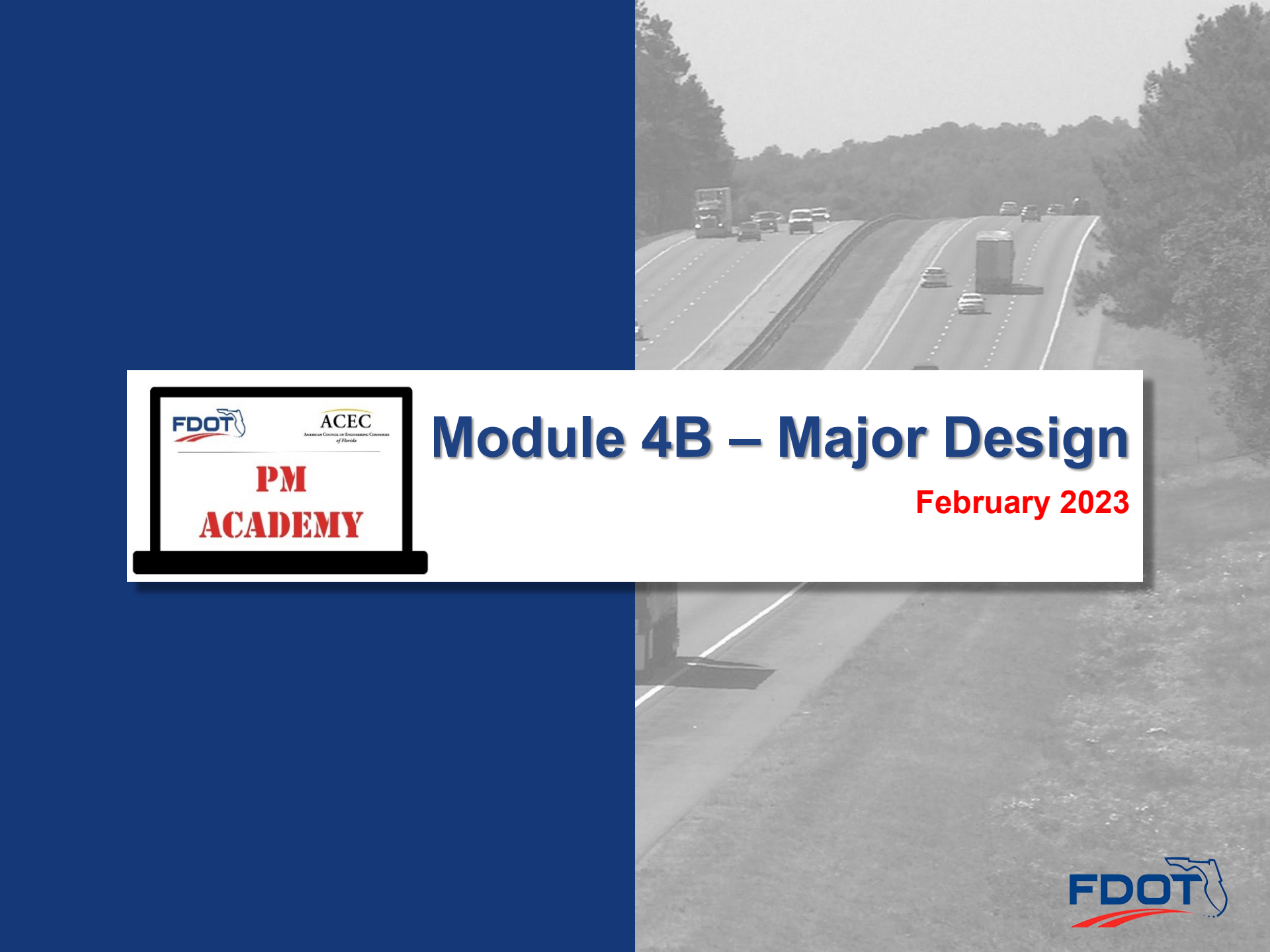


Module 4B – Major Design

February 2023

FDOT ACEC

PM ACADEMY

Major Design Technical Design

Mike Molkenbur, P.E.
Florida Department of Transportation
District 2 Consultant Project Management Engineer

What is Major Design "Refresher"

- **Major Design Work Types**
  - 3.2 Major Highway Design
  - 3.3 Controlled Access Highway Design

- **Examples of Major Design Projects**
  - Widenings
  - 2 to 4 Lane Reconstruction
  - New Alignment
  - Operational Improvements – Major Intersections, Interchange, Alternative Intersections
  - Bridge Replacements
  - Urban Drainage

Major Design Delivery Methods “Refresher”

- **Design Delivery**
  - Combined PD&E and Design Contract
  - Design Contract Only
  - Districtwide and Continuing Services Contracts

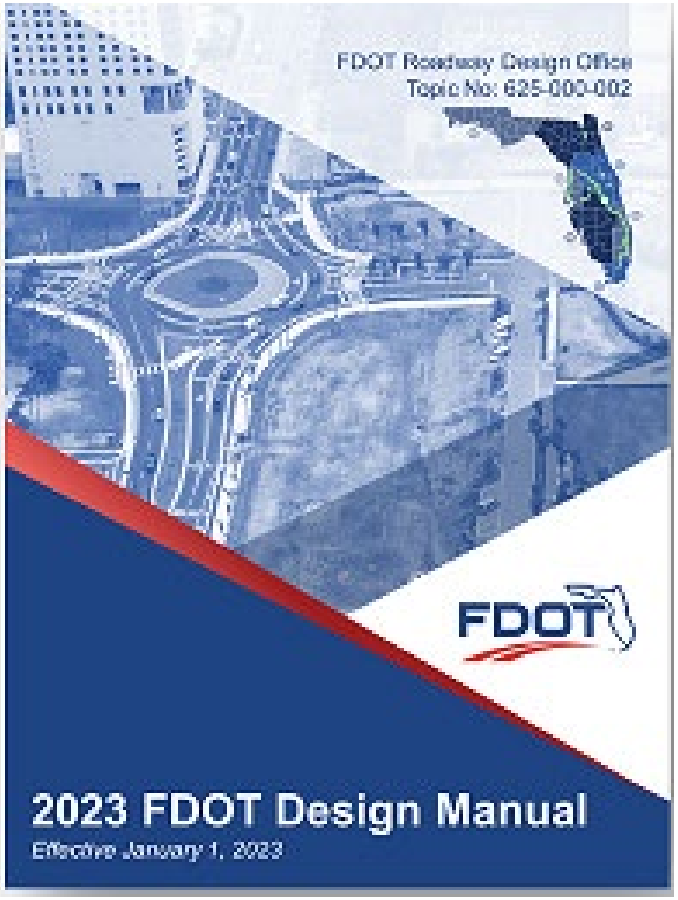
- **Construction Delivery**
  - Design-Bid-Build
  - Design Build

Major Technical Design (Roadway Plans)

- Typical Section
- Horizontal Design
- Vertical Design
- Geotechnical Considerations
- Drainage Design
- Utility Requirements
- Temporary Traffic Control Design
- Erosion Control
- 3D Design
- NexGen Plans
- Post Design

Typical Section Package

Typical Section Package



- FDM 120.2.3
- FDM 913.2

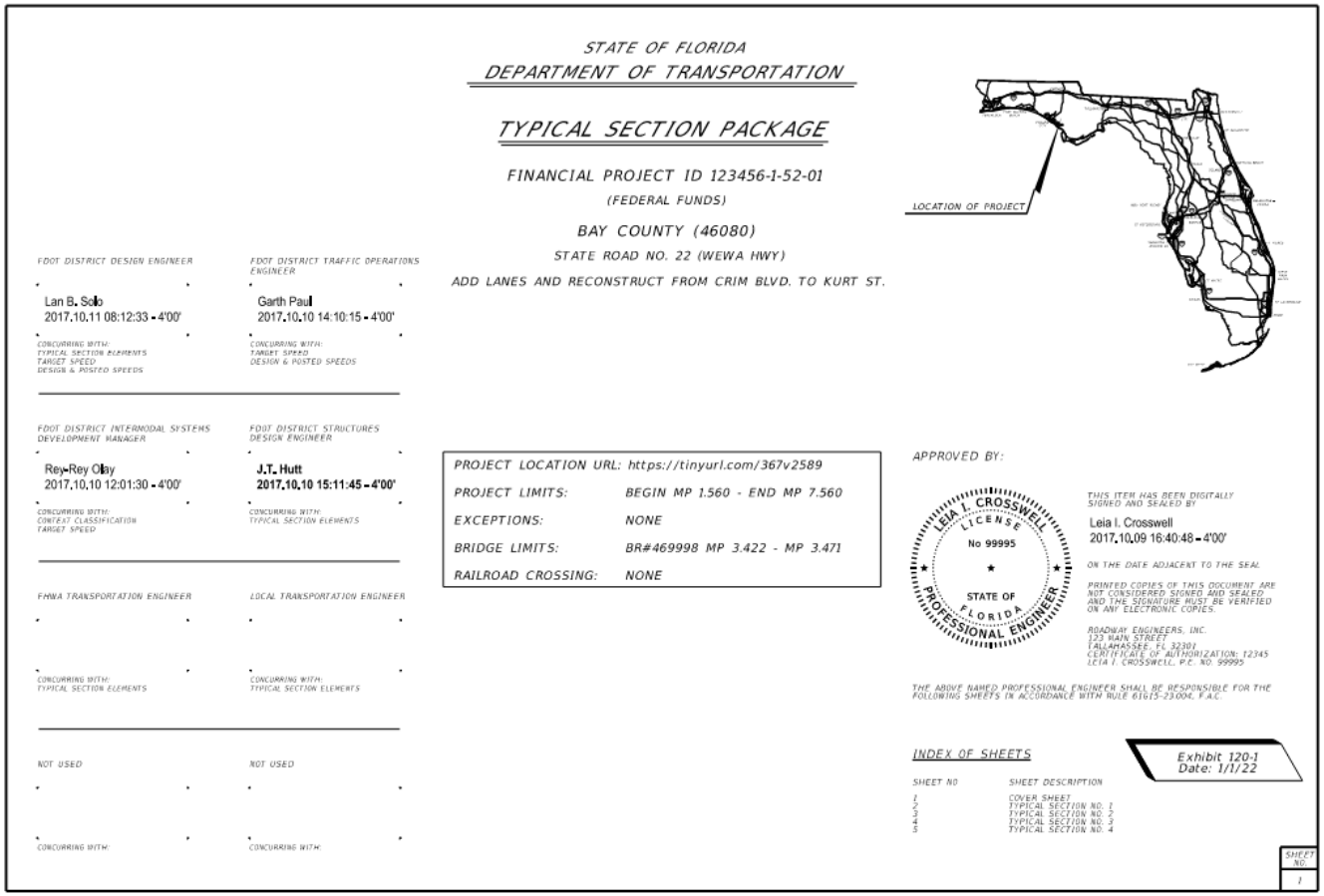
FDOT

Typical Section Package

- **When is the Package prepared?**
  - Projects with a PD&E Phase
    - After the preferred alternative is selected
    - Signed and Sealed by the PD&E EOR
    - Included in the Final Preliminary Engineering Report
  - Projects without a PD&E Phase OR if significant changes occurred during the design process
    - Signed and Sealed by the Design EOR
    - Approval prior to Phase II plan submittal

Typical Section Package

- Cover Sheet



STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION PACKAGE

FINANCIAL PROJECT ID 123456-1-52-01
(FEDERAL FUNDS)

BAY COUNTY (46080)
STATE ROAD NO. 22 (WEWA HWY)
ADD LANES AND RECONSTRUCT FROM CRIM BLVD. TO KURT ST.

LOCATION OF PROJECT

FDOT DISTRICT DESIGN ENGINEER
Lan B. Solo
2017.10.11 08:12:33 - 4'00'
CONCURRING WITH:
TYPICAL SECTION ELEMENTS
TARGET SPEED
DESIGN & POSTED SPEEDS

FDOT DISTRICT TRAFFIC OPERATIONS ENGINEER
Garth Paul
2017.10.10 14:10:15 - 4'00'
CONCURRING WITH:
TARGET SPEED
DESIGN & POSTED SPEEDS

FDOT DISTRICT INTERMODAL SYSTEMS DEVELOPMENT MANAGER
Rey-Rey Olay
2017.10.10 12:01:30 - 4'00'
CONCURRING WITH:
CONTEXT CLASSIFICATION
TARGET SPEED

FDOT DISTRICT STRUCTURES DESIGN ENGINEER
J.T. Hutt
2017.10.10 15:11:45 - 4'00'
CONCURRING WITH:
TYPICAL SECTION ELEMENTS

FHWA TRANSPORTATION ENGINEER
CONCURRING WITH:
TYPICAL SECTION ELEMENTS

LOCAL TRANSPORTATION ENGINEER
CONCURRING WITH:
TYPICAL SECTION ELEMENTS

NOT USED
CONCURRING WITH:

NOT USED
CONCURRING WITH:

PROJECT LOCATION URL:	https://tinyurl.com/367v2589
PROJECT LIMITS:	BEGIN MP 1.560 - END MP 7.560
EXCEPTIONS:	NONE
BRIDGE LIMITS:	BR#469998 MP 3.422 - MP 3.471
RAILROAD CROSSING:	NONE

APPROVED BY:

LEIA I. CROSSWELL LICENSE No 99995 STATE OF FLORIDA PROFESSIONAL ENGINEER

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123 MAIN STREET
TALLAHASSEE, FL 32301
CERTIFICATE OF AUTHORIZATION: 12345
LEIA I. CROSSWELL, P.E. NO. 99995

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INDEX OF SHEETS

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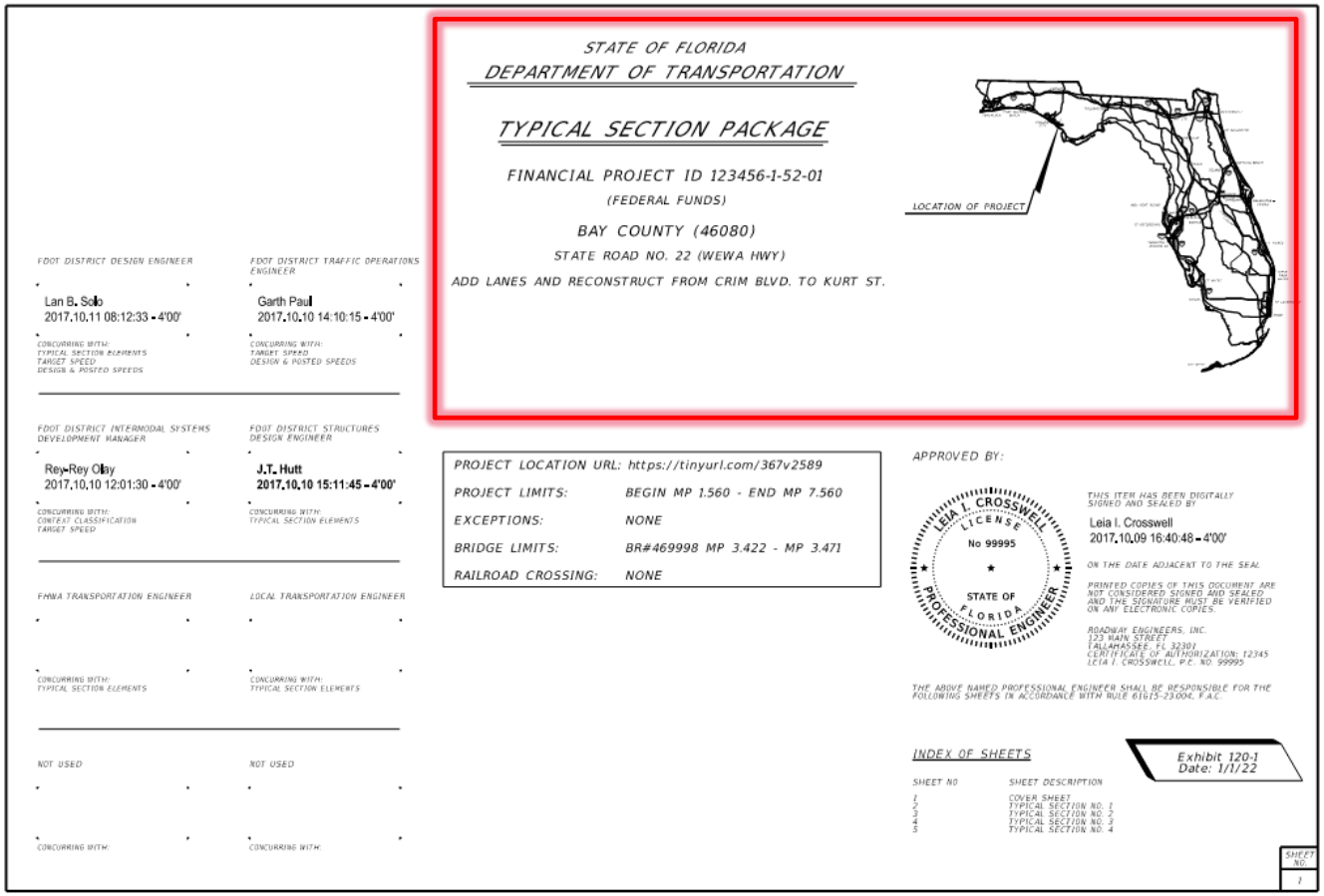

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

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NOT USED
CONCURRING WITH:

NOT USED
CONCURRING WITH:

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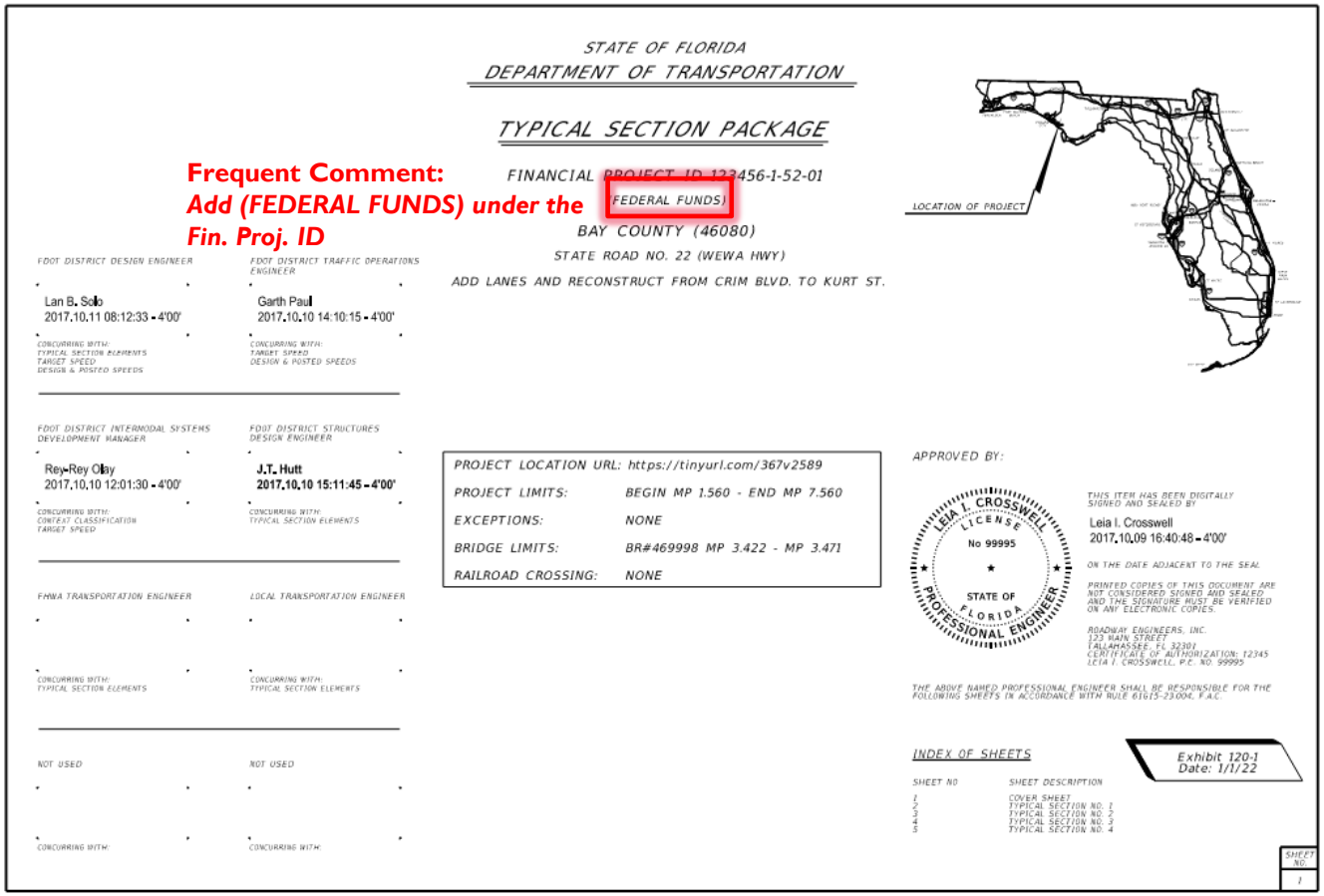

STATE OF FLORIDA
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ADD LANES AND RECONSTRUCT FROM CRIM BLVD. TO KURT ST.

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Frequent Comment:
Add (FEDERAL FUNDS) under the Fin. Proj. ID

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Lan B. Solo
2017.10.11 08:12:33 -4'00'
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FHWA TRANSPORTATION ENGINEER
CONCURRING WITH: TYPICAL SECTION ELEMENTS

LOCAL TRANSPORTATION ENGINEER
CONCURRING WITH: TYPICAL SECTION ELEMENTS

NOT USED
CONCURRING WITH:

NOT USED
CONCURRING WITH:

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PROJECT LIMITS:	BEGIN MP 1.560 - END MP 7.560
EXCEPTIONS:	NONE
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RAILROAD CROSSING:	NONE

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SHEET NO. 1

Typical Section Package

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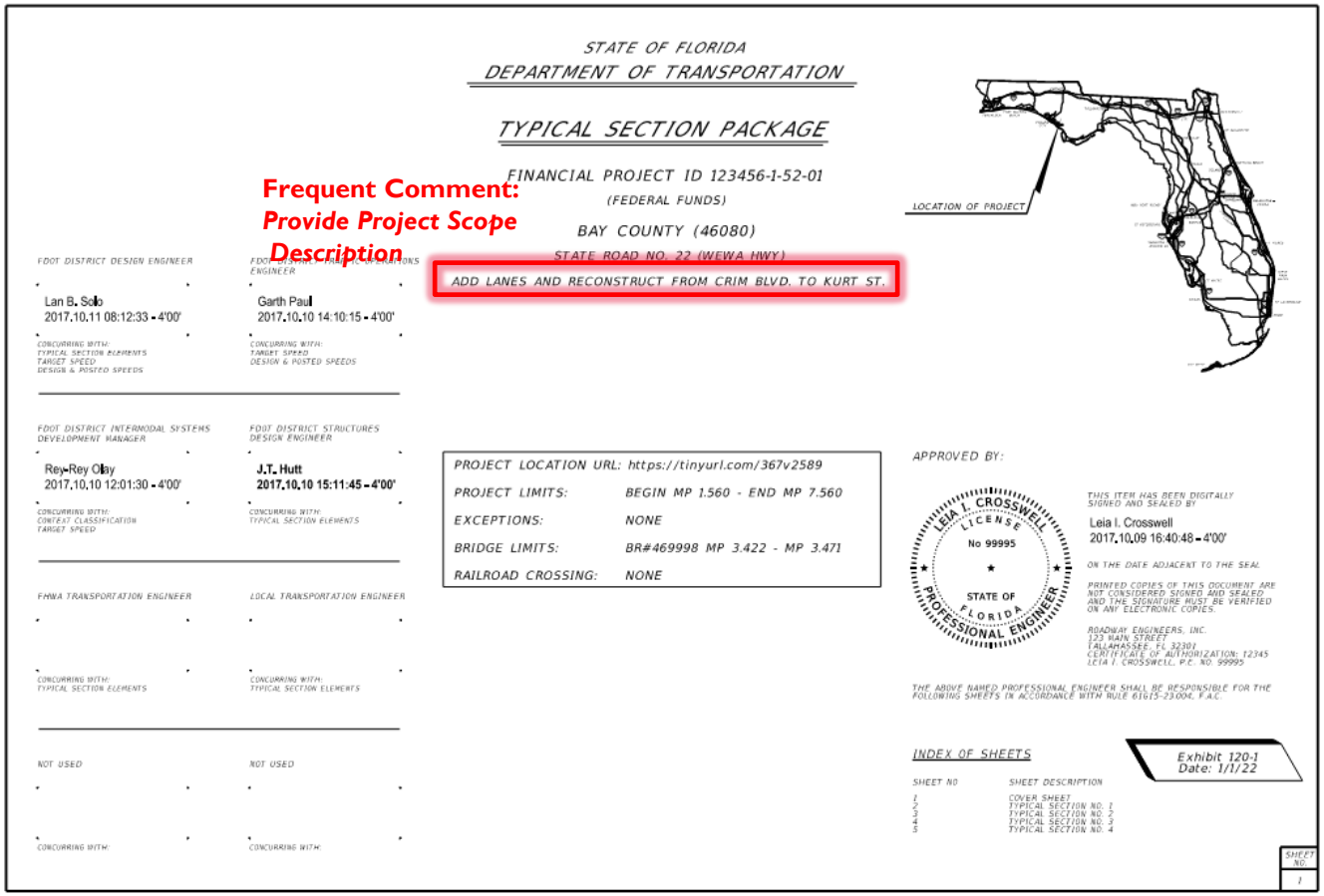

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION PACKAGE

FINANCIAL PROJECT ID 123456-1-52-01
(FEDERAL FUNDS)

BAY COUNTY (46080)

STATE ROAD NO. 22 (WEWA HWY)

ADD LANES AND RECONSTRUCT FROM CRIM BLVD. TO KURT ST.

Frequent Comment:
Provide Project Scope Description

LOCATION OF PROJECT

FDOT DISTRICT DESIGN ENGINEER
Lan B. Solo
2017.10.11 08:12:33 - 4'00'
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TARGET SPEED
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FHWA TRANSPORTATION ENGINEER
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LOCAL TRANSPORTATION ENGINEER
CONCURRING WITH:
TYPICAL SECTION ELEMENTS

NOT USED
CONCURRING WITH:

NOT USED
CONCURRING WITH:

PROJECT LOCATION URL:	https://tinyurl.com/367v2589
PROJECT LIMITS:	BEGIN MP 1.560 - END MP 7.560
EXCEPTIONS:	NONE
BRIDGE LIMITS:	BR#469998 MP 3.422 - MP 3.471
RAILROAD CROSSING:	NONE

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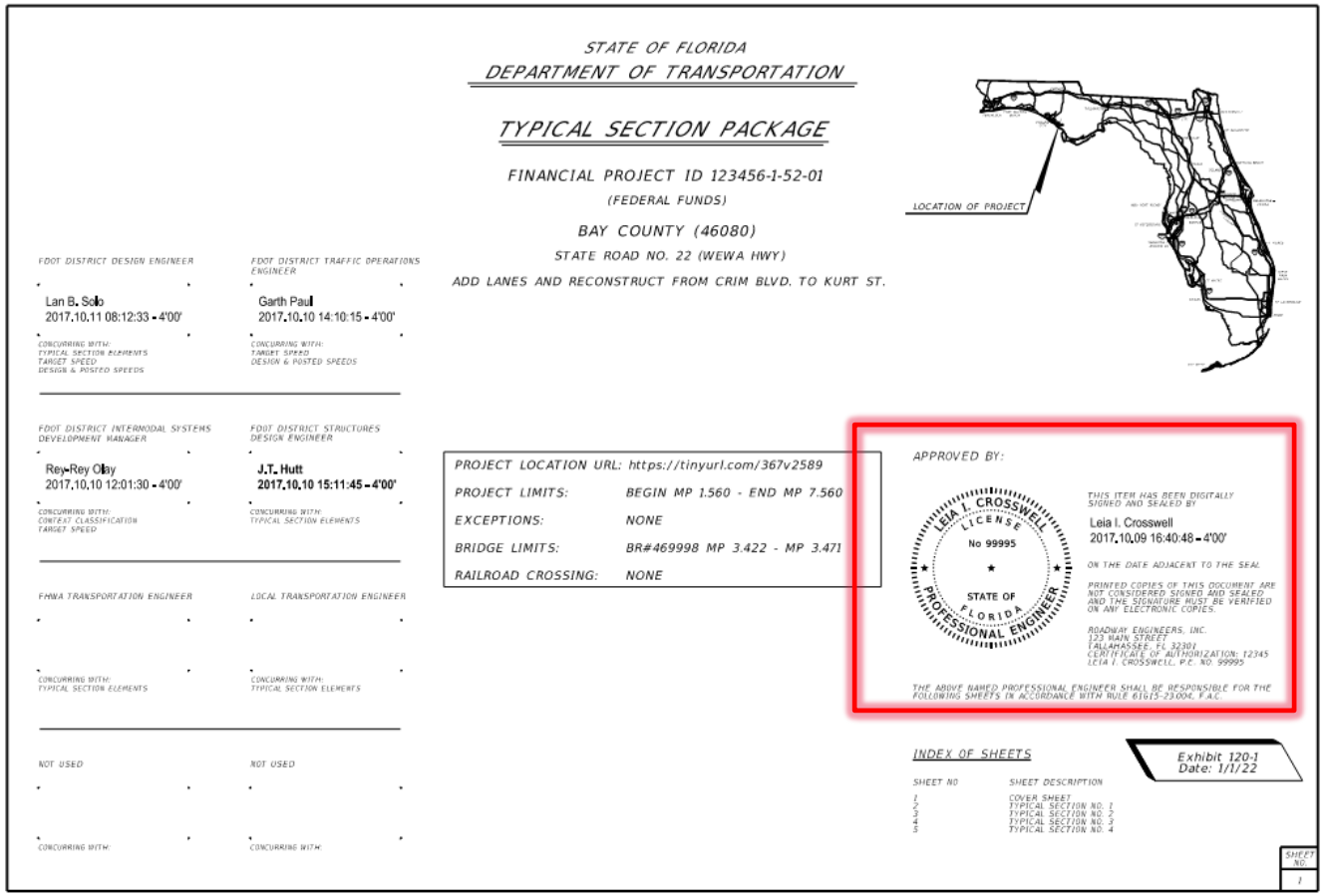

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION PACKAGE

FINANCIAL PROJECT ID 123456-1-52-01
(FEDERAL FUNDS)

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Lan B. Solo
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J.T. Hutt
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CONCURRING WITH: TYPICAL SECTION ELEMENTS

FHWA TRANSPORTATION ENGINEER
CONCURRING WITH: TYPICAL SECTION ELEMENTS

LOCAL TRANSPORTATION ENGINEER
CONCURRING WITH: TYPICAL SECTION ELEMENTS

NOT USED
CONCURRING WITH:

NOT USED
CONCURRING WITH:

PROJECT LOCATION URL:	https://tinyurl.com/367v2589
PROJECT LIMITS:	BEGIN MP 1.560 - END MP 7.560
EXCEPTIONS:	NONE
BRIDGE LIMITS:	BR#469998 MP 3.422 - MP 3.471
RAILROAD CROSSING:	NONE

APPROVED BY:

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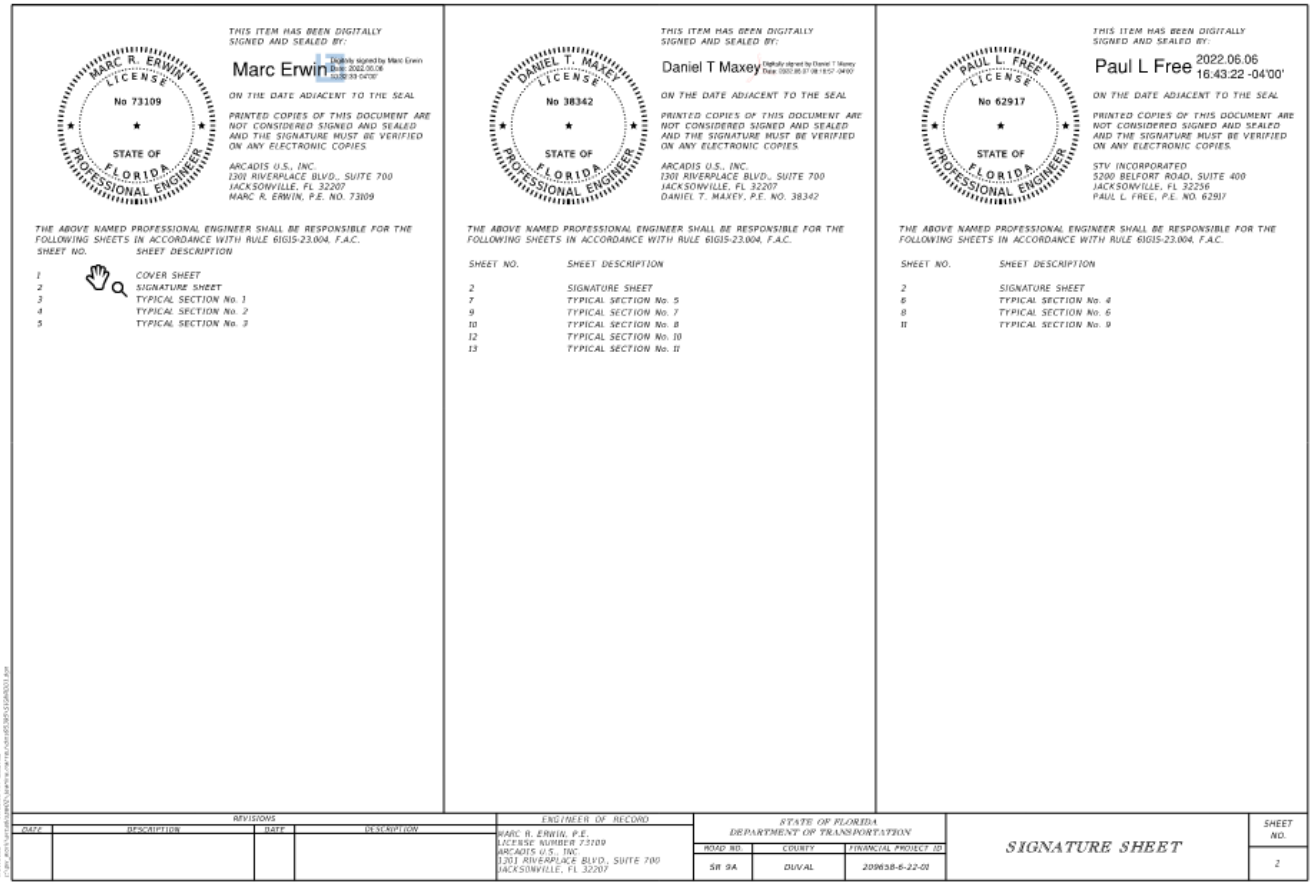
Date: 1/1/22

SHEET NO. 1

Typical Section Package

- Signature Sheet



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Marc Erwin

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MARC R. ERWIN, P.E. NO. 73109

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SHEET NO.	SHEET DESCRIPTION
1	COVER SHEET
2	SIGNATURE SHEET
3	TYPICAL SECTION No. 1
4	TYPICAL SECTION No. 2
5	TYPICAL SECTION No. 3

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DANIEL T. MAXEY LICENSE No 38342 STATE OF FLORIDA PROFESSIONAL ENGINEER

Daniel T Maxey

ON THE DATE ADJACENT TO THE SEAL

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DANIEL T. MAXEY, P.E. NO. 38342

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SHEET NO.	SHEET DESCRIPTION
2	SIGNATURE SHEET
7	TYPICAL SECTION No. 5
9	TYPICAL SECTION No. 7
10	TYPICAL SECTION No. 8
12	TYPICAL SECTION No. 10
13	TYPICAL SECTION No. 11

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PAUL L. FREE LICENSE No 62917 STATE OF FLORIDA PROFESSIONAL ENGINEER

Paul L Free 2022.06.06 16:43:22 -04'00'

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STV INCORPORATED
5200 BELFORT ROAD, SUITE 400
JACKSONVILLE, FL 32256
PAUL L. FREE, P.E. NO. 62917

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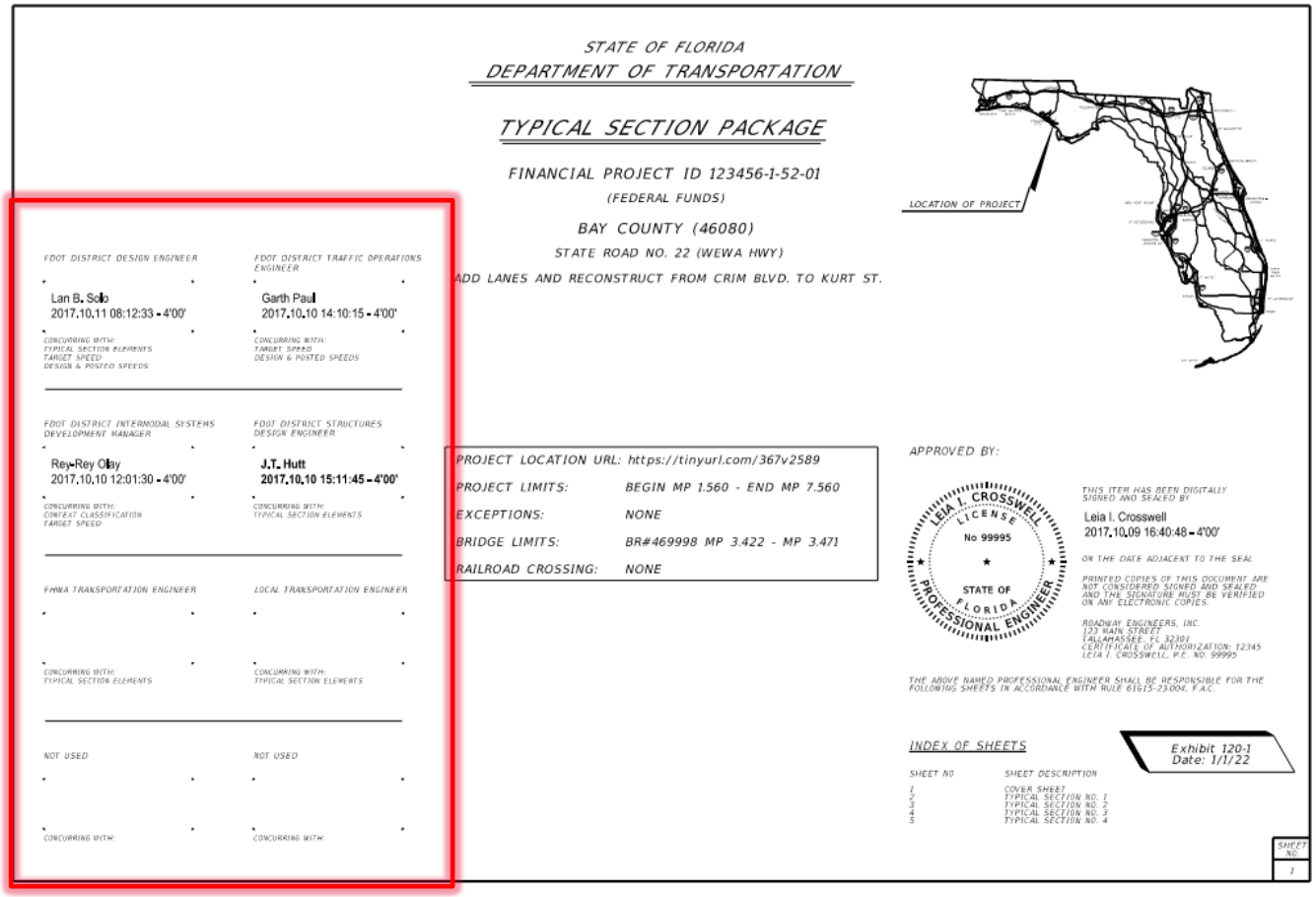
SHEET NO.	SHEET DESCRIPTION
2	SIGNATURE SHEET
6	TYPICAL SECTION No. 4
8	TYPICAL SECTION No. 6
11	TYPICAL SECTION No. 9

REVISIONS				ENGINEER OF RECORD	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	MARC R. ERWIN, P.E. LICENSE NUMBER 73109 ARCADIS U.S., INC 1301 RIVERPLACE BLVD., SUITE 700 JACKSONVILLE, FL 32207	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	SIGNATURE SHEET	2
					SR 9A	DUVAL	209638-6-22-01		

FDOT

Typical Section Package

- Cover Sheet



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CONCURRING WITH:

NOT USED
CONCURRING WITH:

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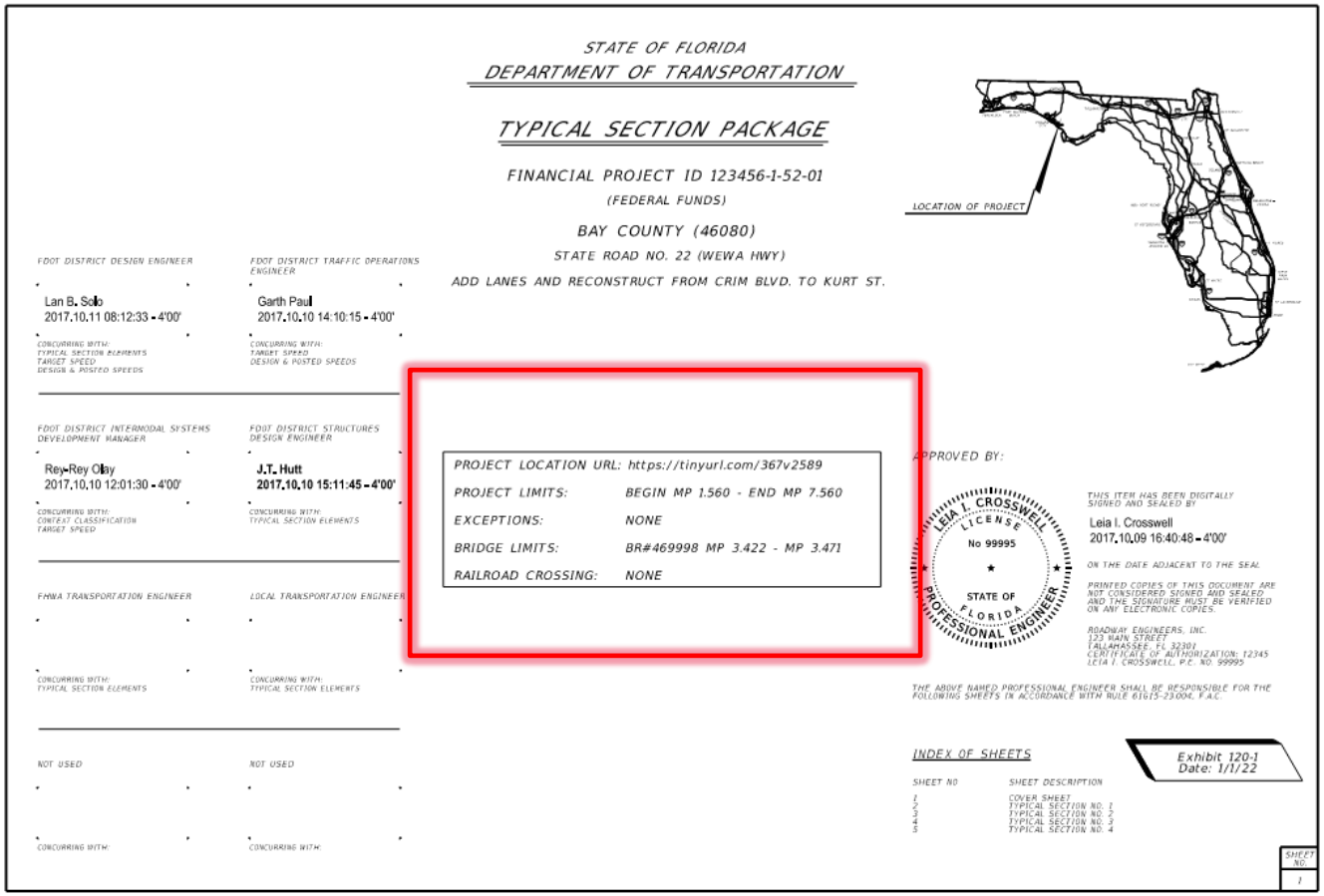

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FDOT DISTRICT TRAFFIC OPERATIONS ENGINEER
Garth Paul
2017.10.10 14:10:15 - 4'00'
CONCURRING WITH: TARGET SPEED, DESIGN & POSTED SPEEDS

FDOT DISTRICT INTERMODAL SYSTEMS DEVELOPMENT MANAGER
Rey-Rey Olay
2017.10.10 12:01:30 - 4'00'
CONCURRING WITH: CONTEXT CLASSIFICATION, TARGET SPEED

FDOT DISTRICT STRUCTURES DESIGN ENGINEER
J.T. Hutt
2017.10.10 15:11:45 - 4'00'
CONCURRING WITH: TYPICAL SECTION ELEMENTS

FHWA TRANSPORTATION ENGINEER
CONCURRING WITH: TYPICAL SECTION ELEMENTS

LOCAL TRANSPORTATION ENGINEER
CONCURRING WITH: TYPICAL SECTION ELEMENTS

NOT USED
CONCURRING WITH:

NOT USED
CONCURRING WITH:

PROJECT LOCATION URL:	https://tinyurl.com/367v2589
PROJECT LIMITS:	BEGIN MP 1.560 - END MP 7.560
EXCEPTIONS:	NONE
BRIDGE LIMITS:	BR#469998 MP 3.422 - MP 3.471
RAILROAD CROSSING:	NONE

APPROVED BY:

LEIA I. CROSSWELL LICENSE No 99995 STATE OF FLORIDA PROFESSIONAL ENGINEER

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY
Leia I. Crosswell
2017.10.09 16:40:48 - 4'00'
ON THE DATE ADJACENT TO THE SEAL

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ROADWAY ENGINEERS, INC.
123 MAIN STREET
TALLAHASSEE, FL 32301
CERTIFICATE OF AUTHORIZATION: 12345
LEIA I. CROSSWELL, P.E. NO. 99995

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

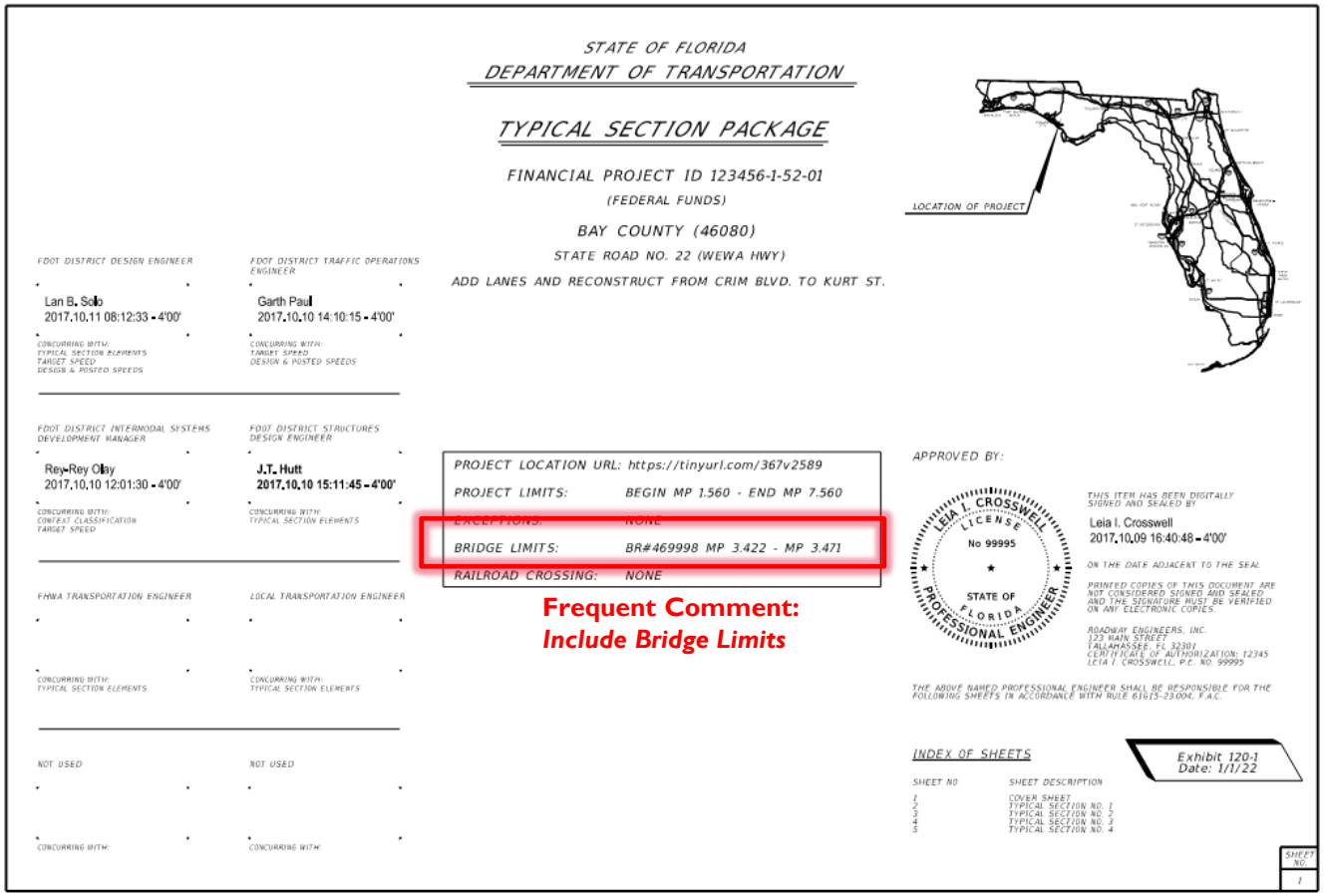
SHEET NO	SHEET DESCRIPTION
1	COVER SHEET
2	TYPICAL SECTION NO. 1
3	TYPICAL SECTION NO. 2
4	TYPICAL SECTION NO. 3
5	TYPICAL SECTION NO. 4

Exhibit 120-1
Date: 1/1/22

SHEET NO. 1

Typical Section Package

- Cover Sheet



STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION PACKAGE

FINANCIAL PROJECT ID 123456-1-52-01
(FEDERAL FUNDS)

BAY COUNTY (46080)

STATE ROAD NO. 22 (WEWA HWY)

ADD LANES AND RECONSTRUCT FROM CRIM BLVD. TO KURT ST.

