

FINAL PRELIMINARY ENGINEERING REPORT

Florida Department of Transportation

District 1

SR 789 (Ringling) Project Development & Environment (PD&E) Study

from Bird Key Drive to Sarasota Harbour West

Sarasota County, Florida

Financial Management Number(s): 436680-1-22-01 & 436680-1-32-01

ETDM Number: 14384

Date: October 2024

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022 and executed by the Federal Highway Administration and FDOT.

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PROFESSIONAL ENGINEER CERTIFICATION

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Federal Aid Project Number: TBD

This preliminary engineering report contains engineering information that fulfills the purpose and need for the SR 789 (Ringling) Project Development & Environment Study from Bird Key Drive to Sarasota Harbour West in Sarasota County, Florida. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

I hereby certify that I am a registered professional engineer in the State of Florida practicing with Hardesty & Hanover, LLC, and that I have prepared or approved the evaluation, findings, opinions, conclusions or technical advice for this project.

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APPENDICES

Appendix A: Preferred Alternative Concept Plans

Appendix B: Context Classification

Appendix C: Long Range Estimate

Appendix D: Typical Section Package

Appendix E: Approved Design Variations

LIST OF ACRONYMS

AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
APE	Area of Potential Effect
BMP	Best Management Practices
CAC	Citizen Advisory Committee
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CIDR	Comprehensive Inventory Data Reports
CNE	Common Noise Environment
CRAS	Cultural Resources Assessment Survey
CRBS	Coastal Barrier Resource System
CSER	Contamination Screening Evaluation Report
D Factor	Directional Distribution
DDHV	Directional Design Hourly Volume
DOE	Degree of Effect
EFH	Essential Fish Habitat
ERP	Environmental Resource Permit
ETAT	Environmental Technical Advisory Team
ETDM	Efficient Transportation Decision Making
FAR	Florida Administrative Register
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDM	FDOT Design Manual
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FLUCCS	Florida Land Use, Cover and Forms Classification System
FMSF	Florida Master Site File
F.S.	Florida Statute
FSUTMS	Florida Standard Urban Transportation Model Structure
FTI	Florida Traffic Information
FWC	Florida Fish and Wildlife Conservation Commission
GFRP	Glass Fiber Reinforced Polymer
HAPC	Habitat Areas of Particular Concern
HCM	Highway Capacity Manual
ITS	Intelligent Transportation Systems
K Factor	Ratio of Peak Hour Traffic to Daily Traffic
LOS	Level of Service
LRE	Long Range Estimate
LRFD	Load and Resistance Factor

MHW	Mean High Water Line
MOT	Maintenance of Traffic
MPO	Metropolitan Planning Organization
MURT	Multi-use Recreational Trail
NAC	Noise Abatement Criterion
NAVD	North American Vertical Datum
NGVD	National Geodetic Vertical Datum
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
NRE	Natural Resource Evaluation
NSR	Noise Study Report
NWI	National Wetlands Inventory
OEM	Office of Environmental Management
OFW	Outstanding Florida Waters
PD&E	Project Development & Environment
PE	Professional Engineer
PER	Preliminary Engineering Report
PHF	Peak Hour Factor
PIP	Public Involvement Plan
PSADT	Peak Season Average Daily Traffic
SBBS	Shared Bus Bike Lane
SCS	Soil Conservation Service
SDG	Structural Design Guidelines
SDO	Structure Design Office
SERO	NOAA Fisheries Science Center Southeast Regional Office
SUN	Shared-use Non-motorized
SWEPT	StateWide Environmental Project Tracker
SWFWMD	Southwest Florida Water Management District
T	Truck Percentages
TAC	Technical Advisory Committee
TD	Transportation Disadvantaged
TIITF	Trustees of the Internal Improvement Trust Fund
TMV	Turning Movement Volume
TSM&O	Transportation System Management and Operations
UAO	Utility Agency/Owner
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VM	Veterans Medical
WMD	Water Management District

1.0 PROJECT SUMMARY

1.1 Project Description

This project involves the reconstruction of the SR 789 (John Ringling Causeway) bridges [Structure Numbers 170022 and 170951]. The limits of the improvements are from Bird Key Drive to Sarasota Harbour West in the City of Sarasota, in Sarasota County, shown on **Figure 1-1**. The purpose of the study is to address structural integrity and operational deficiencies. SR 789 is classified as an Urban, Minor Arterial and consists of a four-lane, divided typical section between Bird Key Drive and Sarasota Harbour West, a distance of 0.741 miles. SR 789 serves as the only connection from downtown Sarasota to St. Armands Key and Lido Key. Although SR 789 is designated as a north-south route, within the project limits SR 789 runs in a generally east-west direction.

The existing twin bridges were constructed in 1958 and cross the Coon Key Waterway, a navigable waterway without a defined channel. The existing deck elevation at the center of the bridges is approximately 15.73 feet (ft). The bridges are spaced 100 ft apart (center to center) and each bridge is 1,006 ft-10-inches (-in) long (19 spans of 48 ft each, and 2 spans at 47 ft-5-in). Each bridge has two 12-foot (-ft) travel lanes and a 5-ft wide sidewalk on both sides. There are currently no shoulders or designated bicycle facilities across the bridges.

1.2 Purpose and Need

The purpose of the project is to address structural integrity and operational deficiencies of the SR 789 bridges due to deteriorating conditions [Structure Numbers 170022 and 170951]. Other goals include accommodate greater multimodal transportation access by providing bicycle/pedestrian and transit facilities along the 0.741 miles of roadway that provides a connection between nearby neighborhoods and recreational facilities (Bird Key Park, West Causeway Park and the Sarasota Yacht Club), and enhance safety by providing resilience for an emergency evacuation route. The need for the project is based on the following criteria:

1.2.1 Bridge Deficiencies: Operational and Structural

The current concrete prestressed girder bridges are the second bridges that have existed at this location, replacing the original bridge in 1958. The bridges cross the Coon Key Waterway. The channel is navigable but there is no defined channel and is not regulated by the US Coast Guard. Several sections of the deck were replaced on the northbound bridge in 2016 along with a variety of other repair-type work throughout the years. The SR 789 bridges, located between downtown Sarasota and St. Armands Key and Lido Key, are more than fifty-years old, the typical expected design life for transportation infrastructure of this era, and are operationally deficient, particularly for transit. SR 789, including the bridges, is identified as a constrained roadway by the Sarasota / Manatee Metropolitan Planning Organization (MPO), meaning it does not preclude any type of improvement in the future, but it identifies that the corridor has physical, or policy challenges associated with a widening/capacity project.

Figure 1-1
Project Location Map



Based on a January 2023 FDOT bridge inspection report, the northbound SR 789 bridge, carrying traffic west to St. Armands, received a sufficiency rating of 76.9 and a health index of 68.0, while the southbound bridge, carrying traffic east to the mainland, based on a July 2023 inspection report, received a sufficiency rating of 77.7 and a health index of 71.04, as measured on scales of 0-100. Sufficiency rating is an overall rating of a bridge's fitness to remain in service and whether it will be repaired or replaced. A bridge with a sufficiency rating of 80 or less is generally

eligible for bridge rehabilitation funding. The health index is a tool that measures the overall condition of a bridge and typically includes about 10 to 12 different elements that are evaluated by the department. A health index below 85 generally indicates that some repairs are needed, although it doesn't mean the bridge is unsafe. A low health index may also indicate that it would be more economical to replace the bridge than repair it. Both bridges do not meet current road design and safety standards. The bridge conditions are as follows:

Northbound (170022)

- Overall Condition: Fair
- Deck: Fair
- Superstructure: Satisfactory
- Substructure: Satisfactory
- Deck Geometry Appraisal: Substandard typical section elements
- Countermeasures have been installed to mitigate a potential problem with scour.

Southbound (170951)

- Overall Condition: Good
- Deck: Satisfactory
- Superstructure: Good
- Substructure: Satisfactory
- Deck Geometry Appraisal: Substandard typical section elements
- Countermeasures have been installed to mitigate a potential problem with scour.

1.2.2 Modal Interrelationships

SR 789 serves as the primary connection between downtown Sarasota and St. Armand's Key and Lido Key and is frequently used by bicyclists and pedestrians to access the adjacent parks and recreational facilities [Bird Key Park, West Multi-Use Recreational Trail (MURT) Bird Key / Coon Key Phase I, John Ringling Boulevard Trail and Longboat Key Trail]. The Longboat Key Trail SUN Trail exists throughout most of the project; however, it does not currently exist on either of the bridges over the Coon Key Waterway. While there are 5-ft wide sidewalks on both sides of the bridges, there are currently no shoulders or designated bicycle facilities across the bridges. Due to the minimal sidewalk width, there are often conflicts between pedestrians and bicyclists. Overall, the proposed project intends to enhance mobility by evaluating alternatives for reconstruction or rehabilitation with consideration of bicycle/pedestrian and transit facilities within the study limits.

1.2.3 Safety

Serving as part of the emergency evacuation route network designated by the Florida Division of Emergency Management and City of Sarasota, SR 789 plays a critical role in facilitating traffic during emergency evacuation periods as the primary connection between downtown Sarasota and St. Armand's Key and Lido Key. The entire project corridor is located in the City of Sarasota's Hurricane Evacuation Zone "A."

The City of Sarasota Climate Adaptation Plan (December 4, 2017) studied and evaluated climate threats to public infrastructure to understand how sea level rise, storm surge, extreme precipitation, and extreme heat might impact the City of Sarasota's transportation network, stormwater management, water supply, wastewater systems, public lands, and critical buildings. Thirty-four transportation assets were evaluated of which 15 were deemed most vulnerable, including SR 789 [Project ID T15, pg. 31]. When prioritizing transportation vulnerabilities, the SR 789 bridge received a risk score of 64.4 (on a scale of 0-100). The potential reconstruction or rehabilitation of the SR 789 (Little Ringling) bridges would make it more resilient to climate vulnerabilities.

1.2.4 Project Status

This project is included in the Sarasota/Manatee Metropolitan Planning Organization (MPO) 2045 Long Range Transportation Plan (LRTP). The latest Sarasota/Manatee MPO Transportation Improvement Program (TIP) for FY2023/24 - FY2027/28 also includes this project. The project purpose and need aligns with the MPO's goals of infrastructure resiliency and safety.

1.3 Commitments

1. The FDOT commits to adding a plan note into the General Notes of the project's final design plans to ensure that contractor equipment staging, materials stockpiling or storing activities will not be allowed within City of Sarasota-owned portions of Bird Key Park and will not impair public use of the Sarasota Bay Blueway Paddling Trail resource.
2. The FDOT will implement the NMFS' SERO's *Vessel Strike Avoidance Measures* and *Protected Species Construction Conditions* during in-water construction activities.
3. In accordance with the use of the USFWS' *Consultation Key for the Florida Bonneted Bat and Florida Bonneted Bat Consultation Guidelines* and the finding of a MANLAA-P effect determination for the Florida bonneted bat, the FDOT will implement bonneted bat BMP #1: If potential roost trees or structures need to be removed, check cavities for bats within 30 days prior to removal of trees, snags, or structures. When possible, remove structure outside of breeding season (e.g., January 1 - April 15). If evidence of use by any bat species is observed, discontinue removal efforts in that area and coordinate with the Service on how to proceed. If the listing status of the tricolored bat is elevated by USFWS to Threatened or Endangered and the Preferred Alternative is located within the consultation area, FDOT commits to re-initiating consultation with the USFWS during the design and permitting phase of the project to determine the appropriate survey methodology and to address USFWS regulations regarding the protection of the tricolored bat.
4. In accordance with the use of the USFWS' *Consultation Key for the Florida Bonneted Bat and Florida Bonneted Bat Consultation Guidelines* and the finding of a MANLAA-P effect determination for the Florida bonneted bat, the FDOT will implement bonneted bat BMP #4: For every 5 acres of impact, retain a minimum of 0.25 acre of native vegetation. If upland habitat is impacted, then upland habitat with native vegetation should be retained.

5. In accordance with the use of the USFWS' *Consultation Key for the Florida Bonneted Bat and Florida Bonneted Bat Consultation Guidelines* and the finding of a MANLAA-P effect determination for the Florida bonneted bat, the FDOT will implement bonneted bat BMP #9: Retain mature trees and snags that could provide roosting habitat. These may include live trees of various sizes and dead or dying trees with cavities, hollows, crevices, and loose bark.
6. In accordance with the use of the USFWS' *Consultation Key for the Florida Bonneted Bat and Florida Bonneted Bat Consultation Guidelines* and the finding of a MANLAA-P effect determination for the Florida bonneted bat, the FDOT will implement bonneted bat BMP #12: Incorporate engineering designs that discourage bats from using buildings or structures. If Florida bonneted bats take residence within a structure, contact the Service and Florida Fish and Wildlife Conservation Commission prior to attempting removal or when conducting maintenance activities on the structure.
7. If the listing status of the monarch butterfly is elevated by USFWS to Threatened or Endangered and the Preferred Alternative is located within the consultation area, FDOT commits to re-initiating consultation with the USFWS during the design and permitting phase of the project to determine the appropriate survey methodology and to address USFWS regulations regarding the protection of the monarch butterfly.
8. If the listing status of the tricolored bat is elevated by USFWS to Threatened or Endangered and the Preferred Alternative is located within the consultation area, FDOT commits to re-initiating consultation with the USFWS during the design and permitting phase of the project to determine the appropriate survey methodology and to address USFWS regulations regarding the protection of the tricolored bat.
9. The FDOT will implement the USFWS' *Standard Manatee Conditions for In-Water Work*.
10. The FDOT will utilize at least one dedicated manatee observer on-site for all in-water construction.
11. The FDOT will only conduct in-water work during daytime hours.
12. The FDOT will require contractors to use a ramp-up procedure during pile driving. This gradual increase in noise level gives species time to leave the impact area prior to initiation of full noise levels.
13. Mooring of work barges or vessels shall maintain at least 1.5-ft clearance above the water body bottom to allow sturgeon passage and to minimize potential disturbance to bottom sediments and submerged aquatic vegetation.
14. The FDOT will delineate project seagrass beds which are not anticipated to be impacted with floating buoys to reduce the potential for unforeseen impacts to these beds.
15. If blasting is required for demolition of existing structures, a blast plan and marine species watch plan shall be developed and submitted to FWS, NMFS, and FWC for approval prior to the commencement of this activity.

16. The FDOT will perform an updated seagrass survey during the project's permitting phase and provide the results to NMFS.
17. The FDOT commits to further coordination with City of Sarasota, FDEP and NMFS representatives to discuss the relocation of oyster beds which would be directly impacted as a result of construction to the nearby Bird Key Park beach where other oyster beds currently exist as a mitigative measure.
18. The FDOT commits to re-initiate EFH consultation once compensatory mitigation plans for unavoidable impacts to NMFS trust resources have been finalized during the design and permitting phase.

1.4 Alternative Analysis Summary

FDOT analyzed a No-Build, a multimodal alternative and bridge replacement alternatives, with consideration of bicycle/pedestrian facilities, to meet the purpose and need of the project.

The No-Build Alternative was presented at the Alternatives Public Workshop and includes only routine maintenance performed as needed to keep the bridges open to traffic until safety issues, such as reduced capacity due to ongoing deterioration, would require them to be closed. The No-Build Alternative does not meet the purpose and need by providing multi-modal accommodation but remains as an option throughout the study. This alternative is detailed in Section 5.1. The estimated cost for the No-Build alternative is \$36M and is detailed in **Table 5-9**.

A Multimodal Alternative was also evaluated as part of the study. Due to extensive design and construction effort required to complete the rehabilitation alternative, and the bridges still requiring replacement after 30 years, this option was eliminated as a viable alternative. The estimated cost for the Multimodal alternative is \$44M. This alternative is detailed in Section 5.3.

Two Build alternatives (Single Bridge Alternative and Twin Bridge Alternative), and the No-Build alternative were presented to the public at the Public Workshop on April 5th and 7th, 2022. Replacing the existing bridges addresses the structural integrity and operational deficiencies and will provide greater multimodal transportation access. At the Public Workshop, an evaluation matrix, **Table 5-9**, identified the impacts and costs associated with these alternatives. The estimated cost for the Single Bridge and Twin Bridge alternative are \$64M and \$72M respectively. At the conclusion of the workshop, approximately 84 percent of attendees were in favor of replacing the existing bridges and a majority were in favor of the Single Bridge Alternative.

Sarasota County Area Transit (The Breeze) staff attended FDOT's April 5, 2022, Public Workshop. The transit authority requested that the new bridge be widened to accommodate a shared bus bike shoulder (SBBS) or bus on shoulder in the future if needed. This improvement aligns with FDOT's Sarasota and Manatee Barrier Island Traffic Study recommendation SM4 which proposed a new bridge that adds a flexible lane in the future.

1.5 Description of Preferred Alternative

Based on meeting the project needs of adding multimodal accommodations, addressing structural deficiencies, improving geometric components for safety, accommodating a dedicated transit lane

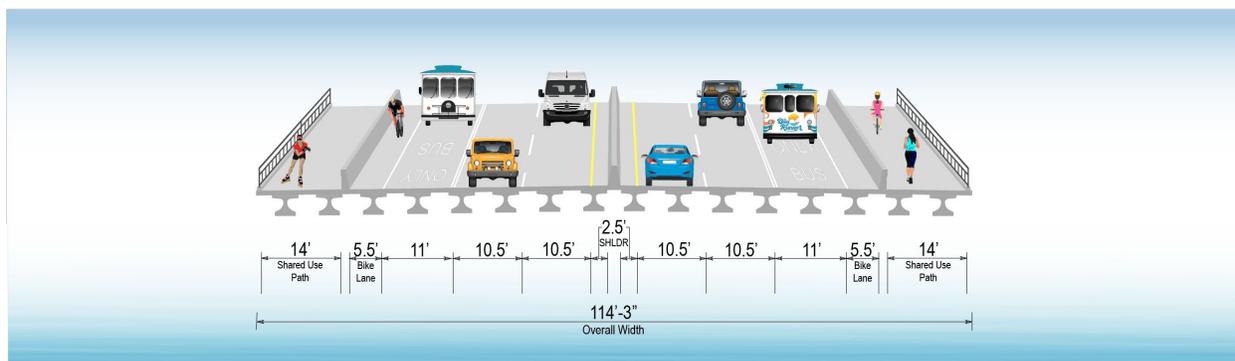
and concurrence from the public, the Single Bridge Alternative is the preferred alternative. This alternative addresses the structural deficiencies by replacing the bridge and provides the following to meet the multimodal accommodations:

- The addition of dedicated bicycle lanes adjacent to the bus on shoulder
- Shared use paths in each direction on the bridge to connect to the existing 10-ft paths on each side of the bridge
- A bus on shoulder to connect to FPID 447824-1, restriping the John Ringling Causeway bridge to accommodate a bus/bike lane and FPID 445926-2, adds a bus on shoulder from the John Ringling Causeway bridge to the Bird Key Drive intersection.

This alternative requires design variations for lane widths and inside shoulder widths on the bridge described in Section 7.5 and the approved variations have been uploaded into the Statewide Environmental Project Tracker (SWEPT) and included in **Appendix E**.

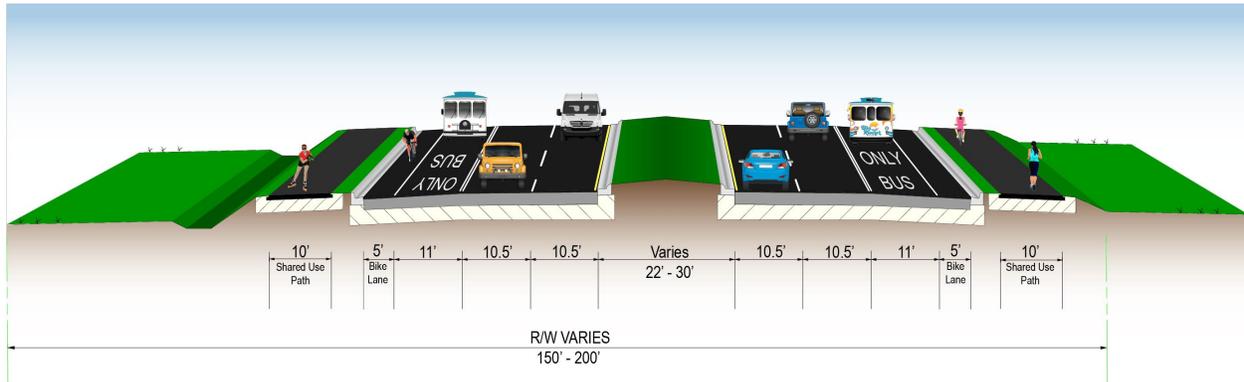
The preferred alternative replaces the existing twin bridges with a single bridge. Project improvements were evaluated using a 2045 design year. The single bridge typical section includes a 2.5-ft inside shoulder, two 10.5-ft wide travel lanes, an 11-ft bus on shoulder, a 5.5-ft bike lane, and a 14-ft shared use path in each direction, shown on **Figure 1-2**. The total width of the bridge is 114 ft-3-in. The proposed deck elevation at the center of the new bridge will be approximately 26.23 ft, making it approximately 10.50 ft higher than the existing bridges. The additional height is to address storm surge and wave forces and FDOT corrosion criteria.

Figure 1-2
SR 789 Preferred Single Bridge Typical Section



The new bridge will transition to a curb and gutter roadway typical section that includes two 10.5-ft wide travel lanes, an 11-ft bus on shoulder, and a 5-ft bike lane in each direction, separated by a median with Type E curb and gutter. This section of roadway also includes a 10-ft shared-use path on both sides of the roadway that connects to the bridge, shown on **Figure 1-3**. The design speed is 40 mph with a posted and target speed of 35 mph.

Figure 1-3
SR 789 Preferred Roadway Typical Section



1.6 List of Technical Documents

The technical reports that have been completed during this study are listed in **Table 1-1**.

SECTION 1 – PROJECT SUMMARY

**Table 1-1
List of Technical Documents**

Document	Date of Publication
Public Involvement	
Advance Notification Package	January 2020
Public Involvement Plan	May 2020
Public Hearing Transcript	March 2024
Comments and Coordination Report	June 2024
Engineering	
Geotechnical Report	October 2020
Future Volumes Technical Memorandum	July 2022
Project Traffic Analysis Report	August 2023
Bridge Hydraulic Technical Memorandum	February 2022
Location Hydraulic Report	February 2024
Pond Siting Technical Memorandum	February 2024
Bridge Development Report	TBD
Typical Section Package	April 2023
Context Classification Memo	November 2020
Environmental	
Type 2 Categorical Exclusion	October 2024
Cultural Resource Assessment Survey Report	April 2023
Natural Resource Evaluation Report	November 2023
Noise Study Report	October 2023
Water Quality Impact Evaluation	June 2023
Section 4(f) Resources	May 2023
Level I Contamination Screening Evaluation Report	May 2023
ETDM Programming Screen Summary Report	July 2020
Sociocultural Data Report	May 2020

2.0 EXISTING CONDITIONS

2.1 Previous Planning Studies

The following planning studies have been conducted within the project limits.

- FDOT Sarasota / Manatee Barrier Islands Traffic Study; Phase 1; June 2017
- FDOT Sarasota / Manatee Barrier Islands Traffic Study; Phase 2 – Operations and Identifications: FM 440411-1-12-01; October 2018
 - In the short term, the following were recommended:
 - Complete discontinuous sidewalk
 - Install high-visibility backplates at the traffic signal at Bird Key Drive
 - In the midterm, the following were recommended:
 - New bridge at SR 789 / Coon Key will include a flexible lane added to bridge typical section to accommodate future bus on shoulder
 - Sarasota Yacht Club – Potential water shuttle
 - Roadway – Widen existing bike lanes into cart lanes to allow motorized carts to travel outside of the general-purpose lanes.
 - In the long term, the following were recommended:
 - Provide street car service from Van Wezel to St. Armands/Lido Beach

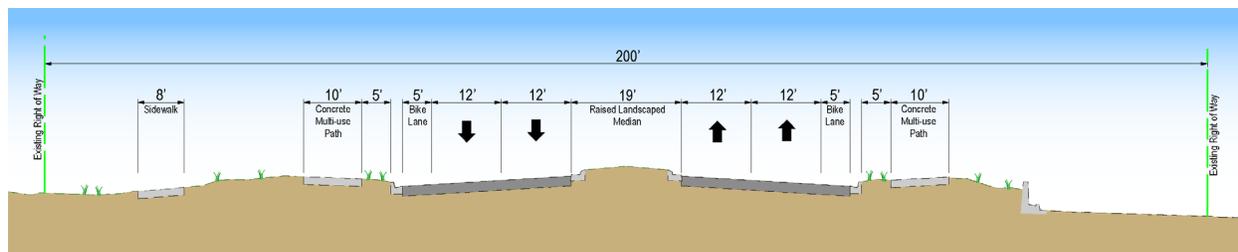
2.2 Existing Roadway Conditions

2.2.1 Typical Sections

2.2.1.1 SR 789 East of Bird Key Drive

To the east of the study area, the existing typical section includes two 12-ft wide travel lanes in each direction, separated by a 19.5-ft raised median with Type E curb and gutter. This section of roadway also includes 5-ft wide dedicated bike lanes and 10-ft multi-use paths adjacent to a 5-ft grassed strip with Type F curb and gutter along the outside travel lanes, shown on **Figure 2-1**. Adjacent to the multi-use paths are landscaped borders. In addition, along the eastbound lanes there is a separate 8-ft sidewalk that travels under the main bridge and connects to Bird Key Park.

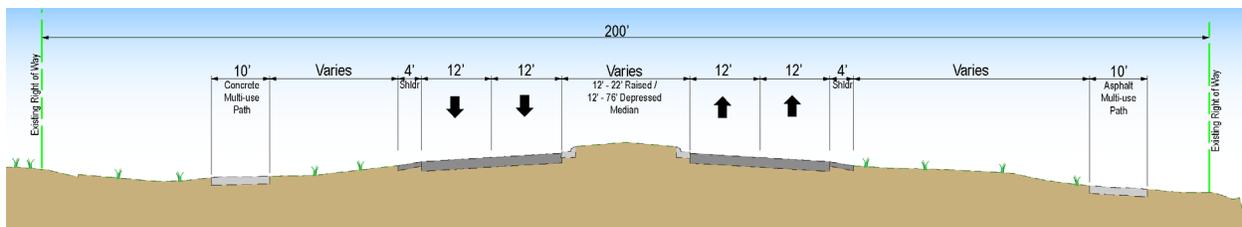
Figure 2-1
SR 789 East of Bird Key Drive Typical Section



2.2.1.2 Bird Key Drive to the Bridge

The existing typical section includes two 12-ft wide travel lanes in each direction, separated by a curb and gutter and flush landscaped median ranging in width from a minimum of 12 ft to a maximum of 76 ft. This section of roadway also includes 4-ft wide paved shoulders and a 10-ft multi-use path on the north side and a meandering 10-ft multi-use path within Bird Key Park that connects to the existing bridges, shown on **Figure 2-2**.

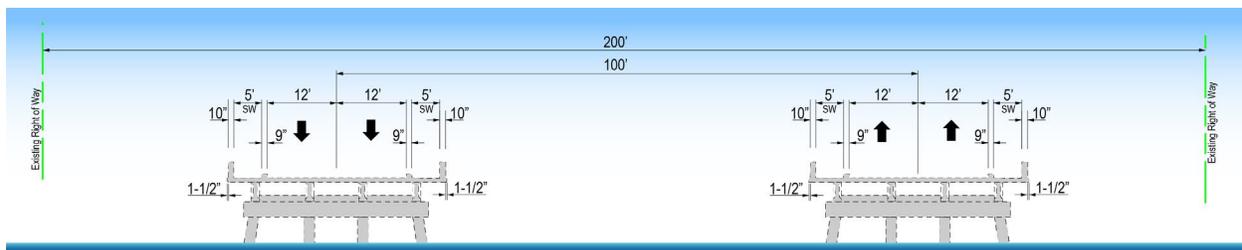
Figure 2-2
SR 789 Bird Key Drive to the Bridge Typical Section



2.2.1.3 Bridge Crossing Typical Section

The existing twin bridge typical section includes two 12-ft wide travel lanes, 5-ft sidewalks separated by a 9-in raised curb for conduits and 10-in railings on both sides. No shoulders or bicycle lanes are currently provided on the bridge. The total width of each bridge is 37 ft 5-in. The clear space between the twin bridges is 62 ft 7-in, shown on **Figure 2-3**.

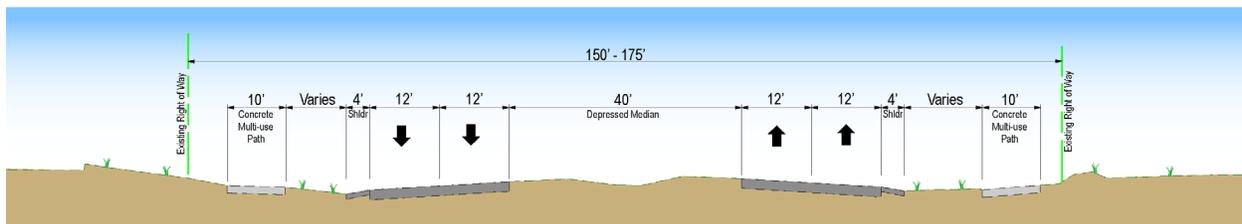
Figure 2-3
SR 789 Existing Twin Bridge Typical Section



2.2.1.4 Bridge to Sarasota Harbour West

The existing typical section includes two 12-ft wide travel lanes in each direction, separated by a 40-ft depressed landscaped median. This section of roadway also includes 4-ft wide paved shoulders, and 10-ft shared-use paths on both sides, shown on **Figure 2-4**. An existing overhead power line is located within the median.

Figure 2-4
Bridge to Sarasota Harbour



2.2.2 Roadway Functional & Context Classifications

SR 789 is classified as an Urban Minor Arterial and falls within the 2020 Urban Area Boundary for Sarasota County, between St. Armands Circle and mainland City of Sarasota. SR 789 is a hurricane evacuation route. The context classification for SR 789, approved on November 12, 2020, is C3R-Suburban Residential. See **Appendix B** for documentation.

2.2.3 Access Management Classification

The access management classification for SR 789, shown in **Table 2-1**, is Class 5 – Restrictive, based on FDOT’s Rule 14-97 (FDM Table 201.4.2), which sets forth an access control classification system and access management standards to implement the State Highway System Access Management Act of 1988 (Florida Statute [F.S.] 335.18).

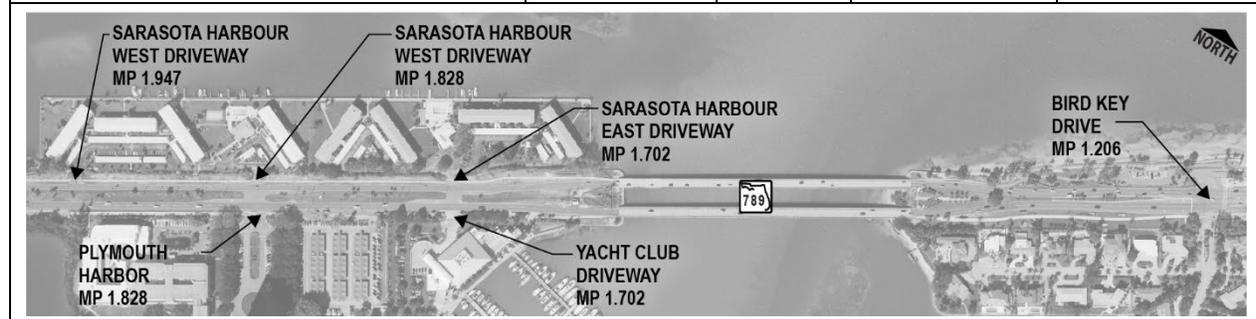
Table 2-1
Access Management Classification

Access Class 5 - Restrictive				
Connection Spacing (ft)		Median Opening Spacing (ft)		Signal Spacing (ft)
>45 mph	≤45 mph	Directional	Full	
440	245	660	2640 > 45 mph; 1320 ≤ 45 mph	

Table 2-2 documents the existing connection and median opening spacing along the project.

Table 2-2
Existing Connection and Median Opening Spacing

Location	MP – MP (mi)	Distance (ft)	Meets Connection Spacing Requirements	Meets Median Opening Spacing Requirements
Bird Key Drive/Park Entrance to Sarasota Harbour East/Yacht Club Entrance	1.206 – 1.702	2619	Yes	Yes
Sarasota Harbour East/Yacht Club Entrance to Sarasota Harbour West/Plymouth Harbor	1.702 – 1.828	665	Yes	No
Sarasota Harbour West/Plymouth Harbor to Sarasota Harbour West	1.828 – 1.947	628	Yes	N/A



2.2.4 Right-of-Way

Table 2-3 provides the existing right-of-way widths along SR 789.

**Table 2-3
Existing Right-of-Way Widths**

Facility	From	To	Width
SR 789	Bird Key Drive (MP 1.206)	Bridge (MP 1.400)	200 ft
	Bridge (MP 1.400)	Bridge (MP 1.593)	200 ft
	Bridge (MP 1.593)	Sarasota Harbour East (MP 1.702)	175 ft
	Sarasota Harbour East (MP 1.702)	Sarasota Harbour West (MP 1.828)	150 ft

2.2.5 Adjacent Land Use

Existing land uses, shown on **Figure 2-5**, were reviewed within the study area. Existing landward uses along the project corridor (and their approximate percentages) consist of:

- Residential, High Density (multi-family units) (26.02%),
- Transportation (20.93%),
- Residential, Medium Density (single-family units) (9.26%),
- Commercial and Services (3.72%), and
- Recreational land uses (1.18 %).

**Figure 2-5
Existing Land Use**



2.2.6 Pavement Type & Condition

The Pavement Conditions Forecast report dated August 4, 2020 documents the current condition and future condition of the pavement within the study area, shown in **Table 2-4**. The project study area was resurfaced in 2011. Currently there are no ratings of 6.4 or less but by 2025 it is anticipated that the right lane ride will be at 6.4 which is considered deficient pavement.

**Table 2-4
Existing Pavement Condition**

Begin MP	End MP	Roadway Lane	Year	Cracking	Ride
1.206	2.252	R2	2020	9.5	7.2
			2025	9.4	6.4
1.206	2.252	L2	2020	9.5	7.3
			2025	9.4	7.1

2.2.7 Existing Design and Posted Speeds

Table 2-5 provides the design and existing posted speed limits along SR 789. The locations of the posted speed limit signs are shown on **Figure 2-6**. Along the corridor there are four speed limit signs with speed feedback to improve safety.

Table 2-5
Existing Design and Posted Speed Limits

Facility	From	To	Design Speed (mph)	Posted Speed (mph)
Westbound				
SR 789	Bird Key Drive (MP 1.206)	Sarasota Harbour East (MP 1.702)	40	35
SR 789	Sarasota Harbour East (MP 1.702)	Sarasota Harbour West (MP 1.947)	40	35
Eastbound				
SR 789	Sarasota Harbour West (MP 1.947)	Sarasota Harbour East (MP 1.702)	40	35
SR 789	Sarasota Harbour East (MP 1.702)	Bird Key Drive (MP 1.206)	40	35

Figure 2-6
Posted Speed Limit Sign Locations



2.2.8 Horizontal Alignment

The information on the existing horizontal alignment on SR 789, shown in **Table 2-6**, was obtained from the survey data collected for this project.

Table 2-6
Existing Centerline of Survey

PI Station	Degree of Curvature	Curve Direction	Radius (ft)	Tangent Direction	Tangent Length (ft)	Northing	Easting
87+01.070	N/A	N/A	N/A			1088710.108	474325.774
102+94.392	N/A	N/A	N/A	S59° 02' 06.0" W	1,593.322	1087890.311	472959.536
104+63.057	N/A	N/A	N/A	S59° 01' 40.8" W	168.665	1087803.512	472814.920
134+99.997	N/A	N/A	N/A	S59° 01' 15.6" W	3,036.940	1086240.305	470211.194

2.2.9 Vertical Alignment

Table 2-7 lists the vertical geometry within the bridge limits only. This geometry was derived from the November 7, 1955 bridge plans prepared by Parsons, Brinckerhoff, Hall and Macdonald Engineers (State Job Number 1703-175). The National Geodetic Vertical Datum (NGVD) of 1929 elevation was converted to North American Vertical Datum (NAVD) of 1988. No as-builts were found for documenting the crest, sag, vertical curve length, and existing K value along the roadway segments east and west of the bridge.

Table 2-7
Existing Vertical Alignment (Bridge Only)

VPI Stationing VPI EL. (ft)	Crest/Sag/PI (C/S/PI)	Grade In (%) EL. In (ft)	Grade Out (%) EL. Out (ft)	Existing Vertical Curve Length (ft)	Existing K Value	Posted Speed (mph)
10+76.164 18.25	C	+1.650 11.65	-1.650 11.65	800	242	35
End bridge profile at Sta. 15+79.58 EL. 9.93'						

2.2.10 Multi-modal Facilities

2.2.10.1 Pedestrian Accommodations

Pedestrian facilities on SR 789 are shown in **Table 2-8**.

Table 2-8
Pedestrian Facilities on SR 789

Facility	Limits	North Side	South Side
SR 789	East of Bird Key Drive	10-ft concrete shared-use path	10-ft concrete shared-use path
	Bird Key Drive to Bridge	10-ft concrete shared-use path	Asphalt Path within Bird Key Park
	Bridge	5-ft sidewalk both sides of both bridges	5-ft sidewalk both sides of both bridges
	Bridge to Sarasota Harbour West	10-ft concrete shared-use path	10-ft concrete shared-use path

2.2.10.2 Bicycle Facilities

Bicycle facilities on SR 789 are shown in **Table 2-9**.

Table 2-9
Bicycle Facilities on SR 789

Facility	Limits	North Side	South Side
SR 789	East of Bird Key Drive	5-ft designated	5-ft designated
	Bird Key Drive to Bridge	4-ft paved shoulder	4-ft paved shoulder
	Bridge	None	None
	Bridge to Sarasota Harbour West	4-ft paved shoulder	4-ft paved shoulder

2.2.10.3 Transit Facilities

The Breeze (formally known as SCAT) service within the project area is an OnDemand curb-to-curb service, shown on **Figure 2-7**. Riders enter the starting and ending locations into the Breeze OnDemand website or OnDemand by Sarasota County mobile app. The app will confirm trip availability and provide an estimated driver arrival time. In addition:

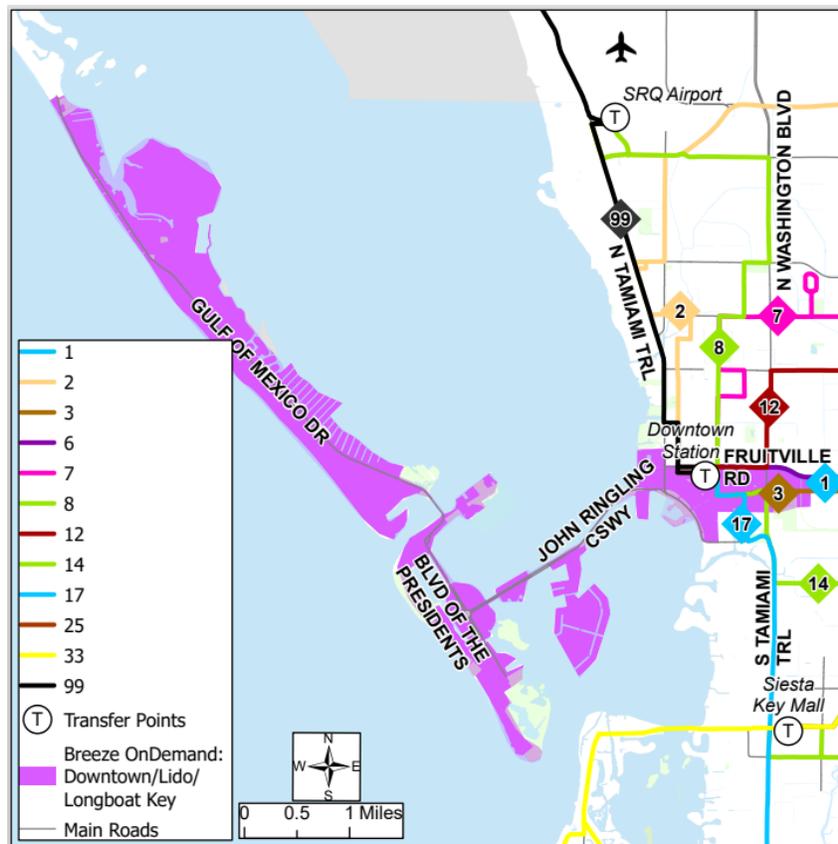
SECTION 2 – EXISTING CONDITIONS

- Trips must start and stop within the same service zone.
- A transfer to or from the bus system or other transportation provider will be necessary if some of the trip is outside the OnDemand zone.

