.
1777 Main Street, Suite 200
Sarasota, FL 34236
Phone: 941.379.7600

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1.0 Project Description

The project consists of widening SR 789 from Bird Key Drive to Sunset Drive in Sarasota County, Florida. SR 789 has a functional classification of an urban minor arterial with a design, posted, and target speed of 35 mph and has a C3R Suburban Residential Context Classification. The project is scoped to widen the corridor to add transit lanes, reconstruct the intersection of SR 789 with Bird Key Drive and Sunset Drive to improve resiliency, and mill and resurface all travel lanes.

The existing four-lane typical section for SR 789 consists of an urban curb and gutter section with 11.5-ft travel lanes, 5-ft bike lanes for both directions, and a raise 19-ft median. The proposed configuration will reduce the raised median width to a minimum of 9.1-ft and a maximum of 17.9-ft, reduce the lane widths to 10.5', provide an 11-ft transit lane, and maintain the 5-ft bike lanes. The typical section package is provided in **Appendix A.**

This Design Variation Memorandum is necessary as the proposed median width violates the 2023 FDOT Design Manual (FDM) criteria.

2.0 DVM #1 Median Width

2.1 Design Criteria Versus Proposed Criteria

2.1.1 FDOT Criteria

- Based on the 2023 FDOT Design Manual (FDM), Chapter 210, Section 210.3, Table 210.3.1, the required median width for a curbed roadway with a context classification of C3R and a Design Speed of 35 mph is 22-ft. Median widths may be reduced to a minimum of 15.5-ft for reconstruction projects where the design speed is less than or equal to 40 mph per Note 1 of the table.

2.1.2 AASHTO Criteria

- AASHTO allows for a minimum median width of 4-ft and a minimum of 6-ft to accommodate for pedestrian crossing movements. (A *Policy on Geometric Design of Highways and Streets 2018,* page 7-41)

2.1.3 Proposed Criteria

- The proposed design will provide the minimum median width identified by AASHTO of 6-ft. However, due to existing curb and gutter constraints, the minimum width required by FDOT will not be met.

Table 2.1 - Proposed Criteria

Begin Sta (MP)	End Sta (MP)	Design Speed	Design Criteria Median Width	Proposed Design Median Width
0.000	1.006	35 mph	15.5-ft	9.1-ft to 15.5-ft

2.1.4 Reason the Design Criteria Are Not Appropriate

- The existing curb to curb pavement width is 85-ft, consisting of 10.5-ft lanes, 5-ft bike lanes, and variable width raised median. To provide a 15.5-ft minimum median width along with the addition of transit lanes would require additional widening which would not be warranted because the median would still require transitioning into the narrower barrier separated bridge median at both ends of the bridge.
- There is an existing bridge that has a 6-ft barrier separated median that the roadway must tie into which necessitates a narrower roadway median.

2.2 Safety Impacts/Review of Crash History

- Crash data was provided from Signal4 Analytics from 1/1/2018 to 7/1/2023.
- There was a total of 108 crashes with no fatal crashes data.
    - There were no pedestrian crashes.
    - There were 5 (4.6%) reported crashes with Bicyclists.
    - There were 28 (25.9%) reported crashes as sideswipes.
    - There were 30 (27.8%) reported crashes as angle.
    - There were 3 (2.8%) crashes reported as front to front.
- Based on a thorough review of the crash history, there were no crashes attributed to a narrower median. The majority of the crashes occurred at the intersection of SR 789 with Sunset Drive, followed by the intersection of SR 789 with Bird Key Drive.

2.4 Justification for the Proposed Criteria

- There are no anticipated negative effects to the roadway with this Design Variation, as the condition is already in existence within the project corridor.
- The project will widen the existing corridor to provide designated transit lanes in both directions, which will improve operations along the project corridor.
- The narrow median width occurs outside of the influence of left turn lanes where a minimum of 15.5-ft will be provided for at the intersections where left turning lanes are required.
- The proposed median width is within AASHTO's requirements for a suburban arterial.

2.5 Conclusion and Recommendation

- This Design Variation Memorandum is requested because the 15.5 ft minimum raised median will be reduced to a 9.1-ft (min.) which does not meet FDM criteria.
- The narrower roadway median is required to transition to an existing barrier separated 6ft. median on the bridge.
- The proposed design does not have any anticipated negative impacts to the road operation, drainage, or safety given the reduction in median width.
- Approval of this Design Variation Memorandum is recommended for the proposed median width throughout the project limits.

Appendix A Typical Section Package

STATE OF FLORIDA

DEPARTMENT OF TRANSPORTATION

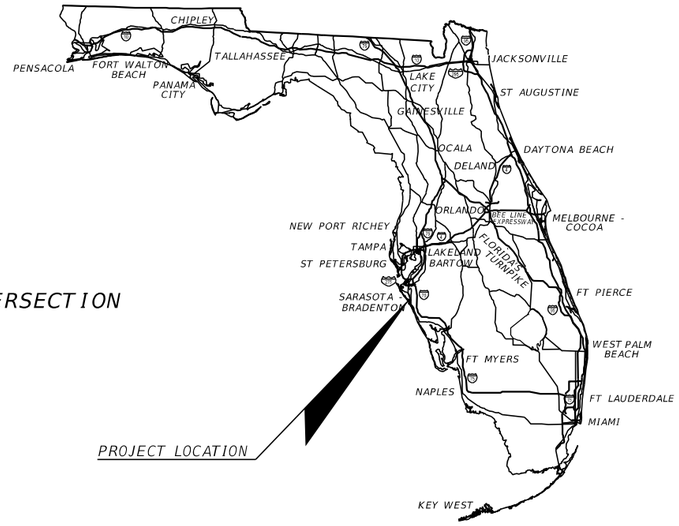
TYPICAL SECTION PACKAGE

FINANCIAL PROJECT ID 445926-1-52-01

SARASOTA COUNTY (17030)

STATE ROAD NO. 789 (JOHN RINGLING CAUSEWAY/GULFSTREAM AVE.)

WIDENING TO ADD TRANSIT LANES AND RECONSTRUCT WEST OF BIRD KEY DR. INTERSECTION AND RECONSTRUCT SUNSET DR./GOLDEN GATE PT. INTERSECTION



PROJECT LOCATION URL:	https://tinyurl.com/yc7dvpe6
PROJECT LIMITS:	BEGIN STA. 122+70.00 – END STA. 133+65.23 BEGIN STA. 164+93.72 – END STA. 184+20.00
EXCEPTIONS:	NONE
BRIDGE LIMITS:	BEGIN STA. 133+65.23 – END STA. 164+93.72
RAILROAD CROSSING:	NONE

FDOT DISTRICT DESIGN ENGINEER

CONCURRING WITH:
TYPICAL SECTION ELEMENTS
TARGET SPEED
DESIGN & POSTED SPEEDS

FDOT DISTRICT TRAFFIC OPERATIONS ENGINEER

CONCURRING WITH:
TARGET SPEED
DESIGN & POSTED SPEEDS

FDOT DISTRICT INTERMODAL SYSTEMS DEVELOPMENT MANAGER

CONCURRING WITH:
CONTEXT CLASSIFICATION
TARGET SPEED

FDOT DISTRICT STRUCTURES DESIGN ENGINEER

CONCURRING WITH:
TYPICAL SECTION ELEMENTS

FHWA TRANSPORTATION ENGINEER

CONCURRING WITH:
TYPICAL SECTION ELEMENTS

LOCAL TRANSPORTATION ENGINEER

CONCURRING WITH:
TYPICAL SECTION ELEMENTS

NOT USED

CONCURRING WITH:

NOT USED

CONCURRING WITH:

APPROVED BY:

GARY J. NADEAU
LICENSE
No 49629
STATE OF FLORIDA
PROFESSIONAL ENGINEER

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY

ON THE DATE ADJACENT TO THE SEAL

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

KIMLEY-HORN AND ASSOCIATES, INC.
1777 MAIN ST., SUITE 200
SARASOTA, FLORIDA 34236
GARY J. NADEAU, P.E. NO. 49629

THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE WITH RULE 61G15-23.004, F.A.C.

INDEX OF SHEETS

SHEET NO. 1

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
(X) C3R : SUBURBAN RES.
( ) C3C : SUBURBAN COMM.
( ) C4 : URBAN GENERAL
( ) C5 : URBAN CENTER
( ) C6 : URBAN CORE
( ) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
( ) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
(X) MINOR ARTERIAL
( ) MAJOR COLLECTOR
( ) MINOR COLLECTOR
( ) LOCAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

( ) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
(X) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

CRITERIA

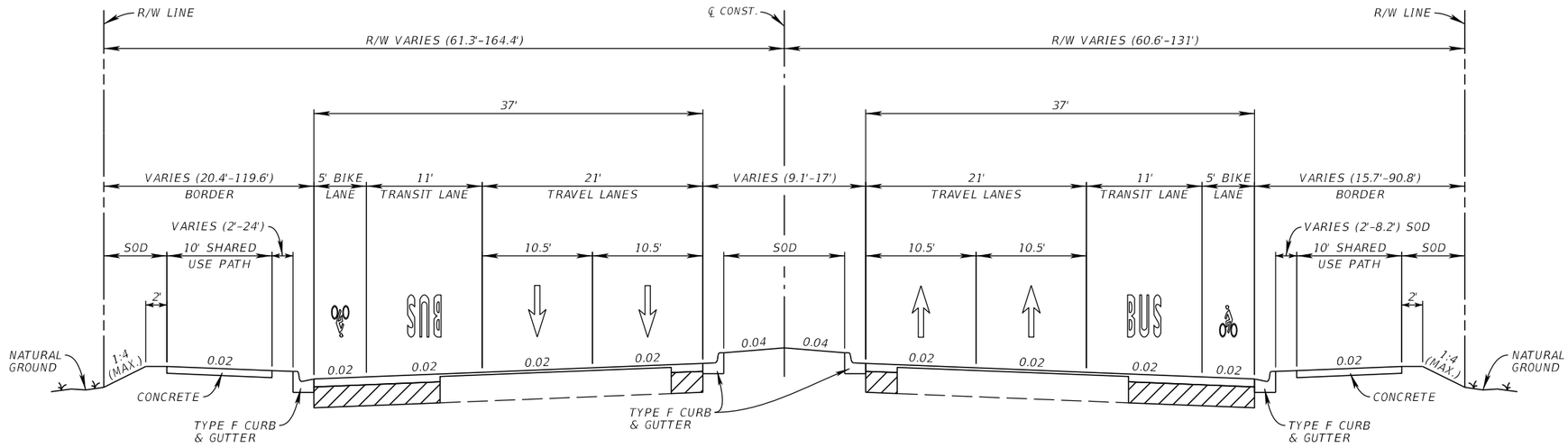
(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

DESIGN VARIATIONS:
MEDIAN WIDTH VARIATION

TYPICAL SECTION No. 1

NOT TO SCALE



SR 789 (JOHN RINGLING CSWY.)
STA. 122+70.00 TO STA. 133+65.23
SR 789 (JOHN RINGLING CSWY./GULFSTREAM AVE.)
STA. 164+93.72 TO STA. 184+20.00

TRAFFIC DATA

CURRENT YEAR = 2023 AADT = 38110
ESTIMATED OPENING YEAR = 2024 AADT = 39253
ESTIMATED DESIGN YEAR = 2044 AADT = 70896
K = 9.0% D = 52.4% T = 3.7% (24 HOUR)
DESIGN HOUR T = 3.7%
TARGET SPEED = 35 MPH
DESIGN SPEED = 35 MPH
POSTED SPEED = 35 MPH

FINANCIAL PROJECT ID	SHEET NO.
445926-1-52-01	2

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

10/20/2023 7:53:07 AM Steven.Hart!
K:\SAR_Worksets\FDOT\149748004_Gulfstream-Sunset\Roadway\TYPDRD01.dgn

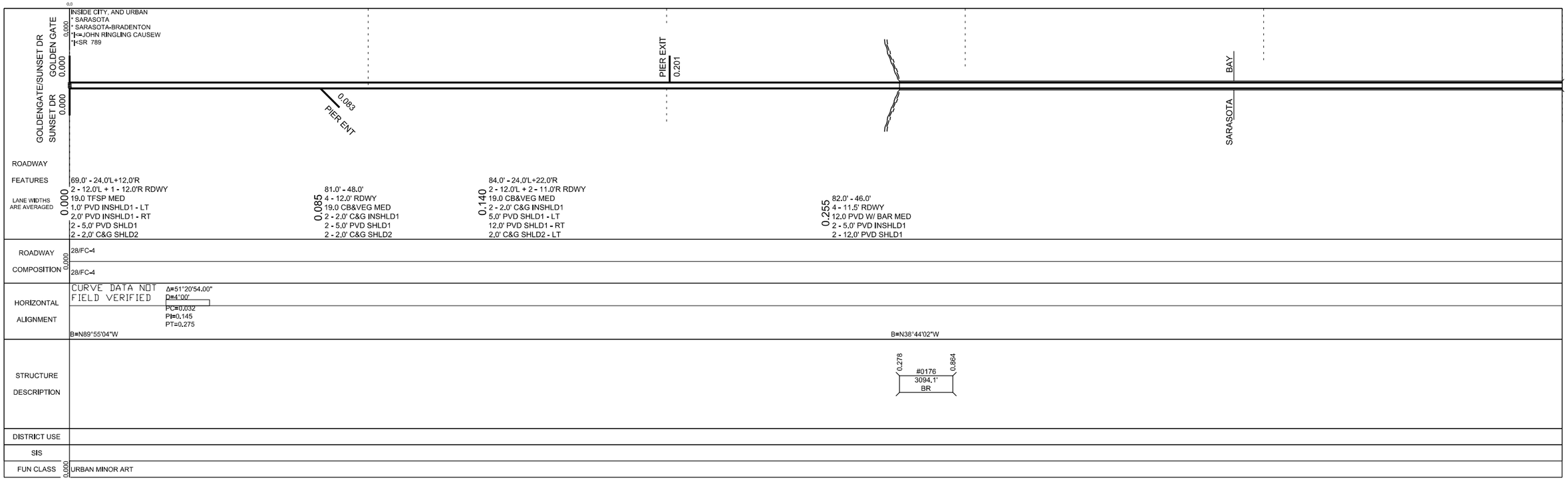
Appendix B Straight Line Diagram

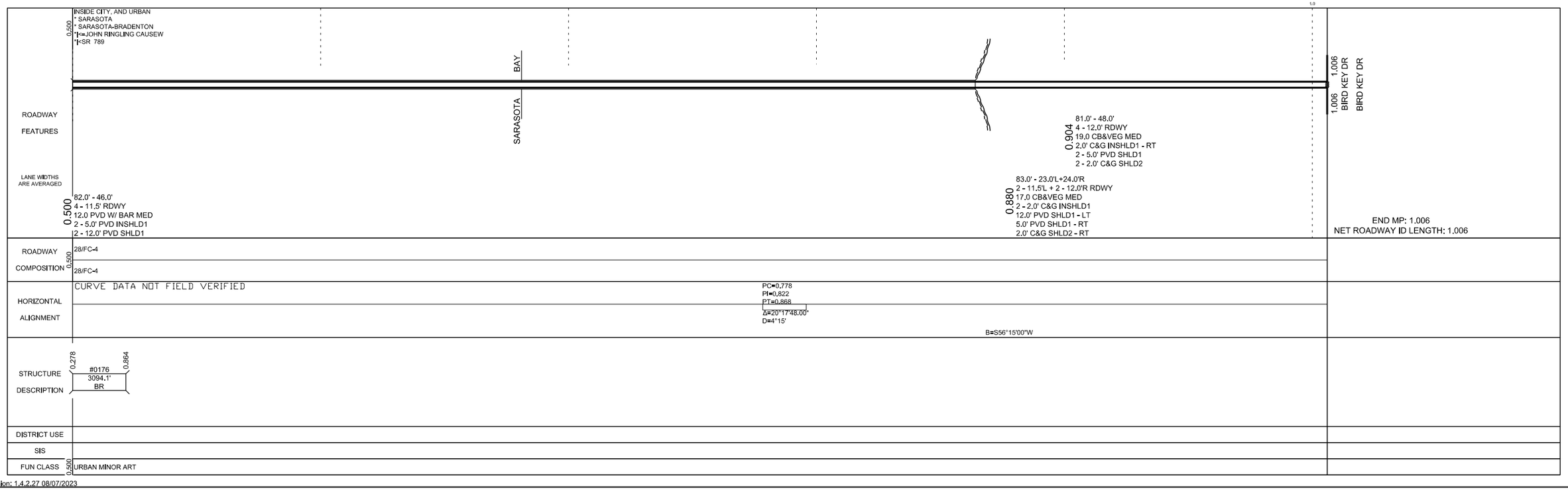
	5 YR INV	SLD REV	BMP	EMP	INV	SLD REV
DATE	06/06/2023	08/07/2023				
BY	FTE	FTE				

FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO.
02		SR 789	SARASOTA	01	17030201	1 OF 1





Version: 1.4.2.27 08/07/2023

Appendix C Roadway Plans


NORTH
0
20
40
80
164
165
166
167
168
169
64
65
66
67
68
69
70
70
Microsoft Bing
© 2023 Microsoft Corporation © 2023 Maxar ©CNES (2023) Distribution Airbus DS Earthstar Geographics SIO


NORTH
0
20
40
80
130
131
132
133
134
135
136
30
31
32
33
34
35
36
© 2023 Microsoft Corporation © 2023 Maxar ©CNES (2023) Distribution Airbus DS Earthstar Geographics SIO

APPENDIX E:

LDAR

Lighting Design Analysis Report

Financial Project ID 445926-1-52-01

SR 789 FROM BIRD KEY DRIVE TO SUNSET DRIVE
Lighting Improvements

Prepared for Florida Department of Transportation
District 1

By:

Kimley-Horn and Associates, Inc.

1800 2nd Street, Suite 900
Sarasota, FL 34236
(941) 379-7600
Certificate of Authorization: 00000696

December 2023

Erin K. Swider, P.E.
FL P.E. No: 95476
Engineer of Record

Contents

List of Figures and Tables

List of Appendices

1.0 Purpose

This report summarizes the results of the roadway lighting design analysis conducted for the lighting system at the proposed intersections at SR 789 at Bird Key Drive and SR 789 at Sunset Drive in Sarasota, FL. The project consists of widening SR 789 from Bird Key Drive to Sunset Drive in Sarasota County, Florida. SR 789 has a functional classification of an urban minor arterial with a design, posted, and target speed of 35 mph and has a C3R Suburban Residential Context Classification. The project is scoped to widen the corridor to add transit lanes, reconstruct the intersection of SR 789 with Bird Key Drive and Sunset Drive to improve resiliency, and mill and resurface all travel lanes.

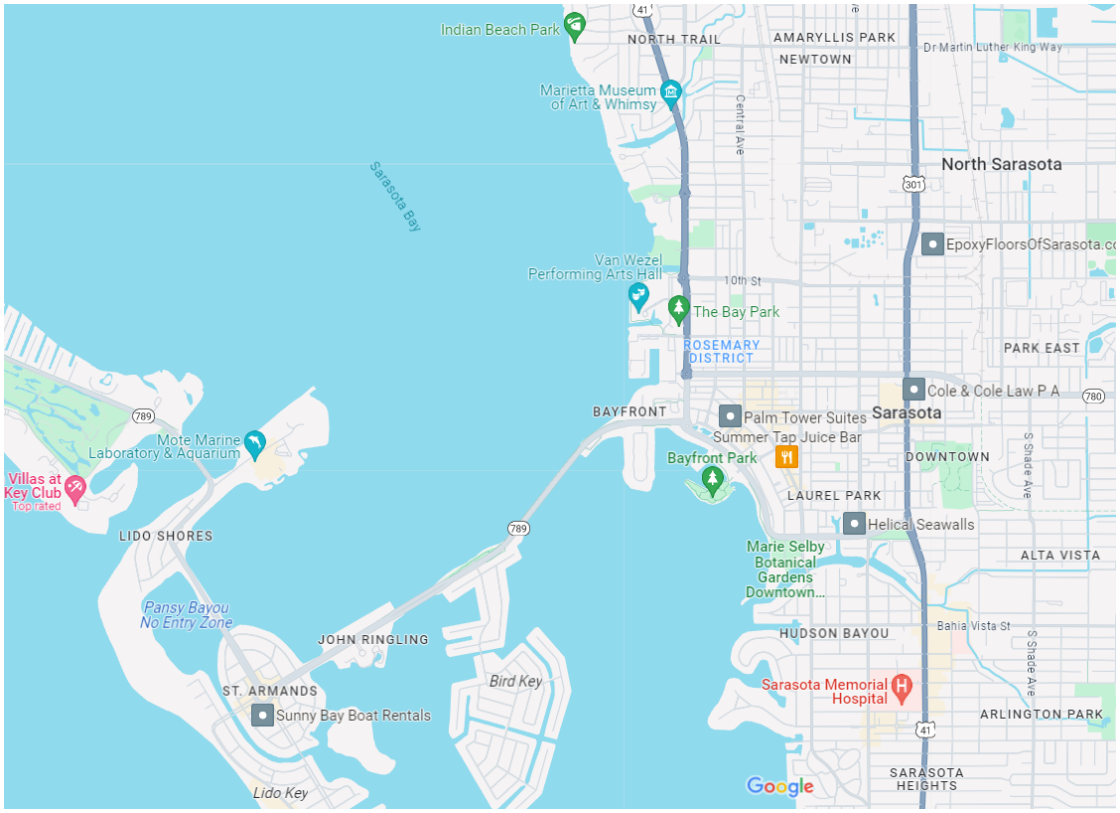


Figure 1 Project Location Map

2.0 Existing Conditions

The existing lighting system within the project limits is maintained by the City of Sarasota. Existing lighting along the corridor between the proposed intersection improvements consists of a mix of circuits, fixtures and aesthetics. Existing pedestrian specific lighting exists along some portions of the project limit where as decorative fixtures and cobra head fixtures exist surrounding the intersection.

Existing light poles adjacent to the proposed lighting system will remain on a 480V system powered from the existing load center located to the northeast of Sunset Drive, installed with the Gulfstream Roundabout Project (FPID 438137-1-52-01). Existing poles within the project limits will largely remain on the existing circuit.

3.0 Roadway Lighting Criteria

Lighting design criteria used in photometric analysis is shown below in Table 1 below. For this corridor, governing lighting criteria comes from Chapter 231 of the FDOT Design Manual (FDM).

Table 1 Signalized Intersection Criteria

Project Type	Illumination Level Average Initial Foot Candle		Illumination Uniformity Ratios		Veiling Luminance Ratio Lv(max)/Lavg
			Avg./Min.	Max./Min.	
New Construction	Horizontal (H.F.C.)	3.0 Std 1.5 Min.	4:1 or less	10:1 or less	N/A
	Vertical (V.F.C.)	1.5 Std. 1.2 Min.			

Source: FDOT Design Manual, Part 2 January 2024.

All light poles associated with this project will be designed to 160 mph design wind speeds in accordance with index 715-002 of the Standard Plans.

4.0 Roadway Lighting Analysis Methodology

The lighting design and analysis was conducted using AGi32 v20.6 lighting analysis software. Software was used to determine the lighting configuration to meet photometric requirements for the proposed cobra head fixtures. A 35 ft. and 40 ft. mounting height were used to meet criteria per the FDM. Light poles along SR 789 are proposed at 35 ft. to maintain continuity to the existing light fixtures along the corridor. Table 2 details the luminaire type used for analysis purposes on this project.

Table 2 Lighting Design .IES File Summary

Manufacturer	Fixture Type/Wattage	Fixture Name	Associated .ies File
General Electric	Cobra (LED)/120W	ERL2	ERL2_16C330.IES
	Cobra (LED)/140W		ERL2_16D330.IES
	Cobra (LED)/140W		ERL2_18D330.IES
	Cobra (LED)/194W		ERL2_23B330.IES

The proposed fixture is an arm mounted, cobra head LED. The proposed fixture was selected to aesthetically blend with the existing lights along the bridge corridor and is a standard accepted fixture on the FDOT Approved Products List. Because of the existing aesthetics and the City of Sarasota's desire for continuity of maintenance, alternative fixtures and configurations were not considered for this project.

4.0 Results and Conclusions

After completing photometric analysis for the corridor, it has been determined that FDM lighting criteria can be met using the ERL2 LED fixture with a mounting height of 35 ft. and 40 ft. Full photometric analysis for the proposed light fixture is included in Appendix A. All proposed light poles at Bird Key Drive will be powered from one load center located southwest corner of the intersection. All proposed light poles at Sunset Drive will be powered from one existing load center northeast of the intersection. Both systems will be wired for 480V operation.

