BRIDGE ANALYSIS REPORT

Florida Department of Transportation (FDOT)

District Six

I-95/State Road (SR) 9 Project Development and Environment (PD&E) Study

From South of SR 860/Miami Gardens Drive to North of Broward County Line

Miami-Dade County, Florida

Financial Management Number: 414964-1

ETDM Number: 14419

April 2025

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

April 2025

BRIDGE ANALYSIS REPORT

I-95/State Road (SR) 9 Project Development and Environment (PD&E) Study
From South of SR 860/Miami Gardens Drive to North of Broward County Line
Miami-Dade County, Florida

Financial Management Number: 414964-1-22-01
Federal Aid Project Number: N/A
Efficient Transportation Decision Making (ETDM): 14419

DISTRICT VI

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BRIDGE ANALYSIS REPORT

Interstate 95 (I-95) / State Road (SR) 9
Project Development and Environment (PD&E) Study

FDOT Financial Project Identification Number: 414964-1-22-01
Efficient Transportation and Decision Making (ETDM) Number: 14419

Project Study Limits:
From South of SR 860/Miami Gardens Drive
to North of the Broward County Line
Miami-Dade County, Florida

Prepared for:

FDOT District Six
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April 2025
DRAFT

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1. Introduction

1.1. Project Description

The Florida Department of Transportation (FDOT) District Six is evaluating alternatives to alleviate traffic congestion along a segment of the I-95 interstate from south of the intersection with SR 860 (Miami Garden Dr.) to north of the intersection with NE 203rd Street (Ives Dairy Rd.), approximately 3.5 miles. Figure 1-1 illustrates the Project Location Map. The proposed corridor improvements will increase traffic capacity. The project is in Miami-Dade County, Florida and is within unincorporated Miami-Dade County.

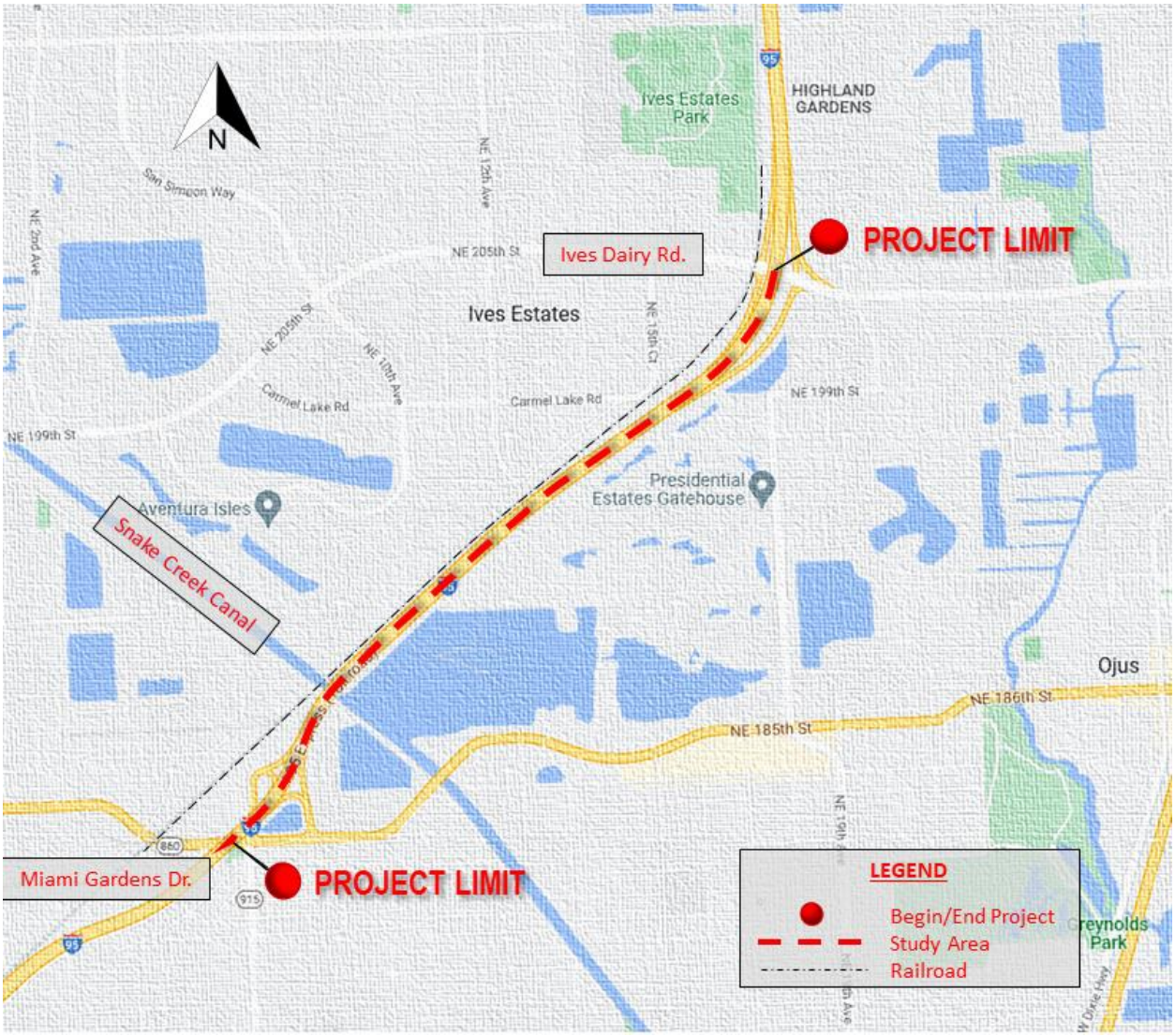

Figure 1-1 Project Location

1.2. Description of the Existing Facility

The purpose of this project is to address the deficient operational capacity and relieve existing/future congestion along the I-95/SR 9A corridor. Other goals of the project are to 1) preserve the operational integrity and regional functionality of I-95/SR 9A (and, therefore, the regional transportation network) by complementing similar corridor improvements throughout Miami-Dade, Broward, and Palm Beach Counties and 2) enhance emergency evacuation and response times.

Figure 1-2 illustrates the location of the existing bridges.

The I-95 project segment includes seven existing bridges between SR860/Miami Gardens Drive and NE 203rd St / Ives dairy Road. The existing bridges include:

Bridge No. 870449 I-95 NB over SR 860 (NW 183rd / Miami Gardens Drive) consisting of 9 spans built with prestressed concrete girders with a cast-in-place concrete deck. It is 651'-0" long, 73'-10" wide, carrying 5 lanes and 10 foot and 4 foot inside and outside shoulders, respectively. Minimum vertical clearance is 16'-8" and Horizontal clearance varies between 2'-3" to 10'-3".

Bridge No. 870352 I-95 SB over SR 860 (NW 183rd / Miami Gardens Drive) consisting of 11 spans built with prestressed concrete girders with a cast-in-place concrete deck. It is 839' - 6" long, 81' -4" wide, carrying 6 lanes and 4 foot and 6 foot inside and outside shoulders,

Figure 1-2 Existing Bridges

respectively. AT 14'-7", the minimum vertical clearance does not meet FDOT criteria. Horizontal clearance varies between 1'-5" to 10'-2".

Bridge No. 870093 I-95 NB over Snake Creek Canal consisting of 4 spans originally built with concrete T-beams and widened with concrete flat slab. It is 132' - 0" long, 91' 11" wide, carrying 6 lanes and 10 foot inside and outside shoulders.

Bridge No. 870094 I-95 SB over Snake Creek Canal consisting of 4 spans originally built with concrete T-beams and widened with concrete flat slab. It is 132' - 0" long, 79' 11" wide, carrying 5 lanes and 10 foot inside and outside shoulders.

Bridge No. 870166 NE 203rd Street / Ives Dairy Road over I-95 consisting of 4 spans built with prestressed concrete girders with a cast-in-place concrete deck. It is 285' - 1" long, 140' -1" wide, carrying 9 lanes and 2 foot inside and 4 foot outside shoulders. AT 15' -10", the minimum vertical clearance does not meet FDOT criteria. Horizontal clearance varies between 5'-9" to 12'-0".

Bridge No. 870576 NE 203rd Street / Ives Dairy Road WB over SFRC RR is combined with Bridge No. 870577 below. The westbound side carries 3 lanes with 2 foot inside and 15' 6" foot outside shoulders, respectively. Minimum vertical clearance is 22' – 2". Horizontal clearance is 2'-0".

Bridge No. 870577 NE 203rd Street / Ives Dairy Road EB over SFRC RR consisting of 4 spans built with prestressed concrete girders with a cast-in-place concrete deck. It is 196' - 10" long, 164' -0" wide (combined with Bridge 870576), carrying 6 lanes and 2 foot inside and 3 foot outside shoulders, respectively. Minimum vertical clearance is 22'-1". Horizontal clearance is 2'-0".

Table 1-1 provides the existing bridge characteristics within the project limits.

Table 1-1 - I-95 EXISTING BRIDGE & OVERPASS CHARACTERISTICS FROM MIAMI GARDENS DRIVE TO COUNTY LINE

Bridge ID No.	LOCATION		DATA		GEOMETRICS					ALIGNMENT				STRUCTURAL		WATERWAY			CONDITION	
	Bridge Location / Crossing Over	Direction	Plans	Inspect. Report	Bridge Length (FT)	Deck Width (FT)	Shoulder Width (FT)		No. of Lanes	Skew Angle	Horizontal Clearance		Min. Vertical (FT)	No. Spans	Superstructure Type	Channel Data	Year Built/ Rebuilt	Sufficiency Rating (%)	Inspection Date	Significant Deficiencies
							Inside	Outside			(N,S,E,W)	(N,S,E,W)								
870449	SR 860 (NW 183 / M. GARDENS DRIVE)	NB	Y	Y	651	73.8	10	4	5	0	4.25/3.75 C S	10.25/3.75 C N	16.6	9	Prestressed concrete girders, cast-in-place deck	-	1962 / 1988	81	3/23/2020	Functionally Obsolete
	SR 860 (NW 183 / M. GARDENS DRIVE)	-	-	-	-	-	-	-	-	-	2.58G S (INT. BENT)	4G N (INT. BENT)	-	-	-	-	-	-	-	-
	OVER I-95 SB OFF RAMP	-	-	-	-	-	-	-	-	-	4.25 W	4.33B W	18.17	-	-	-	-	-	-	-
	OVER 1-95 SB ON RAMP	-	-	-	-	-	-	-	-	-	6.58/2.33 C E	2.25/3.75C E	19.23	-	-	-	-	-	-	-
870352	SR 860 (MIAMI GARDENS DRIVE)	SB	Y	Y	839.5	81.3	4	6	6	0	4.25/3.75 C S	10.16/1.41 C N	14.83	11	Prestressed concrete girders, cast-in-place deck	-	1962 / 1988	77.1	3/23/2020	Functionally Obsolete
	SR 860 (MIAMI GARDENS DRIVE)	-	-	-	-	-	-	-	-	-	2.58G S (INT. BENT)	4G N (INT. BENT)	-	-	-	-	-	-	-	-
	OVER I-95 SB OFF RAMP	-	-	-	-	-	-	-	-	-	4.25 W	4.33B W	14.59	-	-	-	-	-	-	
	OVER 1-95 SB ON RAMP	-	-	-	-	-	-	-	-	-	6.58/2.33 C E	2.25/3.75C E	15.12	-	-	-	-	-	-	-
870093	SNAKE CREEK CANAL	NB	Y	Y	132	91.92	10	10	6	0	-	-	-	4	Concrete T-beam w/ flat slab widening	HW=5.08, NW=2.8, Q=4250 CFS, 200 YR	1948 / 1968 / 2014	92.7	4/15/2019	-
870094	SNAKE CREEK CANAL	SB	Y	Y	132	79.92	10	10	5	0	-	-	-	4	Concrete T-beam w/ flat slab widening	HW=5.08, NW=2.8, Q=4250 CFS, 200 YR	1948 / 1968/ 2015	95.3	4/15/2019	-
870166	IVES DAIRY ROAD OVER I-95	EB + WB	Y	Y	285.1	140.09	2	4	9	0	12/5.75C W	12/11.41C E	15.83	4	Prestressed concrete girders, cast-in-place deck	-	1970 / 1994	81.2	3/18/2020	-
870577	EB IVES DAIRY ROAD OVER FRONTAGE RD & RR	EB	Y	Y	196.8281	82	2	3	6	5	2.0 G E (INT.BENT)	3.0 G W (INT. BENT)	22.07	4	Prestressed concrete girders, cast-in-place deck	-	1970/1992	76.4	5/3/2020	Functionally Obsolete
870576	WB IVES DAIRY ROAD OVER FRONTAGE RD & RR	WB	Y		196.8281	82	2	15.5	3	5	2.0 G E (INT.BENT)	3.0 G W (INT. BENT)	22.14	4	Prestressed concrete girders, cast-in-place deck	-	1970/1992			

NOTES: Skew angle is taken at alignments intersection to a perpendicular to mainline
Horizontal clearances followed by a C means distance to column
Horizontal clearances followed by a G means distance to guardrail
Horizontal clearances followed by a B means distance to barrier railing
Horizontal clearances followed by a SP means distance to slope pavement
Horizontal clearances followed by a INT. BENT means distance to interior bent
HW=High Water Elevation, NW=Normal Water Elevation, Q=Design Discharge
Horizontal clearances followed by a INT. BENT means distance to interior bent
DHW=Design High Water, MHW=Mean High Water
Vertical Clearances based on survey information provided by MG Vera and Assoc.

2. Design Criteria

2.1. General

A. Standards and Specifications

The following list of codes, standards, and specifications will be used during the design of the structures for this project:

- Florida Department of Transportation Standard Specifications for Road and Bridge Construction (FY 2023-24 Edition).
- American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", 9th Edition
- Florida Department of Transportation, Florida Design Manual (FDM), January 2023.
- Florida Department of Transportation Structures Manual, January 2023.
- Florida Department of Transportation FY 2023-24 Standard Plans.

B. Design Method(s)

- Load and Resistance Factor Design (LRFD)

C. Design Loadings

- Dead Loads:

Concrete (Bridge elements)	150 pcf
Steel, Structural:	490 pcf
Stay-in-Place Forms (SIP):	20 psf
Traffic Railing Barrier (Index 521-427):	430 plf
Traffic Railing Barrier (Index 521-426):	645 plf
Concrete walls and deck	150 pcf

- Utilities (DW):
  None yet determined.

- Future Wearing Surface (DW):
  Structure Bridges are considered a long bridge with an 8½ in. slab thickness.
  Design Loading: 15 psf (for short Bridges)

- Live Load (LL+IM):
  Design Loading: HL-93
  Permit Loading: FL-120
- Wind Loads (WL, WS): Per AASHTO LRFD 3.8 and SDG 2.4.

- Creep, Shrinkage and Thermal Effects (CR, SH, TU):
  The design mean temperature shall be 70° F.I

  Thermal effects due to temperature rise and fall shall be calculated for the following temperature ranges:

  For concrete structures: Temperature Rise and/or Fall: 35° F
  For concrete deck on steel girder: Temperature Rise and/or Fall: 40° F

  Coefficient of thermal expansion:
  Concrete structure: 6.0x10-6 per °F
  Steel Structure: 6.5x10-6 per °F

  Shrinkage: Per AASHTO LRFD 5.4.3.

D. Material Properties

The existing bridges date from 1948 to approximately 1994. Specific material properties of these structures are shown in existing plans. For the proposed structures, the materials listed below shall be used in the design of the structure elements presented in this Bridge Analysis Report:

Concrete

Concrete shall be specified in accordance with the FDOT Standard Specifications for Road and Bridge Construction, FY 2023-24 Edition, and the FDOT SDG Section 1.4.3. The following concrete properties are specified:

Class	Minimum 28-day Compressive Strength (psi)	Location
II	$f`_c$ = 3,400	Traffic Railing Barriers
II (Bridge Deck)	$f`_c$ = 4,500	Bridge Deck and Approach Slabs
IV	$f`_c$ = 5,500	CIP Substructure
V	f`c = 6,500	Concrete Piling
VI	$f`_c$ = 8,500	Prestressed Girders

Reinforcing Steel

Reinforcement shall be ASTM A615, Grade 60 ksi.

Structural Steel

Structural steel shall be ASTM A709, Grade 50 ksi, unless otherwise noted. Stiffeners, internal and external cross frames, lateral bracing, and other ancillary items shall be Grade 50 ksi unless otherwise noted.

Prestressing Steel

Prestressed strands shall conform to ASTM A416, Grade 270, low relaxation strands.

E. Concrete Cover

Unless otherwise noted, the following concrete covers shall be used:

Superstructure:	
All Exterior and Interior surfaces (Except top deck surfaces)	2"
Top deck surfaces	2 1/2"
Substructure:	
External surfaces cast against earth and surfaces in contact with water	4"
External formed surfaces	3"
Prestressed Piling	3"
Top and side of Pedestals	2"
Front face of wall, top of barriers & parapet	2"

2.2. Environmental Classification

The classification of the bridge environment has been determined from the existing plans. The structures environment classification is classified as follows.

Substructure: Moderately Aggressive.
Superstructure: Slightly Aggressive

2.3. Aesthetics

Preliminary structures aesthetics criteria must adhere to the criteria summarized in FDM 121.9.3.

3. Alternative Analysis

3.1. Proposed Bridges - Alternative 1

Build Alternative #1 will provide two express lanes throughout the entire corridor; will add one additional general use lane in each direction; will reconfigure the SR 860/Miami Gardens Drive interchange; will provide a Diverging Diamond Interchange configuration at CR 854/Ives Dairy Road; will maintain at-grade access to I-95 northbound from SR 860/Miami Gardens Drive; will add bicycle lanes and sidewalks along SR 860/Miami Gardens Drive; and will add an eastbound through lane, bicycle lanes, and one sidewalk along CR 854/Ives Dairy Road.