LOCATION OF PROJECT

FDOT DISTRICT DESIGN ENGINEER
Lan B. Solo
2017.10.11 08:12:33 - 4'00'
CONCURRING WITH: TYPICAL SECTION ELEMENTS, TARGET SPEED, DESIGN & POSTED SPEEDS

FDOT DISTRICT TRAFFIC OPERATIONS ENGINEER
Garth Paul
2017.10.10 14:10:15 - 4'00'
CONCURRING WITH: TARGET SPEED, DESIGN & POSTED SPEEDS

FDOT DISTRICT INTERMODAL SYSTEMS DEVELOPMENT MANAGER
Rey-Rey Olay
2017.10.10 12:01:30 - 4'00'
CONCURRING WITH: CONTEXT CLASSIFICATION, TARGET SPEED

FDOT DISTRICT STRUCTURES DESIGN ENGINEER
J.T. Hutt
2017.10.10 15:11:45 - 4'00'
CONCURRING WITH: TYPICAL SECTION ELEMENTS

FHWA TRANSPORTATION ENGINEER
CONCURRING WITH: TYPICAL SECTION ELEMENTS

LOCAL TRANSPORTATION ENGINEER
CONCURRING WITH: TYPICAL SECTION ELEMENTS

NOT USED
CONCURRING WITH:

NOT USED
CONCURRING WITH:

PROJECT LOCATION URL:	https://tinyurl.com/367v2589
PROJECT LIMITS:	BEGIN MP 1.560 - END MP 7.560
EXCEPTIONS:	NONE
BRIDGE LIMITS:	BR#469998 MP 3.422 - MP 3.471
RAILROAD CROSSING:	NONE

Frequent Comment:
Include Bridge Limits

APPROVED BY:

LEIA I. CROSSWELL LICENSE No 99995 STATE OF FLORIDA PROFESSIONAL ENGINEER

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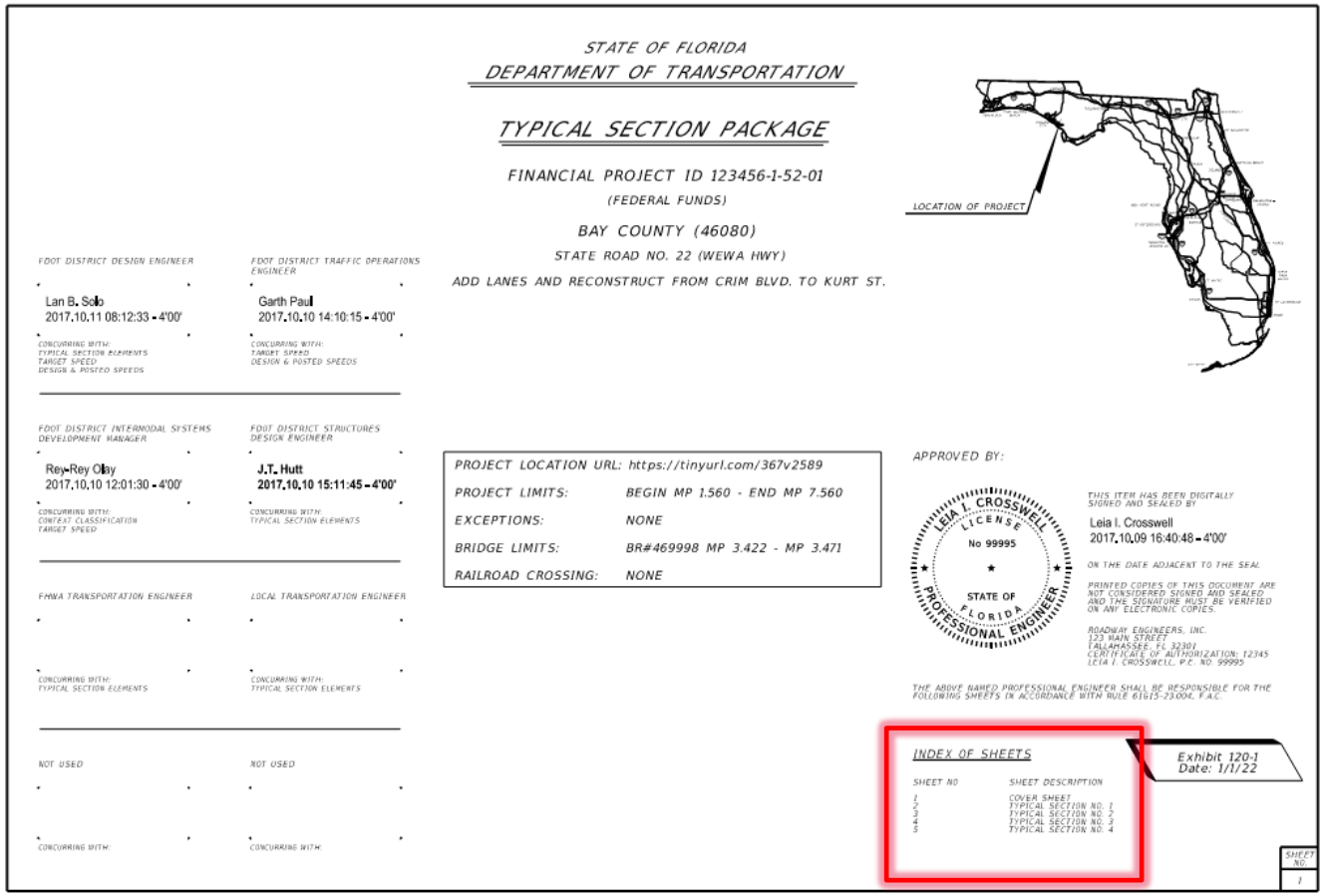
Exhibit 120-1
Date: 1/1/22

SHEET NO. 1

Typical Section Package

- Cover Sheet



STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION PACKAGE

FINANCIAL PROJECT ID 123456-1-52-01
(FEDERAL FUNDS)

BAY COUNTY (46080)
STATE ROAD NO. 22 (WEWA HWY)
ADD LANES AND RECONSTRUCT FROM CRIM BLVD. TO KURT ST.

LOCATION OF PROJECT

FDOT DISTRICT DESIGN ENGINEER
Lan B. Solo
2017.10.11 08:12:33 - 4'00'
CONCURRING WITH: TYPICAL SECTION ELEMENTS, TARGET SPEED, DESIGN & POSTED SPEEDS

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CONCURRING WITH: TYPICAL SECTION ELEMENTS

LOCAL TRANSPORTATION ENGINEER
CONCURRING WITH: TYPICAL SECTION ELEMENTS

NOT USED
CONCURRING WITH:

NOT USED
CONCURRING WITH:

PROJECT LOCATION URL:	https://tinyurl.com/367v2589
PROJECT LIMITS:	BEGIN MP 1.560 - END MP 7.560
EXCEPTIONS:	NONE
BRIDGE LIMITS:	BR#469998 MP 3.422 - MP 3.471
RAILROAD CROSSING:	NONE

APPROVED BY:

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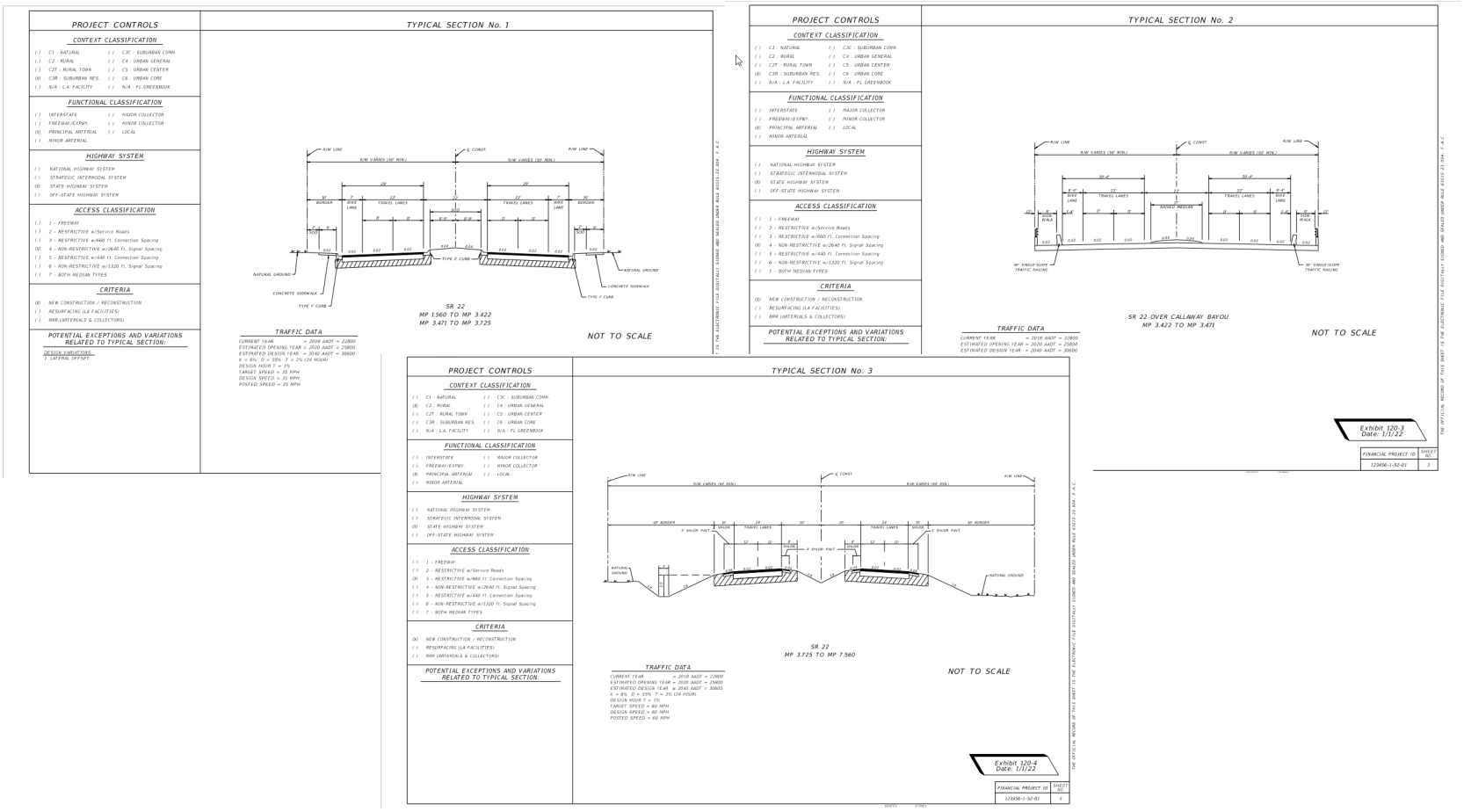
Exhibit 120-1
Date: 1/1/22

SHEET NO. 1

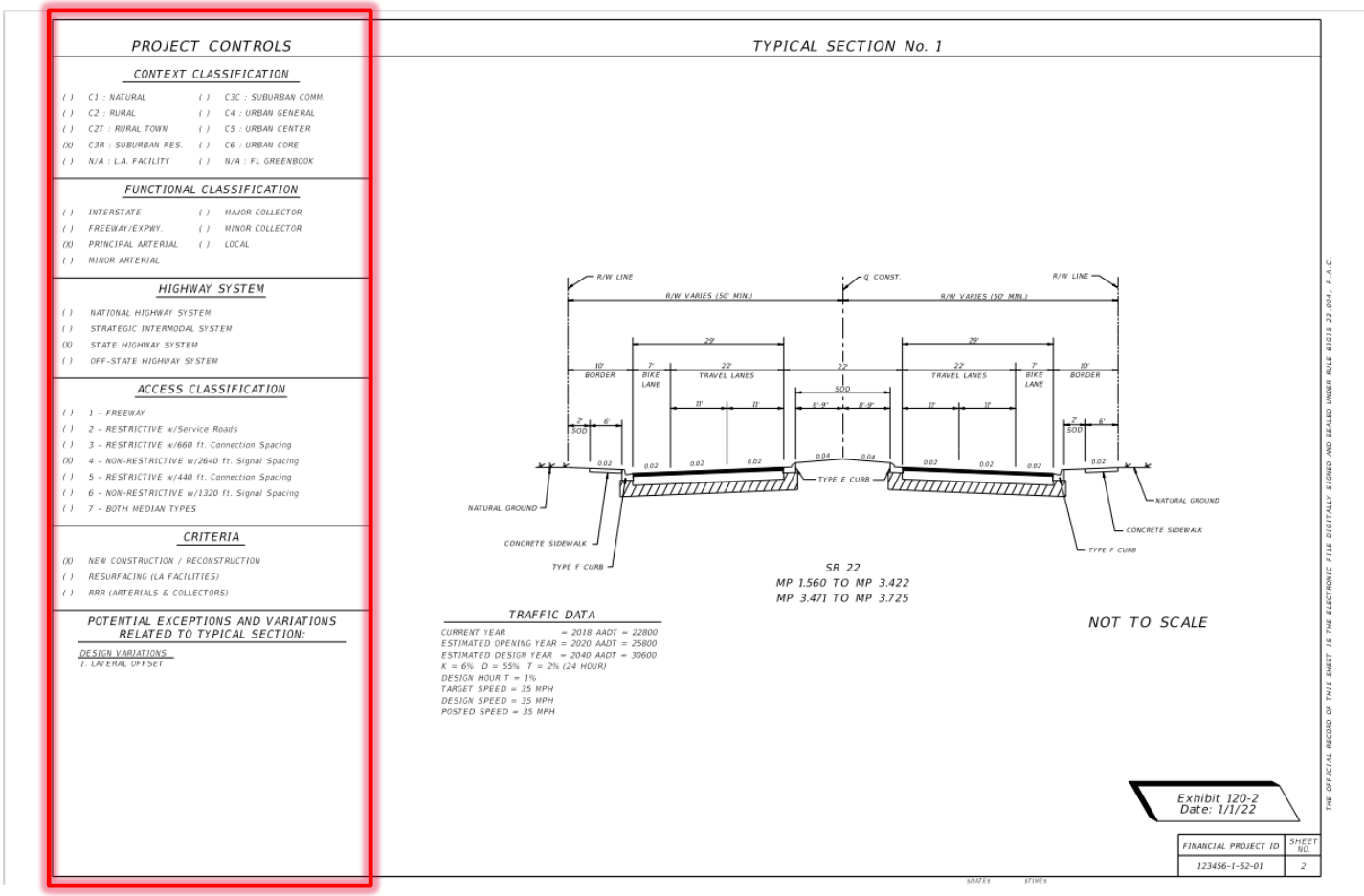
Typical Section Package

- Cover Sheet



Typical Section Package

- Typical Section Sheet(s)



PROJECT CONTROLS

CONTEXT CLASSIFICATION

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

FUNCTIONAL CLASSIFICATION

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

HIGHWAY SYSTEM

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

ACCESS CLASSIFICATION

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

CRITERIA

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

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

DESIGN VARIATIONS
1. LATERAL OFFSET

TYPICAL SECTION No. 1

SR 22
MP 1.560 TO MP 3.422
MP 3.471 TO MP 3.725

TRAFFIC DATA

CURRENT YEAR = 2018 AADT = 22800
ESTIMATED OPENING YEAR = 2020 AADT = 25800
ESTIMATED DESIGN YEAR = 2040 AADT = 30600
K = 6% D = 55% T = 2% (24 HOUR)
DESIGN HOUR T = 1%
TARGET SPEED = 35 MPH
DESIGN SPEED = 35 MPH
POSTED SPEED = 35 MPH

NOT TO SCALE

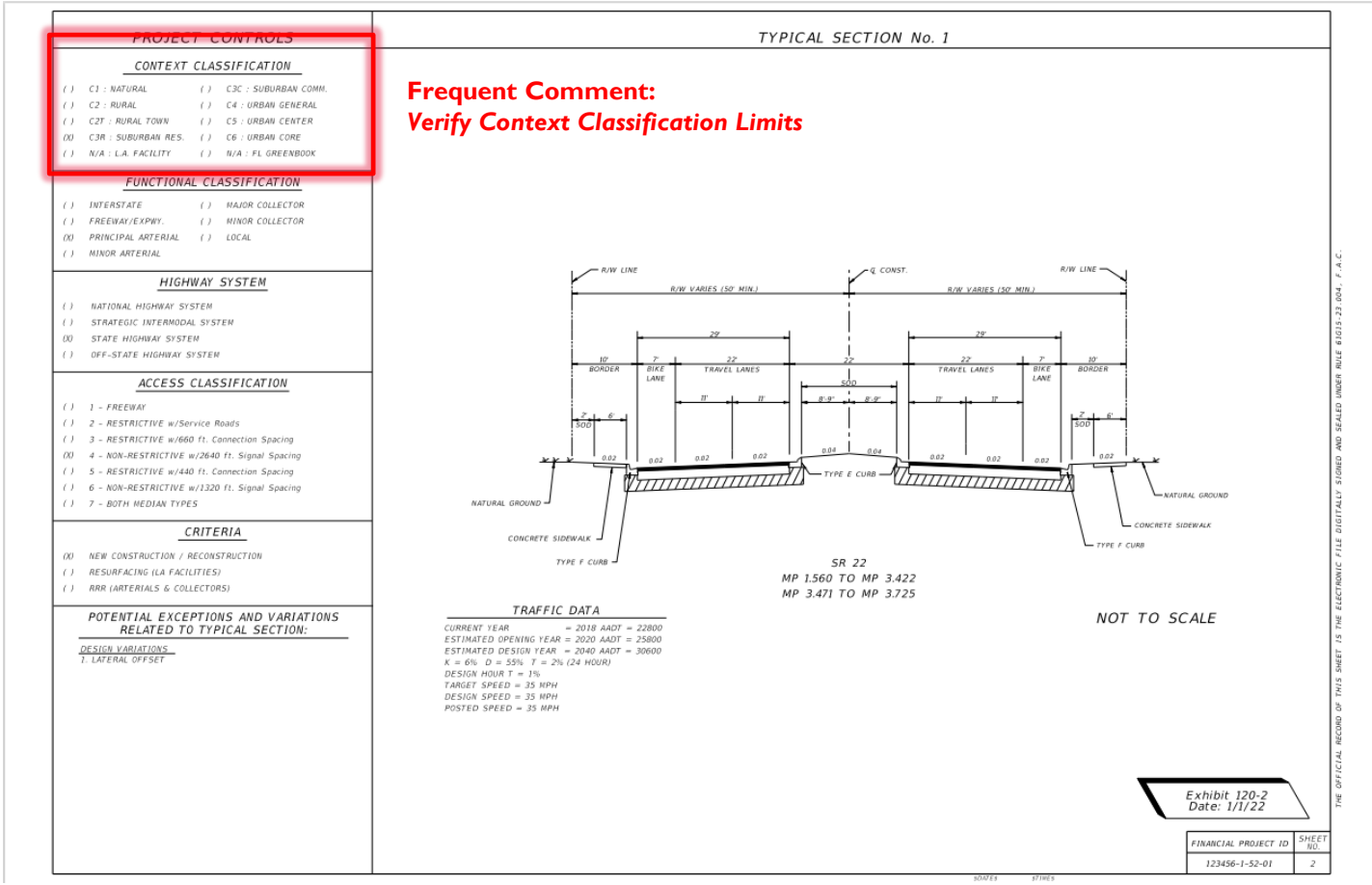
Exhibit 120-2
Date: 1/1/22

FINANCIAL PROJECT ID	SHEET NO.
123456-1-52-01	2

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

Typical Section Package

- Typical Section Sheet(s)



PROJECT CONTROLS

CONTEXT CLASSIFICATION

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( ) C2 : RURAL ( ) C4 : URBAN GENERAL
( ) C2T : RURAL TOWN ( ) C5 : URBAN CENTER
(X) C3R : SUBURBAN RES. ( ) C6 : URBAN CORE
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FUNCTIONAL CLASSIFICATION

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

HIGHWAY SYSTEM

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( ) STRATEGIC INTERMODAL SYSTEM
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CRITERIA

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

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

DESIGN VARIATIONS
1. LATERAL OFFSET

TYPICAL SECTION No. 1

Frequent Comment:
Verify Context Classification Limits

SR 22
MP 1.560 TO MP 3.422
MP 3.471 TO MP 3.725

NOT TO SCALE

TRAFFIC DATA

CURRENT YEAR = 2018 AADT = 22800
ESTIMATED OPENING YEAR = 2020 AADT = 25800
ESTIMATED DESIGN YEAR = 2040 AADT = 30600
K = 6% D = 55% T = 2% (24 HOUR)
DESIGN HOUR T = 1%
TARGET SPEED = 35 MPH
DESIGN SPEED = 35 MPH
POSTED SPEED = 35 MPH

Exhibit 120-2
Date: 1/1/22

FINANCIAL PROJECT ID	SHEET NO.
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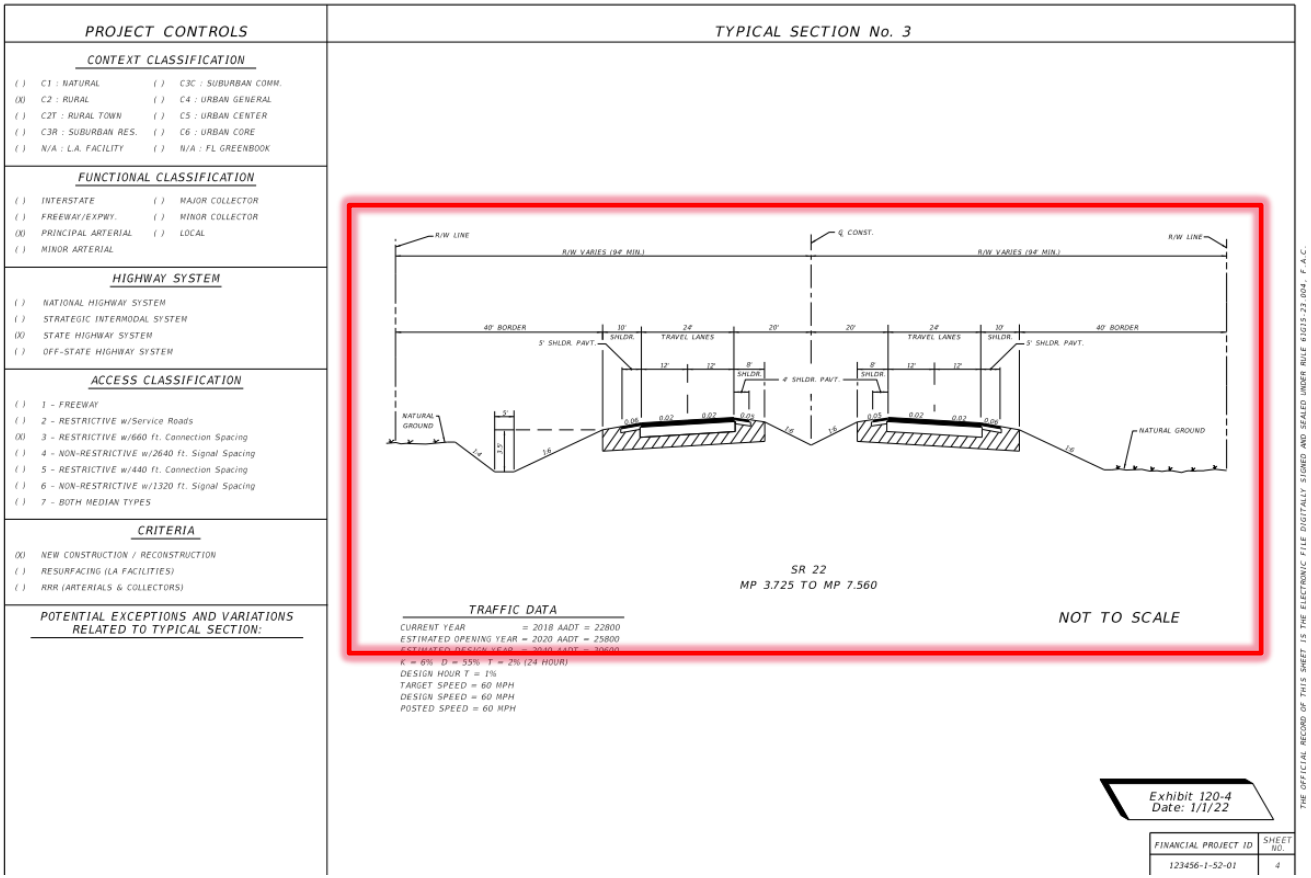
- Typical Section Sheet(s)



PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL ( ) C3C : SUBURBAN COMM.
(X) C2 : RURAL ( ) C4 : URBAN GENERAL
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( ) FREEWAY/EXPWY. ( ) MINOR COLLECTOR
(X) PRINCIPAL ARTERIAL ( ) LOCAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

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

ACCESS CLASSIFICATION

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CRITERIA

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

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

TYPICAL SECTION No. 3

SR 22
MP 3.725 TO MP 7.560

NOT TO SCALE

TRAFFIC DATA

CURRENT YEAR = 2018 AADT = 22800
ESTIMATED OPENING YEAR = 2020 AADT = 25800
ESTIMATED DESIGN YEAR = 2040 AADT = 37000
K = 6% D = 55% T = 2% (24 HOUR)
DESIGN HOUR T = 1%
TARGET SPEED = 60 MPH
DESIGN SPEED = 60 MPH
POSTED SPEED = 60 MPH

Exhibit 120-4
Date: 1/1/22

FINANCIAL PROJECT ID	SHEET NO.
123456-1-52-01	4

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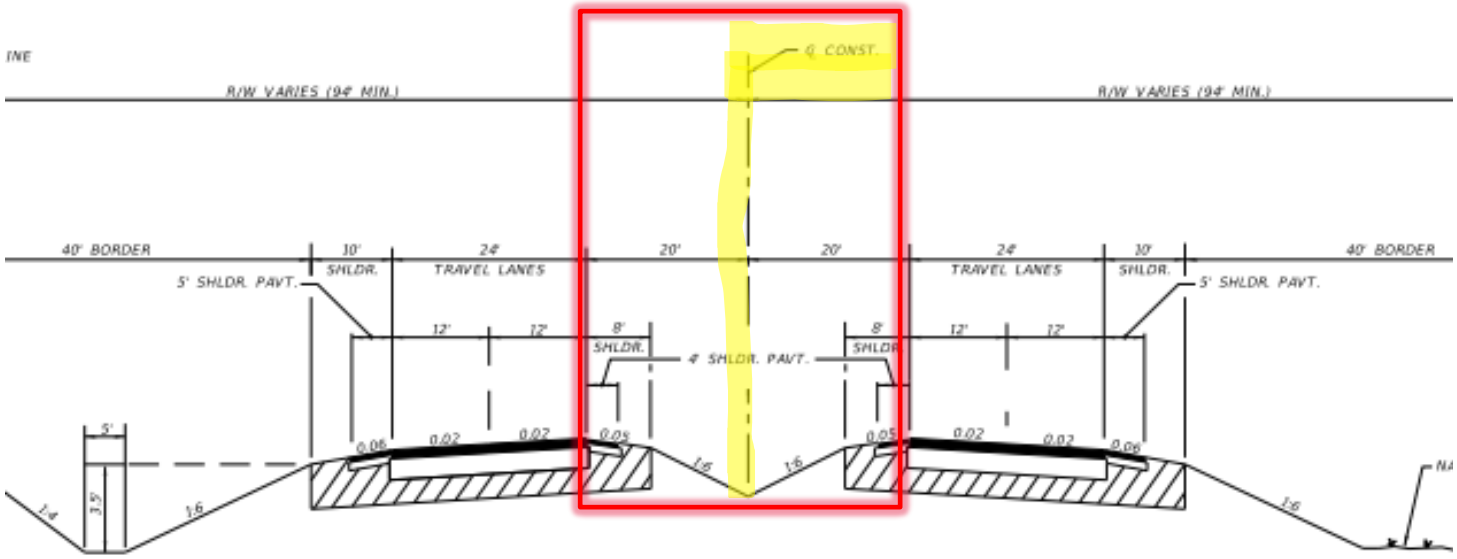
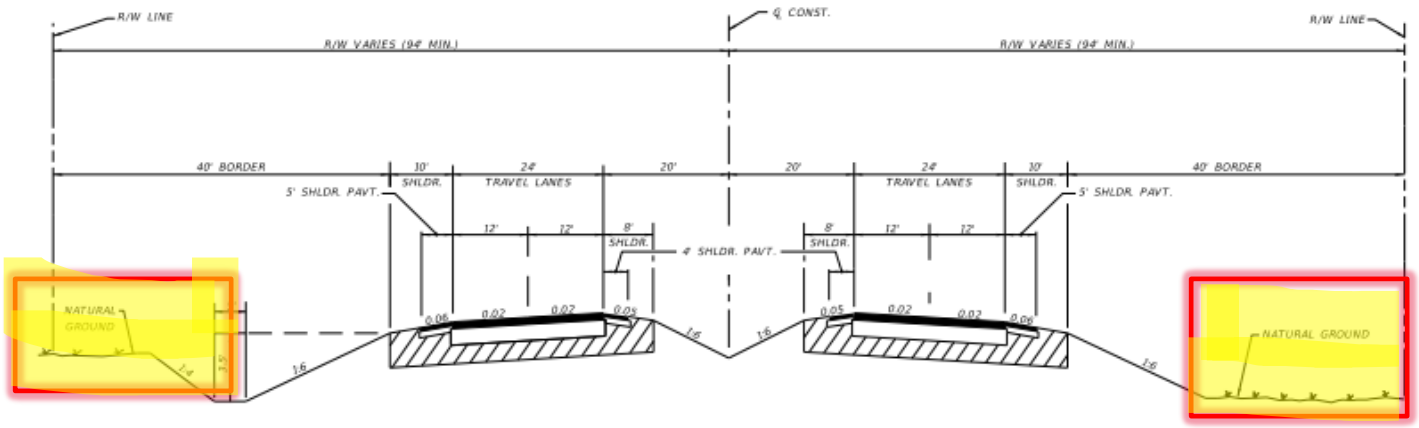
Typical Section Package

- Typical Section Sheet(s)



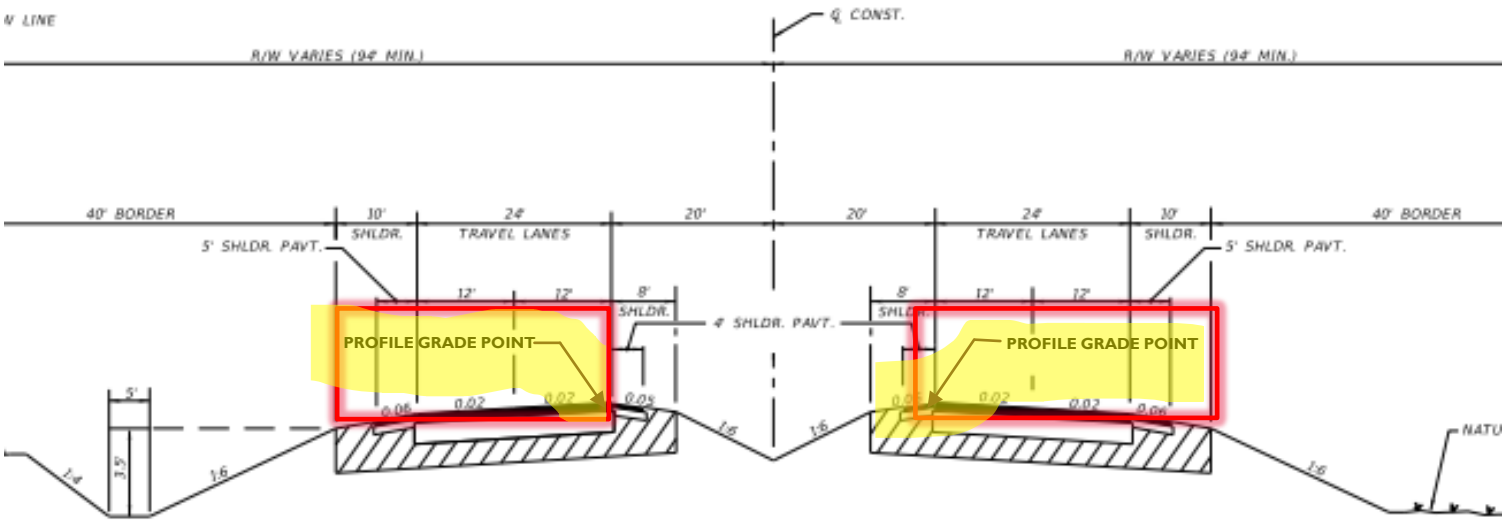
Typical Section Package

- Typical Section Sheet(s)



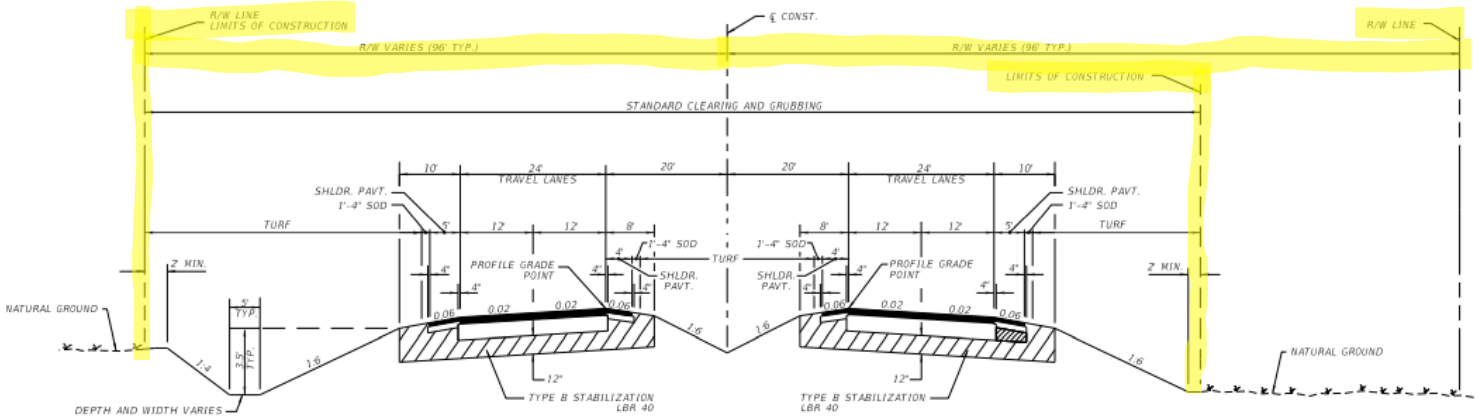
Typical Section Package

- Typical Section Sheet(s)



Typical Section Package

- Typical Section Sheet(s)



Typical Section Package

- Typical Section Sheet(s) – Lane Width Determination

Table 210.2.1 Minimum Travel and Auxiliary Lane Widths

Context Classification		Travel (feet)			Auxiliary (feet)			Two-Way Left Turn (feet)	
		Design Speed (mph)			Design Speed (mph)			Design Speed (mph)	
		25-35	40-45	≥ 50	25-35	40-45	≥ 50	25-35	40
C1	Natural	11	11	12	11	11	12	N/A	
C2	Rural	11	11	12	11	11	12		
C2T	Rural Town	11	11	12	11	11	12	12	12
C3	Suburban	10	11	12	10	11	12	11	12
C4	Urban General	10	11	12	10	11	12	11	12
C5	Urban Center	10	11	12	10	11	12	11	12
C6	Urban Core	10	11	12	10	11	12	11	12

Notes:

Travel Lanes:

(1) Minimum 11-foot travel lanes on designated freight corridors, SIS facilities, or when truck volume exceeds 10% on very low speed roadways (design speed ≤ 35 mph) (regardless of context).

(2) Minimum 12-foot travel lanes on all undivided 2-lane, 2-way roadways (for all context classifications and design speeds). However, 11-foot lanes may be used on 2-lane, 2-way curbed roadways that have adjacent buffered bicycle lanes.

(3) 10-foot travel lanes are typically provided on very low speed roadways (design speed ≤ 35 mph) but should consider wider lanes when transit is present or truck volume exceeds 10%.

(4) Travel lanes should not exceed 14 feet in width.

Auxiliary Lanes:

(1) Auxiliary lanes are typically the same width as the adjacent travel lane.

(2) Table values for right turn lanes may be reduced by 1 foot when a bicycle keyhole is present.

(3) Median turn lanes should not exceed 15 feet in width.

(4) For high-speed curbed roadways, 11-foot minimum lane widths are allowed for the following:

- Dual left turn lanes
- Single left turn lanes at directional median openings.

(5) For RRR Projects, 9-foot right turn lanes on very low speed roadways (design speed ≤ 35 mph) are allowed.

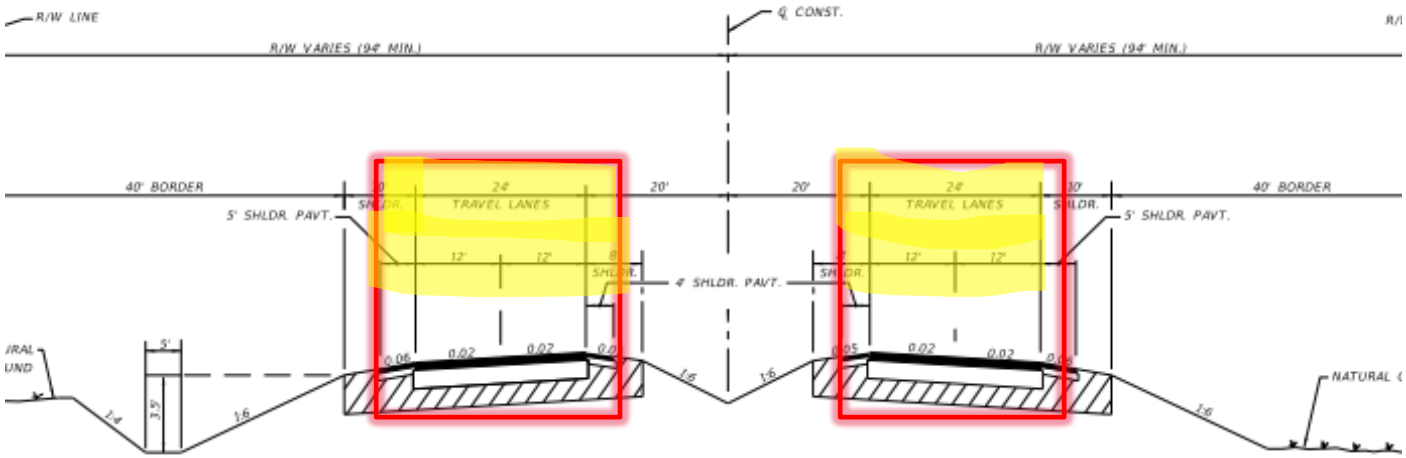
Two-way Left Turn Lanes:

(1) Two-way left turn lanes are typically one foot wider than the adjacent travel lanes.

(2) For RRR Projects, the values in the table may be reduced by 1-foot.

Typical Section Package

- Typical Section Sheet(s)



Typical Section Package

- **Typical Section Sheet(s) – Lane Width Determination (Bicycle Lanes)**

223.2.1.1 Bicycle Lane Width

The width of the bicycle lane is measured from the edge of travel lane to the edge of pavement. For new construction projects when a bicycle lane has been selected as the bicycle facility, a 7-foot buffered bicycle lane is the standard. A buffered bicycle lane has a double-6-inch white edge line separating the bicycle lane and the adjacent travel lane.

Buffered bicycle lanes are depicted in ***Exhibit 223-1***. A buffered bicycle lane should not exceed 7 feet in width (including the buffer). Any additional pavement width that results from restricting the buffered bicycle lane to 7 feet should be applied to the outside travel lane.

For projects where a bicycle lane is needed and it is not practical to move the existing curb (e.g., RRR), the width of the bicycle lane depends on the width of the available roadway pavement. For these types of projects, the options in the order of priority are:

(1) 7-foot buffered bicycle lane

(2) 6-foot buffered bicycle lane

(3) 5-foot bicycle lane

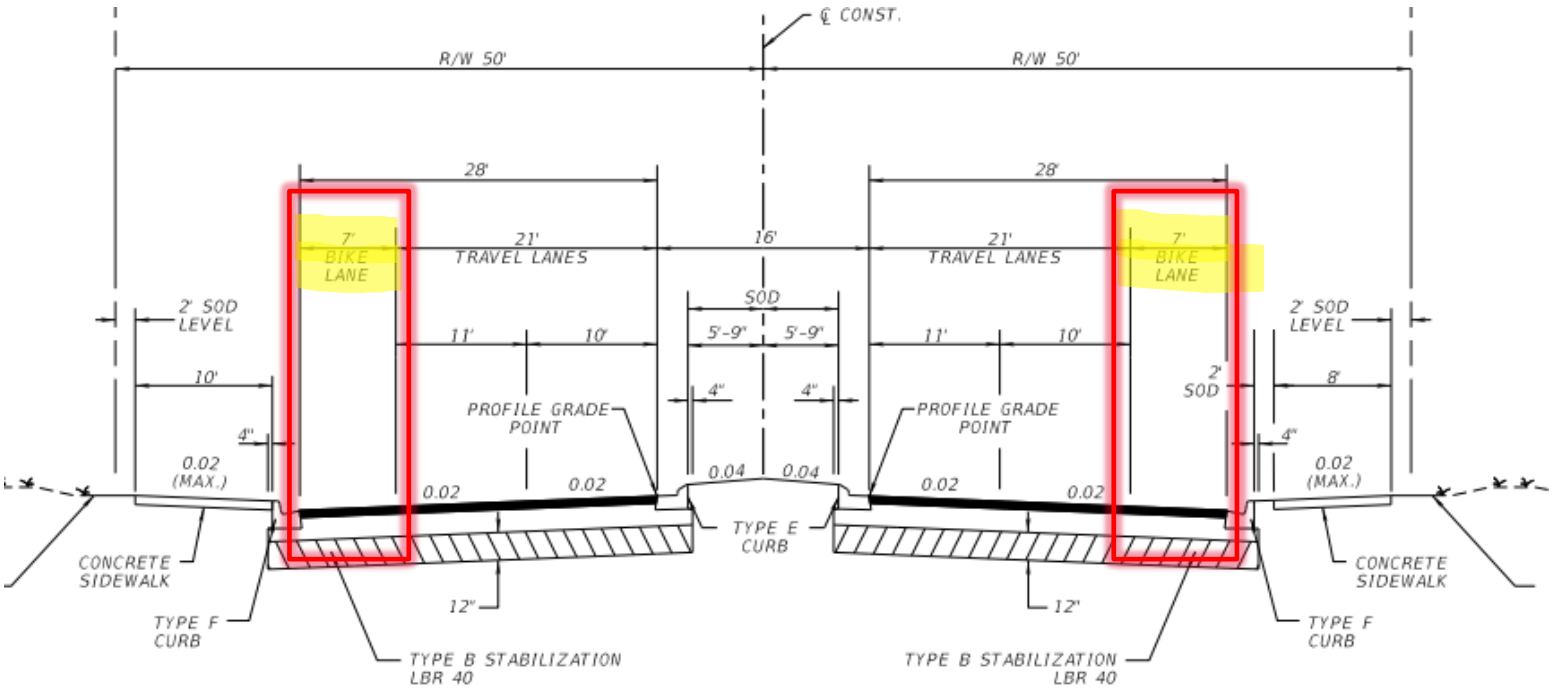
(4) 4-foot bicycle lane

Do not place a 4-foot bicycle lane adjacent to a 10-foot traffic lane.

When roadway pavement is continuous to the face of guardrail or barrier, the minimum bicycle lane width is 5 feet. See ***FDM 223.2.1.3*** when the bicycle lane is adjacent to a right-turn lane or bus bay.

Typical Section Package

- Typical Section Sheet(s)



Typical Section Package

- Typical Section Sheet(s)

Table 210.4.1 Standard Shoulder Widths

Lane Type	# Lanes (One Direction)	Without Shoulder Gutter				With Shoulder Gutter			
		Outside		Median Or Left		Outside		Median Or Left	
		Full Width (feet)	Paved Width (feet)	Full Width (feet)	Paved Width (feet)	Full Width (feet)	Paved Width (feet)	Full Width (feet)	Paved Width (feet)
Travel Lanes	4-Lanes or more	10	5	10	4	15.5	8	15.5	8
	3-Lanes	10	5	10	4	15.5	8	15.5	8
	1-Lane & 2-Lanes	10	5	8	4	15.5	8	13.5	6
Aux. Lanes	ALL	10	5	8	4	11.5	4	11.5	4

Notes:

Without shoulder gutter:

(1) Consider 12-foot outside full width shoulder adjacent to travel lanes with high AADT or greater than 10% trucks.

(2) Consider providing a minimum 10-foot median shoulder where continuous barrier or guardrail is present.

(3) Outside shoulder widths for auxiliary lanes typically match those of the adjacent roadway; however, width may be reduced to 6-foot shoulder with 2-foot paved for right turn lanes when a bicycle keyhole is present.

(4) Pave the entire width of shoulders adjacent to concrete barriers. See ***FDM 215.4.6.1.***

(5) For RRR Projects:

(a) an existing full width shoulder of 6-foot or greater may be retained, and

(b) the following minimum existing paved shoulder widths may also be retained:

i. 4-foot paved outside shoulder adjacent to travel lane

ii. 2-foot paved outside shoulder adjacent to auxiliary lane

iii. 2-foot paved median or left shoulders adjacent to the travel and auxiliary lane.

With shoulder gutter:

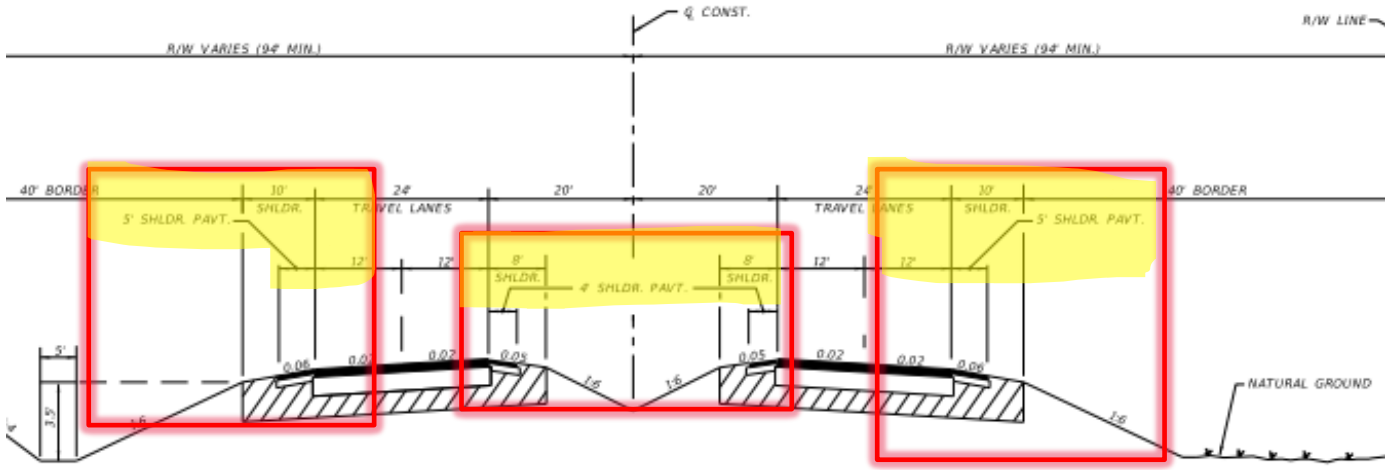
(1) Paved shoulders less than 6 feet in width with adjoining shoulder gutter must be the same type, depth, and cross slope as the roadway pavement.

(2) Shoulders must extend 4 feet beyond the back of shoulder gutter and have a 0.06 cross slope back toward the gutter.

(3) Required shoulder widths for auxiliary lanes typically match those of the adjacent roadway.

Typical Section Package

- Typical Section Sheet(s)

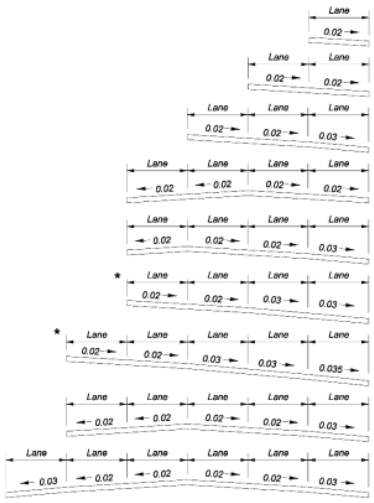


Frequent Comment:
Verify the paved shoulder width

Typical Section Package

- Typical Section Sheet(s) – Travel Lane Cross Slopes

Figure 210.2.1 Standard Pavement Cross Slopes



All Travel Lanes One Direction

(1) These sections show only the standard slopes for adjoining travel lanes; they do not prescribe needed lanes, lane usage or typical section requirements other than lane slope. These slopes are not applicable to parabolic crowns.

(2) Maximum pavement cross slopes for tangent sections are:

(a) 0.04 for design speeds of 45 mph or less

(b) 0.03 for design speeds greater than 45 mph

(c) 0.035 may only be used for 5-lanes sloped in one direction as shown above.

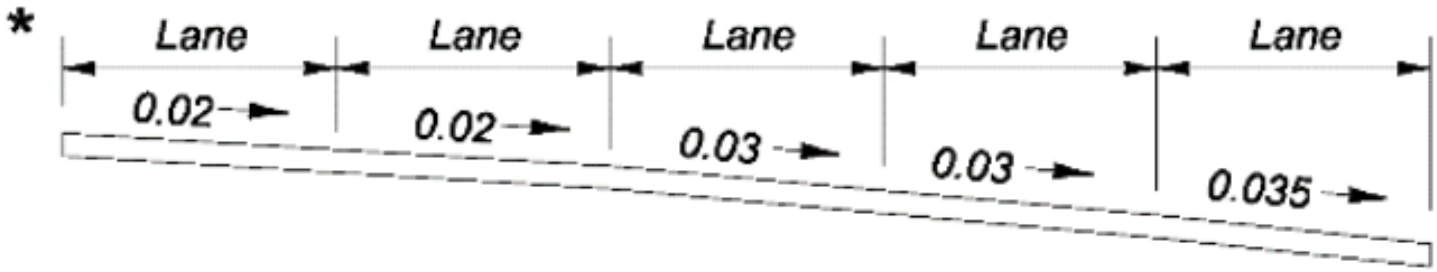
(3) The maximum change in cross slope between adjacent through lanes is 0.04.

(4) Slopes on multi-purpose lanes may be 0.03 to 0.05. Portions of multi-purpose lanes that are reserved for parking and access isles for the physically disabled are to have cross slopes not exceeding 1:50 (0.02) in all directions.

(5) 4 or 5 lanes sloped in one direction (*) may be used with design speed 65 mph or less and longitudinal grades not exceeding 5%.

Typical Section Package

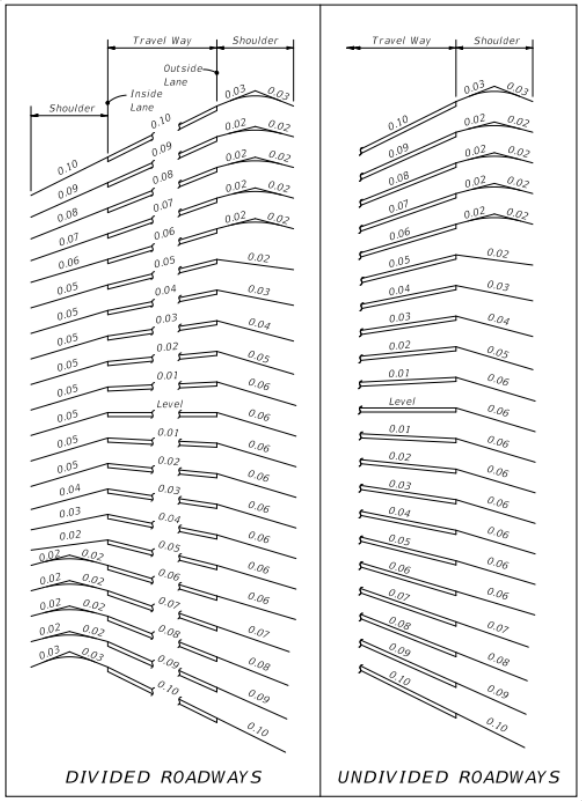
- Typical Section Sheet(s) – Travel Lane Cross Slopes



Typical Section Package

- **Typical Section Sheet(s) – Shoulder Cross Slopes**
  - Standard Shoulder Cross Slopes – 6% for outside shoulders, 5% for inside shoulders

Figure 210.4.2 Shoulder Superelevation



Typical Section Package

- Typical Section Sheet(s) – Roadside Slopes (FDM 215)

Table 215.2.3 Roadside Slope Criteria

Type of Slope	Flush Shoulder and High Speed Curbed		Curbed	
	Height of Fill (feet)	Rate	Height of Fill (feet)	Rate
Front Slope	0 – 5	1:6	0-6	1:2 or to suit property owner, not flatter than 1:6.
	5 – 10	1:6 to edge of Clear Zone, then 1:4	> 6	1:3 or to suit property owner, not flatter than 1:6.
	10 – 20	1:6 to edge of Clear Zone, then 1:3		
	> 20	1:2 with guardrail		
Back Slope	All	1:4 or 1:3 with a standard width trapezoidal ditch and 1:6 front slope	All	1:2 or to suit property owner. Not flatter than 1:6.
Transverse Slope	All	1:10 or flatter (freeway & Interstate) 1:4 (others)	All	1:4

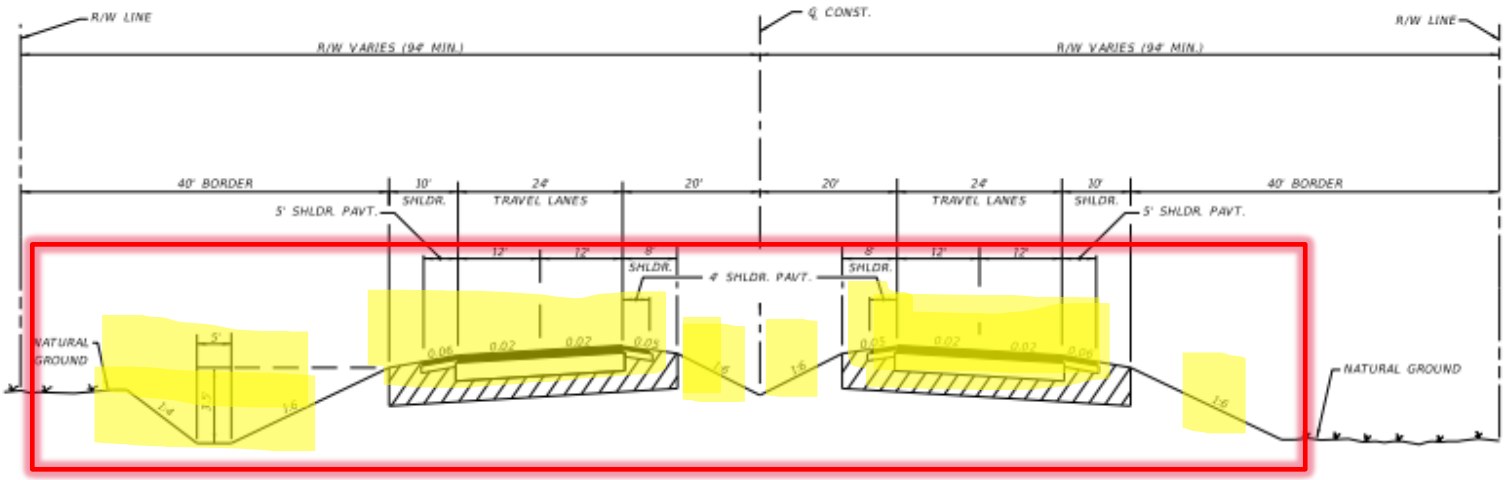
Notes:

(1) Height of fill is the vertical distance from the edge of the outside travel lane to the toe of front slope.