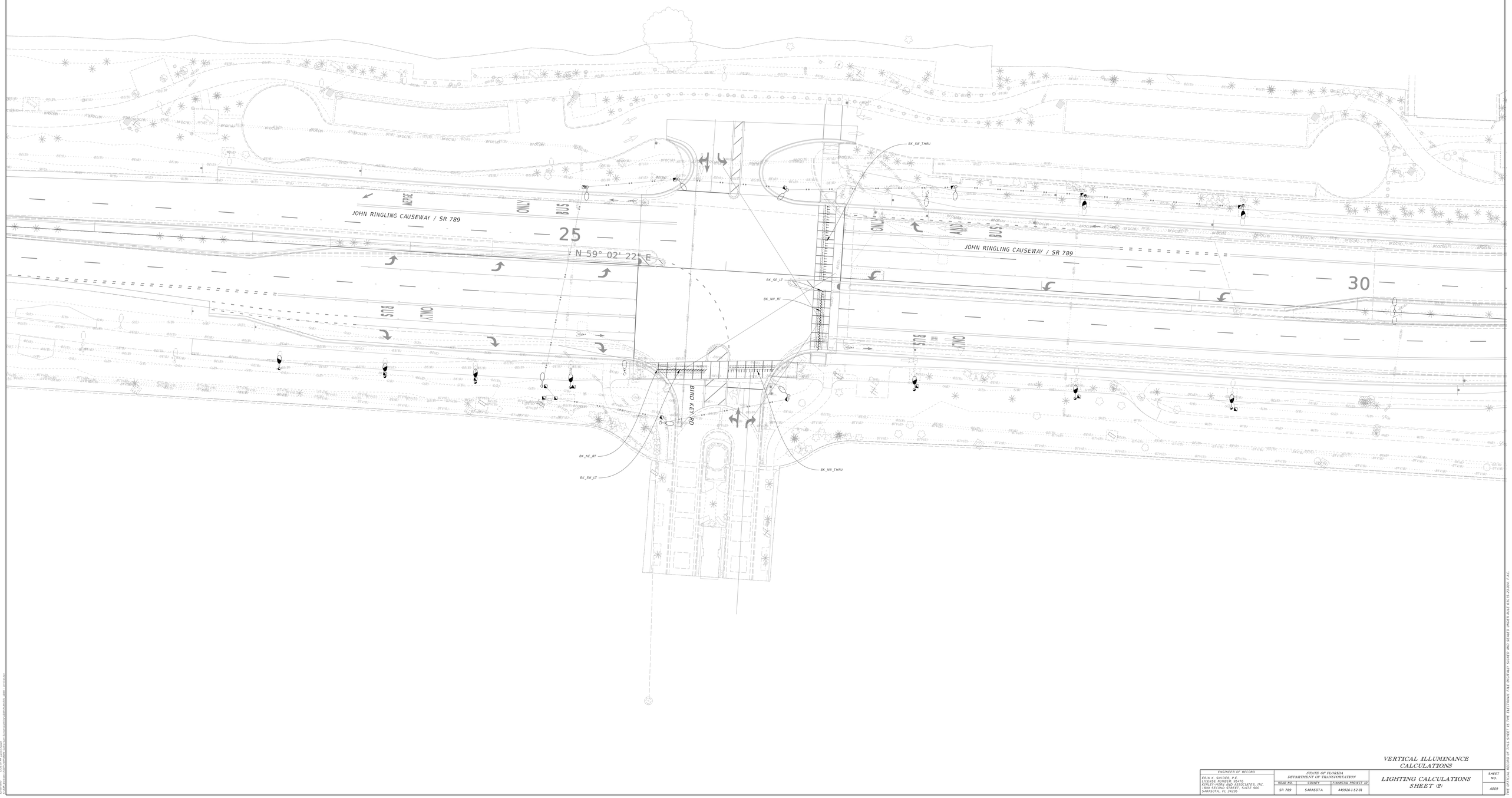
APPENDIX A:
ANALYSIS RESULTS

Calculation Summary

Calculation Summary							
Label	**CalcType**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
birdkey	Illuminance	Fc	3.06	5.8	0.9	3.40	6.44
BK_NE_RT	Illuminance	Fc	1.63	2.0	1.4	1.16	1.43
BK_NW_RT	Illuminance	Fc	1.52	1.6	1.5	1.01	1.07
BK_NW_THRU	Illuminance	Fc	1.53	1.6	1.5	1.02	1.07
BK_SE_LT	Illuminance	Fc	1.54	2.2	1.0	1.54	2.20
BK_SW_LT	Illuminance	Fc	1.55	1.9	1.2	1.29	1.58
BK_SW_THRU	Illuminance	Fc	1.61	2.0	0.6	2.68	3.33
SS_EB-THRU	Illuminance	Fc	1.50	2.0	1.1	1.36	1.82
SS_EB_LT	Illuminance	Fc	1.59	1.7	1.4	1.14	1.21
SS_EB_RT	Illuminance	Fc	1.62	2.0	1.2	1.35	1.67
SS_NB_LT	Illuminance	Fc	1.37	1.8	1.0	1.37	1.80
SS_NB_RT	Illuminance	Fc	1.62	1.7	1.4	1.16	1.21
SS_NB_THRU	Illuminance	Fc	1.62	2.2	1.1	1.47	2.00
SS_SB-THRU	Illuminance	Fc	1.39	1.4	1.3	1.07	1.08
SS_SB_LT	Illuminance	Fc	1.54	2.0	1.2	1.28	1.67
SS_SB_RT	Illuminance	Fc	1.25	1.4	1.0	1.25	1.40
SS_WB-THRU	Illuminance	Fc	1.52	1.9	0.9	1.69	2.11
SS_WB_LT	Illuminance	Fc	1.61	1.7	1.6	1.01	1.06
SS_WB_RT	Illuminance	Fc	1.56	2.2	0.7	2.23	3.14
sunset	Illuminance	Fc	3.04	4.8	1.1	2.76	4.36

HORIZONTAL ILLUMINANCE CALCULATIONS

ENGINEER OF RECORD	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			LIGHTING CALCULATIONS SHEET (1)	SHEET NO.
ERIN K. SWIDER, P.E. LICENSE NUMBER: 95476 KIMLEY-HORN AND ASSOCIATES, INC. 1800 SECOND STREET, SUITE 900 SARASOTA,, FL 34236	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		A008
	SR 789	SARASOTA	445926-1-52-01		



VERTICAL ILLUMINANCE CALCULATIONS

ENGINEER OF RECORD	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			LIGHTING CALCULATIONS SHEET (2)	SHEET NO.
ERIN K. SNYDER, P.E. LICENSE NUMBER: 85476 KIMLEY-HORN AND ASSOCIATES, INC. 1800 SECOND STREET, SUITE 900 SARASOTA, FL 34236	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		A009
	SR 789	SARASOTA	445926-1-52-01		

HORIZONTAL ILLUMINANCE CALCULATIONS

ENGINEER OF RECORD	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			LIGHTING CALCULATIONS SHEET (3)	SHEET NO.
ERIN K. SWIDER, P.E. LICENSE NUMBER: 95476 KIMLEY-HORN AND ASSOCIATES, INC. 1800 SECOND STREET, SUITE 900 SARASOTA,, FL 34236	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
	SR 789	SARASOTA	445926-1-52-01		A010

VERTICAL ILLUMINANCE CALCULATIONS

ENGINEER OF RECORD	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			LIGHTING CALCULATIONS SHEET (4)	SHEET NO.
ERIN K. SWIDER, P.E. LICENSE NUMBER: 95476 KIMLEY-HORN AND ASSOCIATES, INC. 1800 SECOND STREET, SUITE 900 SARASOTA,, FL 34236	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
	SR 789	SARASOTA	445926-1-52-01		A011

APPENDIX B: PRODUCT CUT SHEETS

EVOLVE

LED Roadway Lighting

ERLC-ERL1-ERLH-ERL2

EVOLVE

ERLC Cobra Head
LED Roadway Lighting

CUSTOMER NAME _____

PROJECT NAME _____

DATE _____ TYPE _____

CATALOG NUMBER _____

The Evolve® LED Roadway ERLC Luminaireis optimized utilizing advanced LED reflective optical system for local, collector and major roadways. The modern design incorporates the heat sink directly into the unit for heat transfer to prolong LED life.

Construction

Housing:	Aluminum die cast enclosure casting integral heat sink for maximum heat transfer
Lens:	Impact resistant tempered glass
Paint:	Corrosion resistant powder paint, ≥ 2.0 mil thickness (RAL & custom colors available) Standard = Black, Dark Bronze, Gray, White Optional = Coastal Finish
Weight:	8.5 lbs (5.6 kgs)

Optical System

Lumens:	2,000 - 7,000
Distribution:	Type II Narrow, II/III[3], III, V
Efficacy:	110-143 LPW
CCT:	2700K, 3000K, 4000K & 5000K
CRI:	≥ 70

Electrical

Input Voltage:	120-277V (no 347-480V)
Input Frequency:	50/60Hz
Power Factor:	≥ 90% at rated watts
Total Harmonic Distortion:	≤ 20% at rated watts

Surge Protection*

Standard	Optional
☐ 10kV/5kA	☐ Secondary 10kV/5kA (R Option) or ☐ Secondary 20kV/10kA (T Option)

*Per ANSI C136.2-2018

Lumen Maintenance

Projected Lxx per IES TM-21-11 at 25°C

LUMEN CODES	DISTRIBUTIONS	LXX(10K) @ HOURS		
		25,000 HR	50,000 HR	60,000 HR
02 ,03, 04, 05	A5, B5, C5	L97	L93	L92
06	A5, B5, C5	L96	L91	L89

LUMEN CODES	DISTRIBUTIONS	LXX(10K) @ HOURS		
		25,000 HR	50,000 HR	60,000 HR
02 ,03, 04, 05	V4	L96	L93	L93
06	V4	L94	L90	L88

Ratings

Operating Temperature:	-40°C to 50°C
Vibration:	3G per ANSI C136.31-2018
LM-79:	Testing in accordance with IES Standards

Controls

Dimming:	Standard - 0-10V ☐ Optional - DALI (Option U) ☐
Sensors:	Photo Electric Sensors (PE) available LightGrid Compatible

Warranty

☐ 5 Year (Standard) ☐ 10 Year (Optional)

UL Listed · UL Certified · UL1598 · DLC Listed · IP66 · IK08 · Controls Enabled · IDA Dark Sky Approved

Not all product variations listed on this page are DLC qualified. Visit www.designlights.org/search to confirm qualifications.

CUSTOMER NAME ______________________
PROJECT NAME ______________________
DATE ______________ TYPE ______________
CATALOG NUMBER ______________________

Ordering Information

ERLC

_ _ _ _   _   _ _   _ _   _ _   _   _ _ _ _   _ _ _

PROD. ID	VOLTAGE	LUMENS	DISTRIBUTION	CCT	CONTROLS PER ANSI C136.41	COLOR	OPTIONS
E = Evolve	0 = 120-277V[1]	02 = 2000 lm[2]	A5 = II Narrow	27 = 2700K[4]	A = 7-Pin Receptacle	BLCK = Black	B = Tether
R = Roadway	8 = 120-240V[1]	03 = 3000 lm	B5 = Type II/III[3]	30 = 3000K[4]	D = 7-Pin Receptacle with Shorting Cap	DKBZ = Dark Bronze	C1 = Captive Door
L = Local		04 = 4000 lm	C5 = Type III	40 = 4000K	E = 7 Pin Receptacle with Long Life non-Dimming PE Control	GRAY = Gray	F = Fusing
C = Compact	1 = 120V	05 = 5000 lm	V4 = Type V	50 = 5000K		WHTE= White	G = Internal Bubble Level
	2 = 208V	06 = 6000 lm			Note: 0-10V control standard unless DALI Option "U" requested		L = Tool-Less Entry
	3 = 240V	07 = 7000 lm					M1 = MagnaPak[8]
	4 = 277V						R = Secondary 10kV/5kA SPD
							T = Secondary 20kV/10kA SPD
							U = DALI Programmable[5]
							V1 = Field Adjustable Module[1,7]
							Y = Coastal Finish[6]
							XXX = Special Options

1 **Not Available with Fusing**
2 **Lumen choice only offered for 120-240V**
3 **See ISO plots of the B5 Distribution**
4 **Select 2700K or 3000K CCT for IDA approved units**
5 **Compatible with LightGrid**
6 **Recommended for installations within 750 feet from coast. Lead time varies, check with factory.**
7 **Not available with DALI "U" option**
8 **Option M1 provides for MagnaPak – 40 Fixtures per MagnaPak Container. Single Pack box is standard**

Suggested HID Replacement

- Approximately 2,000 - 7,000 lumens to replace 50-100W HPS Cobra-head

Note: actual replacement lumens may vary based upon mounting height, pole spacing, design criteria, etc.

PREVIOUS	OPTICAL PATTERN	LATEST	NEW OPTICAL PATTERN
A3	Type II Narrow	A5	Type II Narrow
B3	Type II Wide	B5	Type II/III
C3	Type III	C5	Type III
N/A	Type V	V4	Type V

The information above is designed to provide a guideline to select the correct luminaire for a roadway application. The best and most accurate way to ensure the proper design is by doing a lighting layout.

Not all product variations listed on this page are DLC qualified. Visit www.designlights.org/search to confirm qualifications.

CUSTOMER NAME _____

PROJECT NAME _____

DATE _____ TYPE _____

CATALOG NUMBER _____

LUMEN OUTPUT	DIST.	LUMENS			WATTAGE	BUG RATINGS		
		4000K/5000K	3000K	2700K	120-277V	4000K/5000K	3000K	2700K
02	A5	2000	1940	1760	15	B1-U0-G1	B1-U0-G1	B1-U0-G1
	B5	2000	1940	1760	15	B1-U0-G1	B1-U0-G1	B1-U0-G1
	C5	2000	1940	1760	15	B1-U0-G1	B1-U0-G1	B1-U0-G1
	V4	1990	1950	1890	15	B1-U0-G0	B1-U0-G0	B1-U0-G0
03	A5	3000	2910	2640	22	B1-U0-G1	B1-U0-G1	B1-U0-G1
	B5	3000	2910	2640	22	B1-U0-G1	B1-U0-G1	B1-U0-G1
	C5	3000	2910	2640	22	B1-U0-G1	B1-U0-G1	B1-U0-G1
	V4	3100	3030	2950	23	B1-U0-G0	B1-U0-G0	B1-U0-G0
04	A5	4000	3880	3520	28	B1-U0-G1	B1-U0-G1	B1-U0-G1
	B5	4000	3880	3520	28	B1-U0-G1	B1-U0-G1	B1-U0-G1
	C5	4000	3880	3520	28	B1-U0-G1	B1-U0-G1	B1-U0-G1
	V4	4030	3940	3840	32	B2-U0-G0	B2-U0-G0	B2-U0-G0
05	A5	5000	4850	4400	36	B1-U0-G1	B1-U0-G1	B1-U0-G1
	B5	5000	4850	4400	36	B1-U0-G1	B1-U0-G1	B1-U0-G1
	C5	5000	4850	4400	36	B1-U0-G2	B1-U0-G2	B1-U0-G1
	V4	5200	5090	4950	43	B2-U0-G1	B2-U0-G1	B2-U0-G1
06	A5	6000	5820	5280	46	B2-U0-G2	B1-U0-G1	B1-U0-G1
	B5	6000	5820	5280	46	B1-U0-G2	B1-U0-G2	B1-U0-G2
	C5	6000	5820	5280	46	B1-U0-G2	B1-U0-G2	B1-U0-G2
	V4	6350	6220	6050	55	B2-U0-G1	B2-U0-G1	B2-U0-G1
07	A5	7000	6790	6160	56	B2-U0-G2	B2-U0-G2	B2-U0-G2
	B5	7000	6790	6160	56	B1-U0-G2	B1-U0-G2	B1-U0-G2
	C5	7000	6790	6160	56	B1-U0-G2	B1-U0-G2	B1-U0-G2

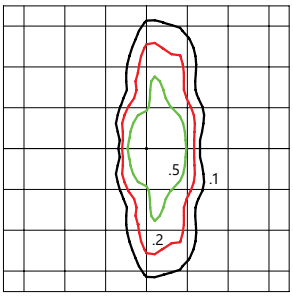
For additional information on ERLC IES files, please click one of the following links:

Non-Shielded Shielded

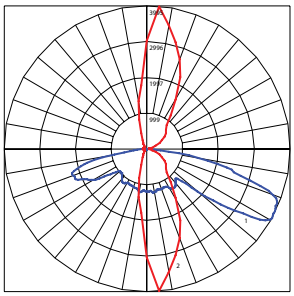
CUSTOMER NAME _____
PROJECT NAME _____
DATE _____ TYPE _____
CATALOG NUMBER _____

ERLC
Type II Narrow

5,000 Lumens
4000K
ERLC_05A540___.



- Mounting Height at 30'
- Initial Footcandle at Grade

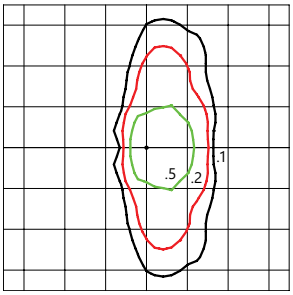


— Vertical plane at max Cd horiz. angle
— Horizontal cone at max Cd vert. angle

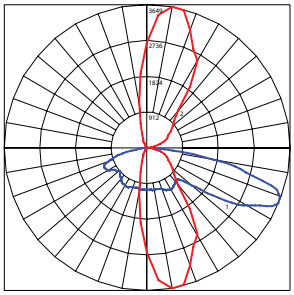
ERLC
Type II/III[3]

5,000 Lumens
4000K
ERLC_05B540___.IES

[3] This optic is designed to address a Roadway Photometric Application and may classify as Type II or III.



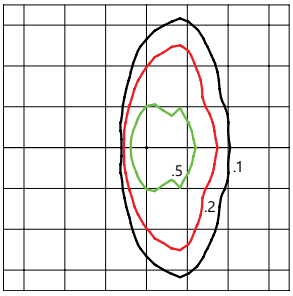
- Mounting Height at 30'
- Initial Footcandle at Grade



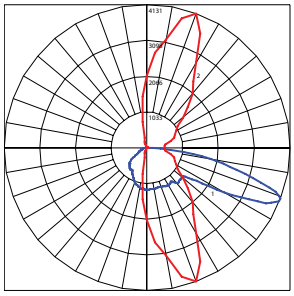
— Vertical plane at max Cd horiz. angle
— Horizontal cone at max Cd vert. angle

ERLC
Type III

5,000 Lumens
4000K
ERLC_05C540___.IES



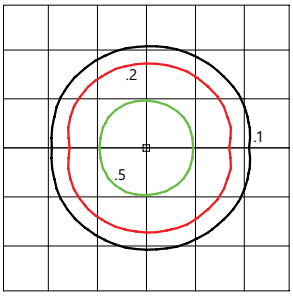
- Mounting Height at 30'
- Initial Footcandle at Grade



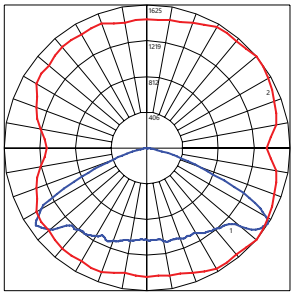
— Vertical plane at max Cd horiz. angle
— Horizontal cone at max Cd vert. angle

ERLC
Type V

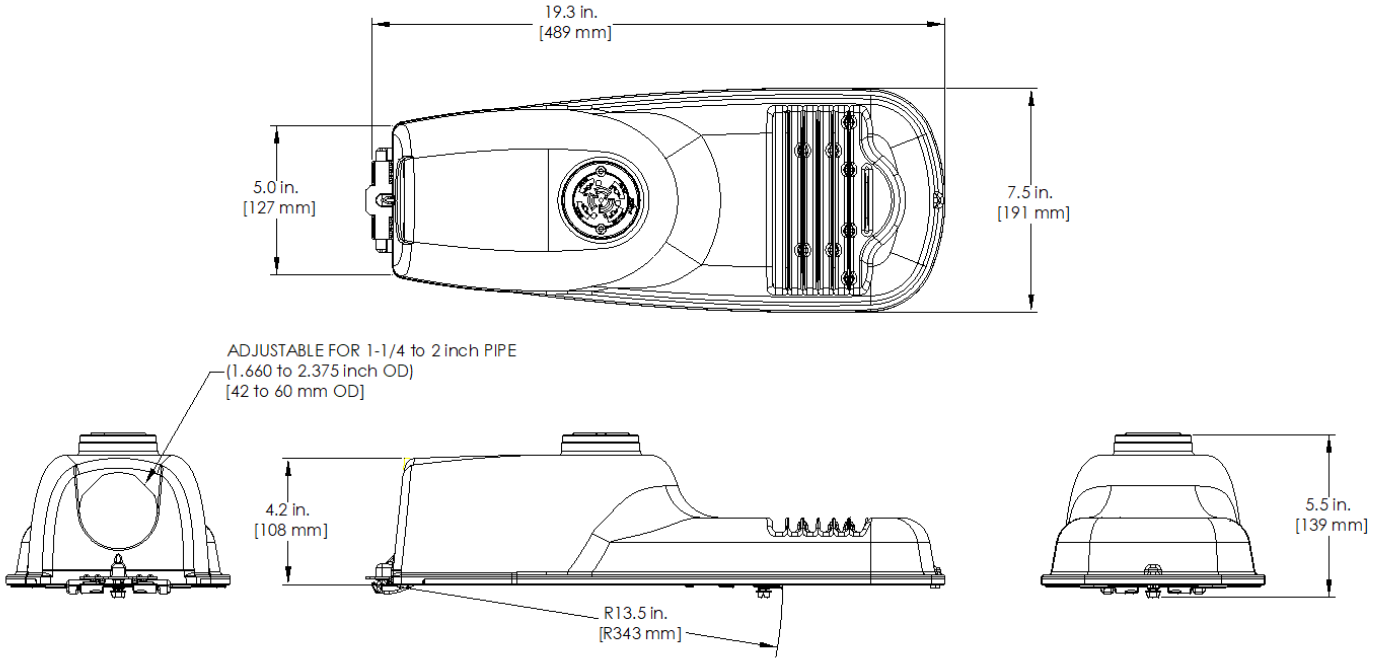
5,200 Lumens
4000K
ERLC_05V440___.IES



- Mounting Height at 30'
- Initial Footcandle at Grade



— Vertical plane at max Cd horiz. angle
— Horizontal cone at max Cd vert. angle



Mounting

- Adjustable for 1.25 to 2 in. nominal mounting pipe
- Integral diecast mounting pipe stop
- Slipfitter with +/- 5 degrees of leveling adjustment

Effective Projected Area

- 0.3 sq ft max (0.029 sq m)

Weight

- Approximate net weight: 8.5 lbs (3.8 kgs)

Accessories

SAP NUMBER	PART NUMBER	DESCRIPTION
93029237	PED-MV-LED-7	ANSI C136.41 Dimming PE, 120-277V
93029238	PED-347-LED-7	ANSI C136.41 Dimming PE, 347V
93029239	PED-480-LED-7	ANSI C136.41 Dimming PE, 480V
28299	PECOTL	Standard 120-277V
XXXXXX	PECHTL	Standard 347-480V
73251	SCCL-PECTL	Shorting Cap

See pages 22 & 23 for more detailed information on ERLC Shields.

Networked Lighting Control

Current's **LightGrid**™ Outdoor Lighting Control System is designed for Street and Roadway Applications. It enables remote monitoring, control, and asset management of a single fixture or a group of fixtures through a web enabled Central Management System.

EVOLVE

ERL1 Cobra Head
LED Roadway Lighting

CUSTOMER NAME _____

PROJECT NAME _____

DATE _____ TYPE _____

CATALOG NUMBER _____

The Evolve® LED Roadway ERL1 Luminaire is optimized utilizing advanced LED reflective optical system for local, collector and major roadways. The modern design incorporates the heat sink directly into the unit for heat transfer to prolong LED life.

Construction

Housing:	Aluminum die cast enclosure casting integral heat sink for maximum heat transfer
Lens:	Impact resistant tempered glass
Paint:	Corrosion resistant powder paint, ≥ 2.0 mil thickness (RAL & custom colors available) Standard = Black, Dark Bronze, Gray, White Optional = Coastal Finish
Weight:	12.4 lbs (5.6kgs)

Optical System

Lumens:	2,000 - 10,000
Distribution:	Type II ,III, IV and Type II Narrow, and Type II Enhanced Backlight
Efficacy:	110-143 LPW
CCT:	2700K, 3000K, 4000K
CRI:	≥70

Electrical

Input Voltage:	120-277V or 347-480V
Input Frequency:	50/60Hz
Power Factor:	≥ 90% at rated watts
Total Harmonic Distortion:	≤ 20% at rated watts

Surge Protection*

Standard	Optional
☐ 10kV/5kA	☐ Secondary 10kV/5kA (R Option) or ☐ Secondary 20kV/10kA (T Option)

*Per ANSI C136.2-2018

Lumen Maintenance

Projected Lxx per IES TM-21-11 at

LUMEN CODES	DISTRIBUTIONS	LXX(10K) @ HOURS		
		25,000 HR	50,000 HR	60,000 HR
02,03,04, 05,06	A3,B3,C3, D3,E3	L96	L95	L94
07,08,09	A3,B3,C3, D3,E3	L95	L91	L89
10	A3,B3,C3, D3,E3	L89	L80	L76

Ratings

Operating Temperature:	-40°C to 50°C
Vibration:	3G per ANSI C136.31-2018
LM-79:	Testing in accordance with IES Standards

Controls

Dimming:	Standard - 0-10V ☐ Optional - DALI (Option U) ☐
Sensors:	Photo Electric Sensors (PE) available LightGrid Compatible

Warranty

☐ 5 Year (Standard) ☐ 10 Year (Optional)

IP65 IK08 CONTROLS ENABLED

Not all product variations listed on this page are DLC qualified. Visit www.designlights.org/search to confirm qualifications.