Figures 3.1.A through 3.1.C show the layout of the proposed bridges in Alternative 1

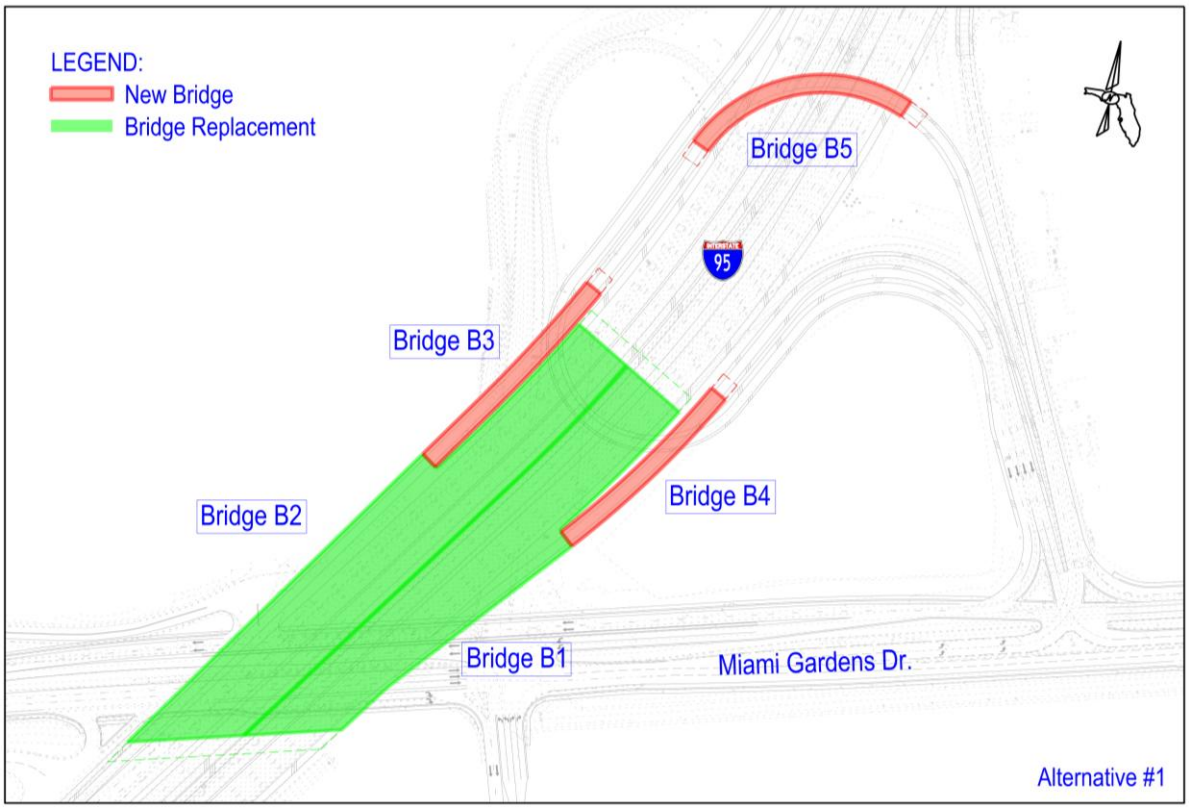

Figure 3-1.A

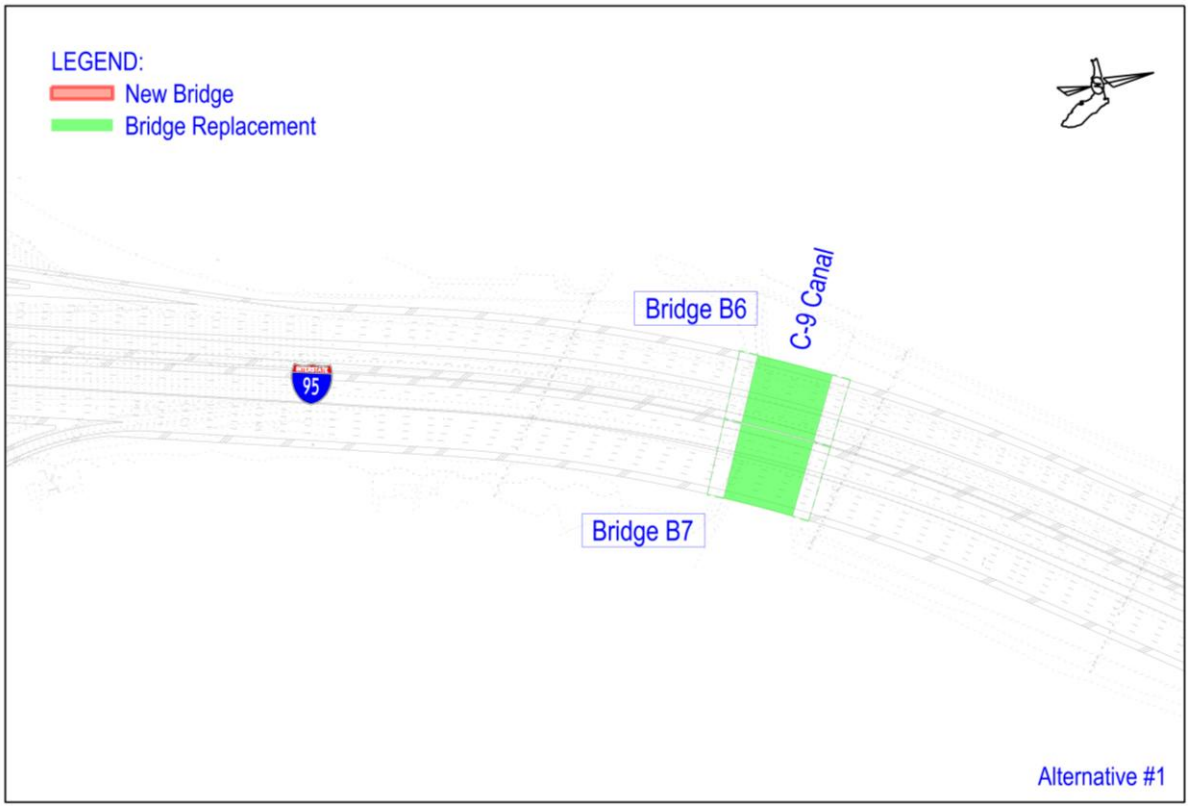

Figure 3.1.B

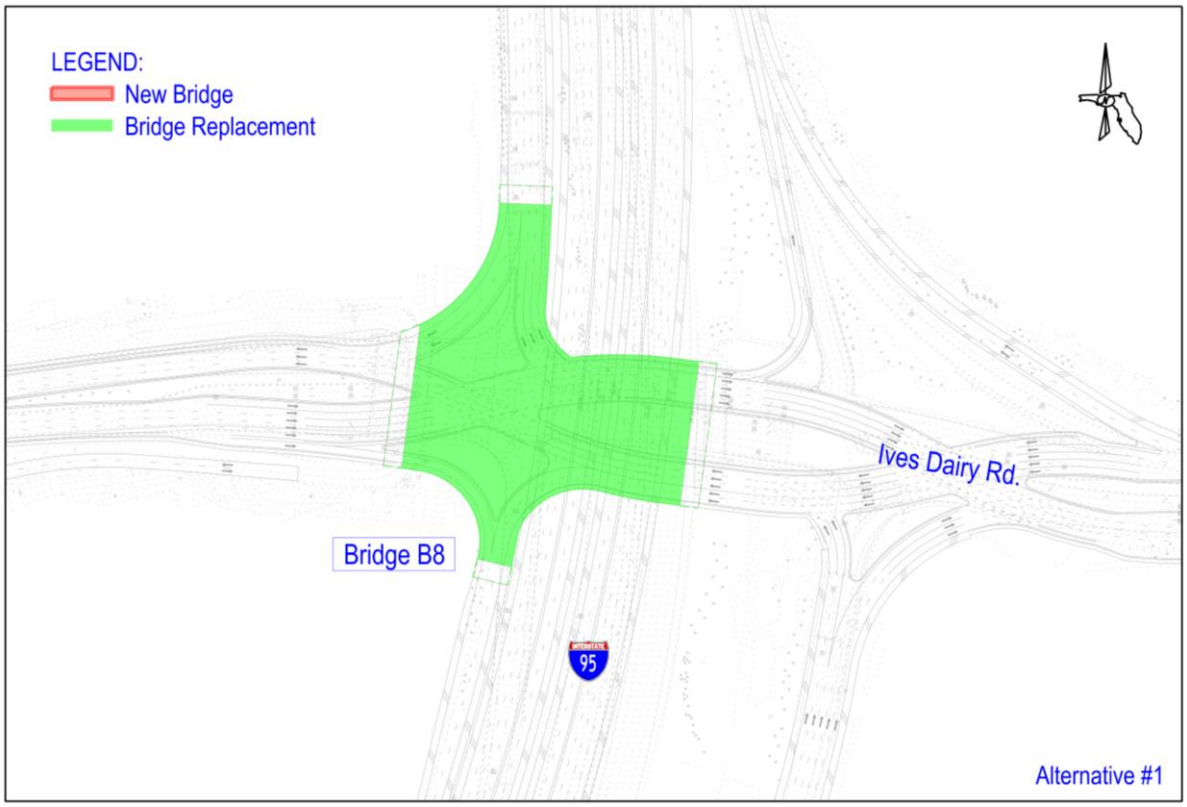

Figure 3.1.C

3.2. Proposed Bridges - Alternative 2

Alternative #2 will provide two express lanes throughout the entire corridor; will add one additional general use lane in each direction; will introduce braided ramp bridge access for the express lanes; will reconfigure the SR 860/Miami Gardens Drive interchange, including second level bridges; will provide a Single Point Urban Interchange configuration at CR 854/Ives Dairy Road; will provide grade-separated bridge access to I-95 from SR 860/Miami Gardens Drive; will add bicycle lanes and sidewalks along SR 860/Miami Gardens Drive; and will add an eastbound through lane, bicycle lanes, and two sidewalks along CR 854/Ives Dairy Road.

Figures 3.2.A through 3.2.G show the layout of the proposed bridges in Alternative 2.