The use of 1:2 slopes on District Two requirements requires the approval of the District Design Engineer

Typical Section Package

- Typical Section Sheet(s)



FDOT

Typical Section Package

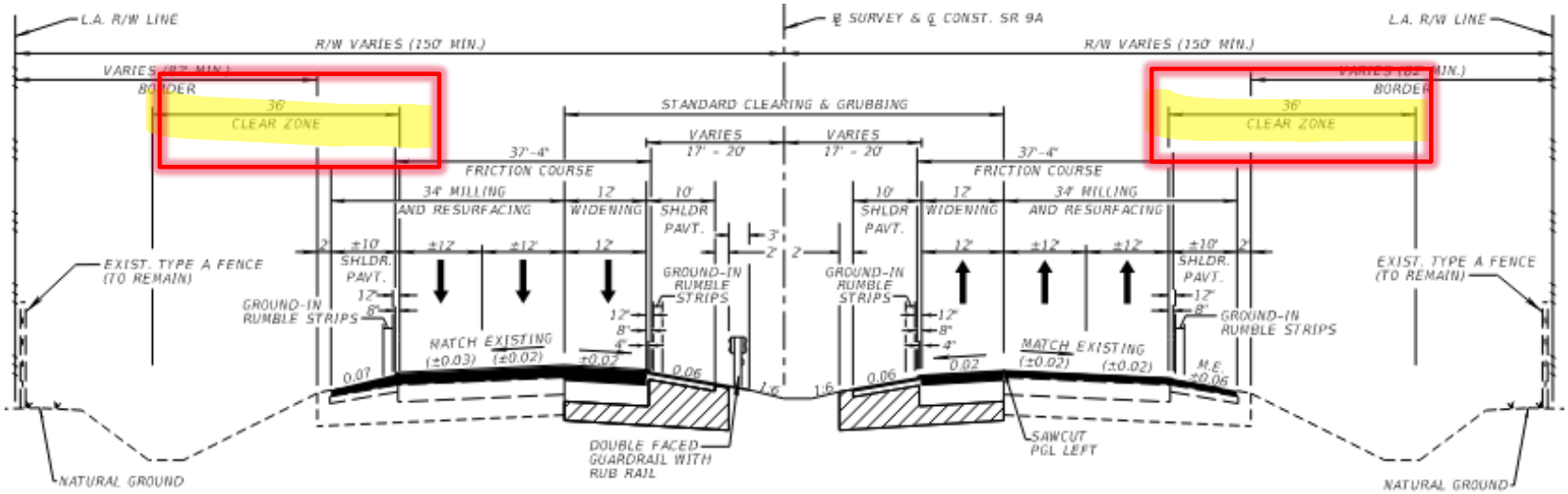
- Typical Section Sheet(s) - Clear Zone (FDM 215)

Table 215.2.1 Clear Zone Width Requirements

	Design Speed (mph)						
	≤ 30	35	40	45	50	55	≥ 60
Clear Zone Width for New Construction							
Travel Lanes & Multilane Ramps	12 feet	14 feet	18 feet	24 feet	24 feet	30 feet	36 feet
Auxiliary Lanes & Single Lane Ramps	10 feet	10 feet	10 feet	14 feet	14 feet	18 feet	24 feet
Clear Zone Width for RRR Projects							
Travel Lanes &	6 feet	6 feet	6 feet	14 feet	18 feet	18 feet	18 feet

Typical Section Package

- Typical Section Sheet(s)



Typical Section Package

- **Typical Section Sheet(s) – Border Width (FDM 210.7)**

Border width provides space for:

(1) Roadside design components such as signing, signals, lighting, drainage features, guardrail, fencing and clear zone, sidewalks with ADA provisions, traffic control devices, fire hydrants, storm drainage features, bus and transit features, permitted public utilities and space for aesthetic features such as sod and other landscape items.

(2) A buffer between vehicles and pedestrians,

(3) Construction and maintenance of the facility, and

(4) Permitted public utilities.

Required border width is provided in ***Table 210.7.1***. Border width is measured to the R/W line as follows:

- **Flush shoulder roadways**: from the shoulder break.
- **Curbed roadways**: from the outside edge of the pavement (lip of gutter).
- **High-speed curbed roadways**: from the outside edge of the traveled way.

Typical Section Package

- Typical Section Sheet(s) – Border Width

Table 210.7.1 Minimum Border Width

Context Classification		Minimum Border Width (Feet)					
		Curbed and High-Speed Curbed Design Speed (mph)				Flush Shoulder Design Speed (mph)	
		25-40	45	50	55	25-45	≥ 50
C1	Natural	N/A	N/A	29	35	N/A	40
C2	Rural	N/A	N/A	29	35	N/A	40
C2T	Rural Town	12	14	N/A	N/A	33	N/A
C3	Suburban	12	14	29	35	33	40
C4	Urban General	12	14	N/A	N/A	33	N/A
C5	Urban Center	12	N/A	N/A	N/A	N/A	N/A
C6	Urban Core	14	N/A	N/A	N/A	N/A	N/A

Notes:

(1) On low-speed curbed roadways that have an adjacent bike lane, the required border width shown in the table may be reduced by 2 feet.

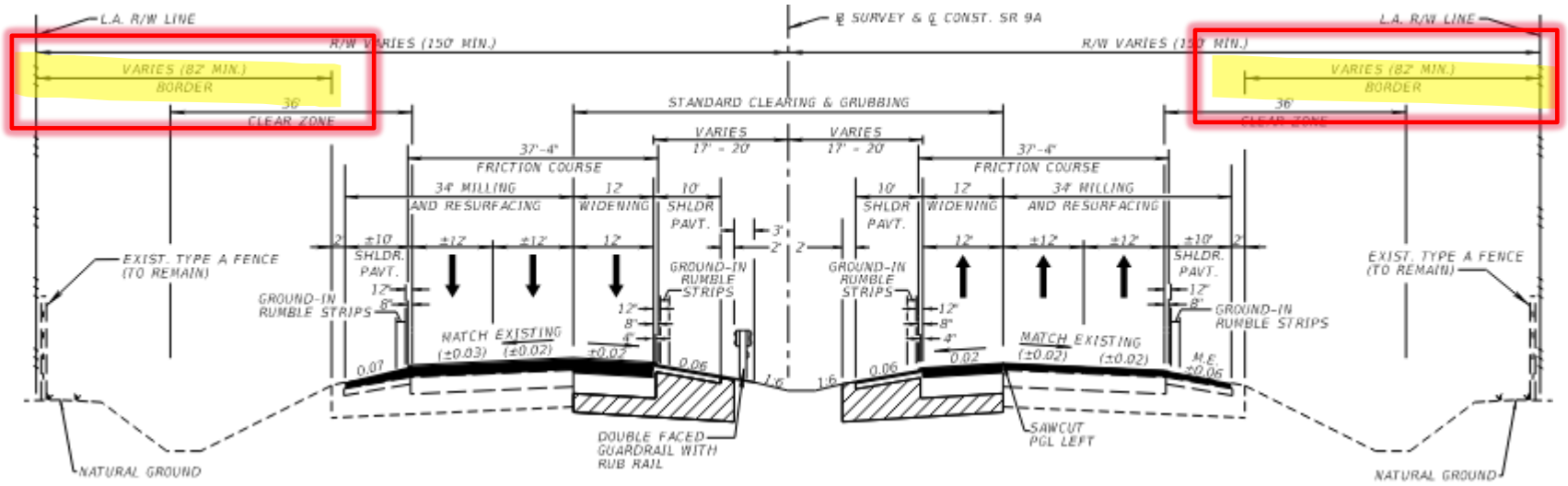
(2) On existing roadways where R/W cannot be acquired or where the decision has been made to simply maintain and preserve the facility, the absolute minimum border under these conditions is 8 feet. No Design Variation is required for this condition.

(3) On existing roadways where R/W is being acquired for other reasons, the minimum border width should be that used for new construction projects; however, the minimum length of wider border width must be a segment of sufficient length to provide reasonable continuity.

(4) N/A indicates this combination of design speed and context classification is outside the intended design range and should be avoided. See ***Table 201.5.1*** for context classifications and design speed ranges.

Typical Section Package

- Typical Section Sheet(s)



Typical Section Package

- Typical Section Sheet(s) – Median Width

Table 210.3.1 Median Widths

Context Classification		Curbed Roadways and Flush Shoulder Roadways (feet)		High Speed Curbed Roadways (feet)	Flush Shoulder Roadways (feet)
		Design Speed (mph)			
		25-35	40-45	50-55	≥ 50
C1	Natural	N/A	N/A	30	40
C2	Rural	N/A	N/A	30	40
C2T	Rural Town	15.5	22	N/A	N/A
C3	Suburban	22	22	30	40
C4	Urban General	15.5	22	N/A	N/A
C5	Urban Center	15.5	N/A	N/A	N/A
C6	Urban Core	15.5	N/A	N/A	N/A

Notes:

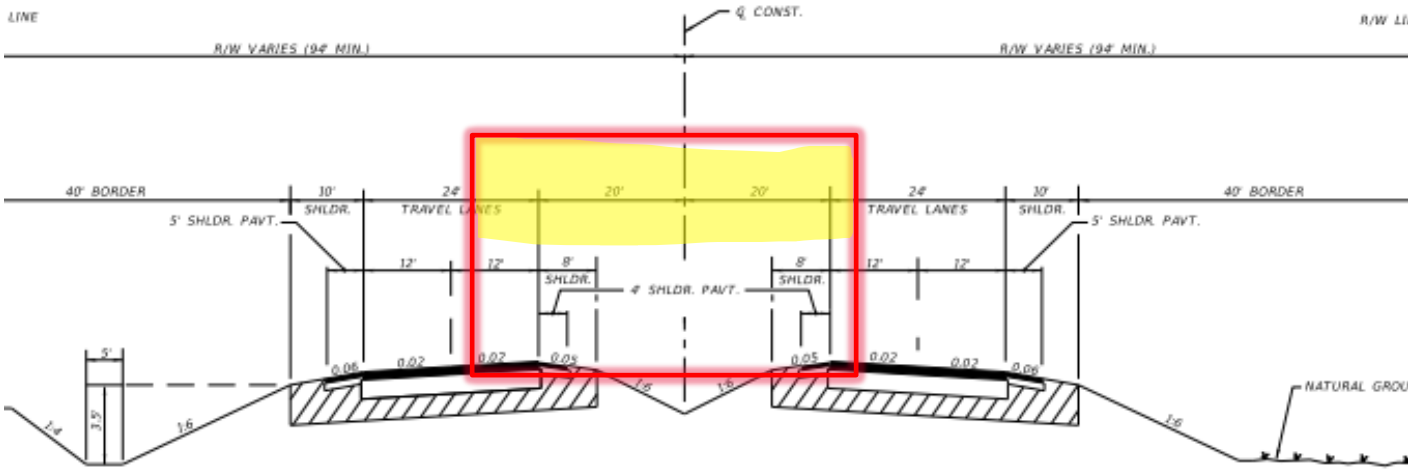
(1) On reconstruction projects where existing curb locations are fixed due to severe right of way constraints, the minimum median width may be reduced to 19.5 feet for design speeds = 45 mph, and to 15.5 feet for design speeds ≤ 40 mph.

(2) A minimum 6-foot median may be used within C5 and C6 context classifications only where left turn lanes are not expected.

(3) N/A indicates this combination of design speed and context classification is outside the intended design range and should be avoided. See ***Table 201.5.1*** for context classifications and design speed ranges.

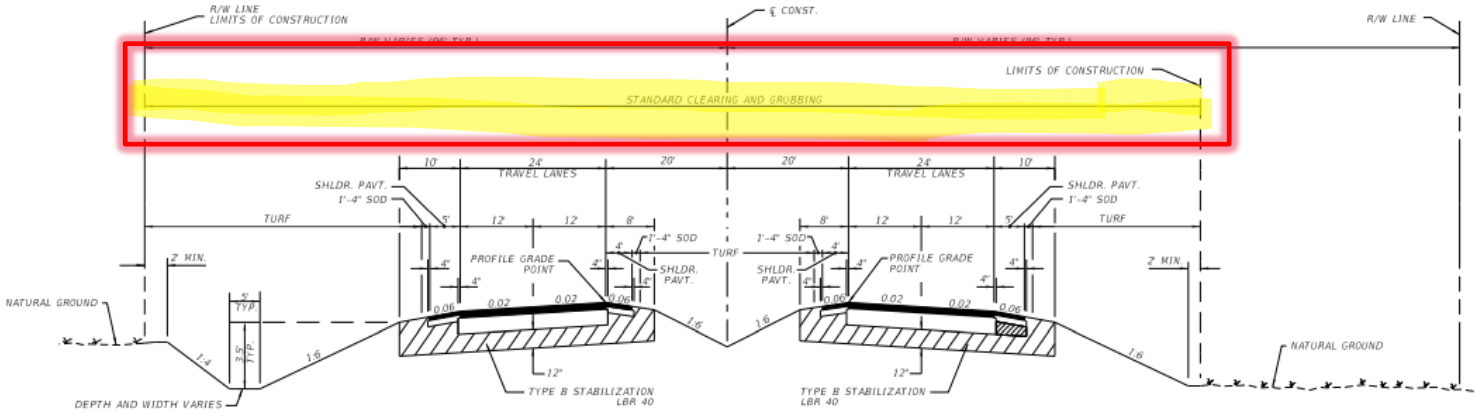
Typical Section Package

- Typical Section Sheet(s)



Typical Section Package

- Typical Section Sheet(s)



Typical Section Package

- **Typical Section Sheet(s) – Sidewalk Requirements (FDM 222)**

For Urban Sections, place sidewalk with a utility strip or directly at the back of curb

For high speed curbed and flush shoulder roadways, place sidewalk in the following order of desirability:

(1) As near the R/W line as possible.

(2) Outside of the clear zone.

(3) Five feet beyond the limits of the full width shoulder.

(4) At the limits of the full width shoulder.

Typical Section Package

- Typical Section Sheet(s) – Sidewalk Requirements (FDM 222)

Table 222.2.1 Standard Sidewalk Widths

Context Classification		Sidewalk Width (feet)
C1	Natural	5
C2	Rural	5
C2T	Rural Town	6
C3	Suburban	6
C4	Urban General	6
C5	Urban Center	10
C6	Urban Core	12

Notes:

(1) For C2T, C3 and C4, sidewalk width may be increased up to 8 feet when the demand is demonstrated.

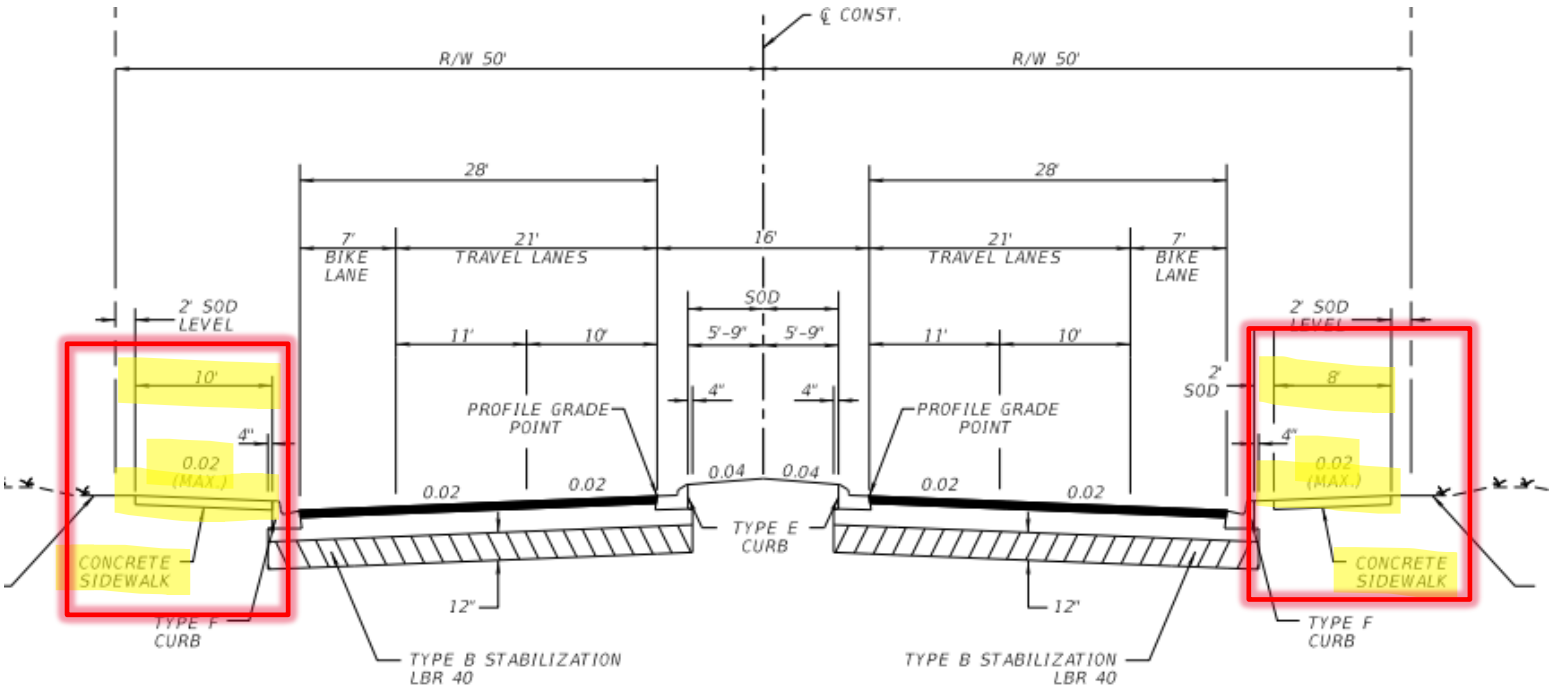
(2) For C5 and C6, when standard sidewalk width cannot be attained, provide the greatest attainable width possible, but not less than 6 feet.

(3) For RRR projects, unaltered sidewalk with width 4 feet or greater may be retained within any context classification.

(4) See ***FDM 260.2.2*** for sidewalk width requirements on bridges.

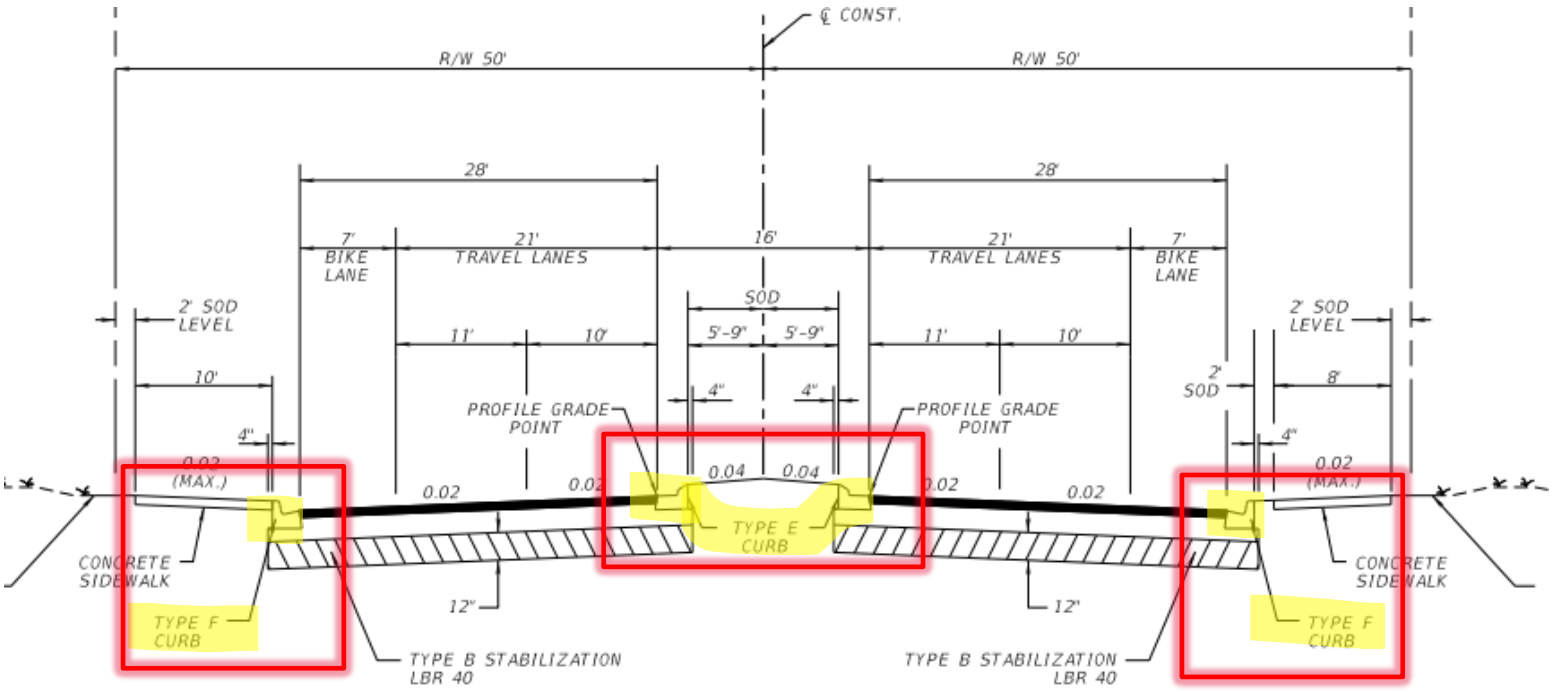
Typical Section Package

- Typical Section Sheet(s)



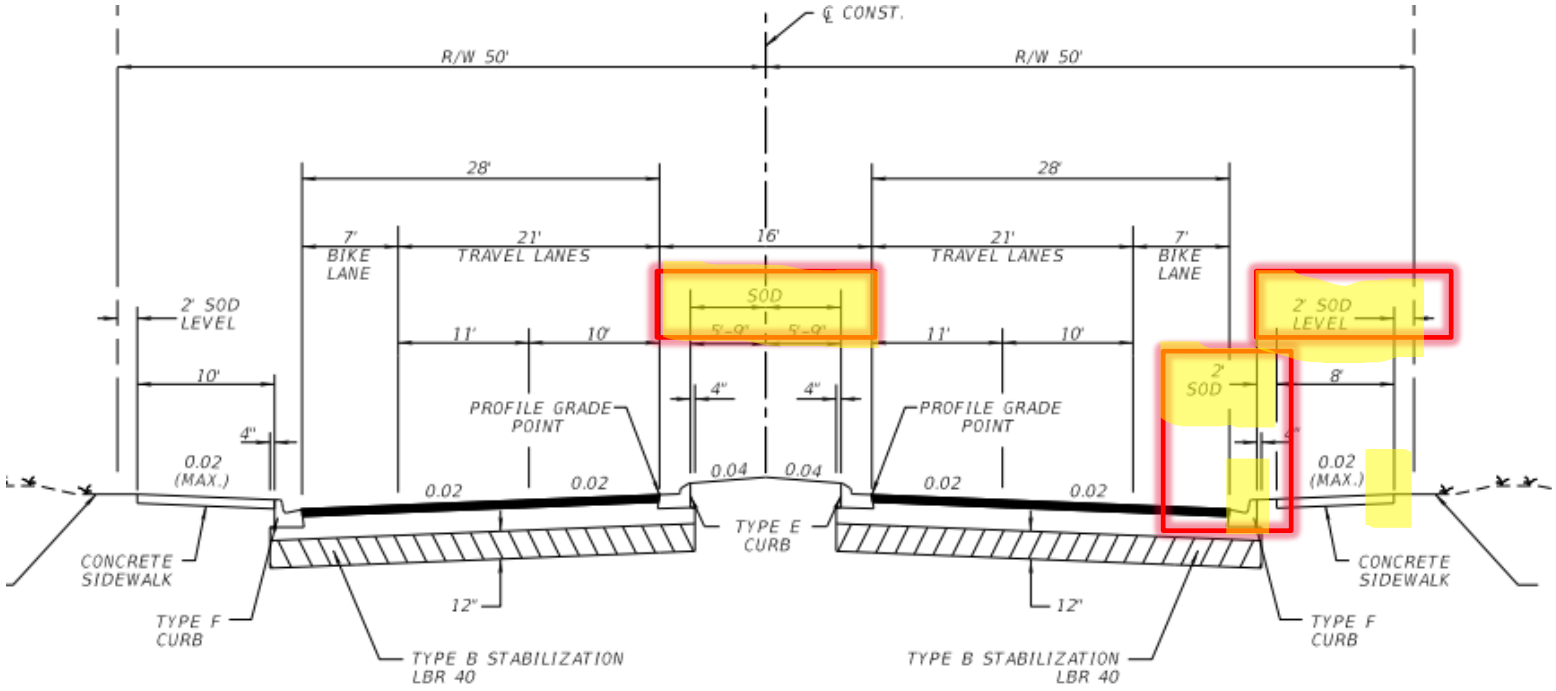
Typical Section Package

- Typical Section Sheet(s)



Typical Section Package

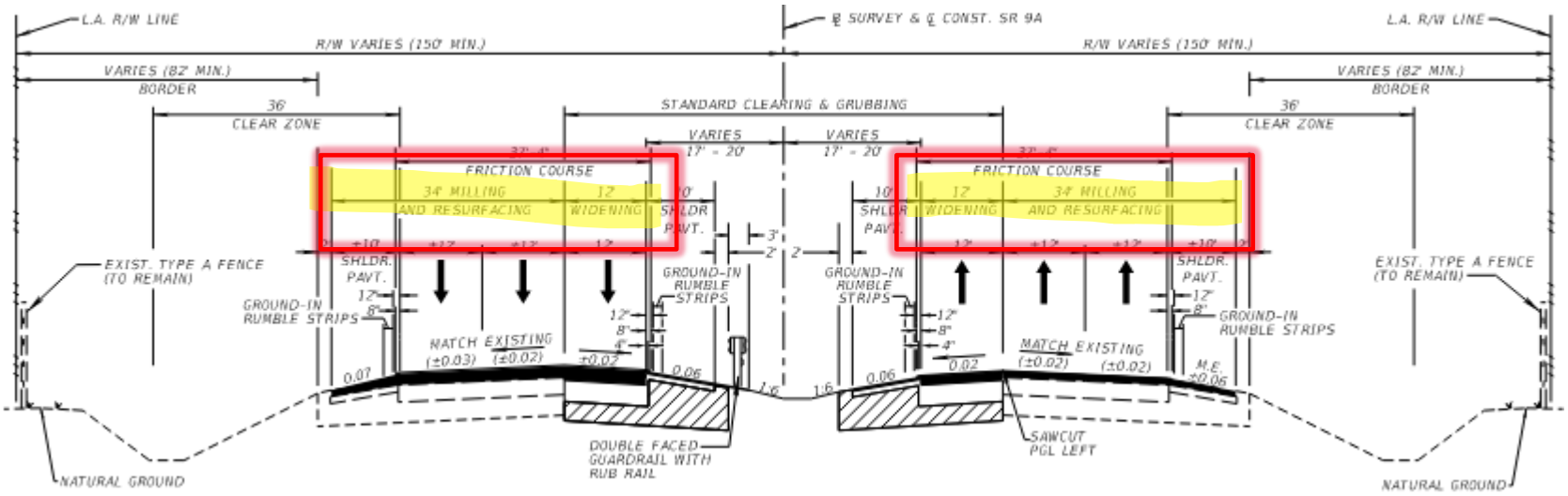
- Typical Section Sheet(s)



District Two uses a 42" sod strip adjacent to the paved shoulders on rural typical section projects

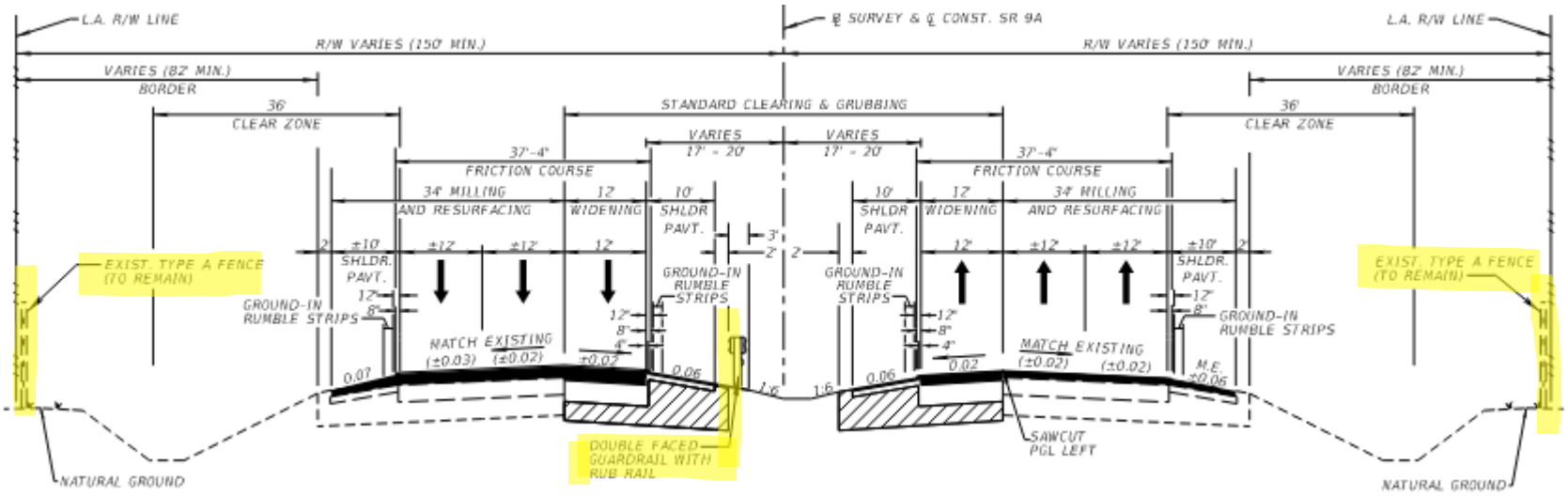
Typical Section Package

- Typical Section Sheet(s)



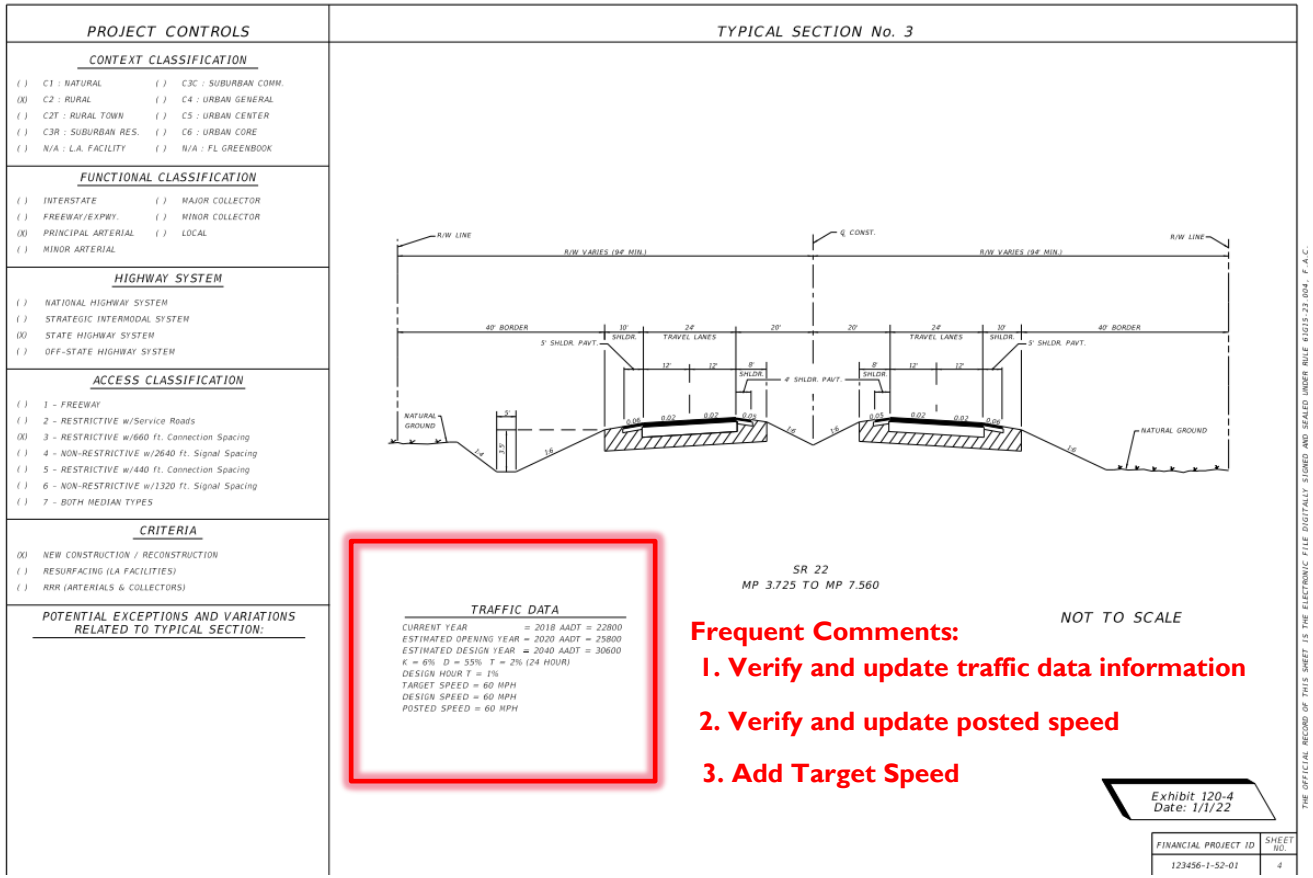
Typical Section Package

- Typical Section Sheet(s)



Typical Section Package

- Typical Section Sheet(s)



PROJECT CONTROLS

CONTEXT CLASSIFICATION

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

FUNCTIONAL CLASSIFICATION

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

HIGHWAY SYSTEM

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

ACCESS CLASSIFICATION

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

CRITERIA

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

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

TYPICAL SECTION No. 3

R/W LINE
℄ CONST.
R/W LINE
R/W VARIES (94' MIN.)
R/W VARIES (94' MIN.)
40' BORDER
10' SHLDR.
24' TRAVEL LANES
20'
20'
24' TRAVEL LANES
10' SHLDR.
40' BORDER
5' SHLDR. PAVT.
5' SHLDR. PAVT.
12'
12'
8' SHLDR.
4' SHLDR. PAVT.
8' SHLDR.
12'
12'
NATURAL GROUND
NATURAL GROUND
0.06
0.02
0.02
0.04
0.04
0.02
0.02
0.06
1:6
1:6
1:6
1:6

TRAFFIC DATA

CURRENT YEAR = 2018 AADT = 22800
ESTIMATED OPENING YEAR = 2020 AADT = 25800
ESTIMATED DESIGN YEAR = 2040 AADT = 30600
K = 6% D = 55% T = 2% (24 HOUR)
DESIGN HOUR T = 1%
TARGET SPEED = 60 MPH
DESIGN SPEED = 60 MPH
POSTED SPEED = 60 MPH

SR 22
MP 3.725 TO MP 7.560

NOT TO SCALE

Frequent Comments:

1. Verify and update traffic data information
2. Verify and update posted speed
3. Add Target Speed

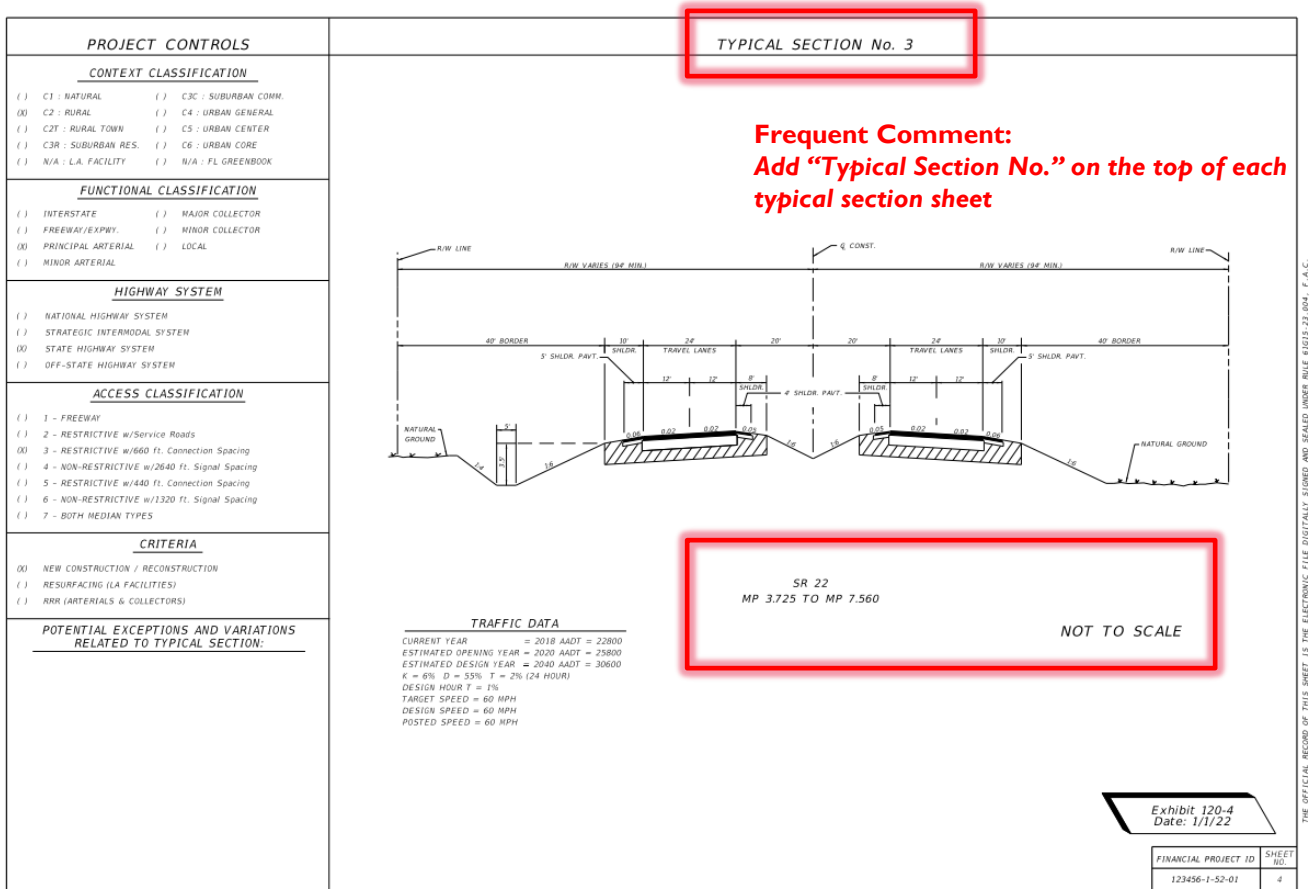
Exhibit 120-4
Date: 1/1/22

FINANCIAL PROJECT ID	SHEET NO.
123456-1-52-01	4

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

Typical Section Package

- Typical Section Sheet(s)



PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
( ) N/A : L.A. FACILITY
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( ) C4 : URBAN GENERAL
( ) C5 : URBAN CENTER
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(X) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL
( ) MAJOR COLLECTOR
( ) MINOR COLLECTOR
( ) LOCAL

HIGHWAY SYSTEM

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( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

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

CRITERIA

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

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

TYPICAL SECTION No. 3

Frequent Comment:
Add "Typical Section No." on the top of each typical section sheet

R/W LINE
℄ CONST.
R/W VARIES (94' MIN.)
40' BORDER
10' SHLDR.
24' TRAVEL LANES
20'
5' SHLDR. PAVT.
4' SHLDR. PAVT.
NATURAL GROUND

TRAFFIC DATA

CURRENT YEAR = 2018 AADT = 22800
ESTIMATED OPENING YEAR = 2020 AADT = 25800
ESTIMATED DESIGN YEAR = 2040 AADT = 30600
K = 6% D = 55% T = 2% (24 HOUR)
DESIGN HOUR T = 1%
TARGET SPEED = 60 MPH
DESIGN SPEED = 60 MPH
POSTED SPEED = 60 MPH

SR 22
MP 3.725 TO MP 7.560

NOT TO SCALE

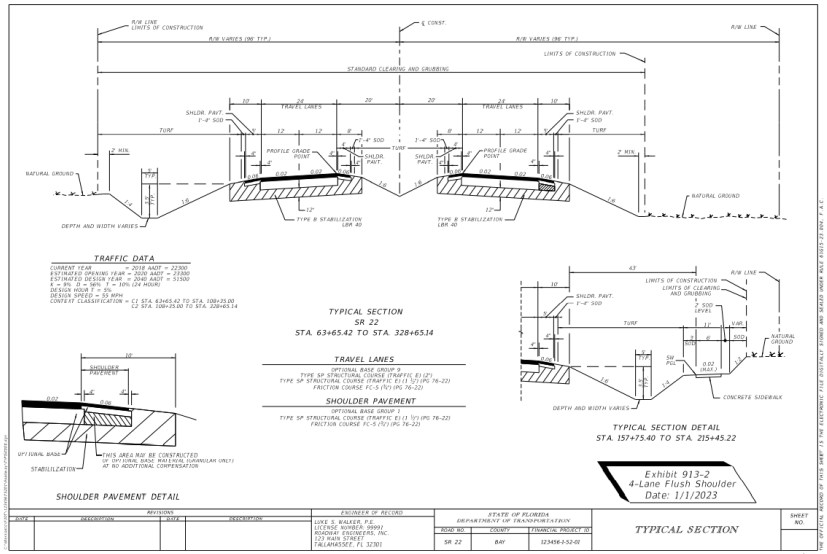
Exhibit 120-4
Date: 1/1/22

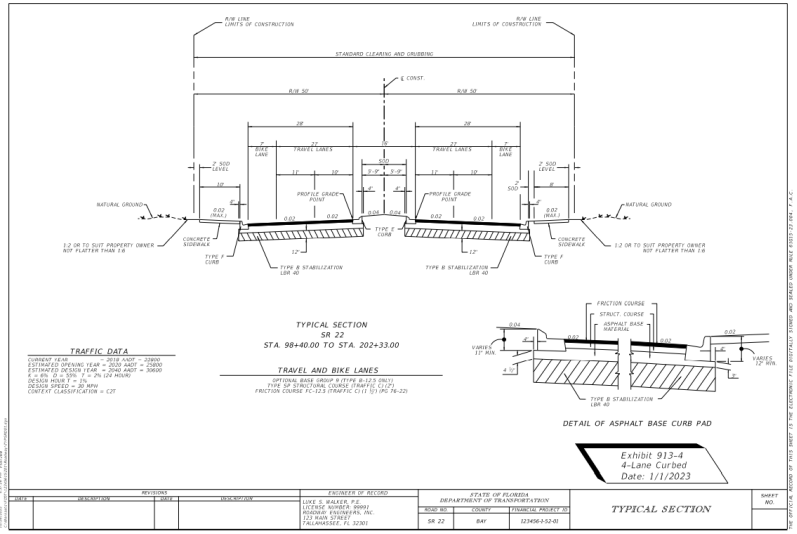
FINANCIAL PROJECT ID	SHEET NO.
123456-1-52-01	4

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

Typical Sections in Roadway Plans

- Use your Typical Section Drawing(s) in your Typical Section Package



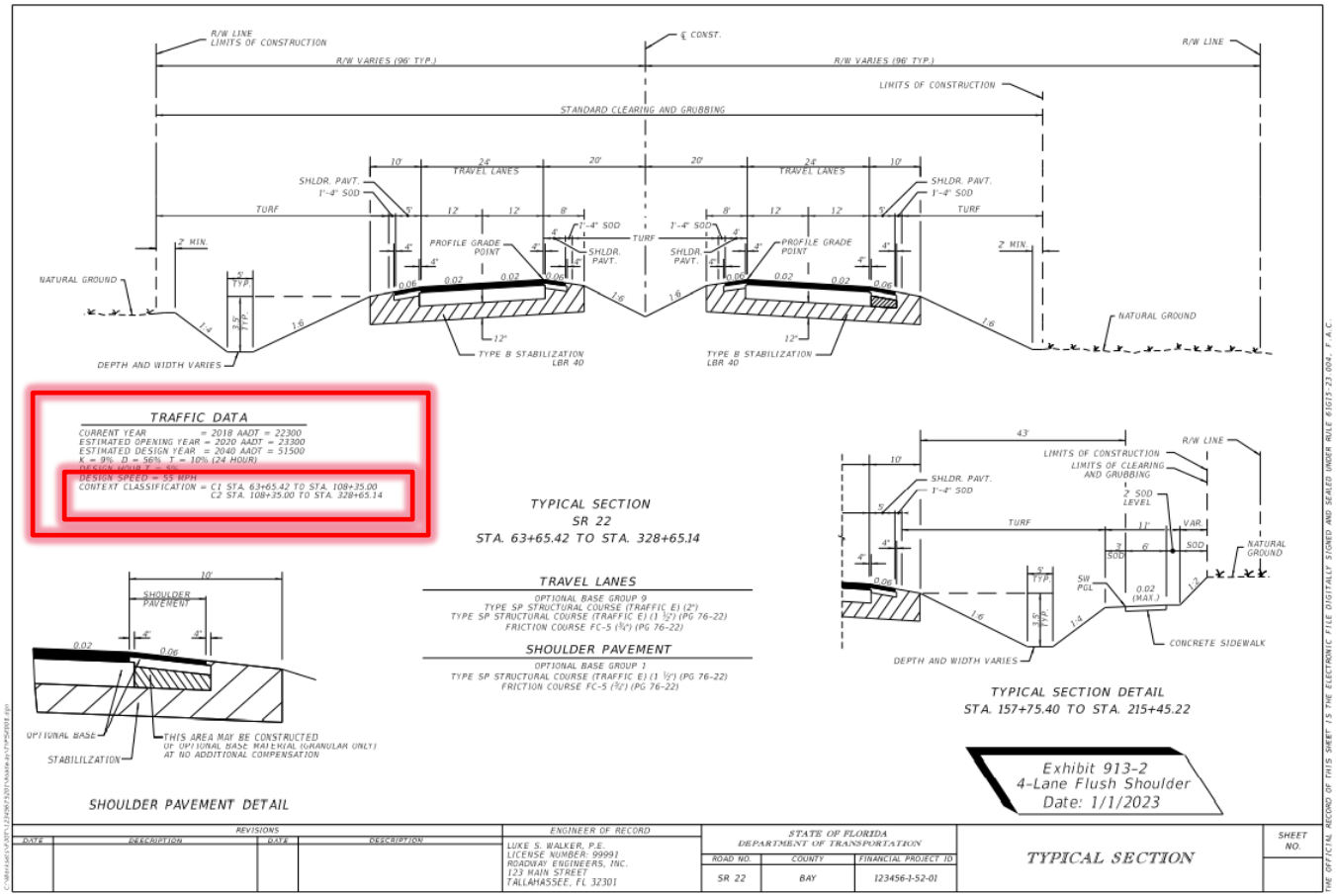


Typical Sections in Roadway Plans

- **Guidelines**
  - One typical section per sheet
  - Order of Typical Sections
    - Roadway Mainline
    - Bridges
    - Toll Sites
    - Ramps and Service Roads
    - Intersecting Roadways
    - Sideroads

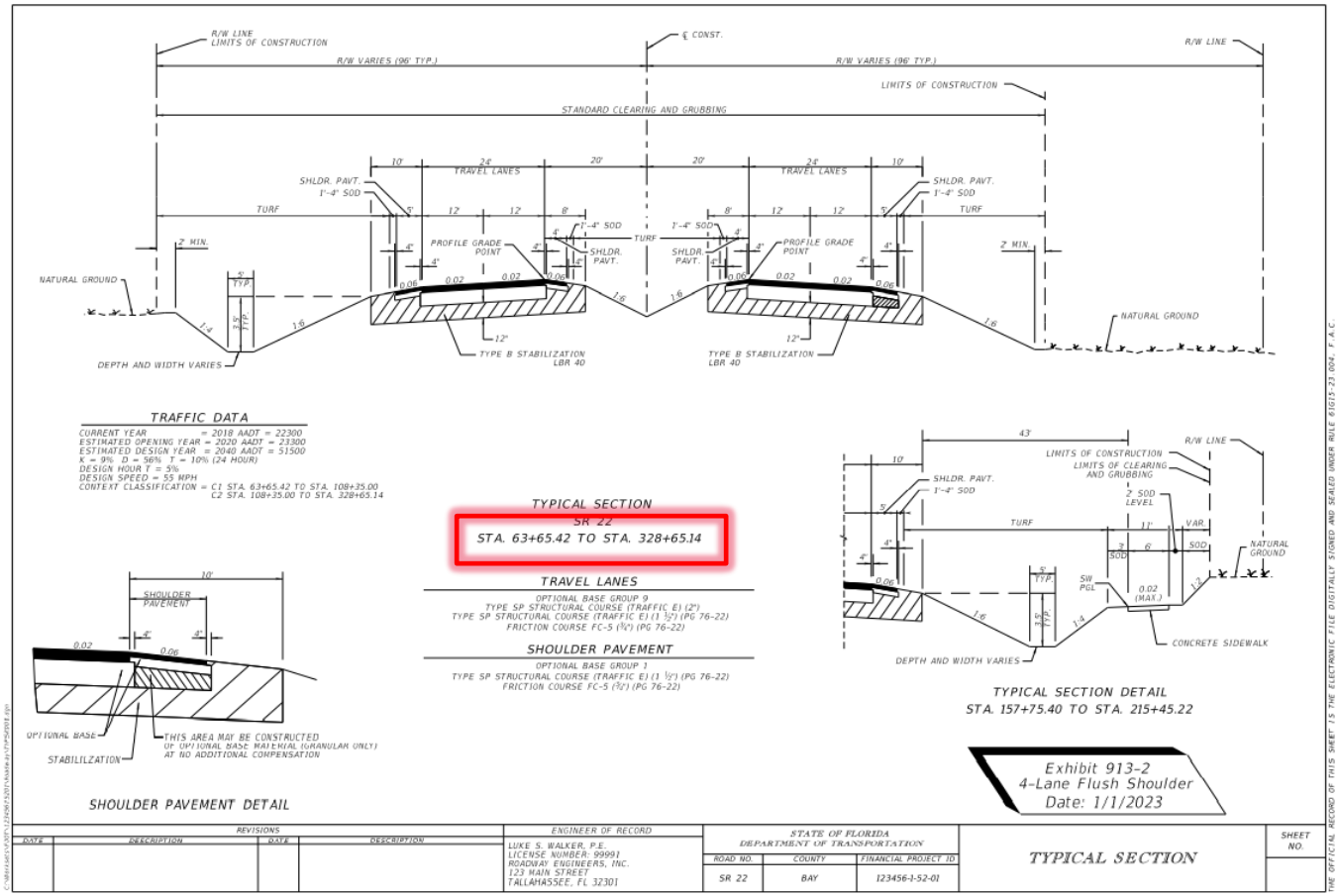
Typical Sections in Roadway Plans

- Added Information



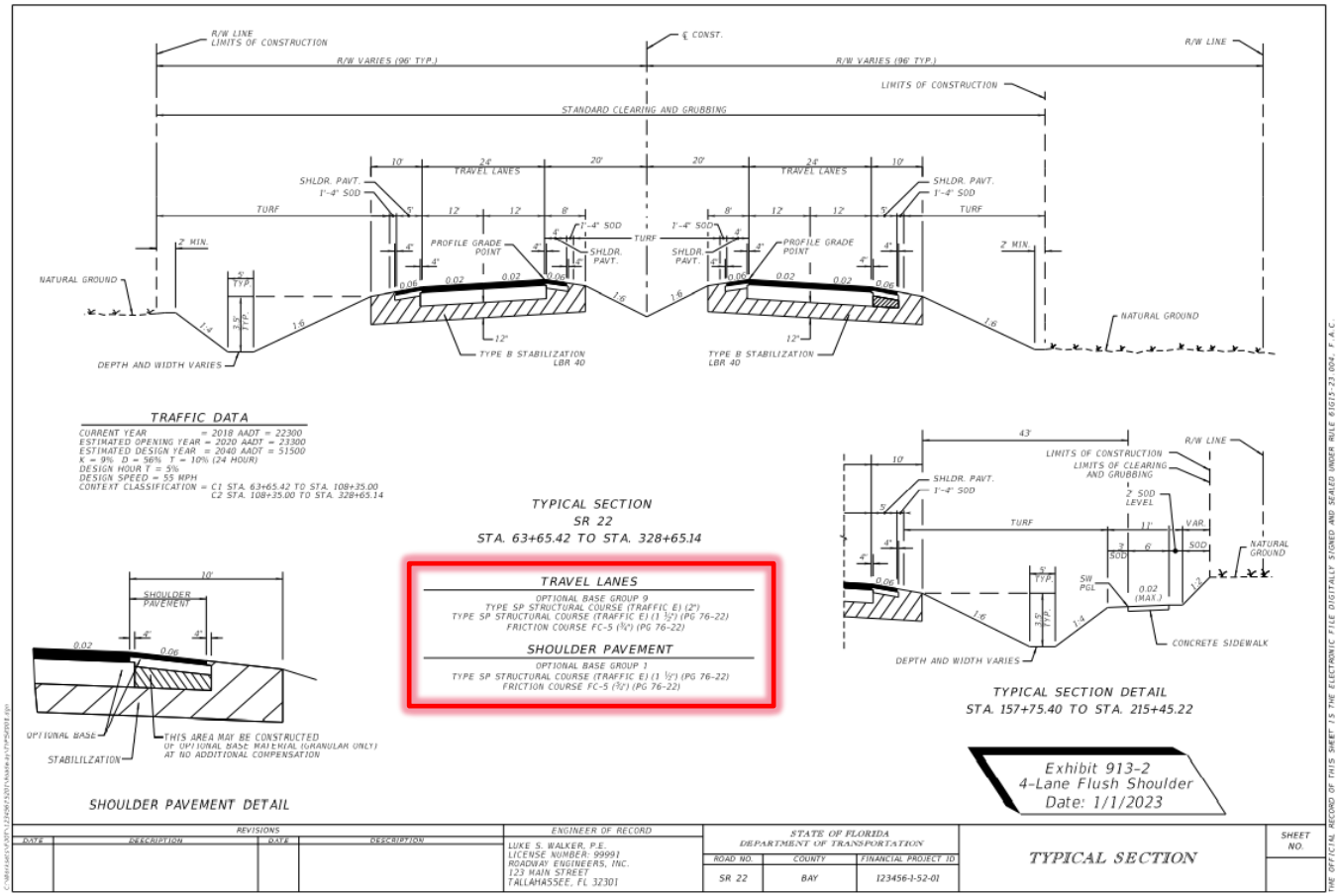
Typical Sections in Roadway Plans

- Added Information



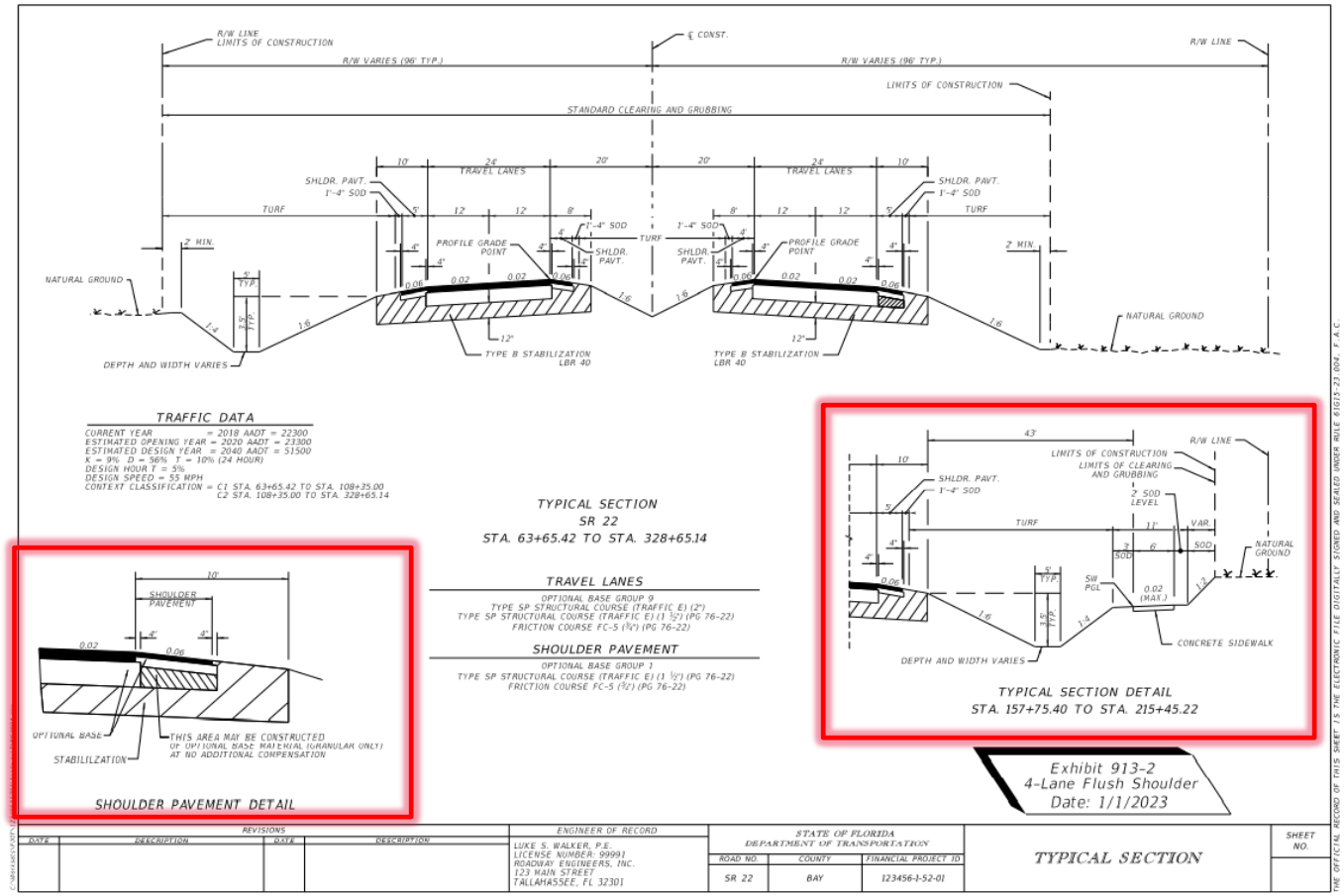
Typical Sections in Roadway Plans

- Added Information



Typical Sections in Roadway Plans

- Added Information



Typical Sections in Roadway Plans

- Added Information

913.2.2 Required Notes and Details

Show the following notes and details on Typical Section sheets as applicable:

(1) For projects using Selective Clearing and Grubbing include the following note:

See Selective Clearing and Grubbing sheets for details and limits of selective clearing and grubbing.