EVOLVE

ERL1 Cobra Head
LED Roadway Lighting

CUSTOMER NAME ____________
PROJECT NAME ____________
DATE ____________ TYPE ____________
CATALOG NUMBER ____________

Ordering Information

ERL1 _ _ _ _ | _ | _ _ | _ _ | _ _ | _ | _ _ _ _ | _ _ _

PROD. ID	VOLTAGE	LUMENS	DISTRIBUTION[3]	CCT	CONTROLS PER ANSI C136.41	COLOR	OPTIONS
E = Evolve	0 = 120-277V[1]	02 = 2000 lm[2]	A3 = Type II Narrow	27 = 2700K[4]	A = 7-Pin Receptacle	BLCK = Black	A = 4 Bolt Slipfitter[5]
R = Roadway	H = 347-480V[1]	03 = 3000 lm	B3 = Type II Wide	30 = 3000K[4]	D = 7-Pin Receptacle with Shorting Cap	DKBZ = Dark Bronze	B = Tether
L = Local		04 = 4000 lm	C3 = Type III	40 = 4000K	E = 7 Pin Receptacle with Long Life non-Dimming PE Control	GRAY = Gray	F = Fusing
1 = Single Module	1 = 120V	05 = 5000 lm	D3 = Type IV		Note: 0-10V control standard unless DALI Option "U" requested	WHTE= White	G = Internal Bubble Level
	2 = 208V	06 = 6000 lm	E3 = Type II Enhanced Back Light				I = Optional IP66 Optical
	3 = 240V	07 = 7000 lm					L = Tool-Less Entry
	4 = 277V	08 = 8000 lm					R = Secondary 10kV/5kA SPD
	D = 347V	09 = 9000 lm					T = Secondary 20kV/10kA SPD
	5 = 480V	10 = 10000 lm					U = DALI Programmable[6,7]
							V1 = Field Adjustable Module[10, 11]
							X = Single Pack[8]
							Y = Coastal Finish[9]
							XXX = Special Options

[1] **Not Available with Fusing**
[2] **02 lumen level voltage options 1, 2, 3, and 8 only**
[3] **Nominal IES Type classing subject to typical variation, individual units may differ**
[4] **Select 2700K or 3000K CCT for IDA approved units**
[5] **Lead time varies, Contact Factory**
[6] **Compatible with LightGrid**
[7] **Not available in 347V, 480V or 347-480V for Lumen Output Levels 07-10**
[8] **Option provides single pack box per fixture. Standard packaging = 23 units per MagnaPak Container**
[9] **Recommended for installations within 750 feet from coast. Lead time varies, check with factory.**
[10] **Not available with DALI "U" option**
[11] **Not compatible with 02 Lumen Code**

Suggested HID Replacement

- 4,000 - 5,000 lumens to replace 100W HPS Cobra-head
- 7,000 - 8,000 lumens to replace 150W HPS Cobra-head
- 8,500 - 11,500 lumens to replace 100W HPS Cobra-head

Note: actual replacement lumens may vary based upon mounting height, pole spacing, design criteria, etc.

PREVIOUS	OPTICAL PATTERN	LATEST	NEW OPTICAL PATTERN
A1, B1	Extra Narrow/Narrow Asymmetric	A3	Type II Narrow
C1, E1	Asymmetric Short/ Medium	B3	Type II Wide
D1, G1	Asymmetric Forward/ Extra Wide	C3	Type III
F1	Asymmetric Wide	D3	Type IV
N/A	N/A	E3	Type II Enhanced Back Light

The information above is designed to provide a guideline to select the correct luminaire for a roadway application. The best and most accurate way to ensure the proper design is by doing a lighting layout.

DLC LISTED

Not all product variations listed on this page are DLC qualified. Visit www.designlights.org/search to confirm qualifications.

CUSTOMER NAME _____

PROJECT NAME _____

DATE _____ TYPE _____

CATALOG NUMBER _____

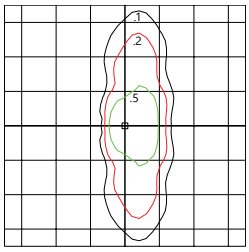
LUMEN OUTPUT	DIST.	LUMENS			WATTAGE		BUG RATINGS		
		4000K	3000K	2700K	277V	480V	4000K	3000K	2700K
02	A3	2000	1900	1900	14	N/A	B1-U0-G1	B1-U0-G1	B1-U0-G1
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1
	C3						B1-U0-G1	B1-U0-G1	B1-U0-G1
	D3						B0-U0-G1	B0-U0-G1	B0-U0-G1
	E3						B1-U0-G1	B1-U0-G1	B1-U0-G1
03	A3	3000	2900	2800	22	26	B1-U0-G1	B1-U0-G1	B1-U0-G1
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1
	C3						B1-U0-G1	B1-U0-G1	B1-U0-G1
	D3						B1-U0-G1	B1-U0-G1	B1-U0-G1
	E3						B1-U0-G1	B1-U0-G1	B1-U0-G1
04	A3	4000	3900	3800	31	34	B1-U0-G1	B1-U0-G1	B1-U0-G1
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1
	C3						B1-U0-G1	B1-U0-G1	B1-U0-G1
	D3						B1-U0-G1	B1-U0-G1	B1-U0-G1
	E3						B1-U0-G1	B1-U0-G1	B1-U0-G1
05	A3	5000	4900	4700	39	43	B1-U0-G1	B1-U0-G1	B1-U0-G1
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2
	D3						B1-U0-G1	B1-U0-G1	B1-U0-G1
	E3						B1-U0-G1	B1-U0-G1	B1-U0-G1
06	A3	6000	5800	5700	47	52	B2-U0-G2	B2-U0-G2	B2-U0-G2
	B3						B1-U0-G2	B1-U0-G2	B1-U0-G2
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2
07	A3	7000	6800	6600	58		B2-U0-G2	B2-U0-G2	B2-U0-G2
	B3						B1-U0-G2	B1-U0-G2	B1-U0-G2
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2
08	A3	8000	7800	7600	71		B2-U0-G2	B2-U0-G2	B2-U0-G2
	B3						B2-U0-G2	B2-U0-G2	B2-U0-G2
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2
09	A3	9000	8800	8500	84		B2-U0-G2	B2-U0-G2	B2-U0-G2
	B3						B2-U0-G2	B2-U0-G2	B2-U0-G2
	C3						B2-U0-G2	B2-U0-G2	B1-U0-G2
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2

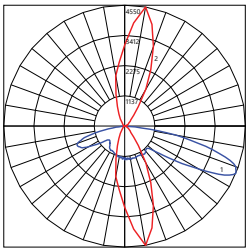
For additional information on ERL1 IES files, please click one of the following links:

Non-Shielded Shielded

ERL1
Type II Narrow

5,000 Lumens
4000K
ERL1_05A340___.



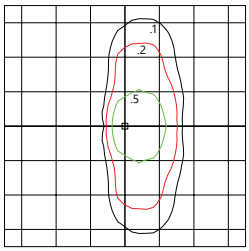


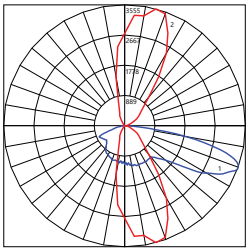
- Mounting Height at 30'
- Initial Footcandle at Grade

— Vertical plane at max Cd horiz. angle 80°
— Horizontal cone at max Cd vert. angle 67°

ERL1
Type II Wide

5,000 Lumens
4000K
ERL1_05B340___.IES



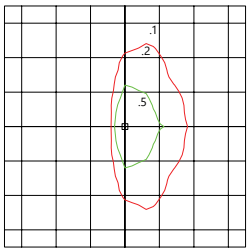


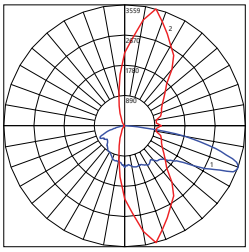
- Mounting Height at 30'
- Initial Footcandle at Grade

— Vertical plane at max Cd horiz. angle 75°
— Horizontal cone at max Cd vert. angle 69°

ERL1
Type III

5,000 Lumens
4000K
ERL1_05C340___.IES



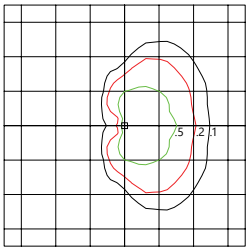


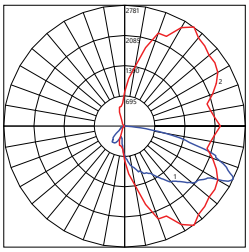
- Mounting Height at 30'
- Initial Footcandle at Grade

— Vertical plane at max Cd horiz. angle 75°
— Horizontal cone at max Cd vert. angle 70°

ERL1
Type IV

5,000 Lumens
4000K
ERL1_05D340___.IES



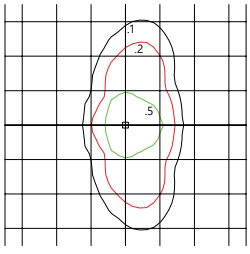


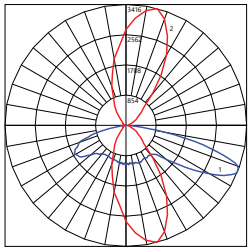
- Mounting Height at 30'
- Initial Footcandle at Grade

— Vertical plane at max Cd horiz. angle 55°
— Horizontal cone at max Cd vert. angle 64°

ERL1
Type II Enhanced Back Light

5,000 Lumens
4000K
ERL1_05E340___.IES





- Mounting Height at 30'
- Initial Footcandle at Grade

— Vertical plane at max Cd horiz. angle 75°
— Horizontal cone at max Cd vert. angle 67°

EVOLVE

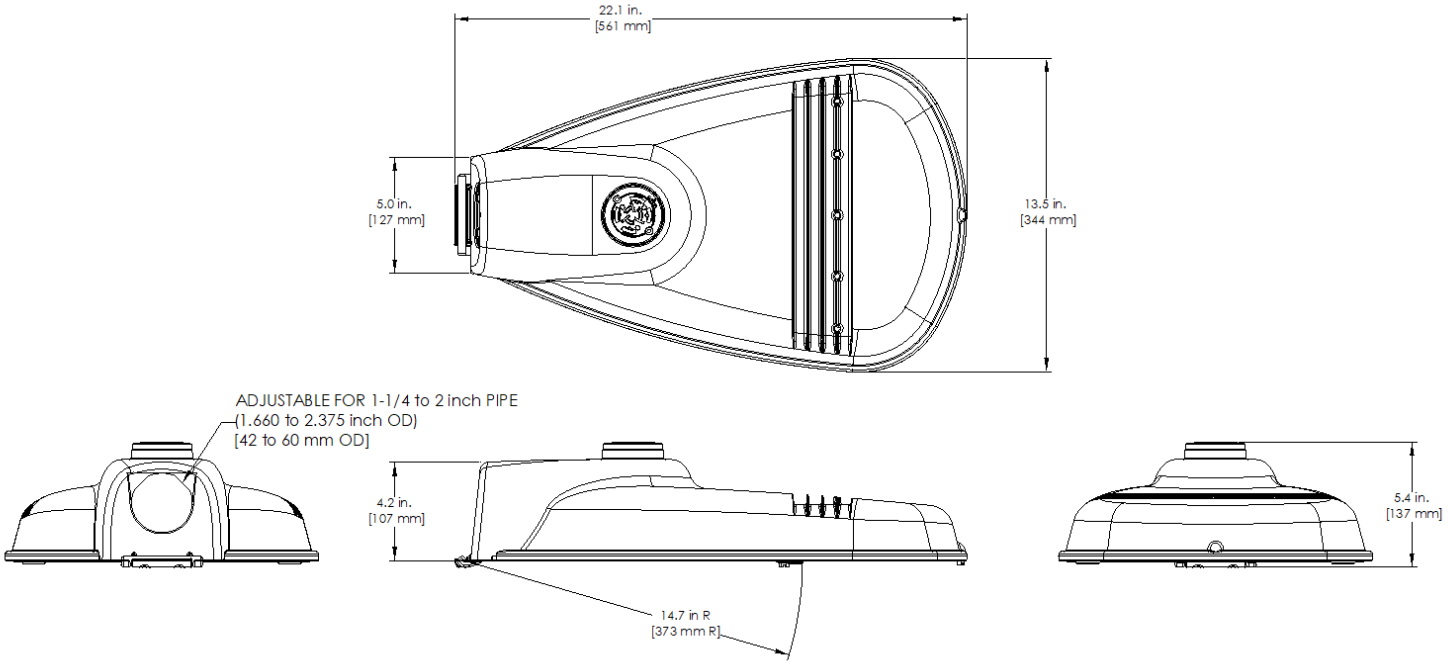
ERL1 Cobra Head
LED Roadway Lighting

CUSTOMER NAME _____

PROJECT NAME _____

DATE _____ TYPE _____

CATALOG NUMBER _____



Mounting

- Adjustable for 1.25 to 2 in. nominal mounting pipe
- Integral diecast mounting pipe stop
- Slipfitter with +/- 5 degrees of leveling adjustment

Effective Projected Area

- 0.5 sq ft max (0.046 sq m)

Weight

- 12.4 lbs (5.6 kgs)

Accessories

SAP NUMBER	PART NUMBER	DESCRIPTION
93029237	PED-MV-LED-7	ANSI C136.41 Dimming PE, 120-277V
93029238	PED-347-LED-7	ANSI C136.41 Dimming PE, 347V
93029239	PED-480-LED-7	ANSI C136.41 Dimming PE, 480V
28299	PECOTL	Standard 120-277V
XXXXXX	PECHTL	Standard 347-480V
73251	SCCL-PECTL	Shorting Cap

See pages 22 & 23 for more detailed information on ERL1 Shields.

Networked Lighting Control

Current's **LightGrid**™ Outdoor Lighting Control System is designed for Street and Roadway Applications. It enables remote monitoring, control, and asset management of a single fixture or a group of fixtures through a web enabled Central Management System.

EVOLVE

ERLH Cobra Head

LED Roadway Lighting

CUSTOMER NAME _____

PROJECT NAME _____

DATE _____ TYPE _____

CATALOG NUMBER _____

The Evolve® LED Roadway ERLH Luminaire is optimized utilizing advanced LED reflective optical system for local, collector and major roadways. The modern design incorporates the heat sink directly into the unit for heat transfer to prolong LED life.

Construction

Housing:	Aluminum die cast enclosure casting integral heat sink for maximum heat transfer
Lens:	Impact resistant tempered glass
Paint:	Corrosion resistant powder paint, ≥ 2.0 mil thickness (RAL & custom colors available) Standard = Black, Dark Bronze, Gray, White Optional = Coastal Finish
Weight:	15.15 lbs (6.9 kgs) w/ 2 Bolt Slipfitter 15.85 lbs (7.2 kgs) w/ 4 Bolt Slipfitter

Optical System

Lumens:	10,000-16,000
Distribution:	Type II Narrow, Type II Wide, Type III, Type IV and Type II Enhanced Back Light
Efficacy:	110-143 LPW
CCT:	2700K, 3000K, 4000K
CRI:	≥70

Electrical

Input Voltage:	120-277V or 347-480V
Input Frequency:	50/60Hz
Power Factor:	≥ 90% at rated watts
Total Harmonic Distortion:	≤ 20% at rated watts

Surge Protection*

STANDARD	OPTIONAL
☐ 10kV/5kA	☐ Secondary 10kV/5kA (R Option) or ☐ Secondary 20kV/10kA (T Option)

***Per ANSI C136.2-2018**

Lumen Maintenance

Projected Lxx per IES TM-21-11 at

LUMEN CODES	DISTRIBUTIONS	LXX(10K) @ HOURS 25,000 HR	50,000 HR	60,000 HR
A3, B3, C3, D3, E3	10,11	L97	L96	L96
A3, B3, C3, D3, E3	13,14	L95	L93	L92
A3, B3, C3, D3, E3	15,16	L94	L91	L91

Ratings

Operating Temperature:	ERLH Lumen outputs 10-11, 13 (-40°C to 50°C) ERLH Lumen outputs 14-16 (-40°C to 45°C)
Vibration:	3G per ANSI C136.31-2018
LM-79:	Testing in accordance with IES Standards

Controls

Dimming:	Standard - 0-10V ☐ Optional - DALI (Option U) ☐
Sensors:	Photo Electric Sensors (PE) available LightGrid Compatible

Warranty

☐ 5 Year (Standard) ☐ 10 Year (Optional)

IP65 IK08 CONTROLS ENABLED

Not all product variations listed on this page are DLC qualified. Visit www.designlights.org/search to confirm qualifications.

EVOLVE

ERLH Cobra Head

LED Roadway Lighting

CUSTOMER NAME ______________________

PROJECT NAME ______________________

DATE ______________ TYPE ______________

CATALOG NUMBER ______________________

ERLH

_ _ _ _   _   _ _   _ _   _ _   _   _ _ _ _   _ _ _

PROD. ID	VOLTAGE	LUMENS	DISTRIBUTION	CCT	CONTROLS PER ANSI C136.41	COLOR	OPTIONS
E = Evolve	0 = 120-277V[1]	10 = 10000 lm	A3 = Type II Narrow	27 = 2700K[3]	A = 7-Pin Receptacle	BLCK = Black	A = 4 Bolt Slipfitter[4]
R = Roadway	H = 347-480V[1]	11 = 11000 lm	B3 = Type II Wide	30 = 3000K[3]	D = 7-Pin Receptacle with Shorting Cap	DKBZ = Dark Bronze	B = Tether
L = Local		13 = 13000 lm	C3 = Type III	40 = 4000K	E = 7 Pin Receptacle with Long Life non-Dimming PE Control[4]	GRAY = Gray	F = Fusing
H = High Output	1 = 120V	14 = 14000 lm	D3 = Type IV		Note: 0-10V control standard unless DALI Option "U" requested	WHTE= White	G = Internal Bubble Level
	2 = 208V	15 = 15000 lm	E3 = Type II Enhanced Back Light				I = Optional IP66 Optical
	3 = 240V	16 = 16000 lm					L = Tool-Less Entry
	4 = 277V						R = Secondary 10kV/5kA SPD
	5 = 480V						T = Secondary 20kV/10kA SPD
	D = 347V						U = DALI Programmable[5,6]
							V1 = Field Adjustable Module[9]
							X = Single Pack[7]
							Y = Coastal Finish[8]
							XXX = Special Options

1 **Not Available with Fusing**
2 **Nominal IES Type classing subject to typical variation, individual units may differ**
3 **Select 2700K or 3000K CCT for IDA approved units**
4 **Lead time varies, Contact Factory**
5 **Compatible with LightGrid**
6 **Not available with 347, 480V, or 347-480V.**
7 **Option provides single pack box per fixture. Standard packaging = 23 units per MagnaPak Container**
8 **Recommended for installations within 750 feet from coast. Lead time varies, check with factory.**
9 **Not available with DALI "U" option**

SUGGESTED HID REPLACEMENT

- Approximately 8,500 -11,500 lumens to replace 200W HPS Cobra-head
- Approximately 11,500 -14,000 lumens to replace 250W HPS Cobra-head

Note: actual replacement lumens may vary based upon mounting height, pole spacing, design criteria, etc.

PREVIOUS	OPTICAL PATTERN	LATEST	NEW OPTICAL PATTERN
A1, B1	Extra Narrow/Narrow Asymmetric	A3	Type II Narrow
C1, E1	Asymmetric Short/ Medium	B3	Type II Wide
D1, G1	Asymmetric Forward/ Extra Wide	C3	Type III
F1	Asymmetric Wide	D3	Type IV
N/A	N/A	E3	Type II Enhanced Back Light

The information above is designed to provide a guideline to select the correct luminaire for a roadway application. The best and most accurate way to ensure the proper design is by doing a lighting layout.

Not all product variations listed on this page are DLC qualified. Visit www.designlights.org/search to confirm qualifications.

CUSTOMER NAME _____

PROJECT NAME _____

DATE _____ TYPE _____

CATALOG NUMBER _____

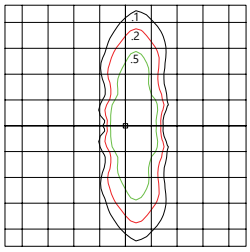
LUMEN OUTPUT	DISTRIBUTION	LUMENS			WATTAGE	BUG RATINGS		
		4000K	3000K	2700K	120-277V 347-480V	4000K	3000K	2700K
10	A3	10000	9600	9300	82	B2-U0-G2	B2-U0-G2	B2-U0-G2
	B3					B2-U0-G2	B2-U0-G2	B2-U0-G2
	C3					B2-U0-G3	B2-U0-G2	B2-U0-G2
	D3					B1-U0-G3	B1-U0-G2	B1-U0-G2
	E3					B3-U0-G3	B3-U0-G3	B3-U0-G3
11	A3	11500	11000	10700	98	B3-U0-G3	B2-U0-G2	B2-U0-G2
	B3					B3-U0-G3	B2-U0-G2	B2-U0-G2
	C3					B2-U0-G3	B2-U0-G3	B2-U0-G3
	D3					B1-U0-G3	B1-U0-G2	B1-U0-G2
	E3					B3-U0-G3	B3-U0-G3	B3-U0-G3
13	A3	13000	12500	12100	111	B3-U0-G3	B3-U0-G3	B3-U0-G3
	B3					B2-U0-G3	B2-U0-G3	B2-U0-G3
	C3					B2-U0-G3	B2-U0-G3	B2-U0-G3
	D3					B2-U0-G3	B2-U0-G3	B1-U0-G3
	E3					B3-U0-G3	B3-U0-G3	B3-U0-G3
14	A3	14000	13400	13000	122	B3-U0-G3	B3-U0-G3	B3-U0-G3
	B3					B2-U0-G3	B2-U0-G3	B2-U0-G3
	C3					B2-U0-G3	B2-U0-G3	B2-U0-G3
	D3					B2-U0-G3	B2-U0-G3	B2-U0-G3
	E3					B3-U0-G3	B3-U0-G3	B3-U0-G3
15	A3	15000	14400	13900	136	B3-U0-G3	B3-U0-G3	B3-U0-G3
	B3					B2-U0-G3	B2-U0-G3	B2-U0-G3
	C3					B2-U0-G3	B3-U0-G3	B2-U0-G3
	D3					B2-U0-G3	B2-U0-G3	B2-U0-G3
	E3					B3-U0-G3	B3-U0-G3	B3-U0-G3

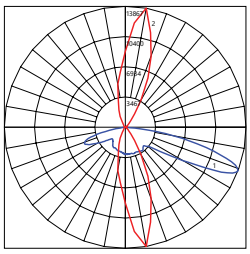
For additional information on ERLH IES files, please click one of the following links:

Non-Shielded Shielded

ERLH
Type II Narrow

13,000 Lumens
4000K
ERLH_13A340___.IES



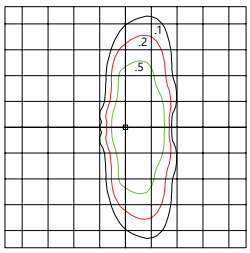


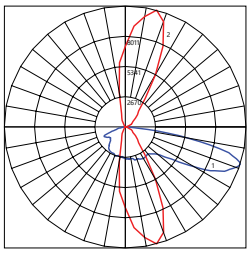
- Mounting Height at 30'
- Initial Footcandle at Grade

— Vertical plane at max Cd horiz. angle
— Horizontal cone at max Cd vert. angle

ERLH
Type II Wide

13,000 Lumens
4000K
ERLH_13B340___.IES



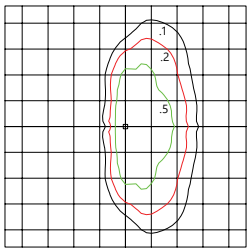


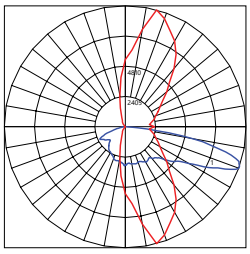
- Mounting Height at 30'
- Initial Footcandle at Grade

— Vertical plane at max Cd horiz. angle
— Horizontal cone at max Cd vert. angle

ERLH
Type III

13,000 Lumens
4000K



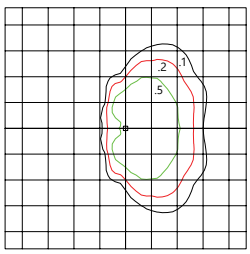


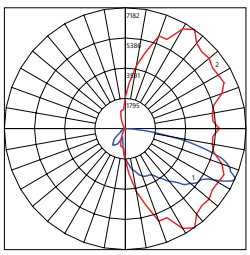
- Mounting Height at 30'
- Initial Footcandle at Grade

— Vertical plane at max Cd horiz. angle
— Horizontal cone at max Cd vert. angle

ERLH
Type IV

13,000 Lumens
4000K
ERLH_13D340___.IES



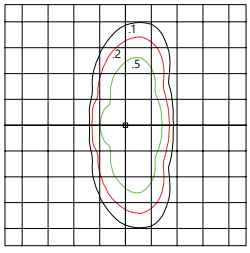


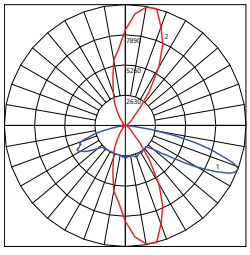
- Mounting Height at 30'
- Initial Footcandle at Grade