Breeze OnDemand hours of operation are 5 a.m. to 10 p.m. Monday through Saturday and 6 a.m. to 9 p.m. Sunday, with revised service hours on New Year's Day, Thanksgiving Day, Christmas Eve, and New Year's Eve. The fares are:

- Standard fare: \$2.00 per person/trip,
- Discounted fare: Passengers participating in the Breeze Plus TD program ride for \$1.50 per trip, and
- Waived fare: Children aged 5 and under ride free.

Figure 2-7
Breeze OnDemand Service Map



In addition, Sarasota County offers Breeze Plus, an eligibility-based service that encompasses the Americans with Disabilities Act (ADA), Transportation Disadvantaged (TD), and Veterans Medical (VM) Programs. Riders must complete an application to be granted temporary, conditional, or unconditional approval. Hours of operations for each of these services are shown below in **Table 2-10**. There is no service on six major holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.

**Table 2-10
Breeze Plus Services**

Service	Cost	Hours
Breeze Plus ADA Program	\$3.00 each way	Monday – Saturday 5 a.m. to 11 p.m. Sunday 6:20 a.m. to 10:30 p.m.
Breeze Plus TD Program	\$3.00 each way	Monday – Saturday 7 a.m. to 7 p.m.
Breeze Plus VM Program	Pay cash fare to the driver. Fare varies by pickup location.	Pickups made Monday – Friday 6:25 a.m. and 7:50 a.m.

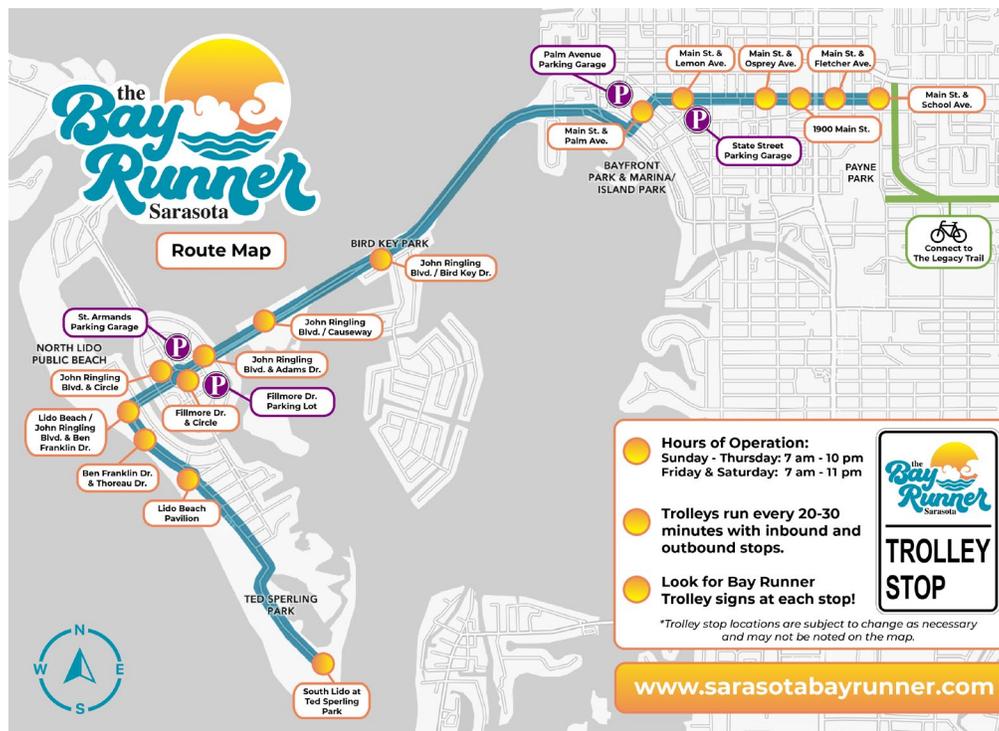
website: https://www.scgov.net/government/breeze-transit/breeze-plus#16625_22205_88023

The City of Sarasota operates the Bay Runner Trolley from Main Street and School Avenue to the South Lido at Ted Sperling Park, shown on **Figure 2-8**. The Bay Runner Trolley is a complimentary service seven days a week until 10:00 p.m. or 11:00 p.m. with trolleys every 20-30 minutes at each inbound and outbound stop. There are two stops within the project limits.

- SR 789 at Sarasota Harbour West/Plymouth Harbor Entrance
 - Westbound – 125 ft west of Sarasota Harbour West Entrance
 - Eastbound – 275 ft east of Plymouth Harbor Entrance

Service availability and real-time tracking of the trolley can be found on the Bay Runner App.

**Figure 2-8
City of Sarasota Bay Runner Trolley Route Map**



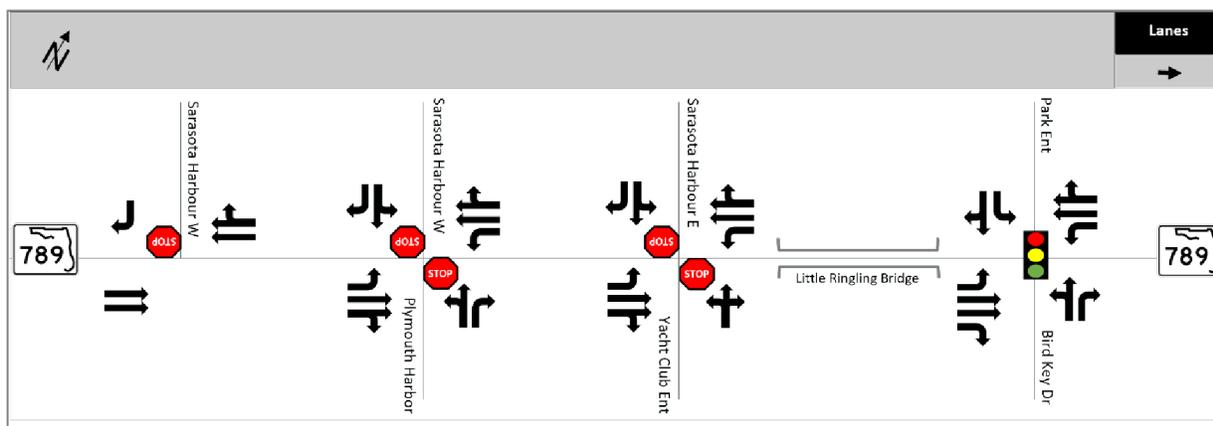
2.2.11 Intersection/Driveway Access

There is 1 signalized intersection at Bird Key Drive, two driveway access with median openings and one driveway access without a median opening shown on **Figure 2-9**.

The location of these intersection/driveway access includes:

- Bird Key Drive / Park Entrance MP 1.206 - signalized
- Sarasota Harbour East / Yacht Club Entrance MP 1.702 - 2-way stop controlled with median opening
- Sarasota Harbour West / Plymouth Harbor MP 1.828 - 2-way stop controlled with median opening
- Sarasota Harbour West MP 1.947 - stop controlled without median opening

**Figure 2-9
Intersection/Driveway Lane Geometries**



2.2.12 Physical or Operational Restrictions

Table 2-11 identifies the fixed objects within the existing project limits. The clear zone requirement for a 40 mph design speed is 18 ft from the edge of the travel lane or 10 ft from an auxiliary lane.

**Table 2-11
Existing Fixed Objects within Clear Zone**

Fixed Object	Location	MP to MP	Existing		Meets Criteria Yes or No
			Lateral Offset (ft)	Flush Shldr or C&G	
Conventional Light Poles	Outside Edge of Travel Lane	1.593 – 1.947	8	Flush	No
Above Ground Utilities	Median	1.593 – 1.947	20	Flush	Yes

Other fixed objects within the project limits include:

- Guardrail at the bridge approaches and ends

2.2.13 Traffic Data

Documented in the *Forecast and Analysis Methodology Report*, COVID-19 affected the traffic count collection schedule and the resulting traffic counts deviated from the historical trend. The year that fit the trendline was 2018. Therefore, the FDOT’s 2018 Florida Traffic Information (FTI) database was used as a data source to extrapolate existing year to provide:

- Annual Average Daily Traffic (AADT)
- K-Factor (K)
- D-Factor (D)
- Truck Percentages (T)
- Peak Season Factor
- Weekly Axle Factor, and
- Traffic Counts

Design characteristics K, D, T, DHT, and peak hour factors were calculated from the traffic counts and compared to other sources to develop the recommended characteristics documented in the “*Project Traffic Analysis Report*” dated August 2023. The recommended design traffic characteristics are as follows.

- Standard K Factor– 9%
- Direction Distribution (D)-Factor – 60%
- T_{24} and T_{Peak} for SR 789 – $T_{24} = 4\%$, $T_{Peak} = 4\%$
- Peak Hour Factor (PHF) = 95%

As Outlined in the *Traffic Analysis Methodology Report* and described in detail in the *Future Volumes Technical Memorandum*, to obtain “worst case scenario” volumes, 2021 peak season average daily traffic (PSADT) volumes for the study area were developed from the 2018 FTI AADTs. A peak season factor of 88% was obtained from the average 2018 FTI seasonal factors for Sarasota Beaches. This factor was applied to the 2018 AADTs to obtain 2018 PSADTs. The 2018 PSADTs were extrapolated to 2021 PSADTs by applying the growth rate from the 2010 and 2040 model outputs.

For the cross streets and entrances, 2021 turning movement counts were used to calculate the percentage of total intersection volume for each intersection leg. These intersection leg percentages were used to calculate 2018 cross street PSADTs from the 2018 SR 789 PSADTs. The resulting 2018 volumes were extrapolated to 2021 volumes using the average growth rate from the 2010 and 2040 model outputs. The development of the initial peak season 2021 PSADTs is shown in **Table 2-12** Error! Reference source not found..

Peak Season Daily Directional Hourly Volumes (DDHVs) and Turning Movement Volumes (TMVs) were calculated from the initial 2021 PSADTs using the recommended K and D factors and the peak hour turning movement percentages calculated from the turning movement counts. Resulting TMVs were balanced and adjusted using the 2021 PSADT east of Bird Key Drive as a control point. Results were compared to the seasonally adjusted raw 2021 counts to confirm that the calculated volumes were similar to the actual volumes.

Table 2-12
Development of Initial 2021 Peak Season ADTs

Location	AADT	Seasonal Adjustment Factor	Seasonally Adjusted AADT	Modul Outputs		Growth Rate	Initial PSADT
	2018	2018 FTI	2018	2018	2040	Model	2021
SR 789 W of Sarasota Harbour W	30,000	0.88	34,181	34,061	39,124	0.46%	34,700
SR 789 W of Sarasota Harbour W/Plymouth Harbor	30,000	0.88	34,181	34,061	39,124	0.46%	34,700
SR 789 E of Sarasota Harbour W	30,000	0.88	34,181	34,061	39,124	0.46%	34,700
SR 789 W of Sarasota Harbour E	30,000	0.88	34,181	34,061	39,124	0.46%	34,700
SR 789 E of Sarasota Harbour E	33,000	0.88	37,599	36,626	42,065	0.46%	38,100
SR 789 W of Bird Key Drive	33,000	0.88	37,599	36,626	42,065	0.46%	38,100
Sr 789 E of Bird Key Drive	34,000	0.88	38,738	38,503	44,165	0.46%	39,300
Sarasota Harbour W Ent N of SR 789	108	0.88	123			0.46%	100
Plymouth Harbor Ent S of SR 789	217	0.88	247			0.46%	200
Sarasota Harbour E N of SR 789	68	0.88	77			0.46%	100
Sarasota Yacht Club Ent S of SR 789	290	0.88	331			0.46%	300
Bird Key Dr N of SR 789	416	0.88	475			0.46%	500
Bird Key Dr S of SR 789	1,151	0.88	1,311			0.46%	1,300

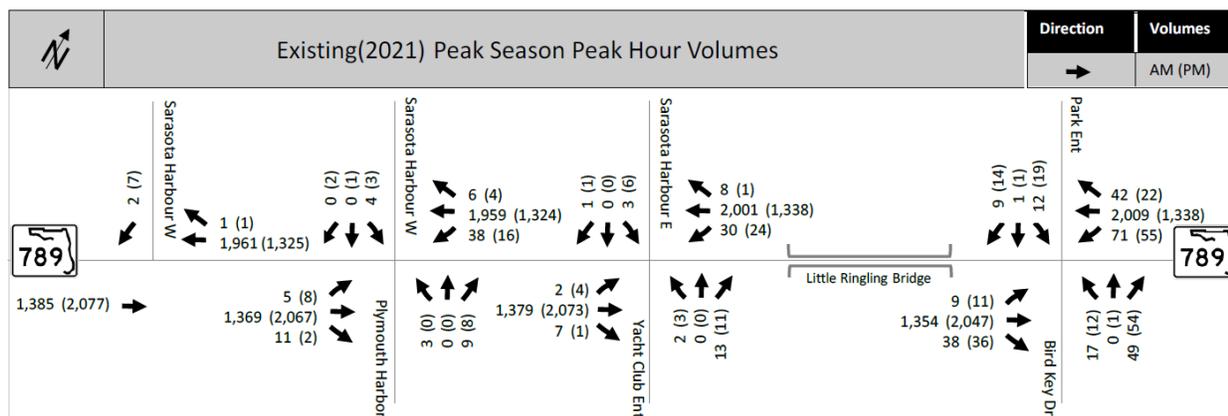
Balanced PSADTs calculated from the balanced design hour turning movements were compared to the initial forecast PSADTs. The balanced PSADTs furthest from the control point are higher than the initial calculations but are within the expected volumes for this corridor as shown in **Table 2-13**. The balanced existing peak hour volumes are shown on **Figure 2-10**.

Table 2-13
Initial 2021 Peak Season Average Daily Traffic Compared to Balanced Peak Season ADTs

Location	Initial 2021 ADT	Balanced 2021 ADT	Difference	% Difference
SR 789 W of Sarasota Harbour W	34,700	38,500	3,800	10%
SR 789 W of Sarasota Harbour W/Plymouth Harbor	34,700	38,500	3,800	10%
SR 789 W of Sarasota Harbour E	34,700	38,600	3,900	11%
SR 789 W of Bird Key Drive	38,100	38,900	800	2%
Sr 789 E of Bird Key Drive*	39,300	39,300	0	0%
Sarasota Harbour W N of SR 789	100	100	0	0%
Plymouth Harbor S of SR 789	200	200	0	0%
Sarasota Harbour E N of SR 789	100	100	0	0%
Sarasota Yacht Club S of SR 789	300	400	100	29%
Bird Key Dr N of SR 789	500	600	100	18%
Bird Key Dr S of SR 789	1,300	1,900	600	38%

(*) control point for balancing

**Figure 2-10
Balanced Existing (2021) Peak Hour Volumes**



Intersection turning movement counts showed high volumes of pedestrian and bicycle traffic on the sidewalks along the corridor and crossing SR 789 at Bird Key Drive. Intersection pedestrian and bicycle counts were collected on May 1, 2021 and May 4, 2021 to be representative of peak season expectations. Highest hour volumes at the study intersections show 160 to 200 non-motorized users in the crosswalks. Daily pedestrian and bicycle volumes were near 1,000 with a small percentage (less than 5%) being children. No disabled persons were noted in the counts. A summary of daily totals and highest hour totals for each counted intersection are in **Table 2-14** Error! Reference source not found..

2.2.14 Roadway Operational Conditions

Traffic operations for roadways are measured in terms of Level of Service (LOS) by comparing the vehicular demands with the available roadway capacity. LOS is a qualitative measure of the traffic operations. LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. Existing roadway configurations were modeled with existing signal timings using Trafficware’s Synchro software package where segment and intersection analyses were performed using the Synchro “Highway Capacity Manual (HCM) 6th Edition Reports” functions, Arterial Analysis Report functions, and SimTraffic Queue Report function.

**Table 2-14
Existing Pedestrian and Bicycle Count Summary**

Location	Type	Daily Total	Highest Hour	Highest Hour Total
Bird Key Drive				
Crossing north leg	ped	23	7:00 AM	6
(Park Entrance)	bike	125	9:00 AM	22
Crossing east leg	ped	242	9:00 AM	80
(SR 789)	bike	19	10:00 AM	6
Crossing south leg	ped	278	9:00 AM	58
(Bird Key Drive)	bike	182	9:00 AM	27
Crossing west leg	ped	3		1
(SR 789)	bike	6		1

Table 2-14
Existing Pedestrian and Bicycle Count Summary

Location	Type	Daily Total	Highest Hour	Highest Hour Total
Intersection Total		878		201
Sarasota Harbour East				
Crossing north leg	ped	237	7:00 AM	61
(Sarasota Harbour E Entrance)	bike	203	9:00 AM	24
Crossing east leg	ped	4	8:00 AM	3
(SR 789)	bike	1	4:00 PM	1
Crossing south leg	ped	277	9:00 AM	47
(Sarasota Yacht Club Entrance)	bike	205	2:00 PM	27
Crossing west leg	ped	7		2
(SR 789)	bike	1	9:00 AM	1
Intersection Total		935		166
Sarasota Harbour West				
Crossing north leg	ped	234	7:00 AM	58
(Sarasota Harbour W Entrance)	bike	194	9:00 AM	27
Crossing east leg	ped	10	9:00 AM	5
(SR 789)	bike	9	9:00 AM	5
Crossing south leg	ped	270	9:00 AM	37
(Plymouth Harbor Entrance)	bike	189	9:00 AM	29
Crossing west leg	ped	3		1
(SR 789)	bike	3	9:00 AM	2
Intersection Total		912		164

2.2.14.1 Existing Segment Operational Analysis

Synchro HCM 6th Arterial Analysis reports show that SR 789 segments are operating at LOS B or better on both approaches to Bird Key Drive. Results are shown in **Table 2-15**.

Table 2-15
Existing Segment Operational Analysis Results

Existing Arterial Analysis Results for SR 789									
Direction	Cross Street	Existing AM				Existing PM			
		Signal Delay (s/veh)	Travel Time (s)	Arterial Speed (mph)	Arterial LOS	Signal Delay (s/veh)	Travel Time (s)	Arterial Speed (mph)	Arterial LOS
Eastbound	Bird Key Drive	11.6	105.7	31	A	23.0	117.1	28	B
Westbound	Bird Key Drive	8.0	47.8	25	B	4.3	44.1	27	B

2.2.14.2 Existing Intersection LOS Analysis

Intersection capacity analyses were conducted to assess the existing LOS at the intersections in the study area using the existing balanced volumes. The intersection analysis was conducted using Synchro's HCM 6th LOS calculations. For signalized intersections, the analysis considers the operation of each lane or group entering the intersection and the LOS designation is for the overall conditions at the intersection.

SECTION 2 – EXISTING CONDITIONS

For unsignalized intersections the analysis provides an LOS for the minor street. The lane configurations used in the Existing Conditions Analysis were verified with Google Map aerials and Google Street Views. Existing speed limits for SR 789 were set to 35 mph and all other streets were set to 25 mph.

Table 2-16 shows the results of the existing intersection analysis. The only movements receiving LOS F were left turn movements onto SR 789 from stop-controlled side streets and the eastbound through movement at Bird Key Drive. All other movements received LOS D or better.

Table 2-16
Existing Intersection Analysis Results

Location	Direction	Movement	Existing AM				Existing PM			
			Average Delay (s/v)	V/C Ratio	LOS	Queue Length 95 th %tile (ft)	Average Delay (s/v)	V/C Ratio	LOS	Queue Length 95 th %tile (ft)
SR 789 & Sarasota Harbour West (unsignalized)	SB	R	21.1	0.01	C	-	14.7	0.02	B	-
SR 789 & Plymouth Harbor/ Sarasota Harbour West (unsignalized)	EB	L	20.8	0.02	C	16	13.6	0.02	B	48
		T								
		TR								
	WB	L	14.4	0.10	B	8	22.9	0.08	C	301
		T								
		TR								
	NB	LT	16.2	0.03	C	14	24.9	0.05	C	302
		R				62				68
SB	LT	1213.0	0.84	F	27	978.3	0.70	F	21	
	R	0.0	-	A	-	16.0	0.01	C	-	
SR 789 & Yacht Club / Sarasota Harbour East (unsignalized)	EB	L	21.4	0.01	C	10	13.7	0.01	B	32
		T								
		TR								
	WB	L	14.5	0.08	B	5	24.2	0.12	C	385
		T								
		TR				50				391
	NB	LTR	81.9	0.26	F	6	351.5	0.70	F	61
	SB	LT	1102.0	0.63	F		699.6	0.70	F	
R		24.5	0.01	C	49	16.3	0.00	C	20	
SR 789 & Bird Key Drive (signalized)	EB	L	45.3	0.10	D	42	18.9	0.06	B	61
		T	21.2	0.77	C	359	103.6	1.16	F	2783
		R	11.5	0.05	B	129	11.3	0.05	B	217
	WB	L	17.1	0.34	B	296	25.3	0.40	C	84
		T	31.7	0.94	C	1153	12.4	0.63	B	266
		TR	32.8	0.95	C	1139	12.4	0.63	B	273

Table 2-16
Existing Intersection Analysis Results

Location	Direction	Movement	Existing AM				Existing PM			
			Average Delay (s/v)	V/C Ratio	LOS	Queue Length 95 th %tile (ft)	Average Delay (s/v)	V/C Ratio	LOS	Queue Length 95 th %tile (ft)
	NB	LT	30.1	0.05	C	35	29.8	0.04	C	56
		R	30.6	0.16	C	55	30.6	0.18	C	68
	SB	L	30.9	0.04	C	41	30.8	0.06	C	46
		TR	29.4	0.03	C	31	29.4	0.05	C	40
Overall			27.6	-	C		64.8	-	E	

2.2.14.3 Existing Pedestrian and Bicycle Analysis

The pedestrian and bicycle analysis was conducted using Synchro's HCM 6th Edition reports for pedestrians and bicycles at signalized intersections. Pedestrian counts were entered into the Synchro networks for AM and PM peak conditions. Results are shown in **Table 2-17**. Pedestrian level of service is LOS D or better for all directions.

Table 2-17
Existing Pedestrian and Bicycle Analysis Results

Existing Ped/Bike Results for SR 789 at Bird Key Drive (signalized)								
Category	AM				PM			
	EB	WB	NB	SB	EB	WB	NB	SB
Pedestrian Delay (s/p)	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5
Pedestrian Compliance Code	Poor							
Pedestrian Walk Score	3.2	3.2	2.0	2.2	3.2	3.2	2.0	2.2
Pedestrian LOS	C	C	B	B	C	C	B	B
Bicycle Delay (s/p)	14.7	9.7	51.3	51.3	14.5	9.6	51.1	51.1
Bicycle Compliance Code	Fair	Good	Poor	Poor	Fair	Good	Poor	Poor
Bicycle LOS Score	3.6	4.4	2.7	2.8	4.2	3.8	2.7	2.8
Bicycle LOS	D	D	C	C	D	D	C	C

2.2.15 Managed Lanes

There are no managed lanes within the corridor.

2.2.16 Crash Data

Five years of crash data was downloaded from Signal Four Analytics on August 25, 2020. Between January 1, 2015 and December 31, 2019 there were 57 crashes in the study area. **Figure 2-11** is a heat map showing the high-density crash areas. The highest number of crashes per hour occurred between 10:00 AM and 12:00 PM (12 crashes or 21% of total crashes) and between 4:00 and 6:00 PM (15 crashes or 26% of total crashes). There is also a directionality component to the crashes with more westbound crashes in the AM and more eastbound crashes in the PM. **Figure 2-12** shows crashes by time of day and their directionality eastbound and westbound.

Figure 2-11
Heat Map showing Crash Density

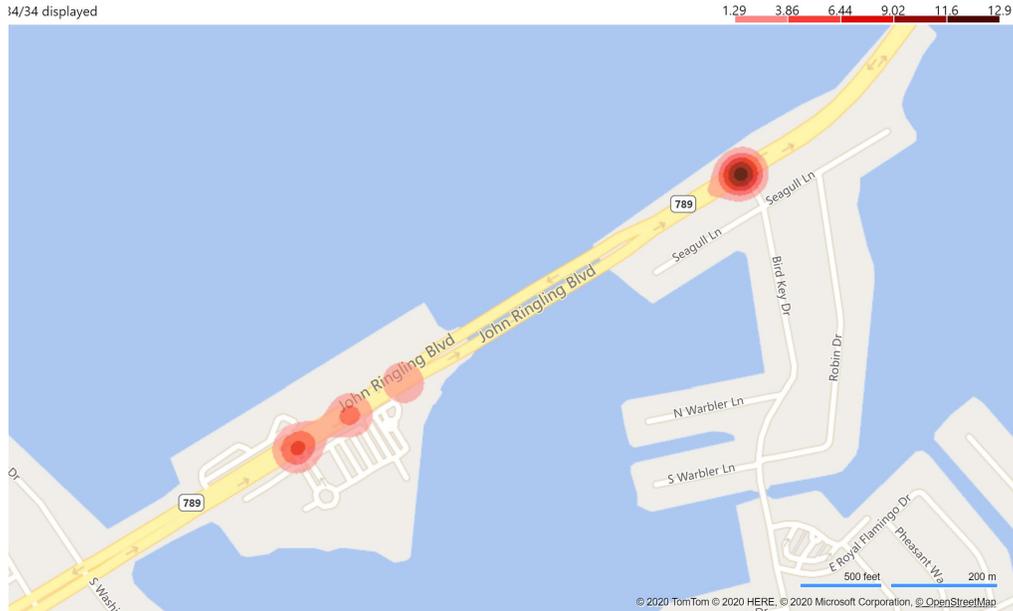
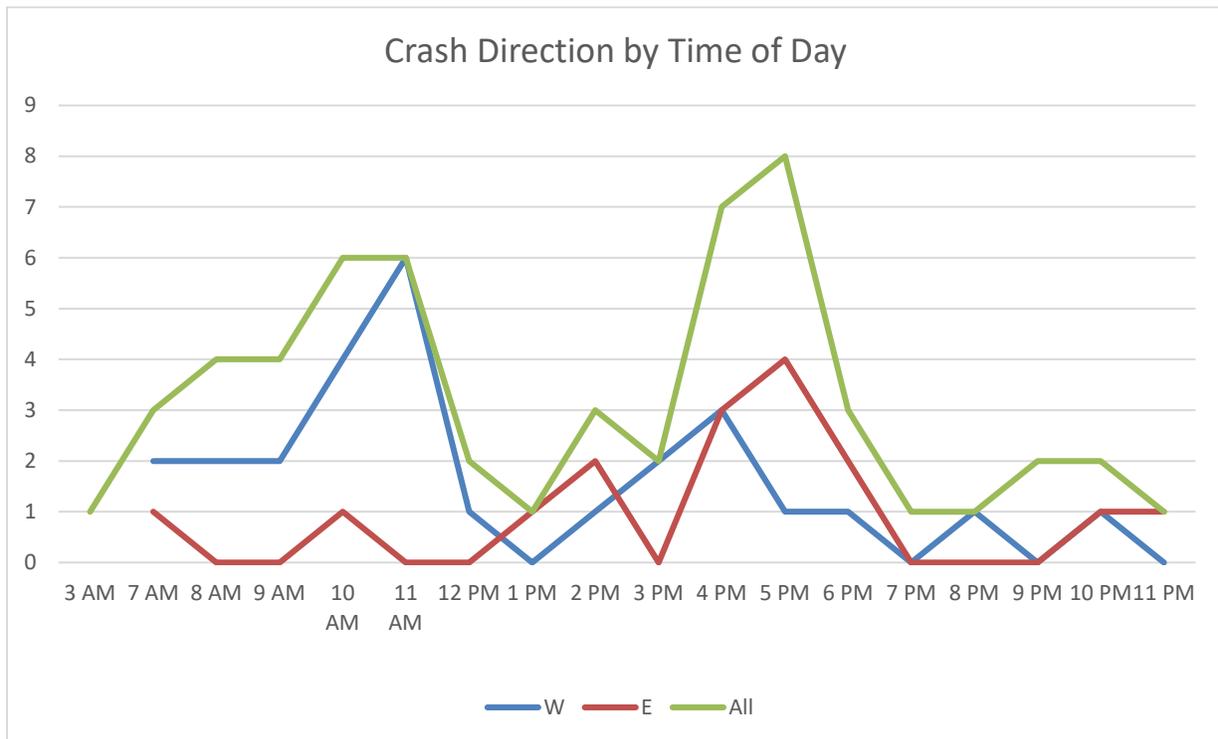


Figure 2-12
Crashes by Direction and Time of Day



2.2.16.1 Crash Summary by Crash Type and Crash Severity

Of the 57 crashes in the five-year period, 28 were rear end crashes. One involved a bicycle, and one involved a pedestrian. There were 17 crashes with injuries and no fatalities. **Table 2-18** and **Table 2-19** show crash types and crash severity.

**Table 2-18
Crash Types by Year**

Crash Type	2015	2016	2017	2018	2019	Type Totals	Percent of Total
Bicycle	1					1	2%
Left Turn					1	1	2%
Off Road		1		2	2	5	9%
Other		2	1	1	3	7	12%
Pedestrian				1		1	2%
Rear End	7	8	4	5	4	28	49%
Rollover		1				1	2%
Sideswipe	1	5	2			8	14%
Unknown	1		1	3		5	9%
Annual Totals	10	17	8	12	10	57	100%

**Table 2-19
Crash Severity by Year**

Crash Severity	2015	2016	2017	2018	2019	Severity Totals	Percent of Total
Injury ¹	4	4	3	5	1	17	30%
Property Damage Only	6	13	5	7	9	40	70%
Annual Totals	10	17	8	12	10	57	100%

(1) Injuries include possible injuries, non-incapacitating injuries, and incapacitating injuries.

2.2.16.2 Crash Summary by Year and Conditions

During the five-year period, most crashes occurred in clear, dry, daylight conditions. **Table 2-20**, **Table 2-21**, and **Table 2-22** summarize the crashes by weather, road surface, and lighting conditions.

**Table 2-20
Crashes by Weather Conditions**

Weather Conditions	2015	2016	2017	2018	2019	Weather Totals	Percent of Total
Clear	6	12	7	10	10	45	79%
Cloudy	1	5				6	11%
Rain	3		1	2		6	11%
Annual Totals	10	17	8	12	10	57	100%

Table 2-21
Crashes by Road Surface Condition

Road Surface Conditions	2015	2016	2017	2018	2019	Surface Totals	Percent of Total
Dry	7	15	7	9	10	48	84%
Water (standing/moving)		1				1	2%
Wet	3	1	1	3		8	14%
Annual Totals	10	17	8	12	10	57	100%

Table 2-22
Crashes by Lighting Conditions

Light Conditions	2015	2016	2017	2018	2019	Lighting Totals	Percent of Total
Dark - Lighted	2	1	1	3	1	8	14%
Dark - Not Lighted		1				1	2%
Daylight	8	15	7	9	8	47	82%
Dusk					1	1	2%
Annual Totals	10	17	8	12	10	57	100%

2.2.16.3 Crash Summary by Intersections

Of the 57 crashes occurring in five years, more than half of those crashes (34) occurred near the intersection of SR 789 and Bird Key Drive. For crashes identified as intersection or intersection related, 15 occurred at Bird Key Drive and two occurred at the Sarasota Harbour West / Plymouth Harbor entrances, as shown in **Table 2-23**.

Table 2-23
Intersection or Intersection Related Crashes by Crash Type

Crash Type	Bird Key Drive	Sarasota Harbour West	Total
Pedestrian	1 (7%)		1 (6%)
Rear End	10 (67%)	1 (50%)	11 (65%)
Same Direction Sideswipe	1 (7%)		1 (6%)
Single Vehicle	3 (20%)		3 (18%)
Unknown		1 (50%)	1 (6%)
Totals	15 (100%)	2 (100%)	17 (100%)

2.2.16.4 Crash Rate Comparison

Five-year crash rates were calculated from the Signal Four data and compared to FDOT 2012-2016 county and statewide average crash rates for a suburban 2-3 lane 2-way divided roadway. **Table 2-24** shows the study area intersection crash rates compared to the state and county crash rates. The Bird Key Drive intersection crash rate stands out because it is higher than the county crash rate. **Table 2-25** shows the SR 789 study area crash rate compared to the county and statewide segment average crash rates. The crash rate for SR 789 is lower than both the county and statewide averages.

**Table 2-24
Intersection Crash Rate Comparison**

Study Area Crashes (Signal Four data)			2012-2016 Average Crash Rates (FDOT)		
Intersection	Number of Crashes	Crash Rate	Road Category	County Average	Statewide Average
Bird Key Drive	15	0.241741	Suburban 2-3Ln 2Wy Divd Rasd 3-leg	0.222222	0.542359
Sarasota Harbour W	2	0.032232	Suburban 2-3Ln 2Wy Divd Pavd 4-leg	0.383117	0.504014

Note: The crash data identified five crashes within 150 ft of the Sarasota Harbour East entrance. Westbound, approximately 70 ft east of the entrance, there was one rear end crash with property damage only. Eastbound, approximately 90 ft east of the entrance, there was one off-road crash, two listed as unknown and one listed as other. Two crashes listed with injury and two with property damage only. None of the five were classified as intersection related.

**Table 2-25
Segment Crash Rate Comparison**

Study Area Crashes (Signal Four data)			2012-2016 Avg. Crash Rates (FDOT)		
Study Area Crashes	Study Length (mi)	Crash Rate	Road Category	County Average	Statewide Average
57	0.74	0.918614	Suburban 2-3Ln 2Wy Divd Pavd	1.19959	2.58244

2.2.17 Railroad Crossings

There are no railroad crossings within the project study area.

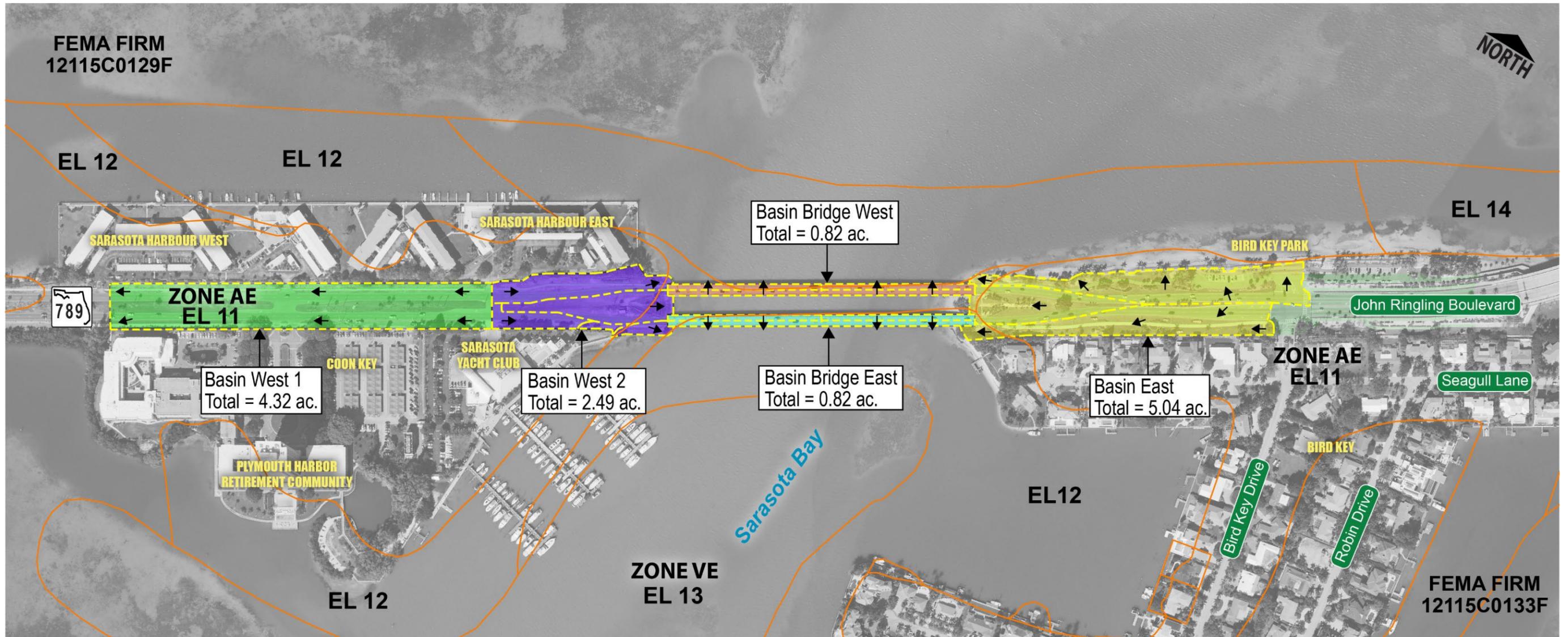
2.2.18 Drainage

The project is located in the Sarasota Bay Watershed. FDEP defines the project in Waterbody Identification Number (WBID) 1968 A, B, and C which is impaired for bacteria and nutrients and is listed as an Outstanding Florida Water (OFW). Runoff from the existing bridge deck directly discharges to the Sarasota Bay via existing scuppers. Runoff from the roadway, east and west of the bridge, flows to adjacent grassed swales and landscaped medians which are graded to drain toward the Sarasota Bay.

Since all portions of the project drain toward the bay, there is one drainage basin (13.5 acres) in the existing condition. See **Figure 2-13** for existing sub catchment areas and drainage patterns. There is one existing stormwater management facility for the Sarasota Yacht Club adjacent to the project limits on the southwest side of the bridge. The existing SR 789 roadway within the project limits is currently an untreated impervious surface.

Per Federal Emergency Management Agency (FEMA) FIRM 12115C0129F (11/04/16), the project is located in Zone VE with a base flood elevation of 13.0 ft NAVD88. This Zone VE designation indicates the bridge will experience high surge and wave climate. The bridge approaches and roadway improvements are in Zone AE with a base flood elevation of 11 to 13 ft NAVD88. Based on discussions with FDOT maintenance and Sarasota County, there are no documented flooding complaints within the project limits. There are no regulatory floodways within the project limits.

Figure 2-13
Existing Drainage Sub Catchment Areas



2.2.19 Lighting

Along SR 789, there is existing street lighting from Bird Key Drive to Sarasota Harbour West. Existing light poles consist of 35 – 40-ft poles spaced approximately 200 ft to 240 ft apart. Arm lengths vary from 4 ft to 8 ft. Light poles are currently installed on both sides of the roadway. Poles are aluminum type made for conventional lighting. Luminaires are high pressure sodium fixtures installed within a cast aluminum housing with reflector holder. Luminaires have internal ballasts. Florida Power and Light serves as the utility company providing power to the existing roadway lighting system. Additional decorative light poles and bollards are located at Bird Key Park. There is also decorative pedestrian lighting along the shared-use path on Bird Key.

2.2.20 Utilities

The existing utility facilities include power, gas, water, sewer and communications. **Table 2-26** lists utility owners and contact information with descriptions of each facility.

Table 2-26
Existing Utilities

Company	Type of Facility	Location
City of Sarasota Utilities	Water Sewer Reclaim	16" WM on the south side of SR 789. They have sanitary and water facilities along both sides of SR 789 for the length of the project.
Comcast Communications	CATV/BFOC	BFOC on the south side from the beginning of the project to the end with some OH-CATV at the western portion of the project on FP&L poles.
FP&L - Distribution	Electric	Underground 13 kV primary is in the median from the begin point of the project (Bird Key Drive) with a subaqueous crossing to the west end of the bridge. There it becomes an overhead system to the west end of the project limits.
Frontier Communications	BT/BFOC	BFOC within the project limits on both sides of SR 789.
Longboat Key Utilities	Water Sewer	No involvement response received 3-1-23
TECO Peoples Gas	Gas- (Distribution)	From west end of bridge: one GM along north side of SR 789 and one in the median. Subaqueous along south side of bridge. Crosses under SR 789 then along north side of SR 789.
Verizon Business/MCI	BFOC	Based on permit information the line is on the north side and crosses the waterway attached to the bridge.