(2) For new construction flush shoulder projects, include a Shoulder Pavement Detail (shown on ***Exhibit 913-1***) with the following note:

This area may be constructed of base material (granular only) at no additional compensation.

(3) For widening projects include the following note:

Actual width of base widening may vary due to actual existing pavement width. A uniform width base widening strip may be constructed at no additional compensation.

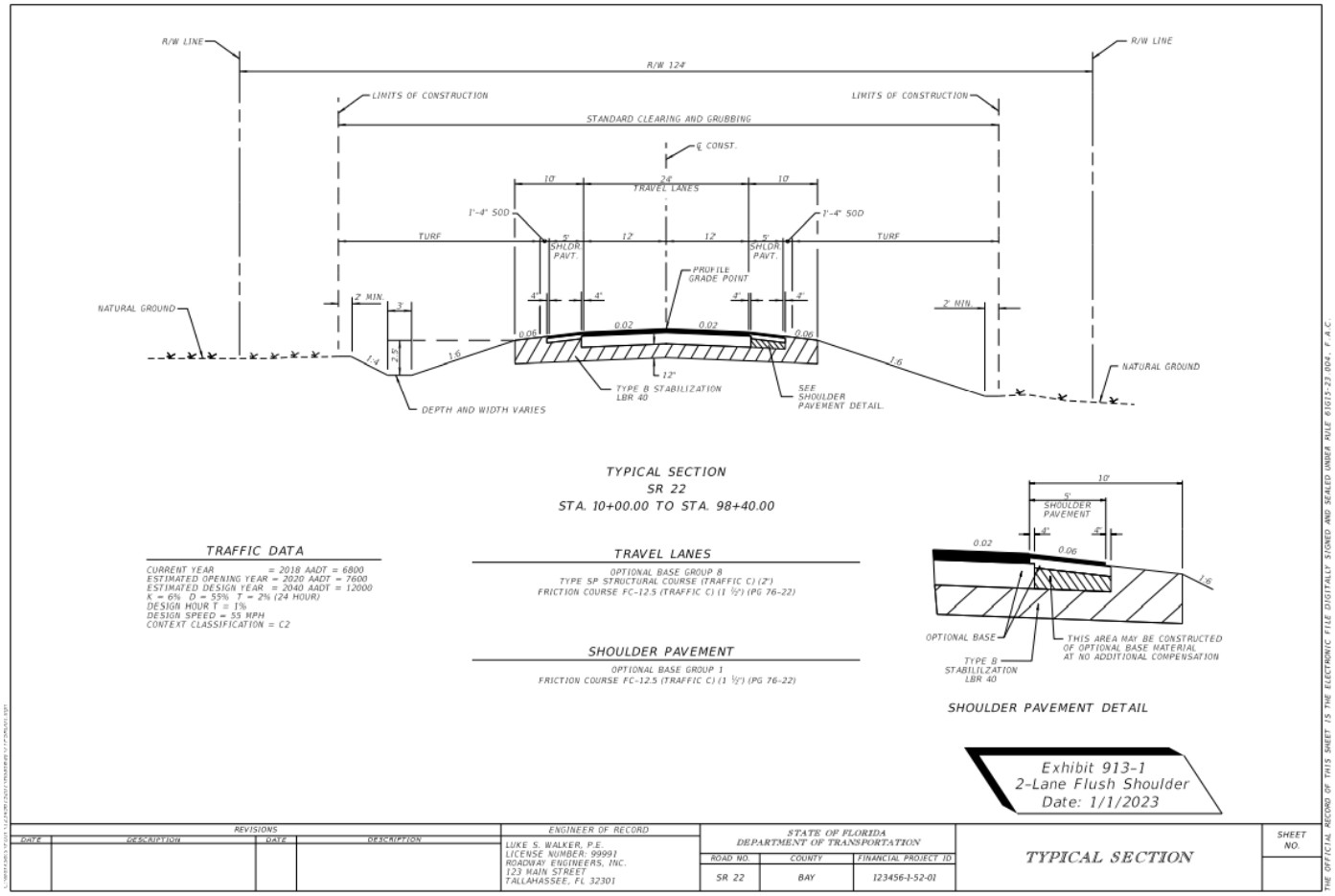
(4) For projects constructing ditches include the following note:

Depth and bottom width of ditch may vary.

(5) For new construction curbed roadway projects with Asphalt Base, Type B-12.5 only, indicate the asphalt curb pad on the typical section and include an Asphalt Base Curb Pad Detail.

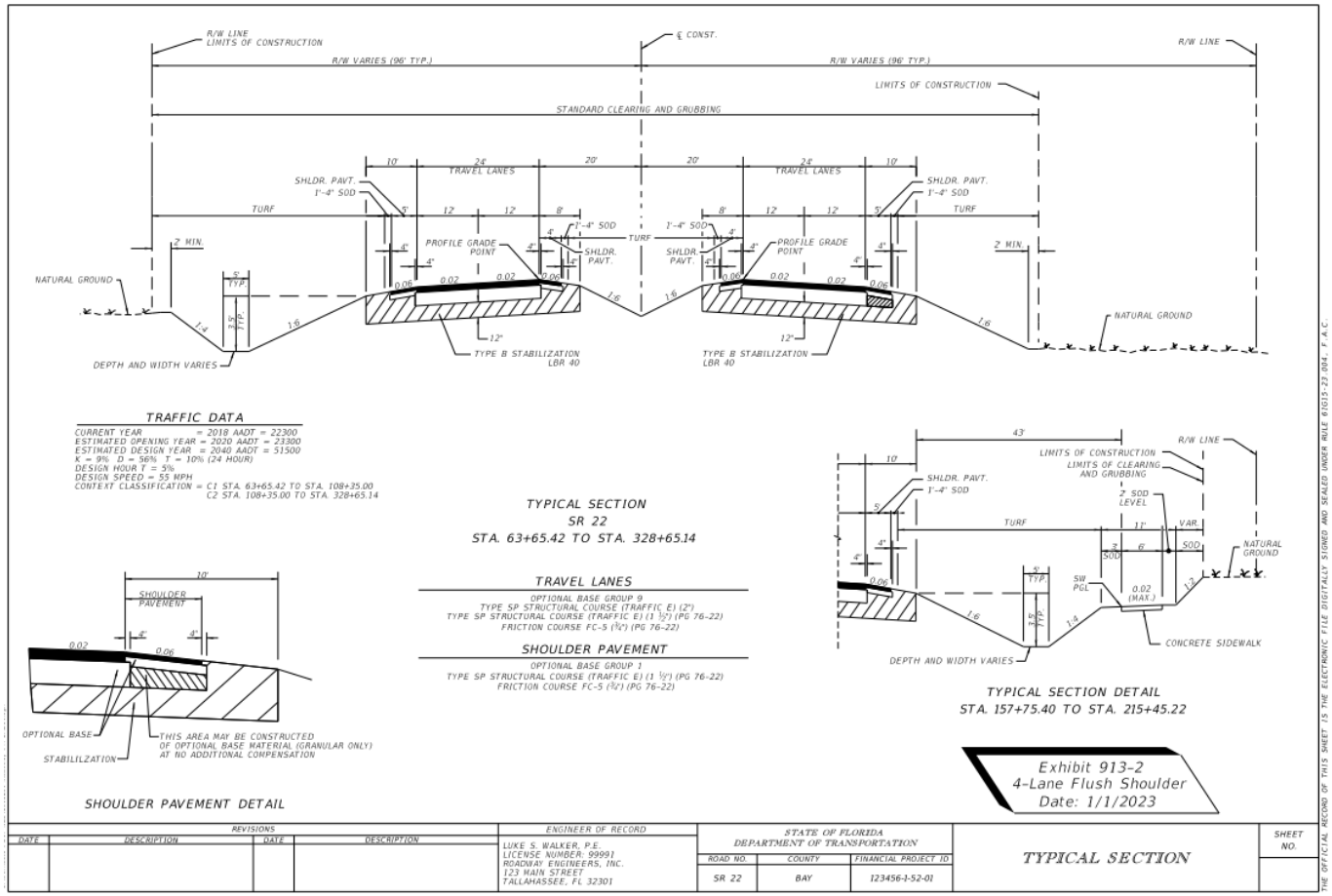
Typical Sections in Roadway Plans

- Examples (FDM 913)



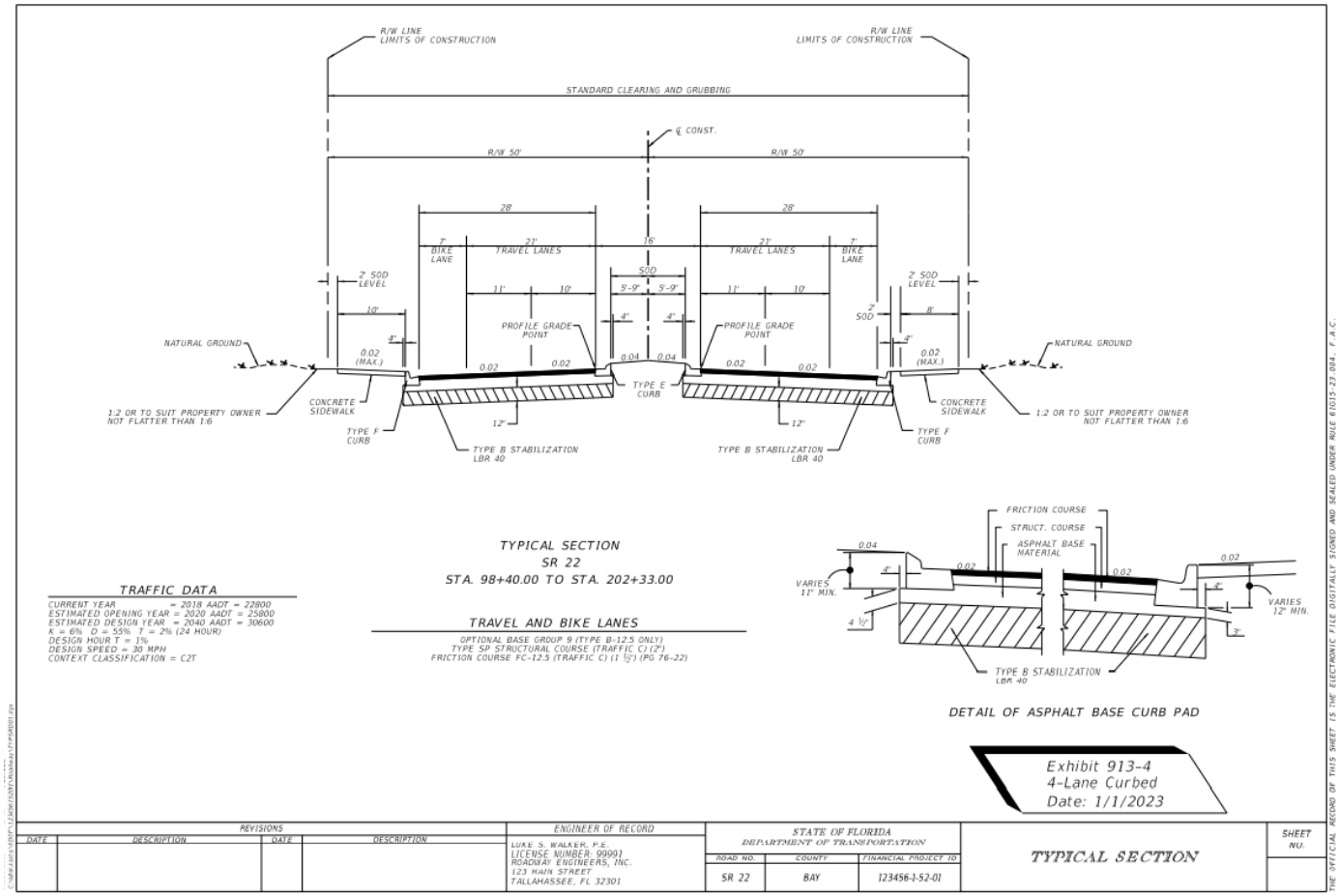
Typical Sections in Roadway Plans

- Examples (FDM 913)



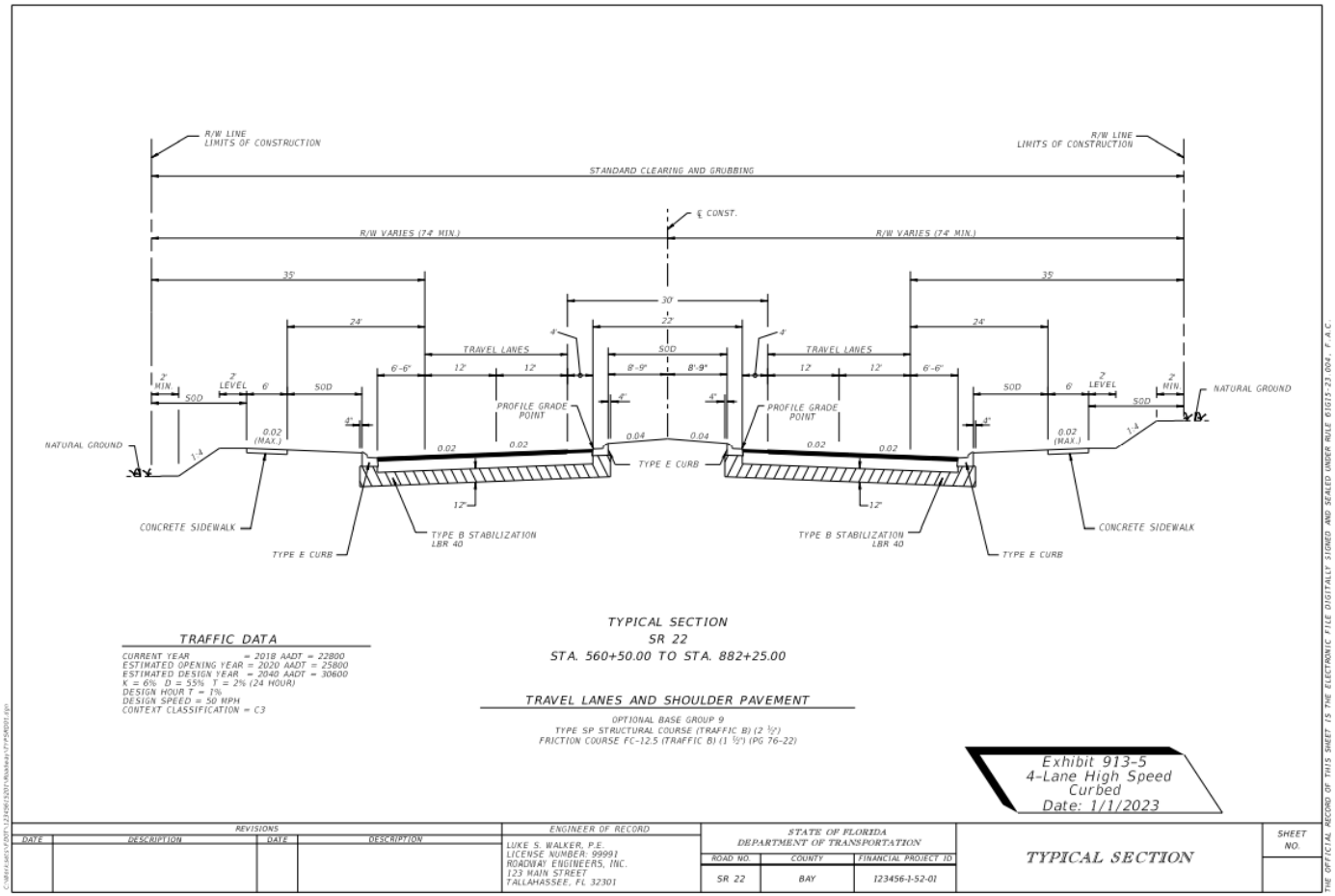
Typical Sections in Roadway Plans

- Examples (FDM 913)



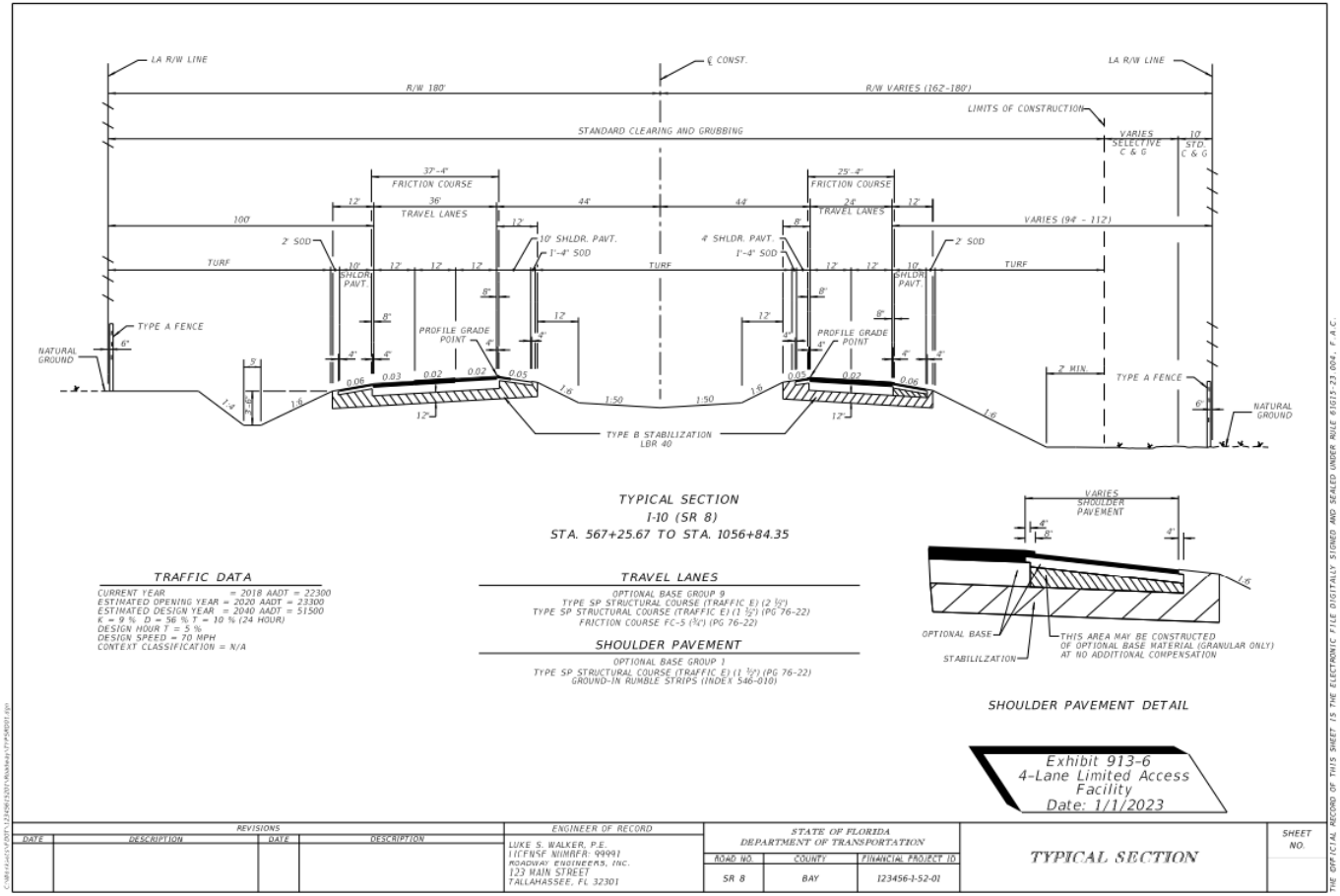
Typical Sections in Roadway Plans

- Examples (FDM 913)



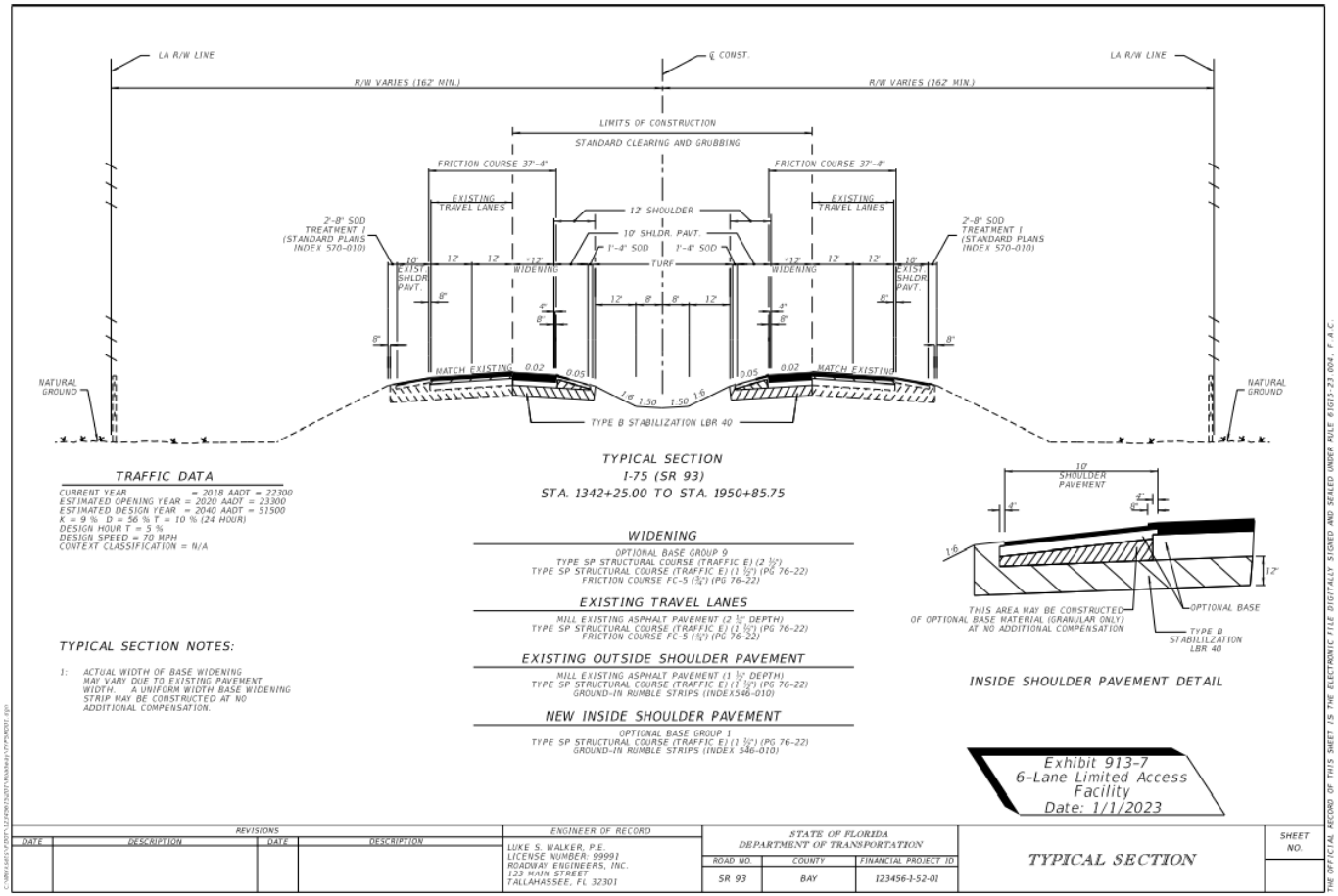
Typical Sections in Roadway Plans

- Examples (FDM 913)



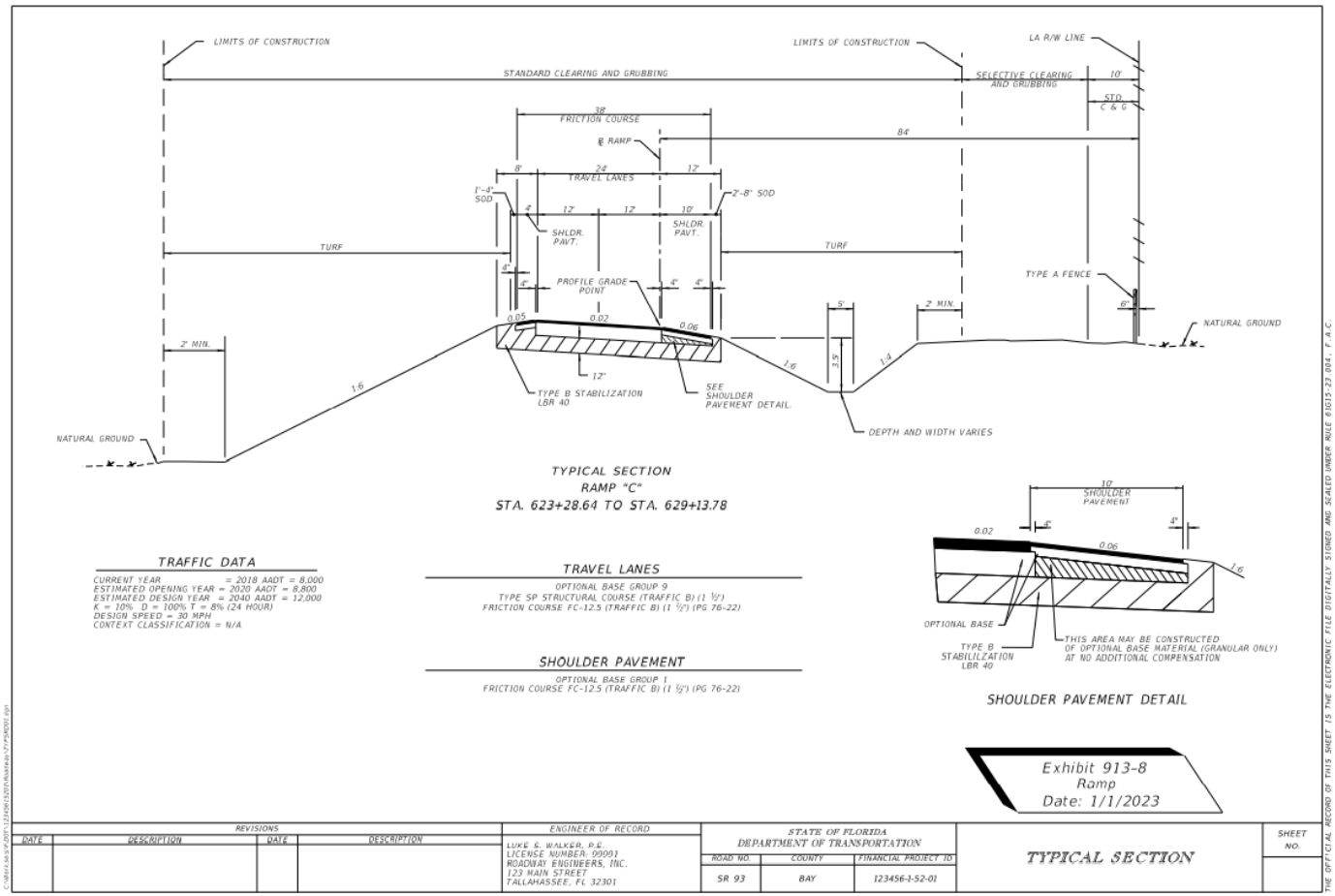
Typical Sections in Roadway Plans

- Examples (FDM 913)



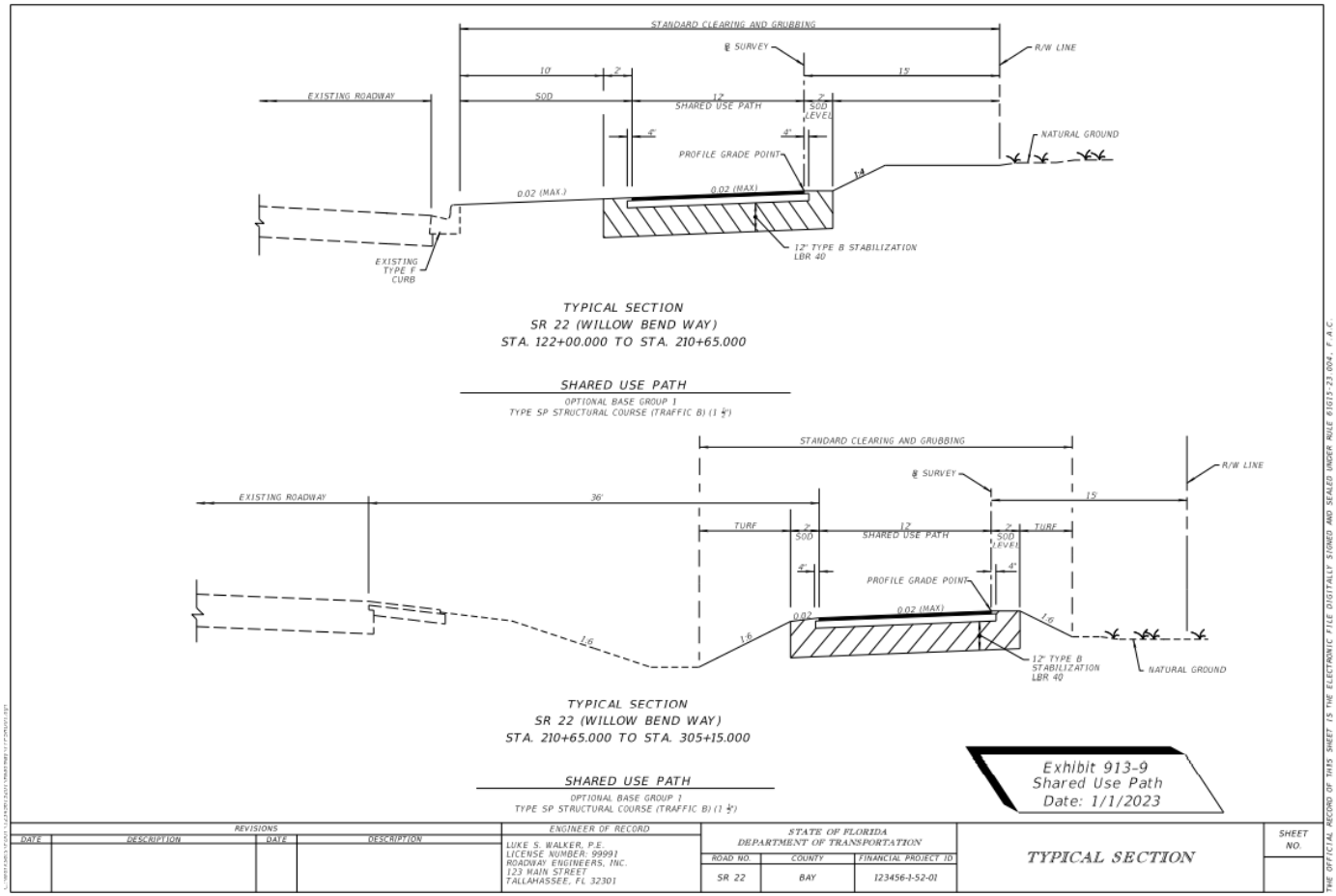
Typical Sections in Roadway Plans

- Examples (FDM 913)



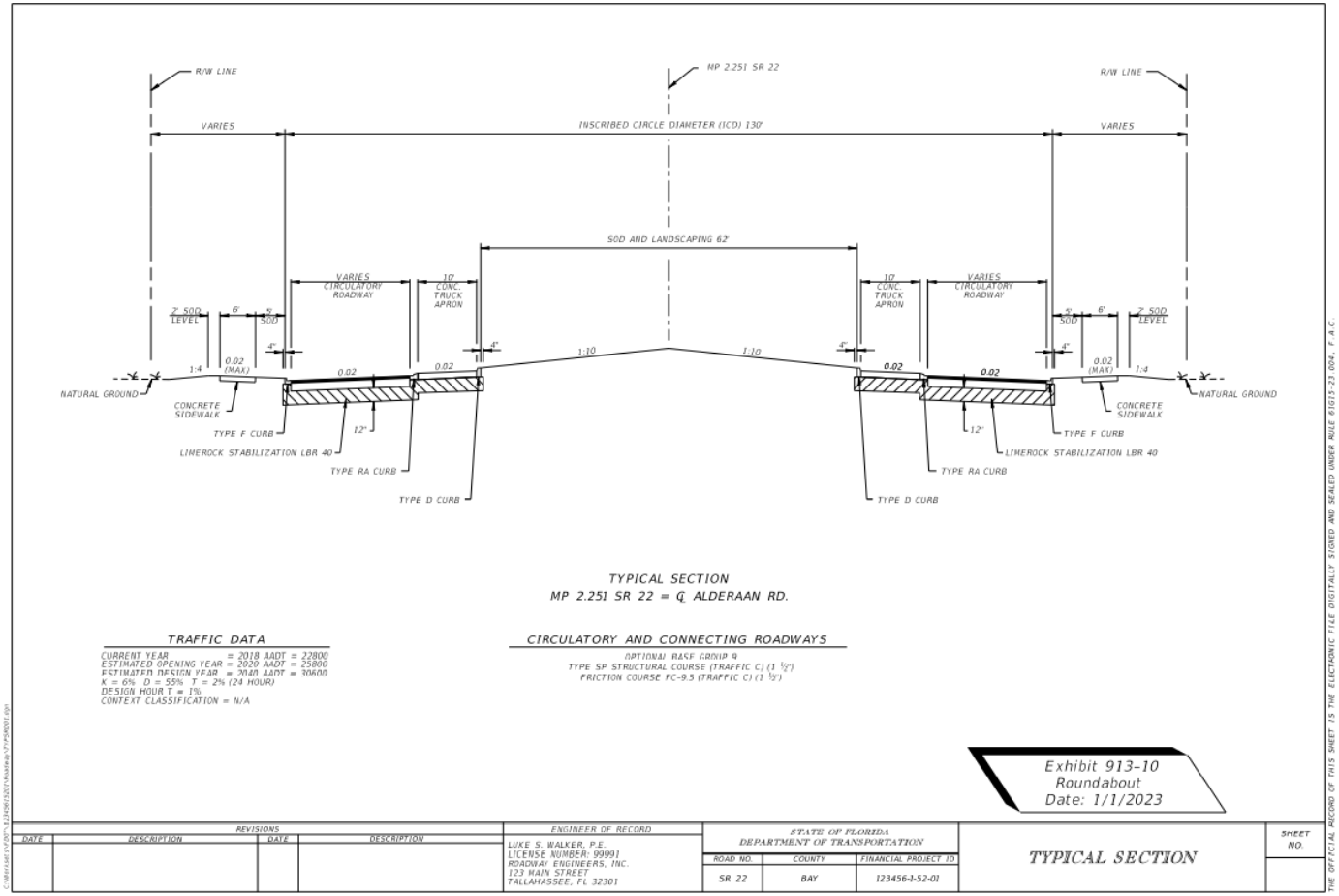
Typical Sections in Roadway Plans

- Examples (FDM 913)



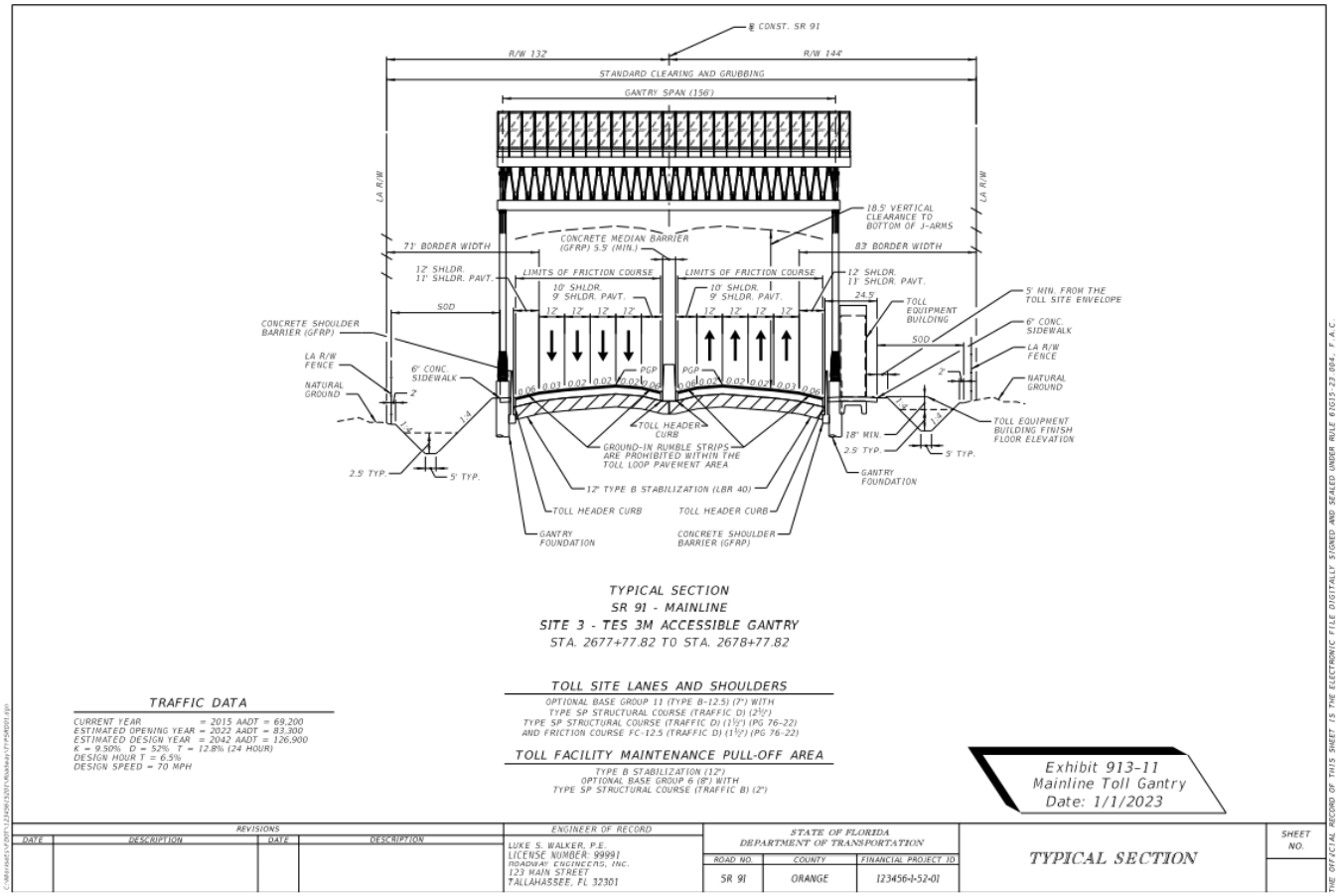
Typical Sections in Roadway Plans

- Examples (FDM 913)



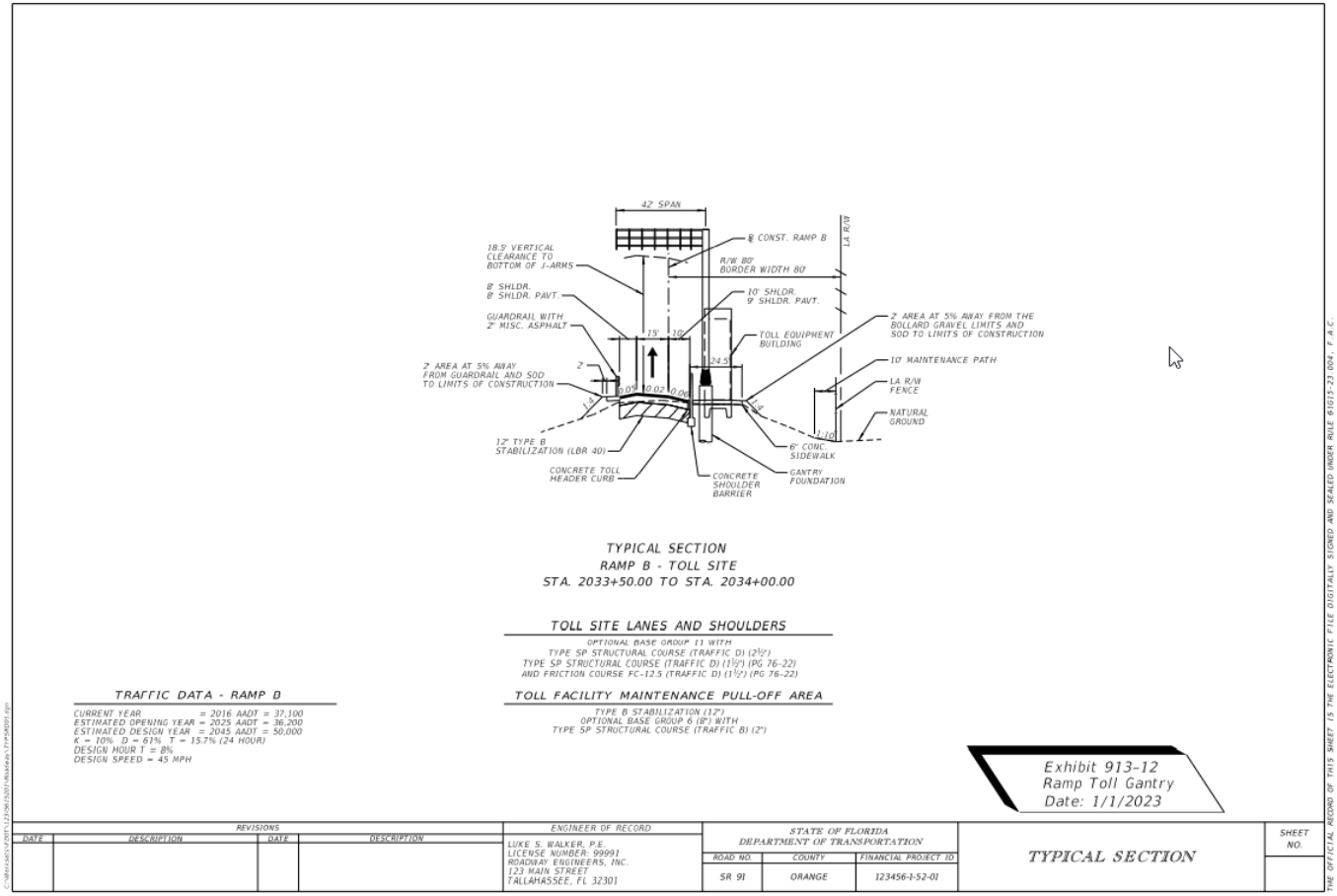
Typical Sections in Roadway Plans

- Examples (FDM 913)



Typical Sections in Roadway Plans

- Examples (FDM 913)



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Horizontal Geometry

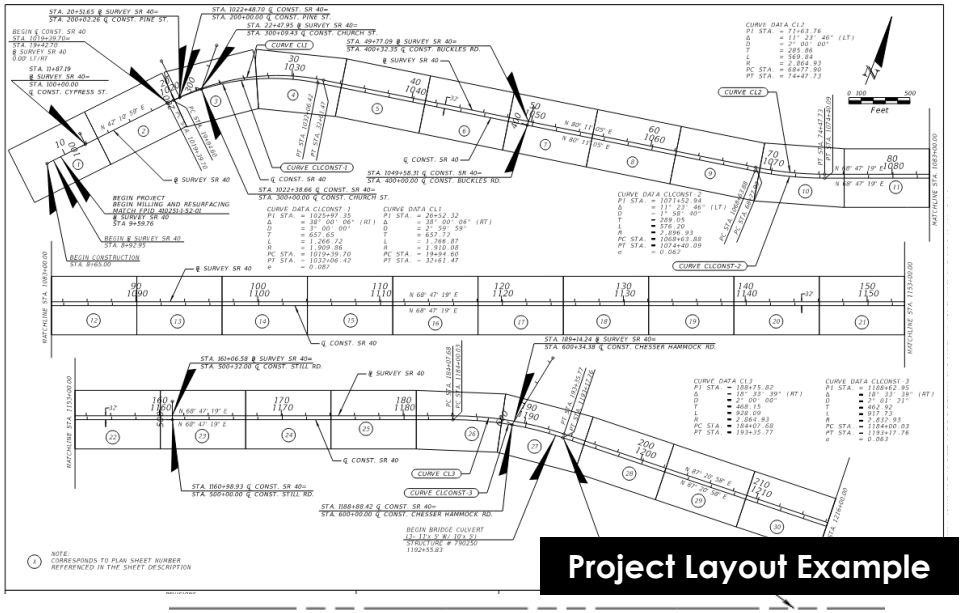
Kevin Tasillo, P.E.
Kisinger Campo & Associates
Transportation Engineer

Overview of Discussion Topics

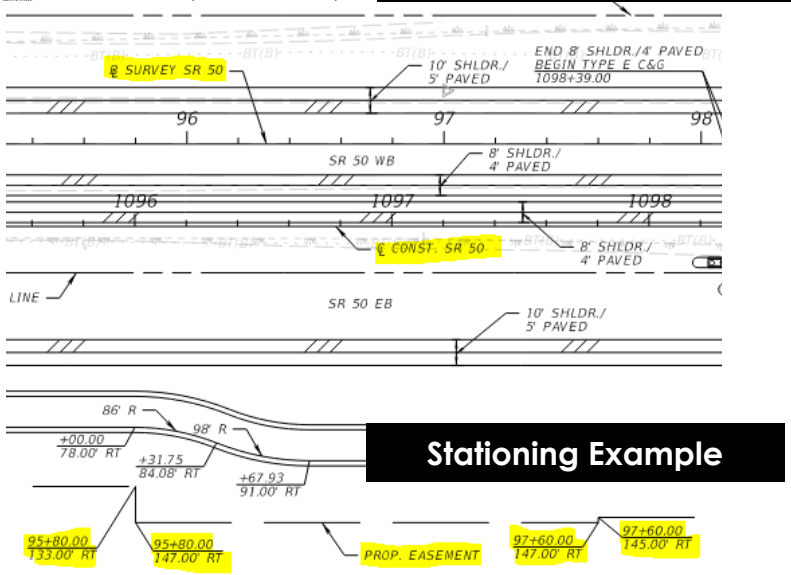
- Centerlines and Baselines
- Horizontal Deflections
- Horizontal Curves
- Compound Curves
- Broken-back, Reverse Curves
- Superelevation
- Intersection Sight Distance

Centerline (CL)/Baseline (BL) Geometry

- Typically identified as CL or BL Construction, may also be BL Survey
- Centerline typically used for proposed plan callouts
- Baseline typically used for R/W mapping



Project Layout Example



Stationing Example

Horizontal Deflections

Horizontal Deflections- known as PI (Point of Intersection)

- Controlled by typical section and design speed.
  - Flush shoulder and curbed roadways with design speed 40 mph and less is 2º00’00”.
  - Flush shoulder roadways with design speed 45 mph and greater is 0º45’00”.
  - Curbed roadways with design speed of 45 mph is 1º00’00”.
  - High speed curbed roadways with design speed 50 mph and greater is 0º45’00”

Horizontal Deflection Example

Horizontal Curves- Length

Length of Horizontal Curve

- FDM Table 210.8.1 (Arterials/Collectors)
- FDM Table 211.7.1 (Limited Access)
- Preferable to use flatter curvature
- Constrained situation min. length = 400’

Table 210.8.1 Length of Horizontal Curve

Desired Length Based on Design Speed (mph)										
mph	25	30	35	40	45	50	55	60	65	70
feet	400	450	525	600	675	750	825	900	975	1050

Desired Length Based on Deflection Angle					
degrees	5°	4°	3°	2°	1°
feet	500	600	700	800	900

Notes:

(1) The desired horizontal curve length shall be the greater of the lengths based on design speed and length based on deflection angle.