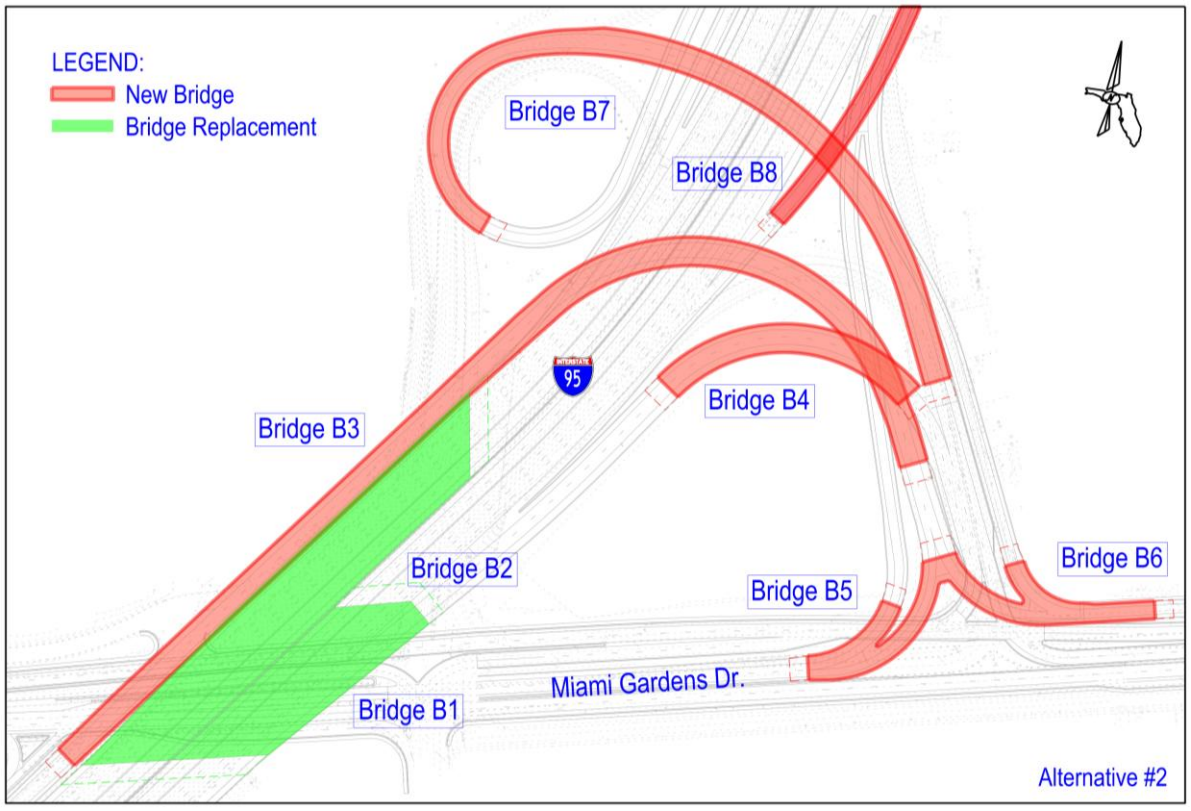

Figure 3.2. A

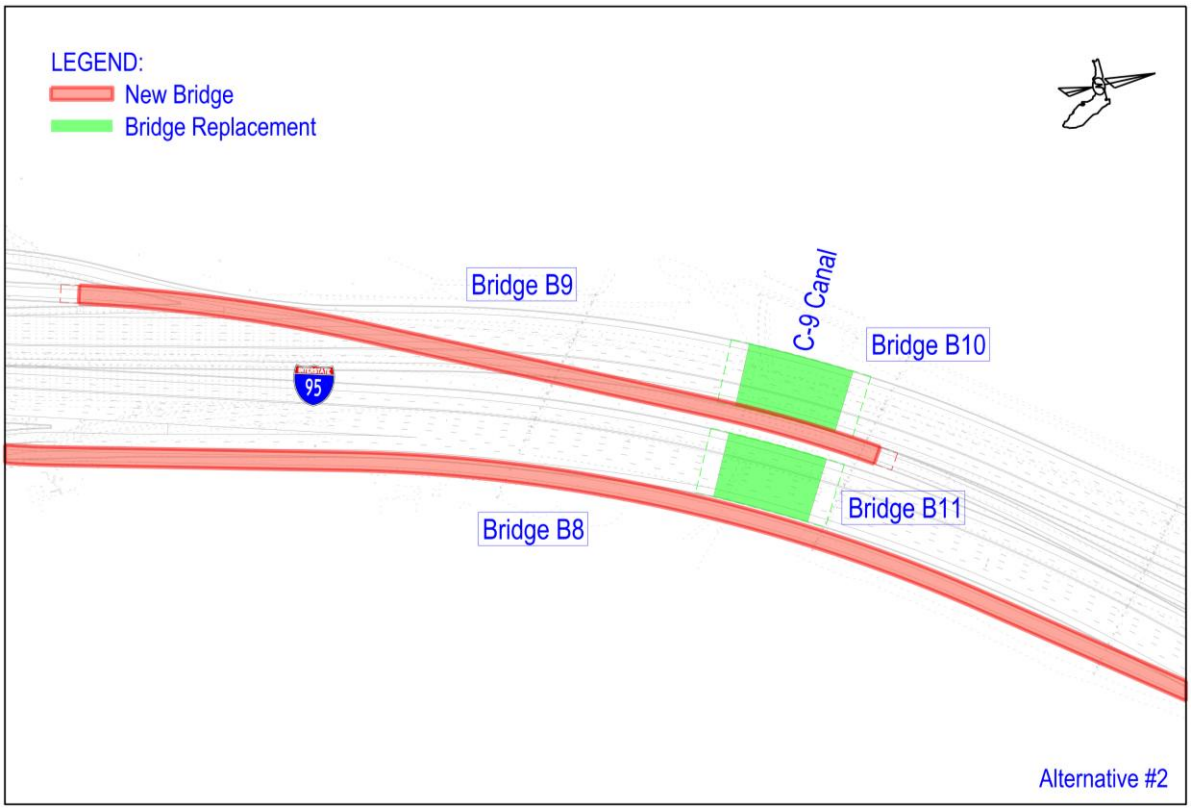

Figure 3.2. B

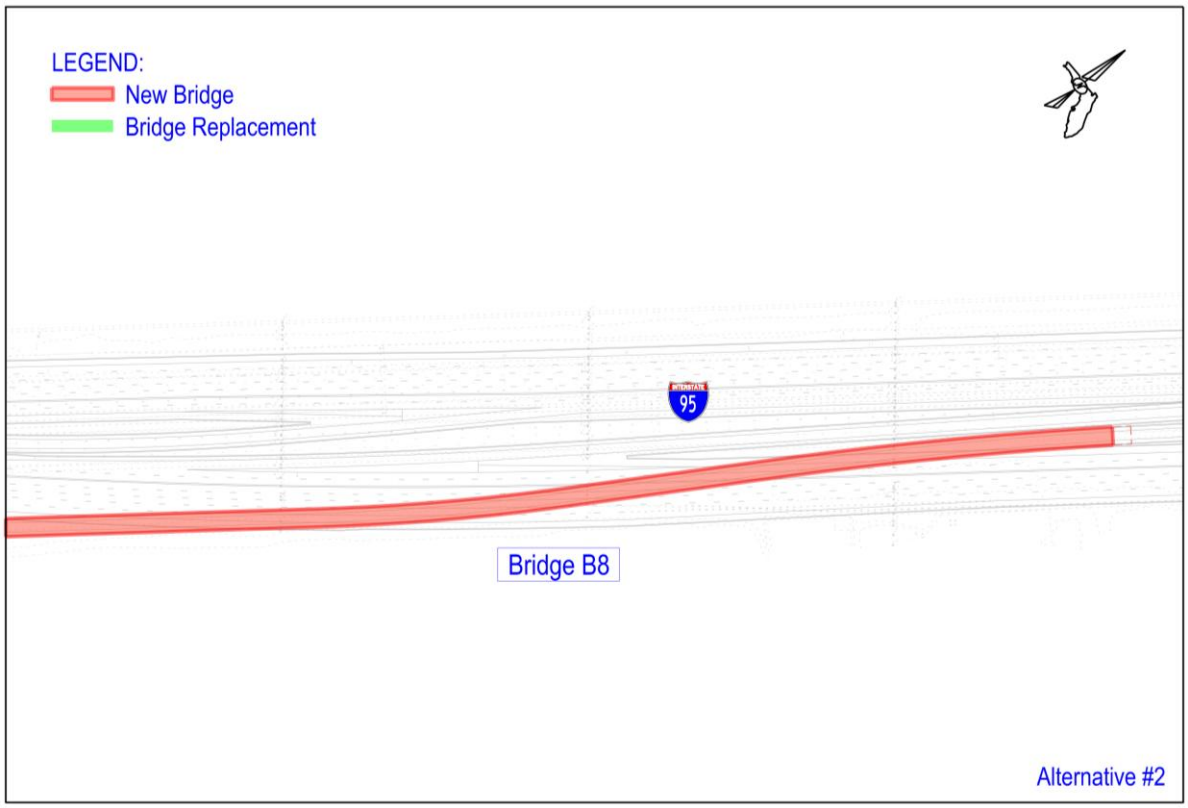

Figure 3.2.C

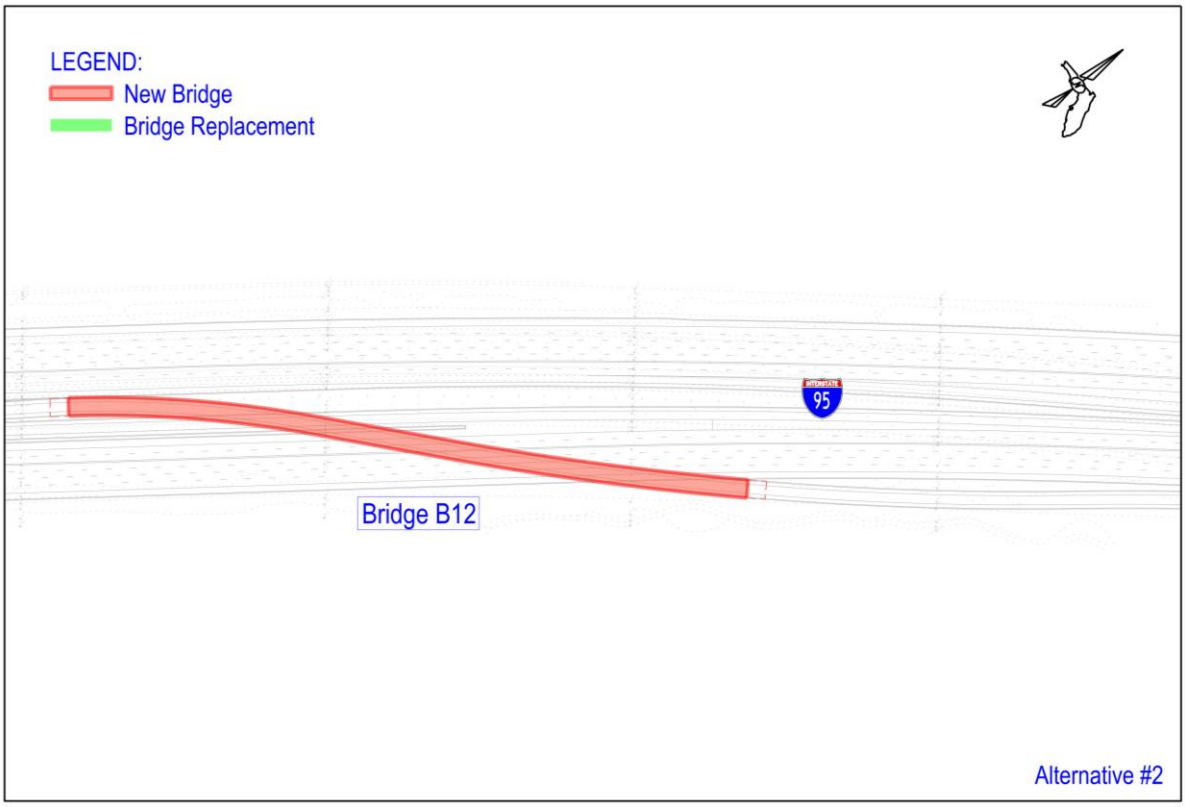

Figure 3.2. D

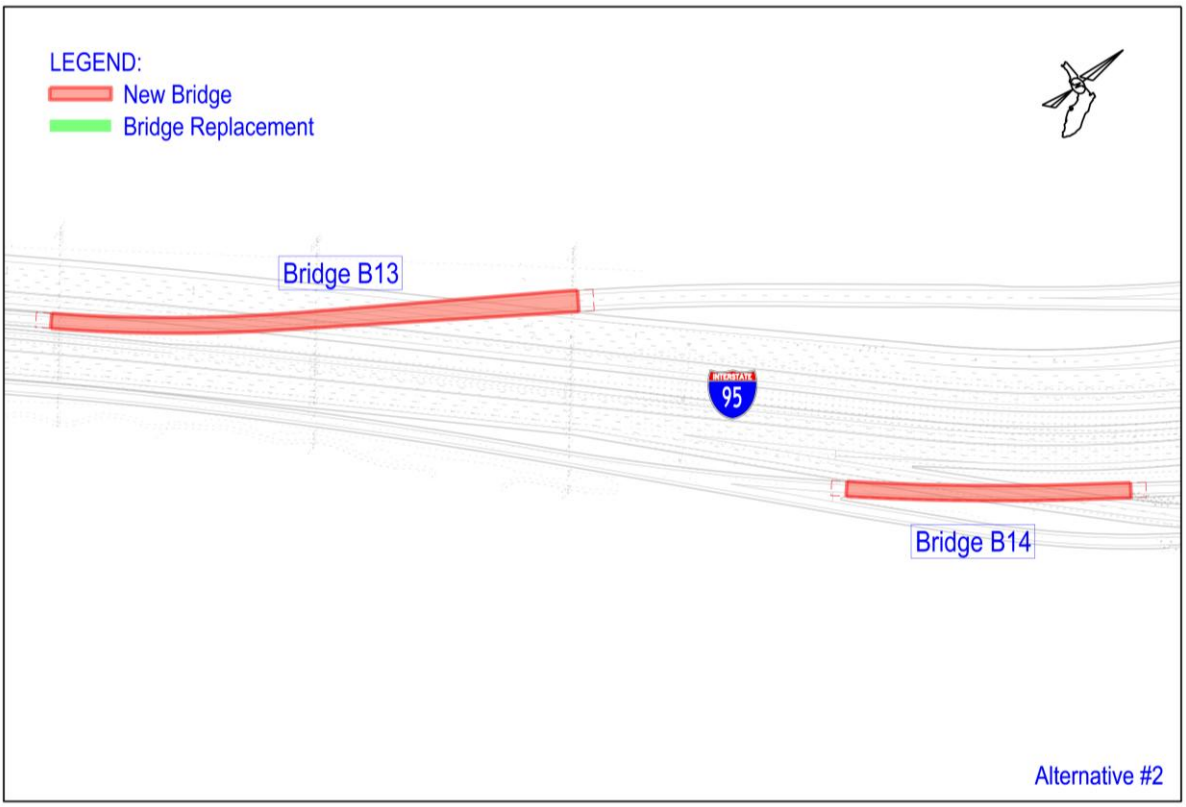

Figure 3.2. E

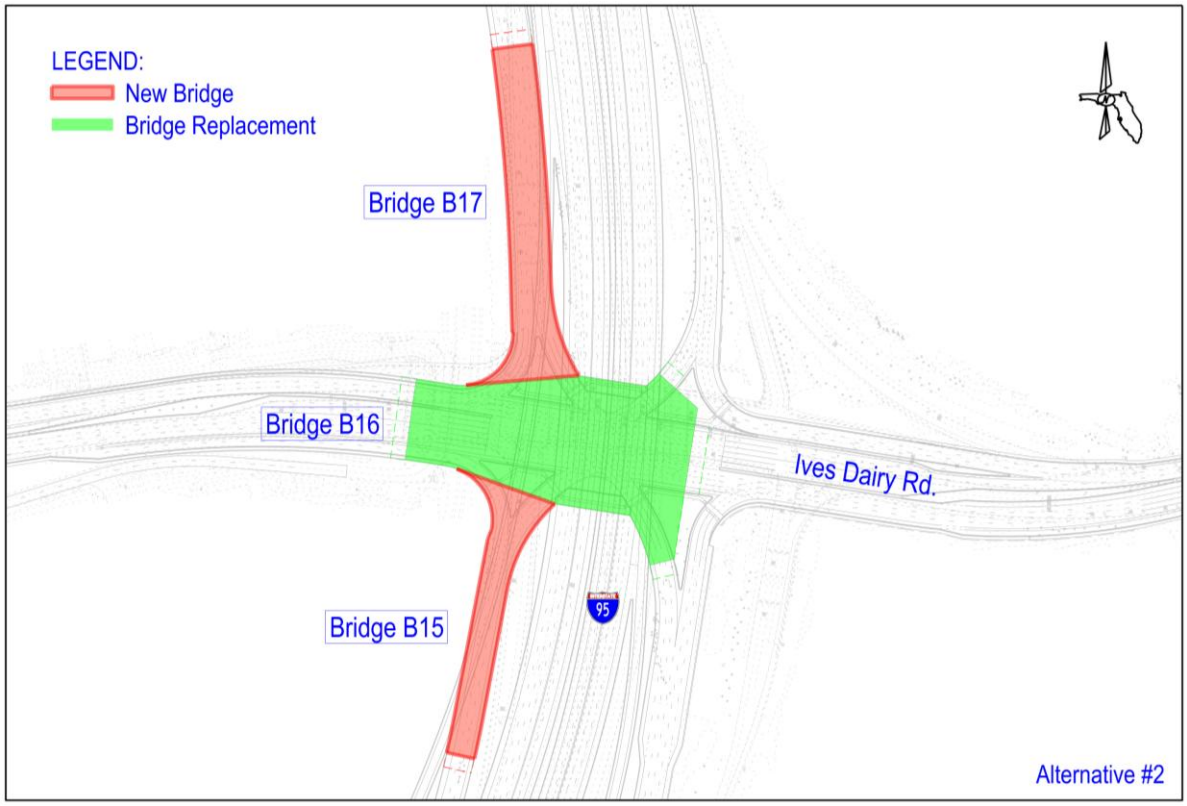

Figure 3.2. F

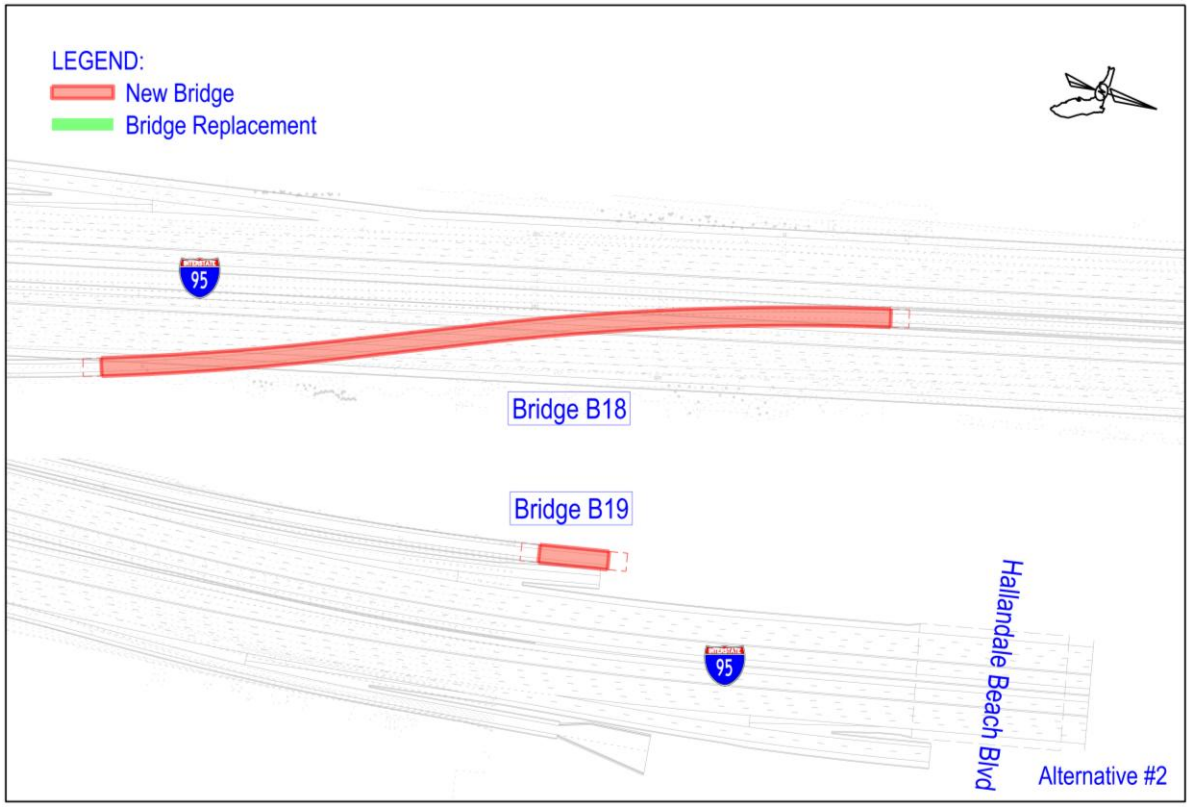

Figure 3.2. G

3.3. Proposed Bridges - Alternative 3

Alternative #3 will provide two express lanes throughout the entire corridor; will add one additional general use lane in each direction; will introduce braided ramp bridge access for the express lanes; will reconfigure the SR 860/Miami Gardens Drive interchange; will provide a Diverging Diamond Interchange configuration at CR 854/Ives Dairy Road; will provide grade-separated bridge access to I-95 from SR 860/Miami Gardens Drive; will add bicycle lanes and sidewalks along SR 860/Miami Gardens Drive; and will add an eastbound through lane, bicycle lanes, and one sidewalk along CR 854/Ives Dairy Road.

Figures 3.3.A through 3.3.F show the layout of the proposed bridges in Alternative 3.