2.2.21 Soils and Geotechnical Data

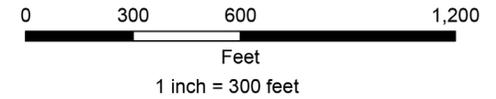
As mapped by the United States Department of Agriculture, Natural Resources Conservation Service (NRCS; formerly the Soil Conservation Service, or SCS) two soil types were identified within the study area, shown on **Figure 2-14**. On both Bird Key and Coon Key, these soil types were identified as Canaveral fine sand, 0 to 5 percent slopes (map symbol 6) and St. Augustine fine sand (map symbol 39).

Figure 2-14
NRCS / USDA Soils Map



NRCS Soils Series Legend

- 6 : Canaveral Fine Sand, 0 to 5 Percent Slopes
- 39 : St. Augustine Fine Sand
- 100 : Waters of the Gulf of Mexico



According to the USDA-SCS report for Sarasota County, Canaveral fine sand is nearly level, somewhat poorly drained to moderately well drained soil found on low dune-like ridges and side slopes bordering sloughs and mangrove swamps with smooth to convex slopes. The soil profile typically consists of an approximate 7-in-thick dark gray to gray fine sand with up to 10% shell content.

The underlying soils are comprised of light gray, yellowish brown, pale brown to light gray fine sand with up to 40% shell content. The (pre-development) water table ranges from 12 to 40 inches below ground surface. Permeability is very rapid and available water capacity is very low.

The USDA – SCS also reports that St. Augustine fine sand is found on former tidal areas, marine terrace flats and rises, generated from sandy mine spoil or earthy fill. The typical soil profile is comprised of fine sand to a depth of 80 inches below ground surface and is generally somewhat poorly drained.

The reported depth to water ranges from about 18 to 36 inches below ground surface, and the available water storage is reported as being low. Soils may include brown to gray fine sand and sandy clay loam with variable shell content.

During the PD&E Study, two SPT soil borings, including rock coring, with a termination depth of 100 feet each were completed at the approximate locations of the proposed new end bents. The soil profiles in the two borings were as expected from the USDA-NRCS soils map.

2.2.22 Aesthetics Features

The area surrounding the project consists primarily of residential and recreational land uses which may have scenic views of Sarasota Bay. Other existing aesthetic features that are located within the study area consist of landscaping within the median and along the outside border area, and low-level pedestrian lighting along the south side of SR 789 in front of the Bird Key subdivision. There are no existing bridge aesthetics features that were identified for the area.

2.2.23 Traffic Signs

The project corridor has single post and double post signs consisting of regulatory, guide and miscellaneous signs. **Table 2-27** lists the type of signs along the project corridor. In addition, a “No Fishing by order of FDOT” sign is attached to the bridge.

**Table 2-27
Existing Signs**

Regulatory - Single Post	Guide - Double Post	Miscellaneous - Single Post
Speed Limit Stop Sign No Parking on Right-of-Way No Parking Do Not Block Intersection Do Not Enter Overweight Permit Trucks Prohibited Across Bridge One-way Yield Pedestrian Crossing Ahead	Bird Key Drive Next Signal	Adopt-A-Highway Trolley Stops

2.2.24 Noise Walls and Perimeter Walls

There are no noise walls within the project limits. Perimeter walls outside the departments right of way separating the highway from adjacent properties are located along the Bird Key Subdivision and Sarasota Yacht Club. These walls are maintained by the Bird Key Homeowners Association and the Sarasota Yacht Club.

2.2.25 Intelligent Transportation Systems (ITS) / Transportation System Management and Operations (TSM&O) Features

There are no traditional ITS features within the project limits. However, there are TSM&O features consisting of traffic signal related systems within the project limits. These TSM&O features consist of:

- Traffic Signal system at Bird Key Drive. This feature is described in Section 2.2.11.
- Four electronic speed feedback signs, shown on **Figure 2-6**, as a safety feature. An Electronic Speed Feedback sign is an interactive sign that displays vehicle speed as drivers approach. The purpose of this type of sign is to reduce vehicle speed by making drivers aware of their approaching speed relative to the posted speed or school speed zone limit. These signs are solar powered signs.

2.3 Existing Bridges and Structures: Twin Bridges Numbers 170022 & 170951

2.3.1 Structure Type / Span Arrangement

The existing twin bridges on SR 789 carry the northbound (Bridge No. 170022) and southbound (Bridge No. 170951) traffic over the Coon Key Waterway in Sarasota County. Both bridges are 1,006-ft 10-in long, low-level structures, each consisting of 19 48-ft and two 47-ft - 5-in concrete spans, shown on Figure 2-3. The easternmost and westernmost spans are 47 ft-5-in and the remaining 19 spans are 48 ft-0-in. The superstructures consist of reinforced concrete decks supported by prestressed concrete girders. Each bridge accommodates two 12-ft travel lanes in one direction with no shoulders and 5-ft sidewalks on each side of each bridge. The sidewalk deck is cantilevered beyond the exterior girders on each side of both bridges. The existing concrete post and rail system is obsolete and does not meet current standards.

The superstructure for both bridges is supported on pile bents that consist of a cast-in-place reinforced concrete cap on driven precast concrete piles. The embankment at each end abutment on both bridges is stabilized by a precast concrete sheet pile bulkhead with reinforced concrete caps and sand-cement riprap. The minimum vertical clearance under the twin bridges is 10 ft above mean high water elevation at the center of the bridge and approximately 7 ft at the ends of the bridge.

2.3.2 Current Condition and Year of Construction

General Condition: The existing twin bridges were constructed in 1958. The following summary of the overall condition of the bridges is based on the FDOT Bridge Management System Bridge Inspection Report for the inspection performed on January 24, 2023, for northbound bridge number 170022 and July 28, 2023 for southbound bridge number 170951 and the corresponding *Comprehensive Inventory Data Reports (CIDR)*. Both bridges have substandard typical section

elements. Currently, Bridge No. 170022 (SR 789 NB) has a sufficiency rating of 76.9 and Bridge No. 170951 (SR 789 SB) has a sufficiency rating of 77.7. The sufficiency rating is a method of evaluating highway bridge data by considering a number of factors to obtain a numeric value that indicates sufficiency of a bridge to remain in service.

The overall condition of the bridges is consistent with age, environmental exposure conditions and heavy use. The bridges have been in service for more than 65 years. At the time of construction, it was customary to assume an anticipated service life of 50 years for bridge structures. The bridges are located in an extremely aggressive coastal environment and carry a moderate volume of vehicular traffic. Per the 2023 Bridge Inspection Reports, the overall condition ratings of the bridges are provided in **Table 2-28**.

In addition to routine maintenance and periodic minor repair projects, the concrete deck and pedestrian railings of spans 19, 20 and 21 of the westbound bridge were replaced in 2015. Westbound traffic was limited to one lane during the phased construction work.

Table 2-28
Overall NBI Condition Ratings

Element	Bridge No. 170022	Bridge No. 170951
Deck	Fair – 5	Satisfactory – 6
Superstructure	Satisfactory – 6	Good – 7
Substructure	Satisfactory – 6	Satisfactory – 6

(1) “Fair” denotes that structural elements show minor cracks and signs of deterioration.

(2) “Satisfactory” denotes that structural elements show some minor deterioration.

(3) “Good” denotes that structural elements show some minor problems.

Concrete Element Condition: As a part of the continuous exposure to the salt-water environment, the concrete of both the superstructure and substructure on both bridges is likely contaminated with chlorides, creating a condition conducive to continuing corrosion of the reinforcing steel.

The concrete pile bent caps, concrete beams and associated diaphragms for both bridges exhibit corrosion of the reinforcing at locations throughout the bridge including delaminated areas, cracks, spalls and failed patches. The cathodic pile jackets also show signs of corrosion and deterioration. The deterioration of the concrete is expected to accelerate as the reinforcing steel continues to corrode and the chloride levels continue to increase. Although no concrete sampling and testing was performed under this study, the visual condition of the concrete confirms that the reinforcement is at an advanced stage of corrosion.

Load Capacity: The original plans show a design live loading of H-15-44 which represents a two-axle single unit truck weighing 30,000 pounds with 6,000 pounds on the steering axle and 24,000 pounds on its driving axle. The load ratings, performed in 1991 and 1992, indicate operating rating factors greater than one for all Florida legal loads. Neither bridge requires posting.

Both bridges will be evaluated for widening or retrofitting, described in Section 5.3, along with the advantages/disadvantages of this alternative.

Scour: The bridges are no longer considered scour critical. Rock rubble riprap has been installed

around pile bents 4 through 6 on Bridge No. 170951 and around pile bents 3 through 9 and 17 through 19 on Bridge No. 170022.

2.3.3 Ship Impact Data

Not applicable.

2.3.4 Historical Significance

Not applicable.

2.3.5 Bridge Geotechnical Information

During the PD&E Study, two SPT soil borings, including rock coring, with a termination depth of 100 feet each were completed at the approximate locations of the proposed new end bents. The soil profiles in the two borings were as expected from the USDA-NRCS soils map and are in general agreement with four SPT borings completed in 1952 as part of the original design.

2.3.6 Channel Data

Bridges 170951 and 170022 span the Coon Key Waterway, a channel connecting two portions of Sarasota Bay. The channel under the bridge is approximately 1,000 feet wide and has a maximum depth of approximately 25 feet. The channel is considered navigable but does not have a defined channel. Existing vertical clearance to the low member is approximately 10 feet.

2.3.7 Normal High Water and Mean High Water

Mean High Water (MHW) is shown as +0.15 feet NAVD88 and Mean Low Water (MLW) is shown as -1.10 feet NAVD88.

2.3.8 Bridge Security Issues

Not applicable.

2.4 Existing Environmental Features

The following sections are a summary of the environmental features within the project limits. Detailed analysis can be found in the supporting documents and the Type 2 Categorical Exclusion.

2.4.1 Cultural Resources

2.4.1.1 Section 106 of the National Historic Preservation Act

A Cultural Resource Assessment Survey (CRAS), conducted in accordance with 36 CFR Part 800, was performed for the project, and the resources listed below were identified within the project Area of Potential Effect (APE).

For this study, the archaeological APE was defined as the footprint of construction within the existing Right-of-Way, while the historical/architectural APE was set based on the single bridge replacement alternative. Based on the proposed bridge height, the historical/architectural APE was defined as a 1,000-ft viewshed from the center of the proposed bridge. Furthermore, because the road improvements along SR 789 will not introduce new roadway features and will remain

within the existing Right-of-Way, the APE to the east and west of the bridge replacement is defined as the footprint of construction within the existing right-of-way.

Archaeological background research, which included a review of the Florida Master Site File (FMSF), and the NRHP, indicated that no archaeological sites were recorded within the archaeological APE, but one site is recorded within one mile. Although the Efficient Transportation Decision Making (ETDM) report (#14384) evaluated the project as having a moderate archaeological probability, due to the extensive development of SR 789, including roadway construction, drainage structures, and buried utilities, the probability was downgraded to low archaeological potential for the discovery of prehistoric or historic archaeological sites. If sites were found, it was anticipated that they would be remnants of prehistoric shell middens or artifact scatters. As a result of field survey, no prehistoric or historic archaeological sites were identified within the APE.

In addition, the FMSF, historic maps, aerials, and other documents do not record the location of shipwrecks or other historic maritime resources that would be of concern. Based on the historic coastline and known aboriginal settlement patterns in the area, there is no expectation of submerged aboriginal sites. These, along with the planned scope and impacts, it was determined that maritime archaeology did not appear necessary.

The historical/architectural field survey resulted in the identification of eight historic resources (8SO06906, 8SO06907, 8SO12048, 8SO12111, 8SO12112, 8SO12125, 8SO14518, and 8SO14519) within the APE. This includes two newly identified historic buildings (8SO14518 and 8SO14519) and six previously recorded historic resources (two bridges (8SO06906 and 8SO06907) and four buildings 8SO12048, 8SO12111, 8SO12112, and 8SO12125). Of these, six historic resources (8SO12048, 8SO12111, 8SO12112, 8SO12125, 8SO14518, and 8SO14519) were recorded/updated and evaluated within the APE.

These include two Mid-Century Modern style buildings (8SO12048 and 8SO14518), one Ranch style building (8SO12111), one Frame Vernacular style building (8SO12112), and two Masonry Vernacular style building (8SO12125 and 8SO14519) built between circa (ca.) 1961 and ca. 1973. The two previously recorded bridges (8SO06906 and 8SO06907) were not updated because they were evaluated by the SHPO as ineligible for listing in the NRHP and no significant changes were observed during the field survey. Furthermore, the bridges are excluded from Section 106 consideration by the Program Comment for Common Post-1945 Concrete and Steel Bridges (Federal Register 2012:68793).

2.4.1.2 Section 4(f) pursuant to USDOT Act of 1966, as amended

Four Section 4(f) resources were identified within the project limits and are described below.

2.4.1.2.1 Sarasota Bay Blueway Paddling Trail

The Sarasota Bay Paddling Trail is located in the northwestern portion of Sarasota County and extends approximately 12 miles in length from the Sarasota/Manatee County Line to downtown Sarasota. This trail is designated as part of Sarasota County's Blueway Paddling Trails Program. The Sarasota Bay Paddling Trail is an unimproved, open water facility lacking amenities. It is

available for various public recreation activities such as kayak/canoeing, fishing, wildlife viewing and sight- seeing.

The underlying portions of Sarasota Bay are owned by the State of Florida's Trustees of the Internal Improvements Trust Fund (TIITF) and overseen by the FDEP's Division of State Lands, except for a portion along the north side of Bird Key which is owned by the City of Sarasota as part of Bird Key Park. Within the project limits, the Sarasota Bay Paddling Trail is accessed by shallow-water kayak/canoe ramps within Bird Key Park. Within Sarasota Bay, access to this trail is provided by a total of 4 launch points, 2 landing points and 2 boat ramps. The trail provides connections to 12 different park/public recreation facilities. Use of this facility is generally 24 hours/day, 7 days/week.

2.4.1.2.2 Bird Key Park (City-owned portion)

Bird Key Park is a City of Sarasota property on the north side of SR 789 on Bird Key, approximately 1.2 miles due southwest of downtown Sarasota. This property consists of two portions. The first portion is a 19.71-acre portion owned by the City, discussed here. The second portion is a 1.594-acre portion of FDOT right of way for which the FDOT and City have completed a 25-year lease agreement. The FDOT-owned portion is addressed in the following section. Landward portions of the park have been developed with various recreational amenities including parking and drive aisles, landscaping and irrigation improvements, signage, hardscape improvements, benches, waste receptacles and light pole fixtures. The park is open (i.e., public use allowed) from 5 AM to 11 PM daily.

2.4.1.2.3 Bird Key Park – (FDOT-owned portion)

This section discusses the 1.594-acre portion of Bird Key Park located within FDOT's SR 789 roadway right-of-way for which the FDOT and City have completed a 25-year lease agreement. For the lease agreement portion, the easement is scheduled to run through April 1, 2035 (subject to lease cancellation or extension) The amenities and public availability are the same as those described previously for the city-owned portion.

2.4.1.2.4 Longboat Key SUN Trail Segment

The Florida Shared-Use Nonmotorized (SUN) Trail Program was created pursuant to Section 339.81, Florida Statutes (F.S.) in 2015 in coordination with the FDEP to establish a statewide system of interconnected multi-use trails for bicyclists and pedestrians. Today, the SUN Trail network includes a combination of existing, planned, and conceptual multiple-use trails that increase the reliability of Florida's transportation system.

The general segment of the SUN Trail network within the subject project limits is the Longboat Key Trail segment extending from North Washington Drive on St. Armands Key to Sunset Drive in Sarasota. Specific to the project limits, there are three sub-segments of the Longboat Key Trail. Below is a summary of the sub- segments and funding status:

- Sub-segment 1 – Existing, beginning at North Washington Drive (0.65-mile overall length, 0.35-mile within project limits. Previously constructed by the City of Sarasota under FPID# 438255-2-58-01 via Local Agency Program/LAP agreement with

FDOT).

- Sub-segment 2 - Programmed / Funded (0.2-mile, bridge crossing within project limits)
- Sub-segment 3 - Existing (1.2-mile overall length; 0.22-mile known as the Coon Key Multi-Use Recreational Trail within the FDOT Right of Way portion of Bird Key Park within and adjacent to the project limits).

While the Longboat Key Trail SUN Trail segment exists throughout most of the project, Sub-segment 2 does not currently exist on either of the bridges over the Coon Key Waterway being traversed by this project.

2.4.1.3 Section 6(f) of the Land and Water Conservation Fund Act of 1965

The FDOT has previously granted a 25-year Public Use Easement to the City of Sarasota which allowed improvements to the City's Bird Key Park/Phase Coon Key MURT facility (i.e., portion of the Longboat Key Trail segment of the SUN Trail network) within the FDOT's existing SR 789 right-of-way. The City used federal Land and Water Conservation Fund (LWCF) funds for the construction of at least a portion of the Bird Key MURT within the FDOT's right-of-way. The total Public Use Easement acreage is 1.59 acres.

2.4.2 Natural Resources

2.4.2.1 Protected Species and Habitat

A Natural Resource Evaluation (NRE) (November 2023) was prepared to document and summarize the potential impacts to natural resources including federal and state protected species. The NRE also documented commitments and implementation measures considered to avoid, minimize, and mitigate potential impacts. The evaluation included coordination with USFWS, NMFS, US Environmental Protection Agency (USEPA), US Army Corps of Engineers (USACE), FWC, Florida Department of Agriculture and Consumer Services (FDACS) and Southwest Florida Water Management District (SWFWMD).

Following literature and agency database searches, environmental scientists familiar with Florida natural communities conducted field reviews within the project corridor in January 2020 and aquatic surveys in July 2020.

Based on this evaluation, a total of twenty federally listed, two listing candidate, one otherwise federally-protected species and an additional thirteen state-protected (12 listed) were identified as potentially occurring within the project study area. **Table 2-29** identifies the species of federal concern that were evaluated, their listing status, and their potential occurrence within the study area.

SECTION 2 – EXISTING CONDITIONS

**Table 2-29
Potential for Occurrence of Federal and State Protected Species**

Species	Listing Status*	Potential for Occurrence
Plants		
Aboriginal Prickly-Apple (<i>Harrisia aboriginum</i>)	USFWS/FDACS – Endangered	None
Florida Bonamia (<i>Bonamia grandiflora</i>)	USFWS/FDACS – Endangered	None
Florida Golden Aster (<i>Chrysopsis floridana</i>)	USFWS/FDACS – Endangered	None
Pygmy Fringe Tree (<i>Chionanthus pygmaeus</i>)	USFWS/FDACS – Endangered	None
Sanibel lovegrass (<i>Eragrostis pectinacea</i> var. <i>tracyi</i>)	FDACS – Endangered	None
Invertebrates		
Monarch Butterfly (<i>Danaus plexippus</i>)	USFWS – Candidate	High
Fish		
Gulf Sturgeon (<i>Acipenser oxyrinchus desotoi</i>)	NMFS/USFWS – Threatened	Low
Smalltooth Sawfish (<i>Pristis pectinata</i>)	NMFS – Endangered	Low
Giant Manta Ray (<i>Manta birostris</i>)	NMFS – Threatened	Low
Reptiles		
Eastern Indigo Snake (<i>Drymarchon corais couperi</i>)	USFWS – Threatened	None
Green Sea Turtle (<i>Chelonia mydas</i>)	USFWS – Endangered	High
Hawksbill Sea Turtle (<i>Eretmochelys imbricata</i>)	USFWS – Endangered	Low
Kemp’s Ridley Sea Turtle (<i>Lepidochelys kempii</i>)	USFWS – Endangered	High
Leatherback Sea Turtle (<i>Dermochelys coriacea</i>)	USFWS – Endangered	Low
Loggerhead Sea Turtle (<i>Caretta caretta</i>)	USFWS – Threatened	High
Gopher Tortoise (<i>Gopher polyphemus</i>)	FWC – Threatened	None
Birds		
Eastern Black Rail (<i>Laterallus jamaicensis jamaicensis</i>)	USFWS – Threatened	None
Florida Scrub-Jay (<i>Aphelocoma coerulescens</i>)	USFWS – Threatened	None
Piping Plover (<i>Charadrius melodus</i>)	USFWS – Threatened	Low
Red Knot (<i>Calidris canutus rufa</i>)	USFWS – Threatened	Low
Wood Stork (<i>Mycteria americana</i>)	USFWS – Threatened	Low
American Oystercatcher (<i>Haematopus palliatus</i>)	FWC – Threatened	Low
Black Skimmer (<i>Rynchops niger</i>)	FWC – Threatened	Low
Florida Burrowing Owl (<i>Athene cunicularia</i>)	FWC – Threatened	None
Florida Sandhill Crane (<i>Antigone canadensis pratensis</i>)	FWC – Threatened	Low
Least Tern (<i>Sternula antillarum</i>)	FWC – Threatened	High
Little Blue Heron (<i>Egretta caerulea</i>)	FWC – Threatened	Moderate
Reddish Egret (<i>Egretta rufescens</i>)	FWC – Threatened	Low
Roseate Spoonbill (<i>Platalea ajaja</i>)	FWC – Threatened	Moderate
Snowy Plover (<i>Charadrius nivosus</i>)	FWC – Threatened	Low
Tricolored Heron (<i>Egretta tricolor</i>)	FWC – Threatened	Moderate
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	N/A ¹	Moderate
Mammals		
Florida Bonneted Bat (<i>Eumops floridanus</i>)	USFWS – Endangered	Low
Tricolored Bat (<i>Perimyotis subflavus</i>)	USFWS – Candidate	Low
West Indian Manatee (<i>Trichechus manatus latirostris</i>)	USFWS - Threatened	High (observed)
Miscellaneous bat species	FWC – NL ²	Moderate

*FWC listing status was not included for species with the same federal listing status because of the State’s deferment to federal status under Chapter 68A-27, F.A.C.

(1) Protected under the federal Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act

(2) Protected under the Florida Administrative Code (F.A.C.) rule 68A-4.001 General Prohibitions and rule 68A-9.010 Taking Nuisance Wildlife

2.4.2.2 Wetlands and Other Surface Waters

As documented within the November 2023 NRE for this project, the boundaries of all wetlands and other surface waters within the study area were approximated using both desktop and field reviews. No jurisdictional delineations/determinations were conducted. The existing conditions of all surface waters (including wetlands) within the study area were assessed using Geographic Information System (GIS) data resources and field verification. Twenty-two systems occur within the study area. These systems all occur within the Sarasota Bay watershed and are presumed to be both state and federally jurisdictional. These systems are further described in **Table 2-30**, which includes the total acreage within the study area, the Florida Land Use, Cover and Forms Classification System (FLUCFCS) Code and description, and the National Wetlands Inventory (NWI) classification of each.

2.4.2.3 Essential Fish Habitat

Essential Fish Habitat (EFH) was identified within the study area for penaeid shrimp, red drum, schoolmaster and mutton snapper; gag, goliath, red, black, and yellowfin grouper; as well as lane, dog, yellowtail, and cubera snapper. Within the study area, EFH occurs within the Coon Key Waterway (i.e., part of Sarasota Bay), and consists of seagrasses; estuarine water column, and mud, sand, shell, rock substrates, and estuarine shrub/scrub (mangroves). No Habitat Areas of Particular Concern (HAPCs) were identified within or adjacent to the project study area.

2.4.2.4 Outstanding Florida Waters

The Coon Key Waterway is part of the Sarasota Bay Estuarine System, designated as an OFW under 62.302.700 F.A.C.

2.4.2.5 Coastal Barrier Resources

The project limits are outside (east) of the limits of Coastal Barrier Resource System (CRBS) Unit FL-72P (Lido Key). This unit is designated as an "otherwise protected area". The Coon Key Bridge is approximately 0.36 mile away from (northeast of) this unit.

SECTION 2 – EXISTING CONDITIONS

**Table 2-30
Wetlands and Other Surface Waters in the Study Area**

Number	FLUCFCS Classification	FLUCFCS Description	NWI Classification	NWI Description	Acres
<i>Other Surface Waters</i>					
O-1	654	Oyster Bars	E2RF2	Estuarine Intertidal Reef Mollusk	0.01
O-2	654	Oyster Bars	E2RF2	Estuarine Intertidal Reef Mollusk	0.01
O-3	654	Oyster Bars	E2RF2	Estuarine Intertidal Reef Mollusk	0.01
O-4	654	Oyster Bars	E2RF2	Estuarine Intertidal Reef Mollusk	0.02
O-5	654	Oyster Bars	E2RF2	Estuarine Intertidal Reef Mollusk	0.01
SB-1	540	Bays and Estuaries	E2US2	Estuarine Intertidal Unconsolidated Shore Sand	22.11
SG-1	911	Seagrass	E2AB3	Estuarine Intertidal Aquatic Bed Rooted Vascular	2.71
SG-2	911	Seagrass	E2AB3	Estuarine Intertidal Aquatic Bed Rooted Vascular	0.004
SG-3	911	Seagrass	E2AB3	Estuarine Intertidal Aquatic Bed Rooted Vascular	0.04
SG-4	911	Seagrass	E2AB3	Estuarine Intertidal Aquatic Bed Rooted Vascular	0.01
SG-5	911	Seagrass	E2AB3	Estuarine Intertidal Aquatic Bed Rooted Vascular	0.05
SG-6	911	Seagrass	E2AB3	Estuarine Intertidal Aquatic Bed Rooted Vascular	0.13
SG-7	911	Seagrass	E2AB3	Estuarine Intertidal Aquatic Bed Rooted Vascular	0.82
SG-8	911	Seagrass	E2AB3	Estuarine Intertidal Aquatic Bed Rooted Vascular	0.38
SG-9	911	Seagrass	E2AB3	Estuarine Intertidal Aquatic Bed Rooted Vascular	0.25
Other Surface Waters Total					26.56
<i>Wetlands</i>					
WL-1	612	Mangrove Swamps	E2FO3	Estuarine Intertidal Forested Broad-Leaved Evergreen	0.003
WL-2	612	Mangrove Swamps	E2FO3	Estuarine Intertidal Forested Broad-Leaved Evergreen	0.003
WL-3	612	Mangrove Swamps	E2FO3	Estuarine Intertidal Forested Broad-Leaved Evergreen	0.0001
WL-4	612	Mangrove Swamps	E2FO3	Estuarine Intertidal Forested Broad-Leaved Evergreen	0.01
WL-5	612	Mangrove Swamps	E2FO3	Estuarine Intertidal Forested Broad-Leaved Evergreen	0.03
WL-6	612	Mangrove Swamps	E2FO3	Estuarine Intertidal Forested Broad-Leaved Evergreen	0.02
Wetlands Total					0.07
Wetlands and Other Surface Waters Total					26.63

2.4.3 Physical Resources

2.4.3.1 Highway Traffic Noise

A *Noise Study Report* (NSR) was prepared in August 2023 using methodology established by the FDOT in the *PD&E Manual*.

This project was evaluated for highway traffic noise impacts based on the relationship between existing and predicted noise levels and the noise abatement criteria (NAC) dictated by land use in the project area. The study area was divided into 10 distinct noise sensitive common noise environments (CNEs). CNEs are a group of receptors within the same NAC that are exposed to similar noise sources and levels, traffic volumes, traffic mix, speed and topographic features. For this study, traffic noise data was collected at two field measurement sites and noise levels were modelled using the existing (2021) and design year (2045) no-build and build conditions for 162 receptor locations within these 10 CNEs. For the design year, this project was analyzed based on Demand and Level of Service (LOS) C traffic volumes, where appropriate. Of the 10 project CNEs, 2 CNEs are predicted to have noise impacts.

- CNE 02 is the Dog Park at the north-west corner of the Garden Building at the Continuing Care Retirement Community (CCRC) of Plymouth Harbor on Sarasota Bay.
- CNE 06 is Bird Key Park.

Neither location was recommended for further consideration.

2.4.3.2 Contamination

A Level I contamination evaluation was conducted, and a *Contamination Screening Evaluation Report* (CSER) (May 2023) was prepared under separate cover pursuant to FHWA's Technical Advisory T 6640.8A and the FDOT *PD&E Manual*. The Level I assessment was conducted to identify and evaluate sites containing hazardous materials, petroleum products, or other sources of potential environmental contamination along the SR 789 project corridor. The CSER included standard environmental site assessment practices of reviewing records of regulatory agencies, site reconnaissance, literature review, and personal interviews of individuals and business owners within the limits of the project.

Based on a document and site review, a total of 7 sites were identified for potential contamination involvement within the study area, summarized in **Table 2-31**.

SECTION 2 – EXISTING CONDITIONS

**Table 2-31
Level 1 CSER Matrix**

Risk	Number of Sites	Site Identification & Description	Source to RIGHT-OF-WAY Distance
No	4	1. Bird Key Municipal Park	Adjacent
		2. Sidewalk refurbishment & staging area	Within
		3. Sarasota Harbour East & West (Townhomes)	Adjacent
		4. Harris Residence, 243 Robin Drive	> 1,000 ft
Low	2	5. Sarasota Yacht Club (SYC), 1100 John Ringling Blvd	300 ft
		6. Plymouth Harbor, 20-story condominium at 700 John Ringling Blvd	350 ft
Medium	1	7. SR 789 Ringling Bridge (Structures 170022 and 170951)	Within
High	0	No Properties / Structures Identified	N/A

3.0 FUTURE CONDITIONS

3.1 Future Conditions Considerations

3.1.1 Future Land Use

The City of Sarasota Comprehensive Plans' 2030 Future Land Use Map shows comparable land uses along the project including: Single-Family (Very Low Density) residential, Multiple-Family (Medium Density) residential, Metropolitan (i.e., the Plymouth Harbor Retirement Community), Community Office/Institutional and Open Space-Recreation-Conservation (park) land uses.

The proposed improvements associated with the Preferred Alternative will occur within the FDOT's existing SR 789 roadway right-of-way and within the existing FDEP Sovereign Submerged Land easement for SR 789 within the Coon Key Waterway. No right-of-way acquisition and no residential or business relocations are necessary for the Preferred Alternative. Therefore, the proposed project will continue to support the existing and future land uses within the project and surrounding areas. Significant land use changes are not anticipated to occur along the project corridor if the proposed project is implemented.

This project is consistent with the Transportation Element and Future Land Use Element of the *City of Sarasota's Comprehensive Plan* (as updated February 2021), and the *Sarasota County Comprehensive Plan* [Element 4: Mobility - Chapter 10 - Transportation] Table 10-5. 2040 Future Thoroughfare Plan Roads [pg. V 1-437] (as adopted October 25, 2016). This project is included in the Sarasota/Manatee MPO's *2045 LRTP Cost Feasible Plan*, the Sarasota/Manatee MPO's FY 2023/24 - FY 2027/28 TIP and FDOT's current 2024-2027 STIP.

3.1.2 Context Classification

The FDOT *Context Classification* guidelines determined that the context classification approved on November 12, 2020, C3R, will remain for the proposed improvements, shown in **Appendix B**.

3.1.3 Future Traffic Analysis

As described in the *Future Volumes Technical Memorandum*, opening and design year PSADTs and turning movement volumes were developed using outputs from a calibrated and validated sub-area model of the Florida Standard Urban Transportation Model Structure (FSUTMS) compliant FDOT District 1 District-wide Cost Feasible 2040 Regional Planning Model (version 1.0.6).

Because the project alternatives for this study focus on bridge design and multi-modal accommodations, the roadway network was unchanged across alternatives. Therefore, the No-Build and Build alternatives will have the same future traffic volumes developed from one model network.

The opening year turning movements were interpolated from the existing and design year turning movements. Manual adjustments were made to balance volumes to adjacent segments. Approach PSADTs were calculated from the approach volumes of the balanced turning movements for both AM and PM periods. These calculations are detailed in the *Future Volumes Technical Memorandum*.

The opening year and design year volumes listed in **Table 3-1** and shown on **Figure 3-1** and **Figure 3-2** were approved by FDOT with the acceptance of the *Future Volumes Technical*

SECTION 3 – FUTURE CONDITIONS

Memorandum in July of 2022.

Table 3-1
Balanced PSADTs for Existing, Opening and Design Year

Location	Balanced PSADTs		
	Existing	No-Build / Build	
	2021	2025	2045
SR 789 west of Sarasota Harbour West	38,500	39,300	43,000
SR 789 west of Sarasota Harbour / Plymouth Harbor	38,500	39,300	43,000
SR 789 west of Sarasota Harbour East	38,600	39,400	43,100
SR 789 west of Bird Key Dr	38,900	39,700	43,400
SR 789 east of Bird Key Dr	39,300	40,100	43,800
Sarasota Harbour West Entrance north of SR 789	100	100	100
Sarasota Harbour / Plymouth Harbor north of SR 789	100	100	100
Sarasota Harbour / Plymouth Harbor south of SR 789	200	200	200
Sarasota Harbour East north of SR 789	100	100	100
Sarasota Yacht Club south of SR 789	400	400	400
Bird Key Dr north of SR 789	600	600	700
Bird Key Dr south of SR 789	1,900	1,900	2,100

Figure 3-1
Opening Year Peak Season Design Hour Volumes (2025)

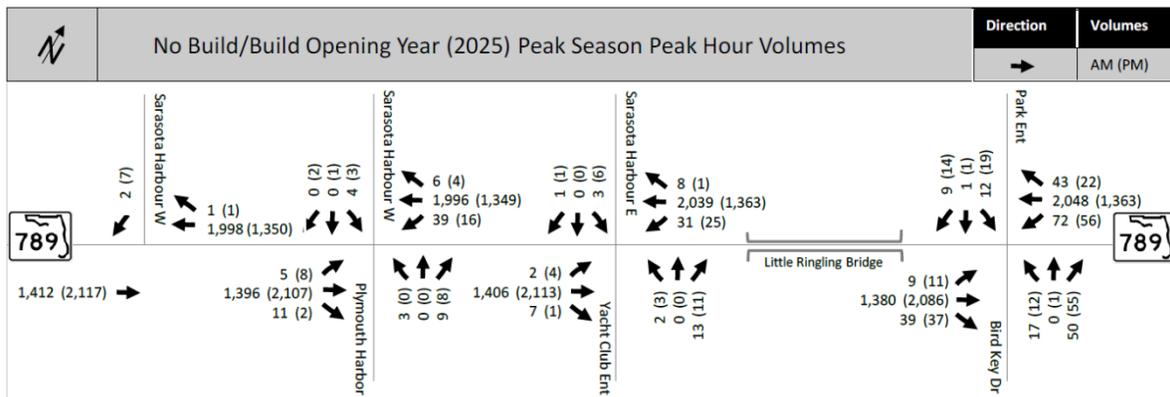
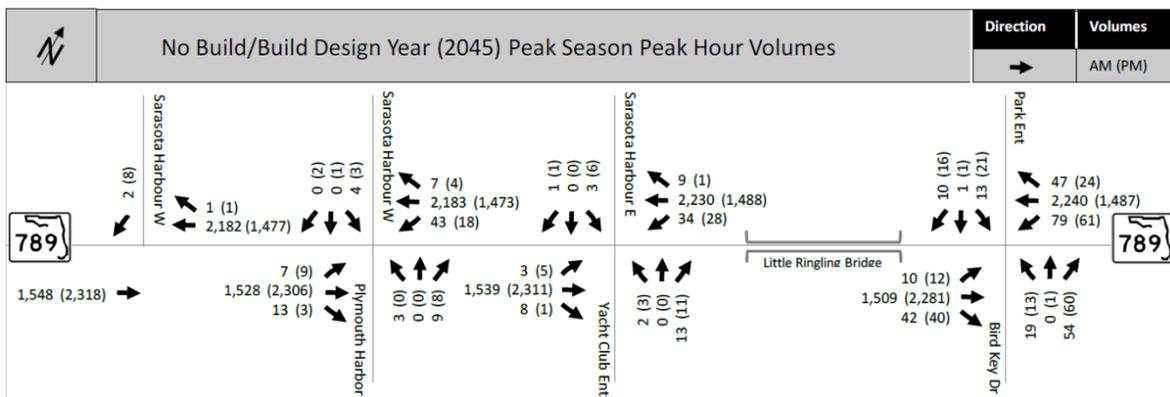


Figure 3-2
Design Year Peak Season Design Hour Volumes (2045)



3.1.4 No-Build (No -Action) Operational Analysis

For Opening Year (2025) and Design Year (2045), Synchro HCM 6th Edition Arterial Analysis reports show that SR 789 segments are operating at LOS B or better on both approaches to Bird Key Drive. The results are shown in **Table 3-2** and **Table 3-3**.

Table 3-2
2025 Opening Year No-Build Segment Analysis Results

No-Build 2025 Arterial Analysis Results for SR 789									
Direction	Cross Street	No-Build 2025 AM				No-Build 2025 PM			
		Signal Delay (s/veh)	Travel Time (s)	Arterial Speed (mph)	Arterial LOS	Signal Delay (s/veh)	Travel Time (s)	Arterial Speed (mph)	Arterial LOS
Eastbound	Bird Key Drive	8.7	102.8	32	A	13.8	107.9	31	A
Westbound	Bird Key Drive	7.2	47.0	25	B	3.4	43.2	28	B

Table 3-3
2045 Design Year No-Build Segment Analysis Results

No-Build 2045 Arterial Analysis Results for SR 789									
Direction	Cross Street	No-Build 2045 AM				No-Build 2045 PM			
		Signal Delay (s/veh)	Travel Time (s)	Arterial Speed (mph)	Arterial LOS	Signal Delay (s/veh)	Travel Time (s)	Arterial Speed (mph)	Arterial LOS
Eastbound	Bird Key Drive	10.6	104.7	32	A	17.9	112.0	29	B
Westbound	Bird Key Drive	9.5	49.3	24	B	3.7	43.5	27	B

For Opening and Design Years, intersection analysis results show that most movements have LOS D or better. The exceptions are the left turn movement from side streets onto SR 789 at the stop-controlled intersections. This was also the case in the Existing Year. Delays are longer than Existing Year, but LOS worsened only for the eastbound movements at Bird Key Drive with eastbound left movement receiving a LOS E in the AM and eastbound through movement receiving a LOS F in the PM. Results are shown in **Table 3-4** and **Table 3-5**.

The pedestrian and bicycle analyses were conducted using Synchro's HCM 6th Edition reports for pedestrians and bicycles at signalized intersections. Pedestrian counts were not changed in the Synchro network from the existing condition volumes. Results are shown in **Table 3-6** and indicate that the 2025 No-Build Ped/Bike LOS is similar to the Existing Ped/Bike LOS. A slight reduction in LOS for the 2045 No-Build condition can be observed for westbound AM bicycles resulting in LOS E.