(2) When desirable horizontal curve length cannot be attained, provide the greatest attainable length possible, but not less than 400 feet.

Table 211.7.1 Length of Horizontal Curve

Length Of Horizontal Curve (ft.)										
Interstate, Freeway and Expressways based on Design Speed (mph)										
	25	30	35	40	45	50	55	60	65	70
Desirable	N/A	N/A	N/A	N/A	N/A	1500	1650	1800	1950	2100
Minimum	N/A	N/A	N/A	N/A	N/A	750	825	900	975	1050
Ramps based on Design Speed (mph)										
	25	30	35	40	45	50	55	60	65	70
Desirable	400	450	525	600	675	1500	1650	1800	1950	2100
Minimum	400	400	400	400	400	750	825	900	975	1050

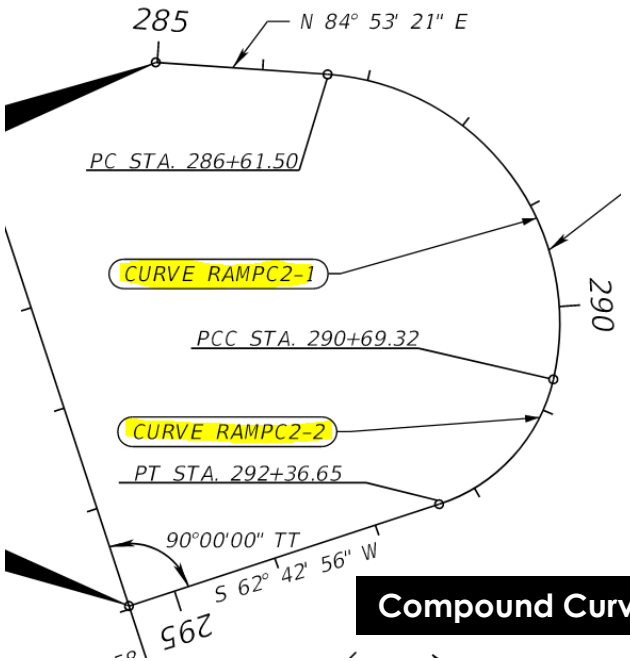
Notes:

Provide the desirable length; however, when desired length cannot be attained, provide the greatest length possible, but not less than the minimum.

Compound Curves

Defined as two curves of different radii in the same direction

- Utilize Ratio of flatter to sharper radius not greater than the following:
  - Open highways- 1.5:1
  - Turning roadways- 2:1



CURVE NO.	R
RAMPC2-1	236.00
RAMPC2-2	163.00

Ratio =236'/163'=1.45

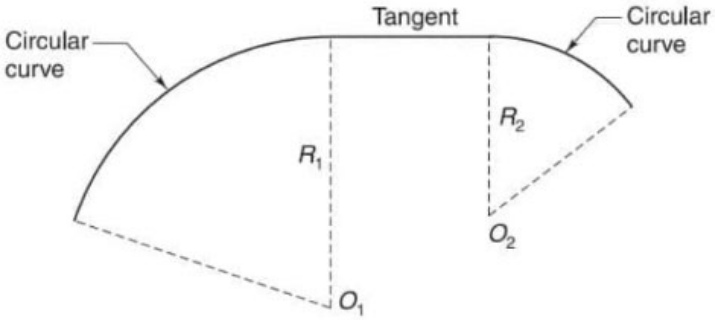
Compound Curve Example

Broken-Back, Reverse Curves

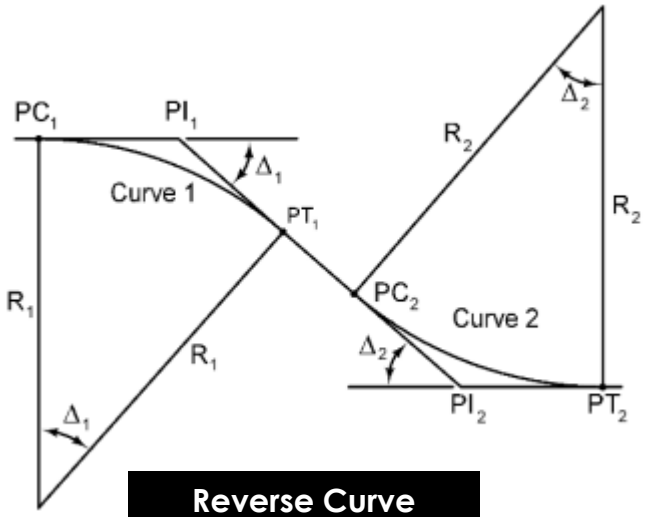
Broken-Back (Flat-Back) Curves– two curves in the same direction, separated by a short tangent.

Reverse Curves – two curves in opposite directions, separated by a short tangent

- Avoid using except where topographical/terrain or right/of-way conditions make alternatives impractical
- Creates abrupt scenarios (not meeting driver's expectations)
- Flatter curvature with shorter tangents is preferable to sharp curves connected by long tangents. (Avoid using minimum horizontal curve lengths)



Broken-Back Curve



Reverse Curve

Superelevation

Superelevation Rates

- Based on smallest traveled radius
- Design Speed
  - Low Speed ≤ 45 mph- e_{max} = 0.05
  - High Speed > 50 mph- e_{max} = 0.10
- e_{max} = 0.10 required on LA Facilities

Table 210.9.2 Superelevation Rates for e_{max} = 0.05

Superelevation Rates (e_{max} =0.05) Tabulated Values					
Degree of Curve (*D*)	Radius (R) (feet)	Design Speed (mph)			
		25-30	35	40	45
2° 00'	2,865	NC	NC	NC	NC
2° 15'	2,546				
2° 45'	2,083				NC
3° 00'	1,910				RC
3° 45'	1,528			NC	
4° 00'	1,432			RC	
4° 45'	1,206				
5° 00'	1,146		NC		
5° 15'	1,091		RC		
5° 30'	1,042				
5° 45'	996				
6° 00'	955				RC
6° 15'	917				0.022
6° 30'	881				0.024
6° 45'	849				0.027
7° 00'	819	NC			0.030
7° 15'	790	RC			0.033
7° 30'	764				0.037
7° 45'	739				0.041
8° 00'	716			RC	0.045
8° 15'	694			0.022	0.050
8° 30'	674			0.025	D_{max} = 8° 15'
8° 45'	655			0.027	
9° 00'	637			0.030	
9° 30'	603			0.034	
10° 00'	573			0.040	
10° 30'	546		RC	0.047	
11° 00'	521		0.023	D_{max} = 10° 45'	
11° 30'	498		0.026		
12° 00'	477		0.030		
13° 00'	441		0.036		
14° 00'	409	RC	0.045		
15° 00'	382	0.023	D_{max} = 14° 15'		
16° 00'	358	0.027			
17° 00'	337	0.032			
18° 00'	318	0.038			
19° 00'	302	0.043			
20° 00'	286	0.050			
		D_{max} = 20° 00'			

Notes:
(1) NC = Normal Crown (-0.02), RC = Reverse Crown (+0.02)
(2) Rates for intermediate D's and R's are to be interpolated.
(3) Design speeds of 25 mph are to be designed as 30 mph.

Table 210.9.1 Superelevation Rates for e_{max} = 0.10

Superelevation Rates (e_{max} =0.10) Tabulated Values										
Degree of Curve (D)	Radius R (ft.)	Design Speed (mph)								
		30	35	40	45	50	55	60	65	70
0° 15'	22,918	NC	NC	NC	NC	NC	NC	NC	NC	NC
0° 30'	11,459	NC	NC	NC	NC	NC	NC	RC	RC	RC
0° 45'	7,639	NC	NC	NC	NC	RC	RC	0.023	0.025	0.028
1° 00'	5,730	NC	NC	NC	RC	0.021	0.025	0.030	0.033	0.037
1° 15'	4,584	NC	NC	RC	0.022	0.026	0.031	0.036	0.041	0.046
1° 30'	3,820 *R_{NC}	NC	RC	0.021	0.026	0.031	0.037	0.043	0.048	0.054
2° 00'	2,865	RC	0.022	0.028	0.034	0.040	0.048	0.055	0.062	0.070
2° 30'	*R_{RC} 2,292	0.021	0.028	0.034	0.041	0.049	0.058	0.067	0.075	0.085
3° 00'	1,910	0.025	0.032	0.040	0.049	0.057	0.067	0.077	0.087	0.096
3° 30'	1,637	0.029	0.037	0.046	0.055	0.065	0.075	0.086	0.095	0.100
4° 00'	1,432	0.033	0.042	0.051	0.061	0.072	0.083	0.093	0.099	D_{max} = 3° 30'
5° 00'	1,146	0.040	0.050	0.061	0.072	0.083	0.094	0.098	D_{max} = 4° 15'	
6° 00'	955	0.046	0.058	0.070	0.082	0.092	0.099	D_{max} = 5° 15'		
7° 00'	819	0.053	0.065	0.078	0.089	0.098	D_{max} = 6° 30'			
8° 00'	716	0.058	0.071	0.084	0.095	0.100				
9° 00'	637	0.063	0.077	0.089	0.098	D_{max} = 8° 15'				
10° 00'	573	0.068	0.082	0.094	0.100					
11° 00'	521	0.072	0.086	0.097	D_{max} = 10° 15'					
12° 00'	477	0.076	0.090	0.099						
13° 00'	441	0.080	0.093	0.100						
14° 00'	409	0.083	0.096	D_{max} = 13° 15'						
15° 00'	382	0.086	0.098							
16° 00'	358	0.089	0.099							
18° 00'	318	0.093	D_{max} = 17° 45'							
20° 00'	286	0.097								
22° 00'	260	0.099								
24° 00'	239	0.100								
		D_{max} = 24° 45'								

Notes:
NC = Normal Crown (-0.02)
RC = Reverse Crown (+0.02)
R_{NC} = Minimum Radius for NC
R_{RC} = Minimum Radius for RC
(1) Rates for intermediate D's and R's are to be interpolated.
(2) Degree of Curvature (D) on high speed curbed roadways must not exceed: 2° 30' for 50 mph and 2° 00' for 55 mph.
(3) Degree of Curvature (D) on interstate must not exceed 3° 00' for 70 mph.

* NC/RC (- -) and RC/e (—) Break Points (Radius in feet)									
Break Points	Design Speed (mph)								
	30	35	40	45	50	55	60	65	70
R_{NC}	3349	4384	5560	6878	8337	9949	11709	13164	14714
R_{RC}	2471	3238	4110	5087	6171	7372	8686	9783	10955

Superelevation

Superelevation Controls

- Low Speed ≤ 45 mph- e_{max} = 0.05
- High Speed > 50 mph- e_{max} = 0.10

Transition Criteria

- 80% Tangent/20% curve
- Min. PGL- 0.5%
- Min. edge- 0.2% (0.5% curbed)

Reverse Curves

- 80% transition length on each curve
- Constrained- not more than 50% on curve
- Minimum full length of superelevation:
  - 100’ for ≤ 45 mph
  - 200’ for ≥ 50 mph

Table 210.9.3 Superelevation Transition Slope Rates

# Lanes One Direction	Superelevation Transition Slope Rates						
	e_{max} = 0.10				e_{max} = 0.05		
	Design Speed (mph)				Design Speed (mph)		
	25-40	45-50	55-60	65-70	25-35	40	45
1-Lane & 2-Lane	1:175	1:200	1:225	1:250	1:100	1:125	1:150
3-Lane	---	1:160	1:180	1:200			
4-Lane or more	---	1:150	1:170	1:190			

Notes:

e_{max} = 0.10:

(1) The length of superelevation transition is to be determined by the relative slope rate between the travel way edge of pavement and the profile grade, except that the minimum length of transition is 100 feet.

(2) For additional information on transitions, see the *Standard Plans*, ***Index 000-510***.

e_{max} = 0.05:

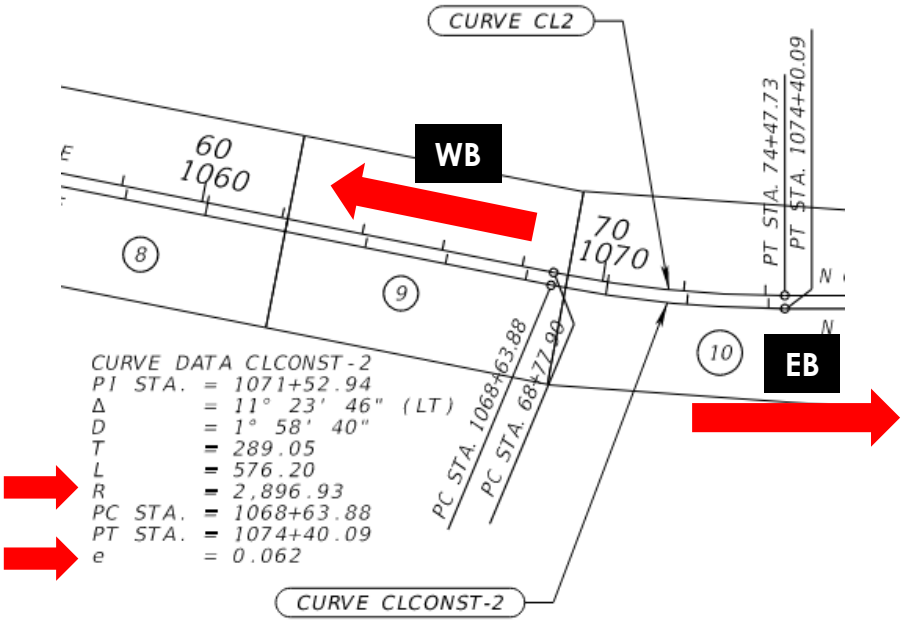
(1) The length of superelevation transition is to be determined by the relative slope rate between the travel way edge of pavement and the profile grade, except that the minimum length of transition is 50 feet for design speeds 25-35 mph and 75 feet for design speeds 40-45 mph.

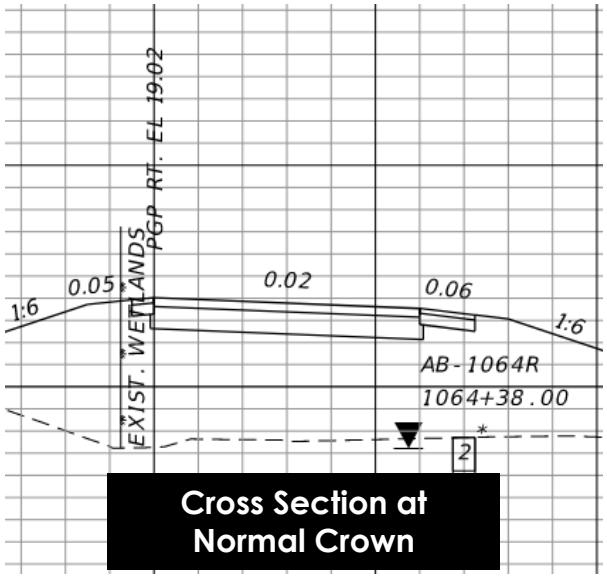
(2) A slope rate of 1:125 may be used for 45 mph under restricted conditions.

(3) For additional information on transitions, see the *Standard Plans*, ***Index 000-511***.

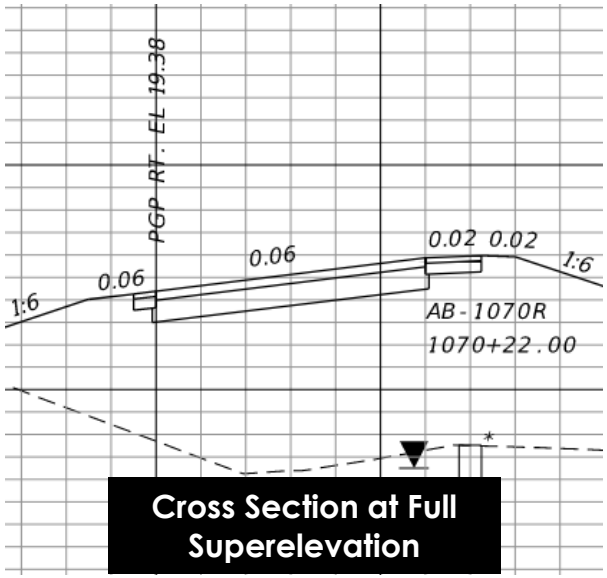
Superelevation- Example

Q: Calculate Superelevation Transition for a two lane (12' wide) divided typical section for the EB lanes with a design speed of 65 mph?





Cross Section at Normal Crown



Cross Section at Full Superelevation

Superelevation- Example

Table 210.9.3 Superelevation Transition Slope Rates

# Lanes One Direction	Superelevation Transition Slope Rates						
	e_{max} = 0.10				e_{max} = 0.05		
	Design Speed (mph)				Design Speed (mph)		
	25-40	45-50	55-60	65-70	25-35	40	45
1-Lane & 2-Lane	1:175	1:200	1:225	1:250	1:100	1:125	1:150
3-Lane	---	1:160	1:180	1:200			
4-Lane or more	---	1:150	1:170	1:190			

Notes:

e_{max} = 0.10:

(1) The length of superelevation transition is to be determined by the relative slope rate between the travel way edge of pavement and the profile grade, except that the minimum length of transition is 100 feet.

(2) For additional information on transitions, see the ***Standard Plans*, Index 000-510**.

e_{max} = 0.05:

(1) The length of superelevation transition is to be determined by the relative slope rate between the travel way edge of pavement and the profile grade, except that the minimum length of transition is 50 feet for design speeds 25-35 mph and 75 feet for design speeds 40-45 mph.

(2) A slope rate of 1:125 may be used for 45 mph under restricted conditions.

(3) For additional information on transitions, see the ***Standard Plans*, Index 000-511**.

Table 210.9.1 Superelevation Rates for e_{max} = 0.10

Superelevation Rates (e_{max} =0.10) Tabulated Values

Degree of Curve (D)	Radius R (ft.)	Design Speed (mph) 30	35	40	45	50	55	60	65	70
0° 15'	22,918	NC	NC	NC	NC	NC	NC	NC	NC	NC
0° 30'	11,459	NC	NC	NC	NC	NC	NC	RC	RC	RC
0° 45'	7,639	NC	NC	NC	NC	RC	RC	0.023	0.025	0.028
1° 00'	5,730	NC	NC	NC	RC	0.021	0.025	0.030	0.033	0.037
1° 15'	4,584	NC	NC	RC	0.022	0.026	0.031	0.036	0.041	0.046
1° 30'	3,820	NC	RC	0.021	0.026	0.031	0.037	0.043	0.048	0.054
	*R_{NC}									
2° 00'	2,865	RC	0.022	0.028	0.034	0.040	0.048	0.055	0.062	0.070
	*R_{RC}									
2° 30'	2,292	0.021	0.028	0.034	0.041	0.049	0.058	0.067	0.075	0.085
3° 00'	1,910	0.025	0.032	0.040	0.049	0.057	0.067	0.077	0.087	0.096
3° 30'	1,637	0.029	0.037	0.046	0.055	0.065	0.075	0.086	0.095	0.100
4° 00'	1,432	0.033	0.042	0.051	0.061	0.072	0.083	0.093	0.099	D_{max} = 3° 30'
5° 00'	1,146	0.040	0.050	0.061	0.072	0.083	0.094	0.098	D_{max} = 4° 15'	
6° 00'	955	0.046	0.058	0.070	0.082	0.092	0.099	D_{max} = 5° 15'		
7° 00'	819	0.053	0.065	0.078	0.089	0.098	D_{max} = 6° 30'			
8° 00'	716	0.058	0.071	0.084	0.095	0.100				
9° 00'	637	0.063	0.077	0.089	0.098	D_{max} = 8° 15'				
10° 00'	573	0.068	0.082	0.094	0.100					
11° 00'	521	0.072	0.086	0.097	D_{max} = 10° 15'					
12° 00'	477	0.076	0.090	0.099						
13° 00'	441	0.080	0.093	0.100						
14° 00'	409	0.083	0.096	D_{max} = 13° 15'						
15° 00'	382	0.086	0.098							
16° 00'	358	0.089	0.099							
18° 00'	318	0.093	D_{max} = 17° 45'							
20° 00'	286	0.097								
22° 00'	260	0.099								
24° 00'	239	0.100								
		D_{max} = 24° 45'								

Notes:

NC = Normal Crown (-0.02)

RC = Reverse Crown (+0.02)

R_{NC} = Minimum Radius for NC

R_{RC} = Minimum Radius for RC

(1) Rates for intermediate D's and R's are to be interpolated.

(2) Degree of Curvature (D) on high speed curbed roadways must not exceed: 2° 30' for 50 mph and 2° 00' for 55 mph.

(3) Degree of Curvature (D) on interstate must not exceed 3° 00' for 70 mph.

*** NC/RC (- -) and RC/e (—) Break Points (Radius in feet)**

Break Points	Design Speed (mph) 30	35	40	45	50	55	60	65	70
R_{NC}	3349	4384	5560	6878	8337	9949	11709	13164	14714
R_{RC}	2471	3238	4110	5087	6171	7372	8686	9783	10955

Superelevation- Example

CLCONST-2 EASTBOUND

Chain:	CL40	Radius:	2896.93 ft
Design Speed	65 MPH		
Total Width (ft)	24	ΔSE=	-8.20%
Starting SE	-2.00%		
Ending SE	6.20%		
Slope Rate	250	(From Table 2.9.3 of FDOT PPM Vol. 1)	
		(Assumed Slope Rate Sufficient for Shoulder)	

CALCULATION

L= (250/1)*24ft*-8.2%	492

Split Percentages Beginning of Curve	20%	80%
Split Percentages End of Curve	20%	80%
PC STA=	1068+63.88	

Beginning of Curve

BEGIN SE TRANS.

B: 106863.88-0.8(492)= 1064+70.28

END SE TRANS.

E: 106863.88+0.2(492)= 1069+62.28

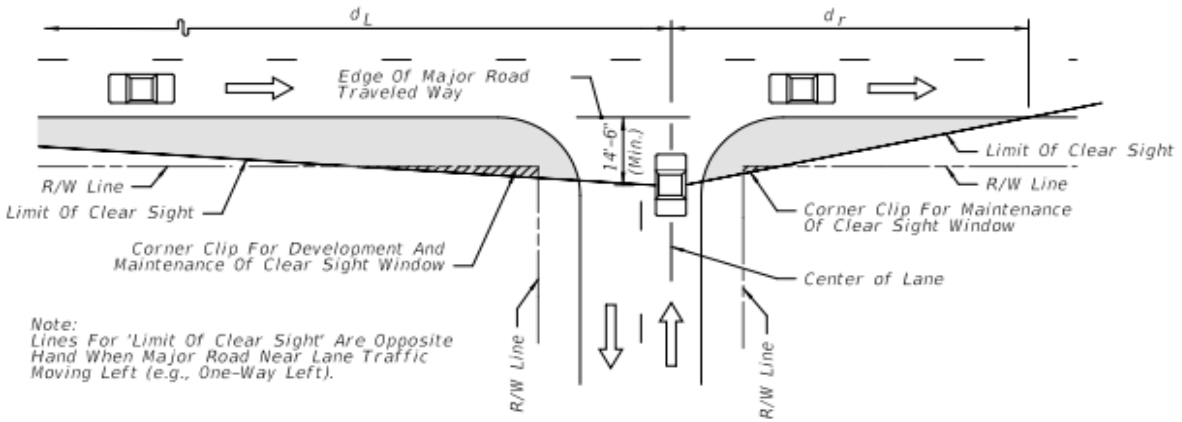
SUMMARY

	SE	STA
BEGIN SE TRANS.	-2.00%	1064+70.28
END SE TRANS.	6.20%	1069+62.28

Intersection Sight Distance

- Establish limits of clear sight at stop-controlled intersections
- Minimum driver setback 14.5’ from edge of travel
- Sight distance dictated by d_L and d_r related to design speed
- Utilize Exhibits 212-4 through 212-7
  - Two and four lane undivided
- Note for projects including landscaping- ensure that appropriate plants are located within sightlines

Figure 212.11.1 Clear Sight Triangles



FDOT ACEC

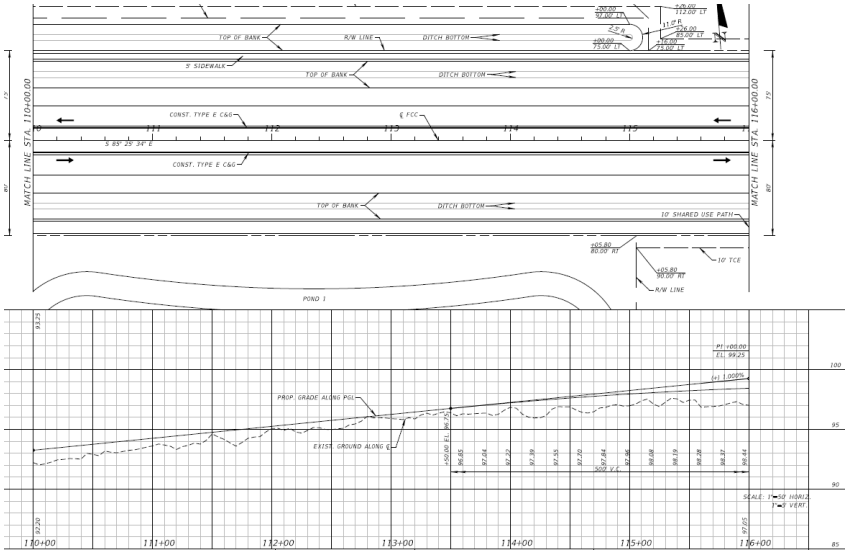
PM ACADEMY

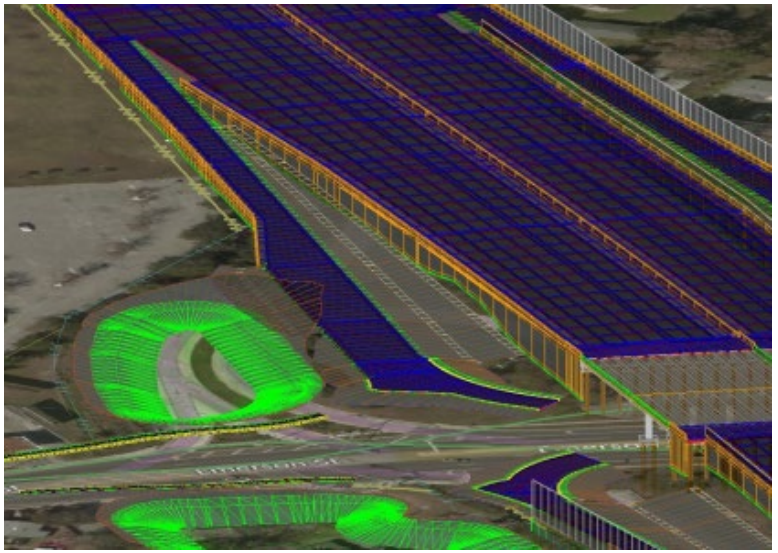
Vertical Geometry

Scott Kroper, P.E.
RS&H Inc.
Transportation Engineer

Vertical Geometry

- **Arterial and Collectors - FDM 210.10**
- **Limited Access Facilities – FDM 211.9**
  - Interstate
  - Freeway
  - Expressway
  - Ramps





Grades (Arterial and Collectors)

- **Maximum Grades (*Table 210.10.1*)**
  - Varies based on Context Classification

Context Classification	Maximum Grades (percent)								
	Design Speed (mph)								
	25-30	35	40	45	50	55	60	65	70
C1 Natural C2 Rural	N/A	N/A	N/A	N/A	4	4	3	3	3
C2T Rural Town C3 Suburban C4 Urban General	8	7	7	6	6	5	N/A	N/A	N/A
C5 Urban Center C6 Urban Core	8	8	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

(1) Maximum grade used should not exceed 4% when truck volume ≥ 10% for all context classifications.

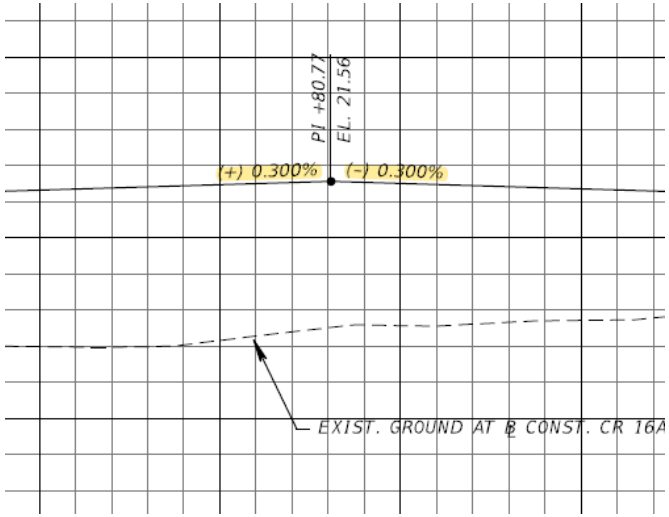
(2) For RRR projects, when existing grades do not meet the above requirements but meet the standards in effect at the time of construction, the existing grade may remain.

(3) N/A indicates this combination of design speed and context classification is outside the intended design range and should be avoided. See ***Table 201.5.1*** for context classifications and design speed ranges.

Grades (Arterial and Collectors)

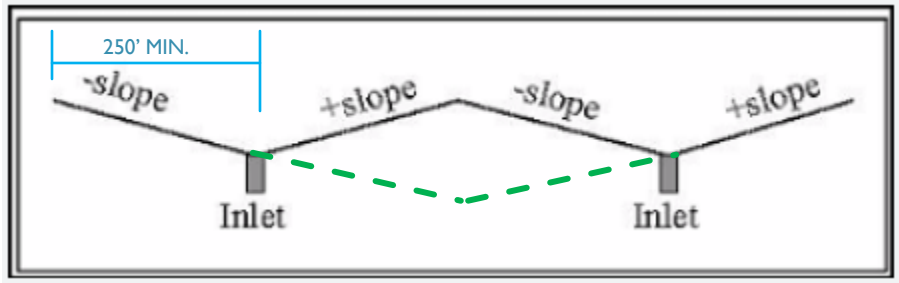
- **Maximum Change in Grade without Vertical Curve (*Table 210.10.2*)**
  - Applies to Arterials/Collectors *and* Limited Access Facilities

Maximum Change In Grade Without Vertical Curve (percent)								
Design Speed (mph)								
25-30	35	40	45	50	55	60	65	70
1.00	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20



Grades (Arterial and Collectors)

- FDM 210.10.1.1 Curbed Roadway
  - Minimum Grade = 0.30%
  - Minimum distance between VPI's = 250'
    - Eliminating low points could result in a drainage savings



Minimum Grades (Limited Access)

- New Criteria in 2023 FDM Section 211.9.1 for **new construction or when the vertical profile is being significantly modified**:
  - Desired Minimum Profile Grade = 0.50%
  - Minimum Grade when 0.5% cannot be achieved = 0.30%

- **Document design decisions with FDOT PM and District Design Engineer**

Grades (Super Elevation Transitions)

- **FDM 210.9.1:**

The standard superelevation transition places 80% of the transition on the tangent and 20% on the curve. Superelevation transition slope rates are provided in ***Table 210.9.3***.

In transition sections where the travel lane(s) cross slope is less than 1.5%, provide one of the following grade criteria:

(1) Maintain a minimum profile grade of 0.5%

(2) Maintain a minimum edge of pavement grade of 0.2% (0.5% for curbed roadway).

Curve Length (Arterials and Collectors)

- FDM *Table 210.10.4*

	Minimum Curve Length (feet)									
	Design Speed (mph)									
	25	30	35	40	45	50	55	60	65	70
Sag	75	90	105	120	135	200	250	300	350	400
Crest						300	350	400	450	500

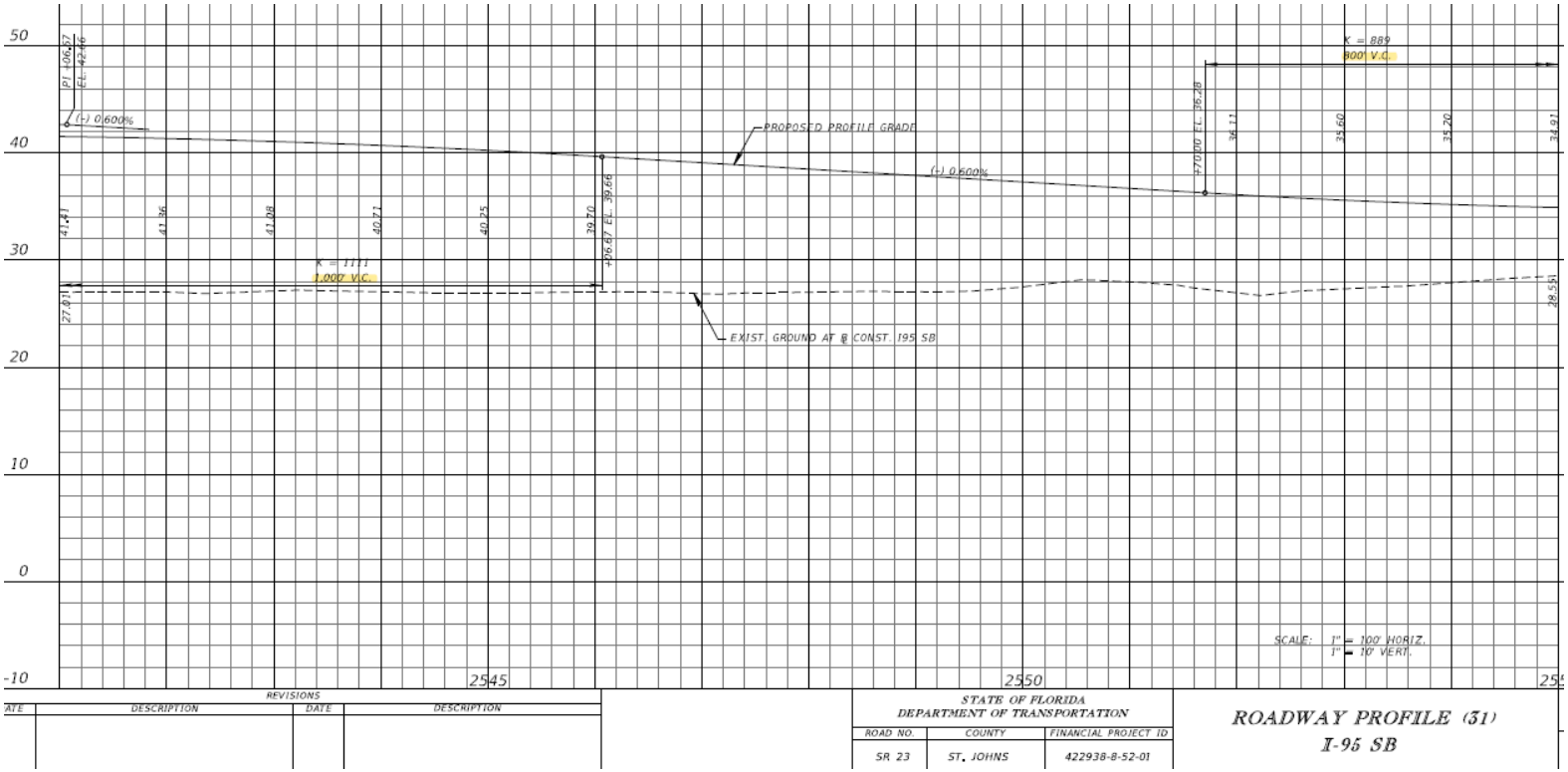
Curve Length (Limited Access)

- FDM *Table 211.9.3*

Type of Curve	Curve Length (ft.)									
	Design Speed (mph)									
	25	30	35	40	45	50	55	60	65	70
Interstate, Freeway and Expressways										
Sag	N/A					800				
Crest (Open Highway)	N/A					1,000				
Crest (Within Interchanges)	N/A					1,800				
Ramps										
Sag	75	90	105	120	135	200	250	300	350	400
Crest						300	350	400	450	500

Curve Length (Limited Access)

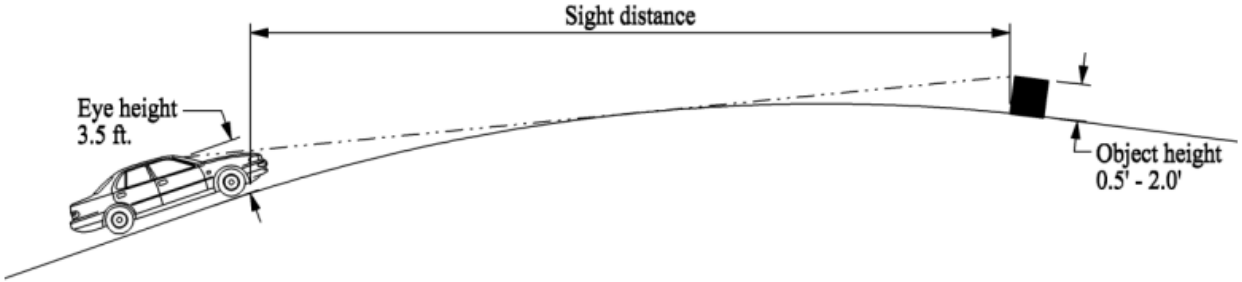
- FDM *Table 211.9.3*



Vertical Curve K Values

- **FDM New Construction K Values for Arterials and LA Facilities are based on:**
  - Driver's Eye Height = 3.5'
  - *Object Height = 0.5'*

- **FDM Resurfacing (RRR) K Values for Arterials and LA Facilities are based on:**
  - Driver's Eye Height = 3.5'
  - *Object Height = 2.0'*
  - *FDM (RRR) K-Values = AASHTO Reconstruction K-Values*



Vertical Curve K Values (Arterials and Collectors)

- FDM 210.10.3

	Minimum K Values For Curves									
	Design Speed (mph)									
	25	30	35	40	45	50	55	60	65	70
Sag	26	37	49	64	79	96	115	136	157	181
Crest (new const.)	19	31	47	70	98	136	185	245	313	401
Crest (RRR Criteria)	12	19	29	44	61	84	114	151	193	247

Notes:

Length, L = KA

Where: K = Rate of vertical curvature

L = Length of vertical curve, (feet)

A = Algebraic difference in grades, (percent)

(1) New Construction K values are based on an eye height of 3.5 feet and an object height of 6 inches. RRR Criteria K values are based on an eye height of 3.5 feet and an object height of 2 feet.

(2) The minimum curve length must not be less than values shown in ***Table 210.10.4***.

Vertical Curve K Values (Limited Access)

- FDM 211.9.2

Type of Curve	Minimum K Values for Vertical Curves									
	Design Speed (mph)									
	25	30	35	40	45	50	55	60	65	70
Interstate										
Sag	N/A					115	136	157	181	206
Crest (New Construction)	N/A					185	245	313	401	506
Crest (Resurfacing)	N/A					114	151	193	247	312
Freeway and Expressways										
Sag	N/A					96	115	136	157	181
Crest (New Construction)	N/A					136	185	245	313	401
Crest (Resurfacing)	N/A					84	114	151	193	247
Ramps										
Sag	26	37	49	64	79	96	115	136	157	181
Crest (New Construction)	19	31	47	70	98	136	185	245	313	401
Crest (Resurfacing)	12	19	29	44	61	84	114	151	193	247

Notes:

Length, L = KA

Where: K = Rate of vertical curvature (a.k.a., K value)

L = Length of vertical curve, (feet)

A = Algebraic difference in grades, (percent)

(1) New construction K values are based on an eye height of 3.5 feet and an object height of 6 inches. Resurfacing K values are based on an eye height of 3.5 feet and an object height of 2 feet.

(2) The minimum curve length must not be less than values shown in ***Table 211.9.3***.

(3) Vertical curves within a system interchange are to use K values based on the higher system.

(4) Use interstate, freeway, or expressway K values on vertical curves located within the ramp terminal area. Ramp vertical curve K values are used for ramps outside of the ramp terminal area.

FDM (RRR) vs AASHTO

FDM 211.9.2 (2023)

Table 211.9.2 K Values for Vertical Curves

Type of Curve	Minimum K Values for Vertical Curves									
	Design Speed (mph)									
	25	30	35	40	45	50	55	60	65	70
Interstate										
Sag	N/A					115	136	157	181	206
Crest (New Construction)	N/A					185	245	313	401	506
Crest (Resurfacing)	N/A					114	151	193	247	312
Freeway and Expressways										
Sag	N/A					96	115	136	157	181
Crest (New Construction)	N/A					136	185	245	313	401
Crest (Resurfacing)	N/A					84	114	151	193	247
Ramps										
Sag	26	37	49	64	79	96	115	136	157	181
Crest (New Construction)	19	31	47	70	98	136	185	245	313	401
Crest (Resurfacing)	12	19	29	44	61	84	114	151	193	247

AASHTO (2018)

U.S. Customary			
Design Speed (mph)	Stopping Sight Distance (ft)	Rate of Vertical Curvature, K^a	
		Calculated	Design
15	80	3.0	3
20	115	6.1	7
25	155	11.1	12
30	200	18.5	19
35	250	29.0	29
40	305	43.1	44
45	360	60.1	61
50	425	83.7	84
55	495	113.5	114
60	570	150.6	151
65	645	192.8	193
70	730	246.9	247
75	820	311.6	312
80	910	383.7	384

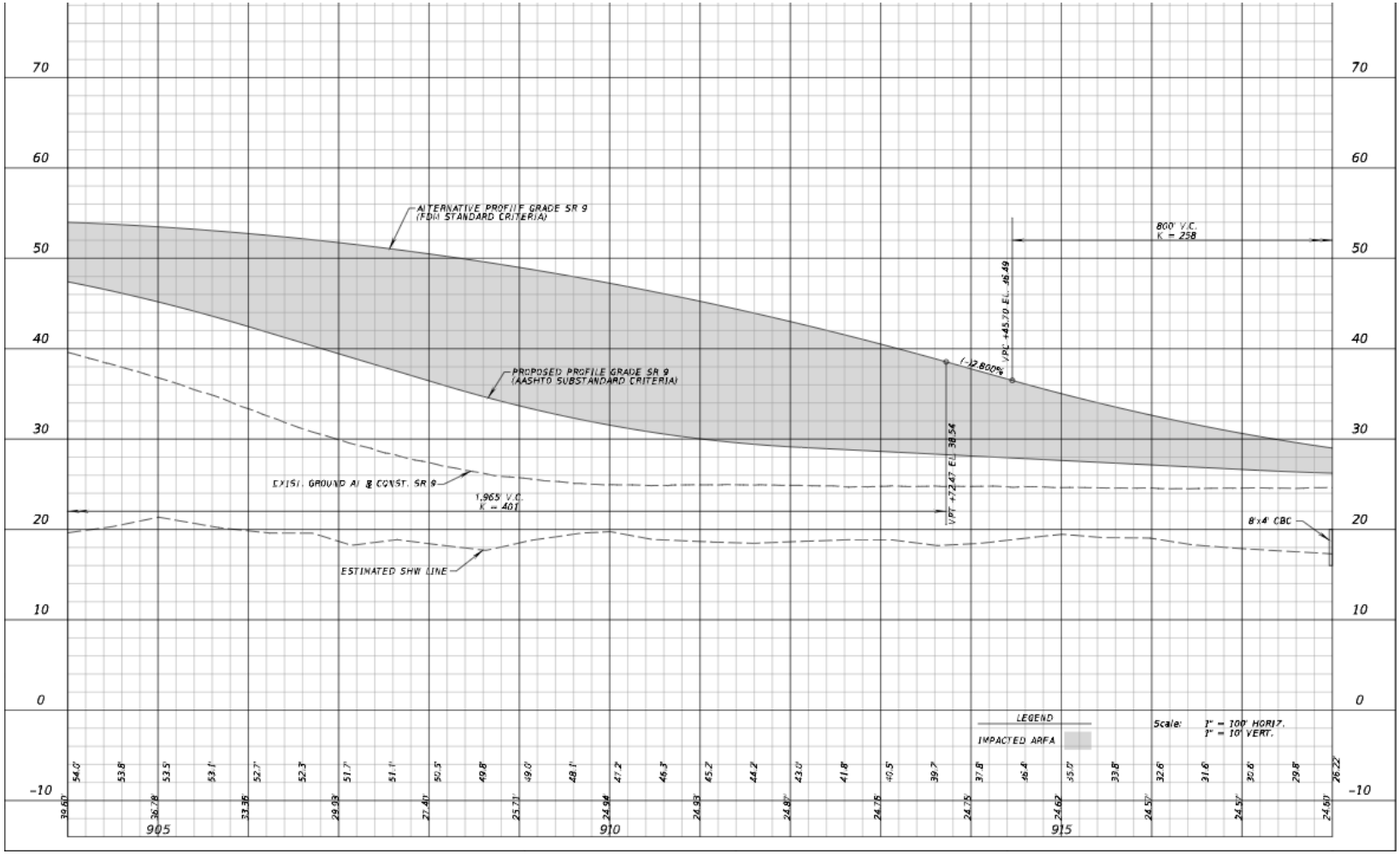
Vertical Curve K Values

- Deficient K-Value along I-95 in Jacksonville:

Vertical Curve K Values

- Deficient K-Value along I-95 in Jacksonville:

Vertical Curves



Vertical Clearances - Roadway

- **Important to receive Geotech information early – Set the Floor**

210.10.3 Vertical Clearances

Consider the following vertical clearance requirements when developing the vertical alignment:

(1) Minimum clearances for bridge structures is given in ***FDM 260.6***.

(2) Minimum clearance from the bottom of the roadway base course to the Base Clearance Water Elevation is 3 feet, except as noted below. These exceptions will require a reduction in the design resilient modulus in accordance with the ***Flexible Pavement Design Manual***. Coordinate with the Pavement Design Engineer for the following facilities:

(a) 2-lane roadways in context classification C1, C2, C2T and C3, and all ramps may be reduced to a 2-foot clearance.

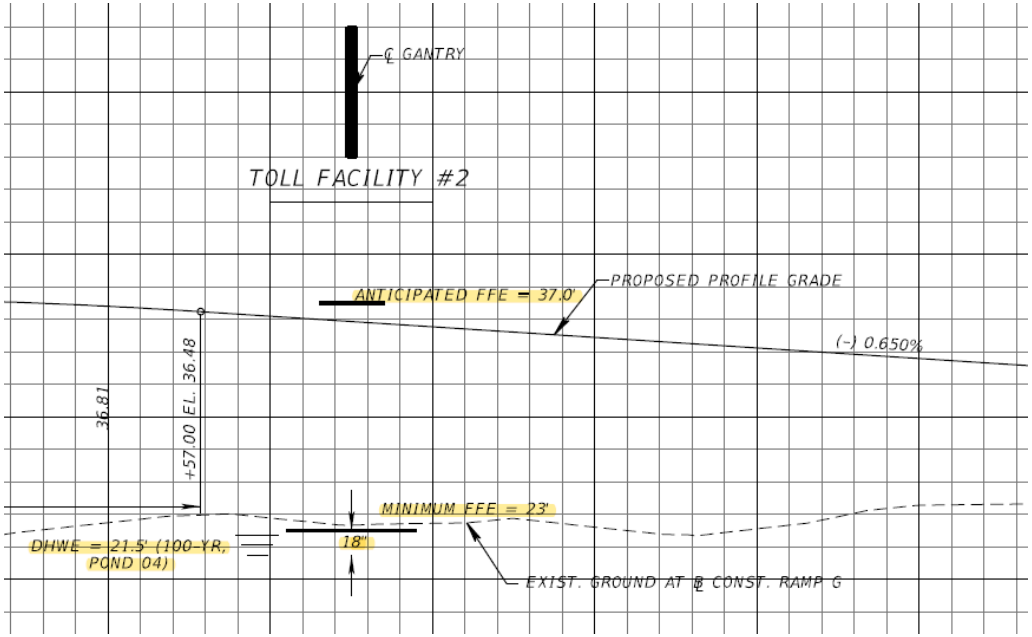
(b) Low point on ramps at crossroads may be reduced to a 1-foot clearance.

(c) All other facilities in context classifications C4 through C6 may be reduced to a 1-foot clearance.

- **100 Year Flood Elevation *(FDM 211.3)***
  - Designing the mainline travel lanes to be above the 100-year flood plain elevation (established by FEMA or other pertinent studies) is a requirement on Florida's Turnpike Facilities and *should* be considered for all LA facilities

Vertical Clearances - Roadway

- **Pond DHW**
  - Ensure roadway is above DHW within the entire basin limits
  - Applies at Toll Facilities



Vertical Clearances – Bridge over Roadway / Railroad

- FDM 260

Table 260.6.1 Minimum Vertical Clearances for Bridges

Type of Crossing	Minimum Vertical Clearance (feet)		
	New Construction		RRR
	New Bridge	Construction Affecting Existing Bridge	
Roadway or Railroad bridge over Limited Access Roadway	16.5	16.0	16.0
Roadway or Railroad bridge over Arterial or Collector Roadway			14.5
Pedestrian bridge over Roadways	17.5	17.0	
Roadway or Pedestrian bridge over Railroad	23.5		
Roadway or Pedestrian bridge over Electrified Railroad	24.25		

Notes:

(1) For construction affecting an existing bridge (e.g., bridge widenings or resurfacing), if the proposed minimum design vertical clearance is between 16 feet and 16 feet 2 inches or if a Design Variation or Design Exception is required, place a note in the plans as shown in ***FDM 914***.

Vertical Clearances – Bridge over water

- **FDM 260.6**
  - Requires information from Drainage Engineer and Hydraulic recommendations

Drainage:

The minimum vertical clearance between the design flood stage and the low member of a bridge is 2 feet. This clearance is necessary to allow the majority of debris to pass without causing damage to the structure. This requirement does not apply to culverts and bridge-culverts.

Navigation:

Provide the following minimum vertical clearance for navigational purposes:

(1) 6 feet above the Mean High Water for tidewater bays and streams

(2) 6 feet above the Normal High Water for freshwater rivers, streams, non-regulated/controlled canals, and lakes

(3) 6 feet above the control elevation for regulated/controlled lakes and canals

Roadside Slopes

- **Maintain 10’ access between slopes (steeper than 1:6) and the R/W Line**
- **District preference to not allow 1:2 roadside slopes**
  - Permitted at bridge abutments (slope pavement or rip-rap)
  - Low fill for property owner tie-in

Table 215.2.3 Roadside Slope Criteria

Type of Slope	Flush Shoulder and High Speed Curbed		Curbed	
	Height of Fill (feet)	Rate	Height of Fill (feet)	Rate
Front Slope	0 – 5	1:6	0-6	1:2 or to suit property owner, not flatter than 1:6.
	5 – 10	1:6 to edge of Clear Zone, then 1:4	> 6	1:3 or to suit property owner, not flatter than 1:6.
	10 – 20	1:6 to edge of Clear Zone, then 1:3		
	> 20	1:2 with guardrail		
Back Slope	All	1:4 or 1:3 with a standard width trapezoidal ditch and 1:6 front slope	All	1:2 or to suit property owner. Not flatter than 1:6.
Transverse Slope	All	1:10 or flatter (freeway & Interstate) 1:4 (others)	All	1:4

Notes:

(1) Height of fill is the vertical distance from the edge of the outside travel lane to the toe of front slope.