— Vertical plane at max Cd horiz. angle
— Horizontal cone at max Cd vert. angle

ERLH
Type II Enhanced Back Light

13,000 Lumens
4000K
ERLH_13E340___.IES





- Mounting Height at 30'
- Initial Footcandle at Grade

— Vertical plane at max Cd horiz. angle
— Horizontal cone at max Cd vert. angle

EVOLVE

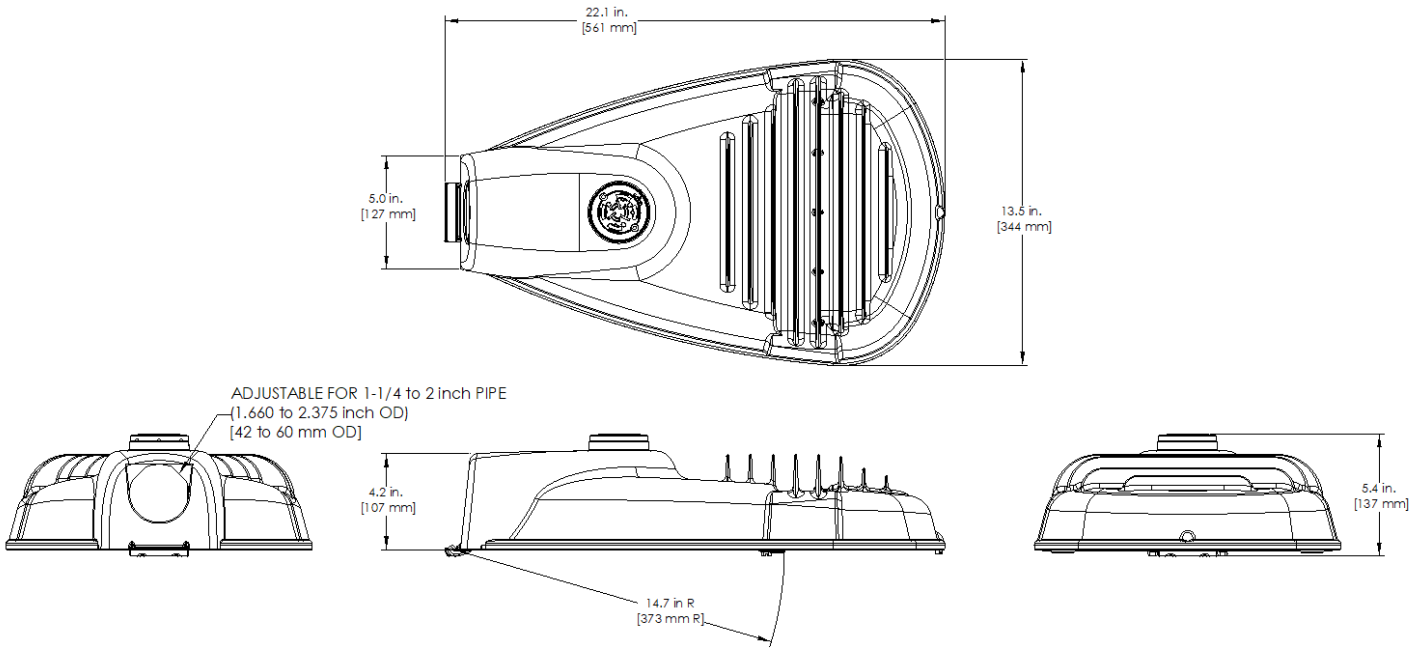
ERLH Cobra Head
LED Roadway Lighting

CUSTOMER NAME _____

PROJECT NAME _____

DATE _____ TYPE _____

CATALOG NUMBER _____



Mounting

- Adjustable for 1.25 to 2 in. nominal mounting pipe
- Integral diecast mounting pipe stop
- Slipfitter with +/- 5 degrees of leveling adjustment

Effective Projected Area

- 0.5 sq ft max (0.046 sq m)

Weight

- 15.15 lbs (6.9 kgs) w/ 2 Bolt Slipfitter
- 15.85 lbs (7.2 kgs) w/ 4 Bolt Slipfitter

Accessories

SAP NUMBER	PART NUMBER	DESCRIPTION
93029237	PED-MV-LED-7	ANSI C136.41 Dimming PE, 120-277V
93029238	PED-347-LED-7	ANSI C136.41 Dimming PE, 347V
93029239	PED-480-LED-7	ANSI C136.41 Dimming PE, 480V
28299	PECOTL	Standard 120-277V
XXXXXX	PECHTL	Standard 347-480V
73251	SCCL-PECTL	Shorting Cap

See pages 22 & 23 for more detailed information on ERLH Shields.

Networked Lighting Control

Current's **LightGrid**™ Outdoor Lighting Control System is designed for Street and Roadway Applications. It enables remote monitoring, control, and asset management of a single fixture or a group of fixtures through a web enabled Central Management System.

EVOLVE

ERL2 Cobra Head
LED Roadway Lighting

CUSTOMER NAME _____

PROJECT NAME _____

DATE _____ TYPE _____

CATALOG NUMBER _____

The Evolve® LED Roadway ERL2 Luminaire is optimized utilizing advanced LED reflective optical system for local, collector and major roadways. The modern design incorporates the heat sink directly into the unit for heat transfer to prolong LED life.

Construction

Housing:	Aluminum die cast enclosure casting integral heat sink for maximum heat transfer
Lens:	Impact resistant tempered glass
Paint:	Corrosion resistant polyester powder paint, minimum ≥ 2.0 mil thickness (RAL & custom colors available) Standard = Black, Dark Bronze, Gray, White Optional = Coastal Finish
Weight:	24.0 lbs (10.9 kgs)

Optical System

Lumens:	16,000 - 30,000
Distribution:	Type II Narrow, II/III, III, V
Efficacy:	110-143 LPW
CCT:	2700K, 3000K, 4000K
CRI:	≥ 70

Electrical

Input Voltage:	120-277V or 347-480V
Input Frequency:	50/60Hz
Power Factor:	≥ 90% at rated watts
Total Harmonic Distortion:	≤ 20% at rated watts

Surge Protection*

STANDARD	OPTIONAL
☐ 10kV/5kA	☐ Secondary 10kV/5kA (R Option) or ☐ Secondary 20kV/10kA (T Option)

***Per ANSI C136.2-2018**

Lumen Maintenance

Projected Lxx per IES TM-21-11 at

LUMEN CODES	DISTRIBUTIONS	LXX(10K) @ HOURS		
		25,000 HR	50,000 HR	60,000 HR
16, 18, 19, 21, 23	A3,B3,C3, D3,E3	L96	L94	L94
25, 27, 28	A3,B3,C3, D3,E3	L95	L93	L92
30	A3,B3,C3, D3,E3	L94	L91	L90

Ratings

Operating Temperature:	Lumen Output 16-28 (-40°C to 50°C) Lumen Output 30 (-40°C to 45°C)
Vibration:	3G per ANSI C136.31-2018
LM-79:	Testing in accordance with IES Standards

Controls

Dimming:	Standard - 0-10V	☐
	Optional - DALI (Option U)	☐
Sensors:	Photo Electric Sensors (PE) available LightGrid Compatible	

Warranty

☐ 5 Year (Standard) ☐ 10 Year (Optional)

UL Listed · UL Certified · UL1598 · DLC Listed · IP65 · IK07 · Controls Enabled · IDA Dark Sky Approved

Not all product variations listed on this page are DLC qualified. Visit www.designlights.org/search to confirm qualifications.

EVOLVE

ERL2 Cobra Head
LED Roadway Lighting

CUSTOMER NAME ______________________
PROJECT NAME ______________________
DATE ______________ TYPE ______________
CATALOG NUMBER ______________________

Ordering Information

ERL2
_ _ _ _   _   _ _   _ _   _ _   _   _ _ _ _   _ _ _

PROD. ID	VOLTAGE	LUMENS	DISTRIBUTION	CCT	CONTROLS PER ANSI C136.41	COLOR	OPTIONS
E = Evolve	0 = 120-277V[1]	16 = 16000 lm	A3 = Type II Narrow[2]	27 = 2700K[3]	A = 7-Pin Receptacle	BLCK = Black	A = 4 Bolt Slipfitter[4]
R = Roadway	H = 347-480V[1]	18 = 18000 lm	B3 = Type II Wide	30 = 3000K[3]	D = 7-Pin Receptacle with Shorting Cap	DKBZ = Dark Bronze	B = Tether
L = Local		19 = 19000 lm	C3 = Type III	40 = 4000K	E = 7 Pin Receptacle with Long Life non-Dimming PE Control[4]	GRAY = Gray	F = Fusing
2 = Double Module	1 = 120V	21 = 21000 lm	D3 = Type IV		Note: 0-10V control standard unless DALI Option "U" requested	WHTE= White	G = Internal Bubble Level
	2 = 208V	23 = 23000 lm	E3 = Type II Enhanced Back Light				I = Optional IP66 Optical
	3 = 240V	25 = 25000 lm					L = Tool-Less Entry
	4 = 277V	27 = 27000 lm					M1 = MagnaPak[8]
	5 = 480V	28 = 28000 lm					R = Secondary 10kV/5kA SPD
	D = 347V	30 = 30000 lm					T = Secondary 20kV/10kA SPD[1]
							U = DALI Programmable[5]
							V1 = Field Adjustable Module[7]
							Y = Coastal Finish[6]
							XXX = Special Options

[1] Not Available with Fusing
[2] Nominal IES Type classing subject to typical variation, individual units may differ
[3] Select 2700K or 3000K CCT for IDA approved units
[4] Lead time varies, Contact Factory
[5] Compatible with LightGrid
[6] Recommended for installations within 750 feet from coast. Lead time varies, check with factory.
[7] Not available with DALI "U" option
[8] Option M1 provides for MagnaPak – 20 Fixtures per MagnaPak Container. Single Pack box is standard

Suggested HID Replacement

- Approximately 21,000 - 30,000 lumens lumens to replace 400W HPS Cobra-head

Note: actual replacement lumens may vary based upon mounting height, pole spacing, design criteria, etc.

PREVIOUS	OPTICAL PATTERN	LATEST	NEW OPTICAL PATTERN
A1, B1	Extra Narrow/Narrow Asymmetric	A3	Type II Narrow
C1, E1	Asymmetric Short/ Medium	B3	Type II Wide
D1, G1	Asymmetric Forward/ Extra Wide	C3	Type III
F1	Asymmetric Wide	D3	Type IV
N/A	N/A	E3	Type II Enhanced Back Light

The information above is designed to provide a guideline to select the correct luminaire for a roadway application. The best and most accurate way to ensure the proper design is by doing a lighting layout.

Not all product variations listed on this page are DLC qualified. Visit www.designlights.org/search to confirm qualifications.

CUSTOMER NAME _____

PROJECT NAME _____

DATE _____ TYPE _____

CATALOG NUMBER _____

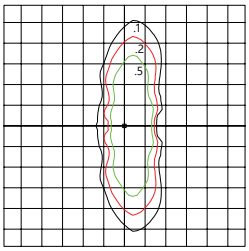
LUMEN OUTPUT	DIST.	LUMENS			WATTAGE		BUG RATINGS		
		4000K	3000K	2700K	277V	480V	4000K	3000K	2700K
16	A3	16000	15300	14900	120		B3-U0-G3	B3-U0-G3	B3-U0-G3
	B3						B3-U0-G3	B3-U0-G3	B2-U0-G3
	C3						B2-U0-G3	B2-U0-G3	B2-U0-G3
	D3						B2-U0-G3	B2-U0-G3	B2-U0-G3
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3
18	A3	18000	17300	16700	140		B3-U0-G3	B3-U0-G3	B3-U0-G3
	B3						B3-U0-G3	B3-U0-G3	B3-U0-G3
	C3						B2-U0-G3	B2-U0-G3	B2-U0-G3
	D3						B2-U0-G3	B2-U0-G3	B2-U0-G3
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3
19	A3	19000	18200	17700	149		B3-U0-G3	B3-U0-G3	B3-U0-G3
	B3						B3-U0-G3	B3-U0-G3	B3-U0-G3
	C3						B3-U0-G3	B2-U0-G3	B2-U0-G3
	D3						B2-U0-G3	B2-U0-G3	B2-U0-G3
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3
21	A3	21000	20100	19500	174	177	B3-U0-G3	B3-U0-G3	B3-U0-G3
	B3						B3-U0-G3	B3-U0-G3	B3-U0-G3
	C3						B3-U0-G4	B3-U0-G3	B3-U0-G3
	D3						B2-U0-G3	B2-U0-G3	B2-U0-G3
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3
23	A3	23000	22100	21400	194	196	B3-U0-G3	B3-U0-G3	B3-U0-G3
	B3						B3-U0-G3	B3-U0-G3	B3-U0-G3
	C3						B3-U0-G4	B3-U0-G4	B3-U0-G4
	D3						B2-U0-G4	B2-U0-G4	B2-U0-G3
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3
25	A3	25000	24000	23300	214		B3-U0-G3	B3-U0-G3	B3-U0-G3
	B3						B3-U0-G3	B3-U0-G3	B3-U0-G3
	C3						B3-U0-G4	B3-U0-G4	B3-U0-G4
	D3						B2-U0-G4	B2-U0-G4	B2-U0-G4
	E3						B4-U0-G4	B4-U0-G4	B4-U0-G4
27	A3	27000	25900	25100	237		B3-U0-G3	B3-U0-G3	B3-U0-G3
	B3						B3-U0-G4	B3-U0-G4	B3-U0-G3
	C3						B3-U0-G4	B3-U0-G4	B3-U0-G4
	D3						B2-U0-G4	B2-U0-G4	B2-U0-G4
	E3						B4-U0-G4	B4-U0-G4	B4-U0-G4
28	A3	28000	26900	26100	251		B3-U0-G3	B3-U0-G3	B3-U0-G3
	B3						B3-U0-G4	B3-U0-G4	B3-U0-G4
	C3						B3-U0-G4	B3-U0-G4	B3-U0-G4
	D3						B2-U0-G4	B2-U0-G4	B2-U0-G4
	E3						B4-U0-G4	B4-U0-G4	B4-U0-G4
30	A3	30000	28800	27900	278		B4-U0-G4	B4-U0-G4	B3-U0-G3
	B3						B3-U0-G4	B3-U0-G4	B3-U0-G4
	C3						B3-U0-G4	B3-U0-G4	B3-U0-G4
	D3						B2-U0-G4	B2-U0-G4	B2-U0-G4
	E3						B4-U0-G4	B4-U0-G4	B4-U0-G4

For additional information on ERL2 IES files, please click one of the following links:

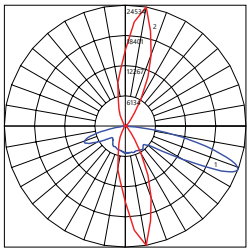
Non-Shielded Shielded

ERL2
Type II Narrow

23,000 Lumens
4000K
ERL2_23A340___.IES



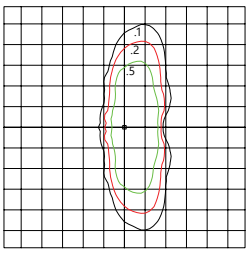
- Mounting Height at 30'
- Initial Footcandle at Grade



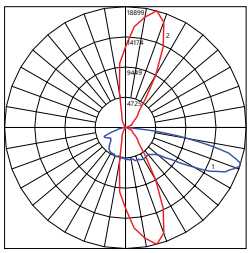
— Vertical plane at max Cd horiz. angle 80°
— Horizontal cone at max Cd vert. angle 69°

ERL2
Type II Wide

23,000 Lumens
4000K
ERL2_23B340___.IES



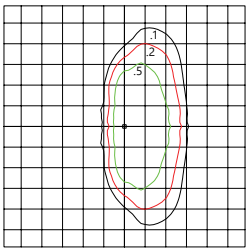
- Mounting Height at 30'
- Initial Footcandle at Grade



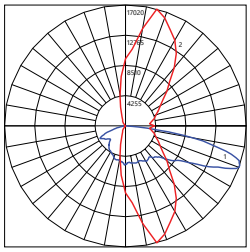
— Vertical plane at max Cd horiz. angle 75°
— Horizontal cone at max Cd vert. angle 72°

ERL2
Type III

23,000 Lumens
4000K
ERL2_23C340___.IES



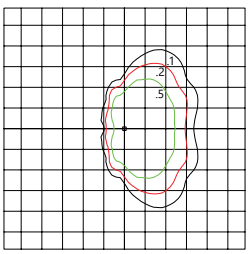
- Mounting Height at 30'
- Initial Footcandle at Grade



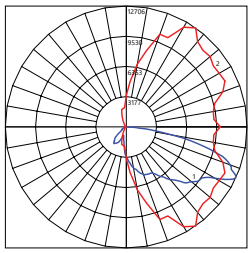
— Vertical plane at max Cd horiz. angle 75°
— Horizontal cone at max Cd vert. angle 71°

ERL2
Type IV

23,000 Lumens
4000K
ERL2_23D340___.IES



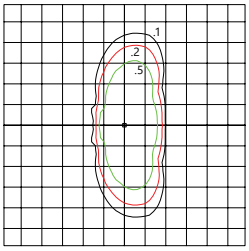
- Mounting Height at 30'
- Initial Footcandle at Grade



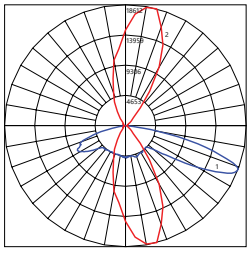
— Vertical plane at max Cd horiz. angle 55°
— Horizontal cone at max Cd vert. angle 65°

ERL2
Type IV

23,000 Lumens
4000K
ERL2_23E340___.IES



- Mounting Height at 30'
- Initial Footcandle at Grade



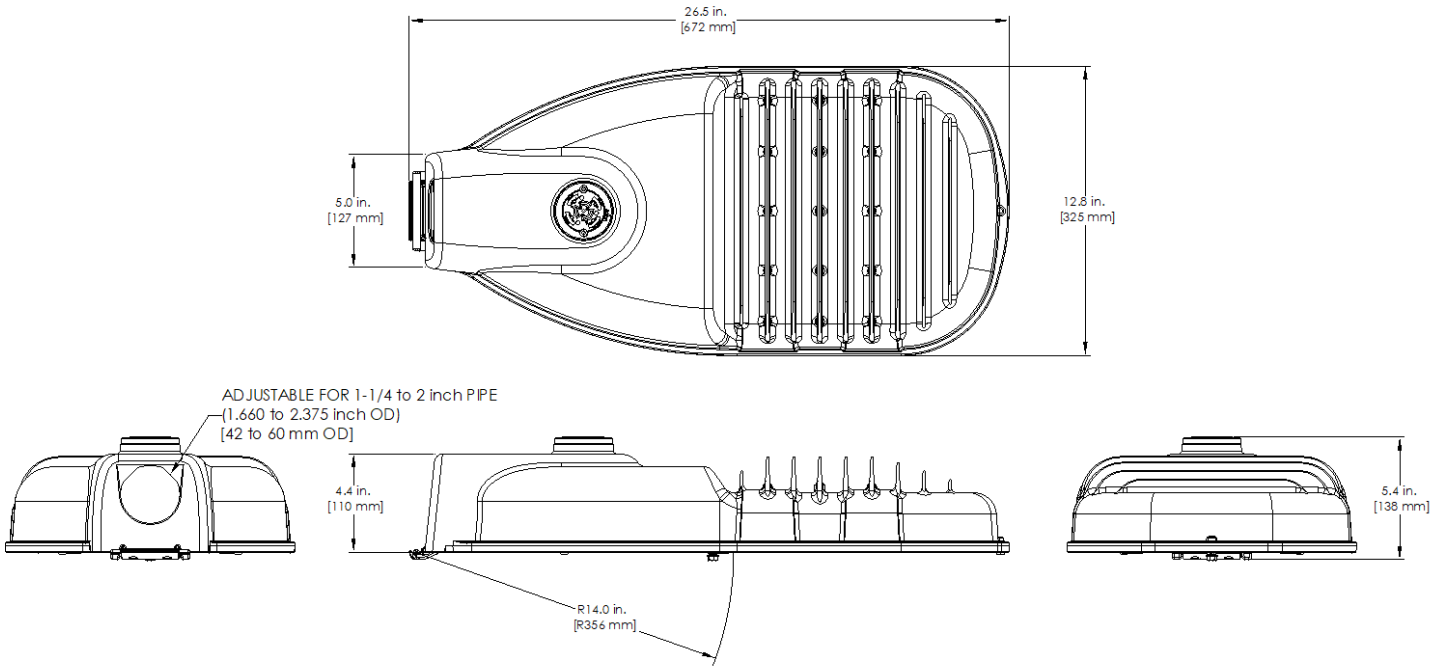
— Vertical plane at max Cd horiz. angle 75°
— Horizontal cone at max Cd vert. angle 69°

CUSTOMER NAME _____

PROJECT NAME _____

DATE _____ TYPE _____

CATALOG NUMBER _____



Mounting

- Adjustable for 1.25 to 2 in. nominal mounting pipe
- Integral diecast mounting pipe stop
- Slipfitter with +/- 5 degrees of leveling adjustment

Effective Projected Area

- 0.57 sq ft max (0.053 sq m)

Weight:

- 24.0 lbs (10.9 kgs)

Accessories

SAP NUMBER	PART NUMBER	DESCRIPTION
93029237	PED-MV-LED-7	ANSI C136.41 Dimming PE, 120-277V
93029238	PED-347-LED-7	ANSI C136.41 Dimming PE, 347V
93029239	PED-480-LED-7	ANSI C136.41 Dimming PE, 480V
28299	PECOTL	Standard 120-277V

See pages 22 & 23 for more detailed information on ERL2 Shields.

Networked Lighting Control

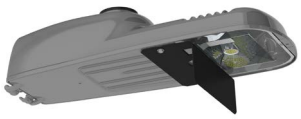
Current's **LightGrid**™ Outdoor Lighting Control System is designed for Street and Roadway Applications. It enables remote monitoring, control, and asset management of a single fixture or a group of fixtures through a web enabled Central Management System.

CUSTOMER NAME _____
PROJECT NAME _____
DATE _____ TYPE _____
CATALOG NUMBER _____

HOUSE SIDE SHIELDS

ERLC Shields

Product Code:	93110037	Description:	ELSHS-ERLC-BLCK
Product Code:	93110038	Description:	ELSHS-ERLC-GRAY



ERL1 / ERLH Shields

Product Code:	93024487	Description:	ELSHS-ERL1-BLCK
Product Code:	93046386	Description:	ELSHS-ERL1-GRAY
Product Code:	93068998	Description:	ELSHS-ERL1-DKBZ

ERL2 Shields

Product Code:	93070722	Description:	ELSHS-ERL2-BLCK
Product Code:	93085564	Description:	ELSHS-ERL2-GRAY
Product Code:	93096747	Description:	ELSHS-ERL2-DKBZ

STREET SIDE SHIELDS

ERLC Shields

Product Code:	93132372	Description:	ELSFS-ERLC-BLCK-10
Product Code:	93132373	Description:	ELSFS-ERLC-BLCK-15
Product Code:	93134760	Description:	ELSFS-ERLC-BLCK-20

ERL1 / ERLH SShields

Product Code:	93092595	Description:	ELSFS-ERL1-BLCK-10
Product Code:	93108740	Description:	ELSFS-ERL1-GRAY-10
Product Code:	93092906	Description:	ELSFS-ERL1-BLCK-15
Product Code:	93105144	Description:	ELSFS-ERL1-GRAY-15
Product Code:	93088130	Description:	ELSFS-ERL1-BLCK-20
Product Code:	93088131	Description:	ELSFS-ERL1-GRAY-20

ERL2 Shields

Product Code:	93132955	Description:	ELSFS-ERL2-BLCK-20
Product Code:	93132986	Description:	ELSFS-ERL2-GRAY-20

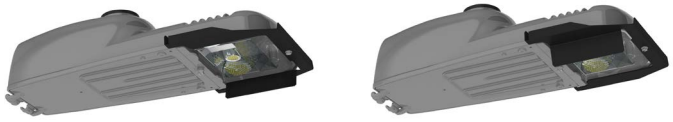
CUSTOMER NAME _____
PROJECT NAME _____
DATE _____ TYPE _____
CATALOG NUMBER _____

SIDE SHIELDS (L&R)

Shipped as a kit - L & R can be used independently

ERLC Shields

Product Code:	93132374	Description:	ELS-ERLC-LEFTRIGHTSIDEKIT-BLCK-10

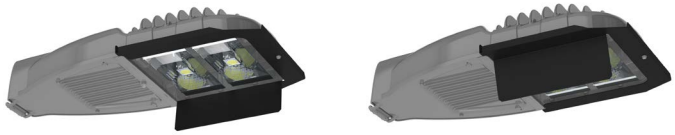


ERL1 / ERLH Shields

Product Code:	93118695	Description:	ELS-ERL1H-LEFTRIGHTSIDEKIT-BLCK-10

ERL2 Shields

Product Code:	93132989	Description:	ELS-ERL2-LEFTRIGHTSIDEKIT-BLCK-10



FOOTNOTES:

1) **10 = 1" Shield Depth; 15 = 1.5" Shield Depth; 20 = 2" Shield Depth**
2) **Black is recommended to reduce potential for glare coming off of the shield**
3) **Use "House Side" Shield to block light trespass behind the pole**
4) **Use "Street Side" / Front Shield to block light light trespass across the street**

APPENDIX C: CORRESPONDENCE

Swider, Erin

From: Hartl, Steven
Sent: Monday, October 16, 2023 2:37 PM
To: Swider, Erin
Subject: FW: Gulfstream/John Ringling Cswy Existing Lighting

See below

Steven J. Hartl
Kimley-Horn | 1777 Main Street, Suite 200, Sarasota, FL 34236
Direct: 941 379 7631 | Main: 941 379 7600
Connect with us: Twitter | LinkedIn | Facebook | Instagram | Kimley-Horn.com

Celebrating 16 years as one of FORTUNE's 100 Best Companies to Work For

---

From: Dennis Hughes <Dennis.Hughes@sarasotaFL.gov>
Sent: Monday, October 16, 2023 2:32 PM
To: Hartl, Steven <Steven.Hartl@kimley-horn.com>
Subject: RE: Gulfstream/John Ringling Cswy Existing Lighting

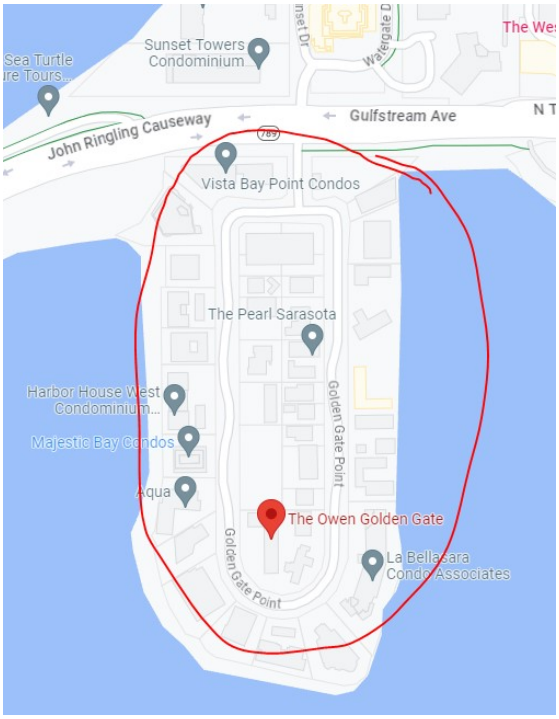
Steve,
The City maintains the lights along Gulfstream/John Rinling and in Goldengate. Give me a day or 2 and I will see if I can find some plans. I looked where they were supposed to be and they are not there.