SECTION 3 – FUTURE CONDITIONS

**Table 3-4
2025 No-Build Alternative Intersection Analysis Results**

Location	Direction	Movement	No Build 2025 AM				No Build 2025 PM			
			Average Delay (s/v)	V/C Ratio	LOS	Queue Length 95 th %tile (ft)	Average Delay (s/v)	V/C Ratio	LOS	Queue Length 95 th %tile (ft)
SR 789 & Sarasota Harbour West (unsignalized)	SB	R	21.5	0.01	C	-	14.9	0.02	B	-
SR 789 & Plymouth Harbor/ Sarasota Harbour West (unsignalized)	EB	L	21.3	0.02	C	17	13.8	0.02	B	17
		T								
		TR								
	WB	L	14.7	0.10	B	6	23.6	0.08	C	76
		T								
		TR								
	NB	LT	16.5	0.03	C	7	25.7	0.05	D	44
		R				75				2
SB	LT	1213.0	0.84	F	45	978.3	0.70	F	29	
	R	0.0	-	A	-	16.2	0.01	C	-	
SR 789 & Yacht Club / Sarasota Harbour East (unsignalized)	EB	L	22.1	0.01	C	10	13.9	0.01	B	15
		T								
		TR								
	WB	L	14.7	0.08	B	5	25.0	0.13	D	4
		T								
		TR				7				59
	NB	LTR	90.8	0.28	F	49	475.8	0.87	F	11
	SB	LT	1102.0	0.63	F		810.3	0.79	F	
R		25.0	0.01	D	4	16.5	0.00	C	3	
SR 789 & Bird Key Drive (signalized)	EB	L	64.9	0.14	E	53	22.9	0.06	C	58
		T	25.1	0.76	C	443	61.2	1.04	F	1545
		R	13.8	0.05	B	175	12.1	0.05	B	145
	WB	L	21.7	0.39	C	277	44.6	0.58	D	115
		T	42.7	0.97	D	1663	14.3	0.60	B	341
		TR	44.4	0.98	D	1631	14.2	0.60	B	335
	NB	LT	35.4	0.05	D	46	44.6	0.04	D	60
		R	35.9	0.14	D	56	45.6	0.18	D	70
	SB	L	36.3	0.04	D	36	46.1	0.06	D	47
TR		34.7	0.03	C	30	44.0	0.05	D	42	
Overall			35.8	-	D		42.2	-	D	

SECTION 3 – FUTURE CONDITIONS

**Table 3-5
2045 No-Build Alternative Intersection Analysis Results**

Location	Direction	Movement	No Build 2045 AM				No Build 2045 PM			
			Average Delay (s/v)	V/C Ratio	LOS	Queue Length 95 th %tile (ft)	Average Delay (s/v)	V/C Ratio	LOS	Queue Length 95 th %tile (ft)
SR 789 & Sarasota Harbour West (unsignalized)	SB	R	24.3	0.01	C	-	16.0	0.03	C	-
SR 789 & Plymouth Harbor/ Sarasota Harbour West (unsignalized)	EB	L	24.9	0.04	C	21	14.9	0.03	B	60
		T								
		TR								
	WB	L	16.4	0.13	C	23	28.4	0.11	D	542
		T								
		TR								
	NB	LT	17.8	0.03	C	79	29.6	0.05	D	545
		R				37				135
SB	LT	2171.1	1.40	F	6	1569.9	1.05	F	253	
	R	0.0	-	A	-	17.4	0.01	C	-	
SR 789 & Yacht Club / Sarasota Harbour East (unsignalized)	EB	L	25.7	0.02	D	12	15.0	0.01	C	48
		T								
		TR								
	WB	L	16.3	0.10	C	1	30.7	0.17	D	663
		T								
		TR				55				672
	NB	LTR	144.6	0.40	F	229	1109.9	1.64	F	84
	SB	LT	3073.6	1.58	F		1426.7	1.26	F	
R		28.5	0.01	D	230	17.7	0.00	C	44	
SR 789 & Bird Key Drive (signalized)	EB	L	79.2	0.22	E	51	26.4	0.07	C	57
		T	23.6	0.75	C	495	99.1	1.14	F	3155
		R	12.2	0.05	B	170	12.2	0.05	B	173
	WB	L	23.5	0.44	C	292	47.7	0.62	D	147
		T	46.4	0.99	D	1975	15.6	0.65	B	367
		TR	48.5	1.00	D	1953	15.6	0.66	B	369
	NB	LT	45.1	0.06	D	63	44.8	0.04	D	74
		R	45.7	0.18	D	66	45.8	0.19	D	78
	SB	L	46.4	0.05	D	44	46.4	0.07	D	49
TR		44.0	0.04	D	33	44.1	0.05	D	48	
Overall			37.7	-	D		64.3	-	E	

**Table 3-6
2025 and 2045 No-Build Pedestrian and Bicycle Analysis Results**

2025 No-Build Ped/Bike Results for SR 789 at Bird Key Drive (signalized)								
Category	AM				PM			
	EB	WB	NB	SB	EB	WB	NB	SB
Pedestrian Delay (s/p)	65.0	65.0	65.0	65.0	75.0	75.0	75.0	75.0
Pedestrian Compliance Code	Poor							
Pedestrian Walk Score	3.2	3.2	2.0	2.2	3.2	3.2	2.0	2.2
Pedestrian LOS	C	C	B	B	C	C	B	B
Bicycle Delay (s/p)	10.8	7.2	57.7	57.7	10.3	7.2	67.2	67.2
Bicycle Compliance Code	Fair	Good	Poor	Poor	Fair	Good	Poor	Poor
Bicycle LOS Score	3.6	4.4	2.7	2.8	4.3	3.8	2.7	2.8
Bicycle LOS	D	D	C	C	D	D	C	C

2045 No-Build Ped/Bike Results for SR 789 at Bird Key Drive (signalized)								
Category	AM				PM			
	EB	WB	NB	SB	EB	WB	NB	SB
Pedestrian Delay (s/p)	75.0	75.0	75.0	75.0	58.5	58.5	58.5	58.5
Pedestrian Compliance Code	Poor							
Pedestrian Walk Score	3.3	3.3	2.0	2.2	3.2	3.2	2.0	2.2
Pedestrian LOS	C	C	B	B	C	C	B	B
Bicycle Delay (s/p)	13.0	7.9	67.4	67.4	14.5	9.6	51.1	51.1
Bicycle Compliance Code	Fair	Good	Poor	Poor	Fair	Good	Poor	Poor
Bicycle LOS Score	3.8	4.6	2.7	2.8	4.2	3.8	2.7	2.8
Bicycle LOS	D	E	C	C	D	D	C	C

3.1.5 Build Operational Analysis

For the Build alternative analysis, the existing Synchro simulation was updated with No-Build opening and design hour volumes from the *Future Volumes Technical Memorandum*. Right turn lanes were added and signals were optimized for the updated volumes.

For Opening Year (2025) and Design Year (2045) Synchro HCM 6th Arterial Analysis reports show that SR 789 segments are operating at LOS B or better on both approaches to Bird Key Drive. The results are shown in **Table 3-7** and **Table 3-8**.

**Table 3-7
2025 Opening Year Build Segment Analysis Results**

Build 2025 Arterial Analysis Results for SR 789									
Direction	Cross Street	Build 2025 AM				Build 2025 PM			
		Signal Delay (s/veh)	Travel Time (s)	Arterial Speed (mph)	Arterial LOS	Signal Delay (s/veh)	Travel Time (s)	Arterial Speed (mph)	Arterial LOS
Eastbound	Bird Key Drive	8.0	102.3	32	A	13.8	108.1	31	A
Westbound	Bird Key Drive	6.2	46.0	26	B	3.4	43.2	28	B

**Table 3-8
2045 Design Year Build Segment Analysis Results**

Build 2045 Arterial Analysis Results for SR 789									
Direction	Cross Street	Build 2045 AM				Build 2045 PM			
		Signal Delay (s/veh)	Travel Time (s)	Arterial Speed (mph)	Arterial LOS	Signal Delay (s/veh)	Travel Time (s)	Arterial Speed (mph)	Arterial LOS
Eastbound	Bird Key Drive	9.7	104.0	32	A	17.9	112.2	29	B
Westbound	Bird Key Drive	8.1	47.9	25	B	3.7	43.5	27	B

For Opening and Design Years, intersection analysis results for the Build Alternative are very similar to the No-Build Alternative. All movements receive LOS D or better except for the left turn movements from side streets to SR 789 at stop-controlled intersections and the eastbound movements at Bird Key Drive which received LOS E and F. This is expected since the lane configurations and volumes did not significantly change between the No-Build and Build Alternatives. Results for the Build Intersection Analysis for the years 2025 and 2045 are shown in **Table 3-9** and **Table 3-10**, respectively.

The pedestrian and bicycle analyses were conducted using Synchro's HCM 6th Edition reports for pedestrians and bicycles at signalized intersections. Pedestrian counts were not changed in the Synchro network from the existing condition volumes. Results are shown in **Table 3-11**. The 2025 Build Ped/Bike LOS is similar to the Existing and No-Build Ped/Bike LOS. A slight reduction in LOS for 2045 Build is shown for westbound AM bicycles resulting in LOS E.

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**Table 3-9
2025 Build Alternative Intersection Analysis Results**

Location	Direction	Movement	2025 Build AM				2025 Build PM			
			Average Delay (s/v)	V/C Ratio	LOS	Queue Length 95 th %tile (ft)	Average Delay (s/v)	V/C Ratio	LOS	Queue Length 95 th %tile (ft)
SR 789 & Sarasota Harbour West (unsignalized)	SB	R	21.5	0.01	C	-	14.9	0.02	B	-
SR 789 & Plymouth Harbor/ Sarasota Harbour West (unsignalized)	EB	L	21.2	0.02	C	16	13.7	0.02	B	19
		T								
		R								
	WB	L	14.6	0.10	B	2	23.6	0.08	C	2
		T								
		R								
	NB	LT	16.4	0.03	C	3	25.6	0.05	D	67
		R				66				30
SB	LT	1213.0	0.84	F	21	978.3	0.70	F	30	
	R	0.0	-	A	-	16.2	0.01	C	-	
SR 789 & Yacht Club / Sarasota Harbour East (unsignalized)	EB	L	21.9	0.01	C	12	13.9	0.01	B	15
		T								
		R								
	WB	L	14.7	0.08	B	2	25.0	0.13	D	1
		T								
		R				49				4
	NB	LTR	90.8	0.28	F	256	475.8	0.87	F	60
	SB	LT	1102.0	0.63	F		810.3	0.79	F	
R		24.9	0.01	C	55	16.5	0.00	C	122	
SR 789 & Bird Key Drive (signalized)	EB	L	57.4	0.12	E	67	29.8	0.07	C	86
		T	21.6	0.69	C	405	61.2	1.04	F	1524
		R	12.2	0.05	B	172	12.1	0.05	B	211
	WB	L	19.1	0.35	B	285	76.6	0.58	E	150
		T	30.3	0.91	C	1807	14.3	0.60	B	332
		TR	31.0	0.91	C	1767	14.2	0.60	B	333
	NB	LT	44.6	0.05	D	52	44.6	0.04	D	69
		R	45.2	0.16	D	60	45.6	0.18	D	66
	SB	L	45.7	0.04	D	36	46.1	0.06	D	50
TR		43.6	0.03	D	31	44.0	0.05	D	39	
Overall			27.2	-	C		42.7	-	D	

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**Table 3-10
2045 Build Alternative Intersection Analysis Results**

Location	Direction	Movement	2045 Build AM				2045 Build PM			
			Average Delay (s/v)	V/C Ratio	LOS	Queue Length 95 th %tile (ft)	Average Delay (s/v)	V/C Ratio	LOS	Queue Length 95 th %tile (ft)
SR 789 & Sarasota Harbour West (unsignalized)	SB	R	24.3	0.01	C	-	16.0	0.03	C	-
SR 789 & Plymouth Harbor/ Sarasota Harbour West (unsignalized)	EB	L	24.8	0.04	C	16	14.9	0.03	B	100
		T								
		R								
	WB	L	16.2	0.12	C	2	28.2	0.11	D	566
		T								
		R								
	NB	LT	17.7	0.03	C	68	29.6	0.05	D	570
		R				34				68
SB	LT	2171.1	1.40	F	32	1569.9	1.05	F	151	
	R	0.0	-	A	-	17.4	0.01	C	-	
SR 789 & Yacht Club / Sarasota Harbour East (unsignalized)	EB	L	25.6	0.02	D	8	15.0	0.01	C	89
		T								
		R								
	WB	L	16.2	0.10	C	51	30.7	0.17	D	697
		T								
		R				365				701
	NB	LTR	144.6	0.40	F	44	1109.9	1.64	F	41
	SB	LT	3073.6	1.58	F		1426.7	1.26	F	
R		28.4	0.01	D	23	17.7	0.00	C	97	
SR 789 & Bird Key Drive (signalized)	EB	L	79.2	0.22	E	66	33.9	0.08	C	107
		T	23.6	0.75	C	403	99.1	1.14	F	3181
		R	12.2	0.05	B	148	12.2	0.05	B	236
	WB	L	23.5	0.44	C	240	79.8	0.62	E	187
		T	46.4	0.99	D	896	15.6	0.65	B	379
		TR	48.5	1.00	D	871	15.6	0.66	B	376
	NB	LT	45.1	0.06	D	51	44.8	0.04	D	79
		R	45.7	0.18	D	59	45.8	0.19	D	71
	SB	L	46.4	0.05	D	37	46.4	0.07	D	49
		TR	44.0	0.04	D	34	44.1	0.05	D	44
Overall			37.7	-	D		64.8	-	E	

Table 3-11
2025 and 2045 Build Pedestrian and Bicycle Analysis Results

2025 Build Ped/Bike Results for SR 789 at Bird Key Drive (signalized)								
Category	AM				PM			
	EB	WB	NB	SB	EB	WB	NB	SB
Pedestrian Delay (s/p)	75.0	75.0	75.0	75.0	58.5	58.5	58.5	58.5
Pedestrian Compliance Code	Poor							
Pedestrian Walk Score	3.2	3.2	2.0	2.2	3.2	3.2	2.0	2.2
Pedestrian LOS	C	C	B	B	C	C	B	B
Bicycle Delay (s/p)	11.0	7.4	67.5	67.5	14.5	9.6	51.1	51.1
Bicycle Compliance Code	Fair	Good	Poor	Poor	Fair	Good	Poor	Poor
Bicycle LOS Score	3.6	4.4	2.7	2.8	4.2	3.8	2.7	2.8
Bicycle LOS	D	D	C	C	D	D	C	C
2045 Build Ped/Bike Results for SR 789 at Bird Key Drive (signalized)								
Category	AM				PM			
	EB	WB	NB	SB	EB	WB	NB	SB
Pedestrian Delay (s/p)	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Pedestrian Compliance Code	Poor							
Pedestrian Walk Score	3.3	3.3	2.0	2.2	3.3	3.3	2.0	2.2
Pedestrian LOS	C	C	B	B	C	C	B	B
Bicycle Delay (s/p)	12.0	6.8	67.4	67.4	10.3	7.2	67.0	67.0
Bicycle Compliance Code	Fair	Good	Poor	Poor	Fair	Good	Poor	Poor
Bicycle LOS Score	3.8	4.6	2.7	2.8	4.4	3.9	2.7	2.8
Bicycle LOS	D	E	C	C	D	D	C	C

4.0 DESIGN CONTROLS & CRITERIA

4.1 Design Controls

The following design controls were used to select the appropriate design criteria and standards for geometric design of the project alternatives shown in **Table 4-1**.

**Table 4-1
Design Controls**

Element	Arterial	Comments
1	Roadway Context Classification C3R	Approved 11/12/20 - Appendix B
2	Functional Classification Urban Minor Arterial	Approved 11/12/20 - Appendix B Hurricane Evacuation but not an SIS Facility
3	Access Classification 5	https://gis-fdot.opendata.arcgis.com/datasets/fdot::access-management-tda/explore?location=27.325317%2C-82.558465%2C15.50
4a	Design Speed 40 mph	FDM Chapter 201.5.1, Table 201.5.1 Approved Typical Section Package 4/4/23
4b	Target Speed & Posted Speed 35 mph	Target Speed – FDM Chapter 202.2.1 Approved Typical Section Package 4/4/23
5	Capacity and LOS Target N/A	This project is not a capacity improvement project
6	Design Vehicle WB-62 FL	FDM Chapter 201.6.2
7a	Pedestrian Requirements Addition of a shared use path on the bridge	The addition of the shared use path on the bridge is to connect the SUNTrail at either end of the bridge.
7b	Bicycle Requirements Within existing right of way	Bicycle lanes will be evaluated using the paved shoulder or a dedicated bike lane adjacent to the C&G within the existing right of way.
8	Physical Constraints Existing right of way	As a constrained corridor, no additional right of way is recommended.
9	Environmental Constraints Bird Key Park	Impacts could only occur within the 1.594 acre portion owned by FDOT and leased to the City per the agreement.
10	Stormwater Management Facilities Swales or Closed System	Swales will be used consistent with the existing facility if a shoulder typical section is recommended. A closed drainage system will be used if curb and gutter are implemented.
11	Navigational Requirements 6 feet above MHW 1 foot above 100-year design wave crest elevation 2 feet above design flood elevation	Navigable waterway with no defined channel FDM Chapter 260.8.1
12	Design High Water +11.6 feet	From surge and wave modeling.

**Table 4-1
Design Controls**

Element	Arterial	Comments
13 Design Wave Heights for coastal bridges, including impacts to sea level rise projections	+17.7 feet	From surge and wave modeling.

4.2 Design Criteria

The design criteria and standards are based on design parameters in accordance with the following and shown in **Table 4-2**.

- FDOT Design Manual (FDM) (FDOT, 2024)
- A Policy on Geometric Design of Highways and Streets (American Association of State Highway and Transportation Officials (AASHTO), 2018)
- AASHTO LRFD Bridge Design Specifications, 9th Edition – 2020
- FDOT Structures Design Guidelines (SDG) (FDOT, 2023)

**Table 4-2
Design Criteria**

Element	Arterial	Comments
Lane, Median, and Border Widths		
Through Lanes	11 ft	FDM Chapter 210.2, Table 210.2.1 Design Variation Required
Turn Lane	11 ft	FDM Chapter 210.2, Table 210.2.1,
Bike Lane	7 ft (Buffered) 4 ft minimum	FDM Chapter 223, Section 223.2.1.1
Bike Lane on Paved Shoulder	Shoulder Width \geq 5 ft and a Design Speed \leq 45 mph	FDM Chapter 223; Section 223.2.1
Pavement Cross Slope	0.02, 0.02, 0.03 Turn Lane, Bike Lane, match adjacent through lane	FDM Chapter 210.2.4, Figure 210.2.1
Roadway Median Width	22 ft	FDM Chapter 210.3, Table 210.3.1
Bridge Median Width	Separate structures if the open space between the bridges is 20 ft + Single structure if the open space between the bridges would be < 10 ft Single structure is recommended when the open space between the bridges would be between 10 and 20 ft	FDM Chapter 260.5 FDM Chapter 260; Figure 260.1.4
Border Width	12 ft curbed and gutter 33 ft flush shoulder	FDM Chapter 210.7, Table 210.7.1
Pedestrian Facilities		
Sidewalk	6 ft	FDM Chapter 222.2.1, Table 222.2.1
Shared Use Paths	10 ft – 14 ft; 12 ft SUNTrail	FDM Chapter 224.4

SECTION 4 – DESIGN CONTROLS & CRITERIA

**Table 4-2
Design Criteria**

Element	Arterial	Comments
Roadway Shoulder Widths		
Without Shoulder Gutter		
Outside	10 ft full / 5 ft paved (8' with bike symbol)	FDM Chapter 210.4, Table 210.4.1
Median/Left	8 ft full / 4 ft paved	FDM Chapter 210.4, Table 210.4.1
Bridge Shoulder Widths		
Outside		
Curbing on approach	8 ft min for bridges > 500 ft in length	FDM Chapter 260, Figure 260.1.4; #1
Flush shoulder on approach	10 ft min	FDM Chapter 260, Figure 260.1.4; # 1
Median/Left – Median Barrier		
Raised Median on approach	6 ft min for bridges > 500 ft in length	FDM Chapter 260, Figure 260.1.4, #2
Flush Median	6 ft min for 2 lanes	FDM Chapter 260, Figure 260.1.4, #2
Grades		
Roadway Max Grade (Flat Terrain)	7.00%	FDM Chapter 210.10.1, Table 210.10.1
Sidewalk Max Grade	5.00% max or mirror roadway profile if less	FDM Chapter 222.2.1.3
Max Grade Change w/o Vertical Curve	0.80%	FDM Chapter 210.10.1, Table 210.10.2
Min Base Clearance	3 ft (2 ft min)	FDM Chapter 210, Section 210.10.3
Min Distance between Vertical Point of Intersection's (VPI's) on Curbed Roadways	250 ft	FDM Chapter 210, Section 210.10.1.1
Min Grade on Curbed Roadways	0.30%	FDM Chapter 210, Section 210.10.1.1
Stopping Sight Distance-SSD	305 ft (grades ≤2%)	FDM Chapter 210.11.1, Table 210.11.1
Horizontal Curves		
Max Deflection w/o Horizontal Curve	40 mph: 2° 00' 00"	FDM Chapter 210, Section 210.8.1
Max Deflection Through Intersection	5° 00' 00"	FDM Chapter 212.7, Table 212.7.1
Length of Horizontal Curve	600 ft	FDM Chapter 210.8.2, Table 210.8.1
Max Degree of Curve for Normal Crown (NC), 40 mph, $e_{max}=0.05$	3°45' 00" (1528 ft)	FDM Chapter 210, Table 210.9.2
Superelevation		
Transitions	80/20 transition split	FDM Chapter 210, Section 210.9.1
Slope Rate ($e_{max}=0.05$)	1:125	FDM Chapter 210.9, Table 210.9.3
Max Superelevation	0.05	FDM Chapter 210, Section 210.9

SECTION 4 – DESIGN CONTROLS & CRITERIA

**Table 4-2
Design Criteria**

Element	Arterial	Comments
Vertical Curves		
K Crest (new construction)	70	FDM Chapter 210.10.2, Table 210.10.3
K Sag	64	FDM Chapter 210.10.2, Table 210.10.3
Min Length (crest or sag)	120 ft	FDM Chapter 210.10.2, Table 210.10.4
Vertical Clearance		
Signal Span Wire/Mast Arm	17 ft – 6 in	FDM Chapter 210, Section 210.10.3 (8)
Clear Zone		
Travel Lanes	18 ft	FDM Chapter 215.2.3, Table 215.2.1
Auxiliary Lanes	10 ft	FDM Chapter 215.2.3, Table 215.2.1
Lateral Offsets		
Conventional Lighting		
Curb	4 ft from face of curb	FDM Chapter 215.2.4, Table 215.2.2
Flush Shoulder	20 ft from travel lane 14 ft from auxiliary lane	FDM Chapter 215.2.4, Table 215.2.2
Signal Poles & Controller Cabinets		
Curb	4 ft from face of curb, do not locate in medians	FDM Chapter 215.2.4, Table 215.2.2
Flush Shoulder	Outside Clear Zone	FDM Chapter 215.2.4, Table 215.2.2
Traffic Control Signs		
Single and Multi-Column	4 ft	FDM Chapter 215.2.4, Table 215.2.2
Aboveground Utilities (See FDM 215.2.8)		
Curb - New/Relocated/Existing	4 ft	FDM Chapter 215.2.4, Table 215.2.2
Flush - New/Relocated/Existing	Outside Clear Zone	FDM Chapter 215.2.4, Table 215.2.2
Miscellaneous		
Trees (Diameter >4 in measured 6 in above ground)	Curbed Roadway: 4 ft Flush Roadway: Outside clear zone	FDM Chapter 215.2.4, Table 215.2.2
Bridge Piers and Abutments	Curbed Roadways The greater of the following: <ul style="list-style-type: none"> • Inside or Outside Travel Lane: 16 ft from Edge of Travel Lane • Outside Auxiliary Lane: 4 ft from Face of Curb • Inside Auxiliary Lane (Median): 6 ft from Edge of Auxiliary Lane (See FDM 215.4.5.4 for Pier Protection criteria and Figures 260.6.3 & 260.6.4) Flush Shoulder <ul style="list-style-type: none"> • Outside Clear Zone 	FDM Chapter 215.2.4, Table 215.2.2
Drainage Structures (e.g., wing walls, end walls and flared end sections)	Refer to FDOT Drainage Manual	FDM Chapter 215.2.4, Table 215.2.2 FDOT Drainage Manual Table 3.4

**Table 4-2
Design Criteria**

Element	Arterial	Comments
Bus Benches And Transit Shelters	Locate in accordance with Rule Chapter 14-20.003, Florida Administrative Code (F.A.C.). Transit Bus benches must be located in accordance with Rule Chapter 14-20.0032, F.A.C.	FDM Chapter 215.2.4, Table 215.2.2 Chapters 14-20.003 & 14-20.0032 F.A.C.
Pedestrian Railings	Curbed Roadway – 4 ft Flush Roadway – Outside Clear Zone	FDM Chapter 215.2.4, Table 215.2.2
Other Roadside Obstacles	Outside clear zone	FDM Chapter 215, Table 215.2.2
Roadside Slopes – Curbed		
Front Slope		
Height of Fill 0-6 ft	1:2 or to suit property owner. Not flatter than 1:6	FDM Chapter 215.2.6, Table 215.2.3
Height of Fill >6 ft	1:3 or to suit property owner. Not flatter than 1:6	
Back Slope	1:2 or to suit property owner. Not flatter than 1:6	FDM Chapter 215.2.6, Table 215.2.3
Transverse Slopes	1:4	FDM Chapter 215.2.6, Table 215.2.3
Drop-off Hazard for low speed curbed roadway	6 ft or greater with a slope steeper than 1:3 within 22 ft of the travel way requires protection	FDM Chapter 215, Section 215.3.3
Drop-off Hazard for Pedestrian & Bicyclist	See FDM 222 and 224	FDM Chapter 222, Section 222.4 FDM Chapter 224, Figure 224.15.1
Americans with Disabilities Act (ADA)		FDM Chapter 222.1.1

4.2.1 Structures Design Criteria

4.2.1.1 Design Method

4.2.1.1.1 Replacement Bridge

The replacement bridge will be designed for a 75-year service life. Per the SDG, Section 1.4.3, concrete components within the splash zone (4 ft below Mean High Water (MHW) and 12 ft above MHW) will utilize corrosion protection measures to enhance durability. Additional corrosion protection may be achieved through the use of stainless steel or Glass Fiber Reinforced Polymer (GFRP) reinforcement.

4.2.1.1.2 Substructure Elements

Substructure elements, including precast and cast-in-place concrete piles, drilled shafts, footings, caps, and columns will be designed for dead load, live load, wind load, etc. in accordance with the Load and Resistance Factor (LRFD) method.

4.2.1.1.3 Superstructure Elements

Superstructure elements, including prestressed and cast-in-place deck slab, beams, and traffic railings will be designed for dead load, live load, wind load, etc. in accordance with the LRFD method.

4.2.1.2 Design Loads and Load Factors

4.2.1.2.1 Live Load

HL-93 Design Vehicular Live Loading, including design truck or design tandem and design lane load, per AASHTO LRFD Bridge Design Specifications, 9th Edition – 2020, Section 3.6, shall be used.

4.2.1.2.2 Wind Load

A Design Wind Speed (V) of 170 mph as per SDG Table 2.4.1-1 shall be used to determine the wind on structure loads for the bridge design.

4.2.1.2.3 Wave Loads

The wave load criteria, shown in **Table 4-3** will be used for design. The criteria was developed through modeling by a coastal engineer. The results of this analysis can be found in the Bridge Hydraulics Technical Memorandum.

Table 4-3
Wave Load Criteria

Element	Ft, NAVD88
MHW	+0.15
MLW	-1.10
50-yr surge	TBD
100-yr surge	TBD
500-yr surge	TBD
Wave Crest	+14.60

*Actual wave load forces to be determined after preferred structural type and span layout are determined.

4.2.1.2.4 Seismic Loads

The superstructure spans will be supported on elastomeric bearings. Therefore, the bridge will be categorized as “exempt” for seismic loads per FDOT Structures Design Guidelines Section 2.3. Only the minimum bearing support dimensions need to be satisfied for seismic adequacy as required by AASHTO Bridge Design Guidelines, Section 4.7.4.4.

4.2.1.2.5 Vehicular Collision Loads

Traffic railing (barriers) will be crash tested and will meet MASH TL-4 requirements.

5.0 ALTERNATIVES ANALYSIS

5.1 No-Build (No-Action) Alternative

The No-Build Alternative includes only routine maintenance performed as needed to keep the bridges open to traffic until safety issues, such as reduced capacity due to ongoing deterioration, would require that the bridges be closed. The No-Build Alternative does not include modification or improvements to the existing bridges or approach roadways. Existing geometric and other deficiencies, including substandard bridge deck curbs, traffic railings, and narrow sidewalks intended for multi-use, would also remain. No changes to the existing horizontal and vertical navigational clearances would occur.

Bridges constructed in this era were anticipated to provide a 50-year service life. Therefore, both bridges have already exceeded their anticipated service life. The bridges are also located in an extremely aggressive coastal environment high in chlorides that contribute to structural steel corrosion and concrete deterioration. Repairs were made to portions of both bridges in 1985 and 1993, and to Bridge No. 170022 in 2016 but some components of the bridges will continue to deteriorate such that they would not likely be economically corrected by routine maintenance or in-kind repair. The bridges also contain structural elements that do not meet current design standards, and repairs to the existing elements within the bridges would not bring them up to current design standards. The estimate for maintaining the existing bridges for 30 years is shown in **Table 5-1**.

Using data from 2020, the following calculates the cost of these repairs in current year (2020) dollars.

- 2020 - 30 years of repairs for Bridges 170951 & 170022 \$27,725,620.99
- Design Cost..... \$2,772,562.00
- Construction Engineering & Inspection (CEI)..... \$3,327,075.00
- Total Cost..... \$ 33,825,257.99

Advantages of the No-Build (No-Action) Alternative include:

- No right-of-way acquisition or relocations
- No impacts to the FDOT owned portion of Bird Key Park
- No environmental impacts to wetlands, surface waters, seagrass and essential fish habitats
- No impacts to utilities

Disadvantage of the No-Build (No-Action) Alternative include:

- Does not address the projects Purpose and Need
 - Does not address the deficient shoulder widths, sidewalk widths and traffic railings on the bridge
 - Does not provide a shared-use path on the bridge to connect the SUN Trail

SECTION 5 – ALTERNATIVES ANALYSIS

Table 5-1
30 Year Maintenance Estimate (Year 2020)

Year	Description	Bridge 170951 Cost	Bridge 170022 Cost
2020	Routine Maintenance	\$14,693.00	\$14,693.00
2021	Routine Maintenance	\$14,693.00	\$14,693.00
2021	Substructure Rehabilitation	\$198,528.55	\$229,772.95
2022	Routine Maintenance	\$14,693.00	\$14,693.00
2023	Routine Maintenance	\$14,693.00	\$14,693.00
2024	Routine Maintenance	\$14,693.00	\$14,693.00
2025	Routine Maintenance	\$14,693.00	\$14,693.00
2025	Superstructure Spall Repair	\$100,000.00	\$100,000.00
2026	Routine Maintenance	\$14,693.00	\$14,693.00
2027	Routine Maintenance	\$14,693.00	\$14,693.00
2028	Routine Maintenance	\$14,693.00	\$14,693.00
2029	Routine Maintenance	\$14,693.00	\$14,693.00
2029	Substructure Rehabilitation	\$198,528.55	\$229,772.95
2030	Routine Maintenance	\$14,693.00	\$14,693.00
2030	Superstructure Spall Repair	\$187,847.22	\$187,847.22
2030	Pile Jackets	\$2,052,000.00	\$2,052,000.00
2031	Routine Maintenance	\$14,693.00	\$14,693.00
2032	Routine Maintenance	\$14,693.00	\$14,693.00
2033	Routine Maintenance	\$14,693.00	\$14,693.00
2034	Routine Maintenance	\$14,693.00	\$14,693.00
2035	Routine Maintenance	\$14,693.00	\$14,693.00
2035	Entire Deck Replacement	\$7,664,616.06	\$7,664,616.06
2036	Routine Maintenance	\$14,693.00	\$14,693.00
2037	Routine Maintenance	\$14,693.00	\$14,693.00
2037	Substructure Rehabilitation	\$198,528.55	\$229,772.95
2038	Routine Maintenance	\$14,693.00	\$14,693.00
2039	Routine Maintenance	\$14,693.00	\$14,693.00
2040	Routine Maintenance	\$14,693.00	\$14,693.00
2040	Superstructure Spall Repair	\$187,847.22	\$187,847.22
2041	Routine Maintenance	\$14,693.00	\$14,693.00
2042	Routine Maintenance	\$14,693.00	\$14,693.00
2043	Routine Maintenance	\$14,693.00	\$14,693.00
2044	Routine Maintenance	\$14,693.00	\$14,693.00
2045	Substructure Rehabilitation	\$198,528.55	\$229,772.95
2045	Routine Maintenance	\$14,693.00	\$14,693.00
2046	Routine Maintenance	\$14,693.00	\$14,693.00
2047	Routine Maintenance	\$14,693.00	\$14,693.00
2048	Routine Maintenance	\$14,693.00	\$14,693.00
2049	Routine Maintenance	\$14,693.00	\$14,693.00
2049	Scour Countermeasure	\$306,414.00	\$306,414.00
2050	Pile Jackets	\$2,052,000.00	\$2,052,000.00
2050	Routine Maintenance	\$14,693.00	\$14,693.00
Subtotal		\$13,800,321.70	\$13,925,299.29

- Does not provide a flexible lane in the future to align with FDOT’s Sarasota and Manatee Barrier Island Traffic Study recommendation SM4
- Will have inconveniences to the traveling public and property owners when major maintenance projects are required on the bridge
- Has a significant cost to maintain the existing bridges which will require replacement in the future
- Does not increase bridge height to improve resiliency

The No-Build Alternative does not meet the Purpose and Need for the project.

5.2 Transportation System Management and Operations (TSM&O) Alternative

A TSM&O alternative includes those types of activities designed to maximize the use of the existing transportation system. It is a limited construction alternative that uses minor improvements to address the deficiencies identified by the project need. Because the primary purpose of the project is to correct the identified deficiencies of the SR 789 bridges [Structure Numbers 170022 and 170951], only the No-Build and Build alternatives were considered. The TSM&O alternative was eliminated since it does not meet the Purpose and Need for the project.

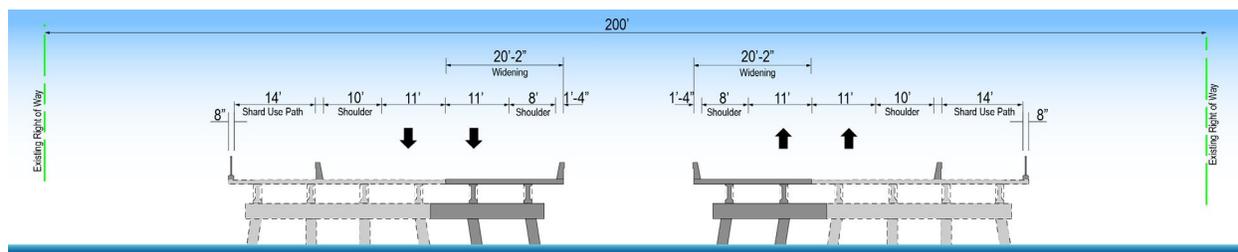
5.3 Multimodal Alternative (Rehabilitation)

SR 789 is frequently used by bicyclists and pedestrians to access the adjacent parks and recreational facilities. Ten-foot shared use paths are present within the existing FDOT right-of-way along both sides of SR 789, except at the existing bridges over the Coon Key Waterway and at Bird Key Park. These paths are part of the Florida SUN Trail program. While there are 5-ft wide sidewalks on both sides of the bridges, there are currently no shoulders or designated bicycle facilities across the bridges.

The feasibility of “re-purposing” the existing bridge was evaluated for this project as a multimodal alternative. Although the existing bridges are not considered structurally deficient, rehabilitation would require significant improvements including repairs, strengthening, safety and accessibility improvements, and widening to provide long-term safety, functionality, maintainability, and reliability. The proposed rehabilitation of the existing bridge would include addressing the following items:

- Typical Section
The existing bridges are not wide enough to accommodate shoulders and a traffic railing between the roadway and sidewalk for pedestrian/bicycle safety. Therefore, the existing bridges would require widening each bridge approximately 20 ft-6-in to the median, shown in **Figure 5-1**. The addition of these improvements meets the *Sarasota County Trails Master Plan (2018)*: Longboat Key Trail and the *Sarasota County Bicycle and Pedestrian Master Plan Update: Chapter 6–Gap Analysis and Prioritization (2021)*.

Figure 5-1
SR 789 Proposed Bridge Widening Typical Section



- Common conditions to both bridges
 - Every pile on both bridges has cathodic protection pile jackets on them. The latest cathodic protection pile jacket repair project was completed in 2006. The typical service life of cathodic protection pile jackets is 25 years. A major project to replace the cathodic protection pile jackets will be required around 2030.
 - The pile caps show major deterioration including delaminations along the length of the caps. Major repairs consisting primarily of spall repair and crack injection will be required at regular intervals in the future.
 - The condition of the concrete deck continues to worsen, particularly on bridge 170022. A 2020 project replaced the deck slab in two spans of bridge 170022. Major repairs consisting primarily of spall repair and crack injection will be required at regular intervals in the future. At some point in the future, the entire concrete deck of both bridges will need to be replaced.
 - The post-tensioned concrete beams exhibit delaminations and spalls including some exposed steel reinforcement. Major repairs consisting primarily of spall repair and crack injection will be required at regular intervals in the future.
- Specific conditions for each bridge are from the July 2023 Bridge Inspection Report.
 - Bridge No. 170022
 - The joints between concrete sheet piles at the west seawall are open up to 1-1/2-in. At the radius of the wall, the joints are open as much as 3-in and a probe penetrates up to 3 ft. The northwest and northeast seawall caps have cracks up to 1/2-in wide with corrosion bleed out and delaminations up to 40 ft long and 27-in wide.
 - All 92 piles have been jacketed. Several pile jacket forms are split up to 8 ft in length. The zinc anodes have up to 70% section remaining.
 - The sand cement bags at the northeast radius have moderate to heavy deterioration.
 - The steel bearings have moderate painted over pitting and corrosion and pack rust with corrosion is bleeding through the paint.
 - The concrete deck and sidewalks have random cracks and spalls throughout the top and bottom surfaces. There are numerous patches throughout, some

sound and some unsound.

- Numerous concrete beams have spalls, cracks and/or unsound patches.
- The concrete posts, railings and curbs have intermittent 1/16-in cracks and unsound spalls throughout.

○ Bridge No. 170951

- The joints between concrete sheet piles at the seawalls are open up to 1-1/2-in with backfill leakage. The seawall caps outside the limits of the bridge have cracks up to 1/8-in wide with corrosion staining and delaminations up to 20 ft long and 3 ft wide.
- Piles 4-3 and 4-4 have 1-ft long by 1/16-in wide vertical cracks in the grout above the pile jackets. Piles 16-5, 18-1, 18-2 and 18-4 have scale damage and rounded corners up to 1/2-in deep below the jackets.
- The reinforced concrete bent caps at bents 3, 5, 7, 9, 13, 19 and 20 have cracks, spalls and unsound previous patches.
- All piles except 2-1, 2-3 and 2-4 have been jacketed. Several pile jacket forms are split up to 8 ft in length.
- The west slope protection has settled near the seawall cap. The sand cement bags have moderate vegetation growth in the joints, primarily in the radius areas.
- The steel bearings have moderate painted over pitting and corrosion bleeding through the paint.
- The top of the concrete deck has map cracking throughout.
- Numerous concrete beams have spalls, cracks and/or unsound patches.
- The concrete posts, railings and curbs have intermittent 1/16-in cracks and unsound spalls throughout.

• Service Life

The service life of the existing bridge can be extended with continued repairs, replacement of deficient structural components and implementation of systems that slow the rate of deterioration; however, it is not practical to extend the life of the bridge indefinitely. The bridge has already exceeded its original design service life of 50 years, and there are a number of elements experiencing varying degrees of corrosion and damage. Based on the current condition of the bridge, the District Structures Maintenance Office (DSMO) has estimated that, with extensive maintenance repairs and a series of major rehabilitations, the existing bridges can most likely remain in service for another 26 years (30 years from 2020).

• Cost

The estimate for rehabilitating the existing twin bridges and adding safety features for 30 years is shown in **Table 5-2**.

SECTION 5 – ALTERNATIVES ANALYSIS

Table 5-2
30 Year Rehabilitation Estimate (Year 2020)

Year	Description	Bridge 170951 Cost	Bridge 170022 Cost
2020	Routine Maintenance	\$14,693.00	\$14,693.00
2021	Routine Maintenance	\$14,693.00	\$14,693.00
2022	Routine Maintenance	\$14,693.00	\$14,693.00
2023	Routine Maintenance	\$14,693.00	\$14,693.00
2024	Routine Maintenance	\$14,693.00	\$14,693.00
2025	Substructure Rehabilitation	\$198,528.55	\$229,772.95
2025	Entire Deck Replacement	\$7,664,616.06	\$7,664,616.06
2025	Pile Jackets	\$2,052,000.00	\$2,052,000.00
2025	Superstructure Spall Repair	\$100,000.00	\$100,000.00
2025	Bridge Widening	\$3,715,215.00	\$3,715,215.00
2026	Routine Maintenance	\$14,693.00	\$14,693.00
2027	Routine Maintenance	\$14,693.00	\$14,693.00
2028	Routine Maintenance	\$14,693.00	\$14,693.00
2029	Routine Maintenance	\$14,693.00	\$14,693.00
2030	Routine Maintenance	\$14,693.00	\$14,693.00
2030	Superstructure Spall Repair	\$187,847.22	\$187,847.22
2031	Routine Maintenance	\$14,693.00	\$14,693.00
2032	Routine Maintenance	\$14,693.00	\$14,693.00
2033	Routine Maintenance	\$14,693.00	\$14,693.00
2033	Substructure Rehabilitation	\$198,528.55	\$229,772.95
2034	Routine Maintenance	\$14,693.00	\$14,693.00
2035	Routine Maintenance	\$14,693.00	\$14,693.00
2035	Superstructure Spall Repair	\$187,847.22	\$187,847.22
2036	Routine Maintenance	\$14,693.00	\$14,693.00
2037	Routine Maintenance	\$14,693.00	\$14,693.00
2038	Routine Maintenance	\$14,693.00	\$14,693.00
2039	Routine Maintenance	\$14,693.00	\$14,693.00
2040	Routine Maintenance	\$14,693.00	\$14,693.00
2040	Superstructure Spall Repair	\$187,847.22	\$187,847.22
2041	Routine Maintenance	\$14,693.00	\$14,693.00
2041	Substructure Rehabilitation	\$198,528.55	\$229,772.95
2042	Routine Maintenance	\$14,693.00	\$14,693.00
2043	Routine Maintenance	\$14,693.00	\$14,693.00
2044	Routine Maintenance	\$14,693.00	\$14,693.00
2045	Routine Maintenance	\$14,693.00	\$14,693.00
2045	Superstructure Spall Repair	\$187,847.22	\$187,847.22
2045	Pile Jackets	\$2,052,000.00	\$2,052,000.00
2045	Scour Countermeasures	\$306,414.00	\$306,414.00
2046	Routine Maintenance	\$14,693.00	\$14,693.00
2047	Routine Maintenance	\$14,693.00	\$14,693.00
2048	Routine Maintenance	\$14,693.00	\$14,693.00
2049	Routine Maintenance	\$14,693.00	\$14,693.00
2050	Substructure Rehabilitation	\$198,528.55	\$229,772.95
2050	Routine Maintenance	\$14,693.00	\$14,693.00
2050	Superstructure Spall Repair	\$187,847.22	\$187,847.22
Subtotal		\$18,064,385.36	\$18,189,362.96

The following calculates the cost in current year (2020) dollars.