FDOT ACEC

PM ACADEMY

Geotechnical Overview

John O'Donnell, P.E.
Terracon Consultants, Inc.
Department Manager

Early Involvement

- **Getting Preliminary Groundwater Data**
  - Hand Auger Borings
  - Piezometers – Long Term Monitoring
- **Pavement Cores (If widening existing roadway)**
  - Asphalt thickness
  - Base Thickness
- **Collecting Bulk Samples**
  - Resilient Modulus Design
  - Corrosion Series Testing/Environmental Classification for Structures

Field Exploration

- **Standard Penetration Test (SPT) Borings**
  - Pros
    - Primary exploration method used by all FDOT districts
    - Soil samples are provided from driven split spoon sample
    - Many engineering properties of soil and rock can be directly correlated from SPT “N-Values”
    - Can drill through and sample most Florida rock with little difficulty
  - Cons
    - Labor intensive – costly and time consuming compared to insitu testing methods

Field Exploration (cont.)

- **Cone Penetration Test (CPT)**
  - Pros
    - Provides a continuous profile of soil stratigraphy and correlated strength and compressibility properties
    - Much quicker than SPT borings and sampling
    - Good for use in both granular and fine grained soils
  - Cons
    - No physical samples collected
    - Difficulty penetrating very dense soils and rock
    - Must be approved by FDOT Materials Office to use (usually as a supplement to SPT)
- **Flat Plate Dilatometer Test (DMT)**
  - Pros
    - Insitu test with preferred correlation with Constrained Modulus for settlement analysis of structures and embankments
    - Very good tool for providing undrained shear strength profile of very soft fine grained soils
    - Quick test – normally conducted on 1-foot vertical intervals
  - Cons
    - No physical sample collected
    - Difficulty penetrating very dense/very hard soils and rock
    - Primarily a method for evaluating very soft/very loose soils

Exploration Delays

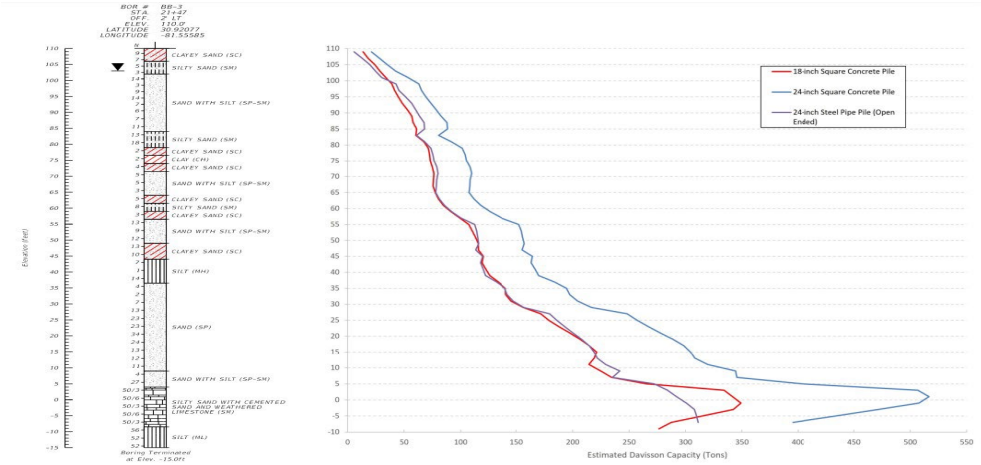
- **Property not yet acquired by FDOT**
  - Need to coordinate access and clearing requirements with owner
- **Weather**
  - Rain (especially with lightning)
- **Unexpected Contamination**
- **Difficult Boring Access**
  - Heavily wooded sites – require clearing of access paths
  - Wetlands/Flooding
    - If amphibious rig is needed, there is usually a much longer lead time to get the rig on-site
  - Underground Utilities

Analyzing the Data

- **Physical Soil Samples Classified by Engineer**
- **Laboratory Testing Assignment**
  - Basic laboratory testing
    - Performed on representative number of samples to confirm soil classification and various index properties
  - Specialty Lab testing
    - Permeability, Consolidation, Triaxial Shear, Direct Shear, etc.

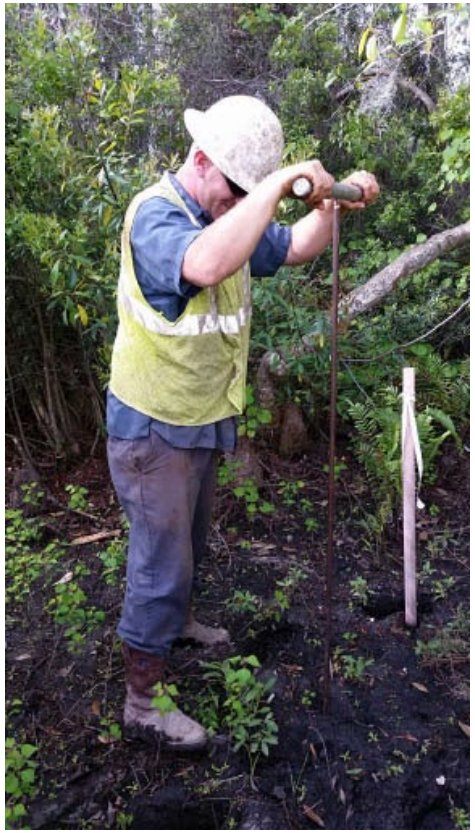
Analyzing the Data (cont.)

- **Analysis/Design**
  - Seasonal High Groundwater Level
    - Determined from published data (USDA Soil Survey Maps, USGS Precipitation Data, etc.), and onsite observation of shallow soil profile for indicators (hydric soil, polychromatic staining, oxidation, etc.
  - Soil Capacity
    - Ability to support structures and embankments
    - Stability of cut and fill slopes and earth retaining structures
  - Settlement
  - Unsuitable material remediation
    - Excavation and replacement
    - Ground improvement (e.g. surcharging with wick drains, rigid inclusions)



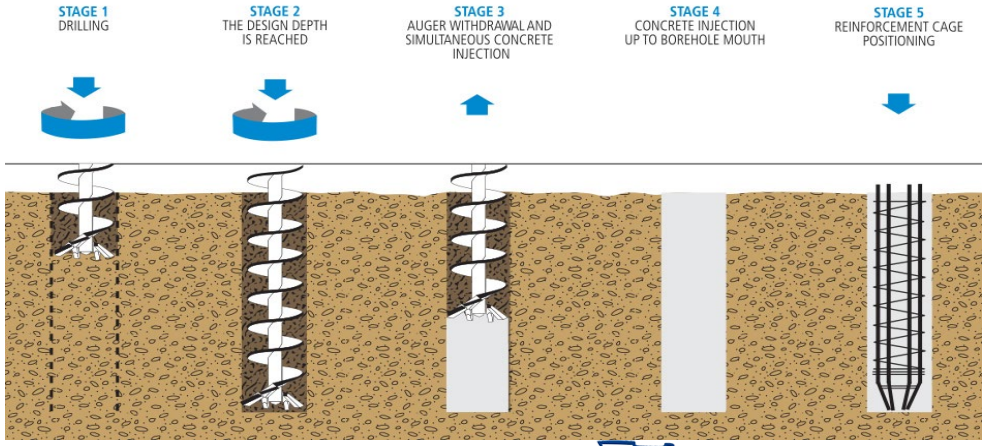
Recommendations & Options

- **High Groundwater Level**
  - Raise grade
  - Side drains/under drains
  - Alternative base materials
- **Unsuitable Material**
  - Muck probe to determine limits of unsuitable material for presentation on plans
  - Excavate
    - Usually economical option if limits of unsuitable material are not too deep and ROW is wide enough to allow for excavation and replacement



Recommendations & Options (cont.)

- **Unsuitable Material (cont.)**
  - Surcharging
    - Option for when limits of unsuitable materials are deeper than possible to excavate
    - Usually only possible to use for new roadways in areas where the surcharge can sit for several months without further impacting construction or maintenance of traffic
    - Required development of Technical Special Provision (TSP) with specific requirements
  - Rigid Inclusion/Controlled Modulus Column
    - Remedial option when unsuitable materials are deeper than practically possible to excavate and replace
    - Formed grout/concrete inclusions are used to transfer embankment load through weak/unsuitable soil to a competent layer
    - Much more complex than excavation or surcharging. Geotechnical specialty contractors have their own proprietary methods which can make it difficult to estimate costs on traditional Bid-Build projects
    - TSP with required performance criteria necessary for this option



Post-Design Services

- Important to keep Geotech EOR involved for any construction related questions/RFIs that may arise
- Additional Geotechnical Exploration for Relocated Structures or Resolution of Construction Issues
- Verify Pile Driving Data
- Review Drilled Shaft Installation Documentation
- Settlement and Vibration Monitoring

Break

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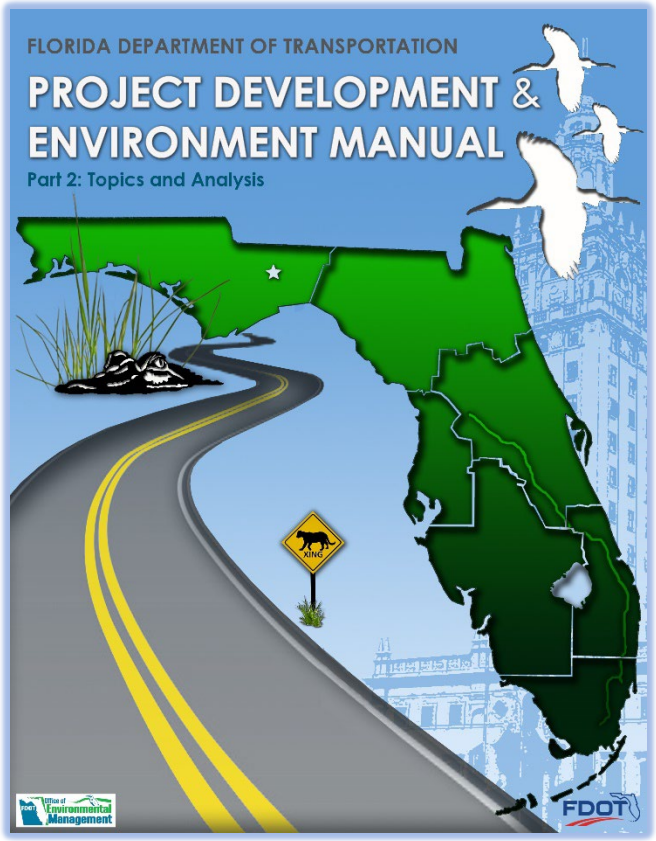
Drainage and Permitting

Vanessa Vitale, P.E.
RS&H Inc.
Water Resources Engineer

FDOT Drainage Resources

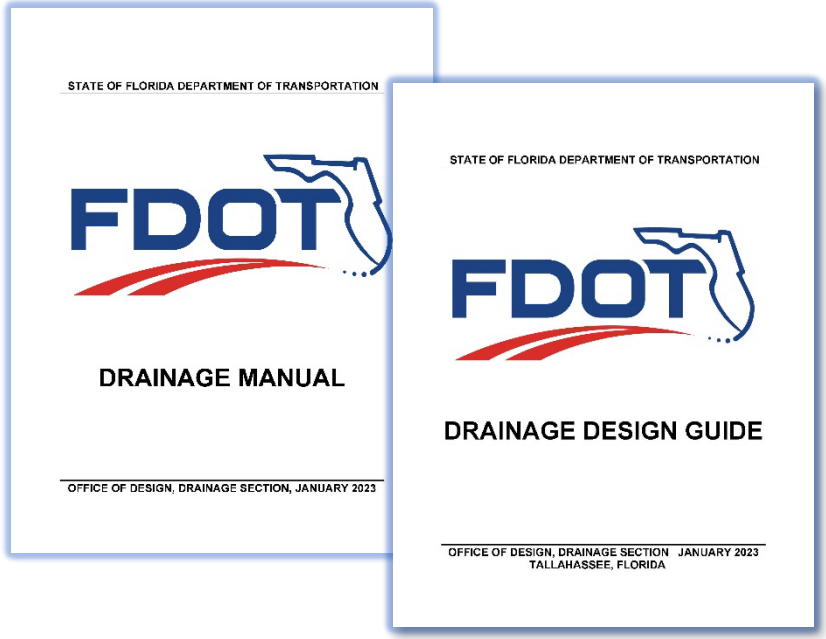
- **PD&E Study (Project Development and Environment Study)**
  - PD&E Manual (Part 1 and Part 2)
    - Water Resources Part 2 Chapter 11
  - Water Quality Impact Evaluation (WQIE)
    - PD&E Manual 11.4.2
  - Location Hydraulics Report (LHR)
    - Review of Floodplain impacts
  - Pond Siting Report (PSR)
    - PD&E Manual 11.4.3.2 and Drainage Manual 5.5
    - Locate Pond Site options
    - PSR is only required if additional Right of way is needed
  - Concept level Permits
  - Manuals are available online
    - PD and E Manual (fdot.gov)



FDOT Drainage Resources (cont.)

- **Drainage Manual**
  - Drainage Design Standards
  - *Defines requirements*

- **Drainage Design Guide**
  - Reference for Designers
  - Includes preferred approaches to design
  - *Design methods to meet requirements*



- **Design Aids**
  - Program tools and tables to assist with design
    (Hydroplaning, Scour Analysis, Culvert Service Life Estimator, and more)

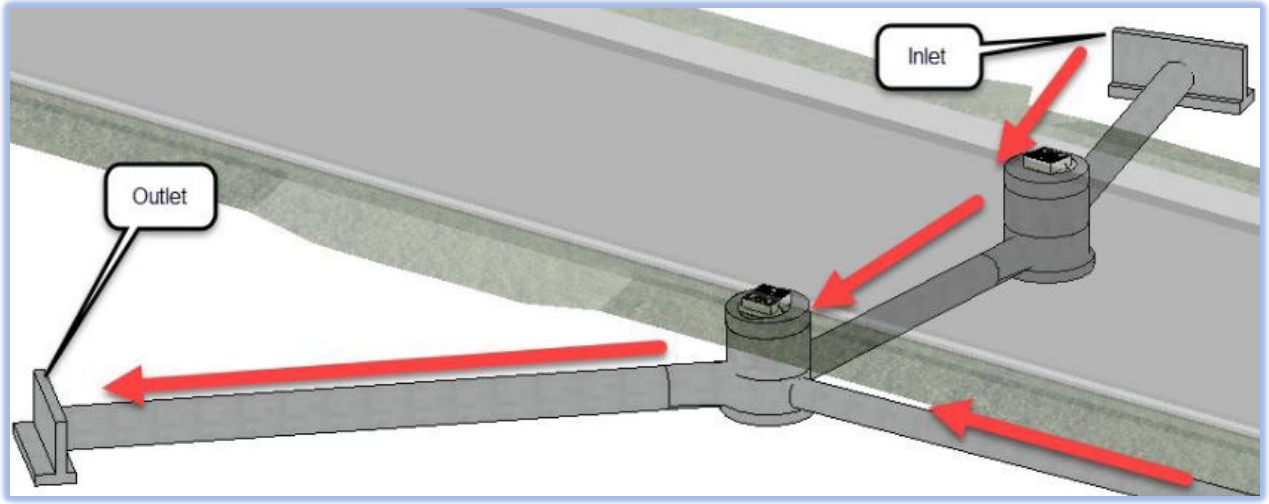
- **Available online**
  - Manuals and Handbooks (fdot.gov)

Drainage Design Process

- **Big Picture Design Tasks**
  - Permitting (Environmental Resource Permit (ERP))
    - Schedule
    - Water Quantity
    - Water Quality
    - Special Basin criteria
  - Stormwater Management Facilities
    - Dry Retention
    - Wet Detention

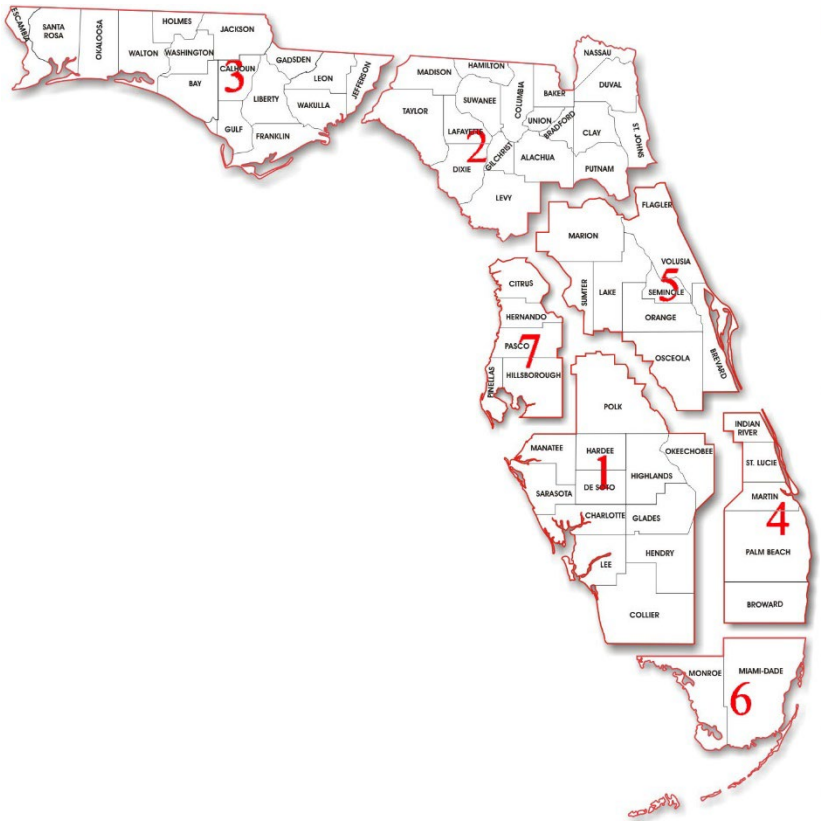
Drainage Design Process (cont.)

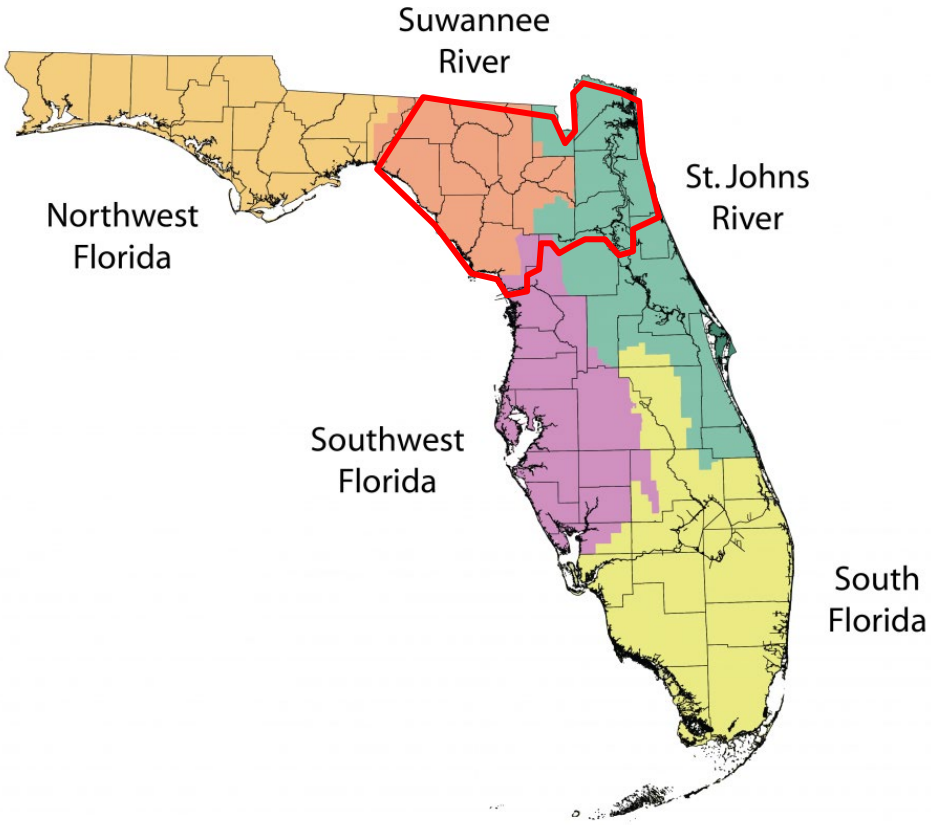
- **Detailed Design Tasks**
  - Stormwater Conveyance
    - Rural-Open System
    - Urban-Closed System
    - Standards and Details
  - Additional Details
  - Design Coordination



Permitting

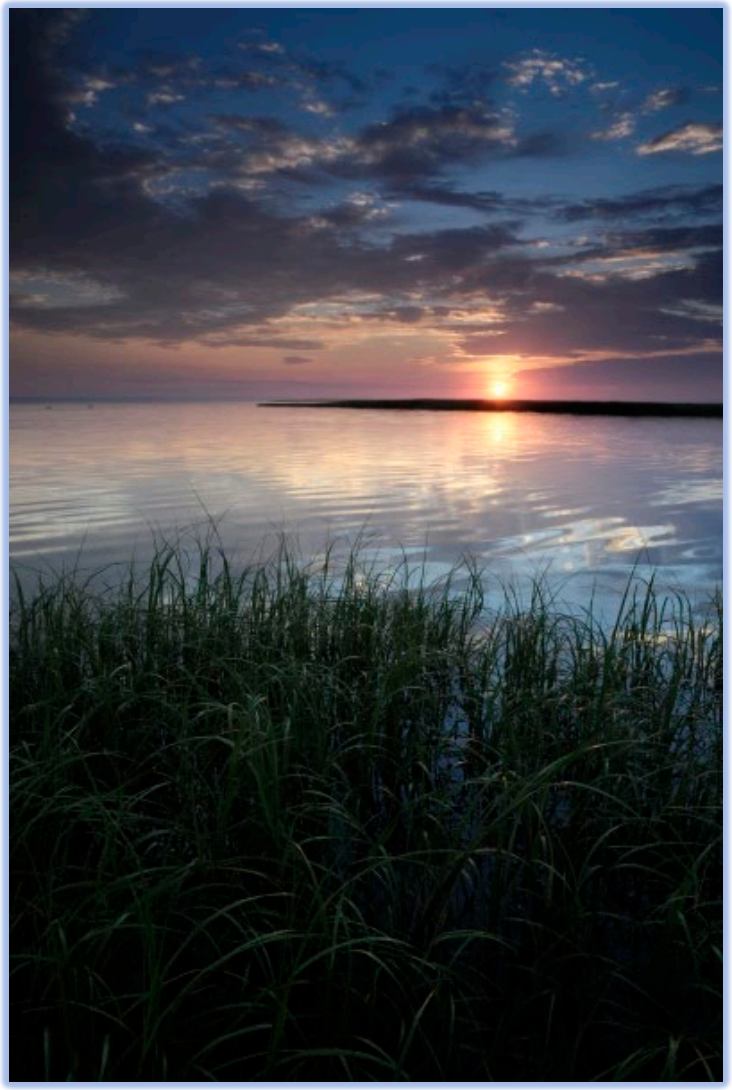
- FDOT District Map versus Water Management District Map





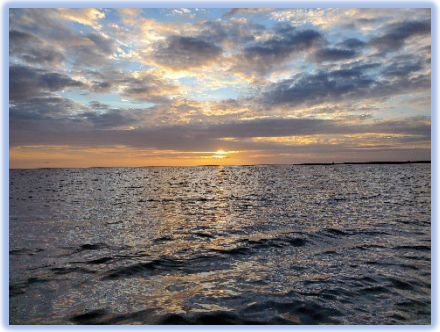
Permitting

- **Florida versus other states**
  - Sensitive waterways and Floridian Aquifer
  - We do not have options to opt out of treatment
- **Start process early**
  - Pre-application meeting agencies
  - Wetlands (schedule site visit with agencies)
- **Add permit timelines to the schedule**
  - Include agency review time
  - Include time for Requests for Additional Information (RAI) from reviewers
- **Communication is KEY**
  - Reviewers
  - Project Team



Water Quantity

- **Pre- and Post-Development Discharge Rates**
  - Non-tidal water bodies
    - Post discharge rates Less than Pre
      - 25-year/24-hour storm event
    - Review flows at basin boundary
      - Review options for combined analysis for Ponds that outfall to the same boundary
  - Tidal water bodies
    - Pre-Post comparison is not required
    - Review discharge rates if outfalling to an existing downstream system prior to the final outfalling into tidal water body



FDOT

Water Quality

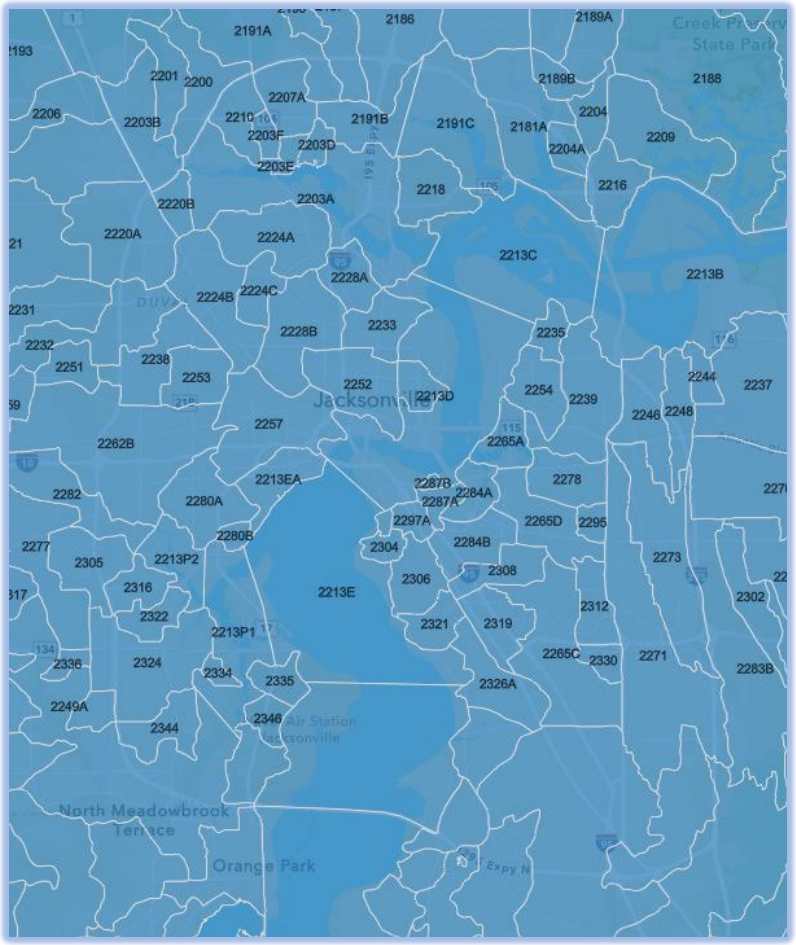
- **Dry Retention vs. Wet Detention (SJRWMD Requirements)**

Description	Dry Retention	Wet Detention
Soils	High permeability	All soils
Water Table	Deeper	Shallow
Treatment Volume (Max)	0.5" X Drainage Area	1" X Drainage Area
	1.25" X Impervious Area	2.5" X Impervious Area
Outstanding Florida Water (OFW)	1.5 X Max Treatment Volume	
Recovery Time	TV within 72 hours	1/2 of TV within 24 to 30 hours
Permanent Pool Volume	n/a	14 day avg residence time
Freeboard	0.5'	1'

- **New SJRWMD criteria anticipated in July 2023**

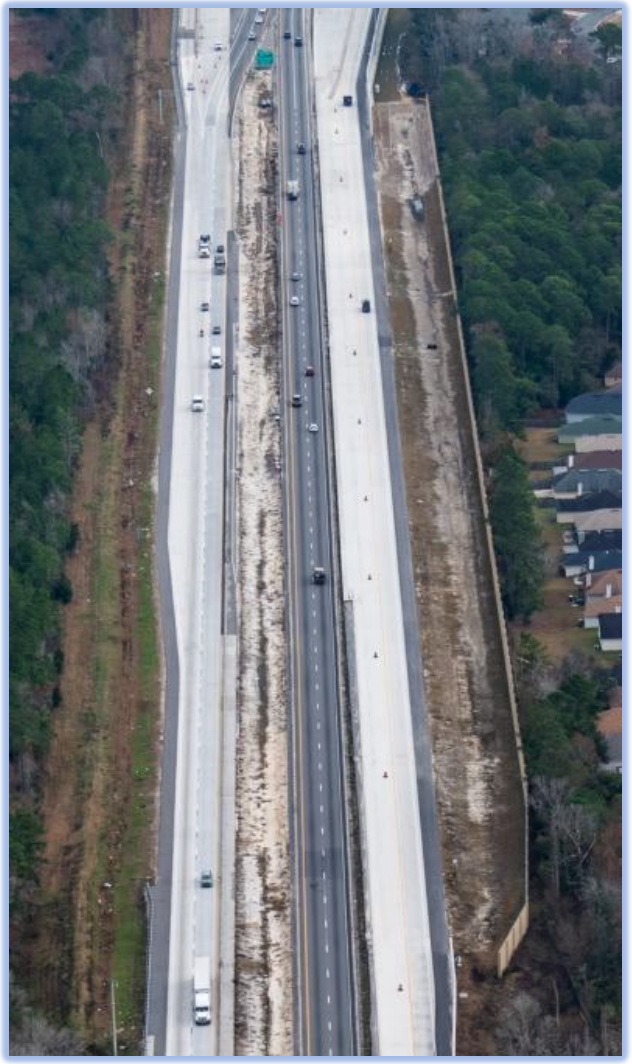
Water Quality

- **Additional Requirements**
  - Florida Department of Environmental Protection (FDEP)
    - Water Body IDs (WBIDs)
    - Basin Management Action Plan (BMAP)
    - Florida Total Maximum Daily Load (TMDL)
      - Impaired for Nutrients (Nitrogen and Phosphorus)
      - Perform Pre-Post Nutrient Calculations
- **Treatment Options**
  - Overtreatment
  - Compensatory Treatment



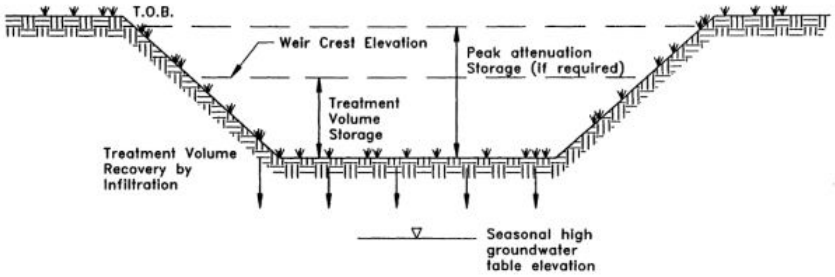
Stormwater Management Facilities
Dry Retention

Dry Retention Pond



Linear Retention Swales

Stormwater Management Facilities
Dry Retention



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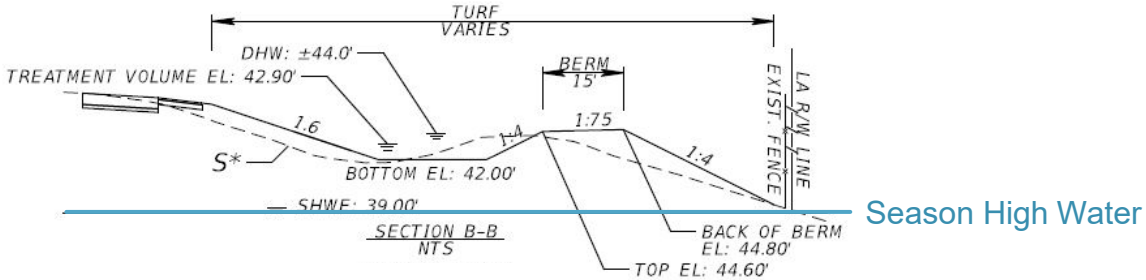
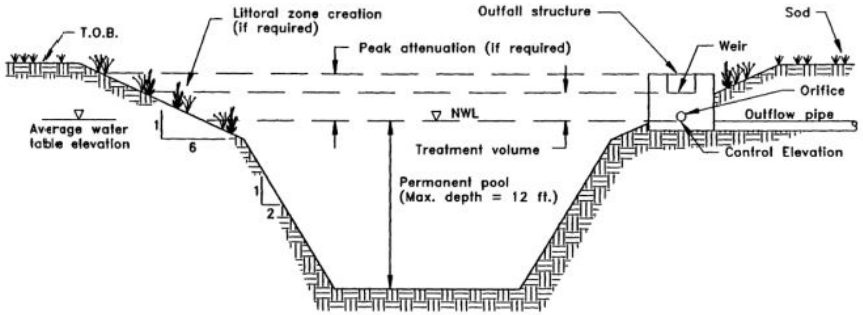


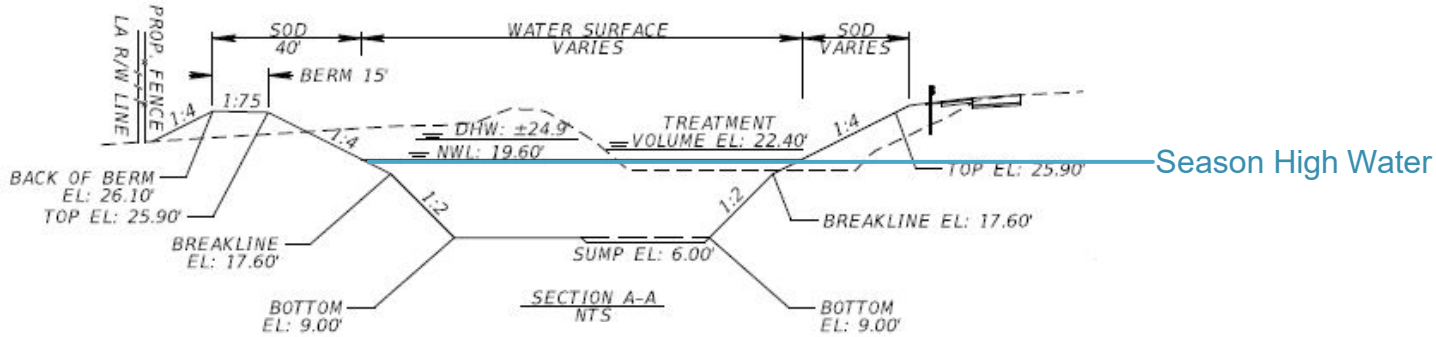
Dry Retention Example

Stormwater Management Facilities
Wet Detention

Stormwater Management Facilities
Wet Detention



Wet Detention (SJRWMD)



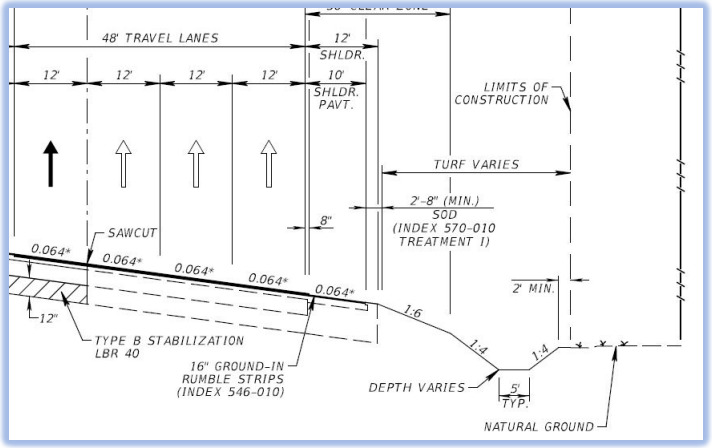
Wet Detention

Stormwater Conveyance
Rural-Open Channel Systems

- **Requirements**
  - Minimum Slope: 0.0005 ft/ft
  - Typical Width: 5 ft
  - Freeboard
    - Ditches in Fill: 1 ft
    - Ditches in Cut: ½ ft
  - Linings
    - Ditch Pavement Velocity > 4 fps
  - Typical Section
    - Coordinate with Roadway Team
    - Define special profiles

Table 2.1: Design Storm Frequencies of Open Channels

TYPE CHANNEL	FREQUENCY
Roadside, Median, and Interceptor Ditches or Swales	10-year
Outfalls	25-year
Canals	25-year
Temporary Roadside and Median Ditches or Swales	2-year
Temporary Outfalls and Canals	5-year



Example Typical Section

Stormwater Conveyance
Urban-Closed Storm Drain Systems

- **Requirements**
  - Length for maintenance access
    - Based on pipe size
    - Add manholes as needed
  - Velocities
    - Min. 2.5 ft/second
    - Max. 15 ft/second
  - Hydraulic Grade Line (HGL) Clearance
    - Major Losses
      - 1 ft clearance b/t HGL and Theoretical Gutter
    - Minor Losses
      - HGL at Theoretical Gutter

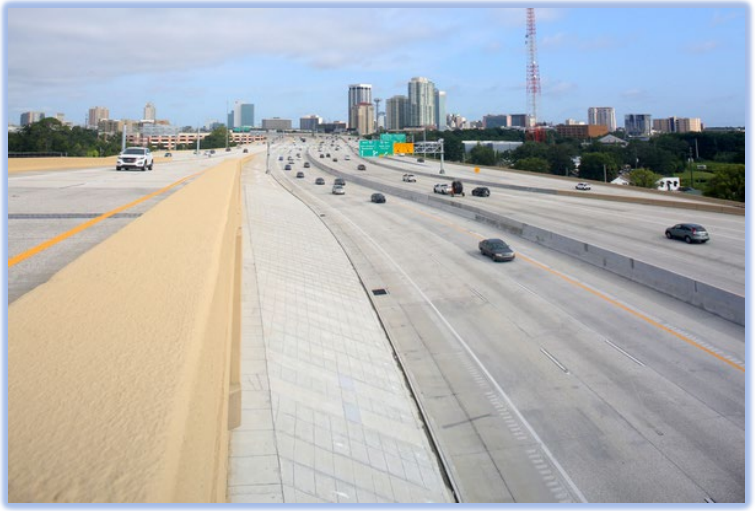
Table 3.1: Design Storm Frequencies of Storm Drain Systems

TYPE STORM DRAIN	FREQUENCY
General design	3-year
• General design work that involves replacement of a roadside ditch with a pipe system by extending side drain pipes • General design on work to Interstate Facilities	10-year
• Outfalls	25-year
• Interstate Facilities for which roadway runoff would have no outlet other than a storm drain system, such as in a sag inlet or cut section • Outlets of systems requiring pumping stations	50-year

Inlet Placement

- **General location:**
  - Based on Roadway geometry
    - Low points
    - Upstream of super transitions
    - Meet maximum pipe length
  - Rural Facilities
    - Meet Ditch Capacity Requirements
  - Urban Facilities
    - Meet Spread Requirements

Rural Facility



Urban Facility

Table 3.5: Spread Criteria

Typical Section Condition	Design Speed (mph)	Spread Criteria*
Parking Lane or Full Width Shoulders	All	No encroachment into the lane
Left Turn Lanes	Design Speed > 45	Keep 8' of lane clear
Right Turn Lanes	All	Keep ½ of lane clear
All Other	Design speed ≤ 45	Keep ½ of lane clear
	45 < Design Speed ≤ 55	Keep 8' of lane clear
	Design Speed > 55	No encroachment into the lane

* The criteria in this column apply to travel, turn, or auxiliary lanes adjacent to barrier wall or curb, in normal or super-elevated sections.

Inlet Placement (cont.)

- **General Guidance**
  - Provide flanking inlets for low points in curbed sections
  - Meet increased spread requirements for shoulder gutter inlets
  - Review inlets and pipes for constructability
  - Review potential conflicts with Utilities, ITS, Signals, Signing, and Lighting
  - Avoid inlets in cross walks and align grates in bike paths perpendicular to wheel path
  - Use Alt G (galvanized) grates and frames within ½ mile of brackish water
  - Review intersection details for minimum slopes and low points
  - Use trench drains as a last resort due to maintenance consideration

FDOT

FDOT Drainage Standard Plans

- **Inlets, Manholes, and Junction Boxes**
  - 425- Series
  - *Work this series with Drainage Manual Tables 3.2 and 3.3*

Table 3.2: Curb and Gutter Inlet Application Guidelines

STANDARD PLANS INDEX	INLET TYPE	TYPE CURB/ GUTTER	GRADE CONSIDERATION	BICYCLE COMPATIBLE	ACCEPTABLE IN AREAS OF OCCASIONAL PEDESTRIAN TRAFFIC [6]	Notes
425-020	1	E & F	Continuous	Yes	Yes	
	2 [1]	E & F	Sag	Yes	Yes	
	3	E & F	Continuous	Yes	Yes	
	4 [1]	E & F	Sag	Yes	Yes	
425-021	5	E & F	Continuous	Yes	Yes	
	6 [1]	E & F	Sag	Yes	Yes	
425-022	7	Separator I & II	Continuous or Sag	Yes	Yes	
425-023	8	Separator IV & V	Continuous or Sag	Yes	Yes	
425-024	9 [2]	D & F	Continuous or Sag	Yes	Yes	
425-025	10 [2]	D & F	Continuous or Sag	Yes	Yes	
425-030	1	Median Barrier Wall	Continuous or Sag	No	Yes [4]	
	2 [3]	Median Barrier Wall	Continuous or Sag	No	Yes [4]	
425-031	-	Barrier Wall	Continuous or Sag	No [5]	Yes	See Index 425-031 Detail "A"
425-032	-	Barrier Wall (Rigid, C & G)	Continuous or Sag	No [5]	Yes	See Index 425-032 Grate Details
425-040	S [7]	Shoulder	Continuous	No [5]	Yes	See Index 425-040 Bar Stub Detail "C"
425-041	V	Valley	Continuous or Sag	No [5]	Yes	

[1] Double-throated inlets usually are not warranted unless the minor gutter flow exceeds 50 ft in length or 0.5 cfs.
[2] Use curb inlets 9 and 10 only where flows are light and right-of-way does not permit the use of throated curb inlets.
[3] These are double inlets; one on each side of the barrier wall.
[4] Specify the reticuline grate.
[5] Bicycle compatible as long as a minimum 4-foot riding surface is provided around the inlet, with a preferred 1-foot offset from the inlet. Consider use of pavement markings shown in the 2009 MUTCD to alert cyclists to the inlet in the bicycle lane or shoulder pavement.
[6] Do not place these inlets in pedestrian ways, but may be used in areas subject to occasional pedestrian traffic near pavement, grassed, or landscaped areas where pedestrians are not directed over the inlet and can walk around the inlet.
[7] Intended for use in shoulder gutter on facilities subject to heavy wheel loads.

Table 3.3: Ditch Inlet Application Guidelines

STANDARD PLANS INDEX	INLET TYPE [1], [2]	TRAFFIC	BICYCLE COMPATIBLE	ACCEPTABLE IN AREAS OF OCCASIONAL PEDESTRIAN TRAFFIC [5]
425-050	A	Heavy Wheel Loads	No	No
425-051	B	Heavy Wheel Loads	No	Yes
425-052	C [3]	Infrequent Traffic	Yes [6]	Yes [4]
	D	Infrequent Traffic	Yes [6]	Yes [4]
	E	Infrequent Traffic	Yes [6]	Yes [4]
	H	Infrequent Traffic	Yes	Yes
425-053	F	Heavy Wheel Loads	Yes	Yes
	G	Heavy Wheel Loads	Yes	Yes
425-054	J	Heavy Wheel Loads	No	Yes
425-055	K	N/A	N/A	N/A

[1] Specify alternate G grates when in salt-water environment.
[2] Inlets with slots are more debris tolerant than inlets without slots. Debris may buildup on Type B fence of Type K inlet.
[3] For back of sidewalk location, see ***Standard Plans, Index 425-060***.
[4] Slotted inlets located in areas accessible to pedestrians must have traversable slots.
[5] Do not place these inlets in pedestrian ways but may be used in areas subject to occasional pedestrian traffic near pavement, grassed, or landscaped areas where pedestrians are not directed over the inlet and can walk around the inlet.
[6] Do not use inlets with traversable slots in areas subject to bicycle traffic.

Pipes

- **Things to consider**
  - Maximum length for maintenance

The maximum pipe lengths without maintenance access structures are as follows:

Pipes without French drains:	
18" pipe	300 feet
24" to 36" pipe	400 feet
42" and larger and all box culverts	500 feet

  - Minimum pipe size 18"
  - Meet Cover requirements (FDOT Drainage Manual-Appendix C)
  - Meet wall zone criteria (FDOT Drainage Manual-Appendix D)
  - Culvert Service Life Estimator (CSLE)
    - Meet Service Life Requirement using Corrosion Test Results from Geotech

End Treatment Selection

- **Understand site conditions**
  - Debris
  - Roadside Safety (Clear Zone)
  - Adjacent slopes
  - R/W constraints (MES vs. straight end wall)
  - Protective treatments
    - Manatee grates
    - Grate requirements
  - Outlet velocities
    - Erosion protection (baffles and riprap)

U-Type Endwall (w/baffles)

Mitered End Section

FDOT

FDOT Drainage Standard Plans

- **End Treatments**
  - 430- Series
  - *Work this series with Drainage Manual Tables 3.4*
  - Major differences
    - Clear Zone
    - Pipe Size
    - Right of Way constraints

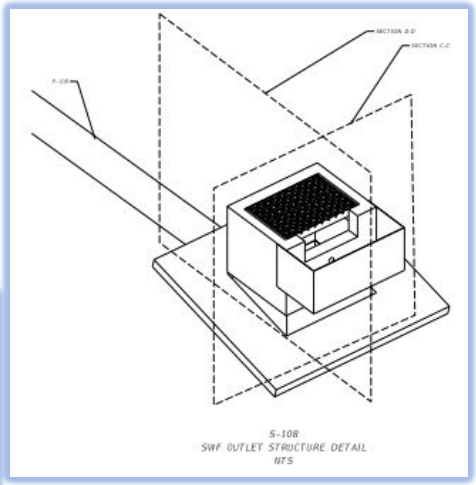
Table 3.4: Drainage End Treatment - Lateral Offset Criteria

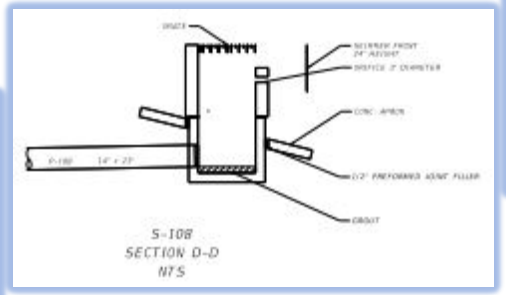
INDEX	STRUCTURE DESCRIPTION	LATERAL OFFSET CRITERIA [1]
400-289 to 400-292	Concrete Box Culvert - End Treatments	Outside Clear Zone
425-020 to 425-041	Curb, Barrier & Gutter Inlets	Permitted within Clear Zone
425-050 to 425-051	Ditch Bottom Inlets – (Types A [2] and B) [3]	
425-052	Ditch Bottom Inlets – (Types C, D, E and H) [3] [4]	Permitted within Clear Zone
	Ditch Bottom Inlet - Type H w/Slot	Outside Clear Zone
425-053 & 425-054	Ditch Bottom Inlets – (Types F, G and J) [3]	Permitted within Clear Zone
425-055	Ditch Bottom Inlet - Type K	Outside Clear Zone
425-060	Back of Sidewalk Drain	Permitted within Clear Zone for Urban Curb & Gutter Sections Only with Design Speed ≤ 45 mph
430-010	U-Type Concrete Endwalls With Grates - 15" to 30" Pipe	Permitted within Clear Zone for Low Design Velocities & Negligible Debris
430-011	U-Type Concrete Endwalls Baffles and Grate Optional - 15" to 30" Pipe	Permitted within Clear Zone w/Grate
430-012	U-Type Concrete Endwalls Energy Dissipator - 30" to 72" Pipe	Outside Clear Zone See Index for "Location Reference"
430-020	Flared End Section	≤ 15" Diameter Inside Clear Zone > 15" Diameter Outside Clear Zone
430-021	Cross Drain Mitered End Section[6]	≤ 24" Diameter Inside Clear Zone [5] > 24" Diameter Outside Clear Zone
430-022	Side Drain Mitered End Section	Permitted within Clear Zone
430-030 to 430-034	Straight Concrete Endwalls	Outside Clear Zone See Indexes for "Location Reference"
430-040	Winged Concrete Endwalls - Single Round Pipe	
430-090	Safety Modifications for Endwalls	Permitted within Clear Zone w/Grate

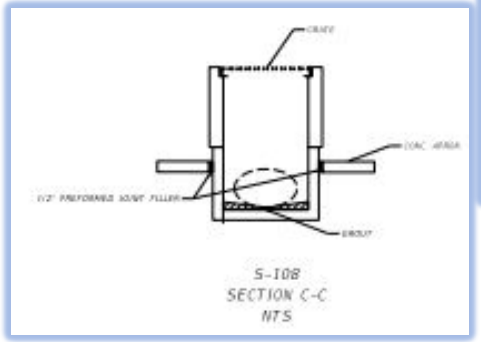
[1] Lateral offset criteria for vehicular traffic only. Additional considerations may be needed for pedestrian or bicycle traffic. See Indexes for additional information.
[2] Designed for use on limited-access facilities where debris may be a problem.
[3] When slots are required due to debris considerations, the inlet must contain a traversable slot design to be located within a clear zone. See Indexes for traversable slot designs.
[4] Designs intended for areas of infrequent traffic loading.
[5] Equivalent size pipe arch or elliptical pipes are permitted within clear zone. Recommended MES slope is 1:4, otherwise steeper slopes require DDrE approval.
[6] Include slope and ditch transitions when the roadway slope must be flattened to place end section outside clear zone. See ***Standard Plans, Index 430-021*** for detail.

Additional Details

- **Pond Control Structures**
  - Often provided in table format
  - Double check design for constructability by reviewing cross section
    - Skimmer height
      - Typical dimensions are provided in Standard Plans 425-070
    - Confirm adequate cover on pipe
    - Review outlet location and velocities
    - Provide maintenance access







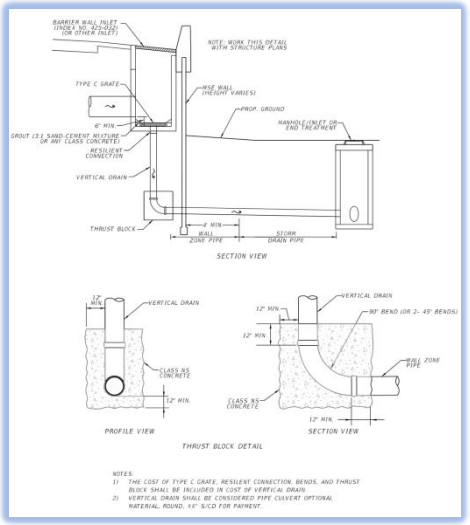
OUTLET STRUCT.	SWF	STATION	OFFSET	REF.	INLET TYPE	INDEX NO.	GRATE EL. (FT NAVD)	WEIR EL. (FT NAVD)	OUTFALL PIPE EL. (FT NAVD)	ORIFICE EL. (FT NAVD)	CONC. DITCH PAVT. (SY)	TOP OF SKIMMER EL. (FT NAVD)
S-108	#2	704+72	109.75	SR61	D	425-052 425-070	33.00	32.00	29.20	31.00	10.91	33.00

EXHIBIT 917-1
Date 1/1/21

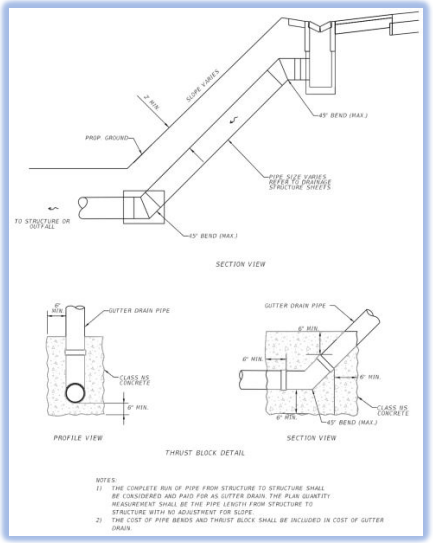
FDM 917 Detail Example

Additional Details (cont.)

- **Gutter Drains**
  - Provide additional details for construction
- **Vertical Drains**
  - Provide additional details for construction
  - Review Structures Design Guidelines and Wall Zone Pipe criteria
  - Include resilient connectors to allow for settlement



Vertical Drain Detail



Gutter Drain Detail

Design Coordination

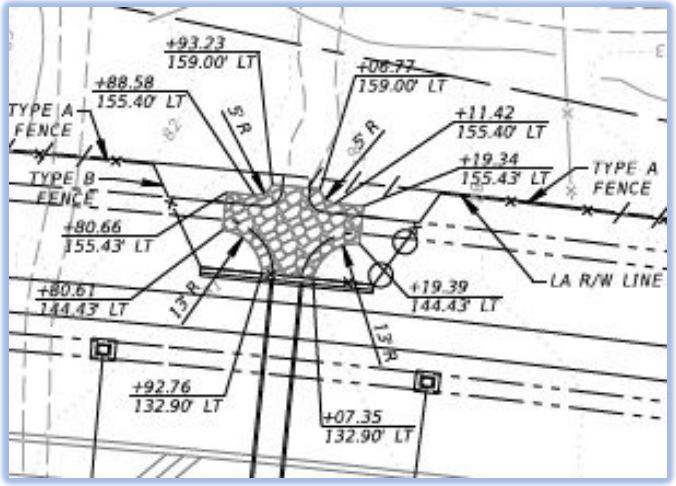
- **Noise Walls**
  - Review profile and cross sections in relation to drainage design
  - Provide slots to maintain existing drainage patterns
  - Coordinate with structures team

Noise Wall Slots

Design Coordination (cont.)