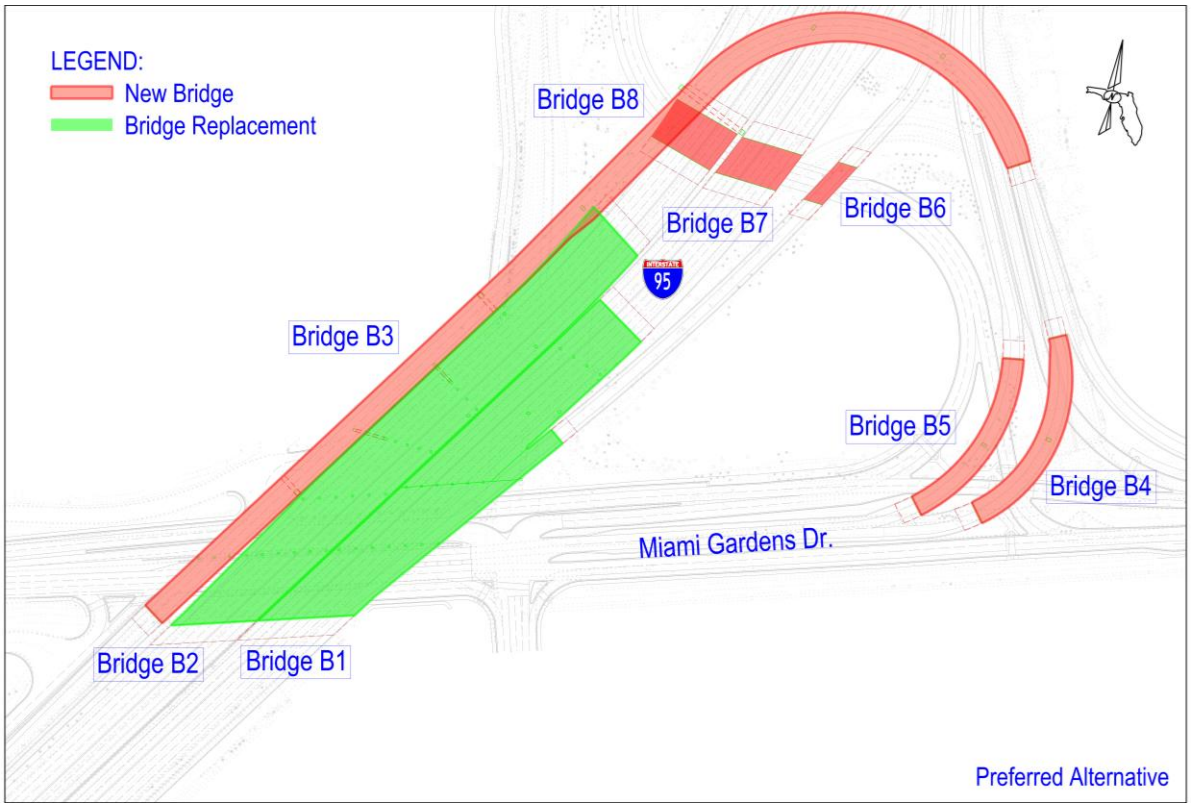

Figure 3.3.A

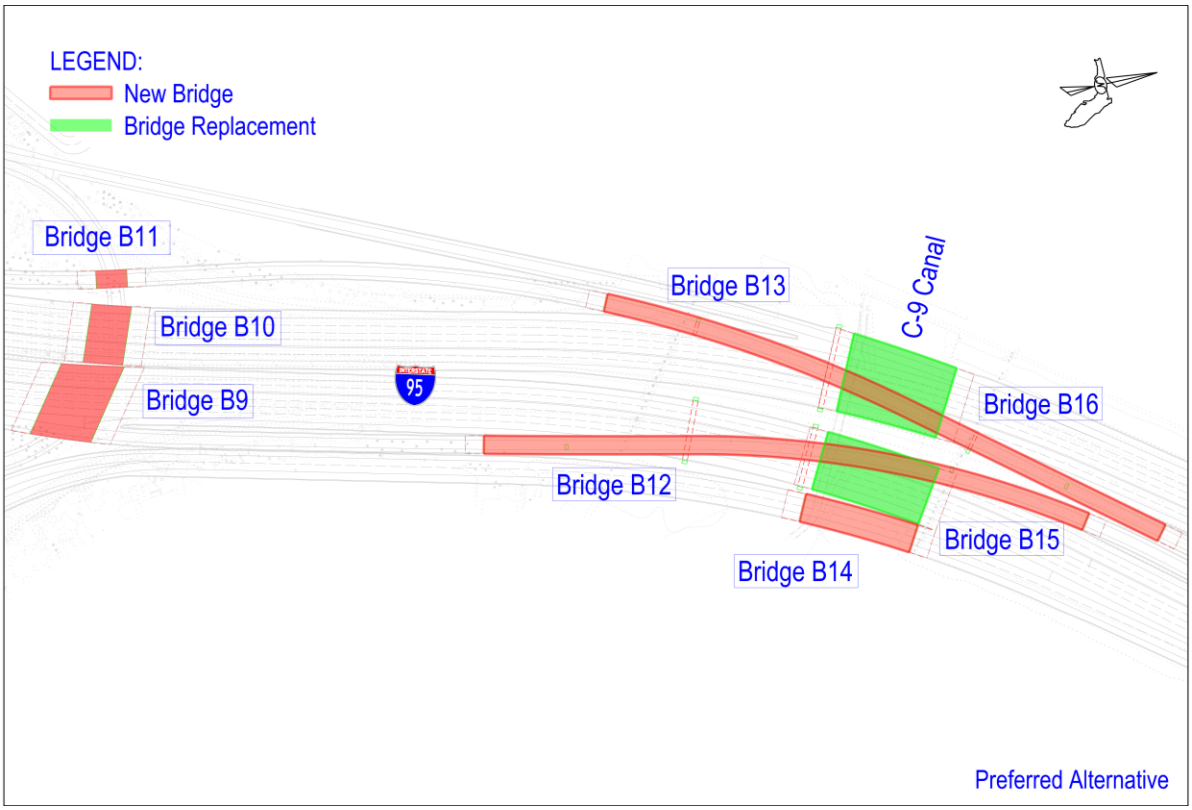

Figure 3.3. B

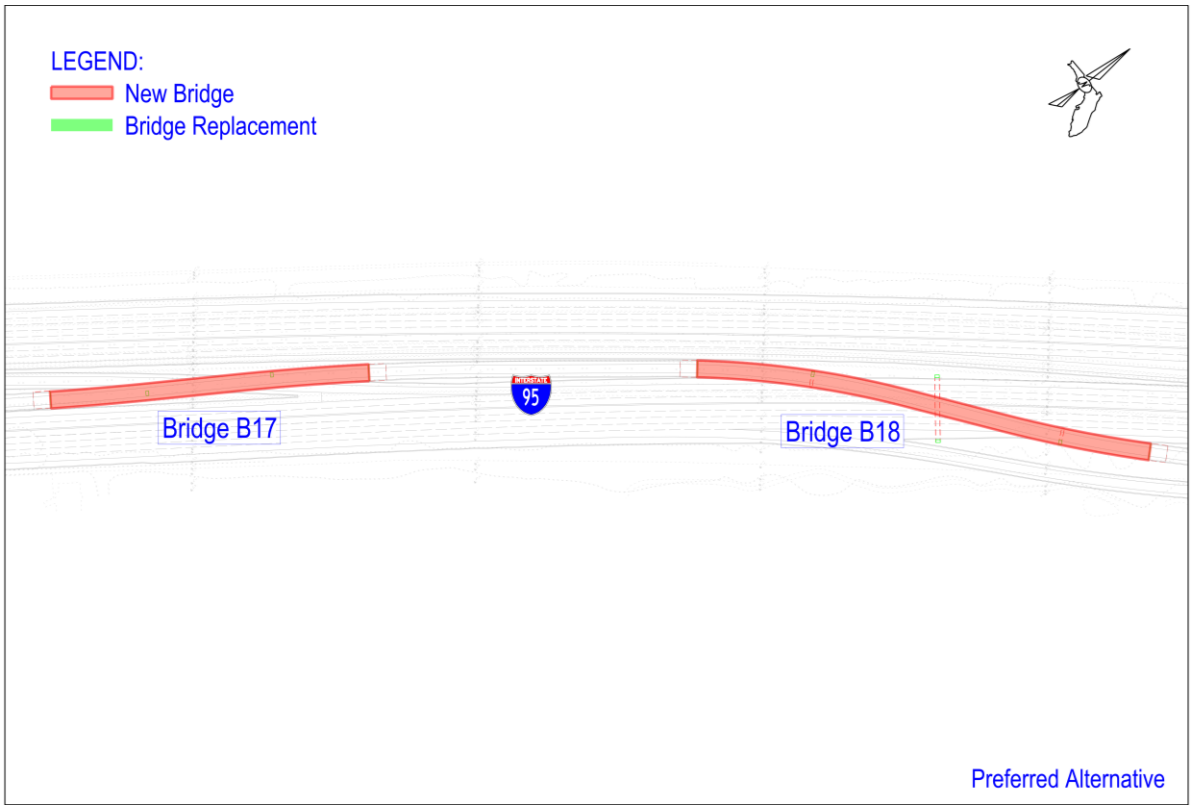

Figure 3.3.C

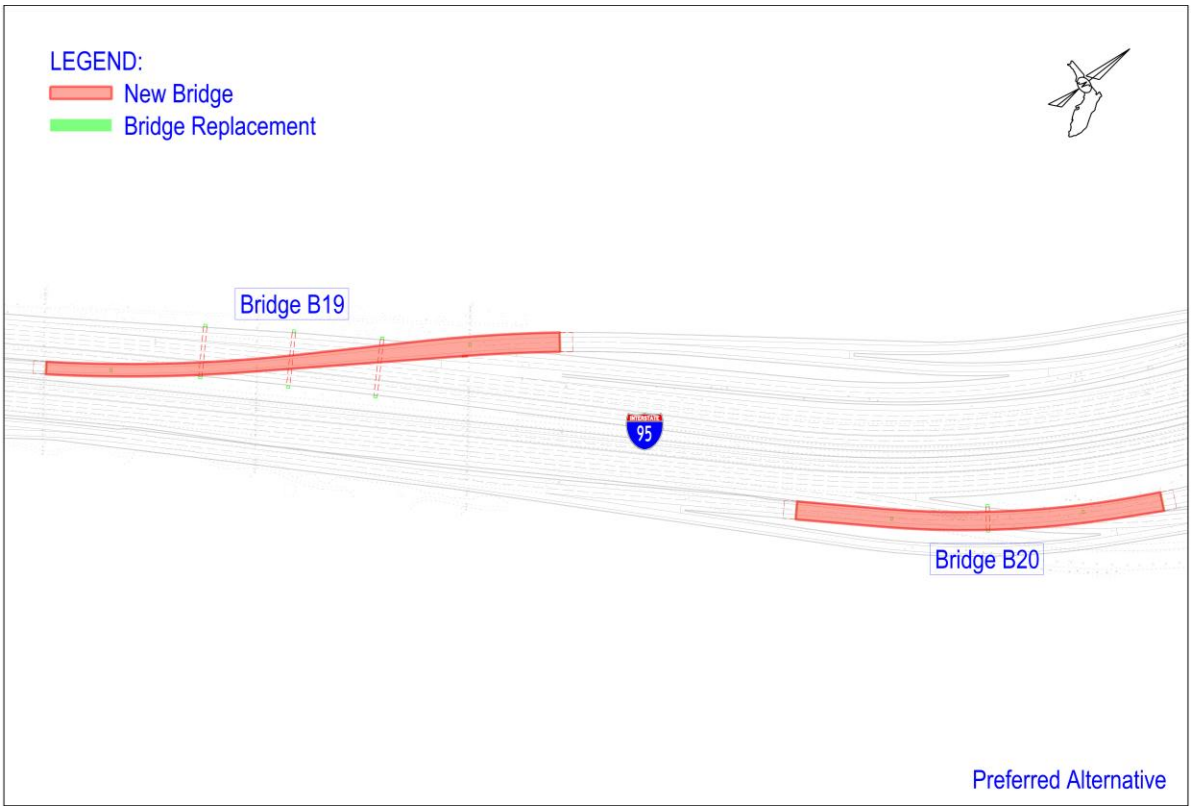

Figure 3.3. D

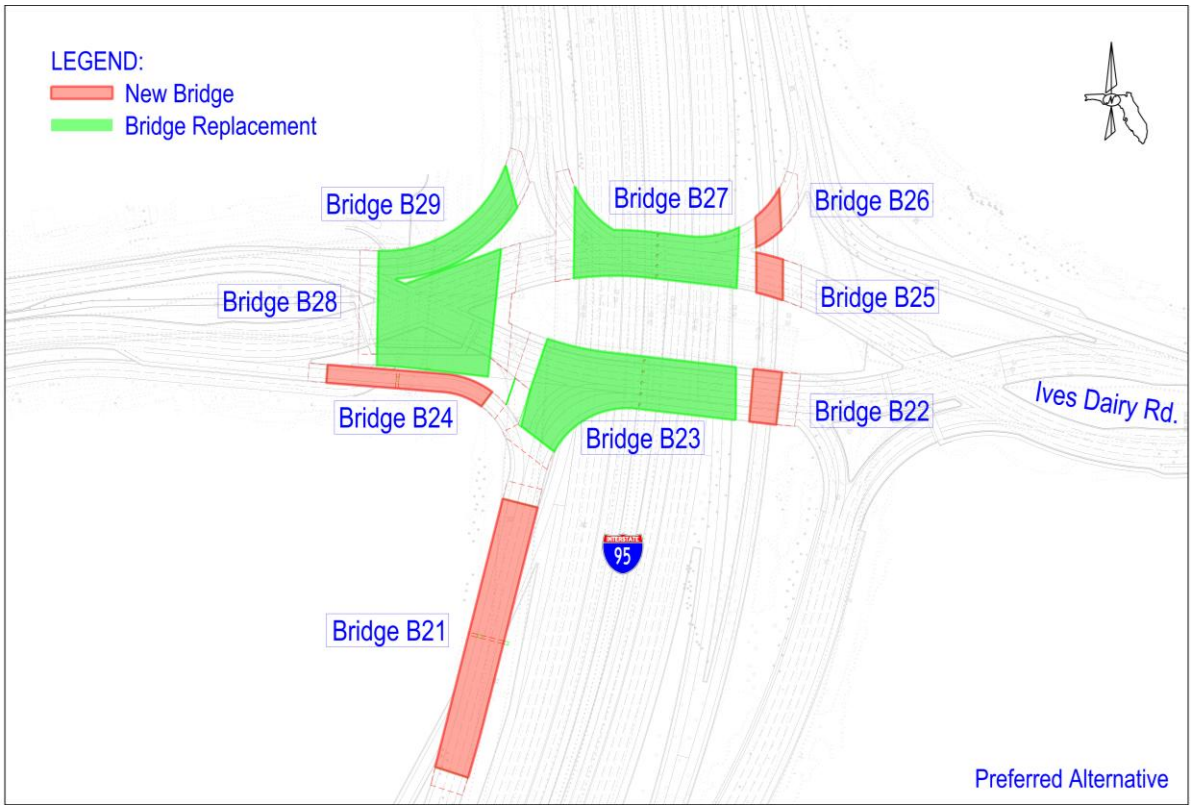

Figure 3.3. E

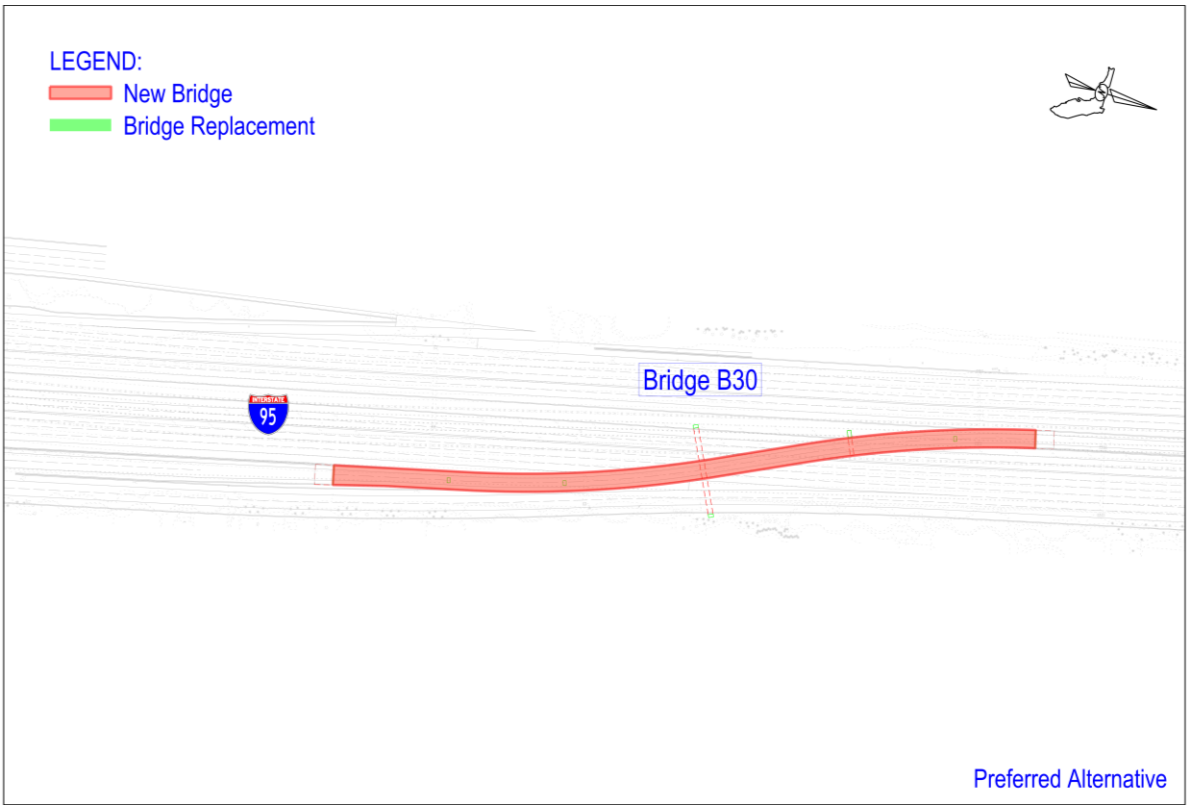
LEGEND:
New Bridge
Bridge Replacement
Bridge B30
95
Preferred Alternative

Figure 3-3.F

4. Structures Analysis

For the preferred alternate, Alternative 3, there are thirty (30) bridge structures within the project limits; twenty-three (23) new bridges and seven (7) bridge replacements. A replacement is a new bridge that is being built in the same footprint as the existing bridge. It is noted that no Historical Bridges have been found within the limits of this project.

Given the presence of residential communities adjacent to the project, mainly on the east side of the project site, noise and vibrations are factors to be considered during the design phase of the project.

Refer to Noise study in the Preliminary Report for the noise impacts and recommended measures to address noise impacts. Existing noise walls along the existing right of way will need to be enhanced, remain in place or as is, to mitigate new noise levels produced by the project.

Construction activities, such as pile driving operations, or other deep foundation installations, are typical sources of vibrations dissipating throughout the vicinity of the project site. Such vibration effects may be cause of damage to the structures surrounding the project site. To mitigate vibration effects on nearby structures, bridge designers should consider the use of alternative deep foundation systems, such as drilled shafts, auger cast piles, or micropiles. These foundation systems tend to generate less vibrations than a hammered pile driving operation. Structures susceptible to damage due to vibration effects from construction activities are to be identified during the design phase and monitored per FDOT Standard Specifications, to avoid damage to the structures.

Detail description of each structure is presented below and in Section 6 – Bridge Concept Plans.

4.1. Bridge B-1 - NB I-95 Overpass Bridge at Miami Gardens Dr.

Existing Condition

Bridge No. 870449 carries I-95 northbound traffic over SR-860 including I-95 on and off ramps. The existing bridge is composed of nine spans, with a total bridge length of 651 ft. The overall width of the bridge is 73 ft – 10 in uniformly along the bridge.

The bridge was built in 1962 with a widening performed in 1988. The bridge consists of three 11 ft general purpose lanes and two express lanes 11 ft wide, with a 4 ft outside shoulder and a 10 ft inside shoulder, and 32" F-Shape traffic railing barrier along each side of the bridge.

The existing superstructure is composed of simply supported AASHTO Type III and Type IV concrete beams. The existing bridge substructure consists of typical end bents and multi-column and hammerhead piers. All pier columns are supported on individual pile caps with 14" and 18" square prestressed concrete pile foundations. The end bents are built with a 3 ft-4$^{1/2}$ in by 2 ft – 6 in cap supported on 18" square prestressed concrete pile foundations. Both end bents have concrete slope pavements. There are no utilities supported by the existing bridge. Based on survey measurements, the existing minimum vertical clearance is 16.62 ft over Miami Gardens Drive.

Figure 4.1.1 - Bridge No. 870449

Proposed Concept

The existing bridge needs to be replaced since it does not accommodate the proposed roadway geometrics, nor the amount of overbuild to achieve the required cross slopes under the ultimate conditions. In addition, existing clear zones do not meet current requirements.

The existing northbound bridge will be replaced with a new bridge as shown in the proposed typical section below, Figure 4.1.2, consisting of three 11 ft – 0 in wide general purpose lanes, one 11 ft – 0 in wide general purpose lane transitioning to 12 ft – 0 in, one 11 ft -0 in wide off ramp lane transitioning to 15 ft – 0 in, two 11 ft express lanes, 10 ft – 0 in inside shoulder, 6 ft – 0 in outside shoulder and 1 ft – 4 in standard traffic railing barriers, adding up to a variable bridge width between 101 ft – 8 in to 115 ft – 4 in.

The proposed superstructure can consist of Florida I-Beams (FIB) with an 8½" thick concrete deck. The girders can be supported on composite neoprene bearing pads. The bridge would be built in phases, since the proposed bridge location overlaps the existing bridge location, due to the proximity of the right-of-way line.

The proposed new bridge spans can be supported on a multicolumn pier and end bents, as needed, at each support location. Minimum vertical clearance of 16.5 ft will be provided at the controlling span. The proposed six-span bridge would be 709 ft - 8 in. long.

The size of the proposed substructure elements (column and pier cap) at the intermediate piers will be determined during the design phase, based on cost and aesthetic requirements. End bents on piles could be provided at bridge ends. Proposed multicolumn pier at the intermediate pier location could be supported on a pile type foundation.

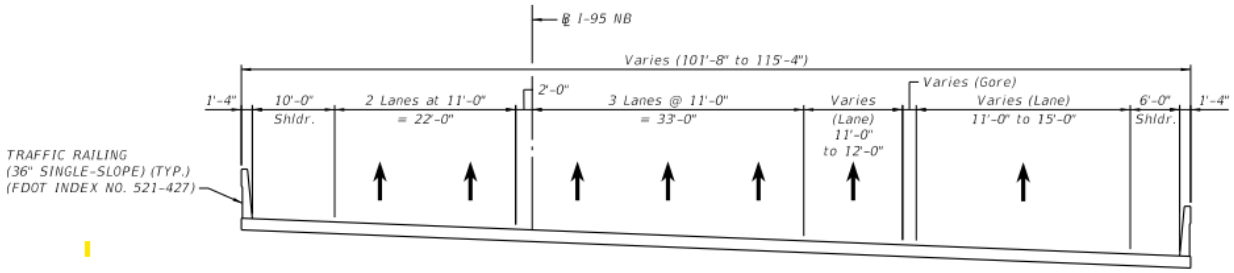

Figure 4.1.2 - Proposed Bridge Typical Section

4.2. Bridge B-2 - SB I-95 OVERPASS BRIDGE AT MIAMI GARDENS DR.

Existing Condition

Bridge 870352 carries I-95 southbound traffic over SR-860 including on and off ramps. The existing bridge is composed of eleven spans, for a total bridge length of 839 ft – 6 in. The overall width of the bridge is 81 ft – 4 in uniformly along the bridge.

The bridge consists of one 12 ft – 0 in wide and three 11 ft – 0 in wide general-purpose lanes, two express lanes 11 ft – 0 in wide, with 6 ft – 0 in outside shoulder and 4 ft – 0 in inside shoulder. The 32" F-Shape Traffic Railing Barrier is used on both sides of the bridge.

The existing superstructure is composed of simply supported AASHTO Type III and IV Beams. The existing bridge substructure consists of typical end bents, multi-column, and hammerhead piers. All pier columns are supported on isolated footings with 14" and 18" square prestressed concrete pile foundations. The end bents are made up of 3 ft-4$^{1/2}$ in ft by 2 ft – 6 in cap and supported on 18" square prestressed concrete pile foundations. Both end bents use concrete slope protection. There are no utilities being currently supported by the existing bridge. The existing minimum vertical clearance is 14.59 ft over I-95 SB Off Ramp. The bridge was built in 1962 with a widening performed in 1988.

Figure 4.2.1 - Bridge 870352

Proposed Concept

The existing bridge needs to be replaced since it:

- does not meet minimum vertical clearance
- does not accommodate the proposed roadway geometrics
- would need excessive amount of overbuild to achieve the required cross slopes under the ultimate conditions
- existing clear zones do not meet current requirements

The existing southbound bridge will be replaced with a new bridge as shown in the proposed typical section below, Figure 4.2.2, consisting of five 11 ft - 0 in wide general purpose lanes transitioning to four 11 ft – 0 in wide lanes, two 11 ft – 0 in wide express lanes, 10 ft – 0 in inside and outside shoulders and 1 ft – 4 in single slope traffic railing barriers, with total bridge deck width varying from 90 ft – 8 in to 101 ft - 8 in. The seven-span bridge will be 920 ft - 8 in long.

The superstructure for the proposed bridge will consist of Florida I-Beams (FIB) with an 8½" thick concrete deck. The girders will be supported on composite neoprene bearing pads. The bridge will be built in phases, since the proposed bridge location overlaps the existing bridge location, due to the proximity of the right-of-way line.

The proposed new bridge spans will be supported on multicolumn piers and end bents, as needed at each support location. Minimum vertical clearance of 16.5 ft will be provided at the controlling span.

The size of the proposed substructure elements (column and pier cap) at the intermediate piers will be optimized for cost and aesthetics. End bents on piles will be provided at bridge ends. Proposed multicolumn pier at the intermediate pier location will be supported on a pile type foundation. Substructure and foundation elements will be evaluated for cost effectiveness during the design phase.

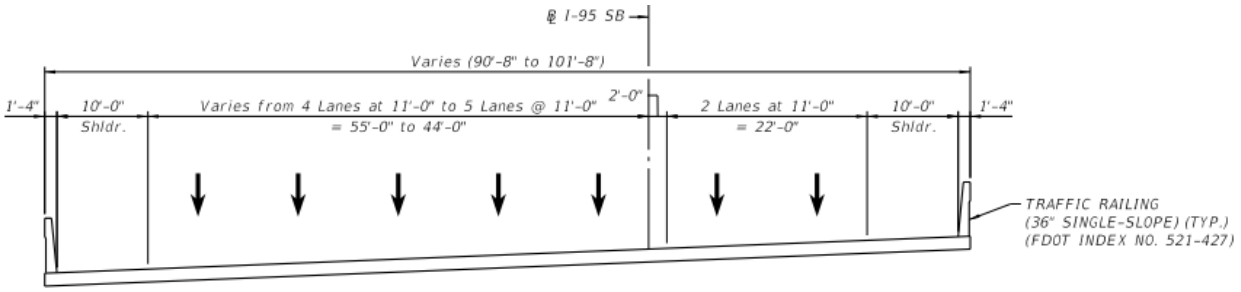

Figure 4.2.2 - Proposed Bridge Typical Section

4.3. Bridge B-3 - SB I-95 ON RAMP FROM MIAMI GARDENS DR. OVER I-95 AND MIAMI GARDENS DR.

Proposed Concept

The proposed bridge is a nine-span, two-lane bridge ramp over SR 860 (Miami Gardens Drive) and NE 5th Avenue. The bridge has an overall length of 1,888 ft - 0 in on a combination of straight and curved alignment and normal end bents. The deck carries two 12 ft – 0 in wide lanes, a transitioning 12 ft - 6 in to 6 ft – 0 in inside shoulder, an 8 ft – 0 in outside shoulder and 1 ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge width varying from 40 ft – 8 in to 47 ft – 2 in, as shown in Figure 4.3.1. The bridge superstructure consists of combination of prestressed concrete Florida I-Beams along the straight alignment and steel plate girders for the curved section of the alignment, with an 8½" thick concrete deck. The substructure consists of normal end bents on piles, and a combination of framed concrete piers, concrete C-Piers and concrete straddle bent. The substructure will be supported on squared prestressed concrete pile foundation system.