○ 2020 - 30 years for rehabilitation Bridges 170951 & 170022	\$36,253,748.32
○ Design Cost	\$3,625,375.00
○ CEI	<u>\$4,350,450.00</u>
○ Total Cost	\$44,229,573.32

Advantages of the Multimodal Alternative include:

- Address the Purpose and Need with respect to sidewalks and bike lanes
 - Provides inside (8-ft) and outside (10-ft) shoulders that meet the design criteria. The outside shoulder on the bridge accommodates bikes and connects to the existing paved shoulders on the roadway
 - Provides a 14-ft shared use path on the bridge to connect to the SUN Trail at either end of the bridge
- No right-of-way acquisition or relocations
- No impacts to the FDOT owned portion of Bird Key Park since the roadway typical remains consistent with the existing facility

Disadvantage of the Multimodal Alternative include:

- Does not address all of the projects Purpose and Need
 - Does not provide a flexible lane in the future to align with FDOT’s Sarasota and Manatee Barrier Island Traffic Study recommendation SM4
- Will have inconveniences to the traveling public and property owners during construction to widen the existing bridges and maintenance on the existing bridges
- Has a significant cost to widen the bridge for multi-modal knowing that the existing bridges will require replacement in the future
- Has environmental impacts to wetlands, surface waters, seagrass and essential fish habitats with the widening of the bridges
- Has impacts to utilities on the bridge
- Does not increase bridge height to improve resiliency

Due to extensive design and construction effort and cost required to complete this alternative, and the bridges still requiring replacement after 30 years, this option was eliminated as a viable alternative.

5.4 Build Alternative(s)

The purpose of the project is to identify the optimal solution for the SR 789 bridges with consideration of multimodal facilities. The build replacement alternatives evaluated for the Public Workshop included a Single Bridge Alternative, and a Twin Bridge Alternative with the following engineering considerations that apply per the PD&E Manual Part 2 Chapter 3.2.5.

5.4.1 Engineering Considerations

5.4.1.1 Complete Streets

SR 789 has a Suburban Residential (C3R) Context Classification with no roadway network within the project limits. This project is a replacement of the existing bridges to bring them up to standards and consider multimodal facilities to be utilized for pedestrians and bicyclists.

5.4.1.2 Pedestrian & Bicycle Accommodations

See Table 4-2 Design Criteria for the appropriate design elements.

5.4.1.3 Traffic Operations and Safety

This project is not a capacity project and therefore no additional capacity lanes are proposed. The proposed improvements will include two travel lanes, a shared use path and bicycle on shoulder in each direction.

5.4.1.4 Managed Lanes

Not applicable.

5.4.1.5 Access Management

The Class 5 – Restrictive will be maintained with the build alternatives. There will be no change to the intersection, median openings or driveway locations.

5.4.1.6 Interchange on Interstate Highways

Not applicable.

5.4.1.7 Intelligent Transportation Systems

As part of this project, conduits for future ITS systems will be installed in the bridge railings.

5.4.1.8 Lane Repurposing

Not applicable.

5.4.1.9 Landscape

Context-sensitive solutions such as aesthetic features and landscaping will be evaluated further during the design phase so that the project is in harmony with local communities and preserves and/or enhances the natural, environmental, scenic, and aesthetic values of the area. The placement and maintenance of any landscaping will comply with applicable roadway clear zone and sight distance requirements.

5.4.1.10 Lighting

The location of the proposed lighting will be determined during the design phase and the type determined as part of the Aesthetic Committee's responsibilities.

5.4.1.11 Wildlife Crossings

Not applicable.

5.4.1.12 Permits

The following federal and state permits will be acquired during design.

5.4.1.12.1 Federal Permit(s)

U. S. Coast Guard (USCG) Bridge Permit

USACE Section 10 or Section 404 Permit

5.4.1.12.2 State Permit(s)

DEP or Water Management District (WMD) Environmental Resource Permit (ERP)

DEP National Pollutant Discharge Elimination System Permit

5.4.1.13 Stormwater Management

The design criteria for stormwater management facilities will comply with all regulatory requirements, including the *SWFWMD ERP Applicant's Handbook, Volume II*, Chapter 5 of the *2024 FDOT Drainage Manual* and Chapter 9 of the *2024 FDOT Drainage Design Guide*. Additional guidelines for developing BMPs for stormwater runoff are provided in the *2015 FDOT BMP Designer and Review Manual* and the *2015 Sarasota County Low Impact Development Guidance Document*. Pre-application meetings were held with SWFWMD on July 11th, 2019, and November 3, 2022.

5.4.1.14 Sea Level Impact Projection (SLIP)

A SLIP Study was prepared on July 18, 2024 and is included in the project files. The following flood mitigation strategies to be evaluated as part of the alternative analysis include:

- The new bridge will be designed higher than the existing bridge
- Alternative wall types will be considered in place of MSE walls which can fail during a storm event
- The shoreline and wall toe of slope will be armored for protection against storm events
- The portion of the structure below the wave crest elevation will be designed for storm event forces
- The new foundations will be designed to resist scour and storm event forces
- All outfall pipes will be fitted with check valves to prevent tidal influence in the storm sewers

5.4.1.15 Water Quality

Sarasota Bay (WBID 1968C) is impaired for nutrients and will require nutrient loading criteria for impaired waterbodies. The project discharges directly into an OFW, which requires 50% additional treatment volume above the presumptive treatment requirements. The build alternatives do not add capacity to the existing roadway and the addition of bicycle lanes and sidewalks are exempt from water quality requirements.

5.4.1.16 Hydrology and Floodplains

Floodplain compensation is not required due to the tidally influenced outfall.

5.4.1.17 Utilities and Railroads

The proposed improvements will potentially have utility impacts associated with the build alternatives. These impacts will be addressed during design.

5.4.1.18 Survey and Mapping

Horizontal and vertical geometry for each build alternative was prepared since the PD&E Study included survey and mapping for the design phase. This can be found in See section 5.4.2.3.

5.4.1.19 Geotechnical Investigation

See section 2.2.21 for the existing geotechnical data.

5.4.1.20 Structures and Bridges

Two build alternatives will be developed for either a twin bridge or single bridge replacement using the criteria established in Section 5.4.2 and design criteria in Section 4.0.

5.4.1.21 Transportation Management Plan

During design and construction, maintenance of traffic during construction activities will be developed then continually monitored and evaluated to provide safe construction zones with minimum traffic delays and maintenance of access to properties along the surface streets.

5.4.1.22 Constructability

The Single Bridge Alternative will be constructed in two phases using the existing facility. The Twin Bridge Alternative will be constructed in three phases using a temporary bridge as a means to maintain two lanes of traffic in each direction.

5.4.1.23 Construction Impacts

Construction activities for the proposed project may cause minor short-term noise, air quality, water quality, traffic congestion and visual impacts within the immediate vicinity of the project.

5.4.2 Bridge Replacement Alternatives

All bridge replacement alternatives were developed to maintain four lanes of travel during construction, minimize environmental impacts and minimize impacts to adjacent properties. The following steps were used in developing the bridge replacement options.

- Step 1: Determination of vertical clearance criteria
- Step 2: Developing typical sections for single and twin bridge options to accommodate bicycles/pedestrians and meet the vertical clearance criteria approved in Step 1. These alternatives tied into the existing roadway typical sections.
- Step 3: Detailing horizontal and vertical geometry for the build alternatives

5.4.2.1 Step 1: Vertical Clearance Criteria

A Bridge Technical Memorandum to determine the minimum vertical clearance of new bridges

was prepared in June 2021 for FDOT District 1 and Central Office. The minimum vertical clearance is a key component in the development of bridge replacement alternatives, with respect to potential impacts to the second auxiliary driveway at the Sarasota Yacht Club. A meeting was held on February 3, 2021, where Yacht Club board members described the importance of maintaining the use of this driveway. The main driveway is used by large delivery trucks and tractor trailers to enter the property, and the auxiliary driveway is used to exit the facility and re-enter traffic on SR 789. The auxiliary driveway is necessary for the operation of the Yacht Club due to the lack of space within the property for these vehicles to turn around.

Current criteria from the FDM lists several requirements for determination of the minimum vertical clearance of new bridges.

- Environmental: 12-ft minimum vertical clearance above MHW for concrete superstructures in environments classified as moderately or extremely aggressive due to chloride content (FDM 260.8.1).
- Drainage: 2-ft minimum vertical clearance between the design flood stage and low bridge member allows debris to pass without damage to the bridge (FDM 260.8.1).
- Navigation: 6-ft minimum clearance above MHW for navigation (FDM 260.8.1).
- Coastal: A minimum vertical clearance of 1-ft above the 100-year design wave crest elevation including the storm surge elevation (FDM 260.8.1).

The hydraulic analysis yielded a 50-year design flood elevation of +11.0 (including 0.9 ft for additional sea level rise (SLR)) and a 100-year wave crest elevation of 18.8 ft above MHW. Since the initial hydraulic analysis calculation, it was determined that an SLR of 2.0 ft should be used for this project. The wave crest elevation was refined through a probabilistic analysis incorporating SLR to a value of 17.7 ft above MHW. The MHW elevation was established at +0.15. Using the criteria defined in the FDM, and the results of the hydraulic analysis, the following minimum required vertical clearances shown in **Table 5-3** were evaluated.

Table 5-3
Design Criteria for Low Member Elevation

Criteria	Minimum Vertical Clearance per Criteria (ft)	SLR (ft)	Freeboard (ft)	MHW (ft)	Low Member Elevation (ft)
Environmental	12.0	2.0	0.0	0.15	14.15
Drainage	10.1 ¹	2.0	2.0	0.15	14.25
Navigation	6.0	2.0	0.0	0.15	8.15
Coastal	17.7	N/A	1.0	0.15	18.85

¹Value subtracts the 0.9 ft of SLR that was established in the hydraulic analysis

The configuration and location of the Yacht Club's auxiliary driveway serves as a constraint on the maximum vertical profile that can be achieved. Attaining a low member elevation of 18.85 at the ends of the bridge would eliminate the Yacht Club's auxiliary driveway since a $\pm 12\%$ grade would be required to tie the driveway back into SR 789, thereby severely impacting their daily operations. In addition, there are minor impacts to the main entrance of the Yacht Club and the entrance of the Sarasota Harbour East condominiums. To determine an initial minimum low member elevation, the maximum slope for the auxiliary driveway was set at 4% for the trucks

leaving the Yacht Club and entering SR 789 from a complete stop.

Using the Yacht Club auxiliary driveway constraint, the vertical profile can provide 8 ft to 10 ft of vertical clearance at the ends of the bridge depending on the horizontal alignment of the new facility. The 10-ft vertical clearance can be maximized with a single bridge by shifting the alignment to the north, which increases the roadway offset from the Yacht Club's auxiliary driveway and maintains the 4% driveway grade. A lesser driveway grade can be achieved with this alignment if an 8-ft vertical clearance is used. The single bridge would be constructed in two phases. Twin bridges centered on the existing alignment and constructed in three phases does not permit this offset, resulting in the lower maximum vertical clearance of 8 ft at the ends of the bridge. **Table 5-4** documents the maximum vertical clearances, using the Yacht Club auxiliary driveway constraint.

The Structures Manual, Volume 1 SDG, Section 2.5: Wave Loads notes that when bridges vulnerable to coastal storms cannot practically meet the wave crest clearance requirement of the Drainage Manual Section 4.9.5, all relevant design information shall be submitted to the Structures Design Office (SDO) to assist in determining the criteria to be used. Coordination with the SDO concluded that the proposed criteria established in **Table 5-4** will be used in developing bridge replacement alternatives.

Table 5-4
Proposed Criteria for Low Member Elevation

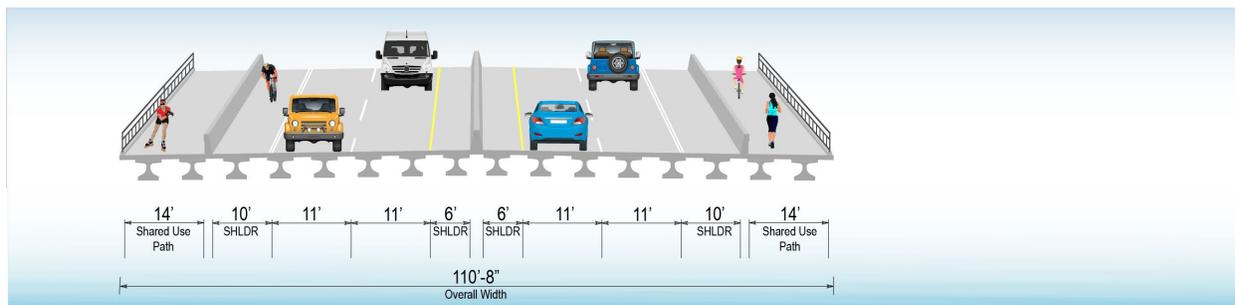
Criteria	Maximum Vertical Clearance per Constraint (ft)	SLR (ft)	Freeboard (ft)	MHW (ft)	Low Member Elevation (ft)*
Twin Structures - Center Alignment	8.0	2.0	0.0	0.15	10.15
Single Structure - Offset Alignment North	8.0	2.0	0.0	0.15	10.15
Single Structure - Offset Alignment North	10.0	2.0	0.0	0.15	12.15

*Concrete components located below 12 ft above MHW will require corrosion protection measures to enhance durability.

5.4.2.2 Step 2: Initial Bridge Typical Sections

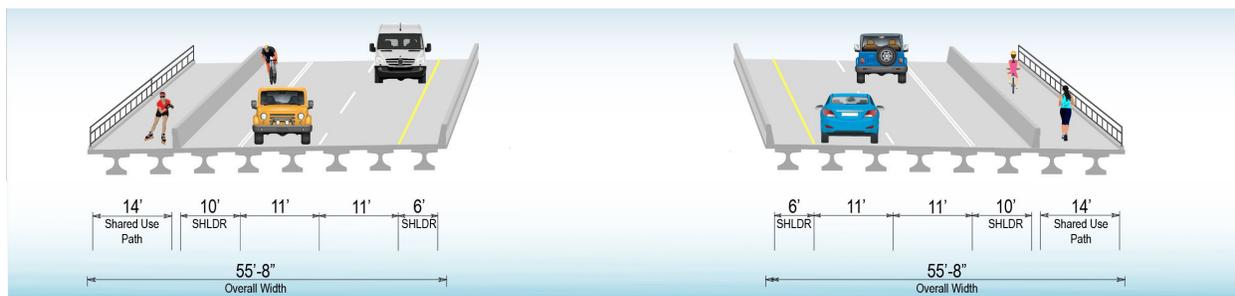
The single bridge typical section includes two 11-ft wide travel lanes with 6-ft inside and 10-ft outside shoulders, and 14-ft shared use paths in each direction. The total width of the bridge is 110 ft 8-in, shown on **Figure 5-2**.

Figure 5-2
SR 789 Proposed Single Bridge Typical Section



The twin bridge typical section includes two 11-ft wide travel lanes with 6-ft inside and 10-ft outside shoulders, and 14-ft shared use paths in each direction. The clear space between the twin bridges is 48-ft-4-in. The total width of each bridge is 55 ft 8-in, shown on **Figure 5-3**.

Figure 5-3
SR 789 Proposed Twin Bridge Typical Section



5.4.2.3 Step 3: Initial Horizontal and Vertical Geometry

5.4.2.3.1 Single Bridge Alternative

The proposed horizontal alignment for the single bridge alternative, is summarized in **Table 5-5** and the vertical alignment in **Table 5-6**. The single bridge alternative shown in **Figure 5-4**, is parallel to the existing alignment and shifted to the north using the typical section shown in **Figure 5-2**.

Table 5-5
Single Bridge Horizontal Alignment

STA	Tangent Direction Back	Tangent Direction Ahead	Distance (ft)	Curve Length (ft)	Radius (ft)	Degree of Deflection
PI Sta 300+00.00		S 58° 55' 44.4" W	806.719			
PC Sta 308+06.72						
PI Sta 310+49.71	S 58° 55' 44.4" W	S 62° 41' 56.4" W		485.809	7384.004	03° 46' 10.60" RT
PRC Sta 312+92.53						
PRC Sta 312+92.53						
PI Sta 315+06.78	S 62° 41' 56.4" W	S 59° 07' 51.6" W		428.374	6879.699	03° 34' 03.37" LT
PT Sta 317+20.90						
PT Sta 317+20.90		S 59° 07' 51.6" W	1116.950			
PI Sta 328+37.85		S 56° 32' 27.6" W	550.072			
PI Sta 333+87.92		S 56° 31' 58.8" W	348.730			

SECTION 5 – ALTERNATIVES ANALYSIS

**Table 5-5
Single Bridge Horizontal Alignment**

STA	Tangent Direction Back	Tangent Direction Ahead	Distance (ft)	Curve Length (ft)	Radius (ft)	Degree of Deflection
PI Sta 337+36.65		S 59° 34' 58.8" W	715.089			
PI Sta 344+51.74		S 57° 02' 13.2" W	375.261			

**Table 5-6
Single Bridge Vertical Alignment**

VPC	VPI	VPRC	VPT	Back Grade (%)	Ahead Grade (%)	Curve Length (ft)
313+09.00	315+30.00	317+51.00		+0.379%	+4.00%	442.00
	322+79.00		328+07.00	+4.00%	-4.00%	1056.00
329+57.00	330+99.00		332+41.00	-4.00%	-0.459%	284.00

5.4.2.3.2 Twin Bridge Alternative

The proposed horizontal alignment for the twin bridge alternative, is summarized in **Table 5-7** and the vertical alignment in **Table 5-8**. The twin bridge alternative shown in **Figure 5-5**, is similar to the alignment of the existing bridges with two parallel bridges separated by 48-ft-4-in using the typical section shown in **Figure 5-3**.

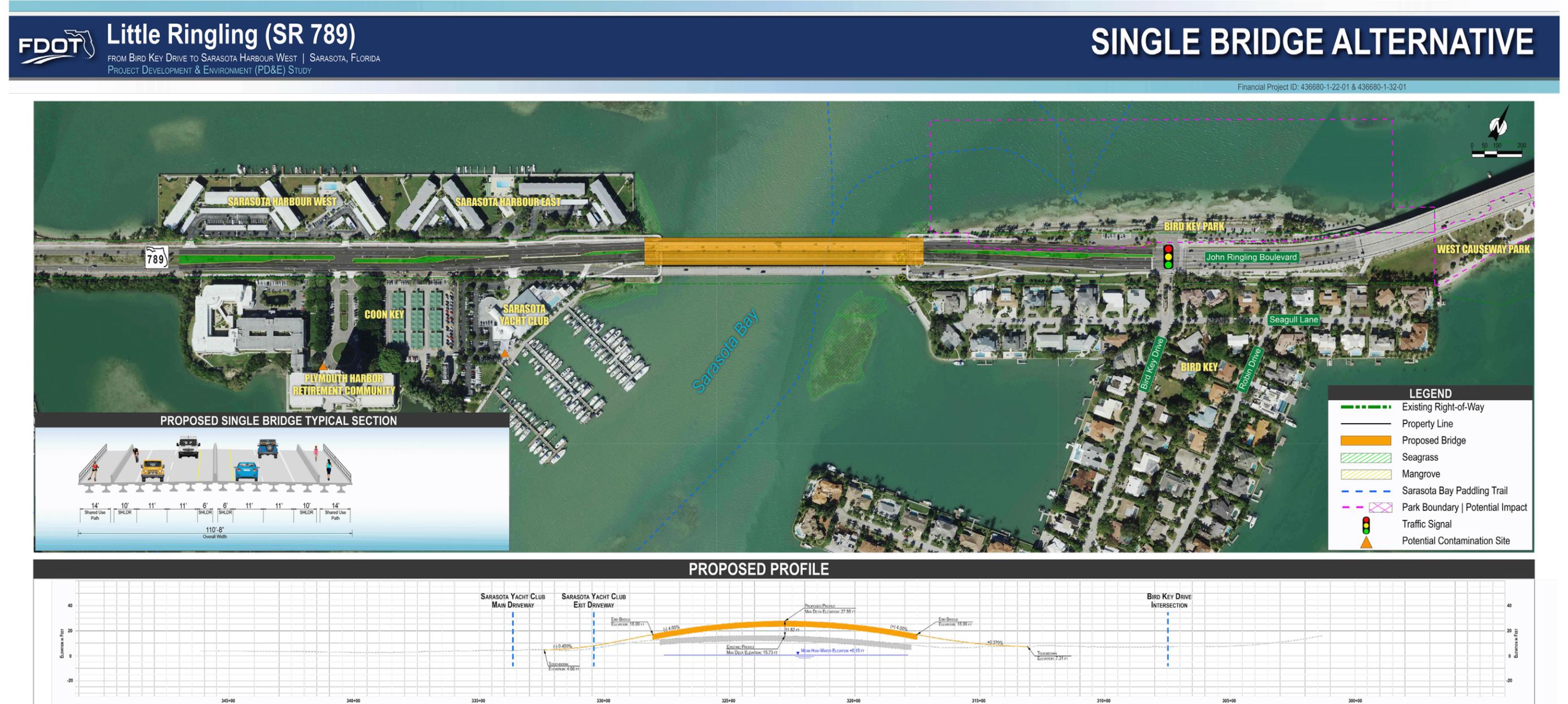
**Table 5-7
Twin Bridge Horizontal Alignment**

STA	Tangent Direction Back	Tangent Direction Ahead	Distance (ft)	Curve Length (ft)	Radius (ft)	Degree of Deflection
PI Sta 1300+00.00		S 59° 25' 51.6" W	882.728			
PC Sta 1308+82.73 PI Sta 1310+87.84 PRC Sta 1312+92.73	S 59° 25' 51.6" W	S 54° 52' 19.2" W		410.001	5153.219'	04° 33' 30.88" LT
PRC Sta 1312+92.73 PI Sta 1315+00.86 PT Sta 1317+08.80	S 54° 52' 19.2" W	S 59° 07' 55.2" W		416.074	5596.440	04° 15' 34.99" RT
PT Sta 1317+08.80		S 59° 07' 55.2" W	1115.313			
PI Sta 1328+24.12		S 61° 35' 24.0" W	496.228			
PI Sta 1333+20.34		S 59° 11' 52.8" W	1140.882			
PI Sta 1344+61.23		S 56° 51' 50.4" W	225.607			
PI Sta 1346+86.83		S 59° 07' 51.6" W	139.614			

**Table 5-8
Twin Bridge Vertical Alignment**

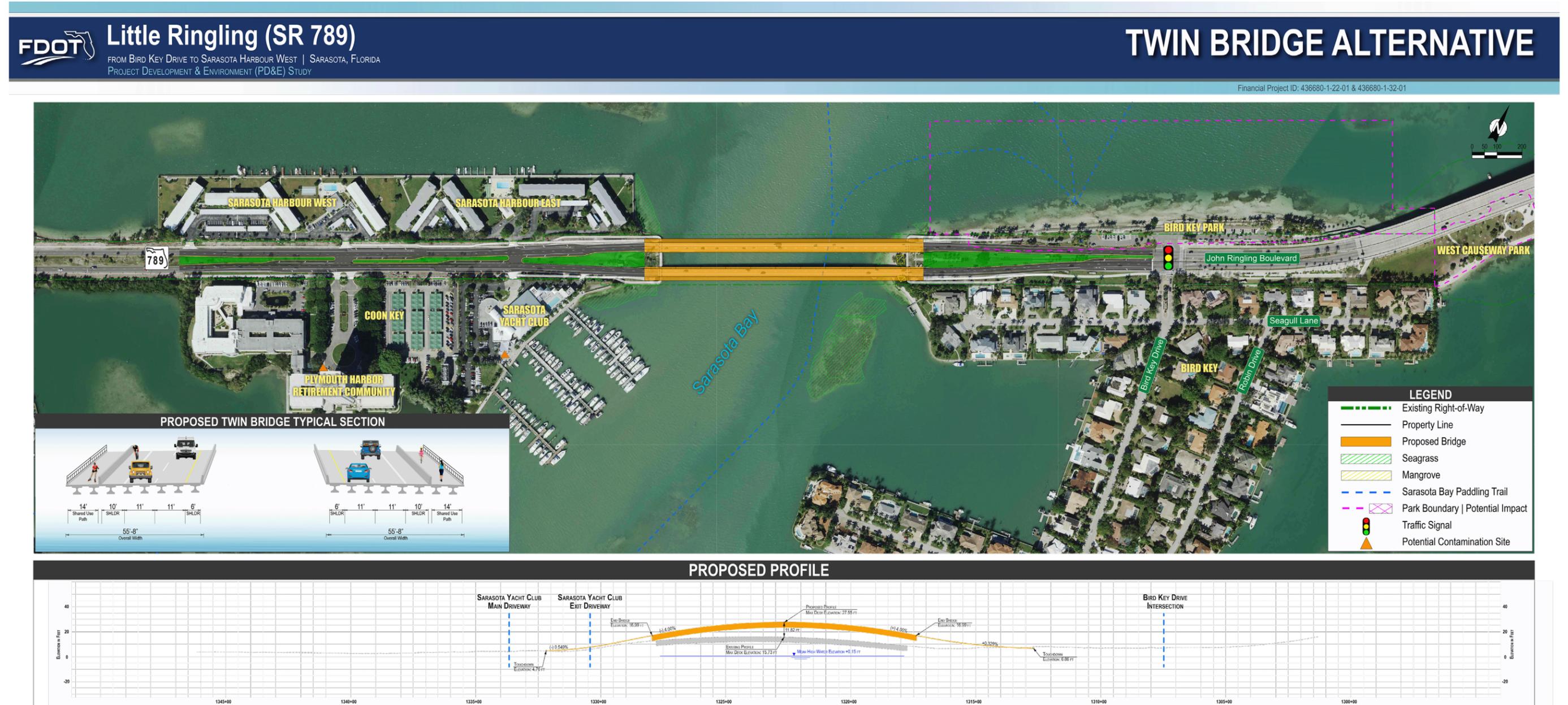
VPC	VPI	VPRC	VPT	Back Grade (%)	Ahead Grade (%)	Curve Length (ft)
1312+70.00	1315+04.00	1317+38.00		+0.329%	+4.00%	468.00
	1322+66.00		1327+94.00	+4.00%	-4.00%	1056.00
1329+44.00	1330+81.00		1332+18.00	-4.00%	-0.549%	274.00

Figure 5-4
SR 789 Proposed Single Bridge Alternative



"The entire project is within the 100-year floodplain zones AE and VE"

Figure 5-5
SR 789 Proposed Twin Bridge Alternative



"The entire project is within the 100-year floodplain zones AE and VE"

5.5 Comparative Alternatives Evaluation

The No-Build, Single Bridge Alternative and Twin Bridge Alternative were presented for public comment on the following dates.

In-Person Public Workshop
Church of the Redeemer
Tuesday, April 5, 2022; 5 pm to 7 pm
222 S. Palm Avenue, Sarasota, FL 34236

Virtual Public Workshop
bit.ly/LittleRinglingWorkshop
Thursday, April 7, 2022; 6 pm to 7 pm

An evaluation matrix presented at the Alternatives Public Workshop is shown in **Table 5-9**. The comparative evaluation matrix reviewed the following metrics for the No-Build, Single Bridge Alternative and Twin Bridge Alternative.

- Benefits to meet the Purpose and Need
 - Safety
 - Barrier Separated Pedestrian Facilities
 - Improves Pedestrian Facilities
 - Improves Bicycle Facilities
 - Maintenance and Operations
 - Reduces Future Maintenance Costs
 - Allows Future Part-time Shoulder Use
- Potential Environmental Impacts
 - Archaeological Probability / Historic Sites (potential)
 - Number of Parks / Recreational Areas Impacted
 - Acres of Wetlands Impacted
 - Acres of Surface Waters Impacted
 - Acres of Seagrass/Submerged Aquatic Vegetation Impacted
 - Acres of Essential Fish Habitat Impacted
 - Potential for Threatened and Endangered Species Impacted
 - Number of High/Medium Risk Contamination Sites
 - Number of Noise Sensitive Sites
- Property Impacts
 - Acres of Right of Way and Number of Parcels/Relocations Impacted
- Estimated Project Costs
 - Design and Construction
 - Maintenance – 30 years
 - Wetland Mitigation
 - Right of Way
 - Construction Engineering and Inspection.

Table 5-9
Evaluation Matrix at Public Workshop

Description	No-Build	Single Bridge Alternative	Twin Bridge Alternative
Benefits			
Safety			
Barrier Separated Pedestrian Facilities	No	Yes	Yes
Improves Pedestrian Facilities	No	Yes	Yes
Improves Bicycle Facilities	No	Yes	Yes
Maintenance & Operations			
Reduces Future Maintenance Costs	No	Yes	Yes
Allows Future Part-time Shoulder Use	No	Yes	Yes
Potential Environmental Impacts			
Archaeological Probability/Historic Sites (potential)	None	Low / None	Low / None
Parks / Recreational Areas	None	1	1
Wetlands (acres)	0	0.06	0.06
Surface Waters (acres)	0	2.42	2.45
Seagrass/Submerged Aquatic Vegetation (acres)	0	0.05	0.07
Essential Fish Habitat (acres)	0	2.48	2.56
Threatened & Endangered Species (potential)	Low	High	High
Contamination Sites Ranked as High/Medium Risk (number)	0 / 1	0 / 1	0 / 1
Noise-sensitive Sites	0	0	1
Property Impacts			
Right-of-Way (acres) Parcels Relocation	0	0	0
Costs (Current Year \$)			
Design	\$2,937,700	\$1,480,400	\$1,480,400
Wetland Mitigation ⁽¹⁾	\$0	\$15,400	\$18,200
Right-of-Way	\$0	\$0	\$0
Construction ⁽²⁾	\$0	\$54,061,200	\$60,988,500
Maintenance – 30 years	\$29,377,100	\$1,491,400	\$1,500,400
Construction Engineering & Inspection	\$3,525,300	\$6,666,300	\$7,498,700
Total Estimated Project Cost ⁽³⁾	\$35,840,100	\$63,714,700	\$71,486,200

(1) Subject to change. Assumes availability/purchase of mitigation bank credits to offset mangrove wetland and seagrass impacts. Values assume \$139,354 cost-per-acre for anticipated fiscal year 2026/27 construction (per FDOT Mitigation Payment Handbook). Costs shown do not include potential costs associated with coral or oyster bed mitigation or permittee-responsible mitigation should mitigation credits not be available.

(2) Final design is included in the construction cost.

(3) Total estimated project costs include engineering, Right-of-Way, and construction but do not include utility relocations, environmental permits or contamination remediation.

As shown in **Figures 5-4** and **5-5**, both of the Build Alternatives bring the existing bridge up to current standards and provide multimodal accommodations for both bike and pedestrian facilities. The potential environmental impacts, shown in **Table 5-9**, are generally the same with a high impact to threatened and endangered species due to the replacement of the bridges over Sarasota Bay. In addition, both Build Alternatives will have similar impacts to the FDOT owned portion of Bird Key Park.

Eighteen members of the public signed into the in-person meeting. Eighty people registered for the virtual workshop with forty people attending the event.

Five comments were received at the public workshop. Sixty-seven comments were provided digitally and fifteen were received by mail following the public workshop.

The following summarizes stakeholders' preferences from this meeting.

- No-Build – 11 in favor
- Single Bridge Alternative – 46 in favor
- Twin Bridge Alternative – 4 in favor
- Build Alternative not specified – 9 in favor

At the conclusion of the workshop, approximately 84% were in favor of replacing the existing bridges with a majority in favor of the Single Bridge Alternative. Replacing the existing bridges addresses the structural integrity and operational deficiencies and will provide greater multimodal transportation access.

Sarasota County Area Transit (The Breeze) staff attended FDOT's April 5, 2022, Public Workshop. The transit authority requested that the new bridge be slightly widened to accommodate a SBBS or bus on shoulder in the future. This improvement aligns with FDOT's Sarasota and Manatee Barrier Island Traffic Study recommendation which proposes a new bridge that adds a flexible lane.

5.6 Selection of the Preferred Alternative

FDOT analyzed a No-Build, a multimodal alternative, and bridge replacement alternatives, with consideration of bicycle/pedestrian facilities, to meet the goals of the project.

The No-Build Alternative only includes routine maintenance performed as needed to keep the bridges open to traffic until safety issues, such as reduced capacity due to ongoing deterioration, would require they be closed. The No-Build Alternative does not meet the Purpose and Need by providing multi-modal accommodation and is therefore not recommended as the preferred alternative but remains as an option throughout the study.

Two Build alternatives (Single Bridge Alternative and Twin Bridge Alternative), replace the existing bridges, address the structural integrity and operational deficiencies and will provide greater multimodal transportation access. The Single Bridge Alternative and the Twin Bridge Alternative utilize the same typical section components and vertical profile.

Construction of the Twin Bridge Alternative will require an additional traffic control phase to

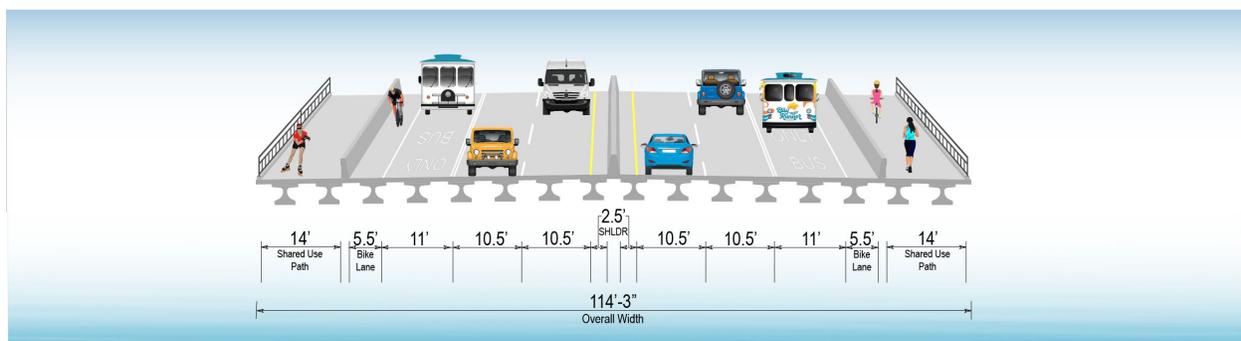
construct a temporary bridge in the median to be used during construction of the first replacement bridge. This additional phase adds to the construction cost of the project and the overall construction duration. At the conclusion of the public workshop, approximately 84 percent of the attendees were in favor of replacing the existing bridges and a majority were in favor of the Single Bridge Alternative.

Concluding the Public Workshop the department re-evaluated the bridge typical section for the Single Bridge Alternative to accommodate a bus on shoulder, requested by the Sarasota County Area Transit, and a dedicated bike lane in each direction.

The addition of these geometric components required re-evaluating the adjacent roadway typical section. To accommodate these changes with no impacts to right of way, a curb and gutter typical section was developed. This change requires design variations for lane width and shoulder width. The approved variations have been uploaded into SWEPT and included in **Appendix E**.

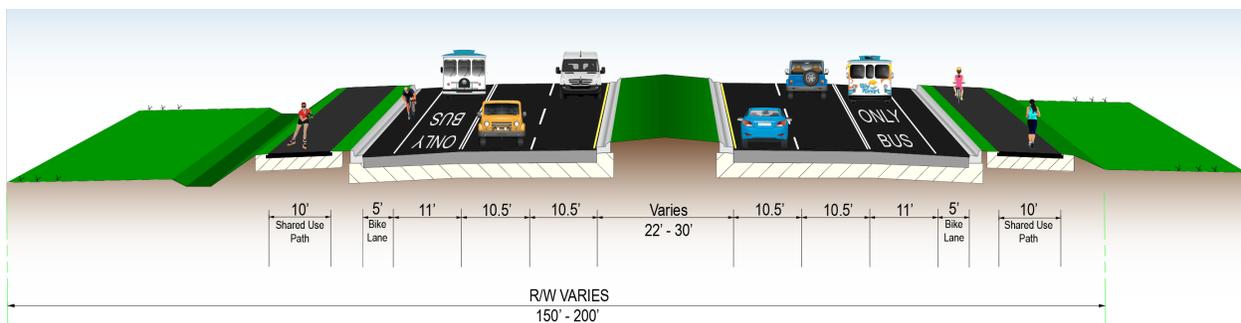
The modified single bridge typical section includes two 10.5-ft wide travel lanes, a 11-ft bus on shoulder, 2.5-ft inside shoulder, 5.5-ft bike lane, and 14-ft shared use path in each direction. The total width of the bridge is 114 ft 3-in, shown on **Figure 5-6**.

Figure 5-6
SR 789 Modified Single Bridge Typical Section



The modified bridge will transition to a curb and gutter roadway typical section that includes two 10.5-ft wide travel lanes, a 11-ft bus on shoulder, and 5-ft bike lane in each direction, separated by a median with Type E curb and gutter. This section of roadway also includes a 10-ft shared-use path on both sides of the roadway that connects to the bridge, shown on **Figure 5-7**. The design speed is 40 mph with a posted and target speed of 35 mph.

Figure 5-7
SR 789 Roadway Typical Section



This alternative, along with the No-Build alternative, were presented to the public at a hybrid public hearing held on March 21, 2024, in-person at 5 p.m. at St. Armands Key Lutheran Church, 40 N. Adam Drive, Sarasota, FL 34326, and online at 5:45 p.m. through GoToWebinar.

The Single Bridge Alternative meets the project needs of adding multimodal accommodations, addressing structural deficiencies, accommodating bus on shoulder and concurrence from the public, and is recommended as the preferred alternative. This alternative addresses the structural deficiencies by replacing the bridge and provides the following to meet the multimodal accommodations:

- The addition of a dedicated bicycle lanes adjacent to the bus on shoulder
- Shared use paths in each direction on the bridge to connect to the existing 10-ft paths on each side of the bridge
- A bus on shoulder to connect to FPID 447824-1 and FPID 445926-2 projects providing dedicated or shared bus/bike lanes

The environmental impacts and costs associated with this alternative are shown in **Table 5-10** and detailed on the conceptual plans in **Appendix A**.