- **Concrete Box Culverts (CBC)**
  - Bridge Culvert vs. Box Culvert
  - Coordination with Structures Team on design and details
  - Riprap placement and design

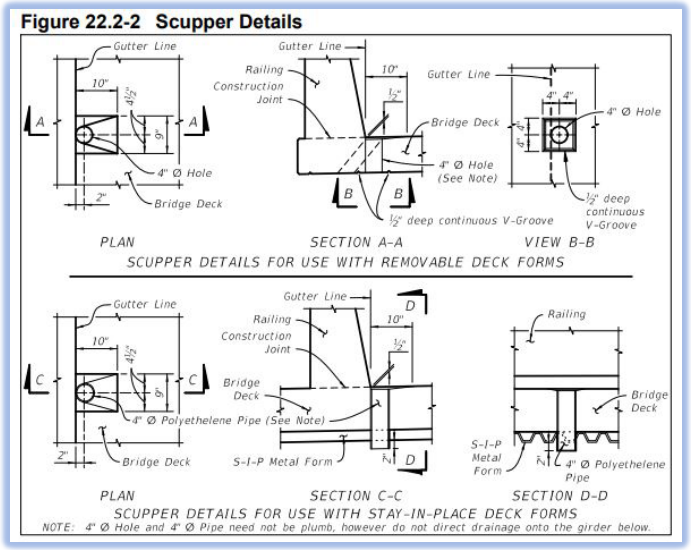
Concrete Box Culvert

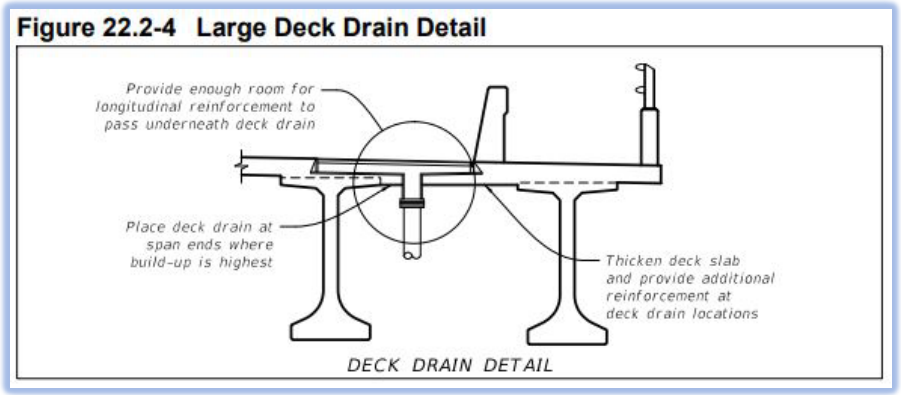


Riprap Detail

Design Coordination (cont.)

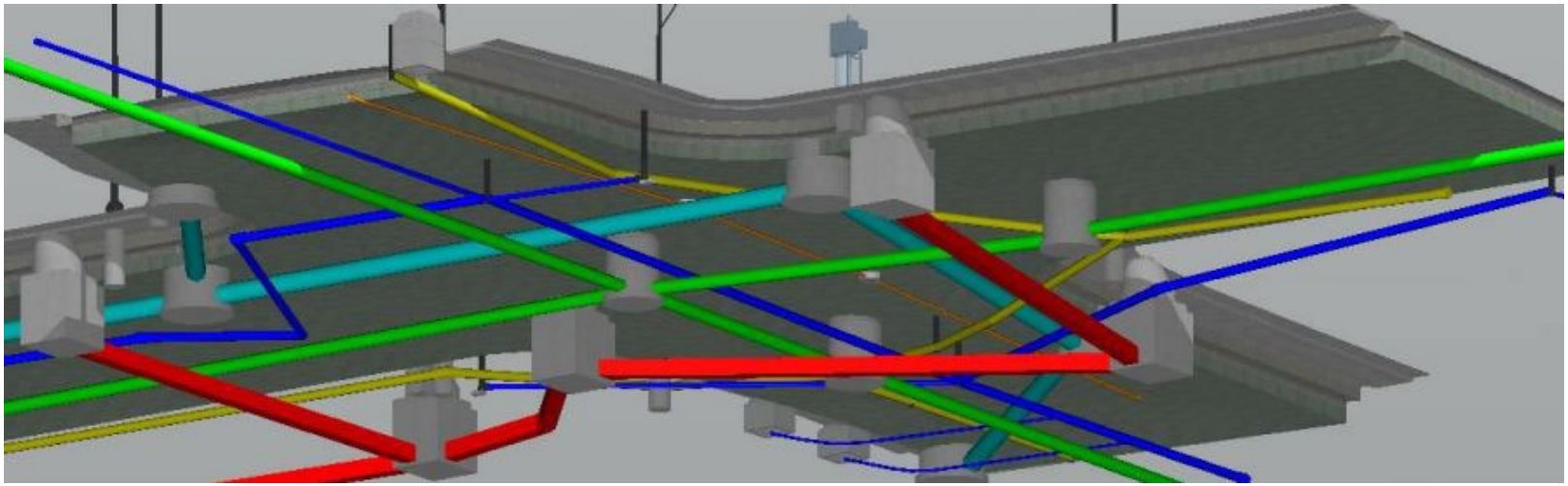
- **Bridges**
  - Participate in process early (Structures Detailing Manual (SDM) Ch 22)
  - Review Spread and determine drainage options
    - No scuppers
    - Free Drainage Scuppers (over waterways, avoid navigational channels)
    - Closed Drainage System (additional maintenance)
  - Adjust profile or cross slopes, if possible, to avoid closed system on bridge





Design Coordination (cont.)

- **Utilities**
  - Last, but NOT LEAST, coordinate with Utilities
    - Avoid conflicts where possible
    - Review VVHs and add available information to all plans



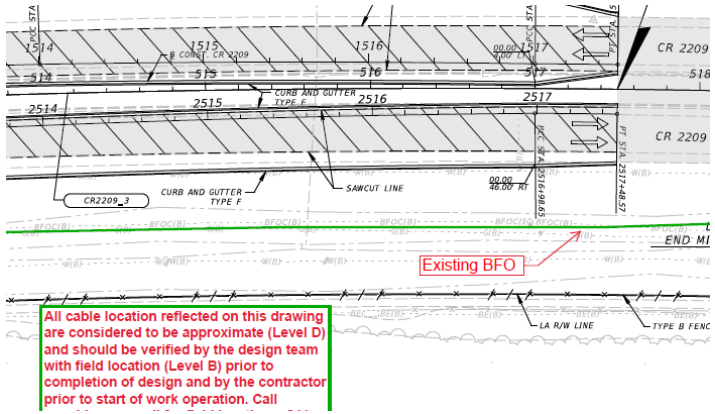
Utility Coordination

Utility Coordination

- **Utility Adjustments**
  - Process and Responsibilities are defined in the Utility Accommodation Manual
- **Utility Work by Highway Contractor**

Utility Adjustments - Schedule

- **By Florida Statute the District Utility Office (DUO) must give the Utility Agency and Owner (UAO) 30 days response time for each Phase of plans sent for review and markup**
- **Phase I Plans**
  - DUO to start the utility coordination process. Request preliminary Red, Green Browns (RGB's).
    - Red – Remove, Green – Remain, Brown – Adjusted/Proposed
  - Confirm Ownership, Size, AND Material



Utility Adjustments - Schedule

- **Phase II Plans**
  - Mobilize surveyor for VVH's during plans development
  - Test hole information is critical for designing drainage and other components
- **EOR to begin contact with UAO's after 60% ERC has been implemented**
  - Proactively discuss relocation limits and options for proposed relocations ahead of Phase III Submittal. It's a process, so count on multiple occurrences for contact and coordination.
- **Phase III Plans**
  - DUO begins requesting Utility Work Schedule (UWS) and RGB's to coincide with the UWS
  - When changes are made after 90%, the UAO is re-engaged and 30 day window begins
  - Ensure existing utilities are shown in drainage structure cross sections

Utility Adjustments – UWS

- **Utility Work Schedules are required per 2017 Utility Adjustment Manual 2.1.10**
  - Section A: UAO, EOR, and District Utility Administrator signatures
  - Section B: Special Conditions/Constraints by the UAO
  - Section C: Description of UAO Work Activities

Rule 14-46.001 F.A.C
Page 2 of 3

FLORIDA DEPARTMENT OF TRANSPORTATION
UTILITY WORK SCHEDULE

December 14, 2016

Financial Project ID: 422938-5-52-01
Utility Company: Clay Electric Cooperative
FDOT Plans Dated: 12/14/2017

SECTION B: UAO SPECIAL CONDITIONS/CONSTRAINTS

1. CEC facilities designated ad marked with paint and/or flags by locating service throughout the duration of the project in accordance with state law.

2. FDOT contractor shall give 2 weeks notice for any request for lines to be covered, and 4 weeks notice for requests to de-energize powerlines for safety purposes. It is FDOT and its contractors responsibility to comply with all OSHA and other applicable safety standards.

3. CEC will need an official notice to proceed with all relocations prior and during construction.

4. FDOT Contractor shall give a two week notice for any request of CEC lines to be covered. The charge for the cover up of CEC power lines will be $415 per truck set up, per day. 25KV lines should be considered energized, even when covered. It is the responsibility of the FDOT and its contractors to comply with all OSHA and other applicable safety standards.

5. FDOT Contractor shall give a 4 week notice for requests to de-energize CEC powerlines for safety purposes. A feasibility study will then be performed to determine if the lines in conflict can be de-energized, and if so, any costs to de-energize or re-route the lines will be

Utility Adjustments – UWS

- **Utility Work Schedules are required per 2017 Utility Adjustment Manual 2.1.10**
  - Section A: UAO, EOR, and District Utility Administrator signatures
  - Section B: Special Conditions/Constraints by the UAO
  - Section C: Description of UAO Work Activities

SECTION C: UAO's WORK ACTIVITIES

Act. No.	Utility Facility (type, size, material, status)	From Station/Offset	To Station/Offset	Utility Work Activity Description	Dependent Activity	TCP Phase	Consecutive Calendar Days Prior to Const.	Consecutive Calendar Days During Const.
1	ENGINEERING						15	
2	PERMITTING						45	
3	MATERIAL PROCUREMENT						45	
	WORK SCHEDULE							
	Existing 6-1.5" HDPE, o/s approximate from B/L of Const. SR 15 SB unless otherwise noted.							
4	Underground FOC	609+00,42' LT	610+58, 42' LT	To Remain in Service	NA	ALL	0	0
5	Underground FOC	610+58, 42'LT	615+82,39'LT	To be Placed Out of Service	After Splicing	Phase 1 (US-17)	0	0
6	Existing Handhole	615+82,40'LT		To be Removed	After Splicing	Phase 1 (US-17)	0	2

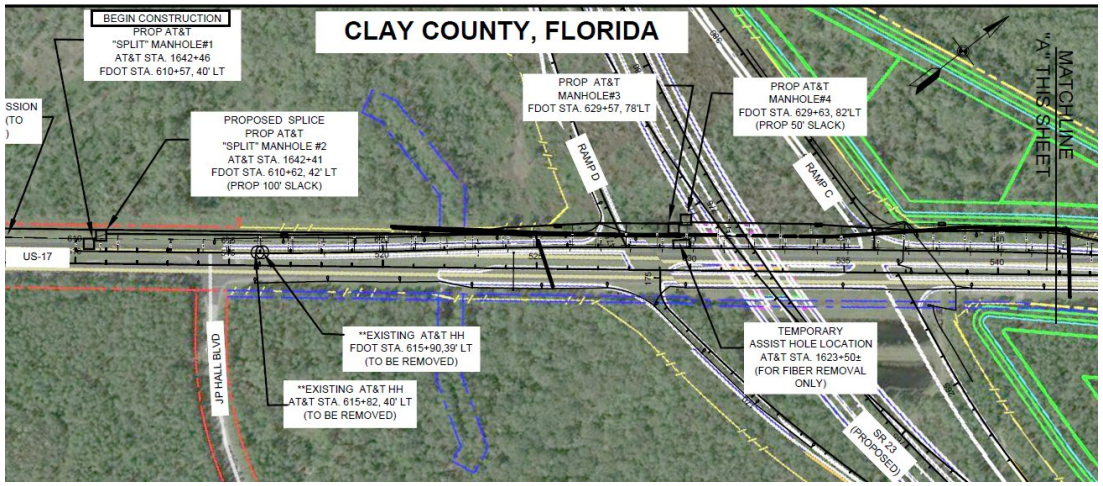
Utility Adjustments - Schedule

- **Phase II Plans**
  - Mobilize surveyor for VVH's during plans development
  - Test hole information is critical for designing drainage and other components
- **EOR to begin contact with UAO's after 60% ERC has been implemented**
  - Proactively discuss relocation limits and options for proposed relocations ahead of Phase III Submittal. It's a process, so count on multiple occurrences for contact and coordination.
- **Phase III Plans**
  - DUO begins requesting Utility Work Schedule (UWS) and RGB's to coincide with the UWS
  - When changes are made after 90%, the UAO is re-engaged and 30 day window begins
  - Ensure existing utilities are shown in drainage structure cross sections

Utility Adjustments - Schedule

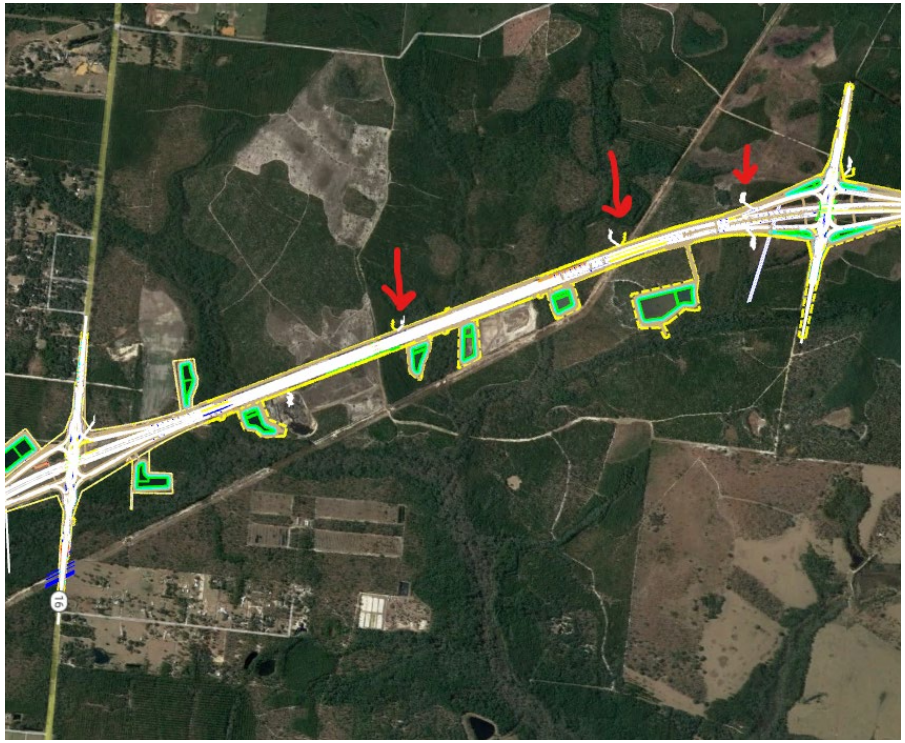
- **Utilities for the Project should be certified by the District Utilities Office 30 days Prior to PS&E 1**

- **Post-Design**
  - Review Utility Permits
  - Provide comments in FDOT One Stop Permitting



Power Service

- **ITS, Lighting, Signals, and Tolls need power**
- **Where is it coming from?**
  - Within the LA R/W (shown in the Contract Plans) or from an Easement outside the LA R/W?



Power Service

- **If primary power for FDOT services is required within the LA R/W then additional scope and cost will be added to the Project**

- **Transformers have long lead times**
  - 240/480v transformers for ITS and Lighting currently have 2-year lead times

Utility Coordination – Best Practices

- **The EOR might consider drafting a UWS to kick-start the process**
- **Ensure the Contractor has staked drainage structures, mast arms, overhead signs, bridge piles etc. in the field prior to the UAO constructing their utilities**
- **Verify Temporary Traffic Control Phasing**
  - Could determine relocation limits
  - Determine schedule of relocations
- **UAO to independently verify existing Overhead Electric clearances, particularly for Transmission Lines**

FDOT

Utility Coordination – Best Practices

- **Consult with FDOT PM and District Utilities Office to verify if 11x17 Utility Adjustment Plans are required**

- **Meetings are recommended with UAO's to discuss relocations**
  - Plan View and Cross Sections
  - KMZ file showing Utilities and Service Points

- **Begin with Reimbursable Utilities**
  - UWS and Utility Estimate Summary (UES) are required to secure funding
  - There is a possibility that Utility Work by Highway Contractor Agreement (UWHCA) might be required
    - Additional Scope and Schedule implications

UWHCA

- **Determine before 60% Submittal**
  - Additional Design Services and Construction Cost
  - Funding under -56
- **Staff Hour Estimate determined on a case-by-case bases**
  - Not included in the standard SHE spreadsheet
- **Requires TSP for the UAO specifications**
  - Include draft TSP with Phase II Submittal
  - UAO approved TSP will be submitted to the District Specs Office by the EOR, no later than Phase III unless approved otherwise
  - TSP should be approved by the UAO before sending to the District Specs Office

FDOT ACEC

PM ACADEMY

Transportation Management Plan

Andy Cummings, P.E.
Connelly & Wicker, Inc.
Vice President

Transportation Management Plan

- **TMP may include:**
  - Temporary Traffic Control (TTC) Plans (Level I / Level II)
  - Transportation Operations Plan
  - Public Information Plan
- **TTC Reference Documents**
  - MUTCD, Part VI
  - 2023 Florida Design Manual (FDM)
    - Sections 240, 241, 242, & 243
    - Section 921 (NexGen)
  - Standard Plans, Series 102 & 711-002
  - Basis of Estimates Manual
  - FDOT Traffic Analysis Handbook
  - AASHTO Guide for Development of Bicycle Facilities, 4th Edition, Chapter 7

Temporary Traffic Control (TTC) Plan

- **Successful Major Project TTC Plans include:**
  - EOR required to have FDOT Temporary Traffic Control (TTC) Advanced Certification
  - Lane Closure Analysis
    - Day time construction (may require temporary pavement)
    - Night time Construction (travel lanes available during peak hours)
  - Development of TTC Phases
    - Bridge construction phasing
    - Utility Accommodations
    - Drainage phasing & Temporary drainage
  - Considerations for ALL modes of transportation
    - Pedestrians
    - Bicyclists
    - Transit
  - D2 requires 45% TCP Review meeting
  - TTC plans should consider Procurement Time, Constructability and Utility issues
  - Preliminary Estimate of Construction Time by Consultant with Quantities & phases
  - Final "**Contract Time Memo**" (by FDOT Construction)

Temporary Traffic Control (TTC) Plan

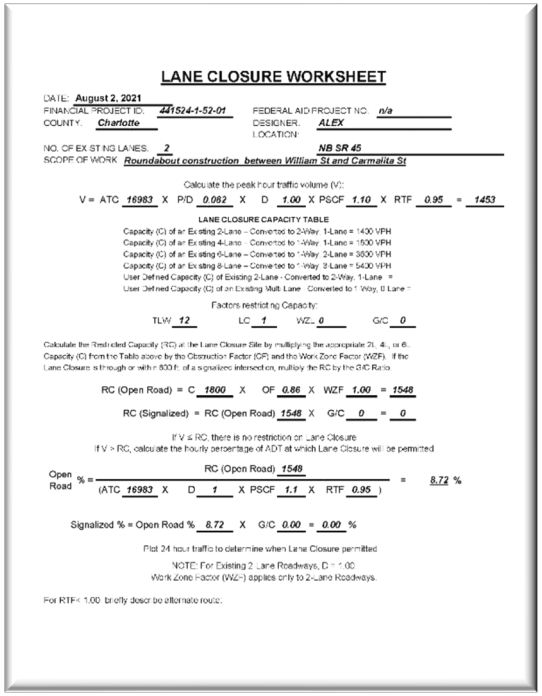
- **FDOT Temporary Traffic Control (TTC) Advance Certification**
  - Advanced TTC Certification required for EOR responsible for the design and development of the TTC plan.
  - Advance TTC Certification is a 20 hour class with an Exam requiring a 70% pass rate
  - Training is by FDOT Approved third party providers.
  - Refresher course (8 hour) is required every four years to maintain valid certification.

Temporary Traffic Control (TTC) Plan

- **Requirements**
  - If working on a Interstate with Emergency Shoulder Use (ESU) (I-10, I-75, I-95), requires FDOT Chief Engineers' approval to OMIT ESU
  - Work Zone Speed
    - Work Zone Speed should use existing POSTED speed
    - On High Speed facilities, the Motorist Awareness System should be used in accordance with FDM 240.2.2.12 and Standard Plans 102 Series
    - A work zone speed MORE than 10 mph below existing speed requires the approval of the District Traffic Operations Engineer AND the District Director of Transportation Operations

Temporary Traffic Control (TTC) Plan

- **Lane Closure Analysis (2023 FDM 241)**
  - Use Excel Lane Closure Worksheets (FDOT library)
  - Use growth factor to increase traffic counts to construction period
  - Must provide lane closure period of at least 10 hours per 24-hour work period for the Contractor or Approval of State Roadway Design Engineer is required
  - Lane Closure Analysis Report typically includes:
    - Project Location Map & Project Description
    - SLD
    - Lane Closure Worksheets
    - Traffic Data
    - Typical Section Package
    - TTC plans & details (Traffic Control Notes; PCMS Messages, Advanced Signing, Detour plans, TTC Typical Sections per Phase)
    - Summary of Lane Closure Analysis Results



LANE CLOSURE WORKSHEET

DATE: August 2, 2021
FINANCIAL PROJECT ID: 441524-1-52-01 FEDERAL AID PROJECT NO. n/a
COUNTY: Charlotte DESIGNER: ALEX
LOCATION:
NO. OF EXISTING LANES: 2 NB SR 45
SCOPE OF WORK: Roundabout construction between William St and Carmalita St

Calculate the peak hour traffic volume (V):

V = ATC 16983 X P/D 0.092 X D 1.00 X PSCF 1.10 X RTF 0.95 = 1453

LANE CLOSURE CAPACITY TABLE

Capacity (C) of an Existing 2-Lane – Converted to 2-Way, 1-Lane = 1400 VPH
Capacity (C) of an Existing 4-Lane – Converted to 1-Way, 1-Lane = 1600 VPH
Capacity (C) of an Existing 6-Lane – Converted to 1-Way, 2-Lane = 3800 VPH
Capacity (C) of an Existing 8-Lane – Converted to 1-Way, 3-Lane = 5400 VPH
User Defined Capacity (C) of Existing 2-Lane - Converted to 2-Way, 1-Lane =
User Defined Capacity (C) of an Existing Multi-Lane - Converted to 1-Way, 8 Lane =

Factors restricting Capacity:

TLW 12 LC 1 WZ 0 G/C 0

Calculate the Restricted Capacity (RC) of the Lane Closure Site by multiplying the appropriate 2l, 4l, or 6l-Capacity (C) from the Table above by the Obstruction Factor (OF) and the Work Zone Factor (WZF). If the Lane Closure is through or within 500 ft. of a signalized intersection, multiply the RC by the G/C Ratio.

RC (Open Road) = C 1800 X OF 0.86 X WZF 1.00 = 1548

RC (Signalized) = RC (Open Road) 1548 X G/C 0 = 0

If V ≤ RC, there is no restriction on Lane Closure.
If V > RC, calculate the hourly percentage of ADT at which Lane Closure will be permitted.

Open Road % = RC (Open Road) 1548 / (ATC 16983 X D 1 X PSCF 1.1 X RTF 0.95) = 8.72 %

Signalized % = Open Road % 8.72 X G/C 0.00 = 0.00 %

Plot 24 hour traffic to determine when Lane Closure permitted

NOTE: For Existing 2 Lane Roadways, D = 1.00
Work Zone Factor (WZF) applies only to 2-Lane Roadways.

For RTF< 1.00 briefly descr be alternate route.

Temporary Traffic Control (TTC) Plan

- **Key TTC Plan design criteria**
  - High speed roadways (> 45 mph) – Temp K Barrier (free standing or anchored)
  - Low speed roadway (< 45 mph) – Low profile barrier

  - Standard plans Index 102-600 defines:
    - Work zone sign spacing
    - Channelizing device spacing
    - Taper & buffer lengths
    - Clear zone width
    - Drop off Protection requirement

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Temporary Traffic Control (TTC) Plan

- **TTC Plans**
  - General / Phasing Notes
  - Phase Typical Sections
  - Special Details / Critical Sectional Views
  - TTC Plans by Phase
  - Detour Plans
  - Temporary Signal Plans
  - Temporary Highway Lighting
  - Temporary Drainage

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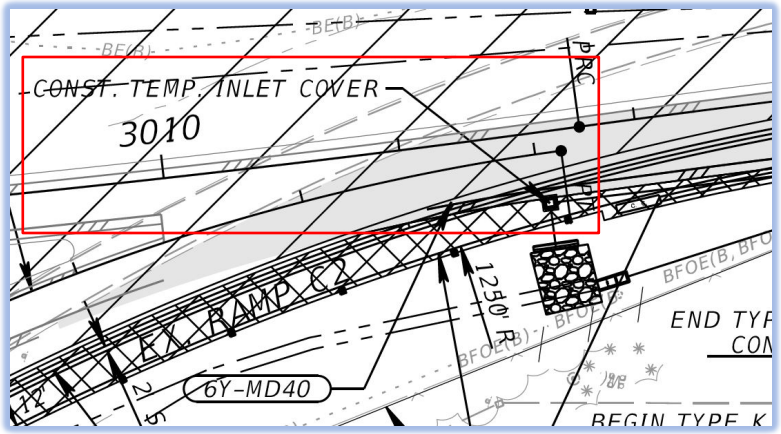
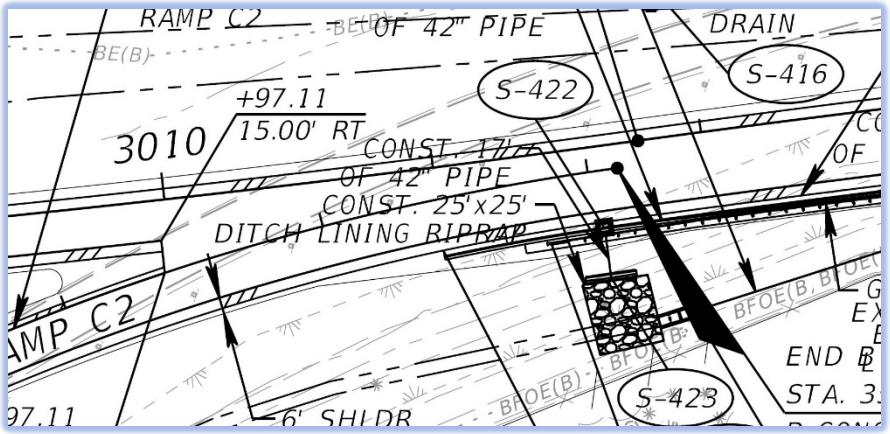
Temporary Drainage

- **Review all TTC Plan Phases**
  - Show existing and proposed drainage
  - Work with MOT Designer to build downstream pipes first
  - Include proposed drainage and show which phase it is constructed
  - Use existing drainage until temporary or proposed drainage is constructed
  - Cap existing or proposed inlets to allow for phased construction of inlets and to cover for temporary pavement
  - Review temporary pavement and fill slopes to avoid increased wetland impacts



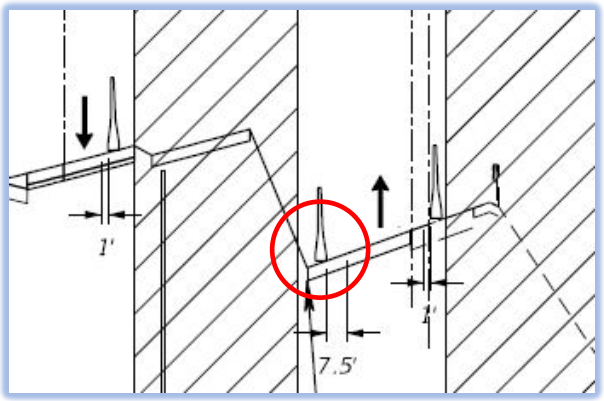
Temp. Pavement with Temp Inlet Cover



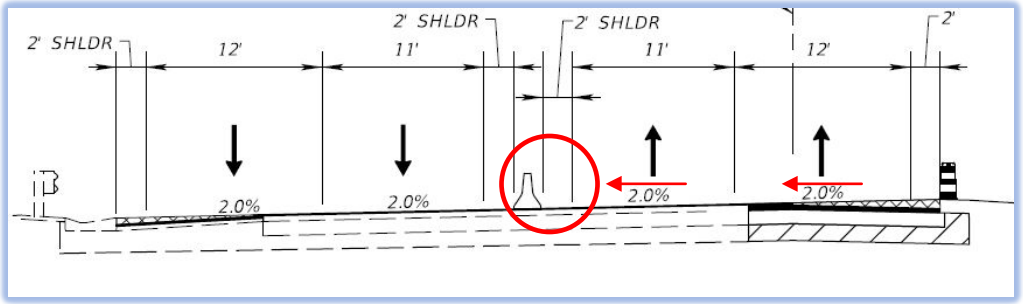
Final Condition

Temporary Drainage

- **Review TTC Typical Sections**
  - Key things to look for
    - Drainage blocked by temporary fill (ramps, travel lanes)
    - Review temporary spread
      - Reduced shoulder width
      - Temporary barrier wall is introduced in areas with no exist. barrier



Water blocked by Fill Slopes



Temporary Barrier Wall

Temporary Traffic Control (TTC) Plan

- **Contract Time Memo**
  - Preliminary Contract Time prepared by EOR
  - Submitted with Phase III submittal
  - Includes all TTC Plans (Typicals, Detours, Plans by Phase)
  - Provide Project Quantities by Construction Phase
  - Use Preliminary Utility Work Schedules

  - After receiving **FINAL "***Contract Time Memo"* from District Construction
    - Update TTC quantities

Temporary Traffic Control (TTC) Plan

- **Lessons Learned**
  - TTC phases should be reviewed by **structures engineer** for constructability and Critical Wall determination.
  - TTC phases should include **drainage engineer** input to minimize temporary drainage
  - TTC phases should be reviewed by **utility owners** for constructability and their work should be detailed by TTC phase in their Utility Work Schedule (UWS)
  - Temporary signals may be required because new mast arms may take up to 9 months from acquisition to installation.
  - Railroads like to construct new crossings in a single phase.
  - Consider Contractor access to work zones when placing temporary barrier.
  - Subsoil excavation typically requires temporary barrier due to multi-day operation
  - Pavement widening pavement design should consider the TCP plan (excavation + stabilization + base construction typically requires multi-day operation)
  - Make sure all works zones have a TTC phase
  - Confirm barrier wall placement with *Autoturn* at intersections

Stormwater Runoff Control Concept Development (SRCC)

Stormwater Runoff Control Concept (SRCC)

- fka: Stormwater Pollution & Prevention Plan (SWPPP)
- SRCC purpose – to provide sediment and erosion control quantities for cost estimating purposes
- 2023 FDM Chapter 251 *(NEW CHAPTER)*
- The *Florida Erosion and Sediment Control Manual* provides guidance.
- SRCC should be prepared in consultation with Drainage, Construction and Environmental personnel.

Stormwater Runoff Control Concept (SRCC)

- SRCC - Conceptual layout of temporary sediment and erosion control Best Management Practice (BMP's)
- Include details for controls that are **NOT** detailed in the *Florida Erosion and Sediment Control Manual.*
- CADD files developed for this concept will **NOT** be signed & sealed.
- SRCC is NOT included in NexGen (900) plans

Break

3D Design & NexGen Plans

Eddie Giese, P.E.
Patel, Greene & Associates, LLC
Production Manager

FDM 900 Series

- **2023 FDM**
  - FDM 300 Series has been sunset
- **What is NexGen?**
  - *Was* model-centric only (MALD)
    - Born from pilot projects
    - Applied to SS10 or OpenX/Civil3D
  - *Now* OpenX/Civil3D with BIM guidance
- **Why NexGen?**
  - Software significantly different
  - Construction techniques evolving (AMG)
  - Industry-wide move to 3D

https://www.fdot.gov/roadway/fdm/default.shtm

NexGen Roadmap

Chapter	Description	Chapter	Description
Plans Production			
300	Production of Plans	900	Production of NexGen Plans
301	Sequence of Plans Preparation	901	Sequence of Plans Preparation
304	Summary of Pay Items	902	Estimated Quantities Report
307	Summary of Quantities		
305	Bridge Hydraulic Recommendation Sheet	903	Bridge Hydraulic Recommendation Sheet
		904	Landscape Opportunity Plan
319	Cross Sections	905	Roadway Cross Sections
Roadway Plans Set			
302	Key Sheet	910	Key Sheet and Signature Sheet
303	Signature Sheet		
309	Project Layout	911	Model Management
310	Project Control	912	Project Control
306	Typical Sections	913	Typical Sections
311	General Notes	914	General Notes
312	Roadway Plan-Profile	915	Roadway Plan-Profile
314	Intersection/Interchange Details and Layouts		
317	Special Details		
313	Special Profiles and Back-of-Sidewalk Profiles		
308	Summary of Drainage Structures and Optional Materials Tabulation	916	Drainage Structures
315	Drainage Structures		
316	Stormwater Facilities	917	Stormwater Facilities
305	Drainage Map	918	Drainage Map
		919	Lateral Ditches
318	Soil Survey	920	Soil Survey and Core Boring Data
321	Temporary Traffic Control Plan	921	Temporary Traffic Control Plan
322	Utility Adjustments	923	Utility Adjustments
323	Selective Clearing and Grubbing	924	Selective Clearing and Grubbing
324	Miscellaneous Structures	922	Miscellaneous Structures
Component Plans Set			
325	Signing and Pavement Marking Plans	940	Signing and Pavement Marking Plans
327	Signalization Plans	941	Signalization Plans
328	Intelligent Transportation Systems (ITS) Plans	942	Intelligent Transportation Systems (ITS) Plans
326	Lighting Plans	943	Lighting Plans
329	Landscape Plans	944	Landscape Plans
		945	Architectural Plans
305	Bridge Hydraulic Recommendation Sheet	946	Structure Plans
		947	Toll Facilities Plans
330	Utility Work by Highway Contractor Agreement (UWHC) Plans	948	Utility Work by Highway Contractor Plans

FDM 900 Series

- **What's changed?**
  - Estimated Quantities Report
  - Model Management Plan
  - Large format plans allowable (not all cases)
  - Drainage Structures –> Profiles
  - Cross Sections – F.I.O.
  - Soil Borings
  - SWPPP out

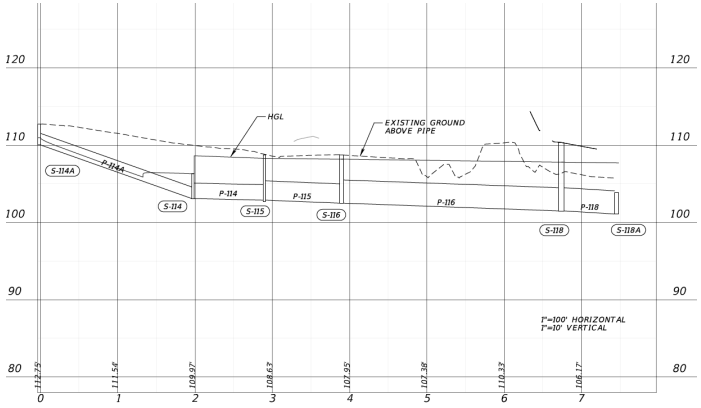


Table 900.3.1 Allowable Sheet Border Sizes

FDM	Sheet	11 x 17	24 x36	36 x 48	36 x 72
904	Landscape Opportunity	X	X	X	X
905	Cross Sections	X	X	X	X
906	Bridge Hydraulics Recommendation	X	X		
	Roadway Plans				
910	Key Sheet & Signature Sheet	X			
911	Model Management	X	X	X	X
912	PNC	X	X		
913	Typical Sections	X			
914	General Notes	X			
915	Plan-Profile	X	X	X	X
916	Drainage Structures	X	X	X	X
917	Stormwater Facilities	X	X	X	X
918	Drainage Map	X	X	X	X
919	Lateral Ditch	X	X	X	X
920	Soil Survey	X	X		
	Report of Core Borings	X	X		
921	TTC Plan	X	X	X	X
922	Misc Structures	X			
923	Utility Adj	X	X	X	X
924	Selective C&G	X	X	X	X

FDM 900 Series

- **Changes to Staff Hour Forms & Guidelines**
  - See PSM22-01 (2/7/22) for more info
  - Move away from “sheets” as unit
    - Length/type/complexity based
  - No more “range”
    - Uses level of effort
  - Further revised in June/Nov 2022
    - EQR strategy
    - Calculated hours

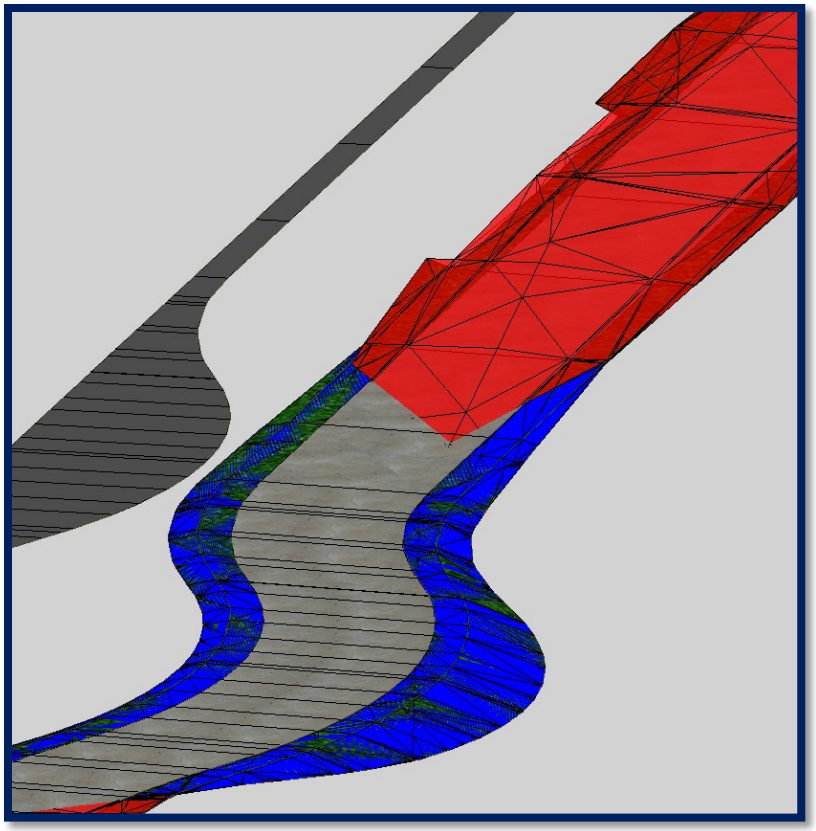
4.15	Roadway Quantities for EQ Report	Length (Miles)	3.50	Calculated Hours	0
		Complexity	Mid Range		
		Interchanges	0	90	
4.16	TTCP Quantities for EQ Report	Complexity	Simple	Calculated Hours	0
		Major Phases	4	8	

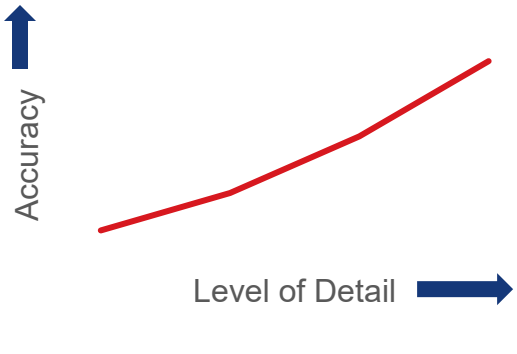
An implementation plan was adopted to update the plans production tabs in 2022, and then the *General* and *Analysis* tabs in 2023. Below is the target release dates for plans production tabs:

Component	Target Release Date
Drainage and Landscape	
6b. Drainage Plans	Jan-22
26. Landscape Plans	
Traffic	
22. Signalization Plans	Apr-22
24. Lighting Plans	
20. Signing & Pavement Marking Plans	
Roadway, Mapping, and ITS	
5. Roadways Plans	Aug-22
29. Mapping	
34. ITS Plans	
Structures	
9. Structures - Summary of Miscellaneous Tasks & Drawings	Dec-22
10. Structures - BDR	
17. Structures - Retaining Walls	
18. Structures - Miscellaneous	
11. Structures - Temporary Bridge	Apr-23
12. Structures - Short Span Concrete	
13. Structures - Medium Span Concrete	
14. Structures - Structural Steel	
15. Structures - Segmental Concrete	
16. Structures - Movable Span	
Architecture	
31. Architecture Development	TBD

Cross Sections & Earthwork

- **WYSIWYG**
- **Days of hand-editing XS are over**
- **End-Area Method vs. Volumetric**
- **A word of caution…**
  - Existing features modeling
  - Clipping/masking
  - Level/Reference display
  - Volume options





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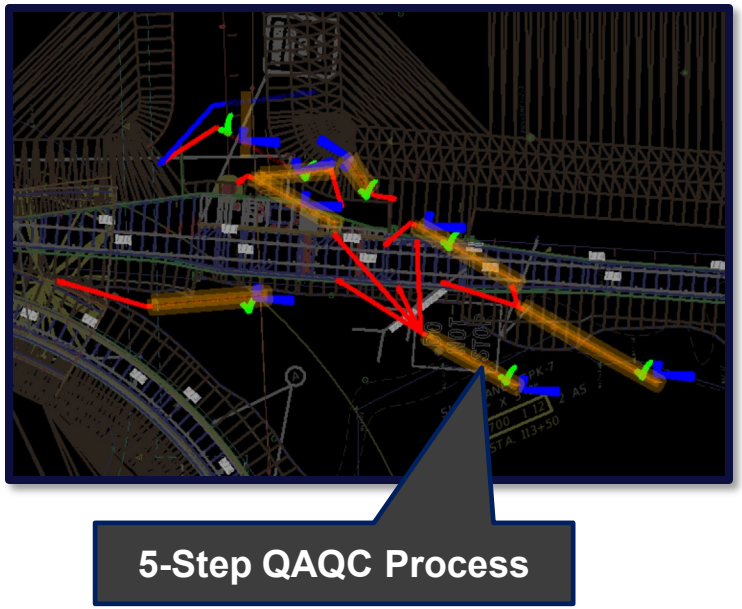
Reviewing 3D Models

- **What is your reviewer's comfort level?**
  - Consider over-the-shoulder reviews / in-DGN
  - Consider other technologies
    - iTwin Design Review
    - Quadri
    - BIM360
  - Is training needed for your reviewers?
  - Might need additional plans for review purposes
- **Keep the end goal in mind**
- **Don't wait until the end!**
  - Interim peer reviews
  - Review corridor templates early/often
- **Establish standards…and stick to them**



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Reviewing 3D Models

FLORIDA DEPARTMENT OF TRANSPORTATION

FDOT Financial Project Number _____

Date: _____

Phase/ Submittal _____

EOR: _____

3D Engineered Model QC Checklist

Implementation Items	Originator	Reviewer	Comments
	Initials	*Initials*	
Geographical Coordinate System has be defined in the model(s)/design file			
3D Baseline/Centerline has been displayed in the model(s)			
Referenced 3D model break lines match the 2D planimetric lines			
Review of model(s) for completeness, visually: ○ Gaps along the model ○ Spikes or lips along seams ○ Overlapping components ○ Transitions between corridors and templates ○ Transitions between varying slope values ○ Slopes harmonization with existing surface ○ Median Crossovers ○ Separator Islands			
Component Depths match the Typical Section: ○ Pavement Layers ○ Driveway ○ Sidewalk ○ Concrete			
Verify Station Offset Elevation at Critical Location: ○ EOP at Drainage Nodes ○ Begin / End Taper Transitions ○ Begin / End Radius ○			
Verify Cross Slopes: ○ Pavement Lanes ○ Shoulders ○ Sidewalk ○ Cross Over Medians ○ Slopes			
Vertical Clearance			
Clash Detection - Interference Checking			
3D Deliverable Created ○ XML files for Corridor Alignments ○ XML files for Existing and Proposed Surfaces (verified against 3D design) ○ Dgn or Dwg files for 2D and 3D lines ○ Icm file for OpenRoads Design Delivery			
other			

SAMPLE

PGA 3D Model QC Checklist
Level of Detail 400

	FPID:	440897-3-52-01
	Phase/Submittal:	Phase II
	Model:	Ramp I
Ready for QC	LTP	T. Hawkins
	Date:	9/19/2022
QC Review	QCR:	E. Giese
	Date:	9/22/2022
Concurrence	LTP:	T. Hawkins
	Date:	9/26/2022
Changes Made	LTP:	T. Hawkins
	Date:	9/26/2022
Changes Verified	QCR:	E. Giese
	Date:	9/27/2022
QA Review	QAR:	H. Patel
	Date:	9/28/2022

3D Model Checklist

Required Info	YES	NO	N/A	Comment	Response	Concurrence
Horizontal and Vertical Controls						
Geographic Coordinate System - Defined in Model	X					
Horizontal Controls	X					
Vertical Controls	X					
condary Alignments Defined in Non-perpendicular Areas			X			
Superelevation & Transitions Match Plans/Calcs		X		Adjust calcs or SE shapes, they don't match. RT shldr slope through toll plaza - should this be 2% instead of 3.9%?	Parametric constraints have been turned off and the rollovers are controlling for the shoulder at 3.9%	Ok
Corridor Items						
plate Drop Station Ranges Match Typicals/Model Needs		X		Typical shows FC-5 starting at 306+11.04	Updated typicals to match models	Ok
Key Stations @ Horiz, Vert, Super, Intx, Crossovers	X					
etric Constraints are Accurate and Match Plans/Typicals	X					
Pavement Designs Match PDP/Typicals		X		Verify shldr base depth multiple templates; verify pavt base depth Ramp_I_BW_RT; verify correct depths are applied in FC-5 section. Don't see a separate template or ParCons. Base depth on Ramp_I should be 6" per typicals. Missing base extensions. Missing base piece on back side of Barrier Wall RT	Pavement designs and base extensions have been checked and updated with the typical sections	Ok
Clipping References Match 2D Plan View	X					
Corridor/Template Intervals per CAD Manual 8.4.4.3		X		Set RAMPI_GRLT to "2 DESIGN" and 10' interval	Agreed. I believe this is set to a 10' interval.	Ok
3D Breaklines Match 2D Plan View		X		See comments in DGN	These have been addressed	Ok

marks:

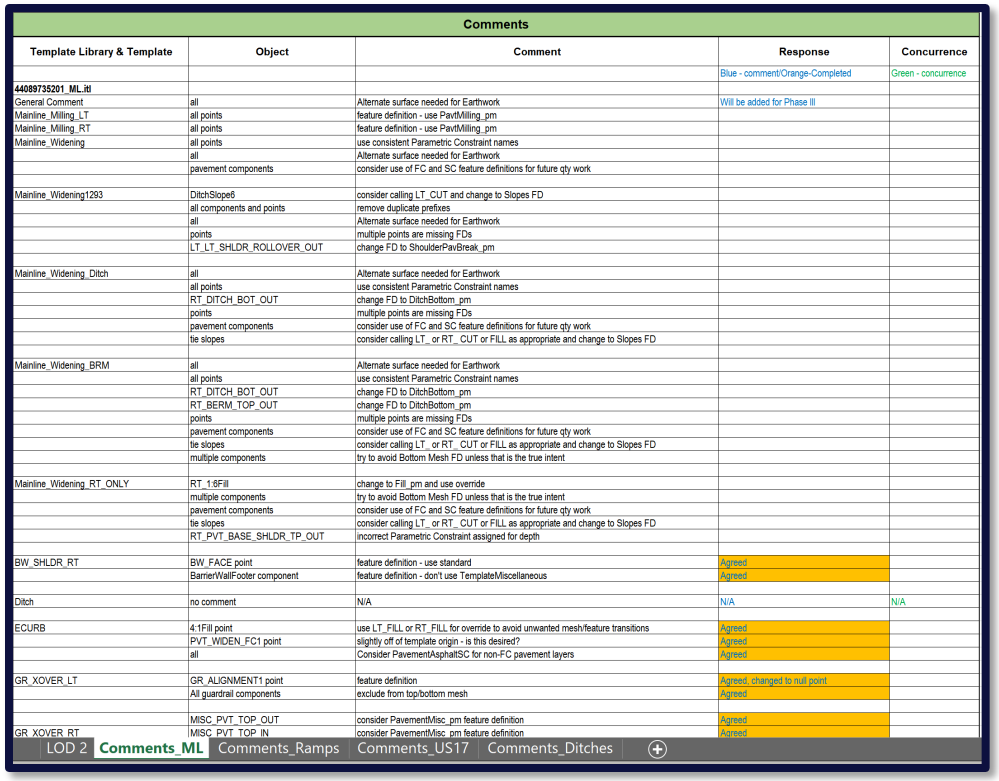
company a QC DGN of the 3D Model.

ition from the typical sections is acceptable provided control lines, parametric constraints, or other methods are used to set the appropriate values

stFeat_TS | 91MineRd_TH | Mainline-01_GG | Mainline-02_GG | Mainline-03 | Mainline-04 | Mainline-05 | Ramp Gores_DP | **Ramp I_TH** | Ramp J1_DP | Ramp J

Reviewing 3D Models

- **Technical Review**
  - Design Criteria & Intent
  - Plan Consistency
  - Constructability & Biddability
- **Modeling Review**
  - External & Internal Standards
  - Consistency
  - No errors
  - Accuracy & completeness



Comments

Template Library & Template	Object	Comment	Response	Concurrence
			Blue - comment/Orange-Completed	Green - concurrence
44089735201_ML.itl				
General Comment	all	Alternate surface needed for Earthwork	Will be added for Phase III	
Mainline_Milling_LT	all points	feature definition - use PavtMilling_pm		
Mainline_Milling_RT	all points	feature definition - use PavtMilling_pm		
Mainline_Widening	all points	use consistent Parametric Constraint names		
	all	Alternate surface needed for Earthwork		
	pavement components	consider use of FC and SC feature definitions for future qty work		
Mainline_Widening1293	DitchSlope6	consider calling LT_CUT and change to Slopes FD		
	all components and points	remove duplicate prefixes		
	all	Alternate surface needed for Earthwork		
	points	multiple points are missing FDs		
	LT_LT_SHLDR_ROLLOVER_OUT	change FD to ShoulderPavBreak_pm		
Mainline_Widening_Ditch	all	Alternate surface needed for Earthwork		
	all points	use consistent Parametric Constraint names		
	RT_DITCH_BOT_OUT	change FD to DitchBottom_pm		
	points	multiple points are missing FDs		
	pavement components	consider use of FC and SC feature definitions for future qty work		
	tie slopes	consider calling LT_ or RT_ CUT or FILL as appropriate and change to Slopes FD		
Mainline_Widening_BRM	all	Alternate surface needed for Earthwork		
	all points	use consistent Parametric Constraint names		
	RT_DITCH_BOT_OUT	change FD to DitchBottom_pm		
	RT_BERM_TOP_OUT	change FD to DitchBottom_pm		
	points	multiple points are missing FDs		
	pavement components	consider use of FC and SC feature definitions for future qty work		
	tie slopes	consider calling LT_ or RT_ CUT or FILL as appropriate and change to Slopes FD		
	multiple components	try to avoid Bottom Mesh FD unless that is the true intent		
Mainline_Widening_RT_ONLY	RT_1:6Fill	change to Fill_pm and use override		
	multiple components	try to avoid Bottom Mesh FD unless that is the true intent		
	pavement components	consider use of FC and SC feature definitions for future qty work		
	tie slopes	consider calling LT_ or RT_ CUT or FILL as appropriate and change to Slopes FD		
	RT_PVT_BASE_SHLDR_TP_OUT	incorrect Parametric Constraint assigned for depth		
BW_SHLDR_RT	BW_FACE point	feature definition - use standard	Agreed	
	BarrierWallFooter component	feature definition - don't use TemplateMiscellaneous	Agreed	
Ditch	no comment	N/A	N/A	N/A
ECURB	4:1Fill point	use LT_FILL or RT_FILL for override to avoid unwanted mesh/feature transitions	Agreed	
	PVT_WIDEN_FC1 point	slightly off of template origin - is this desired?	Agreed	
	all	Consider PavementAsphaltSC for non-FC pavement layers	Agreed	
GR_XOVER_LT	GR_ALIGNMENT1 point	feature definition	Agreed, changed to null point	
	All guardrail components	exclude from top/bottom mesh	Agreed	
	MISC_PVT_TOP_OUT	consider PavementMisc_pm feature definition	Agreed	
GR_XOVER_RT	MISC_PVT_TOP_IN	consider PavementMisc_pm feature definition	Agreed	

LOD 2 | Comments_ML | Comments_Ramps | Comments_US17 | Comments_Ditches

3D Deliverables

- **What is required?**
  - CADD Manual 8.4.6.1
  - Scope of Services & Staff Hours
  - Earthwork (PSM21-02)
- **Why?**
  - Contractors' software needs
  - LandXML is (mostly) universal
  - Preservation of BIM info

THE ABOVE NAMED PROFESSIONAL IS RESPONSIBLE FOR THE FOLLOWING BIM FILES IN ACCORDANCE WITH RULE 61G15-23.004, F.A.C.