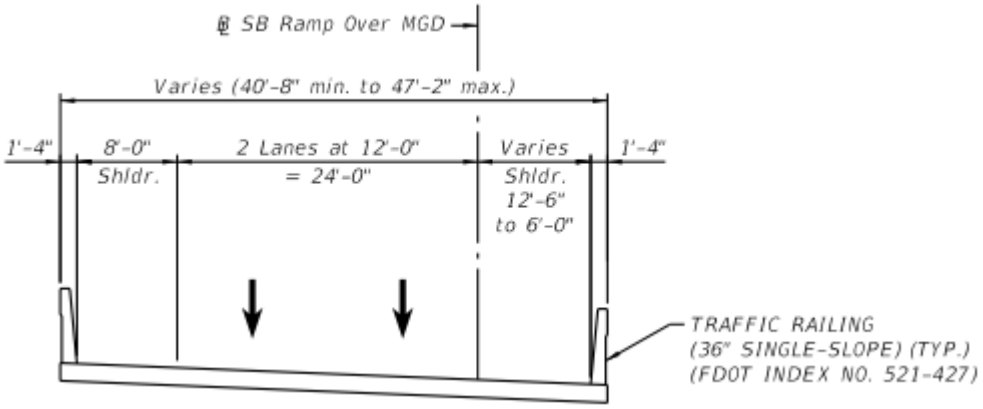

Figure 4.3.1 - Proposed Bridge Typical Section

4.4. Bridge B-4 - SB I-95 ON RAMP FROM MIAMI GARDENS DR. BRIDGE OVER WB MIAMI GARDENS DR. & WB MIAMI GARDENS DR. RAMP TO I-95 NB

Proposed Concept

The proposed bridge is a two-span single-lane bridge ramp over SR 860 (westbound Miami Gardens Drive) and westbound to I-95 NB ramp, carrying the traffic from eastbound Miami Garden Drive entrance ramp to southbound I-95 on-ramp. The bridge has an overall length of 341 ft-5 in on a curve alignment and normal end bents. The deck carries one 15 ft - 0 in wide lane, a 14 ft - 6 in inside shoulder a 6 ft – 0 in outside shoulder transitioning to 14 ft - 6 in and 1 ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge width varying from 38 ft – 2 in to 29 ft – 8 in, as shown in Figure 4.4.1. The bridge superstructure consists of curved steel plate girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.
The substructure will consist of a hammerhead pier supported on squared prestressed concrete pile foundation system.

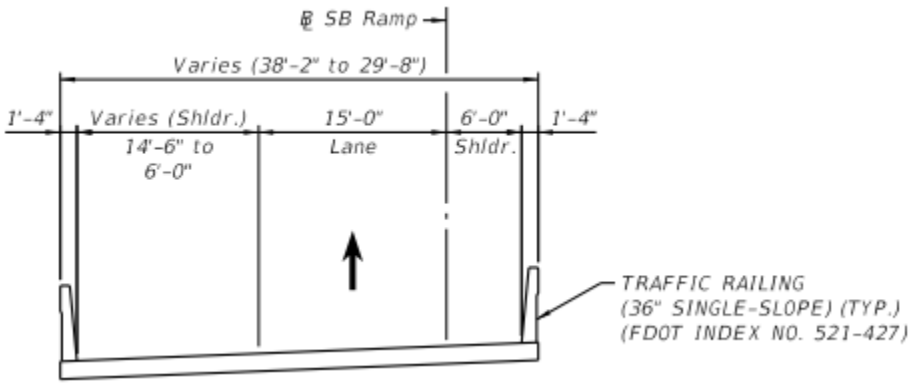

Figure 4.4.1 - Proposed Bridge Typical Section

4.5. Bridge B-5 - EB MIAMI GARDENS DR. TO NB I-95 ON RAMP OVERPASS BRIDGE AT WB MIAMI GARDEN DR. & SB I-95 RAMP TO EB MIAMI GARDENS DR.

Proposed Concept

The proposed bridge is a two-span single-lane bridge ramp over SR 860 (westbound Miami Gardens Drive), carrying the traffic from eastbound Miami Garden Drive entrance ramp to northbound I-95. The bridge has an overall length of 299 ft - 6 in on a curve alignment and normal end bents. The deck carries one 15 ft – 0 in wide lane with a 11 ft - 0 in inside shoulder, a 6 ft – 0 in outside shoulder and 1 ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge width of 34 ft – 8 in, as shown in Figure 4.5.1. The bridge superstructure consists of steel girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles and single column pier on piled foundation at intermediate support.

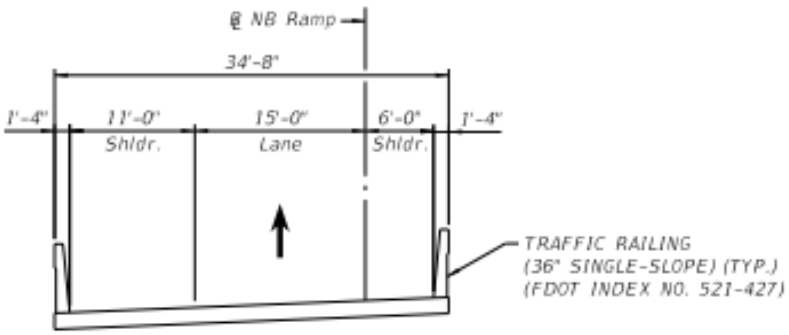

Figure 4.5.1 - Proposed Bridge Typical Section

4.6. Bridge B-6 - NB I-95 OFF RAMP TO MIAMI GARDENS DR. OVER NB I-95 AND SB I-95 OFF RAMPS TO MIAMI GARDEN DR.

Proposed Concept

The proposed structure is a single span single lane bridge ramp, carrying the traffic from NB I-95 exiting to Miami Gardens Dr, over I-95 off ramp to Miami Gardens Dr. The bridge has an overall length of 83 ft, on a straight alignment and skewed end bents. The deck carries one 15 ft – 0 in wide lane, a 6 ft inside and outside shoulders and 1 ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total width of 29 ft 8 in, as shown in Figure 4.6.1. The bridge superstructure consists of Florida I-Beams (FIB) with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

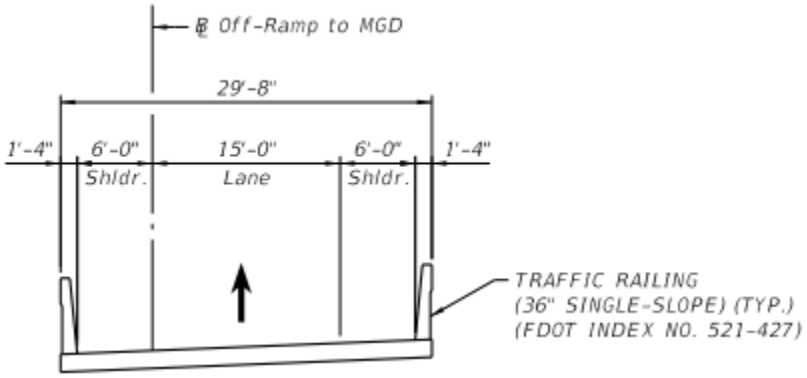

Figure 4.6.1 Proposed Bridge Typical Section

4.7. Bridge B-7 - NB I-95 BRIDGE OVER NB I-95 AND SB I-95 OFF RAMPS TO MIAMI GARDEN DR.

Proposed Concept

The proposed structure is a one-span bridge carrying the NB I-95 mainline traffic over the I-95 off ramp. The bridge has an overall length of 72 ft-10 in on a slightly curved alignment and skewed end bents. The deck carries three 11 ft wide general-purpose lanes, one 12 ft – 0 in wide lane, two 11 ft – 0 in wide express lanes, a 13 ft – 0 in inside shoulder, a 12 ft – 0 in outside shoulder and 1 ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge width of 96 ft – 8 in as shown in Figure 4.7.1. The bridge superstructure would consist of Florida I-Beams (FIB) with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

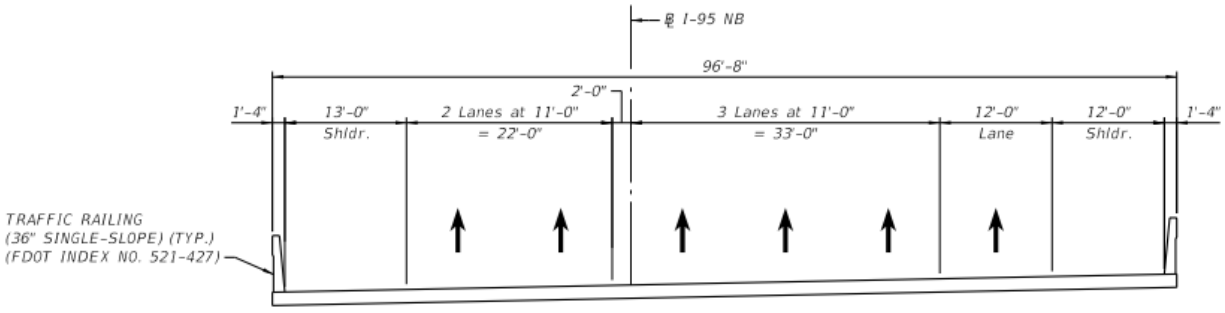

Figure 4.7.1 Proposed Bridge Typical Section

4.8. Bridge B-8 - SB I-95 BRIDGE OVER NB I-95 AND SB I-95 OFF RAMPS TO MIAMI GARDEN DR.

Proposed Concept

The proposed structure is a one-span bridge, carrying the SB I-95 mainline traffic, over the I-95 off ramp. The bridge has an overall length of 74 ft on a slightly curved alignment and skewed end bents. The deck carries four general purpose lanes, two 11 ft – 0 in wide and two transitioning lanes from 11 ft – 0 in to 12 ft -0 in wide; one on ramp lane transitioning from 13 ft – 0 in to 15 ft – 0 in wide, two 11 ft wide express lanes, a 10 ft – 6 in inside shoulder, a 6 ft -0 in outside shoulder and 1 ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge width that varies from 109 ft – 4 in to 113 ft – 7 in, as shown in Figure 4.8.1. The bridge superstructure consists of Florida I-Beams (FIB) with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

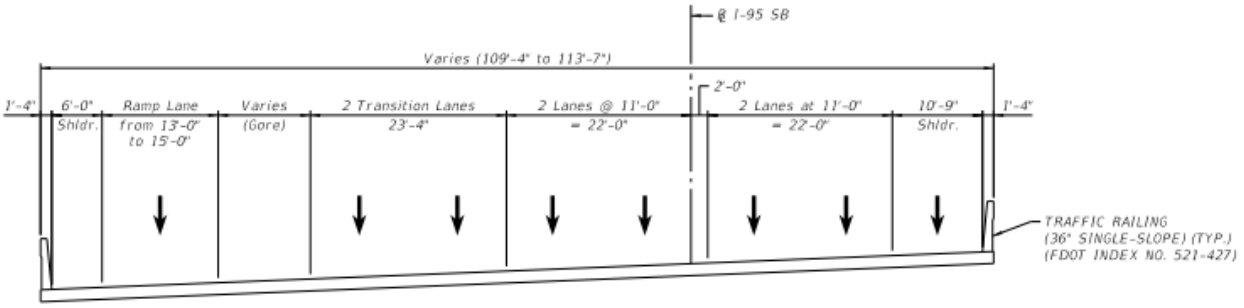

Figure 4.8.1 Proposed Bridge Typical Section

4.9. Bridge B-9 - NB I-95 BRIDGE OVER NB I-95 OFF RAMP TO MIAMI GARDENS DR.

Proposed Concept

The proposed structure is a one-span bridge, carrying the NB I-95 mainline traffic, over the NB I-95 off ramp. The bridge has an overall length of 100 ft - 11 in on a straight alignment and skewed end bents. The deck carries three 11 ft wide general-purpose lanes, one 12 ft – 0 in wide general purpose lane, one 15 ft -0 in wide exit lane, two 11 ft express lanes, a 13 ft – 0 in inside shoulder, a 6 ft – 0 in outside shoulder and 1 ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total variable bridge width of 118 ft – 3 3/4 in to 126 ft – 6 in as shown in Figure 4.9.1. The bridge superstructure consists of Florida I-Beams (FIB) with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

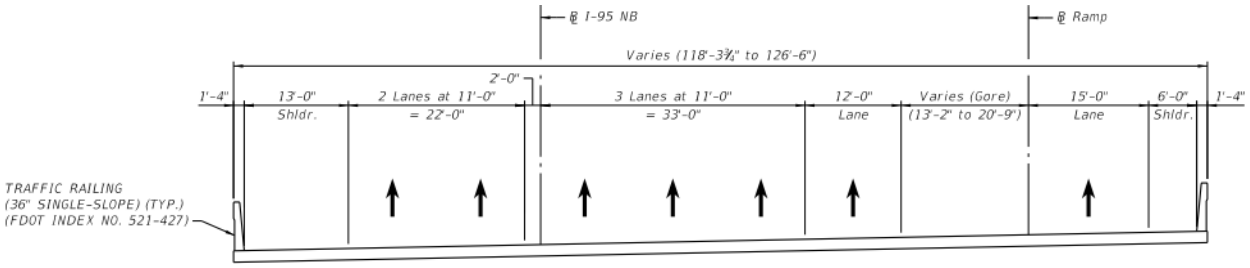

Figure 4.9.1 Proposed Bridge Typical Section

4.10. Bridge B-10 - SB I-95 BRIDGE OVER NB I-95 OFF RAMP TO MIAMI GARDENS DR.

Proposed Concept

The proposed structure is a one-span bridge, carrying the SB I-95 mainline traffic, over the I-95 off ramp. The bridge has an overall length of 64 ft - 9 in, on a straight alignment and slightly skewed end bents. The deck carries four general purpose lanes, two 12 ft – 0 in wide and two 11 ft – 0 in wide, two 11 ft – 0 in wide express lanes, a 12 ft inside shoulder, an outside shoulder varying from 11 ft -0 in to 11 ft – 8 in and 1 ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge width varying from 96 ft – $2^{1/2}$ in to 96 ft – $4^{1/2}$ in as shown in Figure 4.10.1. The bridge superstructure consists of Florida I-Beams (FIB) with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

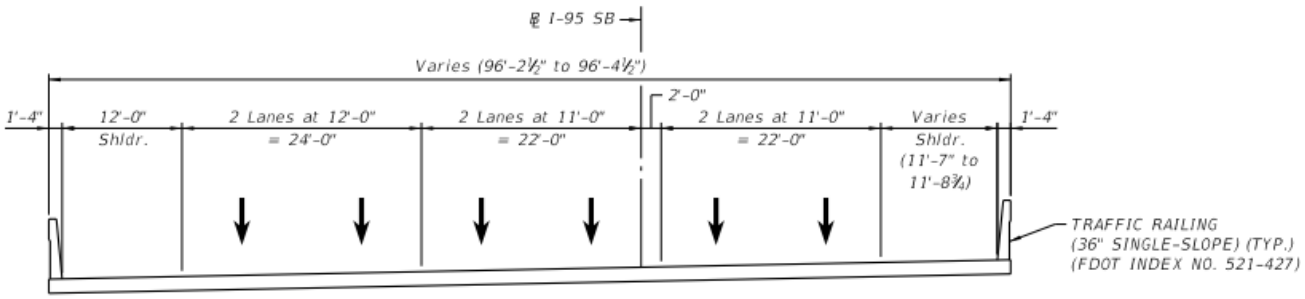

Figure 4.10.1 - Proposed Bridge Typical Section

4.11. Bridge B-11 - SB I-95 EL OFF RAMP TO I-95 SB BRIDGE OVER NB I-95 OFF RAMP TO MIAMI GARDENS DR.

Proposed Concept

The proposed bridge is a one-span bridge ramp, carrying the SB I-95 express lane exiting to I-95 general purpose lanes, over the NB I-95 off ramp. The bridge has an overall length of 50 ft - 6 in on a straight alignment and normal end bents. The deck carries one 15 ft – 0 in wide lane, a 6 ft – 0 in inside and outside shoulders and 1 ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge width of 29 ft – 8 in as shown in Figure 4.11.1. The bridge superstructure consists of Florida I-Beams (FIB) with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

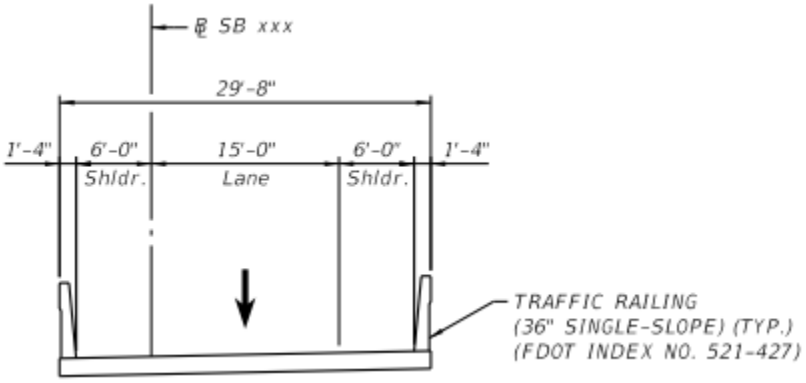

Figure 4.11.1 - Proposed Bridge Typical Section

4.12. Bridge B-12 - NB I-95 GP LANE ON RAMP TO EP LANE BRIDGE OVER NB I-95

Proposed Concept

The proposed bridge is a curved five-span, single-lane braided ramp bridge over the I-95 northbound facility, carrying the traffic from general purpose lanes on northbound I-95 and from SR 860 / Miami Gardens Drive to northbound express lanes. The bridge has an overall length of 993 ft - 6 in, on a curve alignment and normal end bents. The deck carries a 15 ft – 0 in wide lane, a 6 ft – 0 in inside shoulder, a 6 ft – 0 in outside shoulder and 1 ft 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge width of 29 ft – 8 in, as shown in Figure 4.12.1. The bridge superstructure consists of a continuous curved steel plate girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

Substructure will consist of a combination of hammerhead piers and straddle bents, supported on squared prestressed concrete pile foundation system.

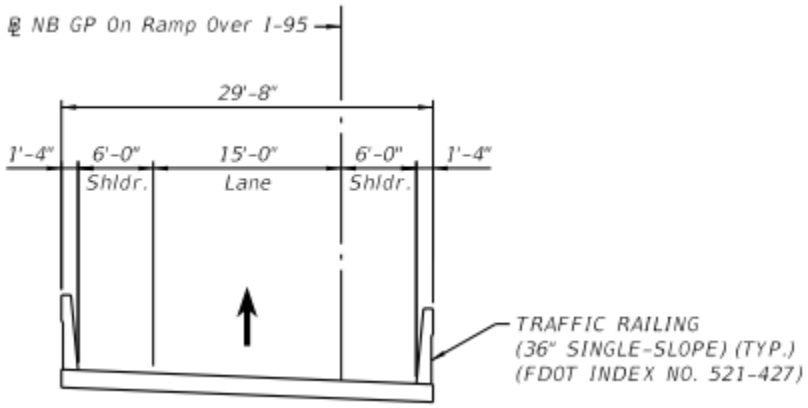

Figure 4-12.1 Proposed Bridge Typical Section

4.13. Bridge B-13 - SB I-95 EP LANE OFF RAMP TO GP LANE BRIDGE OVER SB I-95

Proposed Concept

The proposed bridge is a curved five-span, single-lane, braided ramp bridge over the I-95 southbound facility, carrying the traffic from I-95 Southbound express lanes to southbound I-95 general purpose lanes. The bridge has an overall length of 979 ft - 7 in on a curve alignment and normal end bents. The deck carries a 15 ft- 0 in wide lane, a 6 ft – 0 in inside shoulder, a 6 ft – 0 in outside shoulder and 1ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge width of 29 ft – 8 in as shown in Figure 4.13.1. The bridge superstructure consists of continuous curved steel plate girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

Substructure will consist of a combination of hammerhead piers, C-Piers, and straddle bents, supported on squared prestressed concrete pile foundation system.