Dennis Hughes
Capital Projects Coordinator
Phone: (941) 263-6134
Mobile: (941) 376-0078
Email: dennis.hughes@sarasotafl.gov
1761 12th Street, Sarasota, FL 34236

From: Hartl, Steven <Steven.Hartl@kimley-horn.com>
Sent: Monday, October 16, 2023 2:16 PM
To: Dennis Hughes <Dennis.Hughes@sarasotaFL.gov>
Subject: FW: Gulfstream/John Ringling Cswy Existing Lighting

Hello Dennis,

We are working on improvements for the Gulfstream/John Ringling Cswy project from Bird Key to Sunset Dr. I wanted to see if you had any existing lighting plans for Golden Gate Point that you could send my way. Also, who is the maintaining agency for the lighting along the Gulfstream/John Ringling Cswy corridor?



Thanks

Steven J. Hartl
Kimley-Horn | 1777 Main Street, Suite 200, Sarasota, FL 34236
Direct: 941 379 7631 | Main: 941 379 7600
Connect with us: Twitter | LinkedIn | Facebook | Instagram | Kimley-Horn.com

Swider, Erin

From: Hartl, Steven
Sent: Tuesday, October 31, 2023 9:53 AM
To: Mednick, Jeff
Cc: Swider, Erin
Subject: RE: 445926-1 John Ringling/Gulfstream

Dennis at the City was able to get us the fixture that was used which should be good enough. Thanks for checking.

Steven J. Hartl
Kimley-Horn | 1777 Main Street, Suite 200, Sarasota, FL 34236
Direct: 941 379 7631 | Main: 941 379 7600
Connect with us: Twitter | LinkedIn | Facebook | Instagram | Kimley-Horn.com

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From: Mednick, Jeff <Jeffrey.Mednick@dot.state.fl.us>
Sent: Tuesday, October 31, 2023 9:45 AM
To: Hartl, Steven <Steven.Hartl@kimley-horn.com>
Cc: Swider, Erin <Erin.Swider@kimley-horn.com>
Subject: RE: 445926-1 John Ringling/Gulfstream

I've searched through everything I have access to and I can't find anything about these lights being upgraded to LED. I'm wondering if this was a County/City undertaking. Do you have any idea when they were upgraded? I know we started switching over to LED in 2014, but I'm hoping you locals might have a more specific time range. 😃

Jeff Mednick, MBA
Project Manager

Patel, Greene & Associates, PLLC (PGA)
Consultant Support of FDOT District One
801 N. Broadway Ave, Bartow, FL 33830
Office: 863.519.2304 | Cell: 863.205.4671
Email: Jeffrey.Mednick@dot.state.fl.us

From: Hartl, Steven <Steven.Hartl@kimley-horn.com>
Sent: Monday, October 30, 2023 11:57 AM
To: Mednick, Jeff <Jeffrey.Mednick@dot.state.fl.us>
Cc: Swider, Erin <Erin.Swider@kimley-horn.com>
Subject: 445926-1 John Ringling/Gulfstream

Jeff,

Can you check to see if there are any as-built lighting plans for the John Ringling bridge and causeway? At some point the lighting fixtures were changed to LED's and we were wondering what the wattage was for the new fixtures.

Thanks

Steven J. Hartl
Kimley-Horn | 1777 Main Street, Suite 200, Sarasota, FL 34236
Direct: 941 379 7631 | Main: 941 379 7600
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APPENDIX D: VOLTAGE DROP CALCULATIONS

Client:	FDOT	**Load Center:**	A
Project:	Sunset Drive	**Conductor Type:**	THWN COPPER
Project No:	445926-1-52-01	**Circuit Type:**	480/240 VAC, 1 PHASE, 2 WIRE + GROUND
		Maximum Voltage Drop:	5%
		Minimum Fault Current Ratio:	5:1

CKT #	Phase	Load Amps	BRKR Amps
1	A	4.7	20

PHASE-TO-PHASE VOLTAGE =	480
CONDUCTOR SIZE =	6
GROUND SIZE =	6
CALCULATED % VOLTAGE DROP =	0.2
CALCULATED FAULT CURRENT RATIO =	34.5

Load #	Phase	Load Description	Load (VA)	Load (amps)	Dist.-Previous load (feet)	Segment Load	Segment Dist. (ft)	Actual Voltage	Total Run Dist. (ft)	Fault Current	Fault Cur. Ratio
1	A	POLE NO. 18 POLE NO. 16 POLE NO. 15 POLE NO. 12 POLE NO. 13 POLE NO. 10	1002	2.088	42.6	4.673	42.6	479.8	43	12819.1	641.0
2	A	POLE NO. EX	192	0.400	110.0	2.585	110.0	479.6	153	3575.6	178.8
3	A	POLE NO. 17	194	0.404	39.2	2.185	39.2	479.5	192	2844.3	142.2
4	A	POLE NO. 14	140	0.292	186.0	1.781	186.0	479.2	378	1443.9	72.2
5	A	POLE NO. 11	140	0.292	77.3	1.490	77.3	479.1	455	1198.6	59.9
6	A	POLE NO. 09	194	0.404	112.0	1.198	112.0	479.0	567	961.8	48.1
7	A	POLE NO. 08	194	0.404	130.0	0.794	130.0	478.9	697	782.5	39.1
8	A	POLE NO. EX	187	0.390	93.5	0.390	93.5	478.9	791	689.9	34.5

APPENDIX F:

Lane Closure Analysis

LANE CLOSURE WORKSHEET

DATE: **December 7, 2023**

FINANCIAL PROJECT ID: ***445626-1-52-01*** FEDERAL AID PROJECT NO: ***0***

COUNTY: ***Sarasota*** DESIGNER: ***Kimley-Horn***

NO. OF EXISTING LANES: ***4*** LOCATION: ***SR 789 - Bird Key Dr. to Sunset Dr.***

SCOPE OF WORK: ***Reconstruction, outside/median widening and milling and resurfacing.***

Calculate the peak hour traffic volume (V):

V = ATC ***42150*** X P/D ***0.079*** X D ***0.50*** X PSCF ***0.97*** X RTF ***1.00*** = ***1616***

LANE CLOSURE CAPACITY TABLE

Capacity (C) of an Existing 2-Lane – Converted to 2-Way, 1-Lane = 1400 VPH
Capacity (C) of an Existing 4-Lane – Converted to 1-Way, 1-Lane = 1800 VPH
Capacity (C) of an Existing 6-Lane – Converted to 1-Way, 2-Lane = 3600 VPH
Capacity (C) of an Existing 8-Lane – Converted to 1-Way, 3-Lane = 5400 VPH
User Defined Capacity (C) of Existing 2-Lane - Converted to 2-Way, 1-Lane =
User Defined Capacity (C) of an Existing Multi-Lane - Converted to 1-Way, 1-Lane =

Factors restricting Capacity:

TLW ***10*** LC ***1*** WZL ***N/A*** G/C ***0.6***

Calculate the Restricted Capacity (RC) at the Lane Closure Site by multiplying the appropriate 2L, 4L, or 6L Capacity (C) from the Table above by the Obstruction Factor (OF) and the Work Zone Factor (WZF). If the Lane Closure is through or within 600 ft. of a signalized intersection, multiply the RC by the G/C Ratio.

RC (Open Road) = C ***1800*** X OF ***0.75*** X WZF ***1.00*** = ***1350***

RC (Signalized) = RC (Open Road) ***1350*** X G/C ***0.6*** = ***810***

If V ≤ RC, there is no restriction on Lane Closure
If V > RC, calculate the hourly percentage of ADT at which Lane Closure will be permitted

$$\text{Open Road } \% = \frac{\text{RC (Open Road) } 1350}{(\text{ATC } 42150 \times \text{D } 0.5 \times \text{PSCF } 0.97 \times \text{RTF } 1)} = 6.60\ \%$$

Signalized % = Open Road % ***6.60*** X G/C ***0.60*** = ***3.96 %***

Plot 24 hour traffic to determine when Lane Closure permitted.

NOTE: For Existing 2-Lane Roadways, D = 1.00.
Work Zone Factor (WZF) applies only to 2-Lane Roadways.

For RTF< 1.00, briefly describe alternate route:

LANE CLOSURES

24 HOUR COUNTS

	AM Hourly Volume	ATC %	PM Hourly Volume	ATC %
12 - 1	137	0.3	3214	7.6
1 - 2	65	0.2	3190	7.6
2 - 3	40	0.1	3211	7.6
3 - 4	57	0.1	3331	7.9
4 - 5	102	0.2	3291	7.8
5 - 6	270	0.6	2929	6.9
6 - 7	768	1.8	2333	5.5
7 - 8	1822	4.3	1878	4.5
8 - 9	2431	5.8	1327	3.1
9 - 10	2926	6.9	1193	2.8
10 - 11	3206	7.6	920	2.2
11 - 12	3132	7.4	377	0.9
			TOTAL 42,150	100

P/D = 0.079

COUNT DATE:

March 8, 2022

Designer:

Kimley-Horn

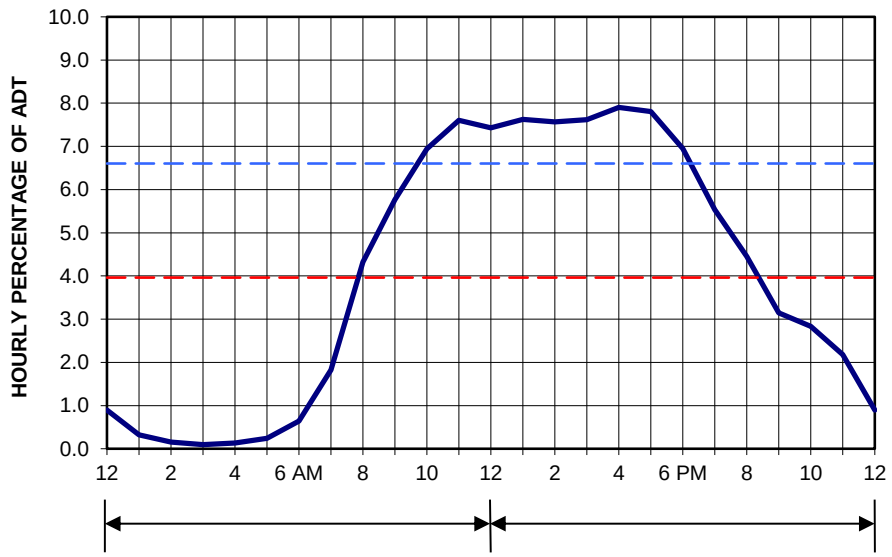
Financial Project ID No.:

445626-1-52-01

Location:

SR 789 - Bird Key Dr. to Sunset Dr.

HOURLY VARIATION OF DAILY TRAFFIC



- CONCLUSION -

ROUND TO THE NEAREST 1/2 HOUR CONSERVATIVELY

OPEN ROAD LANE CLOSURE

7:00PM to 9:00AM

SIGNALIZED LANE CLOSURE

9:00PM to 7:00AM

COUNTY: 17
STATION: 0011
DESCRIPTION: SR-789, RINGLING CAUSEWAY BRIDGE
START DATE: 03/08/2022
START TIME: 0000

	DIRECTION: E					DIRECTION: W					COMBINED
TIME	1ST	2ND	3RD	4TH	TOTAL	1ST	2ND	3RD	4TH	TOTAL	TOTAL
0000	24	34	15	13	86	15	22	8	6	51	137
0100	10	15	11	8	44	11	6	3	1	21	65
0200	8	3	6	3	20	6	4	5	5	20	40
0300	4	7	10	6	27	4	3	16	7	30	57
0400	4	3	14	13	34	6	9	23	30	68	102
0500	12	20	28	31	91	23	33	45	78	179	270
0600	47	39	52	82	220	71	113	156	208	548	768
0700	97	120	160	195	572	201	248	403	398	1250	1822
0800	177	214	214	222	827	381	395	379	449	1604	2431
0900	234	278	318	274	1104	419	451	467	485	1822	2926
1000	307	320	354	349	1330	480	432	502	462	1876	3206
1100	352	322	318	324	1316	376	462	500	478	1816	3132
1200	375	440	398	378	1591	420	380	402	421	1623	3214
1300	347	407	405	426	1585	393	396	418	398	1605	3190
1400	469	443	478	430	1820	334	314	375	368	1391	3211
1500	494	418	487	470	1869	386	379	345	352	1462	3331
1600	461	572	480	482	1995	340	309	344	303	1296	3291
1700	459	569	330	481	1839	270	216	251	353	1090	2929
1800	409	307	288	336	1340	294	285	204	210	993	2333
1900	392	268	234	182	1076	173	204	225	200	802	1878
2000	216	217	179	151	763	169	115	131	149	564	1327
2100	206	192	153	160	711	127	129	112	114	482	1193
2200	168	143	127	115	553	146	95	87	39	367	920
2300	84	84	63	37	268	38	20	28	23	109	377
24-HOUR TOTALS:					21081					21069	42150

PEAK VOLUME INFORMATION

	DIRECTION: E		DIRECTION: W		COMBINED DIRECTIONS	
	HOUR	VOLUME	HOUR	VOLUME	HOUR	VOLUME
A.M.	845	1052	845	1786	845	2838
P.M.	1600	1995	1245	1628	1530	3336
DAILY	1600	1995	945	1899	1530	3336

TRUCK PERCENTAGE 3.56 3.85 3.71

CLASSIFICATION SUMMARY DATABASE

DIR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTTRK	TOTVOL
E	149	16670	3511	13	405	77	11	226	16	3	0	0	0	0	0	751	21081
W	138	16669	3451	6	411	72	14	287	18	2	1	0	0	0	0	811	21069

GENERATED BY SPS 5.0.55P

APPENDIX G:

Horizontal/Vertical Alignment Reports

Horizontal Alignment Review Report

Report Created: Friday, December 8, 2023
Time: 1:43:57 PM

Project: Default
Description:
File Name: K:\SAR_Worksets\FDOT\149748004_Gulfstream-Sunset\Roadway\MODLRD01_BirdKey.dgn
Last Revised: 12/8/2023 13:33:17

Note: All units in this report are in feet unless specified otherwise.

Alignment Name: CLSR789
Alignment Description:
Alignment Style: Alignment\Centerline

		Station	Northing	Easting
Element: Linear				
START	(START)	117+42.56	1087890.35	472959.53
PC	(PC)	129+94.92	1088534.62	474033.46
Tangential Direction:		N59°02'22"E		
Tangential Length:		1252.36		
Element: Circular				
PC	(PC)	129+94.92	1088534.62	474033.46
HPI	(HPI)	133+09.19	1088696.30	474302.96
CC	(CC)		1090039.79	473130.47
PT	(PT)	136+16.88	1088941.45	474499.61
Radius:		1755.25		
Delta:		20°18'09" Left		
Degree of Curvature (Arc):		03°15'51"		
Length:		621.96		
Tangent:		314.28		
Chord:		618.72		
Middle Ordinate:		27.48		
External:		27.91		
Back Tangent Direction:		N59°02'22"E		
Back Radial Direction:		S30°57'38"E		
Chord Direction:		N48°53'18"E		

Ahead Radial Direction:		S51°15'47"E		
Ahead Tangent Direction:		N38°44'13"E		
Element: Linear				
PT	(PT)	136+16.88	1088941.45	474499.61
PC	(PC)	162+12.11	1090965.80	476123.57
Tangential Direction:		N38°44'13"E		
Tangential Length:		2595.23		
Element: Circular				
PC	(PC)	162+12.11	1090965.80	476123.57
HPI	(HPI)	170+55.73	1091623.85	476651.46
CC	(CC)		1089867.46	477492.71
PT	(PT)	177+84.92	1091622.71	477495.08
Radius:		1755.25		
Delta:		51°20'25" Right		
Degree of Curvature (Arc):		03°15'51"		
Length:		1572.81		
Tangent:		843.62		
Chord:		1520.71		
Middle Ordinate:		173.24		
External:		192.21		
Back Tangent Direction:		N38°44'13"E		
Back Radial Direction:		S51°15'47"E		
Chord Direction:		N64°24'26"E		
Ahead Radial Direction:		S00°04'38"W		
Ahead Tangent Direction:		S89°55'22"E		
Element: Linear				
PT	(PT)	177+84.92	1091622.71	477495.08
END	(END)	189+43.14	1091621.14	478653.30
Tangential Direction:		S89°55'22"E		
Tangential Length:		1158.22		

Horizontal Alignment Review Report

Report Created: Wednesday, December 20, 2023
Time: 10:48:51 AM

Project: Default
Description:
File Name: K:\SAR_Worksets\FDOT\149748004_Gulfstream-Sunset\Roadway\ALGNRD01.dgn
Last Revised: 12/19/2023 09:45:12

Note: All units in this report are in feet unless specified otherwise.

Alignment Name: BLSR789
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Linear				
START	( )	17+48.10	1087890.35	472959.53
PC	( )	33+42.07	1088710.36	474326.40
Tangential Direction:		N59°02'22"E		
Tangential Length:		1593.97		
Element: Circular				
PC	( )	33+42.07	1088710.36	474326.40
HPI	( )	35+83.45	1088834.54	474533.39
CC	( )		1089866.42	473632.85
PT	( )	38+19.78	1089022.83	474684.43
Radius:		1348.14		
Delta:		20°18'08.95" Left		
Degree of Curvature (Arc):		04°14'59.95"		
Length:		477.71		
Tangent:		241.38		
Chord:		475.21		
Middle Ordinate:		21.10		
External:		21.44		
Back Tangent Direction:		N59°02'22"E		
Back Radial Direction:		S30°57'38"E		
Chord Direction:		N48°53'18"E		

Ahead Radial Direction:		S51°15'47"E		
Ahead Tangent Direction:		N38°44'13"E		

Element: Linear

PT	( )	38+19.78	1089022.83	474684.43
PC	( )	64+65.64	1091086.67	476340.07
Tangential Direction:		N38°44'13"E		
Tangential Length:		2645.86		

Element: Circular

PC	( )	64+65.64	1091086.67	476340.07
HPI	( )	71+54.09	1091623.68	476770.87
CC	( )		1090190.36	477457.38
PT	( )	77+49.15	1091622.76	477459.31
Radius:		1432.40		
Delta:		51°20'25.26" Right		
Degree of Curvature (Arc):		03°59'59.94"		
Length:		1283.51		
Tangent:		688.45		
Chord:		1241.00		
Middle Ordinate:		141.37		
External:		156.86		
Back Tangent Direction:		N38°44'13"E		
Back Radial Direction:		S51°15'47"E		
Chord Direction:		N64°24'26"E		
Ahead Radial Direction:		S00°04'38"W		
Ahead Tangent Direction:		S89°55'22"E		

Element: Linear

PT	( )	77+49.15	1091622.76	477459.31
END	( )	89+43.14	1091621.14	478653.30
Tangential Direction:		S89°55'22"E		
Tangential Length:		1193.99		

Horizontal Alignment Review Report

Report Created: Monday, December 18, 2023
Time: 6:16:19 PM

Project: Default
Description:
File Name: K:\SAR_Worksets\FDOT\149748004_Gulfstream-Sunset\Roadway\ALGNRD01.dgn
Last Revised: 12/18/2023 18:10:42

Note: All units in this report are in feet unless specified otherwise.

Alignment Name: PGL LT1
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Circular				
PC	( )	222+70.00	1088167.715	473408.211
HPI	( )	223+07.01	1088186.063	473440.351
CC	( )		1094708.854	469673.976
PCC	( )	223+44.02	1088204.725	473472.308
Radius:		7532.00		
Delta:		0.563° Left		
Degree of Curvature (Arc):		0.761°		
Length:		74.02		
Tangent:		37.01		
Chord:		74.01		
Middle Ordinate:		0.09		
External:		0.09		
Back Tangent Direction:		N60.279°E		
Back Radial Direction:		S29.721°E		
Chord Direction:		N59.997°E		
Ahead Radial Direction:		S30.284°E		
Ahead Tangent Direction:		N59.716°E		
Element: Circular				
PCC	( )	223+44.02	1088204.725	473472.308
HPI	( )	224+53.15	1088259.760	473566.548

CC	( )		1094708.854	469673.976
PT	( )	225+62.26	1088317.502	473659.153
Radius:		7532.00		
Delta:		1.660° Left		
Degree of Curvature (Arc):		0.761°		
Length:		218.25		
Tangent:		109.13		
Chord:		218.24		
Middle Ordinate:		0.79		
External:		0.79		
Back Tangent Direction:		N59.716°E		
Back Radial Direction:		S30.284°E		
Chord Direction:		N58.885°E		
Ahead Radial Direction:		S31.945°E		
Ahead Tangent Direction:		N58.055°E		

Element: Linear

PT	( )	225+62.26	1088317.502	473659.153
END	( )	225+72.62	1088322.981	473667.940
Tangential Direction:		N58.055°E		
Tangential Length:		10.36		

Horizontal Alignment Review Report

Report Created: Monday, December 18, 2023
Time: 6:17:39 PM

Project: Default
Description:
File Name: K:\SAR_Worksets\FDOT\149748004_Gulfstream-Sunset\Roadway\ALGNRD01.dgn
Last Revised: 12/18/2023 18:10:42

Note: All units in this report are in feet unless specified otherwise.

Alignment Name: PGL RT1
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Circular				
PC	( )	322+70.00	1088153.190	473416.925
HPI	( )	324+07.87	1088221.369	473536.759
CC	( )		1094209.583	469971.183
PT	( )	325+45.71	1088294.235	473653.803
Radius:		6968.00		
Delta:		2.267° Left		
Degree of Curvature (Arc):		0.822°		
Length:		275.71		
Tangent:		137.87		
Chord:		275.69		
Middle Ordinate:		1.36		
External:		1.36		
Back Tangent Direction:		N60.363°E		
Back Radial Direction:		S29.637°E		
Chord Direction:		N59.229°E		
Ahead Radial Direction:		S31.904°E		
Ahead Tangent Direction:		N58.096°E		
Element: Linear				
PT	( )	325+45.71	1088294.235	473653.803
END	( )	325+72.62	1088308.460	473676.652

Tangential Direction:	N58.096°E
Tangential Length:	26.92

Horizontal Alignment Review Report

Report Created: Monday, December 18, 2023
Time: 6:12:30 PM

Project: Default
Description:
File Name: K:\SAR_Worksets\FDOT\149748004_Gulfstream-Sunset\Roadway\ALGNRD01.dgn
Last Revised: 12/18/2023 18:10:42

Note: All units in this report are in feet unless specified otherwise.