Table 5-10
Preferred Alternative Evaluation Matrix presented at Public Hearing

Description	No Build	Single Bridge Alternative
Benefits		
Safety		
Barrier Separated Pedestrian Facilities	No	Yes
Improves Pedestrian Facilities	No	Yes
Improves Bicycle Facilities	No	Yes
Maintenance & Operations		
Reduces Future Maintenance Costs	No	Yes
Allows Future Part-time Shoulder Use	No	Yes
Expected Service Life	30 years	75 years
Potential Environmental Impacts		
Archaeological Probability/Historic Sites (potential)	None	Low / 8
Parks / Recreational Areas	None	3
Wetlands (acres)	0	0.03
Surface Waters (acres)	0	0.03
Seagrass/Submerged Aquatic Vegetation (acres)	0	0.17
Essential Fish Habitat (acres)	0	2.81
Threatened & Endangered Species (potential)	Low	High
Contamination Sites Ranked as High/Medium Risk (number)	0 / 1	0 / 1
Noise-sensitive Sites	0	4

Table 5-10
Preferred Alternative Evaluation Matrix presented at Public Hearing

Description	No Build	Single Bridge Alternative
Property Impacts		
Right-of-Way (acres) Parcels Relocation	0	0
Costs (Current Year \$, 2022)		
Preliminary Design	\$2,938,000 ⁽¹⁾	\$1,480,000
Final Design	\$0	\$900,000
Wetland Mitigation ⁽²⁾	\$0	\$30,000
Right-of-Way	\$0	\$0
Construction	\$0	\$48,470,000
Maintenance – 30 years	\$29,377,000	\$1,550,000
Construction Engineering & Inspection ⁽³⁾	\$3,525,000	\$5,820,000
Total Estimated Project Cost ⁽⁴⁾	\$38,840,000⁽⁵⁾	\$58,250,000

(1) Assumes engineering design and construction plan development

(2) Subject to change. Assumes availability/purchase of mitigation bank credits to offset mangrove wetland and seagrass impacts. Values assume \$159,829 -per-acre mitigation cost for anticipated fiscal year 2028/29 construction (per FDOT's FY 24/25 – 28/29 Work Program Instructions). Costs shown do not include potential costs associated with coral or oyster bed mitigation or permittee-responsible mitigation should mitigation credits not be available.

(3) CEI is 12% of the Long Range Estimate construction cost.

(4) Total estimated project costs include engineering, right-of-way, and construction but do not include utility relocations, environmental permits or contamination remediation.

(5) Due to the condition of the bridges, the No Build would require increasingly costly and disruptive maintenance and major rehabilitation projects to keep them functional.

6.0 AGENCY COORDINATION & PUBLIC INVOLVEMENT

6.1 Agency Coordination

At the beginning of the study, numerous agencies and stakeholders were identified that would have an interest in the Little Ringling PD&E study. Stakeholders include representatives from various local governments, chambers of commerce, civic organizations, environmental groups, and local businesses.

Through the ETDM process (project #14384), FDOT informed numerous federal, state, and local agencies of the project and its scope. The agency Environmental Technical Advisory Team (ETAT) members provided their comments on the project's purpose and need and issued their Degree of Effect (DOE) by resource area. Upon completion of the ETDM Programming Screen review, the Programming Screen Summary Report was developed and published on July 30, 2020. As a result of the ETDM screening, there were no substantial comments received.

Within the July 2020 ETDM Final Programming Screen Summary Report, several resource elements received a "moderate" determination of effect including Aesthetic Effects, Section 4(f) Potential, Historic and Archaeological Sites, Recreation Areas, Wetlands and Surface Waters, Water Quality and Quantity, Floodplains, Coastal and Marine, Navigation and Special Designations. Opportunities for alternatives development and the avoidance and minimization of potential impacts to the social, cultural, natural, and physical environment are limited by the interrelation of the project's location, the need to use existing SR 789 roadway Right-of-Way and waterward easement areas, and the bridge work proposed as necessary to achieve the project purpose and need without resulting in additional impacts to one or more of these environmental parameters. However, based on the conceptual design for the Preferred Alternative, the proposed improvements have generally avoided impacts to Historic and Archaeological Sites and Recreation Areas. Through the development of the Preferred Alternative as a best-fit alignment, environmental impacts are unavoidable, and these impacts will be minimized and offset through the implementation of best management practices and compensatory mitigation to the extent practicable.

[6.1.1 City of Sarasota and Sarasota-Manatee MPO Meeting - April 2020](#)

FDOT representatives attended a meeting with the City of Sarasota and Sarasota-Manatee MPO. Discussion included bus on shoulder facilities, bike lanes, and project overlap between the SR 789 PD&E study limits and an adjacent roadway resurfacing project.

[6.1.2 City of Sarasota and Sarasota-Manatee MPO Meeting - June 2020](#)

FDOT representatives attended a meeting with the Sarasota-Manatee MPO. FDOT provided an overview of the project and updates on the conceptual design. The MPO was provided an opportunity to ask questions and provide feedback.

[6.1.3 City of Sarasota and Longboat Key Joint Meeting - November 8, 2021](#)

FDOT representatives attended a meeting with the City of Sarasota and Longboat Key. FDOT provided an overview of the project and updates on the conceptual design via a presentation. The

cities were provided an opportunity to ask questions and provide feedback. During this time, the benefits of each alternative were explained, including discussion of reduction of potential traffic impacts during the peak "snowbird" season.

6.1.4 City of Sarasota Meeting - March 25, 2022

FDOT representatives attended a meeting with the City of Sarasota prior to the public workshop. FDOT provided an overview of the project and updates on the project alternatives and materials being presented at the upcoming workshop. The City was provided an opportunity to ask questions and provide feedback.

6.1.5 City of Sarasota Meeting - May 11, 2023

FDOT representatives attended a meeting with the City of Sarasota to discuss their request to set up an aesthetics committee to discuss the potential aesthetic and design treatments for the proposed improvements, including the Little Ringling Bridge, adjacent roadway corridor, lighting, landscape, and hardscape elements within the study limits.

6.1.6 City of Sarasota Aesthetics Kickoff Meeting - October 13, 2023

FDOT and project team representatives attended an aesthetics committee kickoff meeting with the City of Sarasota regarding the development of the aforementioned aesthetics committee. Project team representatives provided an overview of the goals and expectations for the aesthetics committee process, as well as the process for determining potential committee members from local governmental, neighborhood, citizen, and business groups. The City was provided an opportunity to select their own committee members, as well as provide recommendations for community member participation.

Coordination is on-going to determine the committee representatives. Once committee members are determined, this coordination will continue in conjunction with the project's Design phase.

6.1.7 Sarasota-Manatee Metropolitan Planning Organization – March 11, 2024 and March 25, 2024

The FDOT attended the Sarasota-Manatee Metropolitan Planning Organization (MPO) Technical Advisory Committee (TAC) and Citizen Advisory Committee (CAC) meetings on March 11, 2024 prior to the Public Hearing, and the MPO Board on March 25, 2024 after the Public Hearing. Each group was provided an opportunity to ask questions and provide feedback on the Preferred Alternative.

6.2 Public Involvement

A *Comments and Coordination Report* was prepared to fully document the public, agency and stakeholder involvement associated with this project. Coordination efforts completed to date are summarized below.

6.2.1 Advance Notification Package

An Advance Notification package was completed for this project and mailed to the Florida State Clearinghouse and local and federal agencies on January 24, 2020, in accordance with

Governor’s Executive Order 95-359 – Florida State Clearing House and President’s Executive Order 12372 – Intergovernmental Review of Federal Programs. Any comments received are addressed in the final environmental document.

6.2.2 Public Involvement Plan

A *Public Involvement Plan* (PIP) (May 2020) was prepared at the start of the study. This program was implemented in accordance with the FDOT’s PD&E Manual; Section 339.155, Florida Statute (F.S.); Executive Orders 11990, Protection of Wetlands and 11988, Floodplain Management; Council on Environmental Quality (CEQ) Regulations for implementing the procedural provisions of the National Environmental Policy Act; and 23 Code of Federal Regulations (CFR) 771. The PIP outlines the strategies used to address public involvement and outreach over the course of the study. Additionally, a *Comments and Coordination Report* will be prepared to fully document the public, agency and stakeholder involvement associated with this project.

6.2.3 Project Kickoff Notification

FDOT District One sent project kickoff emails to elected and appointed officials on June 8, 2020. These emails provided an overview of the project and public involvement program. They also included the first project newsletter. The project kickoff newsletter was mailed on June 9, 2020 to local residents, businesses and other interested parties who requested to be added to the project mailing list. This newsletter informed the public of the start of the project, included a discussion of the study process and schedule, encouraged the need for public input, and provided FDOT point-of-contact information regarding citizen questions, comments, and concerns.

6.2.4 Small Group Meetings/Presentations

To involve more of the public, presentations were made to various local organizations and groups interested in the project.

6.2.4.1 Sarasota Harbour East Residential Community – January 26, 2021

There were nine attendees at the meeting. The meeting provided an update on the project with a presentation. The Sarasota Harbour East committee members were provided time to ask the project team questions and provide feedback on the project to date. The main topics of concern presented from the attendees were:

- Access to their building during construction,
- Changes in the roadway in front of their property (adding a turn lane, changes in clearance, median openings/closings, footprint of the bridge, etc.),
- Sound abatement,
- Storm resiliency, and
- The format and timing of the public meetings.

6.2.4.2 Sarasota Yacht Club – February 3, 2021

The meeting provided an update on the project with a presentation. The Sarasota Yacht Club was provided time to ask the project team questions and provide feedback on the project to date.

6.2.4.3 Sarasota Harbour West Residential Community – March 29, 2021

There were five attendees at the meeting. The meeting provided an update on the project with a presentation. The Sarasota Harbour West committee members were provided time to ask the project team questions and provide feedback on the project to date. The main topic of concern presented by attendees was whether a right turn lane could be added to their property. Additionally, the public meeting timeline and format was discussed.

6.2.5 Alternatives Public Workshop – April 5, 2022, and April 7, 2022

An Alternatives Public Workshop was held on Tuesday, April 5, 2022, at the Church of the Redeemer, 222 S. Palm Avenue, Sarasota, FL 34236. The in-person event was held from 5 p.m. to 7 p.m. and was held as an open-house. A virtual public workshop was held on April 7, 2022, online through GoTo Webinar. The online event was held from 6 p.m. to 7 p.m. and was held in a presentation and question-and-answer format. The purpose of both workshop events was to provide an opportunity for the public to provide comments regarding the alternatives being considered for the project. Alternatives presented included a "no build" alternative, a single bridge alternative and a twin bridge alternative.

During the workshop events, stakeholders were able to view the project video, materials, and boards and discuss any questions they had with project staff. FDOT's project manager provided a brief statement on the project and following the project video, attendees were able to ask questions and share concerns with the project team. Eighteen (18) people signed into the in-person meeting. Eighty (80) people registered for the virtual workshop with forty (40) people attending the event.

Participants were given an opportunity to provide public comments through the following methods: 1) written comments at the workshop, 2) mail comments to the FDOT's project manager, 3) e-mail comments to the FDOT's project manager, and via the project website: swflroads.com/789/littleringling/.

Five (5) comment cards were received at the public workshop. Sixty-seven (67) comments were provided digitally following the public workshop. Fifteen (15) comments were received by mail following the public workshop.

During the public comment period, 11 stakeholders preferred the no-build option, 46 stakeholders preferred the single bridge alternative, 4 stakeholders preferred the twin bridges alternative, and 9 stakeholders supported improvements to the bridges but did not specify a preference for a specific alternative. The number of stakeholders who provided their preference is different than the total number of comments due to stakeholders commenting multiple times and/or only providing questions or feedback.

The main concerns identified by stakeholders were implementing traffic calming/speed mitigation methods for John Ringling Boulevard, incorporating an aesthetic design for the bridge, bicyclist and pedestrian safety improvements, addition of traffic signals and mid-block crossings, maintaining the turn lanes into Sarasota Harbour East and the Sarasota Yacht Club, and construction maintenance of traffic.

Following correspondence on the project alternatives, FDOT staff met with a homeowner along Bird Key Drive on April 19, 2022 to further address their concerns on the potential impacts the project alternatives may have on their property.

Since a majority of the stakeholders preferred the single bridge alternative, this option will be carried forward to the Public Hearing as the preferred alternative.

6.3 Public Hearing

A hybrid public hearing was held on March 21, 2024, in-person at 5 p.m. at St. Armands Key Lutheran Church, 40 N. Adam Drive, Sarasota, FL 34326, and online at 5:45 p.m. through GoToWebinar. The purpose of the hearing was to provide interested persons with information on the Preferred Alternative selected by the FDOT, and to allow the public the opportunity to comment.

Prior to the public hearing, FDOT distributed a project newsletter, two legal ads, press release, website notification, FDOT public meeting notice, and advertisement in the Florida Administrative Register (FAR). The newsletter was mailed on February 23, 2024, which served as notification of the public hearing. The newsletter also listed locations where the project documents would be displayed for review at least 21 days prior to the hearing, which included the project website. The full mailing list for this newsletter was updated in February 2024. The public hearing notifications, including emails, advertisements, screenshots of the website public hearing announcements and project documents displayed on February 29, 2024, newsletter invite, and mailing list, are provided in the Comments and Coordination Report, prepared under a separate cover.

A total of 83 citizens and 1 elected official (representing Longboat Key) signed in at the public hearing. The meeting began with an open house from 5:00 p.m. to 6:00 p.m., followed by opening remarks and a presentation at 6:00 p.m. The presentation discussed an overview of the project and associated impacts. These details included the PD&E study process, a description of the Preferred Alternative selected by the FDOT, and the estimated project costs. A 10-minute intermission began at 6:24 p.m. and the public testimony period began at 6:34 p.m. Four citizens gave verbal comments during the public testimony portion of the hearing, and the public hearing concluded at 6:45 p.m.

Attendees were provided with a handout with information on the purpose and need for the project, as well as detailing the Preferred and No-Build Alternative. The sign-in sheets, hearing handout, speaker cards, comment sheets from the meeting, as well as those received in the 14 days following, can be found in the Comments and Coordination Report, prepared under a separate cover.

11 comment forms were received at the hearing and 13 were received electronically during the hearing comment period. Of the 24 comments received, 11 were in support of the project, five were in support of the no-build alternative, and eight did not specify their preference. The main topics of concern were impacts to traffic during construction/Maintenance of Traffic (MOT), aesthetics, landscaping, environmental impacts, and bicycle/pedestrian improvements.

7.0 PREFERRED ALTERNATIVE

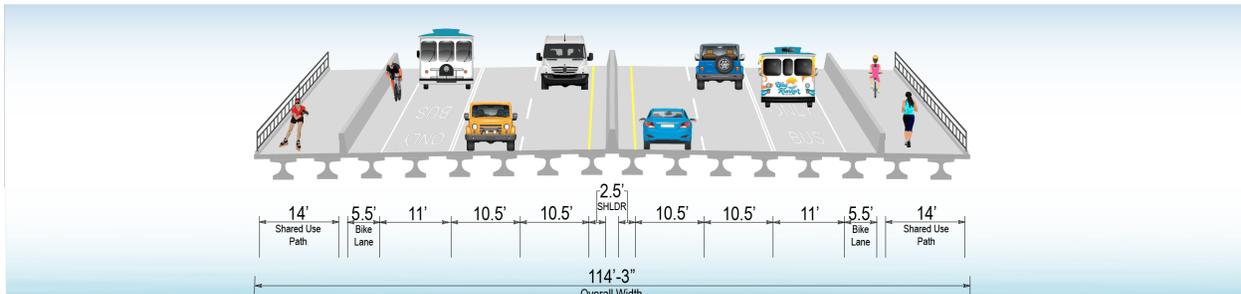
This section summarizes the results of the preliminary design analysis that includes a discussion of the Preferred Alternative. **Appendix A** provides a complete set of concept plans displaying the Preferred Alternative. Typical sections, geometry, costs, drainage, and socioeconomic and environmental impacts associated with the Preferred Alternative are documented in greater detail in the following sections. Bus on shoulders were added to this project after the Public Workshop to connect to the following projects.

- FPID 447824-1: Work to include restriping the lanes on the John Ringling Causeway Bridge to add a separate bike lane.
- FPID 445926-2: Work to include adding a transit lane from the John Ringling Causeway Bridge to Bird Key Drive intersection.

7.1 Typical Sections

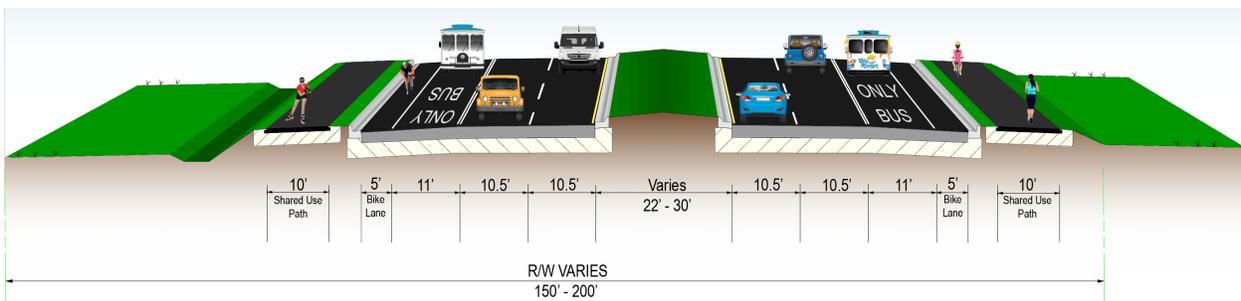
The preferred alternative replaces the existing twin bridges with a single bridge. The single bridge typical section includes two 10.5-ft wide travel lanes, an 11-ft bus on shoulder, 2.5-ft inside shoulder, 5.5-ft bike lane, and 14-ft shared use path in each direction. The total width of the bridge is 114 ft 3-in, shown on **Figure 7-1**.

Figure 7-1
SR 789 Preferred Single Bridge Typical Section



The new bridge will transition to a curb and gutter roadway typical section that includes two 10.5-ft wide travel lanes, an 11-ft bus on shoulder, and 5-ft bike lane in each direction, separated by a median with Type E curb and gutter. This section of roadway also includes a 10-ft shared-use path on both sides of the roadway that connects to the bridge, shown on **Figure 7-2**. The design speed is 40 mph with a posted and target speed of 35 mph.

Figure 7-2
SR 789 Preferred Roadway Typical Section



The Typical Section Package was approved on April 4, 2023 and is in **Appendix D**.

7.2 Access Management

The existing access management classification, Class 5, will remain for the preferred alternative, shown in **Table 2-1**. There are no directional median openings proposed for the preferred alternative. Full median openings/signal spacing were evaluated to meet the 1320-ft spacing however, the preferred alternative does not eliminate/modify any of the existing median openings along the project corridor as shown in **Table 2-2**. The only median opening not meeting criteria is from Sarasota Harbour East/Yacht Club Entrance to Sarasota Harbour West/Plymouth Harbor Entrance.

7.3 Right-of-Way

The Sarasota County Comprehensive Plan [Element 4: Mobility - Chapter 10 - Transportation] Table 10-4 identifies various portions of SR 789 (including within the project limits) as a “constrained roadway”. Constrained County roadways are defined as exhibiting a level of service lower than the adopted standard and not being able to attain the adopted standard because prohibitive costs or environmental limitations prevent the construction of at least two additional through lanes.

The proposed improvements will be constructed within the existing SR 789 alignment and FDOT’s existing right-of-way, with no acquisitions proposed.

The FDOT has issued a Public Use Lease Agreement to the City of Sarasota for the construction of a portion of Bird Key Park within the FDOT’s existing SR 789 right-of-way. The easement was authorized effective April 1, 2020 and expires on April 1, 2035 (pending a subsequent 25-year renewal at the City’s option). Minor impacts to this lease agreement are anticipated and discussed in the *Type 2 Categorical Exclusion*.

7.4 Horizontal and Vertical Geometry

Table 7-1 and **7-2** describe the proposed horizontal and vertical geometry within the project limits.

Table 7-1
Proposed Horizontal Alignment

STA	Tangent Direction Back	Tangent Direction Ahead	Distance (ft)	Curve Length (ft)	Radius (ft)
PI Sta 100+00.00		S 59° 02' 06" W	801.977	N/A	N/A
PI Sta 108+01.98	S 59° 02' 06" W	S 59° 38' 16.8" W	425.189	N/A	N/A
PI Sta 112+27.17	S 59° 38' 16.8" W	S 61° 35' 42" W	493.731	N/A	N/A
PT Sta 117+20.90	S 61° 35' 42" W	S 59° 07' 55.2" W	1116.646	N/A	N/A
PI Sta 128+37.54	S 59° 07' 55.2" W	S 55° 31' 19.2" W	476.575	N/A	N/A
PI Sta 133+14.12	S 55° 31' 19.2" W	S 59° 01' 15.6" W	2086.188	N/A	N/A
PI Sta 154+00.31	S 59° 01' 15.6" W			N/A	N/A

**Table 7-2
Proposed Vertical Alignment**

VPC	VPI	VPT	Back Grade (%)	Ahead Grade (%)	Curve Length (ft)
113+80.08	114+85.60	115+91.11	+0.40%	+3.50%	211.03
117+51.13	122+79.13	128+07.13	+3.50%	-3.50%	1056.00
130+27.13	131+46.63	132+66.13	-3.50%	-0.30%	239.00

7.5 Design Variations and Design Exceptions

In a constrained urban environment, it may be necessary to deviate from standard design criteria used in the design process. Elements have been identified for additional documentation during the design phase.

Design variations for the following elements will be required.

- Lane Width
 - Chapter 210, Table 210.2.1, the minimum lane width for a C3 facility with a design speed of 40 mph is 11 ft. The preferred alternative has 10.5-ft travel lanes to accommodate a bus on shoulder.
- Bridge Shoulder Widths
 - Median Shoulder
 - Chapter 260, Figure 260.1.4, the minimum median shoulder width for bridges longer than 500 ft is 6 ft. The preferred alternative to accommodate a bus on shoulder will reduce the median shoulder to 2.5 ft. A variation has been prepared and approved.
 - Outside Shoulder
 - Chapter 260, Figure 260.1.4, the minimum outside shoulder width for bridges longer than 500 ft is 8 ft. The preferred alternative to accommodate the original transit facility would have reduced the outside shoulder to 5.5 ft which would also be used as a bike lane. A variation has been prepared and approved. Now with the designation of bus on shoulder, a variation is no longer required.

7.6 Multimodal Accommodations

7.6.1 Bicycle and Pedestrian

Existing pedestrian and bicycle facilities on SR 789 were identified in Sections 2.2.10.1 and 2.2.10.2. The proposed improvements provide an opportunity to address pedestrian and bicycle facilities across the bridge.

The proposed improvements will include a 5.5-ft outside shoulder to serve bicyclists and a 14-ft shared use path across the bridge connecting to 5-ft bicycle lanes and 10-ft shared use paths along the roadway section. The addition of these improvements on the bridge meets the *Sarasota County Trails Master Plan (2018)*: Longboat Key Trail and the *Sarasota County Bicycle and Pedestrian Master Plan Update: Chapter 6 –Gap Analysis and Prioritization (2021)*.

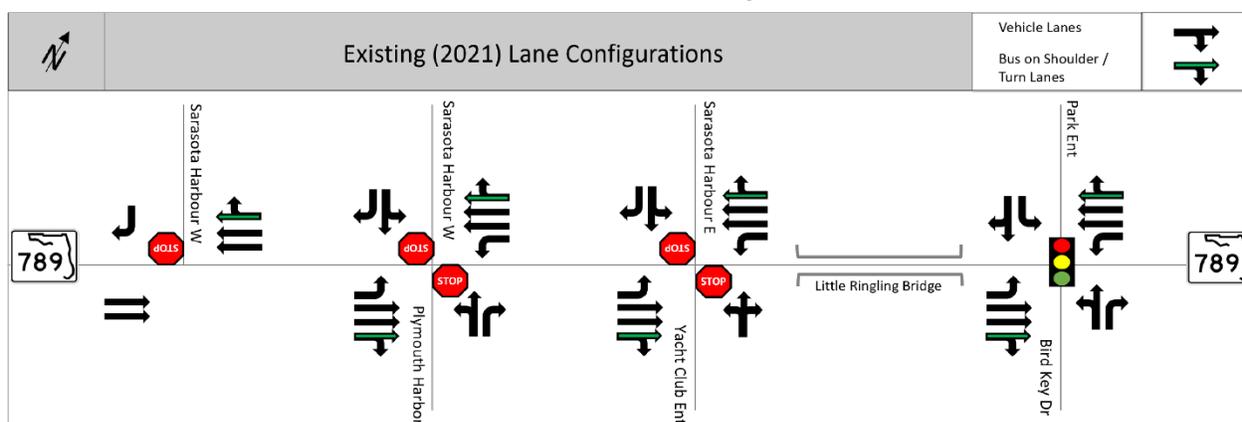
7.6.2 Transit

The 2045 Sarasota/Manatee MPO Long Range Transportation Plan, October 26, 2020, has identified a significant number of important bridges that are reaching the end of their 50-year life cycle that will need to be replaced in the next 25 years. These bridges serve as gateways to urban centers, freight corridors, tourism connectors, and evacuation routes. The MPO Board supports the addition of multi modal facilities on all bridges with a special emphasis on Bus-on-Shoulder lanes for future micro and rapid transit as well as emergency management. The proposed improvements have been designed to accommodate a bus on shoulder.

7.7 Intersection/Driveway Concepts

Figure 7-3 shows the proposed lane configurations at the non-signalized driveways and signalized intersection. The only modification from the existing is the addition of bus on shoulder and right turn lanes at the Bird Key Drive, Sarasota Harbour East/Yacht Club and Sarasota Harbour West/Plymouth Harbor intersections/driveways. The signal timing at Bird Key Drive will require adjustments to accommodate the bus on shoulder.

Figure 7-3
SR 789 Proposed Lane Configuration



7.8 Tolled Projects

SR 789 is not a tolled facility.

7.9 Intelligent Transportation System and TSMO Strategies

As part of this project, conduits for future ITS systems will be installed in the bridge railings.

7.10 Landscape

The proposed typical sections include bicycle lanes, shared use paths and grassed shoulder. In addition, the proposed medians may provide additional green spaces to improve the appearance of the roadway for users. Context-sensitive solutions such as aesthetic features and landscaping will be evaluated further during the design phase so that the project is in harmony with local communities and preserves and/or enhances the natural, environmental, scenic, and aesthetic values of the area. The placement and maintenance of any landscaping will comply with applicable roadway clear zone and sight distance requirements.

7.11 Lighting

Light poles are currently installed on both sides of the roadway. The location of the proposed lighting will be determined during the design phase and the type determined as part of the Aesthetic Committee’s responsibilities.

7.12 Wildlife Crossing

No wildlife crossings are proposed for this project.

7.13 Permits

The following permits are anticipated for this project:

7.13.1 Federal Permit(s)

U. S. Coast Guard (USCG) Bridge Permit..... To be acquired

USACE Section 10 or Section 404 Permit To be acquired

7.13.2 State Permit(s)

DEP or Water Management District (WMD) Environmental Resource Permit (ERP)
..... To be acquired

DEP National Pollutant Discharge Elimination System Permit To be acquired

7.13.3 Perpetual Easement # 22193

Waterward portions of SR 789 constructed over the Coon Key Waterway were authorized by Perpetual Easement #22193 from the State Trustees of the Internal Improvement Trust Fund (TIITF). The FDOT will complete design-phase coordination with the Florida Department of Environmental Protection and the TIITF to determine whether any modifications to the existing perpetual easement may be needed due to the revised footprint needed for the Preferred Alternative.

7.14 Drainage and Stormwater Management Facilities

The design criteria for stormwater management facilities will comply with all regulatory requirements, including the *SWFWMD ERP Applicant’s Handbook, Volume II*, Chapter 5 of the *2024 FDOT Drainage Manual* and Chapter 9 of the *2024 FDOT Drainage Design Guide*. Additional guidelines for developing BMPs for stormwater runoff are provided in the *2015 FDOT BMP Designer and Review Manual* and the *2015 Sarasota County Low Impact Development Guidance Document*. Pre-application meetings were held with SWFWMD on July 11th, 2019, and November 3, 2022.

7.14.1 Water Quality

Sarasota Bay (WBID 1968C) is impaired for nutrients and will require nutrient loading criteria for impaired waterbodies. The project discharges directly into an OFW, which requires 50% additional treatment volume above the presumptive treatment requirements. The proposed improvements do not add capacity to the existing roadway and the additional impervious from bicycle lanes and sidewalks are exempt from water quality requirements. Based on the November 3, 2022, meeting

with SWFWMD, treatment of the shoulders used by buses will be required.

Water quality improvements will be explored within the available “green space” to include stormwater BMPs within the existing right-of-way. Due to the additional width, the removal of scuppers shall be considered to remove directly connected impervious areas from the Sarasota Bay.

7.14.2 Water Quantity

As verified with SWFWMD on 7/11/19 and 11/3/22, for projects discharging to a tidal water body, the peak discharge requirements are not required, therefore no water quantity volumes are considered for this report. Floodplain compensation is also exempt due to the tidal outfall.

7.14.3 Stormwater Management Facilities

The *Pond Siting Memorandum* document that due to the low infiltration rates of the compacted underlying soil and no attenuation storage requirements, on-line detention (dry detention) is the recommended BMP option for this project. Detention basins add the following benefits to the project:

- Pollutant removal efficiencies
- Can be accomplished with shallow depth basins (no attenuation storage required above overflow)
- Applicable to varying and high water table conditions
- Can add aesthetic features to the project

7.15 Floodplain Analysis

The *Location Hydraulics Memorandum* documents that floodplain compensation is not required due to the tidally influenced outfall.

“PROJECTS WHICH WILL NOT INVOLVE THE REPLACEMENT OR MODIFICATION OF ANY DRAINAGE STRUCTURES”

These projects must be on existing alignment. They may involve a change in the profile grade elevation of a magnitude normally associated with resurfacing. There are no known drainage problems within the limits of the project, or other factors that override the need for concurrent drainage improvements.

Furthermore, the project will not affect existing flood heights or floodplain limits. There will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes as the result of construction of this project. Therefore, it has been determined that this encroachment is not significant.

7.16 Bridge and Structure Analysis

A new bridge will be constructed to replace the twin structures currently in use. The single bridge typical section includes two 10.5-ft wide travel lanes, a 11-ft bus on shoulder, 2.5-ft inside shoulder, 5.5-ft bike lane, and 14-ft shared use path in each direction. Pedestrians would be protected with a raised barrier and a pedestrian railing.

The maximum vertical clearance under the center of the bridge is 22.23 ft which is 10.5 ft higher than the existing. The Coon Key Waterway is navigable but not regulated by the US Coast Guard. The new bridge will provide additional vertical clearance for local boaters. The minimum vertical clearance at the ends of the bridge is 12.99 ft which is 7.23 ft higher than the existing bridge. The higher end spans allow for a pedestrian walkway under the ends of the bridge. This will provide safe passage under the roadway for pedestrians and other users of the shared use paths.

The Preferred Alternative is not anticipated to result in the alteration or obstruction of scenic views associated with agricultural features or Florida Scenic Highways or Byways as none occur in the project study area. The elevation change of the bridge will be visible from the west end of Bird Key Park, various residences along the west end of Bird Key, the eastern-most condominium building within Sarasota Harbor East, the Sarasota Yacht Club and higher floors of the Plymouth Harbor Retirement Community. However, these changes are not anticipated to be a significant visual barrier within the current environment.

7.17 Transportation Management Plan

During design and construction, maintenance of traffic during construction activities will be developed then continually monitored and evaluated to provide safe construction zones with minimum traffic delays and maintenance of access to properties along the surface streets.

Strategies to communicate and inform the public (users of affected facilities and area properties) of expected work zone impacts and changing project conditions will be developed and implemented to provide effective maintenance of traffic. Traveler information will be provided through a combination of:

- Community outreach as part of the project's Community Awareness Plan,
- A project website, which will be maintained and updated regularly with events affecting the public surrounding the project area, and
- Local news media, which will be notified in advance of road closings and other construction-related activities that potentially could inconvenience the community, so that motorists, residents, and businesses can adjust plan travel routes accordingly.

7.18 Constructability

The new bridge will be constructed in two phases. In Phase 1, a work trestle will be constructed across the waterway between the two existing bridges. From this platform, crews will begin constructing drilled shaft foundations and bridge spans, backing up and removing the trestle as work progresses. Once this new two-lane bridge is completed across the channel, the two westbound lanes of traffic will be shifted to the new bridge and the existing westbound bridge will be removed.

In Phase 2, the remaining two lanes will be constructed. At the end of Phase 2, all traffic will be shifted onto the new bridge and the existing eastbound bridge will be removed.

7.19 Construction Impacts

Construction activities for the proposed project may cause minor short-term noise, air quality,

water quality, traffic congestion and visual impacts within the immediate vicinity of the project.

For residents living along the project, some of the construction equipment and materials stored for the project may be displeasing visually; however, this will be a temporary condition and should pose no substantial problem.

Minor noise and vibration effects may occur from heavy equipment movement and construction activities. This will be minimized by adherence to noise control measures found in the most current edition of FDOT's Standard Specifications for Road and Bridge Construction. Specific noise level and vibration problems that may arise during project construction will be addressed by the FDOT Construction Engineer in cooperation with the appropriate Environmental Specialist.

Minor air quality impacts may occur as a result of dust from earthwork and unpaved areas. These impacts will be minimized by adherence to applicable state regulations and to applicable sections of the FDOT's Standard Specifications for Road and Bridge Construction.

Potential water quality impacts resulting from erosion and sedimentation during construction will be controlled in accordance with the agency permit conditions, the most current edition of the FDOT's Standard Specifications for Road and Bridge Construction, Section 104 "Prevention, Control, and Abatement of Erosion and Water Pollution", and through the use of BMPs. These BMPs (e.g., siltation barriers and containment devices) will prevent water quality degradation to surrounding or nearby waters during construction activities. A National Pollutant Discharge Elimination Systems (NPDES) construction permit will be acquired, and the associated requirement to develop and implement a Stormwater Runoff Control Concept will be met.

Short-term construction related wetland impacts will be minimized by adherence to regulatory agency permit conditions and the FDOT's Standard Specifications for Road and Bridge Construction. BMPs such delineation markers, barrier fencing, and runoff containment measures will be implemented to limit equipment access and control turbid water discharges outside of construction limits.

Maintenance of traffic and sequencing of construction will be planned and scheduled to minimize traffic delays throughout the project. There are no alternative access points along the corridor, so detours around the work zones are not possible. Signage will be used as appropriate to provide pertinent information to the traveling public. The local news media will be notified in advance of potential road closings and other construction related activities that may excessively inconvenience the community so that motorists, residents, and businesspersons can make other accommodations. A sign providing the name, address, and telephone of an FDOT contact person will be displayed on-site to assist the public in obtaining immediate answers to questions about project activity.

Based on these considerations, construction of the Preferred Alternative is not expected to result in significant impacts.

7.20 Special Features

The FDOT has and will continue to engage local residents and adjacent property owners along with the City of Sarasota, Sarasota County and other applicable stakeholders during the design

phase. This is being done through the formation of an aesthetics committee to solicit input on potential project effects as well as opinions and preferences regarding general design concepts related to aesthetics within the project corridor. Context-sensitive solutions for aesthetic features such as bridge railings, colors, textures, lighting, landscaping and hardscape elements will be evaluated further during the design phase so that the project is compatible with local communities and preserves and/or enhances the natural, environmental, scenic, and aesthetic values of the area. The placement and maintenance of aesthetic elements will comply with applicable engineering and standards such as roadway clear zone and sight distance requirements.

7.21 Utilities

The proposed improvements will potentially have utility impacts associated with the increased width of the roadway facility and proposed closed drainage system. None of the Utility Agency/Owner (UAOs) claimed an easement or reimbursement so all relocations will be at the UAOs expense. More detail will be available as the design progresses to Phase II plans.

7.22 Cost Estimates

Preliminary project costs for construction, preliminary engineering, right-of-way, and construction engineering and inspection were developed for the Preferred Alternative and are included in **Table 7-3**. The project's Long Range Estimate (LRE) has been included within **Appendix C**, which summarizes the design and construction cost for the Preferred Alternative.

**Table 7-3
Preferred Alternative Evaluation Matrix**

Description	Single Bridge Alternative
Benefits	
Safety	
Barrier Separated Pedestrian Facilities	Yes
Improves Pedestrian Facilities	Yes
Improves Bicycle Facilities	Yes
Maintenance & Operations	
Reduces Future Maintenance Costs	Yes
Allows Future Part-time Shoulder Use	Yes
Potential Environmental Impacts	
Archaeological Probability/Historic Sites (potential)	Low / 8
Parks / Recreational Areas	3
Wetlands (acres)	0.03
Surface Waters (acres)	0.03
Seagrass/Submerged Aquatic Vegetation (acres)	0.17
Essential Fish Habitat (acres)	2.81
Threatened & Endangered Species (potential)	High
Contamination Sites Ranked as High/Medium Risk (number)	0 / 1
Noise-sensitive Sites	4
Property Impacts	
Right-of-Way (acres) Parcels Relocation	0
Costs (Current Year \$, 2022)	
Preliminary Design	\$1,480,000
Final Design	\$900,000
Wetland Mitigation ⁽¹⁾	\$30,000
Right-of-Way	\$0
Construction	\$48,470,000
Maintenance – 30 years	\$1,550,000
Construction Engineering & Inspection ⁽²⁾	\$5,820,000
Total Estimated Project Cost ⁽³⁾	\$58,250,000

(6) Subject to change. Assumes availability/purchase of mitigation bank credits to offset mangrove wetland and seagrass impacts. Values assume \$159,829 -per-acre mitigation cost for anticipated fiscal year 2028/29 construction (per FDOT's FY 24/25 – 28/29 Work Program Instructions). Costs shown do not include potential costs associated with coral or oyster bed mitigation or permittee-responsible mitigation should mitigation credits not be available.

(7) CEI is 12% of the Long Range Estimate construction cost.

(8) Total estimated project costs include engineering, right-of-way, and construction but do not include utility relocations, environmental permits or contamination remediation.

Appendix A
Preferred Alternative Concept Plans

CONTRACT PLANS COMPONENTS

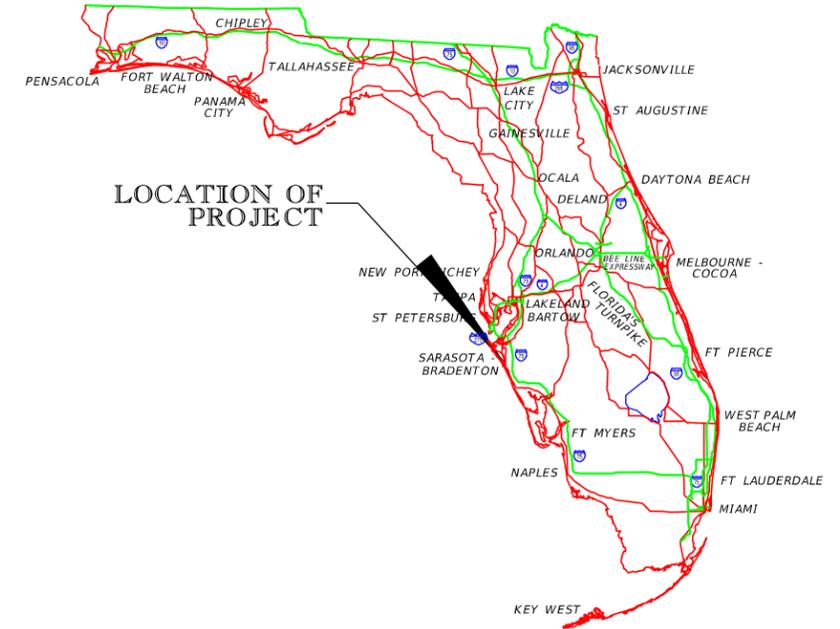
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

CONTRACT PLANS

FINANCIAL PROJECT ID 436680-1-22-01
& 436680-1-32-01

SARASOTA COUNTY (17030)

STATE ROAD NO. 789

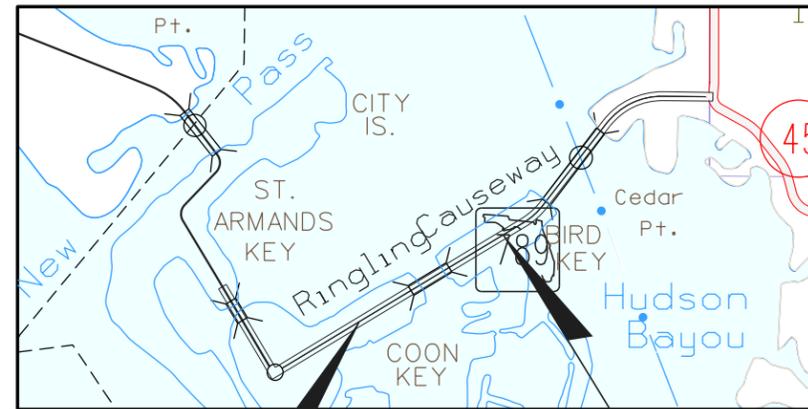


LOCATION OF PROJECT

A DETAILED INDEX APPEARS ON THE
KEY SHEET OF EACH COMPONENT

INDEX OF ROADWAY PLANS

SHEET NO.	SHEET DESCRIPTION
1	KEY SHEET
2	PROJECT LAYOUT
3-4	TYPICAL SECTIONS
5-8	PLAN SHEETS
9-12	PROFILE SHEETS



END PROJECT
STA. 147+00.00
M.P. 1.947

BEGIN PROJECT
STA. 108+00.00
M.P. 1.206



ROADWAY PLANS
ENGINEER OF RECORD:

ROBERT EDWARD HIDECK, P.E.
P.E. LICENSE NUMBER 67495
HARDESTY & HANOVER
5110 EISENHOWER BLVD., SUITE 310
TAMPA, FL 33634
CONTRACT NO.: C0000
VENDOR NO.: 99-999999

FDOT PROJECT MANAGER:

PATRICK BATEMAN, P.E.