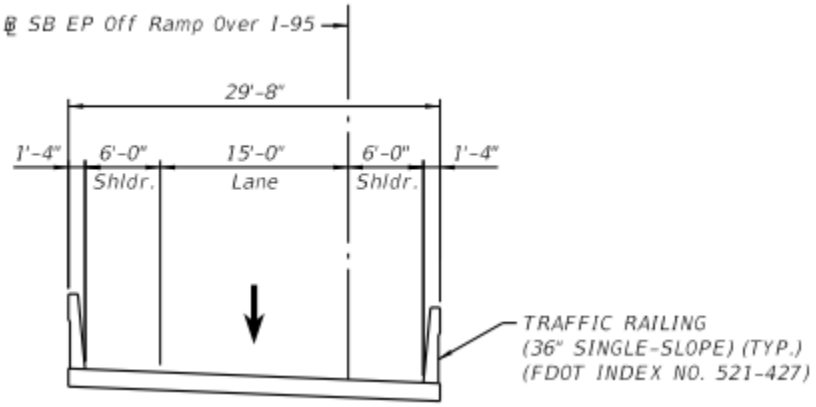

Figure 4.13.1 Proposed Bridge Typical Section

4.14. Bridge B-14 -NB I-95 ON RAMP FROM MIAMI GARDENS DRIVE OVERPASS BRIDGE AT C-9 CANAL

Proposed Concept

This bridge needs to be replaced since it does not provide a suitable vertical clearance over the Snake Creek Canal Trail along the south side of the Snake Creek Canal (C-9). The current vertical clearance over the trail is 5 ft – 6 in.

The proposed bridge is located parallel to the replaced bridges B-15 and B-16 over C-9 Canal, on the entrance ramp connecting SR-860 (Miami Gardens Dr) to northbound I-95 (Refer to Figures 3.3.A and 3.3.B). The structure is a single-lane bridge, 186 ft – 10 in long and 46 ft – 8 in wide. The typical section (Figure 4.14.1) shows two 12 ft – 6 in lanes with 8 ft inside shoulder, 12 ft – 0 in outside shoulder and 1ft – 4 in single slope traffic railing barriers along each side of the bridge.

The proposed bridge is a simply supported structure with the bridge ends placed beyond the limits of the existing structures to avoid conflict with the existing end bent piles. The superstructure comprises Florida-I Beams acting compositely with an 8½" concrete deck. The substructure consists of reinforced concrete end bents supported on precast prestressed concrete piles. MSE walls may be required at the bridge ends. The proposed parallel bridge structures over the canal will meet the minimum vertical clearance requirements over the multi-use path under the bridge and over the canal, controlling the 10 ft minimum vertical clearance over the multi-use path. Figure 4.14.1 illustrates the structure typical section.

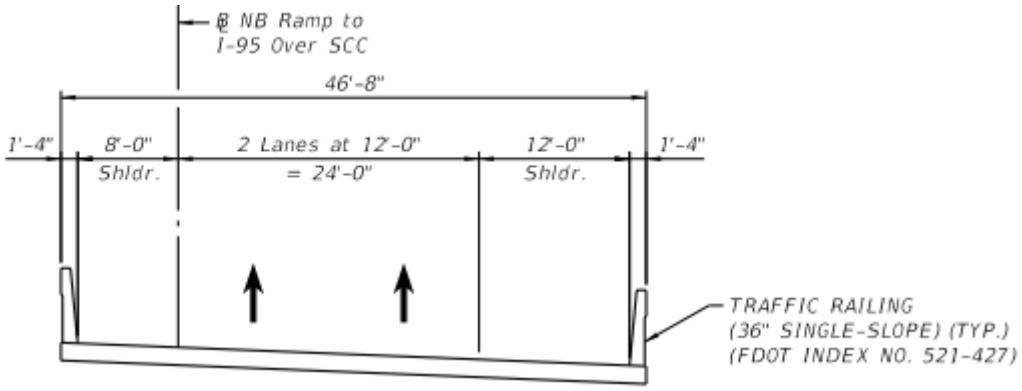

Figure 4.14.1 - Proposed Bridge Typical Section

4.15. Bridge B-15 - NB I-95 OVERPASS BRIDGE OVER C-9 CANAL

Existing Condition

Bridge 870093 carries I-95 northbound traffic over the Snake Creek Canal (C-9). The existing bridge consists of four spans, with a total bridge length of 132 ft. The overall width of the bridge is 91 ft – 11 in uniformly along the bridge. The minimum vertical clearance is approximately 6.5 ft, above Normal High Water (N.H.W.) over Span 3.

The bridge consists of three 11 ft – 0 in wide general-purpose lanes, one 12 ft – 0 in wide auxiliary lane and two 11 ft -0 in wide express lanes, a 10 ft – 0 in outside shoulder and a 10 ft -0 in inside shoulder, with 32" F-Shape traffic railing barriers along each side of the bridge.

The existing superstructure is composed of concrete T beams, subsequently widened with concrete flat slabs. The existing bridge substructure consists of pile bents. Pile bents consist of 2.7 ft by 2.5 ft concrete caps supported on steel H-pile for the original construction and 18 in square prestressed concrete piles for the 1968 bridge widening and 18" square prestressed concrete piles for the subsequent 2014 bridge widening. Both end bents use a wing wall system. There are no utilities being currently supported by the existing bridge.

Figure 4.15.1 - Bridge 870093

Proposed Concept

This bridge needs to be replaced since it does not provide a suitable vertical clearance over the Snake Creek Canal Trail along the south side of the Snake Creek Canal (C-9). The current vertical clearance over the trail is 5' – 6".

The bridge must provide at least 10 feet over the proposed elevation of the Snake Creek Canal trail, which will need at least 1 foot of freeboard over the (future) canal high water elevation (being adjusted for sea-level rise), as well as the minimum clearance over canal C-9. The proposed roadway profile, approaching from the Miami Gardens Drive interchange, accommodates the minimum vertical clearances and has enough room for the bridge superstructure to span over the trail and Canal C-9 with a single span, which eliminates the need for piers in the water, and minimizing scour along the canal.

The existing northbound bridge would be replaced with a new bridge as shown in the proposed typical section below, Figure 4.15.2, with four (4) general purpose lanes, three 11 ft wide and one 12 ft wide, two 11 ft express lanes, 10 ft inside shoulder, 15 ft – 6 in outside shoulder and 1 ft – 4 in single slope traffic railing barriers along each side of the bridge, totaling to a 97 ft – 2 in wide bridge structure. The bridge will be 185 ft – 9 in long.

The proposed structure would consist of a single-span bridge with end bents on piles. The superstructure will consist of Florida I-Beams (FIB) with an 8½" thick concrete deck. The girders will be supported on composite neoprene bearing pads. The bridge will be built in phases since the proposed bridge location overlaps the existing bridge location.

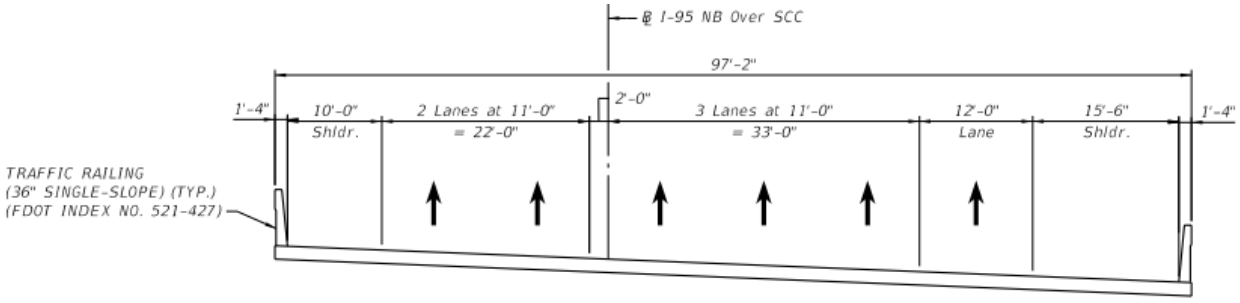

Figure 4.15.2 - Proposed Bridge Typical Section

4.16. Bridge B-16 - SB I-95 OVERPASS BRIDGE AT C-9 CANAL

Existing Condition

This bridge needs to be replaced since it does not provide a suitable vertical clearance over the Snake Creek Canal Trail along the south side of the Snake Creek Canan (C-9). The current vertical clearance over the trail is 5' – 6".

Bridge 870094 carries I-95 southbound traffic over the Snake Creek Canal (C-9). The existing bridge consists of four spans, with a total bridge length of 132 ft. The overall width of the bridge is 79 ft 11 in. The minimum vertical clearance is approximately 6.5 ft, above Normal High Water (N.H.W.) over Span No. 3.

The bridge consists of three 11 ft traffic lanes for general purpose, two 11 ft wide express lanes, a 10 ft outside shoulder, a 10 ft inside shoulder, and 32" F-Shape traffic railing barrier along each side of the bridge.

The existing superstructure is composed of original concrete T beams which were subsequently widened with flat concrete slabs. The bridge substructure consists of pile bents, which were also widened in kind. Pile bents consist of 2.7 ft by 2.5 ft concrete caps supported on steel H-pile for the original construction and 18 in square prestressed concrete piles for the 1968 bridge widening and 18" square prestressed concrete piles for the subsequent 2015 bridge widening. Both end bents use a wing wall system. There are no utilities being currently supported by the existing bridge.

Figure 4.16.1 - Bridge 870094

Proposed Concept

This bridge needs to be replaced since it does not provide a suitable vertical clearance over the Snake Creek Canal Trail along the south side of the Snake Creek Canan (C-9). The current vertical clearance over the trail is 5' – 6".

The existing southbound bridge will be replaced with a new bridge as shown in the proposed typical section below, Figure 4.14.2, consisting of five general purpose lanes, two 11 ft wide, two 11ft – 6 in ft wide and one 12 ft wide, two 11 ft express lanes, 10 ft outside shoulder, 18 ft – 6 in inside shoulder and 1 ft 4 in standard traffic railing barriers along each side of the bridge, totaling a transition from 130 ft – 0 in to 118 ft – 6 in wide bridge structure. The bridge will be 171 ft – 2 in long.

The bridge must provide at least 10 feet over the proposed elevation of the Snake Creek Canal trail, which will need at least 1 foot of freeboard over the (future) canal high water elevation (being adjusted for resiliency), as well as the minimum clearance over canal C-9. The proposed roadway profile coming from the Miami

Gardens Drive interchange accommodates minimum vertical clearances and has enough room for the bridge superstructure to span over the trail and Canal C-9 with a single span, which eliminates the need for piers in the water, and less scouring along the canal.

The proposed bridge would consist of a single span with pile end bents. The superstructure would consist of Florida I-Beams (FIB) with an 8½" thick concrete deck. The girders will be supported on composite neoprene bearing pads. The bridge will be built in phases since the proposed bridge location overlaps the existing bridge location.

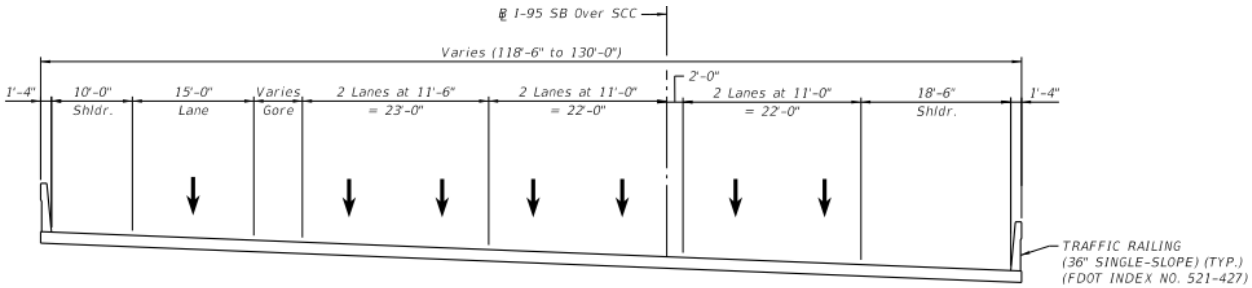

Figure 4.16.2 - Proposed Bridge Typical Section

4.17. Bridge B-17 - NB I-95 EXPRESS LANE OFF RAMP BRIDGE OVER NB I-95 EP ON RAMP

Proposed Concept

The proposed bridge is a curved three-span single-lane braided off-ramp bridge over the I-95 northbound express lanes, carrying the traffic from I-95 northbound express lanes exiting at Ives Dairy Road or northbound I-95 general purpose lanes. The bridge has an overall length of 560 ft-2 in on a curve alignment and normal end bents. The deck carries a 15 ft- 0" wide lane, a 6 ft wide inside shoulder, a 6 ft – 0 in outside shoulder and 1ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge width of 29 ft – 8 in as shown in Figure 4.17.1. The bridge superstructure consists of continuous curved steel plate girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles. Substructure will consist of an integral pier cap supported by a single concrete column on a squared prestressed concrete pile foundation system.

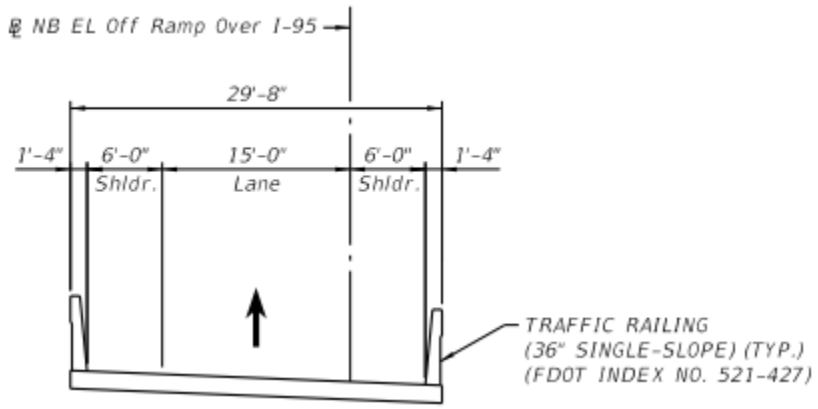

Figure 4.17.1 - Proposed Bridge Typical Section

4.18. Bridge B-18 - NB I-95 EP OFF RAMP BRIDGE OVER NB I-95

Proposed Concept

The proposed bridge is a curved four-span single-lane braided off-ramp bridge over the I-95 northbound express lanes, carrying the traffic from I-95 northbound express lanes, exiting to northbound I-95 general purpose lanes. The bridge has an overall length of 808 ft - 3 in on a curve alignment and normal end bents. The deck carries a 15 ft- 0" wide lane, a 6 ft wide inside shoulder, a 6 ft – 0 in outside shoulder and 1ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge width of 29 ft – 8 in as shown in Figure 4.18.1. The bridge superstructure consists of continuous curved steel plate girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

The substructure will consist of a combination of C-piers and a straddled bent integral with the bridge superstructure, supported on squared prestressed concrete pile foundation system.

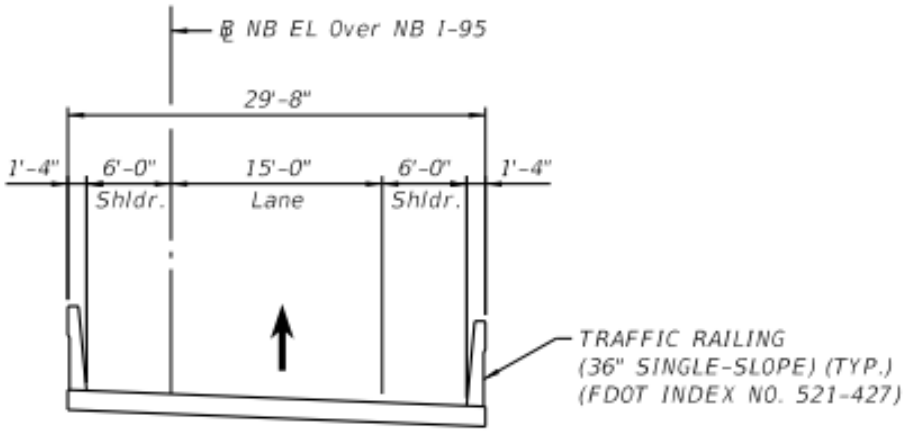

Figure 4.18.1 - Proposed Bridge Typical Section

4.19. Bridge B-19 - SB I-95 EXPRESS LANE ON RAMP BRIDGE OVER SB I-95

Proposed Concept

The proposed bridge is a curved six-span single-lane braided on-ramp bridge over the I-95 southbound general-purpose lanes, carrying the traffic from I-95 southbound general-purpose lanes exiting to southbound I-95 express lanes. The bridge has an overall length of 1,213 ft-9 in on a curve alignment and normal end bents. The deck carries a lane width varying between 15 ft- 0" and 25 ft – 2 in, a 6 ft wide inside shoulder, a 6 ft – 0 in outside shoulder and 1ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge width varying between 29 ft – 8 in and 45 ft – 10 in, as shown in Figure 4.19.1. The bridge superstructure consists of a continuous curved steel plate girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

The substructure will consist of a combination of C-piers, hammerhead piers and straddle bents integral with the bridge superstructure and supported on squared prestressed concrete pile foundation system.

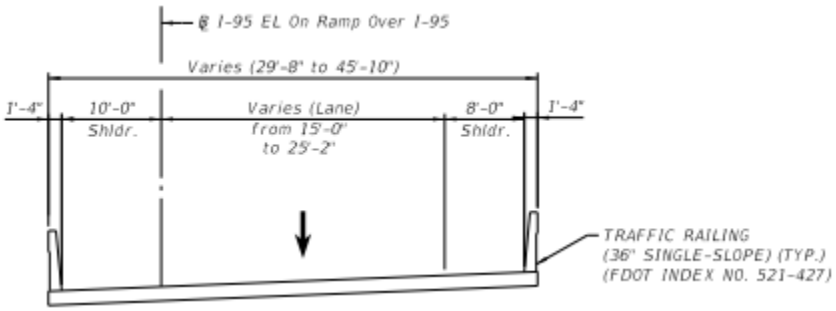

Figure 4.19.1 - Proposed Bridge Typical Section

4.20. Bridge B-20 - NB I-95 CONNECTION RAMP BRIDGE OVER NB I-95 OFF RAMP TO IVES DAIRY ROAD

Proposed Concept

The proposed bridge is a curved four-span two-lane -ramp bridge over the I-95 northbound exit ramp to Ives Dairy Road, carrying the traffic from northbound I-95 ramp traffic heading to northbound I-95 general purpose lanes. The bridge has an overall length of 866 ft- 3 in on a curve alignment and normal end bents. The deck carries one 12 ft- 0 in wide lane, one lane varying from 12 ft – 0 in to 14 ft – 4 in wide, a 6 ft – 0 in inside shoulder, a 10 ft – 0 in outside shoulder and 1ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge

width varying from 42 ft – 8 in to 45 ft – 0 in, as shown in Figure 4.20.1. The bridge superstructure consists of a continuous curved steel plate girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

The substructure will consist of a combination of a straddled bent and hammerhead piers integral with the bridge superstructure, supported on squared prestressed concrete pile foundation system.

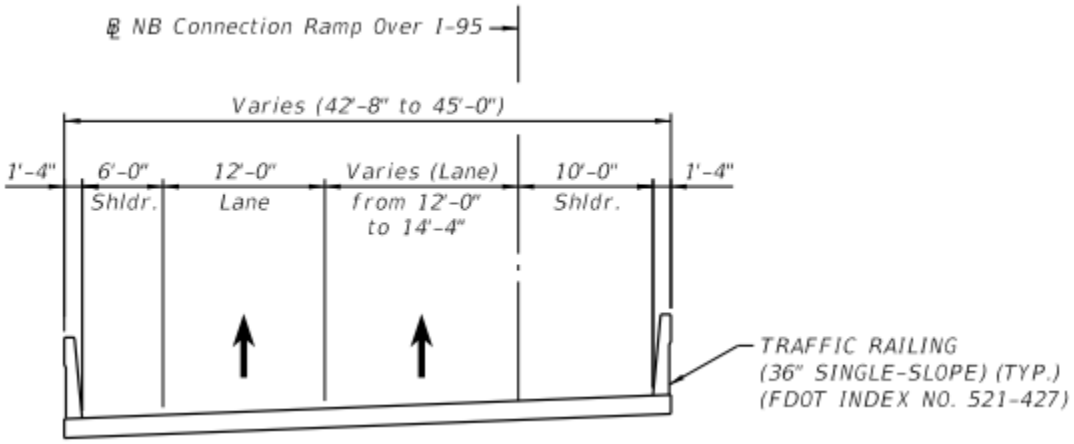

Figure 4.20.1 - Proposed Bridge Typical Section

4.21. Bridge B-21 - IVES DAIRY RD OFF RAMP BRIDGE OVER SB I-95 EXPRESS LANE

Proposed Concept

The proposed bridge is a straight two-span, three-lane, -ramp bridge over the I-95 southbound exit ramp to I-95 southbound express lanes, carrying the traffic from Ives Dairy Road heading to I-95 southbound general-purpose lanes or express lanes. The bridge has an overall length of 451 ft-10 in, on a straight alignment, with normal end bents. The deck carries three 12 ft- 0" wide lanes, an 8 ft wide inside shoulder, an outside shoulder varying between 12 ft and 7 ft – 10 in, and 1ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge width varying from 56 ft-4 in. to 58 ft – 9 in. as shown in Figure 4.21.1. The bridge superstructure consists of a continuous straight steel plate girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

Substructure will consist of an intermediate straddle bent integral with bridge superstructure, supported on squared prestressed concrete pile foundation system.