Alignment Name: PGL LT2
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Circular				
PC	( )	277+65.00	1091632.524	477475.063
HPI	( )	277+86.43	1091632.644	477496.494
CC	( )		1089977.550	477484.311
PT	( )	278+07.86	1091632.209	477517.922
Radius:		1655.00		
Delta:		1.484° Right		
Degree of Curvature (Arc):		3.462°		
Length:		42.86		
Tangent:		21.43		
Chord:		42.86		
Middle Ordinate:		0.14		
External:		0.14		
Back Tangent Direction:		N89.680°E		
Back Radial Direction:		S0.320°E		
Chord Direction:		S89.578°E		
Ahead Radial Direction:		S1.164°W		
Ahead Tangent Direction:		S88.836°E		
Element: Linear				
PT	( )	278+07.86	1091632.209	477517.922
HPI	( )	282+07.40	1091624.095	477917.382

Tangential Direction:		S88.836°E		
Tangential Length:		399.54		
Element: Linear				
HPI	( )	282+07.40	1091624.095	477917.382
HPI	( )	283+28.21	1091621.642	478038.160
Tangential Direction:		S88.836°E		
Tangential Length:		120.80		
Element: Linear				
HPI	( )	283+28.21	1091621.642	478038.160
END	( )	284+20.22	1091622.838	478130.162
Tangential Direction:		N89.255°E		
Tangential Length:		92.01		

Horizontal Alignment Review Report

Report Created: Monday, December 18, 2023
Time: 6:14:22 PM

Project: Default
Description:
File Name: K:\SAR_Worksets\FDOT\149748004_Gulfstream-Sunset\Roadway\ALGNRD01.dgn
Last Revised: 12/18/2023 18:10:42

Note: All units in this report are in feet unless specified otherwise.

Alignment Name: PGL RT2
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Circular				
PC	( )	377+65.00	1091614.791	477475.240
HPI	( )	377+97.26	1091615.219	477507.496
CC	( )		1089787.952	477499.476
PT	( )	378+29.51	1091614.508	477539.747
Radius:		1827.00		
Delta:		2.023° Right		
Degree of Curvature (Arc):		3.136°		
Length:		64.51		
Tangent:		32.26		
Chord:		64.51		
Middle Ordinate:		0.28		
External:		0.28		
Back Tangent Direction:		N89.240°E		
Back Radial Direction:		S0.760°E		
Chord Direction:		S89.749°E		
Ahead Radial Direction:		S1.263°W		
Ahead Tangent Direction:		S88.737°E		
Element: Linear				
PT	( )	378+29.51	1091614.508	477539.747
HPI	( )	381+56.86	1091607.292	477867.020

Tangential Direction:		S88.737°E		
Tangential Length:		327.35		
Element: Linear				
HPI	( )	381+56.86	1091607.292	477867.020
END	( )	384+20.04	1091612.199	478130.148
Tangential Direction:		N88.932°E		
Tangential Length:		263.17		

Vertical Alignment Review Report

Report Created: Friday, December 8, 2023
Time: 1:39:53 PM

Project: Default
Description:
File Name: K:\SAR_Worksets\FDOT\149748004_Gulfstream-Sunset\Roadway\MODLRD01_BirdKey.dgn
Last Revised: 12/8/2023 13:33:17

Note: All units in this report are in feet unless specified otherwise.

Horizontal Alignment: CLSR789
Horizontal Description:
Horizontal Style: Alignment\Centerline

Vertical Alignment: PGL LT
Vertical Description:
Vertical Style: Linear\Roadway Design\Plan/Profile 2D Lines\Pavement\Profile Grade Line Left PGL LT

	Station	Elevation
Element: Linear		
START	121+00.00	8.43
VPI	122+90.00	9.20
Tangent Grade:	0.405%	
Tangent Length:	190.00	
Element: Linear		
VPI	122+90.00	9.20
END	125+72.60	8.10
Tangent Grade:	-0.389%	
Tangent Length:	282.60	

Vertical Alignment Review Report

Report Created: Friday, December 8, 2023
Time: 1:41:50 PM

Project: Default
Description:
File Name: K:\SAR_Worksets\FDOT\149748004_Gulfstream-Sunset\Roadway\MODLRD01_BirdKey.dgn
Last Revised: 12/8/2023 13:33:17

Note: All units in this report are in feet unless specified otherwise.

Horizontal Alignment: CLSR789
Horizontal Description:
Horizontal Style: Alignment\Centerline

Vertical Alignment: PGL RT
Vertical Description:
Vertical Style: Linear\Roadway Design\Plan/Profile 2D Lines\Pavement\Profile Grade Line Right PGL RT

	Station	Elevation
Element: Linear		
START	121+00.00	8.43
VPI	122+90.00	9.20
Tangent Grade:	0.405%	
Tangent Length:	190.00	
Element: Linear		
VPI	122+90.00	9.20
END	125+72.50	8.30
Tangent Grade:	-0.319%	
Tangent Length:	282.50	

Vertical Alignment Review Report

Report Created: Friday, December 8, 2023
Time: 1:47:41 PM

Project: Default
Description:
File Name: K:\SAR_Worksets\FDOT\149748004_Gulfstream-Sunset\Roadway\MODLRD01_Sunset.dgn
Last Revised: 12/8/2023 13:46:43

Note: All units in this report are in feet unless specified otherwise.

Horizontal Alignment: CLSR789
Horizontal Description:
Horizontal Style: Alignment\Centerline

Vertical Alignment: PGL LT
Vertical Description:
Vertical Style: Linear\Roadway Design\Plan/Profile 2D Lines\Pavement\Profile Grade Line Left PGL LT

	Station	Elevation
Element: Linear		
START	177+65.00	5.29
VPI	180+50.00	6.20
Tangent Grade:	0.319%	
Tangent Length:	285.00	
Element: Linear		
VPI	180+50.00	6.20
END	184+20.00	4.90
Tangent Grade:	-0.351%	
Tangent Length:	370.00	

Vertical Alignment Review Report

Report Created: Friday, December 8, 2023
Time: 1:48:18 PM

Project: Default
Description:
File Name: K:\SAR_Worksets\FDOT\149748004_Gulfstream-Sunset\Roadway\MODLRD01_Sunset.dgn
Last Revised: 12/8/2023 13:46:43

Note: All units in this report are in feet unless specified otherwise.

Horizontal Alignment: CLSR789
Horizontal Description:
Horizontal Style: Alignment\Centerline

Vertical Alignment: PGL RT
Vertical Description:
Vertical Style: Linear\Roadway Design\Plan/Profile 2D Lines\Pavement\Profile Grade Line Right PGL RT

	Station	Elevation
Element: Linear		
START	177+65.00	5.17
VPI	180+50.00	6.20
Tangent Grade:	0.360%	
Tangent Length:	285.00	
Element: Linear		
VPI	180+50.00	6.20
END	184+20.00	4.90
Tangent Grade:	-0.351%	
Tangent Length:	370.00	

APPENDIX H:

Drainage Report

SR 789 FROM SUNSET DRIVE TO WEST OF BIRD KEY DRIVE

Drainage Documentation

FPID 445926-1-32-01

Sarasota County, Florida

Prepared for:

FDOT District One
10041 Daniels Parkway
Ft. Myers, Florida 33913

Prepared by:

Kimley-Horn and Associates, Inc.
1777 Main Street, Suite 200
Sarasota, FL 34236

November 2023

Kimley»Horn

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List of Appendices

INTRODUCTION

Kimley-Horn and Associates, Inc. is tasked with preparing roadway plans for the resurfacing, rehabilitation and restoration of SR 789 from the intersection of Bird Key Dr to just west of the intersection of SR 45 (excluding Ringling Bridge, #170176). The project is located in Section 24 and 25 of Township 36 South, Range 17 East. The project is a total of 1.295 miles and is surrounded by a mixture of commercial, high-density residential and public parks. Proposed improvements include reconstruction, milling and resurfacing, and widening.

The intersection of Sunset Drive and Golden Gate Point is proposed to be reconstructed to raise the edge of pavement elevation to a minimum of 4.0 (NAVD88 ft) to coincide the propoded elevations established by the Gulfstream Roundabout project (FPID #438137-1-32-01). Widening from just west of SR 45 to the bridge approach to accommodate the proposed intersection reconstruction. Additional widening and reconstruction is proposed from Bird Key Drive to the east Ringling Bridge approach.

Due to these roadway improvements, the existing closed drainage system is proposed to be adjusted to maintain drainage patterns. The purpose of this report is to provide drainage documentation to ensure the project causes no adverse impacts to the existing hydraulics and hydrology of the area.

Vertical Datum Information

All elevations referenced in this report at in North American Vertical Datum of 1988 (NAVD88). The conversion factor from National Geodetic Vertical Datum 1929 (NGVD29) to NAVD88 is -1.19 ft.

PERMITTING REQUIREMENTS

Permit History

This project is under the jurisdiction of Southwest Florida Water Management District (SWFWMD). SWFWMD Permit Listing shows a General Environmental Resource Permit (ERP) issued to Sarasota County for the John Ringling Causeway issued in 2002 (See Permit #1855.004; App #40058).

Water Quantity and Quality

The total added impervious area is 1.29 ac which does not require attenuation due to a tidally influenced outfall. Additional treatment is not required for this project as treatment for the basins were provided in the previous project (Permit #1855.004; App #40058). See Appendix D for excerpts from the previous permit.

EXISTING CONDITIONS

The existing typical section for SR 789 from SR 45 to Bird Key Drive consist of four-lane road with 11’ wide lanes, curb and gutter, and bike lanes that vary in width (4’-10’). Barrier walls are used at the bridge approaches. The existing drainage system consists of a closed system of curb and barrier wall inlets which outfall to the existing ponds. There are two existing ponds within the project limits; one being located near the SR-789 intersection with Bird Key Dr at Sta. 135+00.00 while the second is located near the Sunset Dr intersection near Sta. 173+00.00. These ponds are part of the City of Sarasota’s stormwater system and are all interconnected.

PROPOSED CONDITIONS

The proposed roadway section consists of a divided 6-lane roadway with a median that varies in width, 5' bike lane, 10' shared paths, and curb and gutter. Barrier wall is proposed at the bridge approaches similar to the existing conditions. The typical section includes 2 travel lanes and a transit lane in one direction. To accommodate the proposed roadway widening, the existing inlets will be adjusted to tie into the new proposed curb line.

Basins

There are a total of 3 roadway drainage sub-basins within the project limits. The existing basins ultimately discharge to Sarasota Bay. The basins are as follows:

Basin ID	Existing				Proposed				Outfall
	Area (ac)	Impervious Area (Non-vehicular) (ac)	Impervious Area (Vehicular) (ac)	Pervious Area (ac)	Area (ac)	Impervious Area (Non-vehicular) (ac)	Impervious Area (Vehicular) (ac)	Pervious Area (ac)	
Basin 1	2.70	0.27	1.21	1.22	2.77	0.43	1.36	0.98	Exist. Pond
Basin 2	6.77	1.31	3.5	1.96	6.84	1.32	3.75	1.77	Exist. Pond
Basin 3	12.47	2.2	7.65	2.62	12.47	4.74	5.83	1.90	Exist. Pond

See **Appendix B** for the Basin Maps

Soils Information

Soil classification and descriptions for the project were determined using the USDA/SCS Soil Survey of Sarasota County, Florida. Refer to **Appendix B** for Soil Classification Map. The predominant soil types within each basin are St. Augustine fine sand-urban land complex, Eua-Gallie-Myakka fine sands-Urban land complex with small portions of the area also including Canaverall fine sand-Urban land complex and Orsino fine sand-Urban land complex.

OUTFALL ANALYSIS

Runoff from the project area outlets into Sarasota Bay through three outfalls. The FDOT Drainage Manual Section 3.4 states that the mean high tide is the appropriate tailwater for tidal bays. A mean high tide of 1.83 ft for Whitefield Estates, Sarasota Bay was selected as the tail water for the drainage analysis since this is the closest stage with more recent mean high tide elevations.

The FDOT Drainage Manual requires a sea rise analysis to be performed for coastal construction. The closest station to the project is St. Petersburg which estimates a mean sea-level rise of 3.3 mm/year. The estimated design year for this project is 2044, which would mean an estimated sea level rise of 0.23' (69.3 mm) and a tailwater of 2.06 (NGVD ft). The lowest edge of pavement of the roadway within the project limits is 3.81 (NGVD ft).

Floodplain Information

The project's floodplain information is based on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) data for Sarasota County, Florida within Panels 12115C0133F and 12115C0129F dated November 4th, 2016. The project limits are located within Zone X, areas determined to be outside the 0.2% annual chance floodplain, within Zone AE, areas inside of the flood zone with determined base flood elevations (BFE), and Zone VE Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. Therefore, no floodplain impacts are anticipated.

DRAINAGE CALCULATIONS

Spread Analysis

Spread analysis was conducted to ensure that the drainage structures were properly spaced to avoid encroachment beyond acceptable limits. See Appendix B

Optional Pipe Material

An optional pipe material analysis will be provided with the next submittal once geotechnical data is received.

CONCLUSION

Drainage for the proposed roadway improvements will be accommodated through the adjustment of the existing closed system. Since this project is tidally influenced and treatment has been provided in the previous projecs, no adjustments to the existing ponds are necessary. Currently, sea level rise predictions pose no current threat to the roadway within the project's limits. Thus, the proposed project poses no adverse impacts.

APPENDICES

APPENDIX A
Exhibits

Kimley»Horn

PROJECT LOCATION MAP

SR-789

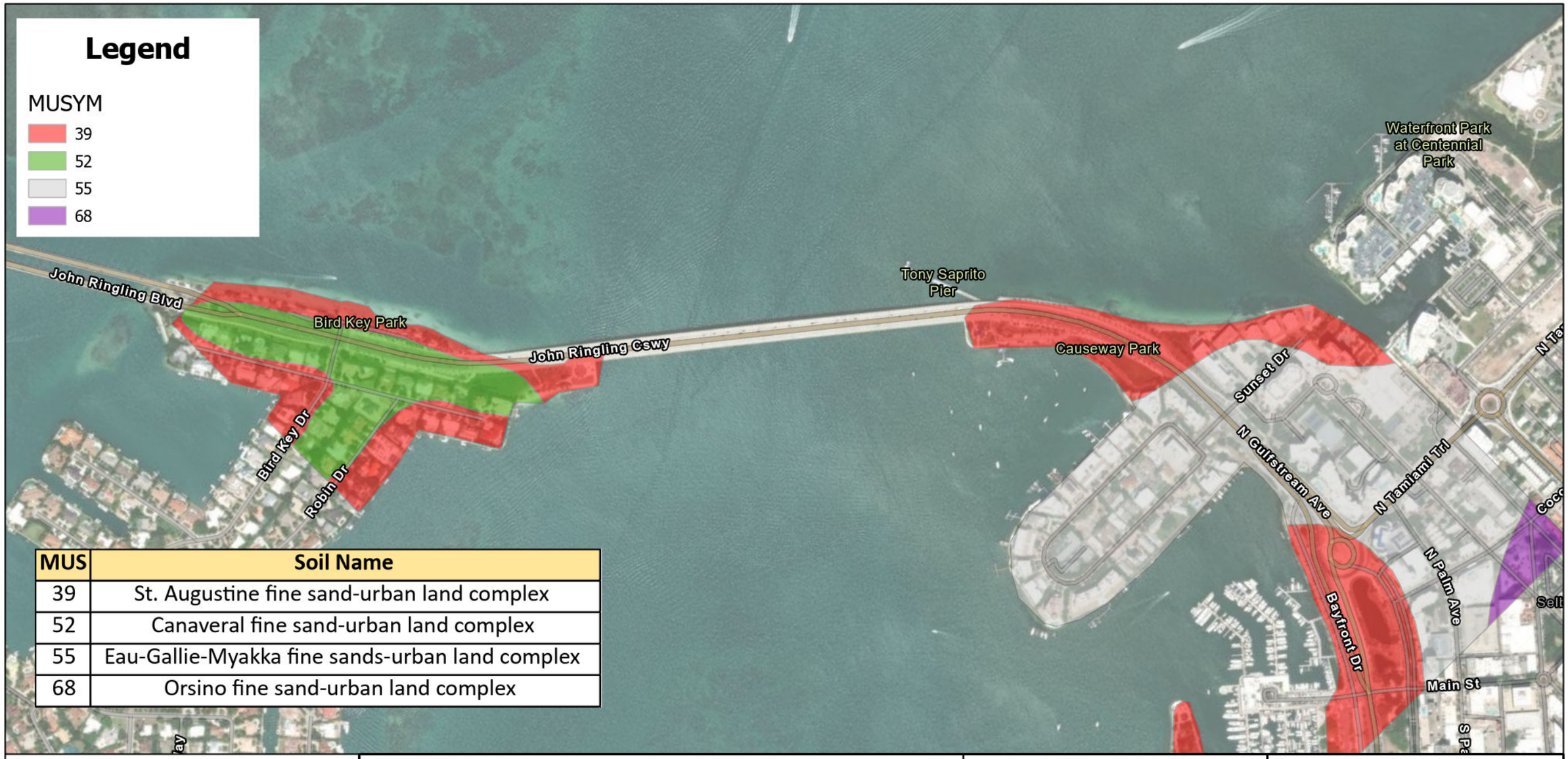
FPID: 445926-1-52-01

SARASOTA, FL

N

0 0.1 0.2 0.3

Miles



MUS	Soil Name
39	St. Augustine fine sand-urban land complex
52	Canaveral fine sand-urban land complex
55	Eau-Gallie-Myakka fine sands-urban land complex
68	Orsino fine sand-urban land complex