CONSTRUCTION CONTRACT NO.	FISCAL YEAR	SHEET NO.
		1

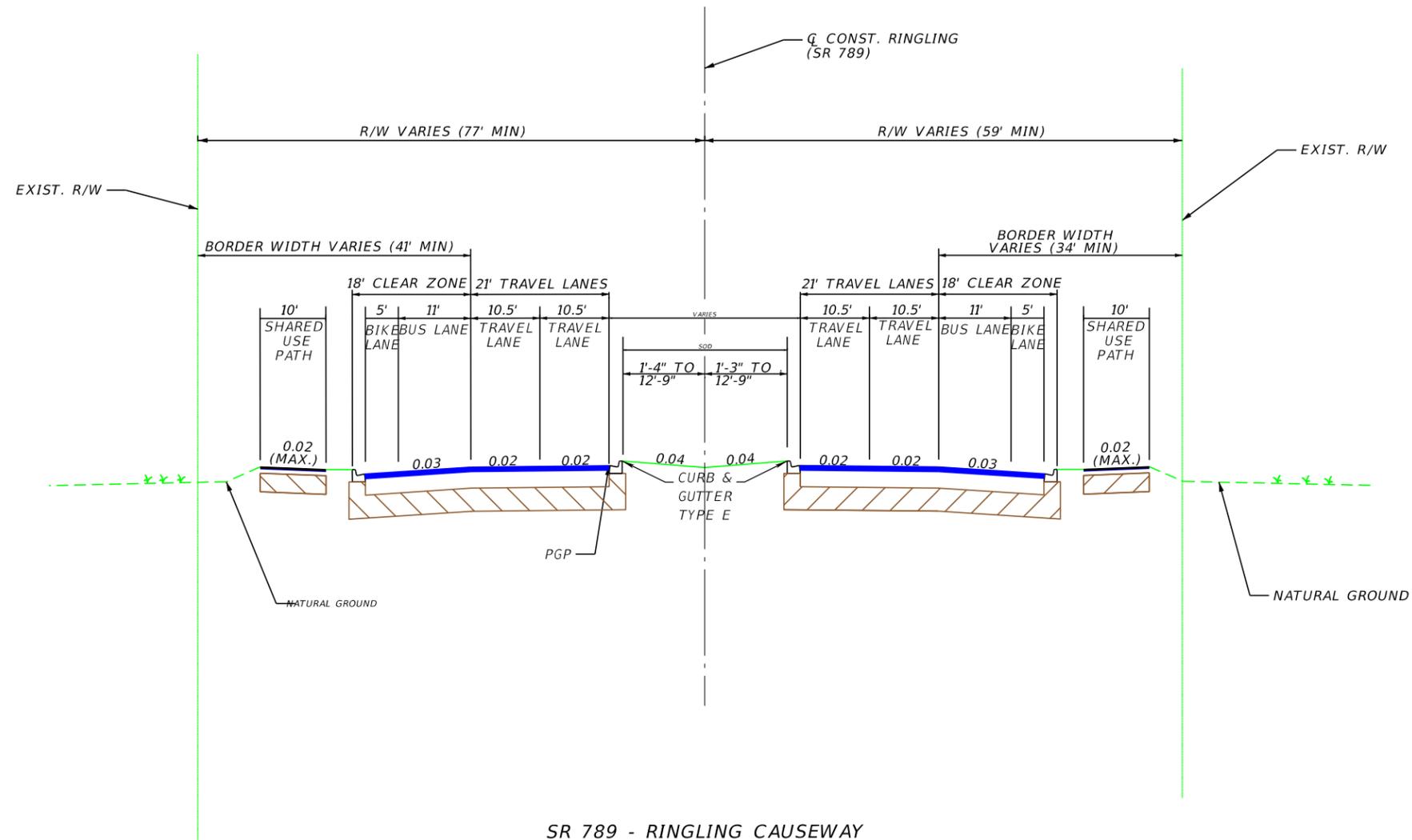


LEGEND	
	EXISTING RIGHT-OF-WAY
	PROPERTY LINE
	PROPOSED BRIDGE
	SEAGRASS
	MANGROVE
	SARASOTA BAY PADDLING TRAIL
	PARK BOUNDARY POTENTIAL IMPACT
	TRAFFIC SIGNAL
	POTENTIAL CONTAMINATION SITE

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REVISIONS				ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PROJECT LAYOUT	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROBERT EDWARD HIDECK, P.E. LICENSE NUMBER: 67495 HARDESTY & HANOVER 5110 EISENHOWER BOULEVARD, SUITE 310 TAMPA, FL 33634		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		2
						789	SARASOTA	436680-1-22-01 436680-1-32-01		

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



SR 789 - RINGLING CAUSEWAY
 FROM STA. 108+00 TO STA. 117+20.57
 FROM STA. 128+36.57 TO STA. 146+98.44
 NTS

TRAFFIC DATA

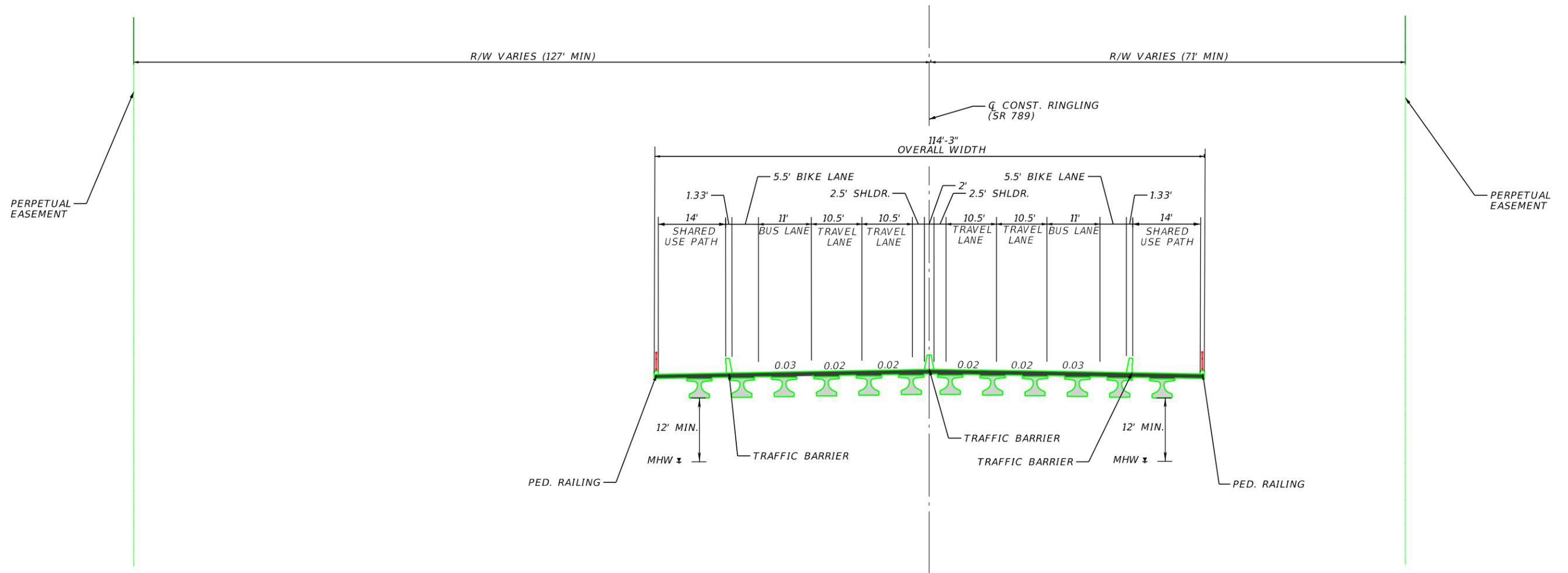
CURRENT YEAR = 2021 AADT = 35,000
 ESTIMATED OPENING YEAR = 2025 AADT = 39393
 ESTIMATED DESIGN YEAR = 2045 AADT = 71146
 K = 9.0% D = 52.3% T = 3.9% (24 HOUR)
 DESIGN HOUR T = 1.96% TRUCK DDHV = 72
 DESIGN SPEED = 40 MPH
 POSTED SPEED = 35 MPH
 TARGET SPEED = 35 MPH

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REVISIONS				ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROBERT EDWARD HIDECK, P.E. LICENSE NUMBER: 67495 HARDESTY & HANOVER 5110 EISENHOWER BOULEVARD, SUITE 310 TAMPA, FL 33634		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
						789	SARASOTA	436680-1-22-01 436680-1-32-01	3

TYPICAL SECTIONS

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



SR 789 - RINGLING CAUSEWAY
FROM STA. 117+20.57 TO STA. 128+36.57
NTS

TRAFFIC DATA

CURRENT YEAR = 2021 AADT = 35,000
 ESTIMATED OPENING YEAR = 2025 AADT = 39393
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 TARGET SPEED = 35 MPH

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REVISIONS				ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			TYPICAL SECTIONS	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROBERT EDWARD HIDECK, P.E. LICENSE NUMBER: 67495 HARDESTY & HANOVER 5110 EISENHOWER BOULEVARD, SUITE 310 TAMPA, FL 33634		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		4
						789	SARASOTA	436680-1-22-01 436680-1-32-01		

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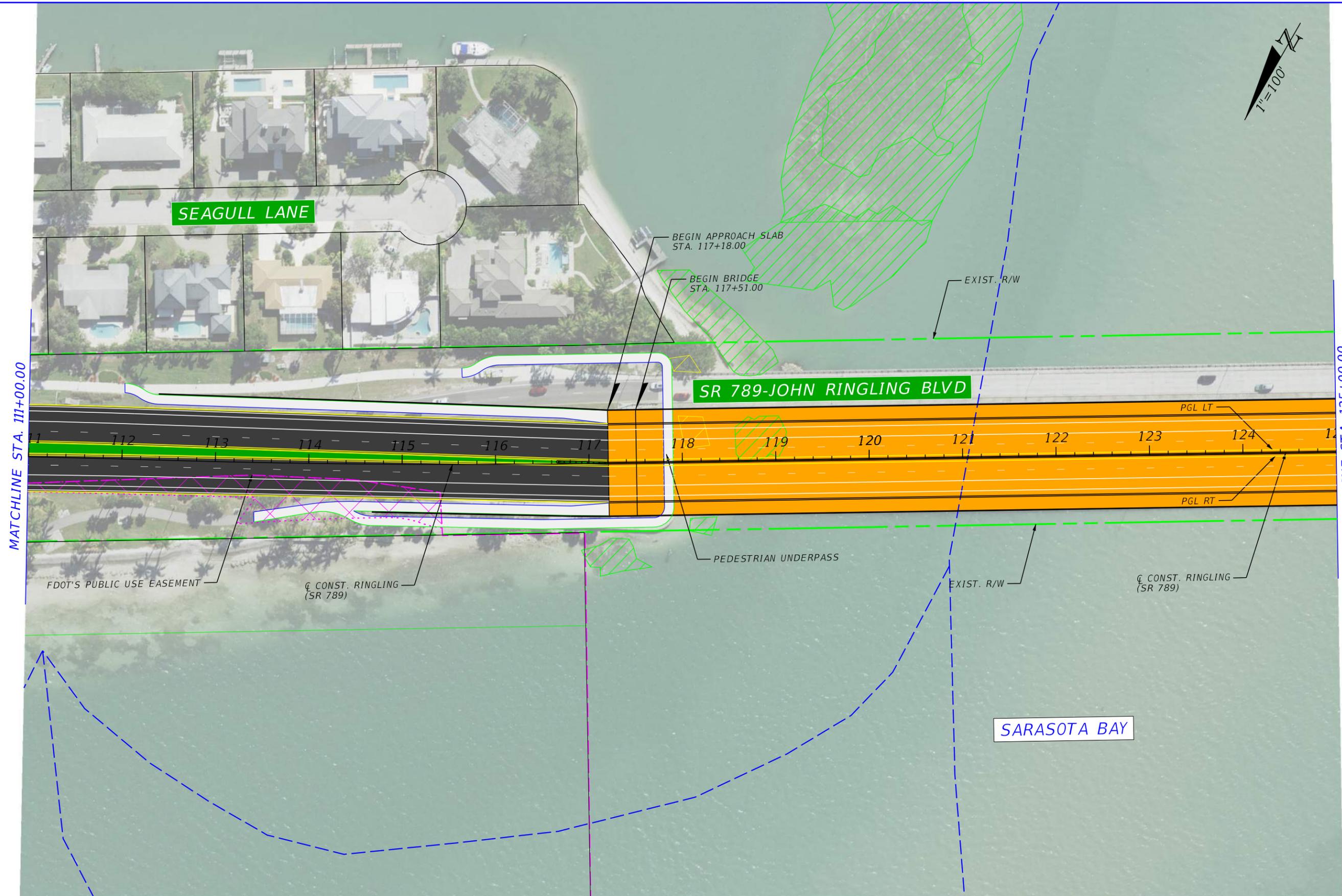
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REVISIONS				ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROBERT EDWARD HIDECK, P.E. LICENSE NUMBER: 67495 HARDESTY & HANOVER 5110 EISENHOWER BOULEVARD, SUITE 310 TAMPA, FL 33634		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
						789	SARASOTA	436680-1-22-01 436680-1-32-01	5

ROADWAY PLAN

MATCHLINE STA. III+00.00

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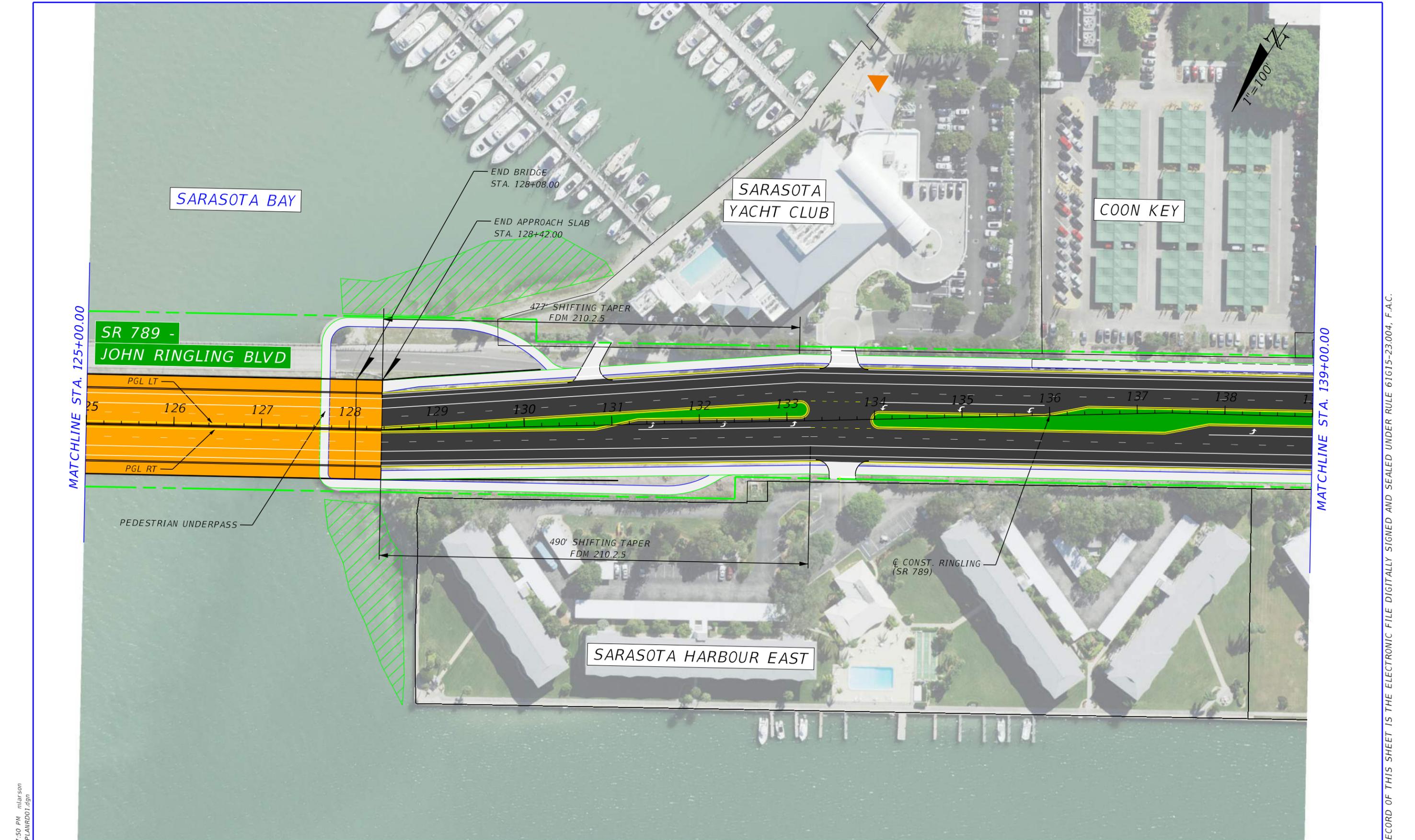
MATCHLINE STA. 111+00.00

MATCHLINE STA. 125+00.00

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REVISIONS				ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			ROADWAY PLAN	SHEET NO. 6
DATE	DESCRIPTION	DATE	DESCRIPTION	ROBERT EDWARD HIDECK, P.E. LICENSE NUMBER: 67495 HARDESTY & HANOVER 5110 EISENHOWER BOULEVARD, SUITE 310 TAMPA, FL 33634		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
						789	SARASOTA	436680-1-22-01 436680-1-32-01		

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MATCHLINE STA. 125+00.00

MATCHLINE STA. 139+00.00

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REVISIONS				ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			ROADWAY PLAN	SHEET NO. 7
DATE	DESCRIPTION	DATE	DESCRIPTION	ROBERT EDWARD HIDECK, P.E. LICENSE NUMBER: 67495 HARDESTY & HANOVER 5110 EISENHOWER BOULEVARD, SUITE 310 TAMPA, FL 33634		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
						789	SARASOTA	436680-1-22-01 436680-1-32-01		

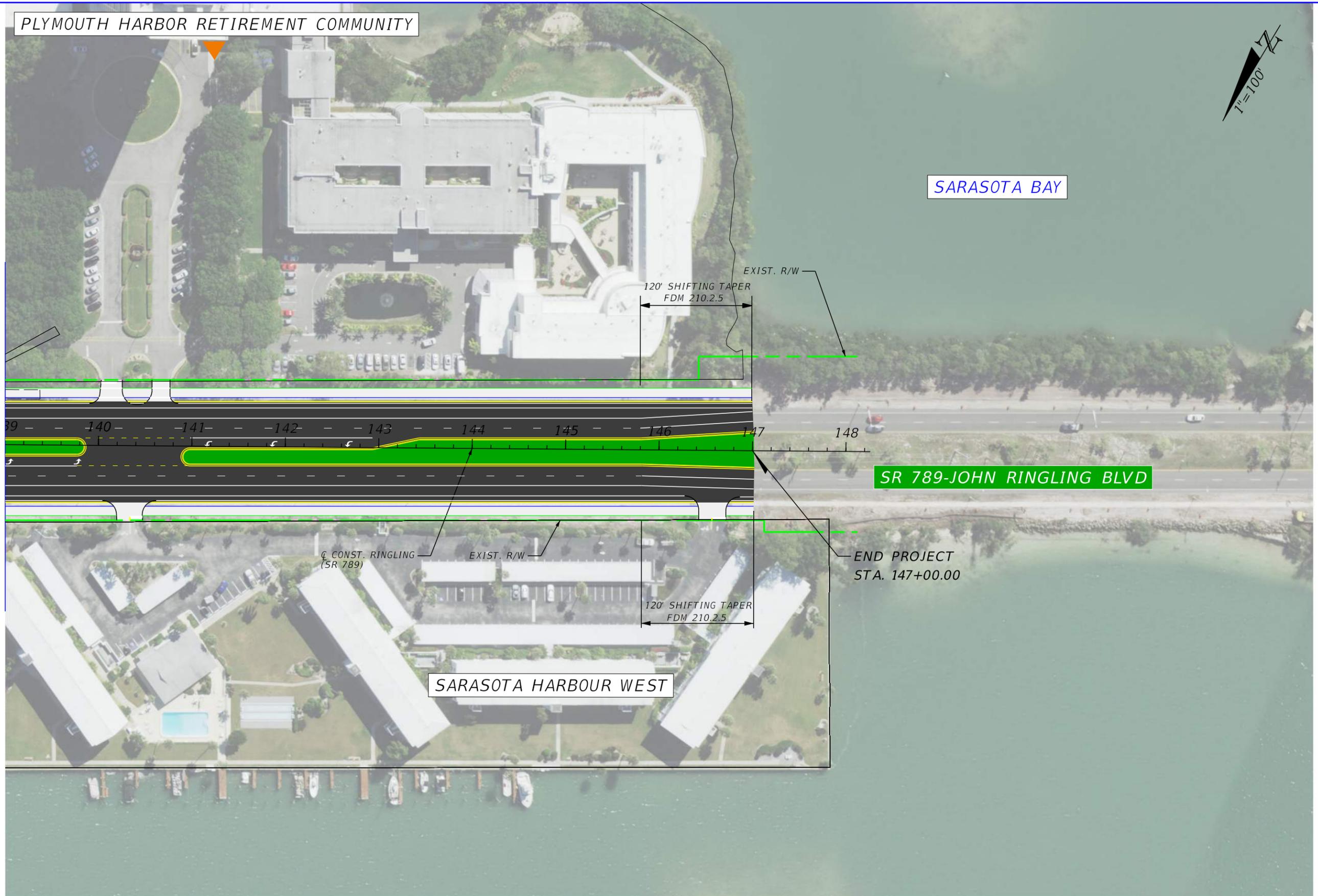
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PLYMOUTH HARBOR RETIREMENT COMMUNITY



SARASOTA BAY

MATCHLINE STA. 139+00.00



SR 789-JOHN RINGLING BLVD

SARASOTA HARBOUR WEST

END PROJECT STA. 147+00.00

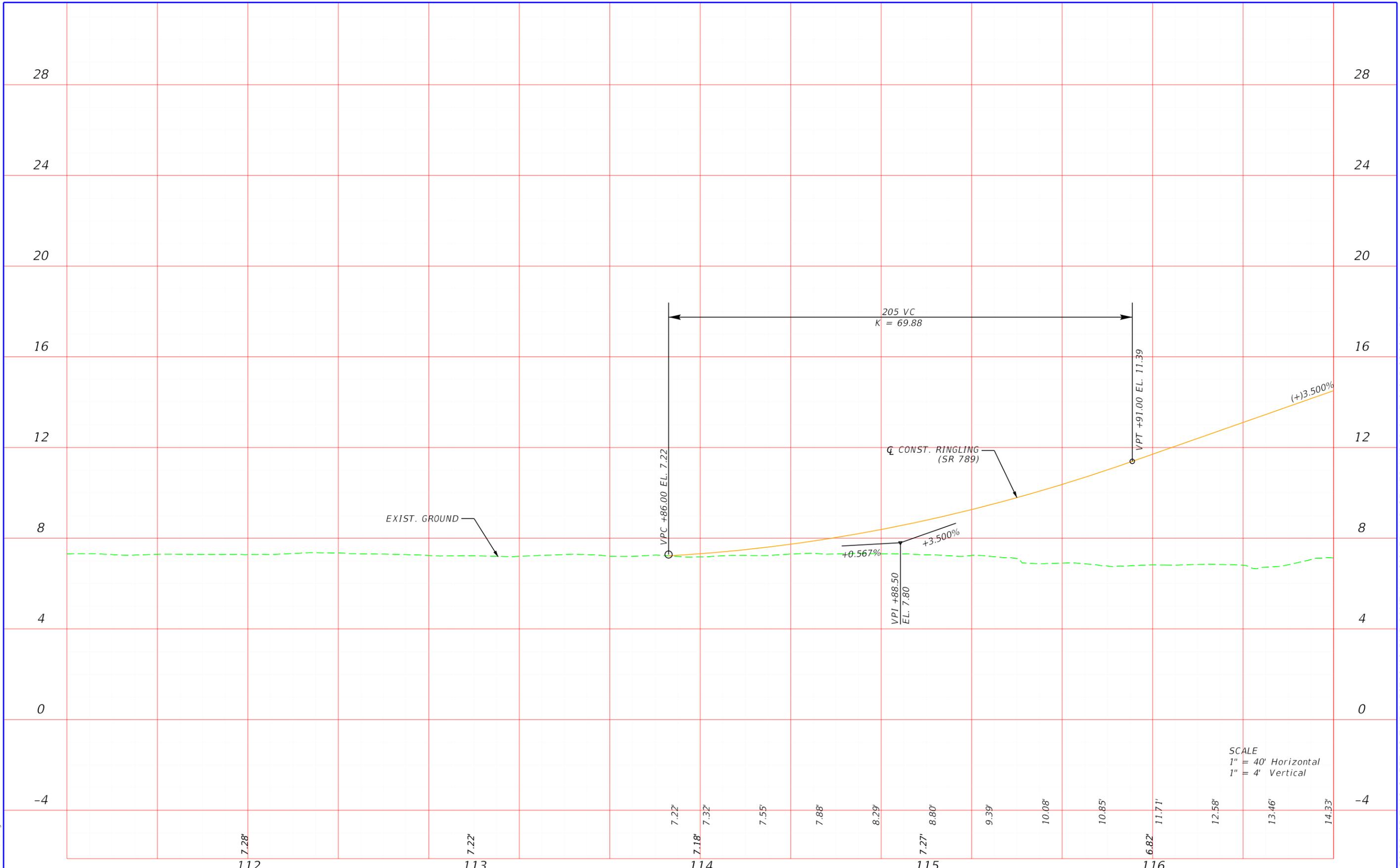
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REVISIONS				ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROBERT EDWARD HIDECK, P.E. LICENSE NUMBER: 67495 HARDESTY & HANOVER 5110 EISENHOWER BOULEVARD, SUITE 310 TAMPA, FL 33634		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
						789	SARASOTA	436680-1-22-01 436680-1-32-01	8

ROADWAY PLAN

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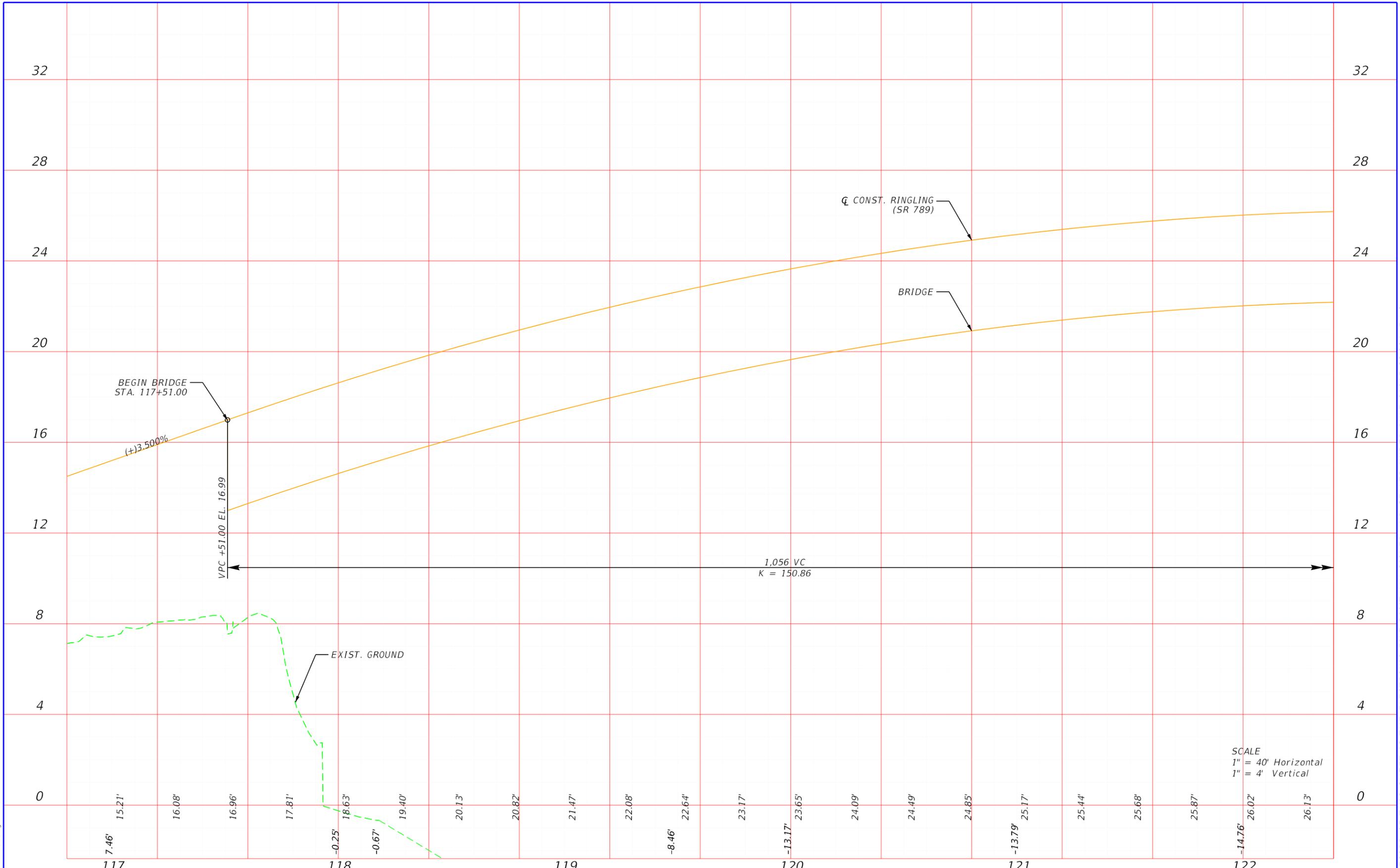


REVISIONS		ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
				789	SARASOTA	436680-1-22-01 436680-1-32-01	9

PROFILE

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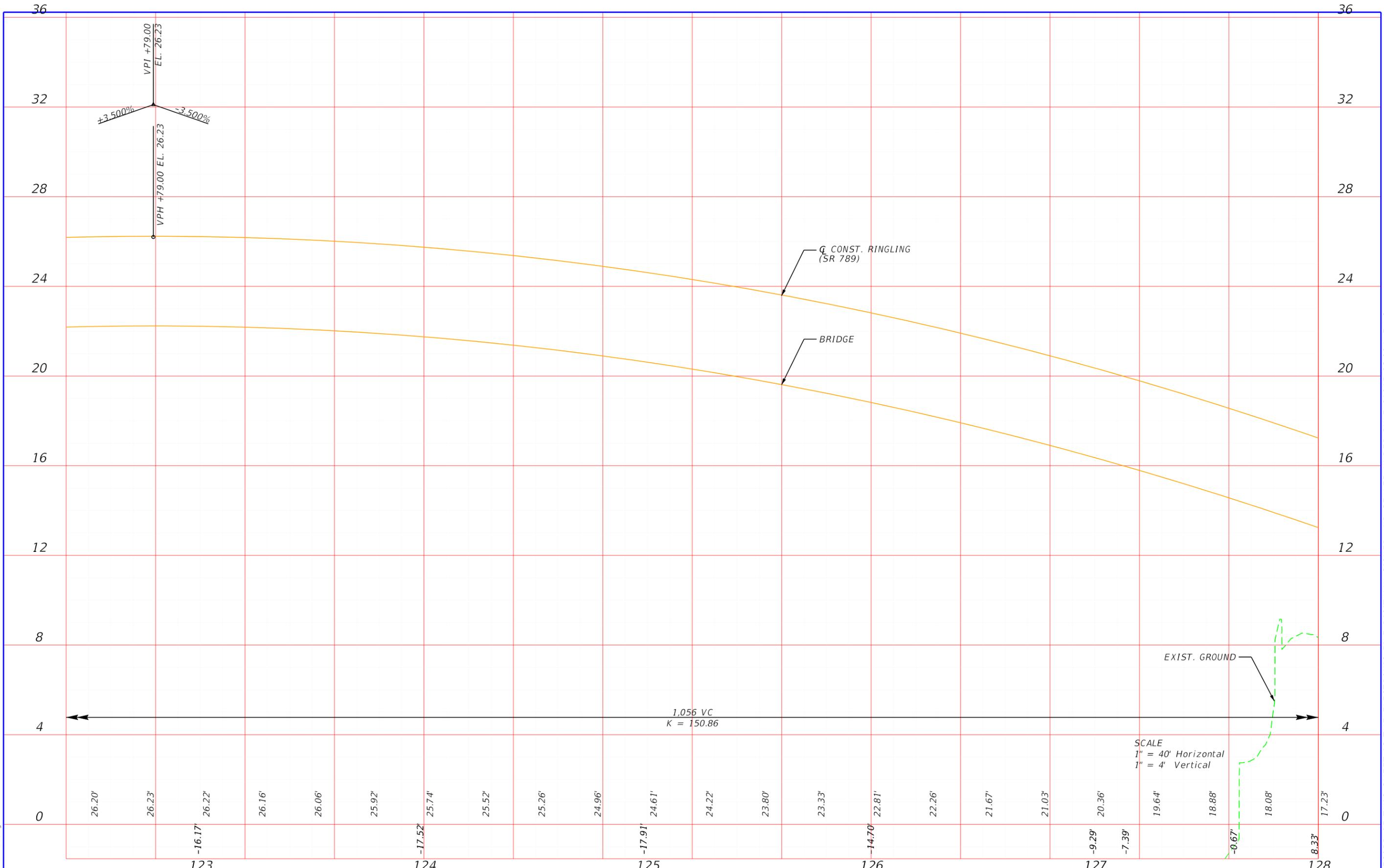


7.46'	15.21'	16.08'	16.96'	17.81'	18.63'	19.40'	20.13'	20.82'	21.47'	22.08'	22.64'	23.17'	23.65'	24.09'	24.49'	24.85'	25.17'	25.44'	25.68'	25.87'	26.02'	26.13'
117				118					119				120				121					122

SCALE
 1" = 40' Horizontal
 1" = 4' Vertical

REVISIONS				ENGINEER OF RECORD			STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PROFILE	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROBERT EDWARD HIDECK, P.E. LICENSE NUMBER: 67495 HARDESTY & HANOVER 5110 EISENHOWER BOULEVARD, SUITE 310 TAMPA, FL 33634			ROAD NO.	COUNTY	FINANCIAL PROJECT ID		10
							789	SARASOTA	436680-1-22-01 436680-1-32-01		

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DATE		DESCRIPTION		ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
				ROBERT EDWARD HIDECK, P.E. LICENSE NUMBER: 67495 HARDESTY & HANOVER 5110 EISENHOWER BOULEVARD, SUITE 310 TAMPA, FL 33634		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
						789	SARASOTA	436680-1-22-01 436680-1-32-01	

PROFILE

SCALE
 1" = 40' Horizontal
 1" = 4' Vertical

Appendix B
Context Classification



Florida Department of Transportation

RON DESANTIS
GOVERNOR

801 N. Broadway Avenue
Bartow, Florida 33830-3809

KEVIN J. THIBAUT, P.E.
SECRETARY

CONTEXT CLASSIFICATION - REVIEW COMMENTS

FPID Number: **436680-1**

Roadway Name: **SR 789**

Roadway ID: **17030000**

Beginning MP: **1.206**

Ending MP: **1.947**

RECOMMENDED CONTEXT CLASSIFICATION

C3R - Suburban Residen

Primary & Secondary Measures												
		Average Intersection Density (Intersection/Sq. Mile)	Median Block Perimeter (Feet)	Average Block Length (Feet)	Building Heights (# of Stories)	Building Placement	Fronting Uses	Location of Off Street Parking	Allowed Residential Density (DU/Acre)	Allowed Office/Retail Density (FAR)	Population Density (Persons/Acre)	Employment Density (Jobs/Acre)
Seg. 1	CC Segment: C3R From MP: 1.206 To MP: 1.947	22-58	N/A	981-2206	N/A	N/A	N/A	N/A	N/A	N/A	3.06-6.26	0.538-2.17

2019 Florida Design Manual- Design Criteria		Justification
Control	Seg. 1	
Allowable Design Speed Range	35-55 mph	<p>C3R is the approved Context Classification based on the distinguishing characteristics and future land use. On the northwest side there is natural context with parking for recreation, and on the southeast side there is low-residential (single family homes) on a large disconnected block. C3R is appropriate for the residential area and it supercedes the natural area on the opposite side. On the western section there are resort style development, and despite having taller buildings, there are no frontage uses with parking in the front and side. The Primary and secondary measures align with the C3R Context on both sides of the bridge.</p> <p>The future land use for the area remains the same for the eastern side of the bridge. For the western portions, the south side is zoned for a retirement center and the north for multiple family (medium density). Thus, no major change from the current development.</p> <p>Planning Studio recommends lower speeds for this segment as it transitions to a C5 context at the St Armands Circle and it leads to the beach. Also, including the (10-12') shared use paths on both sides will help with pedestrian and cyclist movement to the shops at the circle and the beach.</p>
SIS Minimum Design Speed	50 mph	
Minimum Travel and Auxiliary Lane Width	35 mph: 10 ft. 40-45 mph: 11 ft. > or = 50 mph: 12 ft.	
Two-Way Left Turn Lane Width	25-35 mph: 11 ft. 40 mph: 12 ft.	
On-Street Parking	Allowed	
Median Width	35-45 mph: 22 ft. 50-55 mph: 30 ft.	
Sidewalk Width	6 ft.	