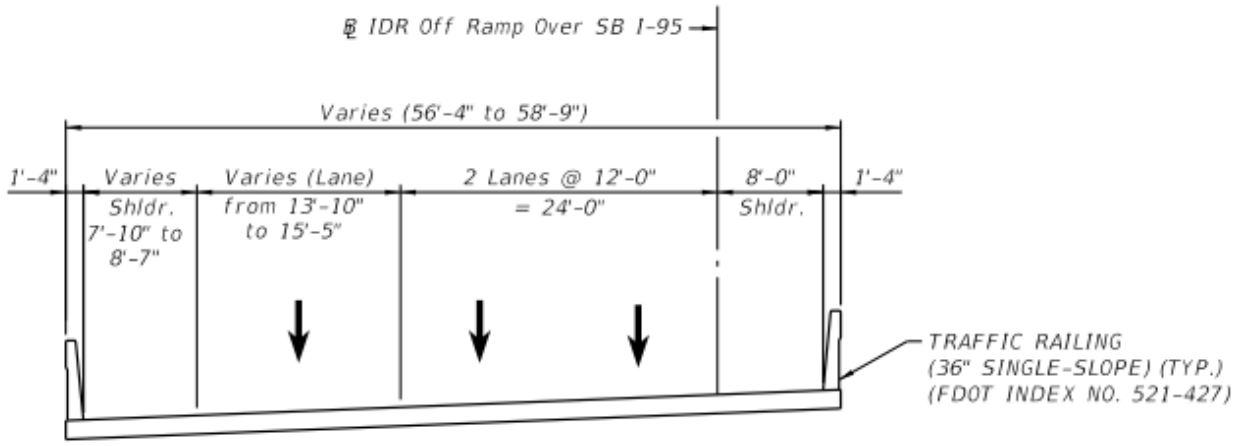

Figure 4.21.1 - Proposed Bridge Typical Section

4.22. Bridge B-22 - WB IVES DAIRY RD BRIDGE OVER NB I-95 EXPRESS LANE

Proposed Concept

The proposed bridge is a straight single-span, five-lane bridge carrying the traffic heading west on Ives Dairy Road over the I-95 northbound on-ramp to I-95 northbound express lanes at Ives Dairy Road. The bridge has an overall length of 45 ft - 3 in on a straight alignment with normal end bents. The deck carries five 11 ft - 0" wide lanes, a 7 ft – 0 in wide inside shoulder, a 10 ft - 0 in wide outside shoulder, a 1 ft – 4 in single slope traffic railing separating traffic lanes from bridge sidewalk, a 10 ft – 0 in wide sidewalk, a 1 ft – 1 in vertical shape traffic railing, and a1 ft – 4 in single slope traffic railing barrier along other side of the bridge, for a total bridge width of 85 ft – 9 in. as shown in Figure 4.22.1. The bridge superstructure consists of prestressed concrete slab beams with a 6" CIP topping or prestressed concrete beams with an 8" thick concrete deck, supported at the bridge ends by end bents on piles.

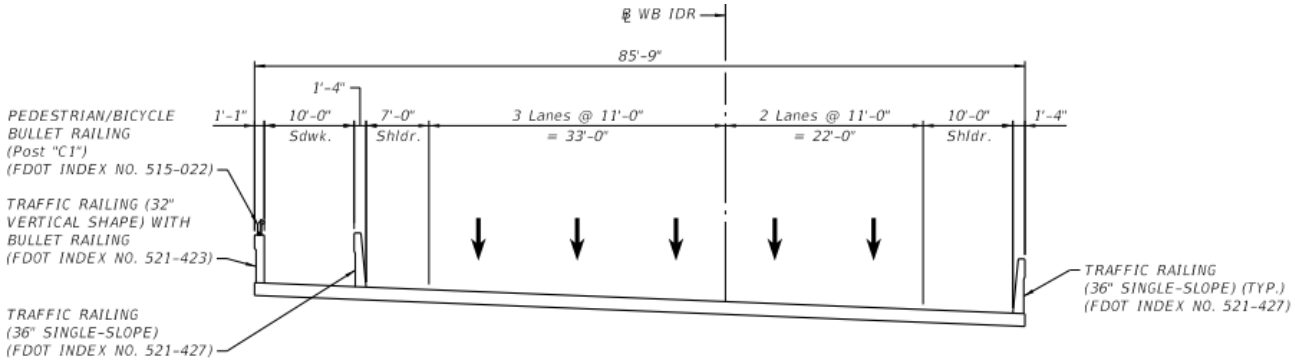

Figure 4.22.1 - Proposed Bridge Typical Section

4.23. Bridge B-23 - WB IVES DAIRY RD OVERPASS BRIDGE AT I-95

Existing Conditions

Bridge 870166 carries NE 205TH ST. (Ives Dairy Road) eastbound and westbound traffic over I-95. The existing bridge consists of four spans, with a total bridge length of 285 ft – 1 in. The overall width of the bridge is 140 ft – 1 in uniformly along the bridge. The existing minimum vertical clearance is 15.83 ft and occurs in Span 3 along Northbound I-95.

The bridge carries two-way traffic separated by a 4 ft. raised traffic separator. The eastbound side consists of five 12 ft general purpose lanes, with 4 ft outside shoulder and 2 ft inside shoulder. The westbound side consists of four 12 ft general purpose lanes, with 4 ft outside shoulder and 2ft inside shoulder. A 6 ft sidewalk with a 32" F-Shape Traffic Railing Barrier protecting the pedestrians from the traffic and 27" concrete Parapet with Pedestrian Bullet Railing is used on both sides of the bridge.

The existing superstructure is composed of AASHTO Type II (Span 4), Type III (Span 1) and Type IV Beams in spans 1, 2, 3 & 4. The existing bridge substructure consists of typical end bents and multi-column piers with an additional single column pier for the outside widenings. All pier columns are round in cross section except an oval column is used for the single column piers in the bridge widenings. The column piers are supported on isolated footings with 18" square prestressed concrete pile foundations. The end bents are made up of 3 ft by 2 ft – 6 in cap and are similarly supported on 18" square prestressed concrete pile foundations. Both end bents use concrete slope protection. There are some electrical utilities currently supported by the existing bridge.

Figure 4.23.1 – Bridge 870166

Proposed Concept

The existing westbound Ives Dairy Road bridge over I-95 will need to be replaced since it does not accommodate the geometrics required for the diverted diamond interchange being proposed at the crossing.

The proposed bridge is a two span five-lane bridge ramp over the I-95 mainline facility, carrying westbound traffic on Ives Dairy Road, including a lane for the ramp to southbound I-95. The bridge has an overall length of 325 ft - 3 in on a straight and slightly curved alignment. It includes a curved portion at the ramp to I-95 southbound. The end bents are on a slight skew. The deck carries five 11 ft – 0 in wide lanes, a 7 ft – 0 in inside shoulder, a 10 ft – 0 in outside shoulder, a 1 ft – 4 in single slope traffic railing separating traffic lanes from the bridge sidewalk, a 10 ft – 0 in sidewalk with a 1 ft – 1 in vertical shape traffic railing on the outside face of the sidewalk and a 1 ft 4 in single slope traffic railing along the other side of the bridge for a total bridge width of 85 ft – 9 in, as shown in Figure 4.23.2. The bridge superstructure consists of steel girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles and framed concrete piers supported on a pile foundation system.

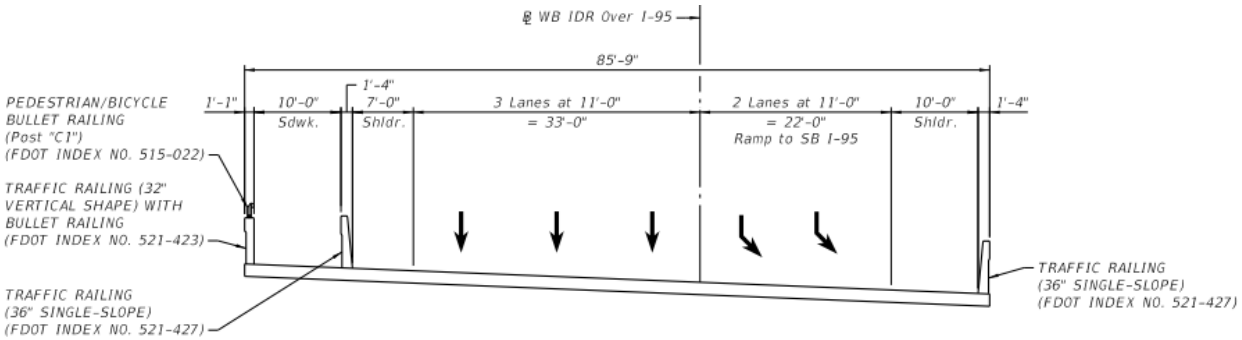

Figure 4.23.2 - Proposed Bridge Typical Section

4.24. Bridge B-24 - EB IVES DAIRY RD OFF RAMP BRIDGE OVER RAILROAD

Proposed Concept

The proposed bridge is a two-span single-lane bridge ramp over perimeter road and the South Florida Rail Corridor, carrying eastbound traffic heading to the on-ramp to I-95 southbound. The bridge has an overall length of 266 ft - 0 in on a mostly straight alignment with a curved alignment at east end. End bents are normal to alignment. The deck carries one lane 15 ft – 0 in wide, a 6 ft – 0 in inside shoulder, a 6 ft – 0 in outside shoulder, and 1 ft – 4 in single slope traffic railing barriers along both sides of the bridge, for a total bridge width of 29 ft – 8 in, as shown in Figure 4.24.1. The bridge superstructure consists of continuous steel girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles and a hammerhead intermediate concrete pier supported on a pile foundation system.

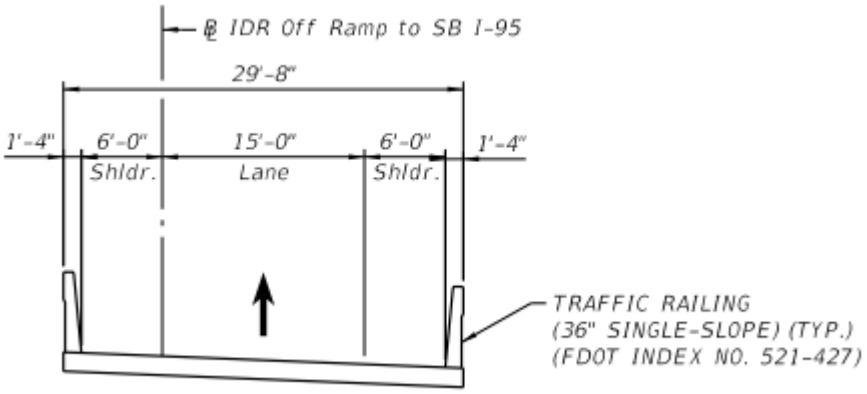

Figure 4.24.1 - Proposed Bridge Typical Section

4.25. Bridge B-25 - EB IVES DAIRY RD BRIDGE OVER NB I-95 EXPRESS LANE

Proposed Concept

The proposed bridge is a four-lane, slightly curved, single span bridge, carrying the traffic heading east on Ives Dairy Road over the I-95 northbound on-ramp to I-95 northbound express lanes at Ives Dairy Road. The bridge has an overall length of 44 ft-11 in on a straight alignment with skewed end bents. The deck carries four 11 ft- 0 in wide lanes, a 7 ft – 0 in inside shoulder, a 10 t- 0 in outside shoulder, and 1 ft – 4 in single slope traffic railing barriers along both sides of the bridge, for a total bridge width of 63 ft – 8 in as shown in Figure 4.25.1. The bridge superstructure consists of prestressed concrete slab beams with a 6" CIP topping or prestressed concrete beams with an 8" thick concrete deck, supported at the bridge ends by end bents on piles.

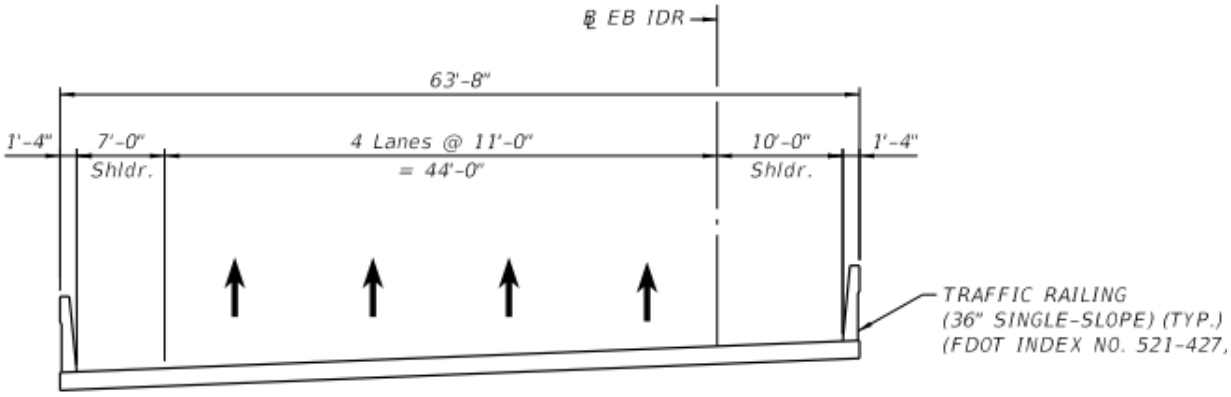

Figure 4.25.1 - Proposed Bridge Typical Section

4.26. Bridge B-26 - EB IVES DAIRY RD OFF RAMP BRIDGE OVER NB I-95 EXPRESS LANE

Proposed Concept

The proposed bridge is a curved single-span, single-lane bridge carrying the traffic heading east towards the I-95 northbound general-purpose lanes over the I-95 northbound on-ramp to I-95 northbound express lanes at Ives Dairy Road. The bridge has an overall length of 53 ft - 1 in on a curved alignment with skewed end bents. The deck carries one lane varying from 24 ft – 6 in to 25 ft – 6 in wide, a 10 ft – 0 in wide inside shoulder, a 6 ft- 0 in wide outside shoulder, and 1ft – 4 in single slope traffic railing barriers along both sides of the bridge, for a total bridge width varying from 43 ft – 2 in to 44 ft – 2 in, as shown in Figure 4.26.1.

The bridge superstructure consists of prestressed concrete beams with an 8" thick concrete deck, supported at the bridge ends by end bents on piles.

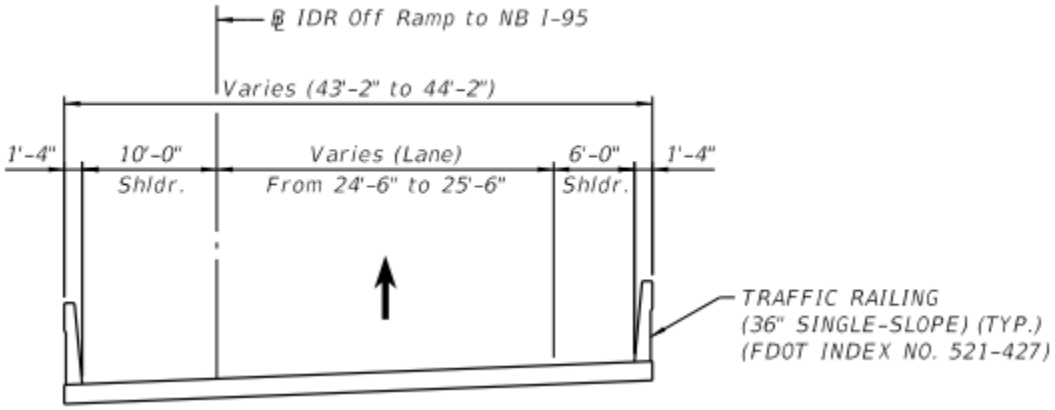

Figure 4.26.1 - Proposed Bridge Typical Section

4.27. Bridge B-27 - EB IVES DAIRY RD OVERPASS BRIDGE AT I-95

Existing Condition

Bridge No. 870166 NE 205th Street / Ives Dairy Road over I-95 is described in Section 4.23 above.

Proposed Concept

The existing eastbound Ives Dairy Road bridge over I-95 will need to be replaced since it does not accommodate the geometrics required for the diverted diamond interchange being proposed at the crossing.

The proposed bridge is a two-span, five-lane bridge ramp over the I-95 main facility, carrying eastbound traffic on Ives Dairy Road, including two lanes from the off-ramp from southbound I-95. The bridge has an overall length of 266 ft - 10 in, on a slightly curved alignment. It includes a curved portion at the ramp from I-95 southbound. The end bents are on a slight skew. The deck carries five 11 ft – 0 in wide lanes, a 7 ft – 0 in wide shoulder, a 10 ft – 0 in outside shoulder, 1 ft – 4 in single slope traffic railing barriers along both sides of the bridge, for a total bridge width of 74 ft – 8 in, as shown in Figure 4.27.1. The bridge superstructure consists of steel girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles and framed concrete piers supported on a pile foundation system.

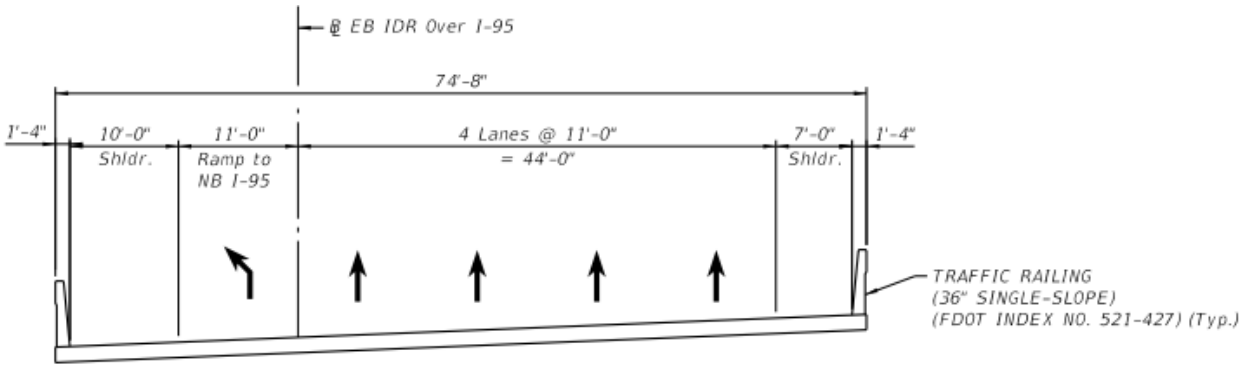

Figure 4.27.1 - Proposed Bridge Typical Section

Bridge B-28 - IVES DAIRY RD OVERPASS BRIDGE AT RAILROAD

Existing Condition

Bridge 870576 carries NE 205TH ST. (Ives Dairy Road) westbound traffic over the RR and Frontage Rd to NE 17th Ave. The bridge consists of four (4) spans, with a total bridge length of 196.8 ft. The overall width of the bridge is 82.0 ft uniformly along spans 1 and 2, then varies to approximately 119 ft at the end of span 4. The existing minimum vertical clearance is 22 ft – 2 in and occurs in Span 3 along the RR.