Kimley»Horn

USDA SOILS MAP

SR-789

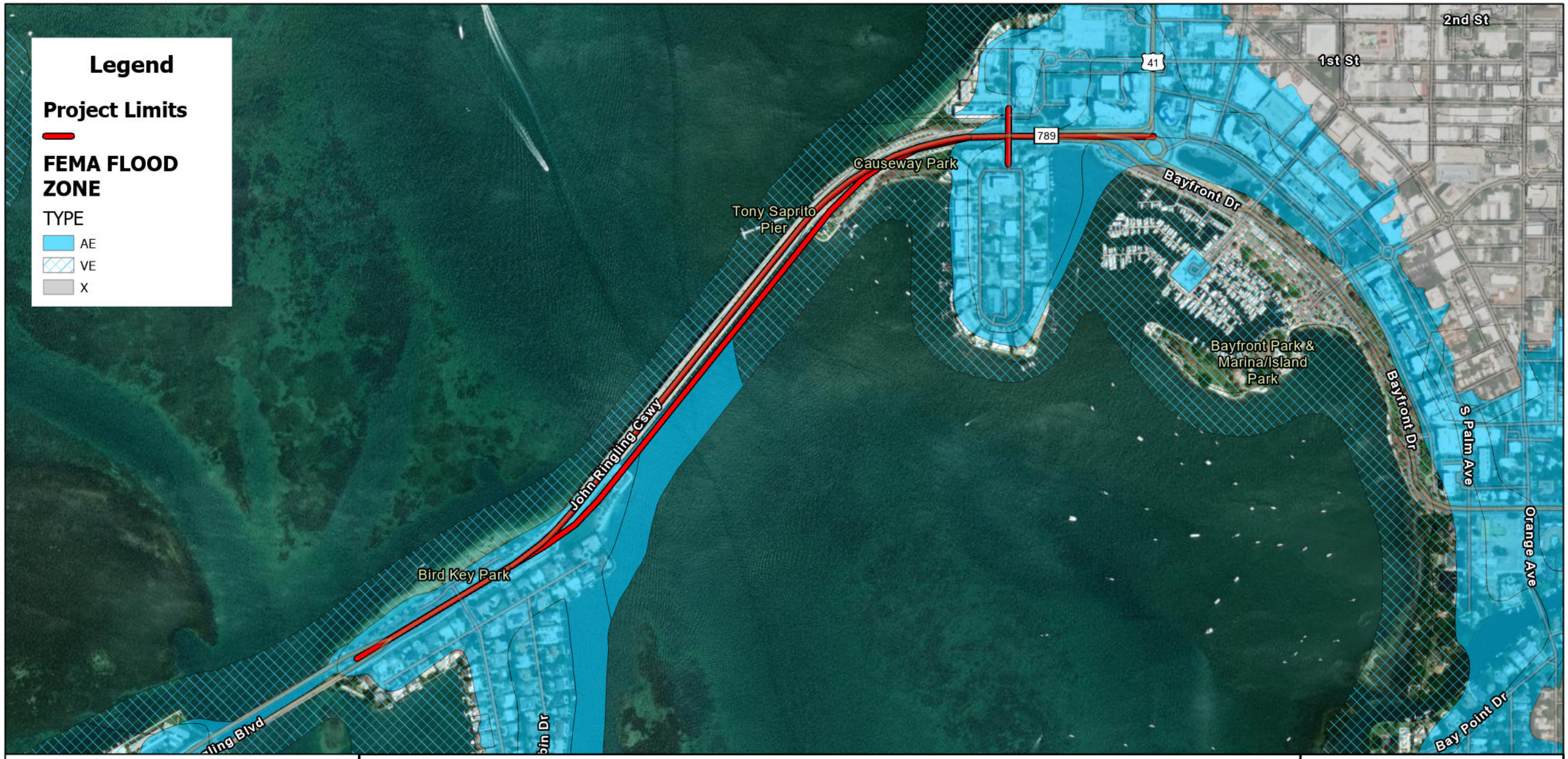
FPID: 445926-1-52-01

SARASOTA, FL

N

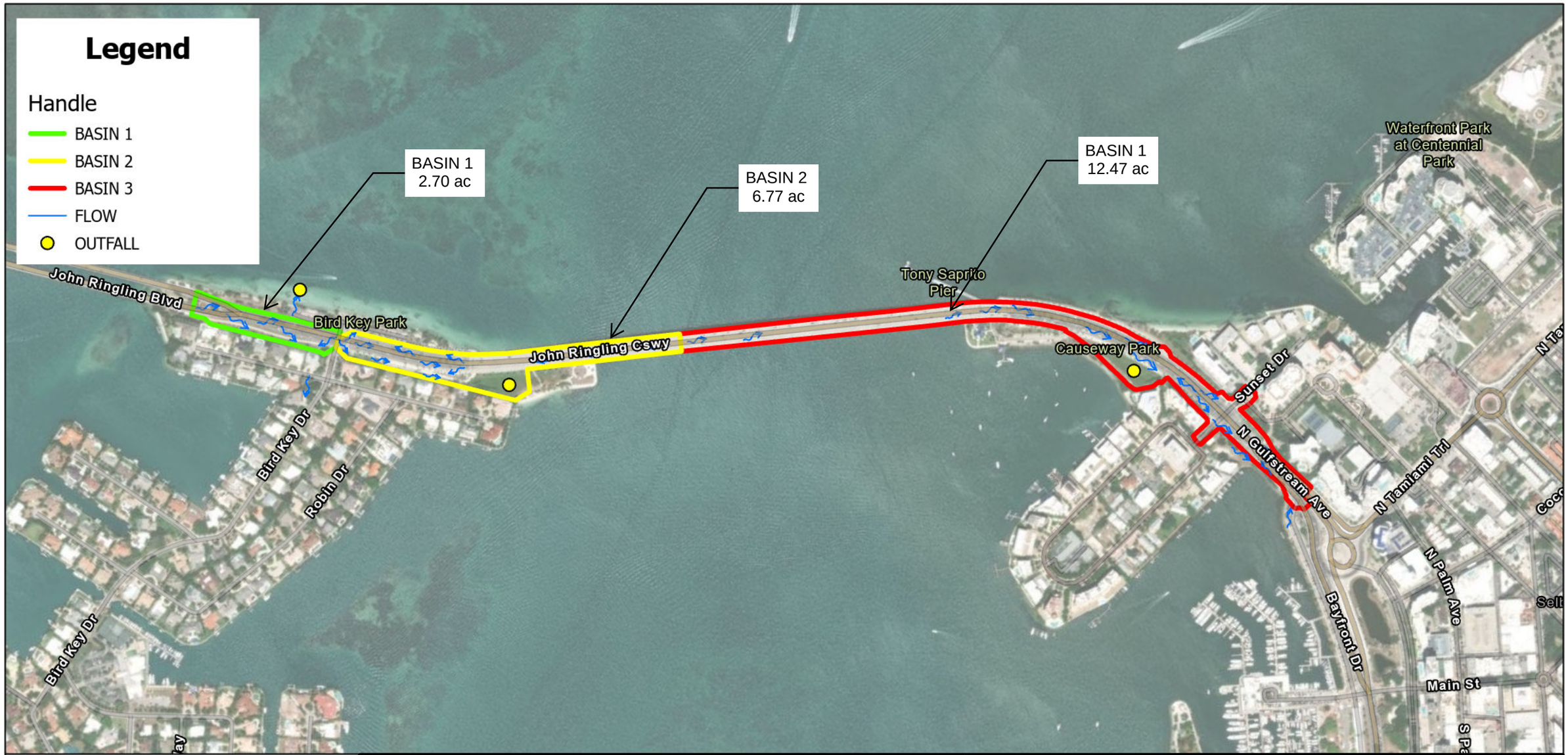
0 0.1 0.2 0.3

Miles



Kimley»Horn

FEMA Flood Zone Map



Kimley»Horn

EXISTING BAISN MAP

SR-789

FPID: 445926-1-52-01

SARASOTA, FL

0 0.1 0.2 0.3

Miles

Kimley»Horn

PROPOSED BAISN MAP

SR-789

FPID: 445926-1-52-01

SARASOTA, FL

N

0 0.1 0.2 0.3

Miles

APPENDIX B
Spread Calculations

Spread Calculations
Bird Key
Baseline: CL Const. SR 789

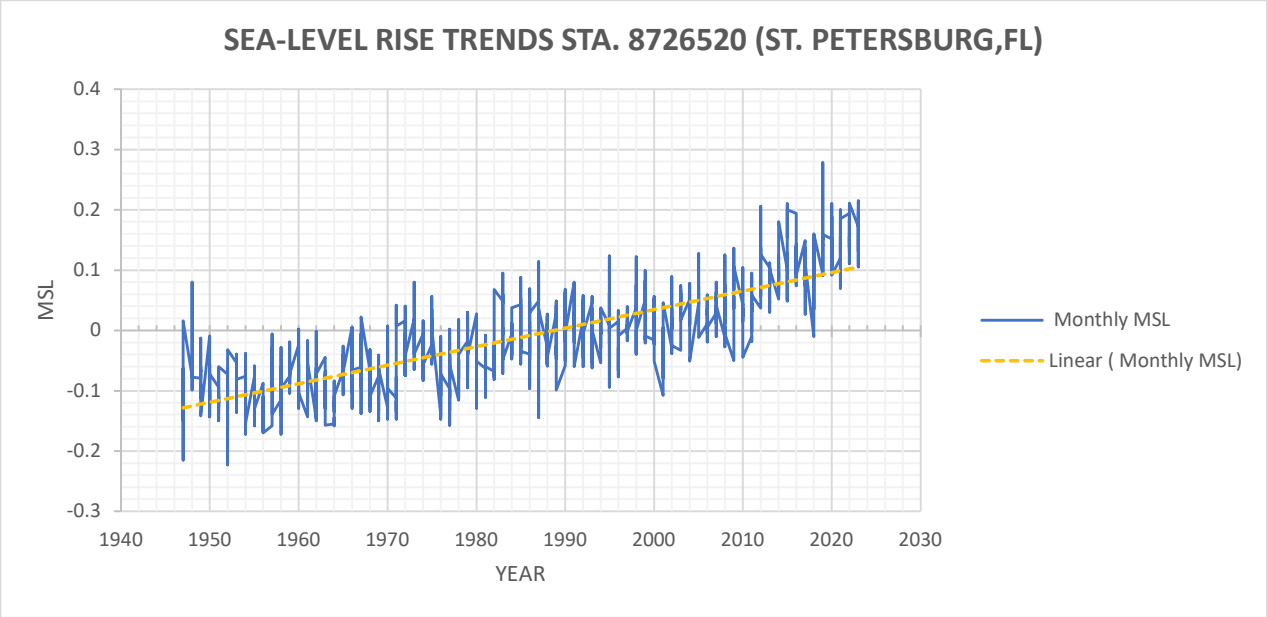
Label	Baseline Station (ft)	Baseline Offset (ft)	Inlet	Inlet Drainage Area (acres)	Inlet C	Total Inlet Intensity (in/h)	Total Rational Flow to Inlet (cfs)	Road Cross Slope (%)	Longitudinal Slope (Inlet) (%)	Manning's n (Inlet)	Depth (Gutter) (in)	Spread / Top Width (ft)	Maximum Spread (ft)	Inlet Location
-	123+50	-42.72	Open Flume	0.09	0.95	4	0.33	3	0.33	0.016	1.63	4.53	10.5	On Grade
-	124+10	-42.30	Open Fume	0.06	0.95	4	0.23	3	0.33	0.016	1.42	3.96	10.5	On Grade
-	124+70	-42.35	Open Flume	0.06	0.95	4	0.23	3	0.33	0.016	1.42	3.96	10.5	On Grade
-	125+30	-42.89	Open Flume	0.06	0.95	4	0.23	3	0.33	0.016	1.42	3.96	10.5	On Grade
S-101B	124+10	59.25	Curb Inlet Type 5	0.10	0.90	4	0.37	3	0.33	0.016	1.72	4.76	12	On Grade
S-101	125+30	58.60	Curb Inlet Type 5	0.10	0.90	4	0.37	3	0.33	0.016	1.72	4.76	12	On Grade
S-102	125+57	80.00	Open Flume to DBI Type C	0.12	0.95	4	0.46	2	0.30	0.016	1.63	6.77	7	In Sag
S-103	126+34	70.06	Open Flume to DBI Type C	0.13	0.95	4	0.48	2	0.30	0.016	1.64	6.83	7	In Sag
S-104	126+74	-45.00	Curb Inlet Type 5	0.32	0.95	4	1.20	3	0.60	0.016	2.37	6.59	12	On Grade
S-107	126+74	46.00	Curb Inlet Type 5	0.36	0.95	4	1.36	3	0.62	0.016	2.47	6.86	12	On Grade
S-108	129+02	-45.00	Curb Inlet Type 5	0.14	0.95	4	0.52	3	0.68	0.016	1.69	4.71	12	On Grade
EX-109	129+19	7.57	Curb Inlet Type 7	0.12	0.95	4	0.46	3	1.15	0.016	1.47	4.08	12	On Grade
S-110	130+03	-45.00	Curb Inlet Type 5	0.21	0.95	4	0.81	3	1.74	0.016	1.67	4.65	12	On Grade
S-112	130+04	8.00	Curb Inlet Type 5	0.22	0.95	4	0.83	3	2.03	0.016	1.65	4.58	7	On Grade
S-113	131+65	-3.00	Barrier Wall Inlet (Median)	0.16	0.95	4	0.61	3	3.36	0.016	1.34	3.71	12	On Grade
S-119	131+66	-42.30	Curb Inlet Type 5	0.16	0.95	4	0.61	3	3.32	0.016	1.34	3.72	12	On Grade
S-120	132+96	-2.60	Barrier Wall Inlet	0.04	0.95	4	0.16	3	4.40	0.016	0.76	2.11	12	On Grade
S-121	132+96	-40.20	Barrier Wall Inlet (Median)	0.04	0.95	4	0.16	4	4.40	0.016	0.85	1.78	12	On Grade
S-122	133+29	0.75	Barrier Wall Inlet	0.03	0.95	4	0.12	4	4.40	0.016	0.76	1.59	12	On Grade
S-123	133+30	-42.00	Barrier Wall Inlet (Median)	0.03	0.95	4	0.11	4	4.40	0.016	0.75	1.57	12	On Grade
S-124	133+55	-41.00	Barrier Wall Inlet (Median)	1.94	0.95	4	7.36	4	4.40	0.016	3.59	7.48	12	On Grade
S-125	133+56	1.00	Barrier Wall Inlet	1.91	0.95	4	7.25	4	4.40	0.016	3.57	7.44	7.5	On Grade

Spread Calculations
Sunset
Baseline: CL Const. SR 789

Label	Baseline Station (ft)	Baseline Offset (ft)	Inlet	Inlet Drainage Area (acres)	Inlet C	Total Inlet Intensity (in/h)	Total Rational Flow to Inlet (cfs)	Road Cross Slope (%)	Longitudinal Slope (Inlet) (%)	Manning's n (Inlet)	Depth (Gutter) (in)	Spread / Top Width (ft)	Maximum Spread (ft)	Inlet Location
S-200	165+12	-0.95	MEDIAN BARRIER INLET	0.04	0.95	4	0.15	4	5.00	0.016	0.82	1.71	6.75	On Grade
EX-200	165+14	39.13	ADJACENT BARRIER INLET	0.04	0.95	4	0.15	4	5.00	0.016	0.82	1.71	12	On Grade
S-201	165+44	1.55	MEDIAN BARRIER INLET	0.08	0.95	4	0.31	4	5.00	0.016	1.07	2.22	6.75	On Grade
EX-201	165+52	40.08	ADJACENT BARRIER INLET	0.05	0.95	4	0.17	4	5.00	0.016	0.86	1.78	12	On Grade
S-202	165+77	3.98	MEDIAN BARRIER INLET	0.04	0.95	4	0.16	4	5.00	0.016	0.83	1.72	6.75	On Grade
EX-202	165+78	40.24	ADJACENT BARRIER INLET	0.03	0.95	4	0.12	4	5.00	0.016	0.74	1.55	12	On Grade
S-203	167+25	-8.06	MEDIAN BARRIER INLET	0.19	0.95	4	0.70	4	3.30	0.016	1.57	3.27	12	On Grade
S-204	167+25	39.00	CURB INLET TYPE 5	0.17	0.95	4	0.66	3	2.80	0.016	1.42	3.95	12	On Grade
S-205	168+22	41.00	CURB INLET TYPE 5	0.12	0.95	4	0.45	2	0.30	0.016	1.61	6.71	12	On Grade
S-206	168+60	2.65	MEDIAN BARRIER INLET	0.19	0.95	4	0.71	4	0.30	0.016	2.48	5.16	12	On Grade
S-207	170+29	43.00	CURB INLET TYPE 5	0.26	0.95	4	1.00	3	0.30	0.016	2.52	7.01	12	On Grade
S-208	170+36	-6.25	CURB INLET TYPE 5	0.21	0.95	4	0.79	3	0.30	0.016	2.31	6.41	12	On Grade
S-209	172+00	-6.25	CURB INLET TYPE 5	0.21	0.95	4	0.79	3	0.30	0.016	2.31	6.41	12	On Grade
S-210	173+64	44.25	CURB INLET TYPE 5	0.44	0.95	4	1.66	3	0.30	0.016	3.05	8.47	12	On Grade
S-211	173+64	-8.60	CURB INLET TYPE 5	0.22	0.95	4	0.83	3	0.30	0.016	2.36	6.54	12	On Grade
S-212	174+94	45.00	CURB INLET TYPE 5	0.18	0.95	4	0.68	3	0.30	0.016	2.18	6.07	12	On Grade
EX-17	174+97	-4.25	CURB INLET TYPE 7	0.18	0.95	4	0.67	3	0.50	0.016	1.98	5.49	7.5	On Grade
EX-18	176+27	-4.22	CURB INLET TYPE 7	0.17	0.95	4	0.65	3	0.50	0.016	1.95	5.41	7.5	On Grade
S-214	176+92	45.00	CURB INLET TYPE 5	0.29	0.95	4	1.09	3	0.50	0.016	2.37	6.59	12	On Grade
EX-19	176+93	-4.09	CURB INLET TYPE 7	0.09	0.95	4	0.32	3	0.50	0.016	1.50	4.17	6.75	On Grade
EX-20	177+42	-4.28	CURB INLET TYPE 7	0.06	0.95	4	0.24	3	0.50	0.016	1.34	3.73	6.75	On Grade
S-216	177+65	45.00	CURB INLET TYPE 6	0.25	0.95	4	0.96	3	0.30	0.016	2.49	6.91	12	In Sag
S-217	177+65	-47.00	CURB INLET TYPE 6	0.19	0.95	4	0.71	3	0.30	0.016	2.22	6.17	12	In Sag
S-219	178+85	81.52	CURB INLET TYPE 5	0.09	0.95	4	0.35	2	1.20	0.016	1.13	4.70	7	On Grade
S-220	178+96	-141.47	CURB INLET TYPE 5	0.13	0.95	4	0.48	2	0.96	0.016	1.32	5.51	7	On Grade
S-221	179+22	81.44	CURB INLET TYPE 5	0.23	0.95	4	0.87	2	1.20	0.016	1.59	6.62	7	On Grade
S-222	179+51	-115.79	CURB INLET TYPE 5	0.13	0.95	4	0.49	2	0.50	0.016	1.51	6.30	7	On Grade
S-222A	179+72	-53.92	CURB INLET TYPE 5	0.04	0.95	4	0.15	3	0.30	0.016	1.25	3.46	7	On Grade
S-223	181+90	51.50	CURB INLET TYPE 5	0.21	0.95	4	0.79	3	0.30	0.016	2.32	6.43	12	On Grade
S-224	182+40	-46.75	CURB INLET TYPE 5	0.39	0.95	4	1.47	3	0.35	0.016	2.83	7.87	12	On Grade
S-225	184+20	44.25	CURB INLET TYPE 6	0.32	0.91	4	1.15	3	0.38	0.016	2.56	6.99	7.5	In Sag
S-226	184+20	-41.00	CURB INLET TYPE 6	0.24	0.95	4	0.93	2	0.30	0.016	2.11	8.78	12	In Sag

APPENDIX C
Outfall Analysis

Station	Location	MHW	MTL	MSL	Date
8726083	Sarasota	1.71	1.09	1.06	9/3/2003
8726159	WHITFIELD ESTATES, SARASOTA BAY FL	1.83	1.18	1.2	5/10/2011
8726233	PALMA SOLA BAY SOUTH	1.94	1.13	1.16	9/11/2003
8726249	PALMA SOLA BAY NORTH	1.93	1.12	1.13	9/11/2003
8726520	St. Petersburg	1.98	1.18	1.2	9/6/2022



Datums for 8726233, PALMA SOLA BAY, SOUTH FL

NOTICE: All data values are relative to the NAVD88.

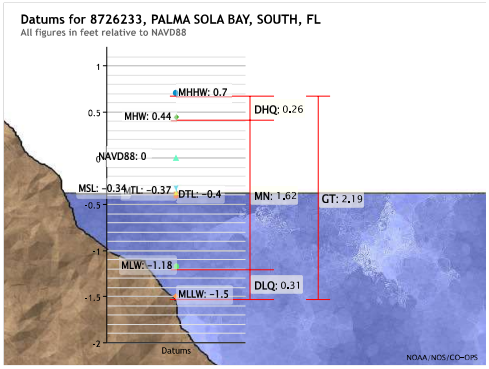
Elevations on NAVD88

Station: 8726233, PALMA SOLA BAY, SOUTH, FL
Status: Accepted (Sep 11 2003)
Units: Feet
Control Station: 8726247 BRADENTON, MANATEE RIVER, FL
T.M.: 75
Epoch: (/datum_options.html#NTDE) 1983-2001
Datum: NAVD88

Datum	Value	Description
MHHW (/datum_options.html#MHHW)	0.70	Mean Higher-High Water
MHW (/datum_options.html#MHW)	0.44	Mean High Water
MTL (/datum_options.html#MTL)	-0.37	Mean Tide Level
MSL (/datum_options.html#MSL)	-0.34	Mean Sea Level
DTL (/datum_options.html#DTL)	-0.40	Mean Diurnal Tide Level
MLW (/datum_options.html#MLW)	-1.18	Mean Low Water
MLLW (/datum_options.html#MLLW)	-1.50	Mean Lower-Low Water
NAVD88 (/datum_options.html)	0.00	North American Vertical Datum of 1988
STND (/datum_options.html#STND)	-3.85	Station Datum
GT (/datum_options.html#GT)	2.19	Great Diurnal Range
MN (/datum_options.html#MN)	1.62	Mean Range of Tide
DHQ (/datum_options.html#DHQ)	0.26	Mean Diurnal High Water Inequality
DLQ (/datum_options.html#DLQ)	0.31	Mean Diurnal Low Water Inequality
HWI (/datum_options.html#HWI)	5.78	Greenwich High Water Interval (in hours)
LWI (/datum_options.html#LWI)	12.28	Greenwich Low Water Interval (in hours)
Max Tide (/datum_options.html#MAXTIDE)		Highest Observed Tide
Max Tide Date & Time (/datum_options.html#MAXTIDEDT)		Highest Observed Tide Date & Time
Min Tide (/datum_options.html#MINTIDE)		Lowest Observed Tide
Min Tide Date & Time (/datum_options.html#MINTIDEDT)		Lowest Observed Tide Date & Time
HAT (/datum_options.html#HAT)		Highest Astronomical Tide
HAT Date & Time		HAT Date and Time
LAT (/datum_options.html#LAT)		Lowest Astronomical Tide
LAT Date & Time		LAT Date and Time

Tidal Datum Analysis Periods

05/01/1977 - 07/31/1977



Showing datums for
8726233 PALMA SOLA BAY, ...

Datum
NAVD88

Data Units ◉ Feet ○ Meters

Epoch ◉ Present (1983-2001) ○ Superseded (1960-1978)

Submit

Show nearby stations

Products available at 8726233 PALMA SOLA BAY, SOUTH, FL

TIDES/WATER LEVELS

Water Levels
NOAA Tide Predictions
Harmonic Constituents
Sea Level Trends

Datums (/datums.html?id=8726233)

Bench Mark Sheets (/benchmarks.html?id=8726233)

Extreme Water Levels (/est/est_station.shtml?stnid=8726233)

Reports (/reports.html?id=8726233)

METEOROLOGICAL/OTHER

Meteorological Observations
Water Temp/Conductivity

PORTS®

This station is not a member of PORTS®

OPERATIONAL FORECAST SYSTEMS

This station is not a member of OFS

INFORMATION

Station Home Page (/stationhome.html?id=8726233)

Data Inventory (/inventory.html?id=8726233)

Measurement Specifications (/measure.html)

Datums for 8726159, WHITFIELD ESTATES, SARASOTA BAY FL

NOTICE: All data values are relative to the NAVD88.

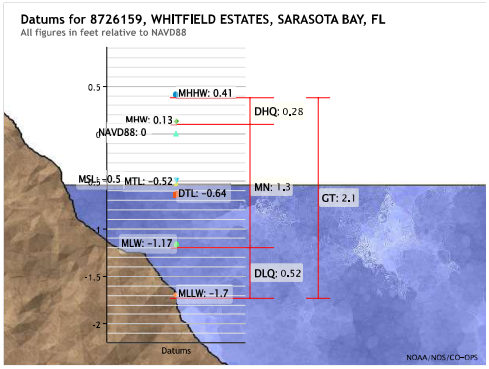
Elevations on NAVD88

Station: 8726159, WHITFIELD ESTATES, SARASOTA BAY, FL
Status: Accepted (May 10 2011)
Units: Feet
Control Station: 8725943 BLACKBURN POINT, FL
T.M.: 75
Epoch: (/datum_options.html#NTDE) 1983-2001
Datum: NAVD88

Datum	Value	Description
MHHW (/datum_options.html#MHHW)	0.41	Mean Higher-High Water
MHW (/datum_options.html#MHW)	0.13	Mean High Water
MTL (/datum_options.html#MTL)	-0.52	Mean Tide Level
MSL (/datum_options.html#MSL)	-0.50	Mean Sea Level
DTL (/datum_options.html#DTL)	-0.64	Mean Diurnal Tide Level
MLW (/datum_options.html#MLW)	-1.17	Mean Low Water
MLLW (/datum_options.html#MLLW)	-1.70	Mean Lower-Low Water
NAVD88 (/datum_options.html)	0.00	North American Vertical Datum of 1988
STND (/datum_options.html#STND)	-3.85	Station Datum
GT (/datum_options.html#GT)	2.10	Great Diurnal Range
MN (/datum_options.html#MN)	1.30	Mean Range of Tide
DHQ (/datum_options.html#DHQ)	0.28	Mean Diurnal High Water Inequality
DLQ (/datum_options.html#DLQ)	0.52	Mean Diurnal Low Water Inequality
HWI (/datum_options.html#HWI)	5.33	Greenwich High Water Interval (in hours)
LWI (/datum_options.html#LWI)	11.48	Greenwich Low Water Interval (in hours)
Max Tide (/datum_options.html#MAXTIDE)		Highest Observed Tide
Max Tide Date & Time (/datum_options.html#MAXTIDEDT)		Highest Observed Tide Date & Time
Min Tide (/datum_options.html#MINTIDE)		Lowest Observed Tide
Min Tide Date & Time (/datum_options.html#MINTIDEDT)		Lowest Observed Tide Date & Time
HAT (/datum_options.html#HAT)		Highest Astronomical Tide
HAT Date & Time		HAT Date and Time
LAT (/datum_options.html#LAT)		Lowest Astronomical Tide
LAT Date & Time		LAT Date and Time

Tidal Datum Analysis Periods

09/01/1977 - 09/30/1977



Showing datums for

8726159 WHITFIELD ESTAT...

Datum

NAVD88

Data Units ◉ Feet ○ Meters

Epoch ◉ Present (1983-2001) ○ Superseded (1960-1978)

Submit

Show nearby stations

Products available at 8726159 WHITFIELD ESTATES, SARASOTA BAY, FL

TIDES/WATER LEVELS

Water Levels
NOAA Tide Predictions
Harmonic Constituents
Sea Level Trends

Datums (/datums.html?id=8726159)

Bench Mark Sheets (/benchmarks.html?id=8726159)

Extreme Water Levels (/est/est_station.shtml?stnid=8726159)

Reports (/reports.html?id=8726159)

METEOROLOGICAL/OTHER

Meteorological Observations
Water Temp/Conductivity

PORTS®

This station is not a member of PORTS®

OPERATIONAL FORECAST SYSTEMS

This station is not a member of OFS

INFORMATION

Station Home Page (/stationhome.html?id=8726159)

Data Inventory (/inventory.html?id=8726159)

Measurement Specifications (/measure.html)

Datums for 8726520, St. Petersburg, Tampa Bay FL

NOTICE: All data values are relative to the MLLW.

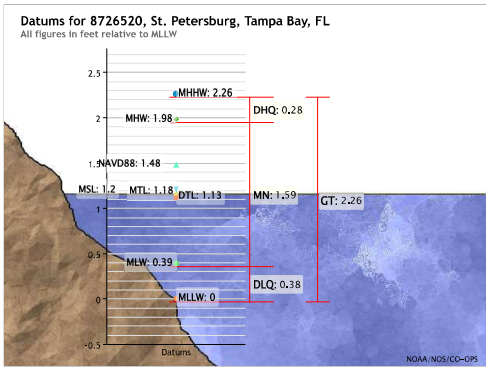
Elevations on Mean Lower Low Water

Station: 8726520, St. Petersburg, Tampa Bay, FL
Status: Accepted (Sep 6 2022)
Units: Feet
Control Station:
T.M.: 0
Epoch: (/datum_options.html#NTDE) 1983-2001
Datum: MLLW

Datum	Value	Description
MHHW (/datum_options.html#MHHW)	2.26	Mean Higher-High Water
MHW (/datum_options.html#MHW)	1.98	Mean High Water
MTL (/datum_options.html#MTL)	1.18	Mean Tide Level
MSL (/datum_options.html#MSL)	1.20	Mean Sea Level
DTL (/datum_options.html#DTL)	1.13	Mean Diurnal Tide Level
MLW (/datum_options.html#MLW)	0.39	Mean Low Water
MLLW (/datum_options.html#MLLW)	0.00	Mean Lower-Low Water
NAVD88 (/datum_options.html)	1.48	North American Vertical Datum of 1988
STND (/datum_options.html#STND)	-3.37	Station Datum
GT (/datum_options.html#GT)	2.26	Great Diurnal Range
MN (/datum_options.html#MN)	1.59	Mean Range of Tide
DHQ (/datum_options.html#DHQ)	0.28	Mean Diurnal High Water Inequality
DLQ (/datum_options.html#DLQ)	0.38	Mean Diurnal Low Water Inequality
HWI (/datum_options.html#HWI)	7.01	Greenwich High Water Interval (in hours)
LWI (/datum_options.html#LWI)	0.60	Greenwich Low Water Interval (in hours)
Max Tide (/datum_options.html#MAXTIDE)	6.26	Highest Observed Tide
Max Tide Date & Time (/datum_options.html#MAXTIDEDT)	08/31/1985 12:42	Highest Observed Tide Date & Time
Min Tide (/datum_options.html#MINTIDE)	-3.54	Lowest Observed Tide
Min Tide Date & Time (/datum_options.html#MINTIDEDT)	09/11/2017 02:12	Lowest Observed Tide Date & Time
HAT (/datum_options.html#HAT)	3.12	Highest Astronomical Tide
HAT Date & Time	07/21/2005 17:48	HAT Date and Time
LAT (/datum_options.html#LAT)	-1.17	Lowest Astronomical Tide
LAT Date & Time	01/10/2005 13:36	LAT Date and Time

Tidal Datum Analysis Periods

01/01/1983 - 12/31/2001



Showing datums for
8726520 St. Petersburg, FL

Datum
NAVD88

Data Units ◉ Feet
○ Meters

Epoch ◉ Present (1983-2001)
○ Superseded (1960-1978)

Submit

Show nearby stations

Products available at 8726520 St. Petersburg, Tampa Bay, FL

TIDES/WATER LEVELS

Water Levels (/waterlevels.html?id=8726520)
NOAA Tide Predictions (/noaatidepredictions.html?id=8726520)
Harmonic Constituents (/harcon.html?id=8726520)

Sea Level Trends (/sltrends/sltrends_station.shtml?id=8726520)

Datums (/datums.html?id=8726520)

Bench Mark Sheets (/benchmarks.html?id=8726520)

Extreme Water Levels (/est/est_station.shtml?stnid=8726520)

Reports (/reports.html?id=8726520)

METEOROLOGICAL/OTHER

Meteorological Observations (/met.html?id=8726520)

Water Temp/Conductivity

PORTS®

Tampa Bay PORTS® (/ports/index.html?port=tb)

PORTS® product page for St. Petersburg, Tampa Bay (/ports/ports.html?id=8726520)

OPERATIONAL FORECAST SYSTEMS

Tampa Bay (/ofs/tbofs/tbofs.html)

OFS product page for St. Petersburg, Tampa Bay

INFORMATION

Station Home Page (/stationhome.html?id=8726520)

Data Inventory (/inventory.html?id=8726520)

Measurement Specifications (/measure.html)

Datums for 8726083, SARASOTA FL

NOTICE: All data values are relative to the NAVD88.