Approved By: Vitor Suguri

Approval Date: 11-12-2020

Appendix C
Long Range Estimate

Date: 2/28/2024 9:51:16 AM

FDOT Long Range Estimating System - Production

R3: Project Details by Sequence Report

Project: 436680-2-52-01 **Letting Date:** 07/2027
Description: SR 789 (RINGLING) FROM BIRD KEY DRIVE TO SARASOTA HARBOR WEST
District: 01 **County:** 17 SARASOTA **Market Area:** 10 **Units:** English
Contract Class: 9 **Lump Sum Project:** N **Design/Build:** Y **Project Length:** 0.741 MI
Project Manager: JMK-MJB-PBB

Version 14 Project Grand Total **\$48,464,680.95**
Description: February 2024 Markups and Unit Cost Updates from Version 13P-2/27/24

Sequence: 1 MIS - Miscellaneous Construction **Net Length:** 0.000 MI
0 LF
Description: Bridge No. 170022 and 170951

SHOULDER COMPONENT

User Input Data

Description	Value
X-Items	
Pay item	Description
Quantity Unit	Unit Price
Extended Amount	
522-2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"
2,780.00 SY	\$66.31
	\$184,341.80
Shoulder Component Total	
	\$184,341.80

LIGHTING COMPONENT

Conventional Lighting Subcomponent

Description	Value
Spacing	MAX
Pay Items	
Pay item	Description
Quantity Unit	Unit Price
Extended Amount	
630-2-11	CONDUIT, F& I, OPEN TRENCH
3,000.00 LF	\$11.80
	\$35,400.00
630-2-12	CONDUIT, F& I, DIRECTIONAL BORE
1,000.00 LF	\$24.83
	\$24,830.00
635-2-11	PULL & SPLICE BOX, F&I, 13" x 24"
40.00 EA	\$827.89
	\$33,115.60
715-500-1	POLE CABLE DIST SYS, CONVENTIONAL
23.00 EA	\$612.73
	\$14,092.79
Subcomponent Total	
	\$107,438.39

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
639-1-112	ELECTRICAL POWER SRV,F&I,OH,M,PUR BY CON	1.00 AS	\$4,001.00	\$4,001.00
715-1-11	LIGHTING CONDUCTORS,F&I,INSUL, NO.10 OR<	28,000.00 LF	\$0.98	\$27,440.00
715-1-12	LIGHTING CONDUCTORS, F&I, INSUL,NO.8-6	2,000.00 LF	\$1.70	\$3,400.00

715-4-15	LIGHT POLE COMPLETE, F&I- STD, 50'	23.00 EA	\$7,964.82	\$183,190.86
715-7-11	LOAD CENTER, F&I, SECONDARY VOLTAGE	1.00 EA	\$16,965.91	\$16,965.91
Lighting Component Total				\$342,436.16

BRIDGES COMPONENT**Bridge 170022**

Description	Value
Estimate Type	SF Estimate
Primary Estimate	YES
Type	Misc/Rehab
Structure No.	170951
Description	SR 789 OVER COON KEY WATERWAY

Bridge Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
110-3	REMOVAL OF EXISTING STRUCTURES/BRIDGES	75,290.00 SF	\$50.23	\$3,781,816.70

Bridge X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
400-2-10	CONC CLASS II, APPROACH SLABS	257.00 CY	\$592.99	\$152,398.43
400-4-4	CONC CLASS IV, SUPERSTRUCTURE	3,605.00 CY	\$1,405.31	\$5,066,142.55
400-4-5	CONC CLASS IV, SUBSTRUCTURE	44.00 CY	\$1,665.10	\$73,264.40
400-4-8	CONC CLASS IV, BULKHEAD	89.20 CY	\$1,656.71	\$147,778.53
400-4-25	CONC CLASS IV, MASS, SUBSTRUCTURE	1,064.00 CY	\$1,027.21	\$1,092,951.44
400-7-1	BRIDGE DECK GROOVING	10,205.00 SY	\$7.54	\$76,945.70
400-9-1	BRIDGE DECK PLANING	13,776.00 SY	\$7.12	\$98,085.12
400-147	COMPOSITE NEOPRENE PADS	168.00 CF	\$1,184.92	\$199,066.56
415-1-4	REINF STEEL- SUPERSTRUCTURE	739,025.00 LB	\$1.26	\$931,171.50
415-1-5	REINF STEEL- SUBSTRUCTURE	207,480.00 LB	\$1.40	\$290,472.00
415-1-8	REINF STEEL- BULKHEAD	13,375.00 LB	\$1.70	\$22,737.50
415-1-9	REINF STEEL- APPROACH SLABS	51,400.00 LB	\$1.29	\$66,306.00
450-2-36	PREST BEAMS: FLORIDA-I BEAM 36"	13,824.00 LF	\$355.86	\$4,919,408.64
450-2-236	PREST BEAMS: FLORIDA-I BEAM 36", FRP/SS	3,072.00 LF	\$500.00	\$1,536,000.00
455-88-4	DRILLED SHAFT, 42" DIA	3,362.00 LF	\$557.57	\$1,874,550.34
455-122-4	UNCLASSIFIED SHAFT EXCAVATION, 42" DIA	1,512.00 LF	\$281.28	\$425,295.36
455-133-3	SHEET PILING STEEL, F&I PERMANENT	29,960.00 SF	\$50.79	\$1,521,668.40
458-1-11	BRIDGE DECK EXPANSION JNT,NEW,POURED	457.00 LF	\$58.05	\$26,528.85
515-2-311	PED/BICYCLE RAILING, ALUM,42" TYPE 1	3,432.00 LF	\$90.94	\$312,106.08
521-5-12	CONC TRAF RAIL- BRG, 36" MED SING SLOPE	1,716.00 LF	\$112.75	\$193,479.00

521-5-13	CONC TRAF RAIL- BRIDGE, 36" SING SLOPE	3,432.00 LF	\$117.41	\$402,951.12
530-3-3	RIPRAP- RUBBLE, BANK AND SHORE	3,003.00 TN	\$137.22	\$412,071.66
530-74	BEDDING STONE	2,139.00 TN	\$137.67	\$294,476.13
630-2-16	CONDUIT, F& I, EMBEDDED- BARR./RAILINGS	15,444.00 LF	\$10.73	\$165,714.12
635-3-13	JUNCTION BOX, FURNISH & INSTALL, EMBED	77.00 EA	\$736.43	\$56,705.11

Bridge EX-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
103-1-X	WORK TRESTLE FOR CONSTRUCTION	1.00 LS	\$4,900,000.00	\$4,900,000.00
X	AESTHETICS	1.00 LS	\$1,000,000.00	\$1,000,000.00
Bridge 170022 Total				\$30,040,091.24
Bridges Component Total				\$30,040,091.24

RETAINING WALLS COMPONENT**X-Items**

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
400-4-11	CONC CLASS IV, RETAINING WALLS	550.00 CY	\$774.16	\$425,788.00
415-1-3	REINF STEEL- RETAINING WALL	107,250.00 LB	\$1.20	\$128,700.00
Retaining Walls Component Total				\$554,488.00

MISCELLANEOUS COMPONENT**X-Items**

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
108-1	MONITOR EXISTING STRUCTURES- SETTL	1.00 LS	\$5,000.00	\$5,000.00
108-2	MONITOR EXISTING STRUCTURES- VIBRA	1.00 LS	\$5,000.00	\$5,000.00
108-3	MONITOR EXISTING STRUCTURES- GROUN	1.00 LS	\$5,000.00	\$5,000.00
455-34-3	PRESTRESSED CONCRETE PILING, 18" SQ	3,200.00 LF	\$186.32	\$596,224.00
Miscellaneous Component Total				\$611,224.00

Sequence 1 Total

\$31,732,581.20

Sequence: 2 NDU - New Construction, Divided, Urban

Net Length: 0.379 MI
2,001 LF

Description: 1000 feet of roadway approach work for each side of bridge

EARTHWORK COMPONENT

User Input Data

Description	Value
Standard Clearing and Grubbing Limits L/R	70.00 / 71.00
Incidental Clearing and Grubbing Area	0.00
Alignment Number	1
Distance	0.379
Top of Structural Course For Begin Section	105.00
Top of Structural Course For End Section	105.00
Horizontal Elevation For Begin Section	100.00
Horizontal Elevation For End Section	100.00
Front Slope L/R	6 to 1 / 6 to 1
Median Shoulder Cross Slope L/R	2.00 % / 3.00 %
Outside Shoulder Cross Slope L/R	2.00 % / 3.00 %
Roadway Cross Slope L/R	2.00 % / 2.00 %

Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
110-1-1	CLEARING & GRUBBING	6.48 AC	\$44,172.21	\$286,235.92
120-6	EMBANKMENT	50,322.24 CY	\$16.60	\$835,349.18
Earthwork Component Total				\$1,121,585.10

ROADWAY COMPONENT

User Input Data

Description	Value
Number of Lanes	4
Roadway Pavement Width L/R	37.00 / 37.00
Structural Spread Rate	330
Friction Course Spread Rate	80

Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
160-4	TYPE B STABILIZATION	18,748.27 SY	\$9.05	\$169,671.84
285-709	OPTIONAL BASE, BASE GROUP 09	16,453.65 SY	\$17.58	\$289,255.17
334-1-13	SUPERPAVE ASPHALTIC CONC, TRAFFIC C	2,714.85 TN	\$171.60	\$465,868.26
337-7-92	ASPH CONC FC, TRAFFIC C, FC-9.5, HIGH POLYM	658.15 TN	\$240.67	\$158,396.96

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
102-2-200	SPECIAL DETOUR- TEMPORARY PAVEMENT	1.00 SY	\$250,000.00	\$250,000.00
102-2-300	SPECIAL DETOUR- TEMPORARY EARTHWORK/BASE	1.00 CY	\$250,000.00	\$250,000.00
102-71-15	TEMPORARY BARRIER, F&I, ANCHORED	1,000.00 LF	\$24.86	\$24,860.00
102-71-16	TEMPORARY BARRIER, F&I, FREE STAND	1,000.00 LF	\$17.05	\$17,050.00

102-71-25	TEMPORARY BARRIER, REL, ANCHORED	1,000.00 LF	\$8.89	\$8,890.00
102-71-26	TEMPORARY BARRIER, REL, FREE STAND	1,000.00 LF	\$5.17	\$5,170.00
337-7-92	ASPH CONC FC, TRAFFIC C, FC-9.5, HIGH POLYM	71.11 TN	\$240.67	\$17,114.04
536-8-111	CUARDR CONN TO RIGID BA, F&I, APPR N2	8.00 EA	\$2,735.50	\$21,884.00

Pavement Marking Subcomponent

Description	Value
Include Thermo/Tape/Other	Y
Pavement Type	Asphalt
Solid Stripe No. of Paint Applications	1
Solid Stripe No. of Stripes	4
Skip Stripe No. of Paint Applications	1
Skip Stripe No. of Stripes	2

Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
706-1-3	RAISED PAVMT MARK, TYPE B	153.00 EA	\$3.87	\$592.11
710-11-101	PAINTED PAVT MARK, STD, WHITE, SOLID, 6"	1.52 GM	\$1,064.01	\$1,617.30
710-11-131	PAINTED PAVT MARK, STD, WHITE, SKIP, 6"	0.76 GM	\$488.01	\$370.89
711-15-101	THERMOPLASTIC, STD-OP, WHITE, SOLID, 6"	1.52 GM	\$4,452.65	\$6,768.03
711-15-131	THERMOPLASTIC, STD-OP, WHITE, SKIP, 6"	0.76 GM	\$1,874.22	\$1,424.41

Peripherals Subcomponent

Description	Value
Off Road Bike Path(s)	0
Off Road Bike Path Width L/R	0.00 / 0.00
Bike Path Structural Spread Rate	0
Noise Barrier Wall Length	0.00
Noise Barrier Wall Begin Height	0.00
Noise Barrier Wall End Height	0.00

Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
339-1	MISCELLANEOUS ASPHALT PAVEMENT	33.67 TN	\$326.37	\$10,988.88
536-1-3	GUARDRAIL- ROADWAY, DOUBLE FACE	1,000.00 LF	\$32.56	\$32,560.00
536-85-27	GUARDRAIL END TREAT- DOUB FACE APPR TER	1.00 EA	\$12,374.09	\$12,374.09
536-85-29	GUARDRAIL END TREAT- DBL TRAIL AN	1.00 EA	\$1,878.31	\$1,878.31

Roadway Component Total \$1,746,734.29

SHOULDER COMPONENT

User Input Data

Description	Value
Total Outside Shoulder Width L/R	11.25 / 11.25
Total Outside Shoulder Perf. Turf Width L/R	4.00 / 4.00

Sidewalk Width L/R

5.00 / 5.00

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
520-1-10	CONCRETE CURB & GUTTER, TYPE F	2,001.12	LF	\$23.05	\$46,125.82
520-1-10	CONCRETE CURB & GUTTER, TYPE F	2,001.12	LF	\$23.05	\$46,125.82
522-1	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	2,223.47	SY	\$49.54	\$110,150.70
570-1-1	PERFORMANCE TURF	1,778.77	SY	\$4.51	\$8,022.25

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
285-704	OPTIONAL BASE,BASE GROUP 04	2,368.96	SY	\$25.73	\$60,953.34
334-1-13	SUPERPAVE ASPHALTIC CONC, TRAFFIC C	122.23	TN	\$171.60	\$20,974.67
337-7-92	ASPH CONC FC, TRAFFIC C, FC-9.5, HIGH POLYM	88.89	TN	\$240.67	\$21,393.16
520-1-10	CONCRETE CURB & GUTTER, TYPE F	5,562.00	LF	\$23.05	\$128,204.10
522-1	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	6,955.00	SY	\$49.54	\$344,550.70

Erosion Control

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
104-10-3	SEDIMENT BARRIER	4,002.24	LF	\$2.22	\$8,884.97
104-11	FLOATING TURBIDITY BARRIER	94.75	LF	\$11.29	\$1,069.73
104-12	STAKED TURBIDITY BARRIER-NYL REINF PVC	94.75	LF	\$5.86	\$555.24
104-15	SOIL TRACKING PREVENTION DEVICE	1.00	EA	\$2,806.66	\$2,806.66
104-18	INLET PROTECTION SYSTEM	20.00	EA	\$144.24	\$2,884.80
107-1	LITTER REMOVAL	9.65	AC	\$58.21	\$561.73
107-2	MOWING	9.65	AC	\$78.70	\$759.46

Shoulder Component Total

\$804,023.15

MEDIAN COMPONENT

User Input Data

Description	Value
Total Median Width	30.00
Performance Turf Width	30.00

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
520-1-7	CONCRETE CURB & GUTTER, TYPE E	4,002.24	LF	\$25.24	\$101,016.54
570-1-2	PERFORMANCE TURF, SOD	6,670.40	SY	\$4.43	\$29,549.87

Median Component Total

\$130,566.41

DRAINAGE COMPONENT

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
425-1-351	INLETS, CURB, TYPE P-5, <10'	22.00 EA	\$5,673.84	\$124,824.48
425-1-541	INLETS, DT BOT, TYPE D, <10'	6.00 EA	\$4,889.17	\$29,335.02
425-1-921	INLETS, ADJACENT BARRIER, <=10'	4.00 EA	\$7,654.06	\$30,616.24
425-2-61	MANHOLES, P-8, <10'	4.00 EA	\$4,800.64	\$19,202.56
430-175-124	PIPE CULV, OPT MATL, ROUND, 24"S/CD	4,584.00 LF	\$114.35	\$524,180.40
430-984-129	MITERED END SECT, OPTIONAL RD, 24" SD	4.00 EA	\$2,103.79	\$8,415.16
440-1-50	UNDERDRAIN, TYPE V	1,250.00 LF	\$45.72	\$57,150.00
570-1-1	PERFORMANCE TURF	266.68 SY	\$4.51	\$1,202.73
Drainage Component Total				\$794,926.59

SIGNING COMPONENT**Pay Items**

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
700-1-11	SINGLE POST SIGN, F&I GM, <12 SF	12.00 AS	\$447.86	\$5,374.32
700-1-12	SINGLE POST SIGN, F&I GM, 12- 20 SF	10.00 AS	\$1,600.83	\$16,008.30
700-2-15	MULTI- POST SIGN, F&I GM, 51- 100 SF	3.00 AS	\$6,176.39	\$18,529.17

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
700-2-14	MULTI- POST SIGN, F&I GM, 31-50 SF	1.00 AS	\$4,360.69	\$4,360.69
Signing Component Total				\$44,272.48

Sequence 2 Total**\$4,642,108.02**

Date: 2/28/2024 9:51:16 AM

FDOT Long Range Estimating System - Production

R3: Project Details by Sequence Report

Project: 436680-2-52-01

Letting Date: 07/2027

Description: SR 789 (RINGLING) FROM BIRD KEY DRIVE TO SARASOTA HARBOR WEST

District: 01

County: 17 SARASOTA

Market Area: 10

Units: English

Contract Class: 9 **Lump Sum Project:** N

Design/Build: Y

Project Length: 0.741 MI

Project Manager: JMK-MJB-PBB

Version 14 Project Grand Total

\$48,464,680.95

Description: February 2024 Markups and Unit Cost Updates from Version 13P-2/27/24

Project Sequences Subtotal **\$36,374,689.22**

102-1	Maintenance of Traffic	15.00 %	\$5,456,203.38
101-1	Mobilization	10.00 %	\$4,183,089.26

Project Sequences Total **\$46,013,981.86**

Project Unknowns	5.00 %	\$2,300,699.09
Design/Build	0.00 %	\$0.00

Non-Bid Components:

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)		LS	\$150,000.00	\$150,000.00

Project Non-Bid Subtotal **\$150,000.00**

Version 14 Project Grand Total **\$48,464,680.95**

Appendix D
Typical Section Package

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

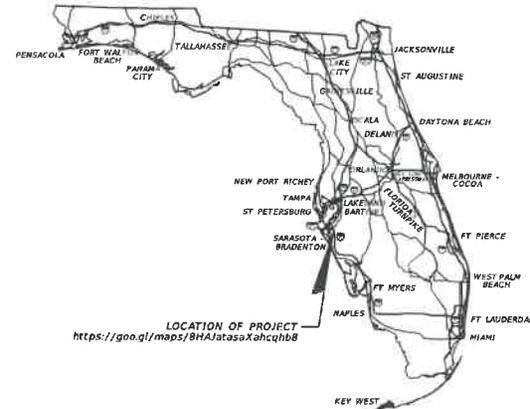
TYPICAL SECTION PACKAGE

FINANCIAL PROJECT ID 436680-1-22-01

& 436680-1-32-01

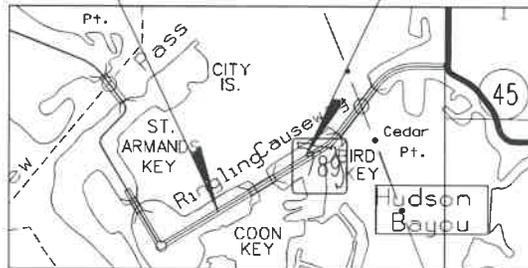
SARASOTA COUNTY (17030)

STATE ROAD NO. 789



END PROJECT
STA. 147+00.00
M.P. 1.947

BEGIN PROJECT
STA. 108+00.00
M.P. 1.206



FDOT DISTRICT DESIGN ENGINEER

Kevin Ingle



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

FDOT DISTRICT TRAFFIC OPERATIONS
ENGINEER

Mark
Mathes

Date: 2023.04.
04 14:56:10 -
04'00'

CONCURRING WITH:
TARGET SPEED
DESIGN & POSTED SPEEDS

FDOT DISTRICT INTERMODAL SYSTEMS
DEVELOPMENT MANAGER

DN: CN = Nicole E Mills
C = US O = FLORIDA
DEPARTMENT OF
TRANSPORTATION
Date: 2023.03.03 16:
06:09 -05'00'

CONCURRING WITH:
CONTEXT CLASSIFICATION
TARGET SPEED

FDOT DISTRICT STRUCTURES
DESIGN ENGINEER

Andra G Diggs II
2023.03.19
15:26:31-04'00'

CONCURRING WITH:
TYPICAL SECTION ELEMENTS

FHWA TRANSPORTATION ENGINEER

CONCURRING WITH:
TYPICAL SECTION ELEMENTS

NOT USED

CONCURRING WITH:

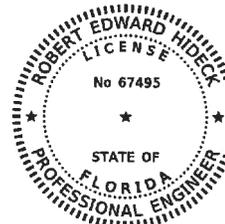
LOCAL TRANSPORTATION ENGINEER

CONCURRING WITH:
TYPICAL SECTION ELEMENTS

NOT USED

CONCURRING WITH:

APPROVED BY:



THIS ITEM HAS BEEN DIGITALLY
SIGNED AND SEALED BY

Digitally signed by Robert E Hideck
Date: 2023.02.24 07:19:00-05'00'

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.

HARDESTY & HANOVER
510 EISENHOWER BLVD., SUITE 310
TAMPA, FL 33634
ROBERT EDWARD HIDECK, P.E. NO. 67495

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	SHEET DESCRIPTION
1	COVER SHEET
2	TYPICAL SECTION NO. 1
3	TYPICAL SECTION NO. 2

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

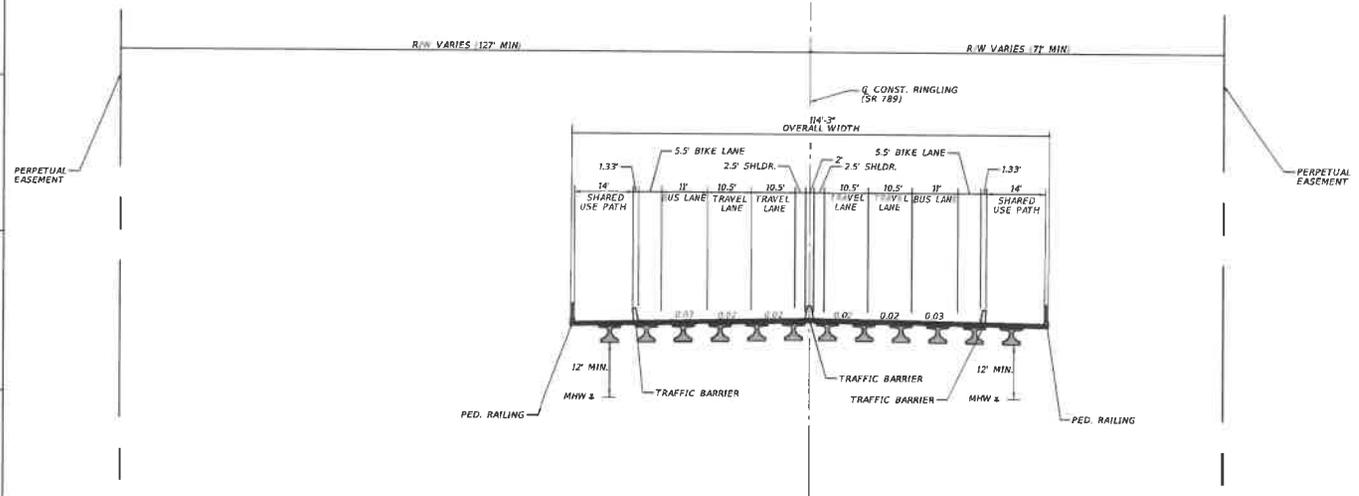
CRITERIA

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

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

INSIDE SHOULDER WIDTH - DESIGN VARIATION
 OUTSIDE SHOULDER WIDTH - DESIGN VARIATION
 LANE WIDTH - DESIGN VARIATION

TYPICAL SECTION No. 02



SR 789 - RINGLING CAUSEWAY
 FROM STA. 117+20.57 TO STA. 128+36.57
 NTS

TRAFFIC DATA

CURRENT YEAR = 2021 AADT = 35,000
 ESTIMATED OPENING YEAR = 2025 AADT = 39393
 ESTIMATED DESIGN YEAR = 2045 AADT = 71146
 K = 9.0% D = 52.3% T = 3.9% (24 HOUR)
 DESIGN HOUR T = 1.96% TRUCK DDHV = 72
 DESIGN SPEED = 40 MPH
 POSTED SPEED = 35 MPH
 TARGET SPEED = 35 MPH

1/20/2023 2:51:57 PM zhenmiana
 C:\user\zhenmiana\03\project\03\18\TYPICAL02.dgn

FINANCIAL PROJECT ID	SHEET NO.
436680-1-22-01 436680-1-32-01	3

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

Appendix E
Design Variations

Project Design Variation Memorandum Form 122-B

To: Kevin S. Ingle, PE

Date: 11/3/2023

Financial Project ID:436680-1-52-01

New Construction RRR Other

Federal Aid Number: N/A

Project Name: SR 789 Little Ringling Bridge Replacement

State Road Number: 789

Co/Sec/Sub: Sarasota/17030/201

Begin Project MP: 1.206

End Project MP: 1.947

Request for Design Variation

The existing two-lane twin bridges have structural deficiencies and are functionally obsolete and are being replaced. A key purpose of the project is to improve multi-modal transportation opportunities. The proposed new structure will have a 2.5-foot inside shoulder, two 10.5-foot travel lanes, an 11-foot transit lane, a 5.5-foot outside shoulder which also serves as a bike lane and a 14-foot shared use path in each direction.

There is not enough width in the existing right-of-way to increase shoulder and lane width. This proposed typical section aligns with the approved typical section of the adjacent project on the Big Ringling Bridge (FPID 447824-1-52-01).

Design Element	MP Begin End	Existing	Proposed	Required	Attr. Crashes	Approved	Denied	Addl. Docum.
1. Inside Shldr Width	1.206 – 1.947	1 ft	2.5 ft	6 ft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Justification: The existing two-lane twin bridges have structural deficiencies and are functionally obsolete and are being replaced. A key purpose of the project is to improve multi-modal transportation opportunities. The proposed new structure will have a 2.5-foot inside shoulder, two 10.5-foot travel lanes, an 11-foot transit lane, a 5.5-foot outside shoulder which also serves as a bike lane and a 14-foot shared use path in each direction.

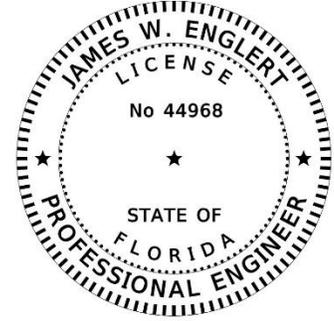
The design speed for the new structure is 40 mph and the context classification is C3R Suburban Residential. FDM Figure 260.1.4 requires a minimum inside shoulder width of 6 feet. Five years of crash data shows no crashes occurring along the bridge. Most of the crashes occurred at the Bird Key Drive Intersection, which is higher than the County crash rate. The proposed design balances the design impacts affecting level of service, right of way, community and environmental impacts, and usability by all modes of transportation. FDM Figure 260.1.4 does allow for a 2.5' minimum median shoulder on bridges less than 500'. This structure is over 1000'. There is not enough width in the existing right-of-way to increase shoulder and lane width. This proposed typical section aligns with the approved typical section of the adjacent project on the Big Ringling Bridge (FPID 447824-1-52-01).

2. Outside Shldr Width	1.206 – 1.947	1 ft	5.5 ft	10 ft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
------------------------	---------------	------	--------	-------	--------------------------	--------------------------	--------------------------	--------------------------

Justification: The existing two-lane twin bridges have structural deficiencies and are functionally obsolete and are being replaced. A key purpose of the project is to improve multi-modal transportation

Recommended by:

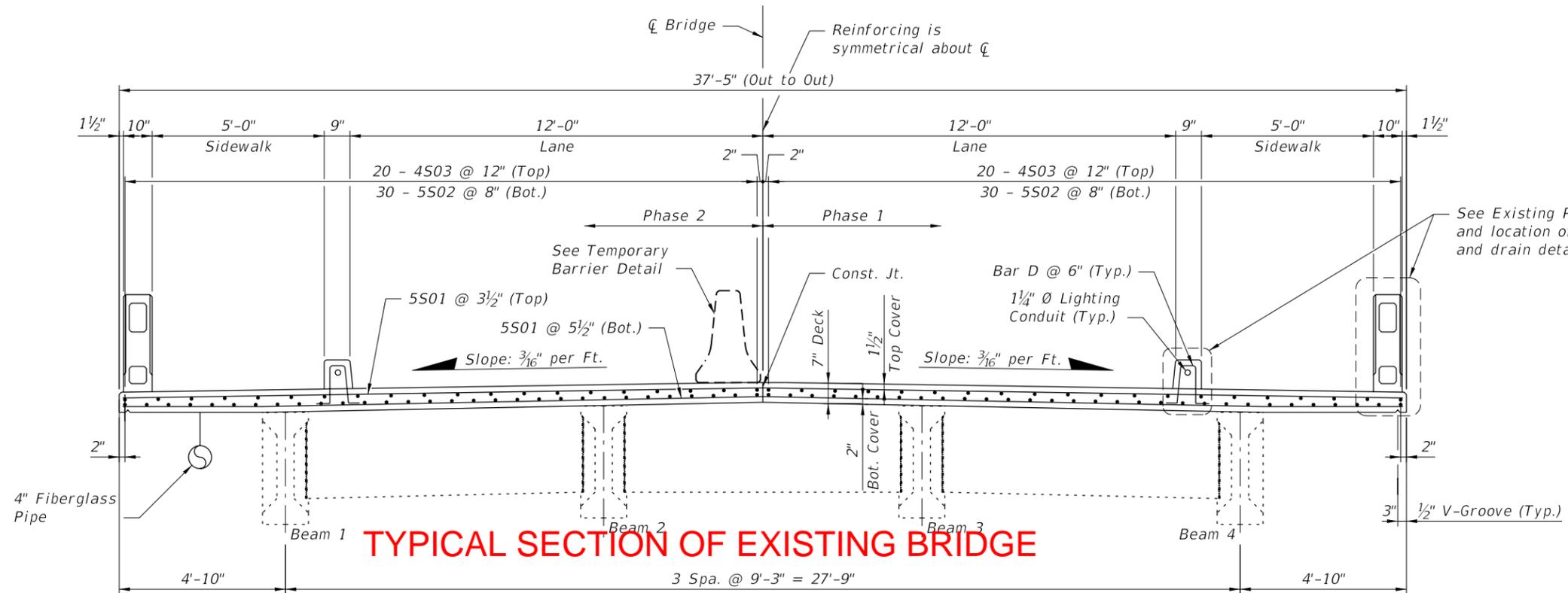
Name: James W. Englert, PE Date: 11/3/23
Responsible Professional Engineer or Landscape Architect (Landscape Only Projects)



Approvals:

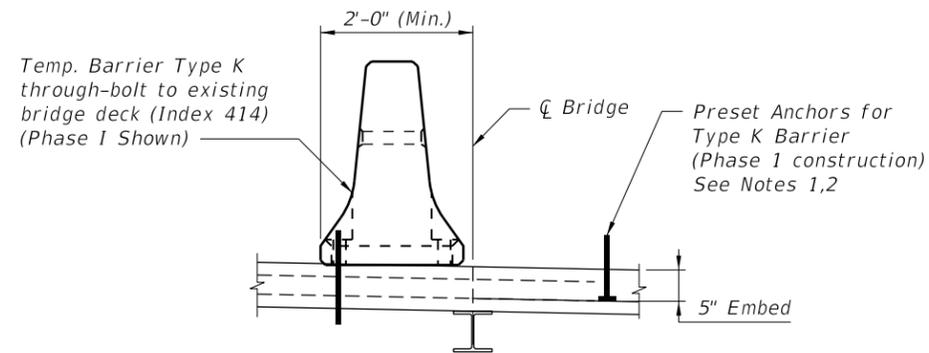
Name: _____ Date: _____
District or Turnpike Traffic Operations Director

Name: _____ Date: _____
District or Turnpike Design Engineer



TYPICAL SECTION OF EXISTING BRIDGE

TYPICAL SECTION



TEMPORARY BARRIER DETAIL

NOTES:

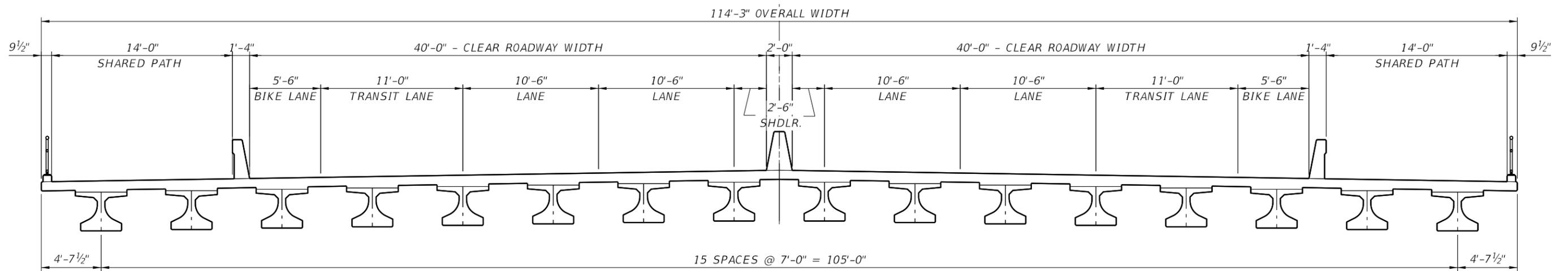
1. Install 1/4" Ø anchors with headed bolt or nut for Type K Temporary Barrier Wall. Coordinate location and placement to match holes and spacing shown in Index 414 and as needed by Traffic Control Plans. Adjust locations of Bars 5S01, 5S02 and 4S03 to allow placement of anchors. Refer to Index 414 for materials and details.
2. After removal of Barrier Wall, remove anchor bolts to a depth of 1" below the deck surface, then repair bridge deck following Specification Section 450-13-6.
3. Preserve and reuse bars from top of prestressed beams and diaphragms. Clean bars to remove loose concrete or corrosion. Dowel in new bars to replace damaged bars, if required.

**NOT FOR CONSTRUCTION
PRELIMINARY AND SUBJECT TO CHANGE**

BRIDGE NO. 170022

REVISIONS						T. Y. LIN INTERNATIONAL 12802 TAMPA OAKS BLVD., SUITE 245 TAMPA, FL 33637 TEL. (813) 972-9444 Cert. of Authorization No. 00002017 Boon Chong, P.E. 48156	DRAWN BY: LMM 1-15 CHECKED BY: RAF 1-15 DESIGNED BY: RAF 1-15 CHECKED BY: AHA 4-15	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET TITLE: SECTION THROUGH BRIDGE	REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
							789	SARASOTA	436545-1-52-01	BRIDGE DECK REPLACEMENT BRIDGE NO. 170022	17	

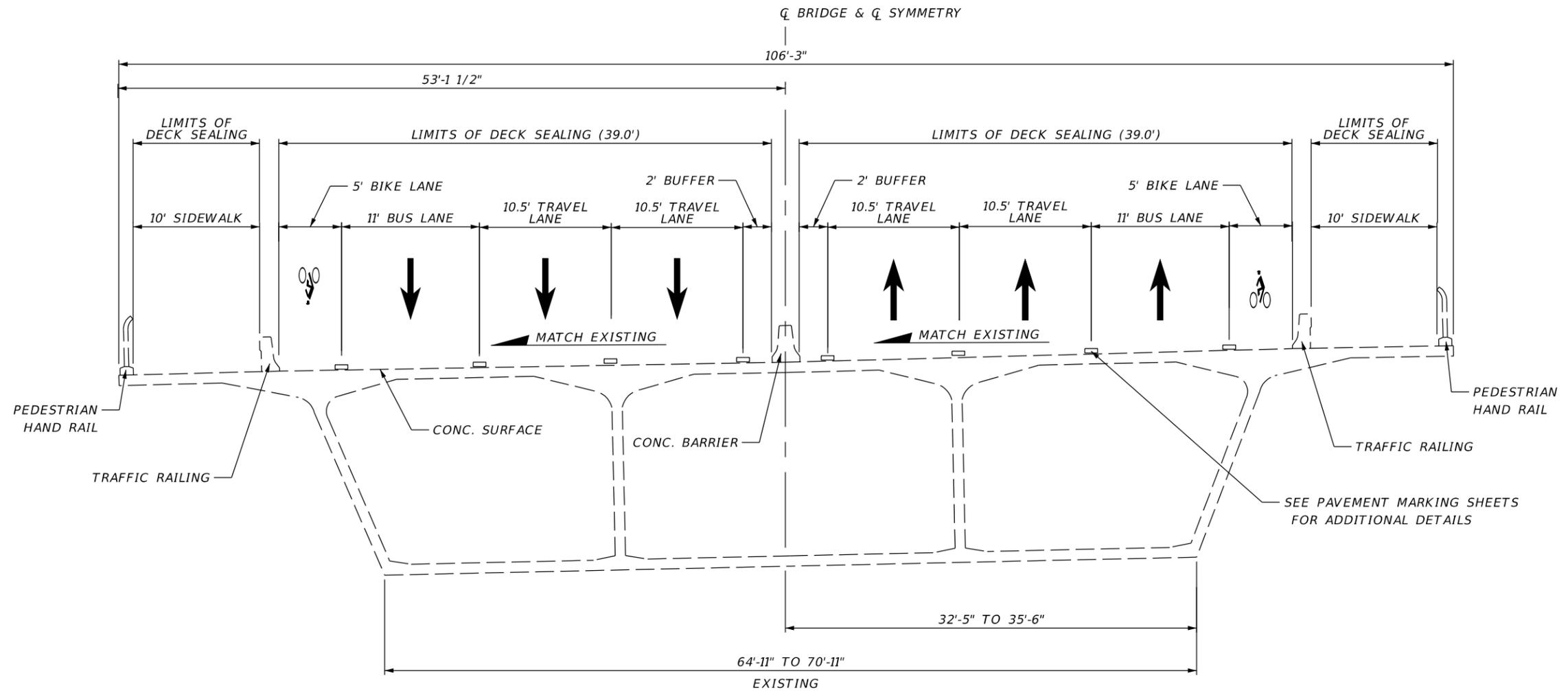
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TYPICAL SECTION THRU BRIDGE

FROM STA. 117+20.57 TO STA. 128+36.57

REVISIONS					DRAWN BY:	STATE OF FLORIDA			SHEET TITLE:	REF. DWG. NO.		
DATE	BY	DESCRIPTION	DATE	BY		DESCRIPTION	DEPARTMENT OF TRANSPORTATION					
							ROAD NO.	COUNTY			FINANCIAL PROJECT ID	PROJECT NAME:
							SR 789	SARASOTA			436680-1-32-01	
									TYPICAL SECTION THRU MAIN BRIDGE			
									SR 789 (RINGLING) FROM BIRD KEY DRIVE TO SARASOTA HARBOR WEST			
										SHEET NO.		
										000		



**APPROVED TYPICAL SECTION MAIN BRIDGE
FPID 447824-1-52-01**

TRAFFIC DATA

CURRENT YEAR = 2022 AADT = 34600
 ESTIMATED OPENING YEAR = 2023 AADT = 34800
 ESTIMATED DESIGN YEAR = 2043 AADT = 36700
 K = 9% D = 51.8% T = 3.9% (24 HOUR)
 DESIGN HOUR T = 3.9%
 DESIGN SPEED = 35 MPH
 POSTED SPEED = 35 MPH

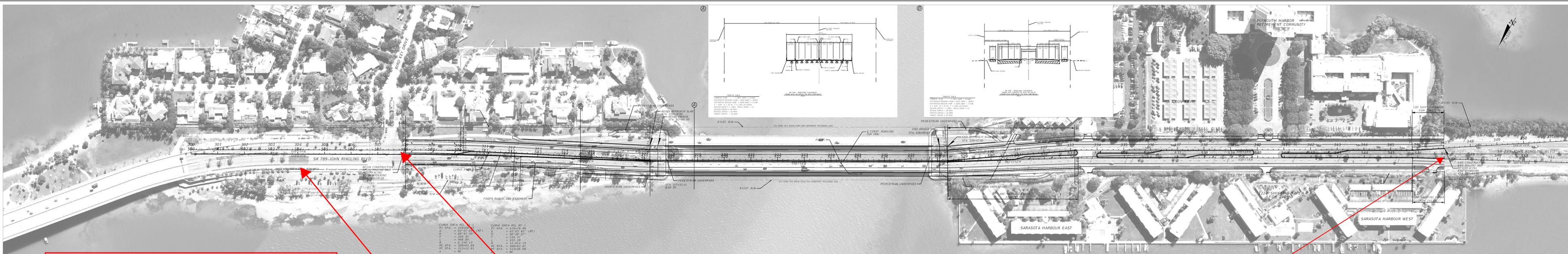
BRIDGE NO. 170176

REVISIONS						DRAWN BY: FML 4/22	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET TITLE: TYPICAL SECTION		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT NAME:		SHEET NO.
							SR 789	SARASOTA	447824-1-52-01	SR 789-JOHN RINGLING CAUSEWAY BRIDGE REPAIRS		

BETH F. STEIMLE, P.E.
 P.E. LICENSE NUMBER 63010
 ELEMENT ENGINEERING GROUP
 1713 E. 9TH AVENUE
 TAMPA, FL 33605

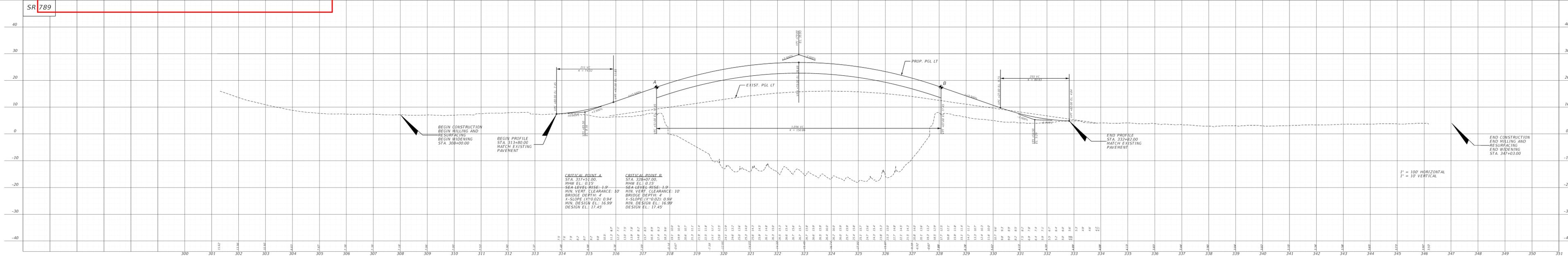
CHECKED BY:
BFS 6/22
 DESIGNED BY:
MGH 4/22
 CHECKED BY:
BFS 6/22

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ADJACENT TRANSIT PROJECT

LIMITS OF PROJECT 436680-1 SR 789 LITTLE RINGLING



1" = 100' HORIZONTAL
 1" = 10' VERTICAL