The bridge consists of three (3) 12 ft general purpose lanes, with 15'-6" outside shoulder and 2 ft inside shoulder. The 32" F-Shape Traffic Railing Barrier is used in the outside to protect a 6 ft sidewalk and a 27" concrete Parapet with Pedestrian Bullet Railing are used on this side of the bridge; in the inside there is a 16 ft raised traffic separator.

The existing superstructure is composed of AASHTO Type II (Span 1), Type III (Span 3) and Type IV Beams in spans 1, 2, 3 & 4. The existing bridge substructure consists of typical end bents and multi-column piers with an additional single column pier for the outside widenings. All pier columns are round in cross section except an oval column is used for the single column piers in the outside widenings. The column piers are supported on isolated footings with 18" square prestressed concrete pile foundations. The end bents are made up of 3 ft by 2 ft – 6 in cap and are similarly supported on 18" square prestressed concrete pile foundations. Both end bents use concrete slope protection. There are some electrical utilities currently supported by the existing bridge. The bridge was built in 1970 with a widening performed in 1994.

Figure 4.28.1 – Bridge 870576

Bridge 870577 carries NE 205TH ST. (Ives Dairy Road) eastbound traffic over Frontage Rd to NE 17th Ave and the Railroad. The bridge consists of four (4) spans, with a total bridge length of 196.8 ft. The overall width of the bridge is 82.0 ft uniformly along spans 1 and 2, then varies to approximately 96 ft at the end of span 4. The existing minimum vertical clearance is 22.13 ft and occurs in Span 3 along the RR.

The bridge consists of three (6) 12 ft traffic lanes for general-purpose, with 3 ft outside shoulder and 2 ft inside shoulder. The 32" F-Shape Traffic Railing Barrier is used in the outside to protect a 6 ft sidewalk and a 27" concrete Parapet with Pedestrian Bullet Railing are used on this side of the bridge; in the inside there is a 16 ft raised traffic separator.

The existing superstructure is composed of AASHTO Type II (Span 4), Type III (Span 1) and Type IV Beams in spans 1, 2, 3 & 4. The existing bridge substructure consists of typical end bents and multi-column piers with an additional single column pier for the outside widenings. All pier columns are round in cross section except the oval column for the single column piers in the bridge widenings. The column piers are supported on isolated footings with 18" square prestressed concrete pile foundations. The end bents are made up of 3 ft by 2.5 ft cap and are similarly

supported on 18" square prestressed concrete pile foundations. Both end bents use concrete slope protection. There are some electrical utilities currently supported by the existing bridge. The bridge was built in 1970 with a widening performed in 1994.

Figure 4.28.2 - Bridge 870577

Proposed Concept

The existing Ives Dairy Road bridges over the South Florida Rail Corridor will need to be replaced since it does not accommodate the geometrics required for the diverted diamond interchange being proposed at the crossing.

The proposed bridge is a single-span multiple-lane bridge over perimeter road and the South Florida Rail Corridor, carrying eastbound and westbound traffic on Ives Dairy Road. The bridge is located at the crossing of the Diverging Diamond Interchange. The bridge has an overall length of 196 ft – 2 in with crossing alignments. End bents are on a skew. The deck carries five 11 Ft – 0 in wide lanes, a 10 ft – 0 in wide inside shoulder, a 7 ft – 0 in wide outside shoulder for EB traffic. The WB traffic carries three 11 ft – 0 in wide lanes, a 10 ft – 0 in wide inside shoulder and a 7 ft – 0 wide outside shoulder; a raised sidewalk varying from 6 ft -7 in to 35 ft – 3 in, and a 10 ft – 0 in wide sidewalk with a 1 ft – 1 in vertical shape traffic railing on the south coping, for a total bridge width varying from 124 ft – 6 in to 177 ft – 6 in as shown in Figure 4.28.3. The south side of the bridge deck will extend beyond the sidewalk limit to maintain traffic during construction. The bridge superstructure consists of steel plate girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

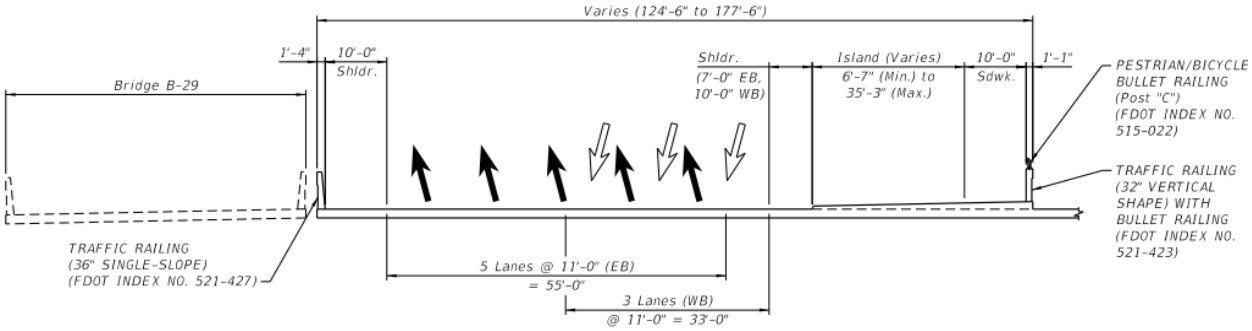

Figure 4.28.3 - Proposed Bridge Typical Section

4.28. Bridge B-29 - SB I-95 OFF RAMP TO WB IVES DAIRY RD BRIDGE OVER RAILROAD

Proposed Concept

The proposed bridge is a single span, two-lane bridge ramp carrying the traffic from southbound I-95 off-ramp to Ives Dairy Road Westbound over the perimeter road and the South Florida Rail Corridor. The bridge has an overall length of 265 ft – 0 in on a curved alignment and skewed end bents. The deck carries two 11 ft – 0 in wide lanes, separated by a variable width gore, a 6 ft – 0 in inside shoulder, a 12 ft – 0 in outside shoulder, 1 ft – 4 in single slope traffic railing barriers along both sides of the bridge, for a total bridge width varying from 48 ft – 5 in to 46 ft – 0 in, as shown in Figure 4.29.1. The bridge superstructure consists of steel girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

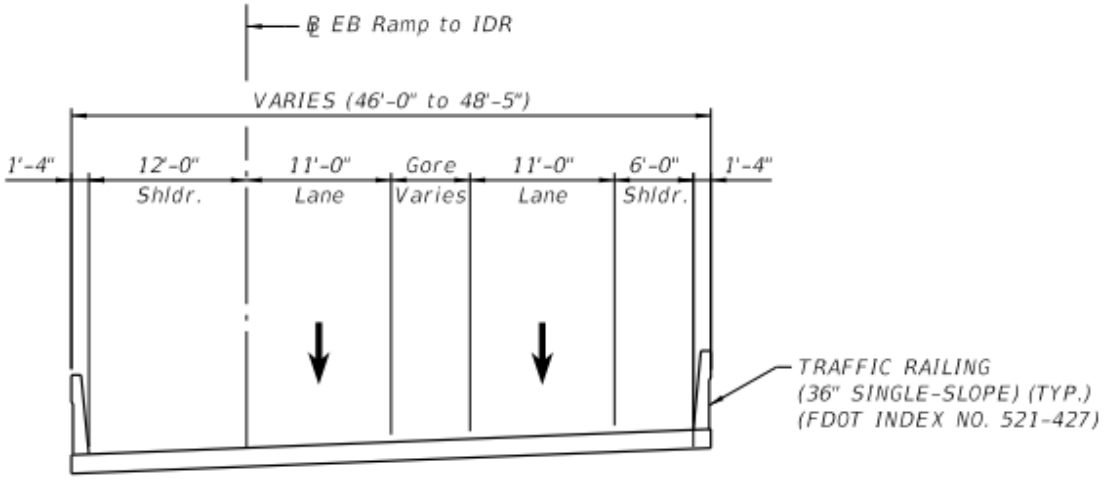

Figure 4.29.1 - Proposed Bridge Typical Section

4.29. Bridge B-30 NB I-95 CONNECTION RAMP BRIDGE OVER NB I-95

Proposed Concept

The proposed bridge is a curved, single-lane braided ramp bridge, carrying the northbound traffic from SR 860 / Miami Gardens Drive to northbound express lanes over the I-95 northbound facility. The six-span bridge has an overall length of 1,147 ft - 1 in, on a curved alignment and normal end bents. The deck carries a 15 ft- 0 in wide lane, a 6 ft – 0 in inside shoulder, a 6 ft – 0 in outside shoulder and 1ft – 4 in single slope traffic railing barriers along each side of the bridge, for a total bridge width of 29 ft – 8 in as shown in Figure 4.30.1. The bridge superstructure consists of a continuous curved steel plate girders with an 8½" thick concrete deck, supported at the bridge ends by end bents on piles.

Substructure will consist of a combination of C- piers and straddle bents integral with the bridge superstructure, supported on squared prestressed concrete pile foundation system.

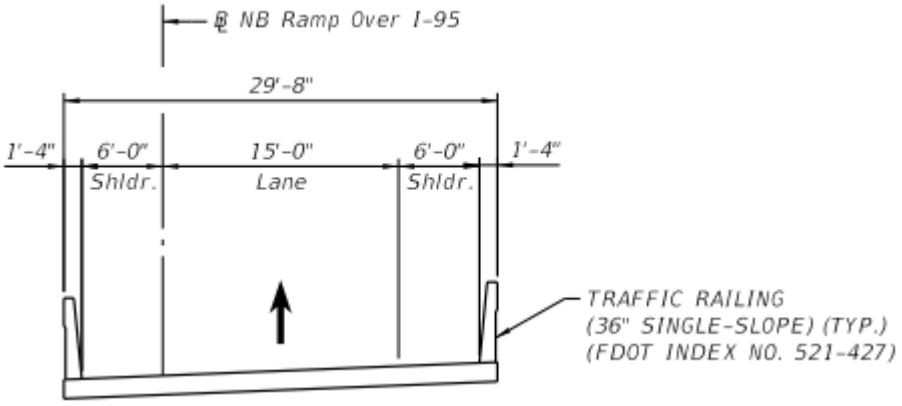

Figure 4.30.1 - Proposed Bridge Typical Section

5. Construction Cost Estimate – Preferred Alternative 3

The following table provides the Construction Cost Estimate for Alternative 3, as the preferred alternative for the project. The cost estimate is based on unit prices shown on FDOT Structures Design Guidelines, BDR Cost Estimating, Chapter 9, January 2023 edition.

Table 5-1 CONSTRUCTION COST ESTIMATE - Alternative 3 Preferred								
Bridge ID No.	Bridge Location	Structure Length (ft)	Bridge Area (Sqft)	Construction Unit Cost	Removal Area (Sqft)	Removal Unit Cost	Bridge Type	Total Cost
B-1	NB I-95 OVERPASS BRIDGE AT MIAMI GARDENS DR. **(B-1)**	709.64	75,632	$190	47,914	$60	CONCRETE DECK/PRESTRESSED BEAMS	$17,244,866
B-2	SB I-95 OVERPASS BRIDGE AT MIAMI GARDENS DR. **(B-2)**	920.70	91,585	$190	68,420	$60	CONCRETE DECK/PRESTRESSED BEAMS	$21,506,274
B-3	SB I-95 ON RAMP FROM MIAMI GARDENS DR. OVER I-95 AND MIAMI GARDENS DR. **(B-3)**	1888	82,437	$240			STEEL GIRDERS	$19,784,997
B-4	SB I-95 ON RAMP FROM MIAMI GARDENS DR. BRIDGE OVER WB MIAMI GARDEN DR. & WB MIAMI GARDENS DR. RAMP TO I95 NB **(B-4)**	341.40	12,691	$240			STEEL GIRDERS	$3,045,838
B-5	EB MIAMI GARDENS DR. TO NB I-95 ON RAMP OVERPASS BRIDGE AT WB MIAMI GARDEN DR. & SB I-95 RAMP TO EB MIAMI GARDENS DR.**(B-5)**	299.49	10,383	$240			STEEL GIRDERS	$2,491,855
B-6	NB I-95 OFF RAMP TO MIAMI GARDENS DR. OVER NB I-95 AND SB I-95 OFF RAMPS TO MIAMI GARDEN DR. **(B-6)**	83.00	2,462	$190			CONCRETE DECK/PRESTRESSED BEAMS	$467,810
B-7	NB I-95 BRIDGE OVER NB I-95 AND SB I-95 OFF RAMPS TO MIAMI GARDEN DR. **(B-7)**	72.83	7,016	$190			CONCRETE DECK/PRESTRESSED BEAMS	$1,333,126
B-8	SB I-95 BRIDGE OVER NB I-95 AND SB I-95 OFF RAMPS TO MIAMI GARDEN DR. **(B-8)**	74.00	8,280	$190			CONCRETE DECK/PRESTRESSED BEAMS	$1,573,105
B-9	NB I-95 BRIDGE OVER NB I-95 OFF RAMP TO MIAMI GARDENS DR. **(B-9)**	100.90	12,476	$190			CONCRETE DECK/PRESTRESSED BEAMS	$2,370,459
B-10	SB I-95 BRIDGE OVER NB I-95 OFF RAMP TO MIAMI GARDENS DR. **(B-10)**	64.79	6,236	$190			CONCRETE DECK/PRESTRESSED BEAMS	$1,819,264
B-11	SB I-95 EL OFF RAMP TO I-95 SB BRIDGE OVER NB I-95 OFF RAMP TO MIAMI GARDENS DR. **(B-11)**	50.48	1,497	$220			CONCRETE DECK/FSB BEAMS	$329,404
B-12	NB I-95 GP LANE ON RAMP TO EP LANE BRIDGE OVER NB I-95 **(B-12)**	993.46	29,472	$240			STEEL GIRDERS	$7,802,820
B-13	SB I-95 EP LANE OFF RAMP TO GP LANE BRIDGE OVER SB I-95 **(B-13)**	979.56	29,054	$240			STEEL GIRDERS	$6,972,917
B-14	NB I-95 ON RAMP FROM MIAMI GARDENS DRIVE OVERPASS BRIDGE AT C-9 CANAL **(B-14)**	186.83	8,719	$190			CONCRETE DECK/PRESTRESSED BEAMS	$1,656,578
B-15	NB I-95 OVERPASS BRIDGE OVER C-9 CANAL **(B-15)**	185.79	18,058	$190	10,573	$60	CONCRETE DECK/PRESTRESSED BEAMS	$4,065,316
B-16	SB I-95 & SB I-95 OFF-RAMP TO MIAMI GARDENS DR. BRIDGE OVER SNAKE CREEK CANAL **(B-16)**	171.17	21,183	$190	12,157	$60	CONCRETE DECK/PRESTRESSED BEAMS	$4,754,220
B-17	NB I-95 EXPRESS LANE OFF RAMP BRIDGE OVER NB I-95 EP ON RAMP **(B-17)**	560.19	16,622	$240			STEEL GIRDERS	$3,989,254
B-18	NB I-95 EP OFF RAMP BRIDGE OVER NB I-95 **(B-18)**	808.23	23,977	$240			STEEL GIRDERS	$5,754,393
B-19	SB I-95 EXPRESS LANE ON RAMP BRIDGE OVER SB I-95 **(B-19)**	1213.70	43,242	$240			STEEL GIRDERS	$10,377,986
B-20	NB I-95 CONNECTION RAMP BRIDGE OVER NB I-95 OFF RAMP TO IVES DAIRY ROAD **(B-20)**	866.22	37,044	$240			STEEL GIRDERS	$8,890,628
B-21	IVES DAIRY RD OFF RAMP BRIDGE OVER SB I-95 EXPRESS LANE **(B-21)**	451.87	26,389	$240			STEEL GIRDERS	$8,728,301
B-22	WB IVES DAIRY RD BRIDGE OVER NB I-95 EXPRESS LANE **(B-22)**	45.29	3,920	$180			CONCRETE DECK/FSB BEAMS	$705,658
B-23	WB IVES DAIRY RD OVERPASS BRIDGE AT I-95 **(B-23)**	325.21	35,025	$240	39,914	$60	STEEL GIRDERS	$10,800,797
B-24	EB IVES DAIRY RD OFF RAMP BRIDGE OVER RAILROAD **(B-24)**	266.06	7,893	$240			STEEL GIRDERS	$4,433,041
B-25	EB IVES DAIRY RD BRIDGE OVER NB I-95 EXPRESS LANE **(B-25)**	44.90	2,863	$180			CONCRETE DECK/FSB BEAMS	$515,412
B-26	EB IVES DAIRY RD OFF RAMP BRIDGE OVER NB I-95 EXPRESS LANE **(B-26)**	53.10	2,369	$190			CONCRETE DECK/PRESTRESSED BEAMS	$450,085
B-27	EB IVES DAIRY RD OVERPASS BRIDGE AT I-95 **(B-27)**	266.81	22,501	$240			STEEL GIRDERS	$5,400,253
B-28	IVES DAIRY RD OVERPASS BRIDGE AT RAILROAD **(B-28)**	196.17	31,065	$240	42,312	$60	STEEL GIRDERS	$9,994,259
B-29	SB I-95 OFF RAMP TO WB IVES DAIRY RD BRIDGE OVER RAILROAD **(B-29)**	265.05	12,732	$240			STEEL GIRDERS	$3,055,668
B-30	NB I-95 CONNECTION RAMP BRIDGE OVER NB I-95 **(B-30)**	1147.09	34,136	$240			STEEL GIRDERS	$8,192,623
							Total:	**$178,507,207**
					30% Contingency:		**Grand Total:**	**$232,059,369**

Notes: Construction Unit Cost are based on BDR Cost Estimating, Chapter 9, SDG January 2023

6. Construction Time – Preferred Alternative 3

The project is located along I-95 at heavily travelled crossings, where facilities are congested for most of the day. The corridor is narrow, with limited space for staging. The west side of the corridor is primarily commercial, while the east side is mostly residential. The congested job site and restricted access significantly impact the construction schedule. Considering factors such as traffic maintenance, access, constructability, site constraints, and the surrounding area, the construction time is estimated to be approximately 5 years. This estimate also depends on the procurement method, whether design-bid-build or design-build, and whether incentives are in place to expedite the construction duration.

7. Construction Phases Impacts – Preferred Alternative 3

A Maintenance of Traffic (MOT) scheme has been developed for the preferred alternative presented in the Preliminary Engineering Report. The MOT plan aims to maintain traffic flow during the demolition of existing bridges and the construction of new ones. Designers must consider critical issues such as noise, vibrations, and the proximity of the railroad facility adjacent to the corridor.

Some bridges may benefit from prestressed precast concrete piles, while those near existing structures or residential areas should use auger cast concrete piles, micro piles, or drilled shafts to mitigate noise and vibration. The phased construction approach considers new versus existing profiles to maintain traffic flow.

Demolition and construction of the bridges at Miami Gardens Drive crossing will be performed in phases, ensuring continuous traffic flow. The pier placement plan avoids conflicts with ongoing traffic and construction operations, and the mainline profile is being raised to meet required vertical clearances.

Similarly, the bridges over Snake Creek Canal, built at a higher profile grade line, will have fewer impacts on surrounding areas due to fewer existing structures. Designers must consider the South Florida Rail Corridor and its bridge over the canal when selecting the bridge foundation system and planning construction.

At the Ives Dairy Road crossing, the bridges are bordered by a business district on the west and residential communities on the east. Construction activities near the east side should mitigate noise and vibration from construction methods. Driven piles should be avoided near residential areas and the railroad facility on the west side. The construction of a diverging diamond interchange over I-95 will require special attention to new bridge profiles and cross-slopes, affecting ongoing traffic maintenance.

Construction activities will also affect pedestrian and bicycle traffic. Traffic maintenance plans should account for these movements during the construction phase.