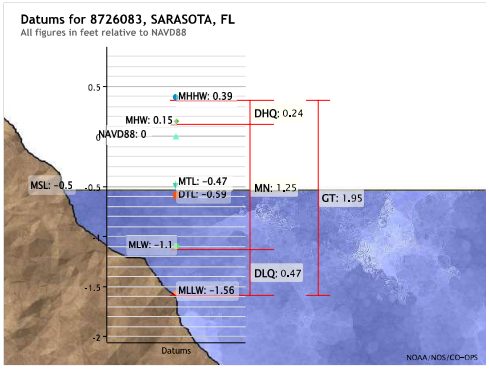
Elevations on NAVD88

Station: 8726083, SARASOTA, FL
Status: Accepted (Sep 3 2003)
Units: Feet
Control Station: 8725943 BLACKBURN POINT, FL
T.M.: 75
Epoch: (/datum_options.html#NTDE) 1983-2001
Datum: NAVD88

Datum	Value	Description
MHHW (/datum_options.html#MHHW)	0.39	Mean Higher-High Water
MHW (/datum_options.html#MHW)	0.15	Mean High Water
MTL (/datum_options.html#MTL)	-0.47	Mean Tide Level
MSL (/datum_options.html#MSL)	-0.50	Mean Sea Level
DTL (/datum_options.html#DTL)	-0.59	Mean Diurnal Tide Level
MLW (/datum_options.html#MLW)	-1.10	Mean Low Water
MLLW (/datum_options.html#MLLW)	-1.56	Mean Lower-Low Water
NAVD88 (/datum_options.html)	0.00	North American Vertical Datum of 1988
STND (/datum_options.html#STND)	-4.22	Station Datum
GT (/datum_options.html#GT)	1.95	Great Diurnal Range
MN (/datum_options.html#MN)	1.25	Mean Range of Tide
DHQ (/datum_options.html#DHQ)	0.24	Mean Diurnal High Water Inequality
DLQ (/datum_options.html#DLQ)	0.47	Mean Diurnal Low Water Inequality
HWI (/datum_options.html#HWI)	5.38	Greenwich High Water Interval (in hours)
LWI (/datum_options.html#LWI)	11.24	Greenwich Low Water Interval (in hours)
Max Tide (/datum_options.html#MAXTIDE)		Highest Observed Tide
Max Tide Date & Time (/datum_options.html#MAXTIDEDT)		Highest Observed Tide Date & Time
Min Tide (/datum_options.html#MINTIDE)		Lowest Observed Tide
Min Tide Date & Time (/datum_options.html#MINTIDEDT)		Lowest Observed Tide Date & Time
HAT (/datum_options.html#HAT)		Highest Astronomical Tide
HAT Date & Time		HAT Date and Time
LAT (/datum_options.html#LAT)		Lowest Astronomical Tide
LAT Date & Time		LAT Date and Time

Tidal Datum Analysis Periods

06/01/1977 - 07/31/1977



Showing datums for

8726083 SARASOTA, FL

Datum

NAVD88

Data Units ◉ Feet ○ Meters

Epoch ◉ Present (1983-2001) ○ Superseded (1960-1978)

Submit

Show nearby stations

Products available at 8726083 SARASOTA, FL

TIDES/WATER LEVELS

Water Levels

NOAA Tide Predictions (/noaatidepredictions.html?id=8726083)

Harmonic Constituents

Sea Level Trends

Datums (/datums.html?id=8726083)

Bench Mark Sheets (/benchmarks.html?id=8726083)

Extreme Water Levels (/est/est_station.shtml?stnid=8726083)

Reports (/reports.html?id=8726083)

METEOROLOGICAL/OTHER

Meteorological Observations
Water Temp/Conductivity

PORTS®

This station is not a member of PORTS®

OPERATIONAL FORECAST SYSTEMS

This station is not a member of OFS

INFORMATION

Station Home Page (/stationhome.html?id=8726083)

Data Inventory (/inventory.html?id=8726083)

Measurement Specifications (/measure.html)

Datums for 8726249, PALMA SOLA BAY NORTH FL

NOTICE: All data values are relative to the NAVD88.

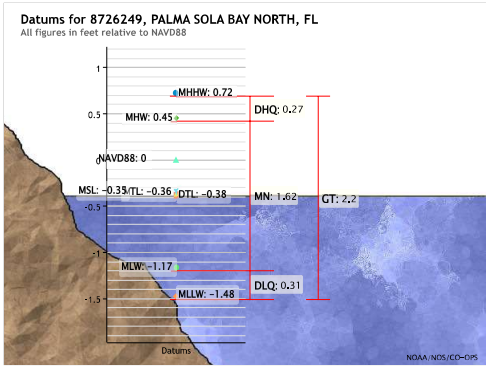
Elevations on NAVD88

Station: 8726249, PALMA SOLA BAY NORTH, FL
Status: Accepted (Sep 11 2003)
Units: Feet
Control Station: 8726247 BRADENTON, MANATEE RIVER, FL
T.M.: 75
Epoch: (/datum_options.html#NTDE) 1983-2001
Datum: NAVD88

Datum	Value	Description
MHHW (/datum_options.html#MHHW)	0.72	Mean Higher-High Water
MHW (/datum_options.html#MHW)	0.45	Mean High Water
MTL (/datum_options.html#MTL)	-0.36	Mean Tide Level
MSL (/datum_options.html#MSL)	-0.35	Mean Sea Level
DTL (/datum_options.html#DTL)	-0.38	Mean Diurnal Tide Level
MLW (/datum_options.html#MLW)	-1.17	Mean Low Water
MLLW (/datum_options.html#MLLW)	-1.48	Mean Lower-Low Water
NAVD88 (/datum_options.html)	0.00	North American Vertical Datum of 1988
STND (/datum_options.html#STND)	-3.05	Station Datum
GT (/datum_options.html#GT)	2.20	Great Diurnal Range
MN (/datum_options.html#MN)	1.62	Mean Range of Tide
DHQ (/datum_options.html#DHQ)	0.27	Mean Diurnal High Water Inequality
DLQ (/datum_options.html#DLQ)	0.31	Mean Diurnal Low Water Inequality
HWI (/datum_options.html#HWI)	5.64	Greenwich High Water Interval (in hours)
LWI (/datum_options.html#LWI)	12.21	Greenwich Low Water Interval (in hours)
Max Tide (/datum_options.html#MAXTIDE)		Highest Observed Tide
Max Tide Date & Time (/datum_options.html#MAXTIDEDT)		Highest Observed Tide Date & Time
Min Tide (/datum_options.html#MINTIDE)		Lowest Observed Tide
Min Tide Date & Time (/datum_options.html#MINTIDEDT)		Lowest Observed Tide Date & Time
HAT (/datum_options.html#HAT)		Highest Astronomical Tide
HAT Date & Time		HAT Date and Time
LAT (/datum_options.html#LAT)		Lowest Astronomical Tide
LAT Date & Time		LAT Date and Time

Tidal Datum Analysis Periods

04/01/1977 - 10/31/1977



Showing datums for

8726249 PALMA SOLA BAY ...

Datum

NAVD88

Data Units ◉ Feet ○ Meters

Epoch ◉ Present (1983-2001) ○ Superseded (1960-1978)

Submit

Show nearby stations

Products available at 8726249 PALMA SOLA BAY NORTH, FL

TIDES/WATER LEVELS

Water Levels
NOAA Tide Predictions
Harmonic Constituents
Sea Level Trends

Datums (/datums.html?id=8726249)

Bench Mark Sheets (/benchmarks.html?id=8726249)

Extreme Water Levels (/est/est_station.shtml?stnid=8726249)

Reports (/reports.html?id=8726249)

METEOROLOGICAL/OTHER

Meteorological Observations
Water Temp/Conductivity

PORTS®

This station is not a member of PORTS®

OPERATIONAL FORECAST SYSTEMS

This station is not a member of OFS

INFORMATION

Station Home Page (/stationhome.html?id=8726249)

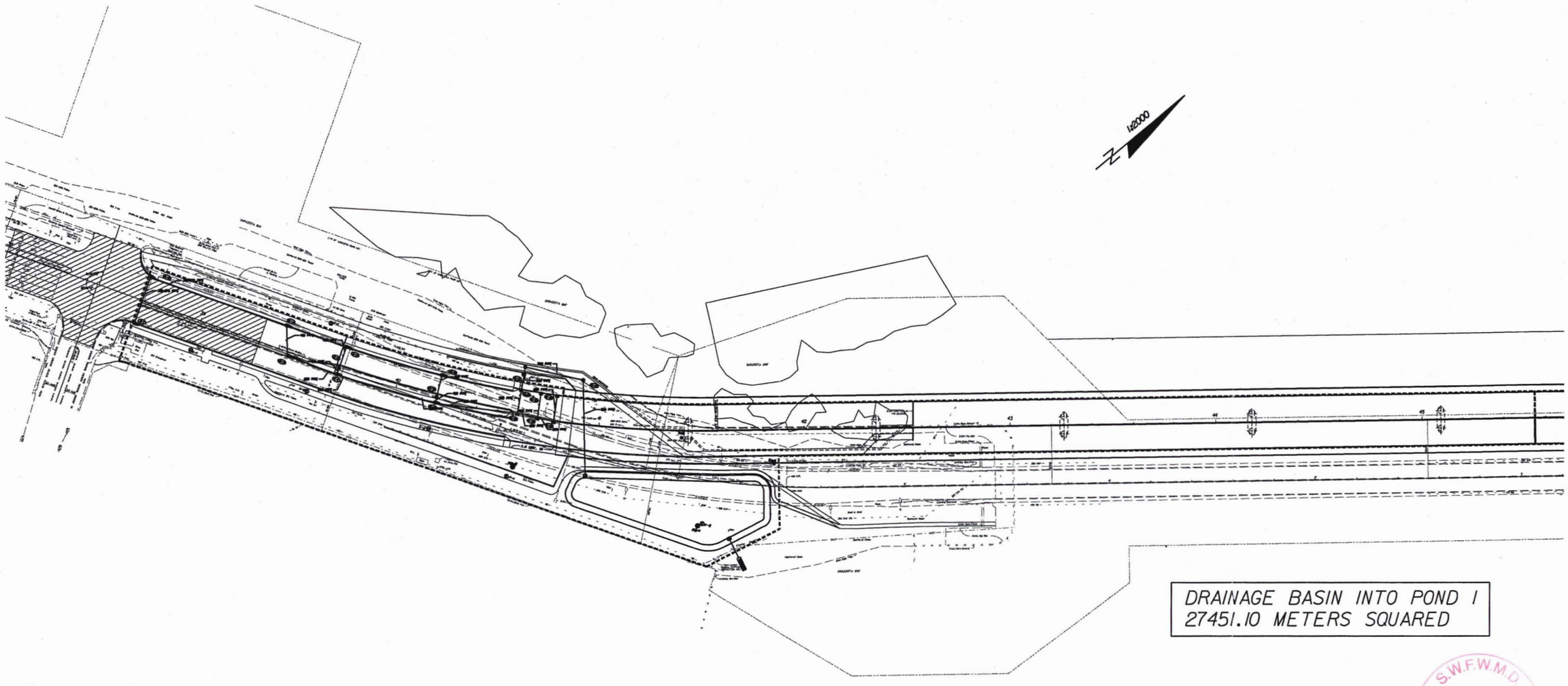
Data Inventory (/inventory.html?id=8726249)

Measurement Specifications (/measure.html)

APPENDIX D
Excerpts from ERP Permit #1855.004, App #40058

APPENDIX F

DRAINAGE MAPS - (AREA TO PONDS)



DRAINAGE BASIN INTO POND 1
27451.10 METERS SQUARED

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

TBE
License No. 3843

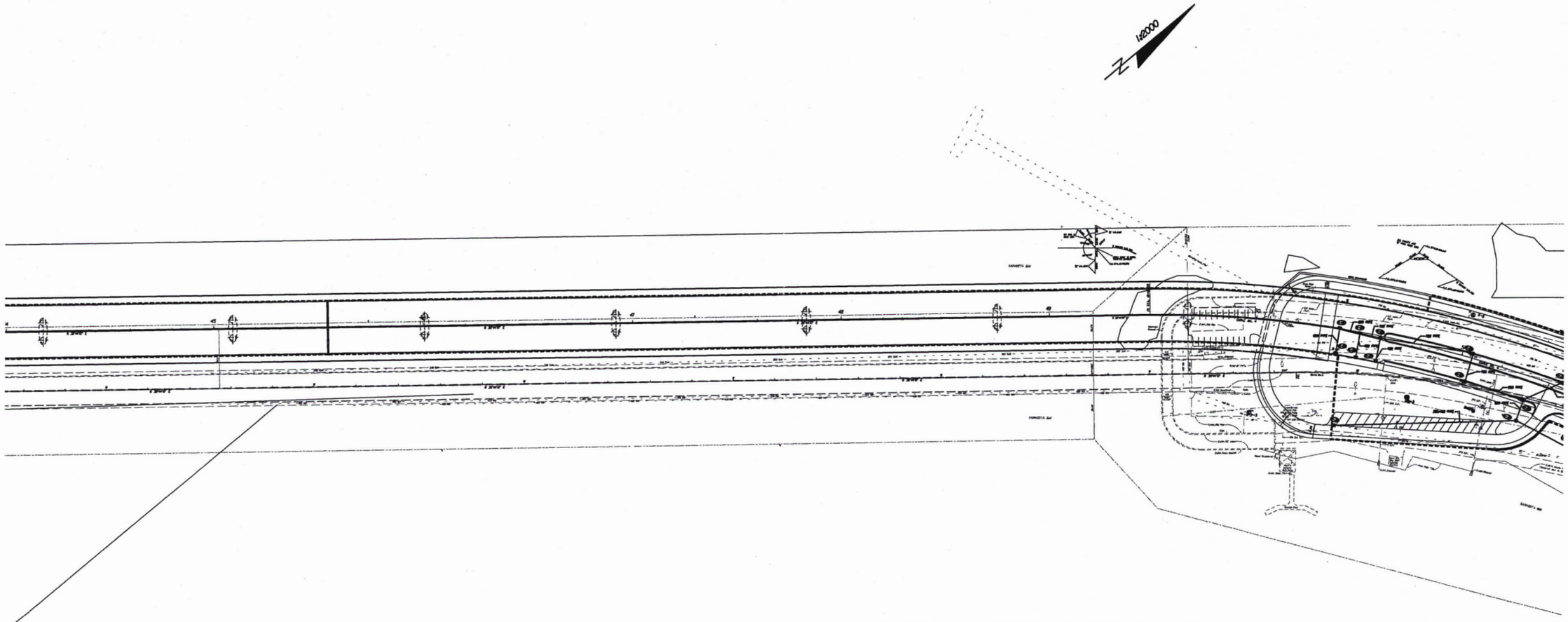
TAMPA BAY ENGINEERING, INC.
380 PARK PLACE BLVD. SUITE 300
CLEARWATER, FL 33759
PHONE: (727) 531-3505
CIVIL ENGINEERING • TRANSPORTATION • ENVIRONMENTAL • PLANNING • UTILITY ENGINEERING/LOCATING

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
S.R.789	SARASOTA	197942-1-52-01

RINGLING CAUSEWAY
DRAINAGE BASIN (POND 1)

SHEET NO. F-1

12/19/2001 04:39:07 PM p:\WS\0002226300\drainbasin01.dgn



DRAINAGE BASIN INTO POND 2
33567.9 METERS SQUARED

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

TBE
License No. 3843

TAMPA BAY ENGINEERING, INC.
380 PARK PLACE BLVD. SUITE 300
CLEARWATER, FL 33759
PHONE: (727) 531-3505
CIVIL ENGINEERING • TRANSPORTATION • ENVIRONMENTAL • PLANNING • UTILITY ENGINEERING/LOCATING

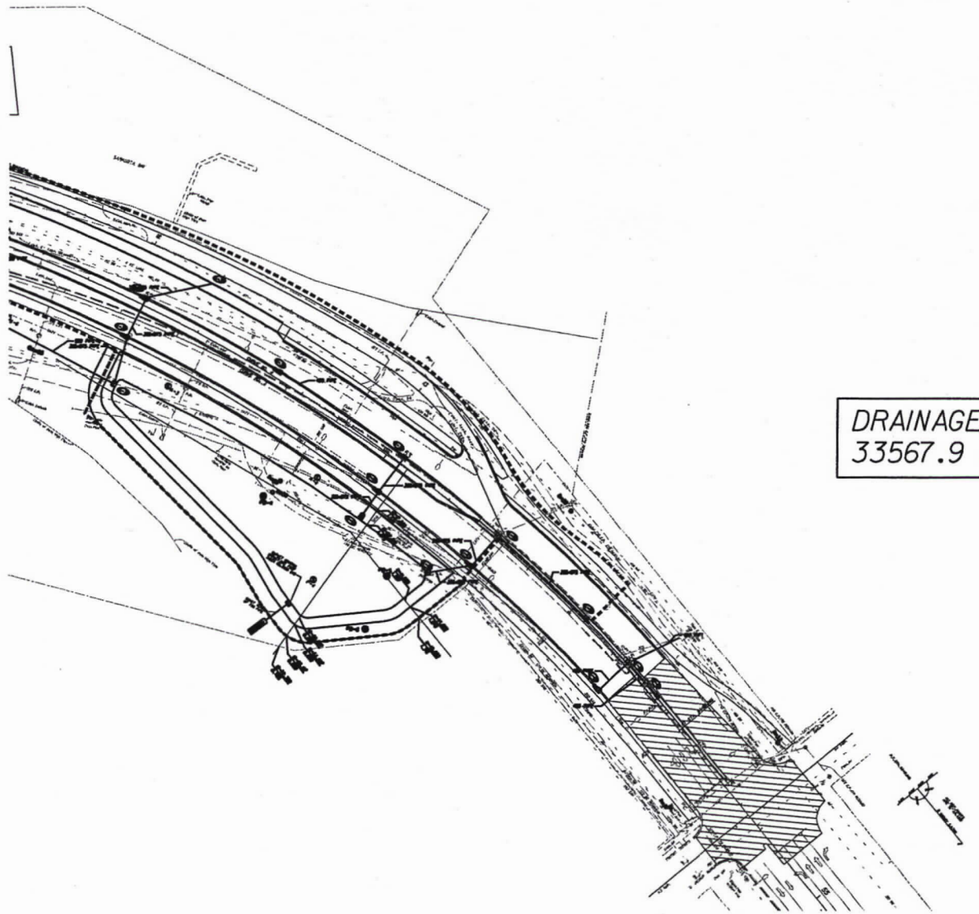
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
S.R.789	SARASOTA	197942-1-52-01

RINGLING CAUSEWAY DRAINAGE BASIN (POND 2)

SHEET NO. F-2

12/19/2001 08:50:55 PM p:\MS\0002226300\drainbasin02.dgn



1"=2000'

DRAINAGE BASIN INTO POND 2
33567.9 METERS SQUARED

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

TBE License No. 3843
TAMPA BAY ENGINEERING, INC.
380 PARK PLACE BLVD, SUITE 300
CLEARWATER, FL 33759
PHONE: (727) 531-3505
CIVIL ENGINEERING • TRANSPORTATION • ENVIRONMENTAL • PLANNING • UTILITY ENGINEERING/LOCATING

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
S.R.789	SARASOTA	197942-1-52-01

RINGLING CAUSEWAY DRAINAGE BASIN (POND 2)

SHEET NO. F-3

12/19/2001 08:51:29 PM p:\WS\0002265300\trainbasin03.dgn

206

TBE GROUP, INC. Civil Engineering • Transportation • Environmental • Planning

COMP. BY: BPG
CHK. BY:
DATE:
SHEET NO.:
PROJ. NO.:

SUBJECT: Ringling Causeway

POND No. 1

TOTAL AREA

27451.10 m^2

IMPERVIOUS AREA

Roadway Area

STA 38+69.00 TO 40+80.934 = 211.93 m

width = 24m + 3m + 3m = 30 m

sidewalk from STA. 40+80.934 to 41+82.92 = 101.986 m

width = 3.89 m

- TOTAL AREA = 6357.90 m^2 + 396.73 m^2 = 6754.63 m^2

Bridge Area

STA. 40+80.934 to 45+54.88 = 473.95 m

width = 25.53 m

- TOTAL AREA = 12099.94 m^2

Median with Grass

STA. 39+60.00 TO 40+56.00 = 96 m

width = 4.2 m

- TOTAL AREA = 403.2 m^2

Utility Grass Strip

STA. 40+15.33 to 38+73.55 = 141.78 m

width = 1.5 m

STA. 38+73.55 to 40+56.00 = 182.45 m

width = 1.5 m

- TOTAL AREA = 486.35 m^2

TBE GROUP, INC. Civil Engineering • Transportation • Environmental • Planning

COMP. BY: BPG
CHK. BY:
DATE:
SHEET NO.:
PROJ. NO.:

SUBJECT: Ringling Causeway

POND No. 1 Continue

LAND COVER	CN
PAVEMENT	98
GRASS	74

TOTAL PAVEMENT AREA

$18854.57\ m^2 \rightarrow 4.659\ Ac$

TOTAL GRASS AREA

$8596.53\ m^2 \rightarrow 2.124\ Ac$

WEIGHTED CN

$$\frac{(4.659)(98) + (2.124)(74)}{6.783\ Ac} = \underline{\underline{90}}$$

TBE GROUP, INC. Civil Engineering • Transportation • Environmental • Planning

COMP. BY: BPG
CHK. BY:
DATE:
SHEET NO.:
PROJ. NO.:

SUBJECT: Ringling Causeway

POND No. 2

TOTAL AREA

33567.86 m^2

IMPERVIOUS AREA

Roadway Area

STA. 50+30.834 to 53+40.00 = 309.17m
width = 25.87m - Total Area = 7998.23 m^2

- Roadway Area where only half of the roadway drains into the drainage system
  Total Area = 725.04 m^2

  roadway
  STA. 53+40 to 53+81.52 = 41.52
  width = 10.9m - Total Area = 452.57 m^2

  sidewalk
  width = 3.0m - Total Area = 124.56 m^2

- grass total area = 147.91 m^2

Bridge Area

STA. 45+54.88 to 50+30.834 = 475.95m
width = 25.53m - Total Area = 12151.11 m^2

Median With Grass

STA. 52+62.00 to 53+17.00 = 55m
width = 5.4m - Total Area = 297 m^2

Utility Grass Strip

STA. 52+45.568 to 53+13.57 = 68.0
width = 1.5m - Total Area = 102.0 m^2

TBE GROUP, INC. Civil Engineering • Transportation • Environmental • Planning

COMP. BY: BPG
CHK. BY:
DATE:
SHEET NO.:
PROJ. NO.:

SUBJECT: Ringling Causeway

POND No. 2 Continue

Utility Grass Strip

STA. 50+64.5 to 53+40.00 = 275.50m
width = 1.5m - Total Area = 413.25m²

Access Road

north STA. 10+85.00 to 13+20.00 = 235m
sidewalk width = 1.8m - total Area = 423m²

STA. 10+85.00 to 13+20.00 = 235m
width = 3.6m - total Area = 846m²

south STA 11+61.71 to 10+67.80 = 93.91m²
width = 11.2 = total Area = 1051.79m² 960.16
sidewalk width = 1.8 = Total Area = 169.04m²

LAND COVER	CN
PAEMENT	98
Grass	74

Total Pavement Area

23216.30m² → 5.74 Ac

Total Grass Area

10351.56 m² → 2.55 Ac

WEIGHTED CN

$$\frac{(5.74)(98) + (2.55)(74)}{8.29\ Ac} = 91$$

TAMPA BAY ENGINEERING, INC.
Civil Engineering • Transportation • Environmental • Planning

COMP. BY: HRF
CHK. BY:
DATE: 12/18/01
SHEET NO.: 1 of 2
PROJ. NO.:

SUBJECT: Ringling Causeway

Pond No. 1 (west)

Total Basin area including pond

27451.1 m^2 = 6.783 Ac

Required Treatment = 0.5" x basin Area

0.5" = 0.0127 m

Treatment Volume = 27451.1 x 0.0127 = 348.6 m^3

Additional volume for OFW = 50%

Required Treatment Volume = 348.6 x 1.5 = **522.9 m^3**

Pond Bottom Elev. = 1.0 m, Weir EL 1.25 m (assume)

EL(m)	Area (m^2)	Provided Volume (m^3)
1.0	2048.5	
1.25	2267.4	539.5

Weir Elev = 1.25 m = 4.10 ft

TAMPA BAY ENGINEERING, INC.
Civil Engineering • Transportation • Environmental • Planning

COMP. BY: HRF
CHK. BY:
DATE: 12/18/01
SHEET NO.: 2 of 2
PROJ. NO.:

SUBJECT: Ringling Causeway

Pond No. 2 (East)

Total Basin Area including Pond

33567.9 m^2 = 8.295 Ac

Required Treatment Volume = 0.5" x Basin Area

0.5" = 0.0127 m

Treatment Volume = 33567.9 x 0.0127 = 426.3 m^3

Additional volume fo OFW = 50%

Required Treatment Volume = 426.3 X1.5 = **639.5 m^3**

Pond Bottom Elev = 0.85 m

Assume weir Elev = 1.08 m

EL	Area (m^2)	Provided Volume (m^3)
0.85	2715.9	
1.08	2966.4	653.5

Weir Elev = 1.08 m = 3.54 ft