BIM FILES IDENTIFIED AS PLANS TO SUPPORT EARTHWORK

FILE NAME	FILE DESCRIPTION	SHA256 Encryption Code
1234561520I\.3DDeliverables\AMG-2DSGNRD01.dgn	AMG file for 3D-Deliverables	8300BBC34652B4CFA33508126A9CAB3D4AE283AE4469104 7C4E73BCD02A2ADBE
1234561520I\.3DDeliverables\AMG-MODLRD01_1.dgn		BC738EA02F2557188804F32EF04AE12D0192CDC9F2531249CC2079A4092A12E9
1234561520I\.3DDeliverables\AMG-ALGNSR01.xml		BA0BAC3CF7B874B9B6AC1290D064CAB1D00B8B9ABD5A3369135 7B0AE76B050E4D
1234561520I\.3DDeliverables\AMG-ALGNBL98.xml		D8AB43AA0BEC770698044D774D0EBA984F1BBB471F66474589DF70745CF6B62
1234561520I\.3DDeliverables\AMG-3SURFACEPR01.xml		56AECC56379686F8F0CB91C97B41739AAE760B685D0C90F5B486B320DAB1B098
1234561520I\.3DDeliverables\AMG-3SURFACEEX01.xml		5B793EFDD20A3452E7B521C1015F7ACB0B1B57FADE4240 1E34B59AE2ABEA121
1234561520I\.3DDeliverables\AMG-3SURFACEEW01.xml		15D9BCA09E81EA498C070705C2FAF7E34232B25ED9F380507FADE7712C0B929A
1234561520I\.3DDeliverables\AMG-3DSGNRDEW01.dwg	AMG file for 3D-Deliverables	7ADF218242F4EFA85BB7AEF36425C628AA5AF0BAA1B4E9CBC7A16691704B2EC9
1234561520I\.3DDeliverables\AMG-3DSGNRDEW01.dgn	AMG file for 3D-Deliverables	52C6233959FFF3A8F3B96DAC21D9FB973A2112E9ABE94E03539A27A0D3044519
1234561520I\.3DDeliverables\AMG-3DSGNRD01.dwg	AMG file for 3D-Deliverables	7F250F5C003F3798E3A457893CD1A8F7255E183C1C4036192 5A3B729F140745
1234561520I\.3DDeliverables\AMG-3DSGNRD01.dgn	AMG file for 3D-Deliverables	9E41F7E20C9EA63B4FF41E9FD590B5C18B79D7487E865BC2E9B00DE4663EF47B

https://emn178.github.io/online-tools/sha256_checksum.html

Exhibit 910-4
Original Signature Sheet
Date: 1/1/2023

REVISIONS				ENGINEER OF RECORD	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SIGNATURE SHEET
E	DESCRIPTION	DATE	DESCRIPTION	LUKE S. WALKER, P.E. LICENSE NUMBER: 99991 ROADWAY ENGINEERS, INC. 123 MAIN STREET TALLAHASSEE, FL 32301	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
					SR 22	BAY	123456-1-52-01	

Table 8.4.6.1

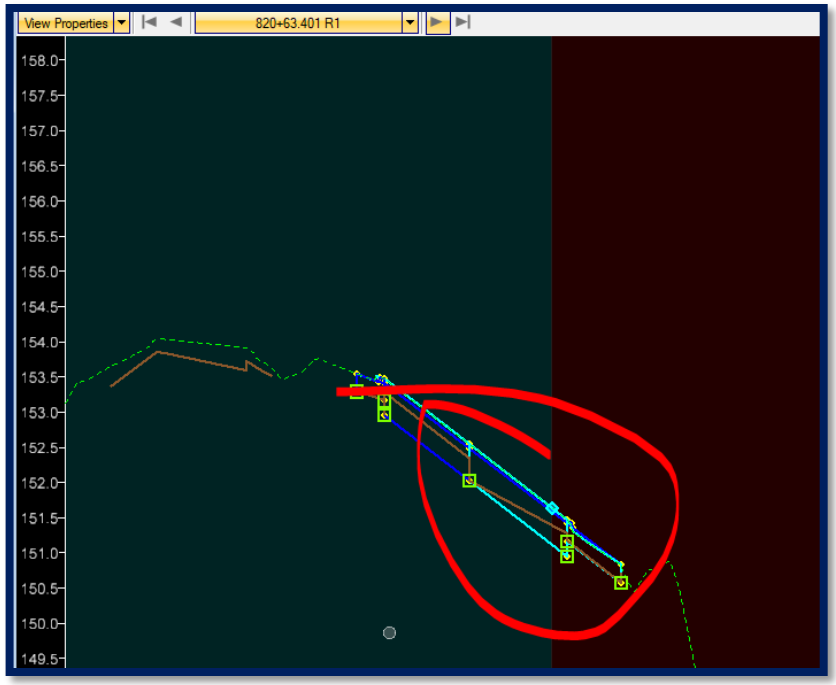
3D DELIVERABLES SUPPORTING AMG

(Store in project folder: 3DDeliverables)

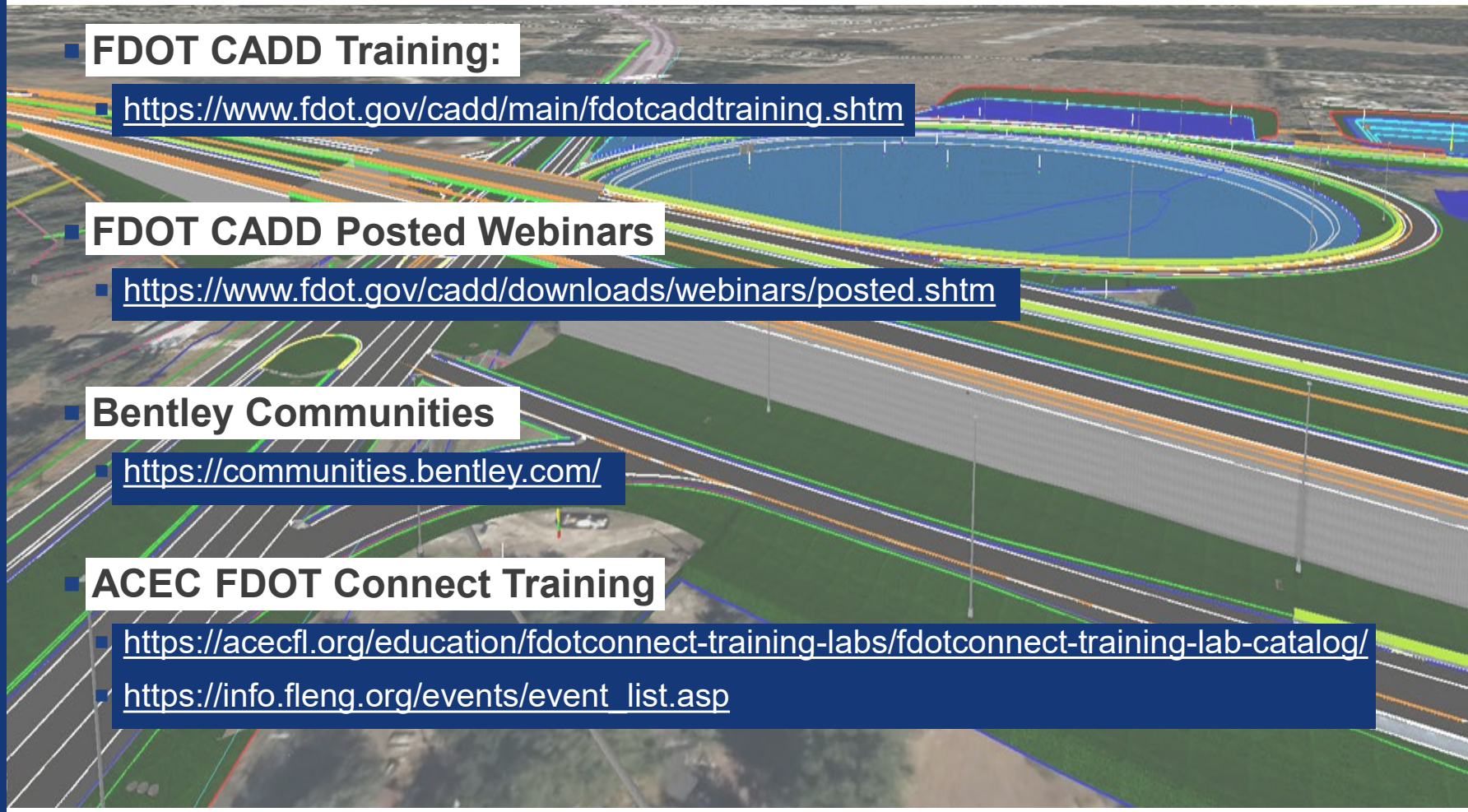
Category	File Name	Description
Design Alignments and Profiles	AMG-ALGN##.xml	All Alignments and Profiles exported from the \Roadway\ALGNRD, PROF or model files and \Roadway\DSGNRD or CORRRD files in LandXML format.
2D Proposed Planimetrics Design	AMG-2DSGN##.dwg/dgn	2D proposed Roadway design exported from the \Roadway\DSGNRD file(s). (Production of this file for construction is at the designer's discretion.)
	AMG-2DRPR##.dwg/dgn	2D proposed Drainage design exported from the \Drainage\DRPRRD file. (Production of this file for construction is at the designer's discretion.)
	AMG-2PDPL##.dwg/dgn	2D proposed Pond design exported from the \Drainage\PDPLRD file. (Production of this file for construction is at the designer's discretion.)
3D Existing Survey *Note: Single survey Planimetrics file.*	AMD-3SURVRD##.dwg/dgn	3D existing Topography, Drainage, and Utilities from the \Survey\SURVRD file
3D Surfaces	AMG-3SURFACEEX##.xml	3D existing surface terrain to be exported from the \Survey\GDTMRD or SURVRD file as LandXML format.
	AMG-3SURFACEPR##.xml	3D finished (top) surface terrain to be exported as LandXML format from the \Roadway\MODLRD file(s).
	AMG-3SURFACEML##.xml	3D milling (bottom) surface terrain, if project includes milling, to be exported as LandXML format from the \Roadway\MODLRD file(s).
	AMG-3SURFACEUM##.xml	3D Unsuitable Material (bottom) surface terrain, if unsuitable material present in project limits. To be generated from triangulation between boreholes at the bottom of the unsuitable material layer and exported to LandXML format. (Production of this file for construction is at the designer's discretion.)
3D Surfaces for Earthwork	AMG-3SURFACEEX_EW##.xml	3D existing (bottom) surface terrain to be created from the \Roadway\MODLRD_Existing_Features file(s) as LandXML format. (This surface will typically follow the bottom of hard surfaces i.e. pavement, asphalt base, sidewalks, curbs, etc.)
	AMG-3SURFACEPR_EW##.xml	3D finished graded (bottom) surface terrain to be created from the \Roadway\MODLRD file(s) as LandXML format.
	AMG-3SURFACESE##.xml	3D Subsoil Excavation (bottom) surface terrain, if Subsoil Excavation needed for project, to be created from the \Roadway\MODLRD file(s) as LandXML format.
3D Proposed Break Lines	AMG-3DSGN##.dwg/dgn	3D Roadway break lines exported from the \Roadway\MODLRD file(s).
3D Proposed Model (Optional format)	AMG-MODLRD0#.ifc/i.dgn	Master roadway 3D model file, exported to the available BIM format based on platform, Industry Foundation Classes format (.ifc) preferred but imodel (i.dgn) acceptable for Bentley projects.
	AMG-DRPRRD0#.ifc/i.dgn	Master drainage 3D model file, exported to the available BIM format based on platform, .ifc preferred but.imodel (i.dgn) acceptable for Bentley projects.
	AMG-B#MODLBR0#.ifc/i.dgn	Master bridge 3D model, exported to the available BIM format based on platform, .ifc preferred but imodel (i.dgn) acceptable for Bentley projects. One file per bridge.

3D Deliverables

- **What is the easiest way to ensure successful delivery?**
- **Build it right in the first place!**
- **Be vigilant about standards**
  - Point & Component Naming
  - Point & Component Feature Definitions
- **Review is critical**
- **Check the data against the source**
  - Bring the top & bottom AMG into the models
  - Then do it again!



Training & Resources

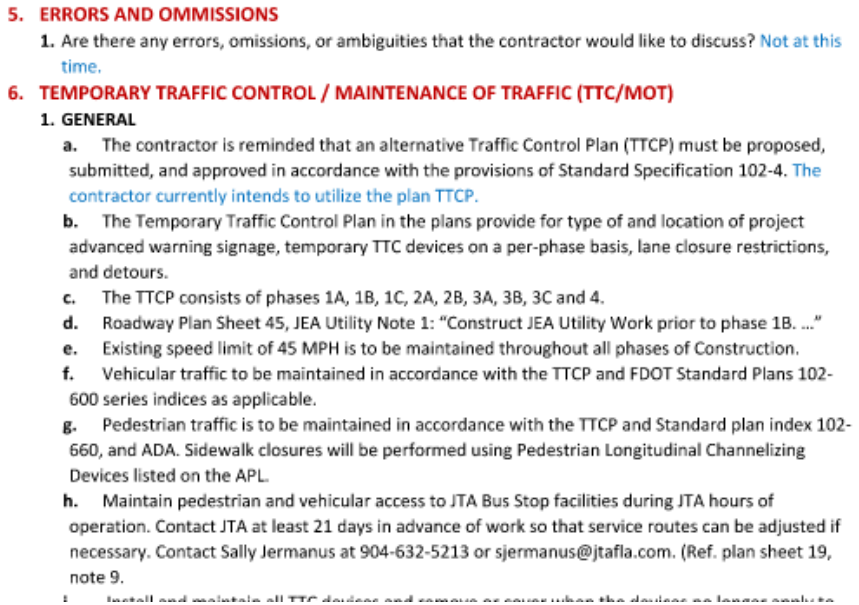


- FDOT CADD Training:
  - https://www.fdot.gov/cadd/main/fdotcaddtraining.shtm
- FDOT CADD Posted Webinars
  - https://www.fdot.gov/cadd/downloads/webinars/posted.shtm
- Bentley Communities
  - https://communities.bentley.com/
- ACEC FDOT Connect Training
  - https://acecfl.org/education/fdotconnect-training-labs/fdotconnect-training-lab-catalog/
  - https://info.fleng.org/events/event_list.asp

Post Design

Post Design (throughout construction)

- **Project has been Let/Awarded/Executed/NTP Issued**
- **Next Step, Pre-Construction Conference**
  - Consultant's Project Manager and Primary EOR should attend
  - Meeting is run by the FDOT Construction PM
  - Input from Consultant PM/EOR primarily includes:



5. ERRORS AND OMMISSIONS

1. Are there any errors, omissions, or ambiguities that the contractor would like to discuss? Not at this time.

6. TEMPORARY TRAFFIC CONTROL / MAINTENANCE OF TRAFFIC (TTC/MOT)

1. GENERAL

a. The contractor is reminded that an alternative Traffic Control Plan (TTCP) must be proposed, submitted, and approved in accordance with the provisions of Standard Specification 102-4. The contractor currently intends to utilize the plan TTCP.

b. The Temporary Traffic Control Plan in the plans provide for type of and location of project advanced warning signage, temporary TTC devices on a per-phase basis, lane closure restrictions, and detours.

c. The TTCP consists of phases 1A, 1B, 1C, 2A, 2B, 3A, 3B, 3C and 4.

d. Roadway Plan Sheet 45, JEA Utility Note 1: "Construct JEA Utility Work prior to phase 1B. …"

e. Existing speed limit of 45 MPH is to be maintained throughout all phases of Construction.

f. Vehicular traffic to be maintained in accordance with the TTCP and FDOT Standard Plans 102-600 series indices as applicable.

g. Pedestrian traffic is to be maintained in accordance with the TTCP and Standard plan index 102-660, and ADA. Sidewalk closures will be performed using Pedestrian Longitudinal Channelizing Devices listed on the APL.

h. Maintain pedestrian and vehicular access to JTA Bus Stop facilities during JTA hours of operation. Contact JTA at least 21 days in advance of work so that service routes can be adjusted if necessary. Contact Sally Jermanus at 904-632-5213 or sjermanus@jtafla.com. (Ref. plan sheet 19, note 9.

i. Install and maintain all TTC devices and remove or cover when the devices no longer apply to

Post Design (throughout construction)

Sample Preconstruction Conference Agenda

Preconstruction Conference Agenda
SR134 (TIMUQUANA ROAD) FROM: WESCONNETT BLVD TO: US17
Date: June 02, 2022, Time: 10:00 AM
Location: FDOT Urban Office
2198 Edison Ave, Jacksonville, FL 32204

Project Description:	SR134 (TIMUQUANA ROAD) FROM: WESCONNETT BLVD TO: US17
Financial Project:	443261-1-52-01, 443261-1-56-01
FAP Number:	D221054B
Contract Number:	T2834
County – Section:	Duval - 72220
Owner:	FLORIDA DEPARTMENT OF TRANSPORTATION
Engineer of Record:	Robert Loren Sykes, P.E. (CES)
Contractor:	Duval Asphalt Products
CEI Consultant:	Adaptive Consulting
Contract Value:	$9,753,945.54

This meeting is being audio/video recorded and will become part of the construction project records. The recording of this meeting will be made available for review at any time during normal business hours. All attendees will receive an electronic copy of the minutes. FDOT will rely on the minutes as the approved summary of matters discussed and conclusions reached during this meeting. If there are any misrepresentation, misunderstandings, or incorrect statements please contact Jonah VanDyke, Project Administrator at 813-424-8870 or jvandyke@adaptiveCE.com within seven (7) days from receipt of the minutes to request corrections.

Safety Discussion of Emergency Exits at meeting location.

Introductions:

- Name, firm, role on the project.
- Please sign in for the record.

1. PROJECT DESCRIPTION:

1. This a federal aid participation (FAP) project consisting primarily of mill and resurfacing of 2.6 miles on SR 134 from east of SR 21 to west of US 17 in Duval County, Florida.
2. The Improvements under this Contract consist of milling and resurfacing, base work, drainage improvements, curb and gutter, traffic signals, highway signing, guardrail, sidewalks and other incidental construction on SR 134 from east of SR 21 to US 17 in Duval County.
3. Water and Sewer utility improvements are included with this Contract and will be completed by the contractor through a Joint Project Agreement (JPA) with JEA Water.
4. Proposed construction ends at the CSX Right of Way that is adjacent to US-17 (Roosevelt Blvd). Coordination will be needed with CSX regarding any TTC or work that will encroach upon or otherwise affect the CSX R/W.

5. IMPORTANT DATES

a. Letting Date: January 26th, 2022

Preconstruction Conference Agenda
SR134 (TIMUQUANA ROAD) FROM: WESCONNETT BLVD TO: US17
Date: June 02, 2022, Time: 10:00 AM
Location: FDOT Urban Office
2198 Edison Ave, Jacksonville, FL 32204

b. Project Award: February 15th, 2022
c. Executed: March 04th, 2022
d. NTP issued on: April 01st, 2022
e. Contract Time Begins: June 16th, 2022
f. Anticipated Start Date: June 16th, 2022
g. Price Adjustment Base Date: May 15th, 2019

2. LINES OF AUTHORITY

1. The contractor is reminded that all correspondence will be through the CEI team and PSSP.

FDOT / CEI	Name	Phone	Email
Resident Engineer	Gregory Perry, P.E.	904-759-1596	gregory.perry@dot.state.fl.us
Project Manager	Daniel Lahey, P.E.	904-360-5553	daniel.lahey@dot.state.fl.us
Sr. Project Engineer	David Olund, P.E.	407-389-9943	dolund@adaptiveCE.com
Project Administrator	Jonah VanDyke	813-424-8870	jvandyke@adaptiveCE.com
Con. Support Spec.	Steve Carrasquillo	808-319-0402	scarrasquillo@adaptiveCE.com
Sr. Inspector	Tom Dennard	904-678-0819	tdennard@adaptiveCE.com

Contractor	Name	Phone	Email
Project Engineer			
Project Manager	Chris Wright	904-424-2644	cwright@duvalasphalt.com
QC Manager	Chad Day	386-365-0036	cday@caltechtesting.com
Project Superintendent	Steve Lyle	904-451-1132	slyle@duvalasphalt.com
Worksite Traffic Supervisor	Steve Lyle	904-451-1132	slyle@duvalasphalt.com

2. EMERGENCY CONTACTS

Name	Agency	Phone
Daniel Lahey	FDOT	904-360-5553

Post Design (throughout construction)

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Con. Support Spec.	Steve Carrasquillo	808-319-0402	scarrasquillo@adaptiveCE.com
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Contractor	Name	Phone	Email
Project Engineer			
Project Manager	Chris Wright	904-424-2644	cwright@duvalasphalt.com
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Jonah VanDyke	CEI	813-424-8870
Steve Lyle	Contractor	904-451-1132
Josh Spradling	Contractor	904-524-4943

3. ISSUE ESCALATION MATRIX

Max. Time Hours/Days	Agency Contact	Consultant CCEI	Contractor
1 Day	N/A	Inspector/Senior Inspector	Foreman/Superintendent
3 Days	N/A	Project Administrator	Superintendent/PM
5 Days	Project Manager	Senior Project Engineer	Project Manager

3. E-CONSTRUCTION
   1. File Transfer Protocol (FTP) utilization:
   2. Digital Signatures from an approved Digital Certificate Authority are required for all documentation requiring signatures. More information on digital signatures, including a link to the Department's Approved Certificate Authorities can be found at the following link: Electronic Signatures (fdot.gov) Do all parties have digital signatures?
   3. Forms shall be compliant to the current version, without alteration, at the time of the work being performed. Letters shall be compliant to the current CPAC version at the time the letter is sent. Be advised that forms and letters may be updated during the duration of this contract.
   4. All documents are to be submitted through ProjectSolve (PSSP). pdT2834@portal2.pbid.com

4. PROPOSED START DATES
   1. Prime Contractor: Duval Asphalt Products
      - Start date:
      - Shifts:
      - Extra hours:
   2. Subcontractor 1: Calloway Construction
      - Start date:

Preconstruction Conference Agenda
SR134 (TIMUQUANA ROAD) FROM: WESCONNETT BLVD TO: US17
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- Shifts:
- Extra hours:

5. ERRORS AND OMMISSIONS
   1. Are there any errors, omissions, or ambiguities that the contractor would like to discuss?

6. TEMPORARY TRAFFIC CONTROL / MAINTENANCE OF TRAFFIC (TTC/MOT)
   1. GENERAL
      a. The contractor is reminded that an alternative Traffic Control Plan (TTCP) must be proposed, submitted, and approved in accordance with the provisions of Standard Specification 102-4.
      b. The Temporary Traffic Control Plan in the plans provide for type of and location of project advanced warning signage, temporary TTC devices on a per-phase basis, lane closure restrictions, and detours.
      c. The TTCP consists of phases 1A, 1B, 1C, 2A, 2B, 3A, 3B, 3C and 4.
      d. Roadway Plan Sheet 45, JEA Utility Note 1: "Construct JEA Utility Work prior to phase 1B. …"
      e. Existing speed limit of 45 MPH is to be maintained throughout all phases of Construction.
      f. Vehicular traffic to be maintained in accordance with the TTCP and FDOT Standard Plans 102-600 series indices as applicable.
      g. Pedestrian traffic is to be maintained in accordance with the TTCP and Standard plan index 102-660, and ADA. Sidewalk closures will be performed using Pedestrian Longitudinal Channelizing Devices listed on the APL.
      h. Maintain pedestrian and vehicular access to JTA Bus Stop facilities during JTA hours of operation. Contact JTA at least 21 days in advance of work so that service routes can be adjusted if necessary. Contact Sally Jermanus at 904-632-5213 or sjermanus@jtafla.com. (Ref. plan sheet 19, note 9.
      i. Install and maintain all TTC devices and remove or cover when the devices no longer apply to current conditions, in accordance with Standard Specification 102-9 and Standard Plan Index 102-600.
      j. Install temporary work zone pavement markings in accordance with the plans and Standard Specification 102-10.
      k. Remove work zone pavement markings when they no longer apply to current conditions or when they will conflict, in accordance with Standard Specification102-5.8.
      l. Crash Reporting will be performed by Department (CEI) personnel. The contractor will provide access to the area, any available pertinent information, and the case number from the reporting law enforcement agency.
      m. Work Zones
      n. Maintain work zone clearances in accordance with the Plans, Standard Plans, and MUTCD.
      o. Night Work – Meet the lighting requirements of Standard Specification 8-4.1.
   2. CSXT

Post Design (throughout construction)

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Josh Spradling	Contractor	904-524-4943

3. ISSUE ESCALATION MATRIX

Max. Time Hours/Days	Agency Contact	Consultant CCEI	Contractor
1 Day	N/A	Inspector/Senior Inspector	Foreman/Superintendent
3 Days	N/A	Project Administrator	Superintendent/PM
5 Days	Project Manager	Senior Project Engineer	Project Manager

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   - Start date:
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   - Extra hours:
2. Subcontractor 1: Calloway Construction
   - Start date:

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- Shifts:
- Extra hours:

5. ERRORS AND OMMISSIONS

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   - c. The TTCP consists of phases 1A, 1B, 1C, 2A, 2B, 3A, 3B, 3C and 4.
   - d. Roadway Plan Sheet 45, JEA Utility Note 1: "Construct JEA Utility Work prior to phase 1B. …"
   - e. Existing speed limit of 45 MPH is to be maintained throughout all phases of Construction.
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   - m. Work Zones
   - n. Maintain work zone clearances in accordance with the Plans, Standard Plans, and MUTCD.
   - o. Night Work – Meet the lighting requirements of Standard Specification 8-4.1.

2. CSAT

Post Design (throughout construction)

Sample Preconstruction Conference Agenda

Preconstruction Conference Agenda
SR134 (TIMUQUANA ROAD) FROM: WESCONNETT BLVD TO: US17
Date: June 02, 2022, Time: 10:00 AM
Location: FDOT Urban Office
2198 Edison Ave, Jacksonville, FL 32204

1. The contractor is advised to pay close attention to Contract Documents regarding CSX.
   a. Plan Sheet 45 includes 2 notes regarding work within or near the CSX R/W.
   b. Plan Sheet 19 also includes 12 notes regarding work within or near the CSX R/W.
   c. Coordinate all railroad activities through the D2 Rail Administrator, _____. (Plan sheet 19, CSXT Railroad note 2)
   d. If any issue or incident occurs within the CSXT R/W, contact the CSXT's public safety coordination center at 800-232-0144 and notify the CSXT representative, _____. (Plan sheet 19, CSXT Railroad note 12)

3. NAVY CORRIDOR USAGE

1. The US Navy routinely utilizes the SR 134 corridor to haul oversized equipment to/from the nearby base on US 17.
2. Given the width of the equipment, bottlenecks are anticipated. The issue is with temporary portable devices that can be moved as needed.
3. CEI will coordinate with the contractor as needed to accommodate.

4. CONTRACTOR REQUIREMENTS (SUBMITTALS)

1. Monthly Certification of Quantities. Form 700-050-62A
2. All TTC devices must be listed on the Department's Approved Product listing (APL) and have a valid APL number permanently marked in a readily visible location. (Emphasis: APL numbers are required on every sign support post.)
3. Approved Independent Channelizing Device Supplier (CDS):
   a. An approved CDS shall be employed to provide non-fixed channelizing devices. (Drums, cones, vertical panels, barricades, temp. tubular markers, and pedestrian LCDs.)
   b. If the CDS is pre-approved and on the State Construction Office website, then Contractor is to provide the name of the CDS that this time. _____
   c. If the CDS is not pre-approved and on the State Construction Office website, then Contractor is to provide the documentation required in Spec. 102-9.1.1.
   d. The CDS shall…:
      - …not be affiliated with the Contractor.
      - …Department approved.
        - Approved CDSs are listed on the State Construction Office website.
        - CDSs seeking inclusion on the list must meet the requirements of Standard Specification 102-9.1.1.
      - …submit monthly certifications on company letterhead attesting to the condition of the devices in use, in accordance with Standard Specification 102-9.1.
4. Worksite Traffic Supervisor (WTS)
   a. Identified in Section 2.1 of these minutes, see table.
   b. Responsible for initiating, installing, and maintaining all TTC devices.
   c. Meets the personnel qualifications of Standard Specification section 105.
      - Certificate of Qualification has not been received.

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   d. Is on site during all setup/takedown, during nighttime operations, performs drive through inspection immediately after setup.
   e. Immediately corrects all safety deficiencies and corrects minor deficiencies within 24 hours.
   f. Is available on a 24 hour per day basis and present at site within 45 minutes for emergencies.
   g. Performs daily daytime and weekly nighttime inspections when working predominately days – or – daily nighttime and weekly daytime inspection when working predominately nights.
   h. The WTS shall be disqualified if corrective action is not completed within the 24-hour time limit on three notifications to the Contractor within a twelve (12) months period. This can result in a suspension of qualification on all projects. **The contractor is strongly encouraged to perform inspections with CEI personnel when possible.**
5. List of Certified Flaggers to be utilized on the project. (Standard Specification 102-5.7)
6. Traffic Control Officers (TCO)
   a. The TCO is included in the plans to assist in controlling and directing traffic/overriding the signal in a signalized intersection.
   b. TCOs may be used for the contractor's convenience at no cost to the Department.
   c. The Department will not consider any claim arising from the failure of a TCO to be present on site.
   d. A non-compensable time extension may be granted in the event of an area-wide shortage of law enforcement personnel.
   e. Reference Standard Specification 102-7 for additional information.
7. Lane Closure Restrictions
   a. SR 21 (Blanding Blvd.) to STA 175+00 (Ortega Farms Blvd.) _8 AM to 6 PM _ No double-lane closures within 600' of a signalized intersection.
   b. STA 175+00 to US 17 _ 6 PM to 9 PM _ No lane closures allowed

7. CONSTRUCTION SCHEDULE

1. The contractor's Baseline work schedule was accepted on 05/20/22.
2. Critical Path Method (CPM) is utilized for this project.
3. CPM updates are due 7 calendar days after the monthly cut-off and at any time the planned order or duration of an activity is changed significantly.
4. A revised project schedule is required whenever work has been added or deleted by Contract modification. (SA, UP, etc.).
5. Progress Meetings are to be held weekly at the CEI Field Office.

8. CONTRACTOR PROVIDES HURRICANE AND EMERGENCY EVACUATION PLANS

9. REGIONAL & STATEWIDE DISPUTES REVIEW BOARD (DRB)

1. A Disputes Review Board will be available to assist in the resolution of disputes and/or claims on this project.
2. The Disputes Review Board is to be utilized when normal dispute or claim resolution between the Department and the Contractor has proven unsuccessful.
3. Either the Department or the Contractor may refer a dispute or claim to the Board.

Post Design (throughout construction)

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4. Refer to Special Provisions (8-3.7 through 8-3.7.8) for additional information about the Regional Disputes Review Board.
5. Refer to Special Provisions (8-3.8 through 8-3.8.6) for additional information about the Statewide Disputes Review Board.

10. INSURANCE POLICY REQUIREMENTS

1. Meet the requirements of Standard Specification 7-13.
2. Additional insurance is required, pertinent to CSXT. Refer to Special Provisions 7-13.3.1 for additional information.

11. CONTRACTOR'S AFFIDAVIT VEHICLE REGISTRATION

1. All Contractor vehicles used on Department construction or maintenance projects shall be registere in Florida.
2. The Contractor is required to sign an affidavit Contractor's Affidavit Vehicle Registration, Form No. 700-010-52. A copy of this form is included in the package provided to the contractor.
3. If the Contractor has registered their company vehicle through the International Registration Plan (IRP) or in a State that has an Interstate Reciprocal Agreement (IRA) with the State of Florida, the Contractor shall provide documentation from the Florida Department of Highway Safety and Motor Vehicles verifying this registration. This form shall be attached to the completed Contractor's Affidavit Vehicle Registration.

12. SWPPP / EROSION CONTROL / ENVIRONMENTAL

1. SWPPP
   a. Will the contractor utilize the plan SWPPP? _____
   b. Inspection Form 650-040-03 is required to be completed weekly AND within 24 hours of a storm/rainfall event that yields 0.50 inches of rain or more.
      - This is a contractor-generated report that reflects found deficiencies with all erosion and sediment control devices. Deficiencies listed will be compared to CEI findings.
      - Include project personnel (CEI) in project review whenever possible. Coordinate with CEI inspection staff. This can greatly reduce the time involved in identifying and resolving issues without the need for lengthy back-and-forth.
2. EROSION & SEDIMENT CONTROL PLAN
   a. Contractor Erosion & Sediment Control Plan, required in accordance with Standard Specificatio 104-5. Received? _____ The contractor must have written approval of the plan before Construction activities can begin.
   b. Prime & subcontractors that are responsible for the installation of erosion control devices shall submit Contractor Certification Form 650-040-07, digitally signed by the Company Officer for each company. Post a copy of all forms to the project bulletin board.
3. REQUIRED PERMITS (EMY DELGADO)
   a. A generic permit is a general permit issued by DEP under the authority of Section 403.0885, Florida Statutes (F.S.), which is the provision authorizing the state to implement the NPDES program.

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   b. An NPDES Stormwater Generic Permit is required for any construction activities that disturb more than one acre of land and/or discharges stormwater to surface waters of the state.
   c. Per the plan SWPPP, plan sheet 43, section 1.C., the total area to be disturbed is 1.4 acres. This classifies as "Small Construction Activity" (> 1 acre / < 5 acres).
   d. Per the plan SWPPP, plan sheet 43, section 1.D., there are 2 outfalls to surface waters:
      - Fishing Creek
      - Ortega River
   e. Further information on requirements and steps for obtaining this permit, refer to FDEP website at https://floridadep.gov/water/stormwater/content/npdes-permits-and-forms.
   f. Permit is/is not required from St. Johns River Water Management District.
4. PROJECT COMMITMENTS
   a. Work with the US NAVY to accommodate oversized equipment transport through the corridor as needed.
   b. Maintain access and minimize impacts to businesses.
   c. Maintain residential access. The residences between STA 200+00 to the 220+00 rely on side-street parking spaces. Stage water main construction operations with this in mind.
   d. Maintain access to bus stops and/or coordinate with JTA as needed.
5. CODE OF FEDERAL REGULATION TITLE 40 PART 12 (40 CFR 112 – OIL POLLUTION PREVENTION)
   a. Administered by the EPA
   b. 40 CFR 112 is available online through the EPA, at Document Display | NEPIS | US EPA.
   c. The contractor and each subcontractor shall account for all regulated bulk oil containers (55-gallon or more) within the project limits for the duration of the project.
6. If the aggregate capacity of above-ground oil storage exceeds 1,320 gallons, the contractor must submit and implement Spill Prevention Control and Countermeasure Plan (SPCC). The SPCC shall be submitted to the PA who will forward to the Emy Delgado.
7. FLORIDA STATUTE SECTION 403.077 (PUBLIC NOTIFICATION OF POLLUTION)
   a. State Law requires that any contractor or sub-contractor responsible for a reportable pollution release is required to notify the public in accordance with the statute, at the following site: Public Notice of Pollution | Florida Department of Environmental Protection.
      - Reportable pollution is defined as the release or discharge of a substance from an installation to the air, land, or waters of the state.
   b. Copies of any public notifications should be provided to the PA.
   c. It is the contractor's responsibility to become familiar with the provisions of this statute.
   d. For all pollution cleanup, follow FDOT Standard Specification 110-9.5.

13. BUY AMERICA PROVISIONS (23 CFR 635.410) AS AMMENDED

1. FDOT STANDARD SPECIFICATION 6-5.2 SOURCE OF SUPPLY – STEEL:
   a. Use steel and iron manufactured in the United States, in accordance with the Buy America provisions of 23 CFR 635.410, as amended.

Post Design (throughout construction)

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   a. Administered by the EPA
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      - Reportable pollution is defined as the release or discharge of a substance from an installation to the air, land, or waters of the state.
   b. Copies of any public notifications should be provided to the PA.
   c. It is the contractor's responsibility to become familiar with the provisions of this statute.
   d. For all pollution cleanup, follow FDOT Standard Specification 110-9.5.

13. BUY AMERICA PROVISIONS (23 CFR 635.410) AS AMMENDED

1. FDOT STANDARD SPECIFICATION 6-5.2 SOURCE OF SUPPLY – STEEL:
   a. Use steel and iron manufactured in the United States, in accordance with the Buy America provisions of 23 CFR 635.410, as amended.

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b. Foreign steel and iron may be used when the total actual cost of such foreign materials does not exceed 0.1% of the total Contract amount or $2,500, whichever is greater.
c. Certification of Compliance is required for acceptance of steel or iron, or any product containing steel or iron.

14. CONSULTANT CEI & MATERIALS TESTING

1. Materials Acceptance and Certification (MAC) system will be used for all acceptance sampling and testing.
   a. Adaptive CE will perform VT/IA sampling and input CEI samples, and Meskel & Associates Engineering will be the CEI lab and will input CEI test results.
   b. Duval Asphalt Products will provide QC sampling, testing, and input. Cal-Tech Testing, Inc. will be the contractor's QC apparatus.
   c. The contractor will be advised on any issues pertaining to QC and is ultimately responsible for all QC related matters.
   d. The PA will approve samples and run comparison packages. The Standard Specification provide for comparison criteria and resolution procedures.
2. Earthwork operations will require density testing. In accordance with **DCE Memo 22—06**, this project will implement the **MAC Earthwork Records System (ERS).** A copy of the DCE Memo is included in the package provided to the contractor. ERS training will be provided by the Department upon request. Would the contractor like to request training at this time? _____
3. ERS logbook review and gauge comparison is needed, does the contractor wish to schedule it during this meeting? _____
4. The contractor will furnish a concrete sample curing box with a high/low thermometer whenever concrete sampling and testing is required.

15. CONRACTOR QUALITY CONTROL (QC) PLAN

1. The contractor's QC Manager is Chad Day with Cal-Tech. His contact information can be found in section 2 of these minutes.
2. Lines of Communication
   a. The Contractor foreman and/or superintendent, or it's delegate (QC Manager or Field Tech.) will coordinate as needed for acceptance testing and/or inspection with the CEI Senior Inspector.
   b. Any issues will be immediately brought to the attention of the PA and the contractor PM.
   c. If needed, a field meeting will be held to discuss issues and develop solutions.
   d. Refer to the Issue Escalation Matrix in section 2.3 of these minutes.
3. The contractor is to upload the QC Plan into MAC.
   a. The Contractor shall name all CTQP qualified technicians that are to work on the project and shall list each of their CTQP qualification categories along with the date that each qualification expires.
   b. If a named technician has a qualification that will expire during the project and if requalification training is not available before the **qualification expires then the technician is not permitted** to perform the duties of that qualification category until requalification is obtained.

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4. The Job Guide Schedule (JGS) is listed in MAC.
5. Approved Products Listing (APL) items shall be submitted with APL information and number prior to installation.
6. Form 700-020-02, Construction Compliance with Specifications and Plans is to be submitted monthly with estimate documentation. A copy of this form is included in the package provided to the contractor.

16. COST SAVINGS INITIATIVE PROPOSALS (CSIP)

1. A CSIP applies to any cost reduction proposal that the Contractor initiates and develops for the purpose of refining the Contract to increase cost effectiveness or significantly improve the quality of the end result.
2. A mandatory Cost Savings Initiative workshop will be held prior to Contract Time beginning for the Contractor and Department to discuss potential proposals unless the contractor and Department agree to eliminate the need for this workshop.
   a. Does the contractor wish to propose a CSIP currently? _____
   b. If no, does the contractor and Department agree to eliminate the need for the workshop currently? _____

17. STOCKPILED MATERIALS & PARTIAL PAYMENTS

1. Form 700-010-42, Certification and Request for Payment for Stockpiled Materials shall be submitted with Estimate backup documentation when stockpiled materials are included in the Estimate.
2. Partial payments will be made in based on the percentage breakdown report from the Pay item Tracking (PTS) system. A copy of this report is included in the package provided to the contractor.
3. Refer to Standard Specification 9-5.5 for further information.

18. TIME EXTENSIONS & CLAIMS

1. TIME EXTENSIONS will be granted for the following reasons:
   a. Suspension of the Contractor's Operations for:
   b. State of Emergency – (Standard Specification 8-6.1.1.)
   c. Holidays & Special Events (Standard Specification 8-6.4) The Contractor shall not work on Holidays and Special Events unless the contractor submits written request to work at least 10 days in advance and receives written approval from the Engineer in accordance with Standard Specification 8-6.4.
   d. Special Events are listed on plan sheet 19, note 5 – shown below.

-FRIDAY BEFORE THROUGH THE SUNDAY AFTER THE FLORIDA-GEORGIA FOOTBALL GAME
-THE DAY OF THE JAGUAR HOME FOOTBALL GAMES (TO INCLUDE PRESEASON AND POSTSEASON)
-THE DAY BEFORE THROUGH THE DAY AFTER THE GATOR BOWL

   e. Negative impacts to the Contractor's Controlling Items of Work caused by conditions or factors outside the control of the Contractor (e.g., Weather, Unforeseen Conditions)
   f. Other considerations as provided for in Standard Specification 8-7.3.2.
2. CLAIMS (NOIs)

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   d. Refer to the Issue Escalation Matrix in section 2.3 of these minutes.
3. The contractor is to upload the QC Plan into MAC.
   a. The Contractor shall name all CTQP qualified technicians that are to work on the project and shall list each of their CTQP qualification categories along with the date that each qualification expires.
   b. If a named technician has a qualification that will expire during the project and if requalification training is not available before the **qualification expires then the technician is not permitted** to perform the duties of that qualification category until requalification is obtained.

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4. The Job Guide Schedule (JGS) is listed in MAC.
5. Approved Products Listing (APL) items shall be submitted with APL information and number prior to installation.
6. Form 700-020-02, Construction Compliance with Specifications and Plans is to be submitted monthly with estimate documentation. A copy of this form is included in the package provided to the contractor.

16. COST SAVINGS INITIATIVE PROPOSALS (CSIP)

1. A CSIP applies to any cost reduction proposal that the Contractor initiates and develops for the purpose of refining the Contract to increase cost effectiveness or significantly improve the quality of the end result.
2. A mandatory Cost Savings Initiative workshop will be held prior to Contract Time beginning for the Contractor and Department to discuss potential proposals unless the contractor and Department agree to eliminate the need for this workshop.
   a. Does the contractor wish to propose a CSIP currently? _____
   b. If no, does the contractor and Department agree to eliminate the need for the workshop currently? _____

17. STOCKPILED MATERIALS & PARTIAL PAYMENTS

1. Form 700-010-42, Certification and Request for Payment for Stockpiled Materials shall be submitted with Estimate backup documentation when stockpiled materials are included in the Estimate.
2. Partial payments will be made in based on the percentage breakdown report from the Pay item Tracking (PTS) system. A copy of this report is included in the package provided to the contractor.

18. TIME EXTENSIONS & CLAIMS

1. TIME EXTENSIONS will be granted for the following reasons:
   a. Suspension of the Contractor's Operations for:
   b. State of Emergency – (Standard Specification 8-6.1.1.)
   c. Holidays & Special Events (Standard Specification 8-6.4) The Contractor shall not work on Holidays and Special Events unless the contractor submits written request to work at least 10 days in advance and receives written approval from the Engineer in accordance with Standard Specification 8-6.4.
   d. Special Events are listed on plan sheet 19, note 5 – shown below.

-FRIDAY BEFORE THROUGH THE SUNDAY AFTER THE FLORIDA-GEORGIA FOOTBALL GAME
-THE DAY OF THE JAGUAR HOME FOOTBALL GAMES (TO INCLUDE PRESEASON AND POSTSEASON)
-THE DAY BEFORE THROUGH THE DAY AFTER THE GATOR BOWL

   e. Negative impacts to the Contractor's Controlling Items of Work caused by conditions or factors outside the control of the Contractor (e.g., Weather, Unforeseen Conditions)
   f. Other considerations as provided for in Standard Specification 8-7.3.2.

Post Design (throughout construction)

Sample Preconstruction Conference Agenda

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1. Brenda Crews is the District 2 Contract Compliance Manager.

26. USE OF CONVICT-PRODUCED MATERIALS AND/OR LABOR

1. Standard Specification 6-5.1 and 23 USC 114, 23 CFR 635.417 specifically prohibit the use of convict produced materials on Federally Funded projects. Material certifications must be reviewed and checked for compliance prior to installation of the product. If the certifications are not provided for review/confirmation ahead of installation, the product must be rejected for use. Work Release individuals having a convict status defined as "incarcerated" are not allowed to work on Federally Funded projects. Only Work Release individuals who are on Parole, Supervised Release as defined by FHWA, or Probation are permitted to work on Federally Funded projects. Supervised Release as define by FHWA is equivalent to a parole-type status. These are Work Release individuals not confined to a detention facility at any time during a 24-hour period. Most of the "Work Release" programs utilized by the Florida Department of Corrections do not meet this definition. As such, any type of Work Release program that is being utilized by the Contractor/Subcontractor should be reviewed for eligibility by FDOT and FHWA prior to the utilization of these individuals on any Federally Funded project.

27. UTILITIES / UTILITY STATUS

1. GENERAL
   - a. This contract includes utility work as depicted in the plans for FIN 443261-56-01.
   - b. Refer to Specification (7-11.5.4) for weekly utility coordination meeting requirements, which can be included with the weekly progress meetings.
   - c. Final As-Built Plans approved by JEA are required for final acceptance of proposed utility work.
   - d. ALL JEA (56-01) work shall be done in the JEA inspector's presence.
   - e. RELEVANT CONTRACT DOCUMENTS
   - f. Special Provision Section T1000 "JEA Utility Work"
   - g. JEA Water & Wastewater Standards Manual
   - h. JEA Responsible Bidders List (RBL)
   - i. JEA Table A Schedule of Values (quantities)
   - j. UTILITIES/UAOs LOCATED WITHIN PROJECT LIMITS

UAO	Contact Phone	Contact Name	Contact Email
AT&T FL	904-699-4976 904-206-3420	PK Patel (Proj. Rep.) Ken Rouw (Field Rep.)	pp5963@att.com kr6796@att.com
CENTURY LINK	352-303-2430	Jimmy Young	james.young2@lumen.com
COMCAST	904-509-6472		
JEA ELECTRIC DIST	904-665-6685 904-665-6583	Mike Short (Proj. Rep.) Steve Belange (Field Rep.)	shorml@jea.com belasf@jea.com
JEA ELECTRIC TRANS	904-665-7016		
JEA FIBER	904-591-2252		
JEA WATER & SEWER	904-233-5191	Leo Robiou (Proj. Rep.)	robil@jea.com
QUANTA (VERIZON-MCI)	904-239-8500 904-322-0841	Kenneth Wheat (Proj. Rep.) Jay Felton (Field Rep.)	Kenneth.wheat@verizonwireless.com jfelton@quantatelcom.com
TECO GAS	904-520-6957		
UNITI FIBER	904-718-8152 904-506-7215	Bob Mensching (Proj. Rep.) Ken McGovern (Field Rep.)	Bob.mensching@uniti.com kenneth.mcgovern@uniti.com

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2. STATUS OF ADJUSTMENTS
   - a. **AT&T FL:**
     - UWS? Yes
     - Locate & Protect, Adjust Collars to new grade
     - All work activities are during Construction
   - b. **Century Link:**
     - UWS? No
   - c. **Comcast:**
     - UWS? No
   - d. **JEA Electric Dist:**
     - UWS? Yes
     - Install OH secondary cable, Install new light poles
     - All work activities are during Construction
   - e. **JEA Electric Trans:**
     - UWS? No
   - f. **JEA Fiber:**
     - UWS? No
   - g. **JEA Water & Sewer:**
     - UWS? Yes
     - Work to be performed by FDOT contractor per JPA/56 plans.
     - JEA to furnish inspector with 72-hour notice
   - h. **Quanta (Verizon-MCI):**
     - UWS? Yes
     - Locate & Protect
     - All work activities are during Construction
   - i. **Teco Gas:**
     - UWS? No
     - Locate & Protect

Post Design (throughout construction)

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Post Design (throughout construction)

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- All work activities are during Construction

j. **Uniti Fiber:**
- UWS? Yes
- Locate, Protect, Designate
- All work activities are during Construction

3. UTILITY OPEN DISCUSSION

a. Can the contractor operate existing valves? Only JEA will operate any valves, except during an emergency. (TSP T1000-7)

28. BUSINESS & COMMUNITY IMPACT PLAN

1. Sara Pleasants is the FDOT Community Outreach Specialist (or PIO) for this project. All project-related interactions will be handled through her via the CEI.

29. PARTNERING

1. Commit to working together in good faith to complete a quality project within the allowable Contract Time and Budget, with minimal impact to local businesses and the community.

30. GLOBAL NAVIGATION SATTELITE SYSTEMS (GNSS)

1. If a GNSS work plan is to be used, submit a comprehensive plan at least 30 days before work is to be performed. Refer to Standard Specification 5-7.6 for further information. Does the contractor intend to utilize GNSS? _____

31. BORROW PITS

1. Do not open borrow pits until the Engineer has approved their location.
2. The contractor shall furnish certification that borrow pits meet the requirements of Florida Statute 337.0262.
3. Do not provide borrow materials that are polluted as defined in Chapter 376 of the Florida Statutes.
4. Prior to placing any borrow material that is the product of soil incineration, provide the Engineer with a copy of the Certificate of Materials Recycling and Post Burn Analysis showing that the material is below all allowable pollutant concentrations.
5. Before receiving approval or before use of borrow areas, obtain written clearance from the Engineer concerning compliance with the Federal Endangered Species Act and other Wildlife Regulations as specified in 7-1.4 and Section 4(f) of the USDOT Act as specified in 7- 1.8.
6. It is the contractor's responsibility to request an endangered species biological investigation and obtain approvals.

32. TRUCK MEASURE

1. The contractor shall provide certified truck capacities for all trucks used to haul material to/from approved borrow pit locations.
2. CEI will track for the purposes of payment on pay item 120-2-2.

33. SIGNALIZATION & LIGHTNING

1. The maintaining agency for the signalization is City of Jacksonville.
2. The maintaining agency for the Lighting is JEA.

34. SHOP DRAWINGS

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1. Refer to Standard Specification 5-1.4 for Shop Drawing requirements.
   a. Formatting no larger than 11" x 17"
   b. Consecutive sheet numbering
   c. Include on each sheet the following items as a minimum requirement:
   - The complete Financial Project Identification Number
   - Bridge Number(s) (if applicable)
   - Drawing title and number
   - Supplier name
   - Contractor name
   - Person responsible for the drawing
   - Drawing date
   - Location of the items within the project
   - Signed & Sealed by a Specialty Engineer or the contractor's EOR. (If applicable)

A re-submittal will be requested when any of the required information is not included.

35. ASPHALT OPERATIONS

1. The pre-pave meeting will be scheduled at a later date.

36. OPEN DISCUSSION

Post Design (throughout construction)

Sample Preconstruction Conference Agenda

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35. ASPHALT OPERATIONS

1. The pre-pave meeting will be scheduled at a later date.

36. OPEN DISCUSSION

Post Design (throughout construction)

- **What's Next?**
  - **Prepaving Conference (Consultant not required to attend)**
    - Contractor's Quality Control Plan
    - Asphalt Data
    - Milling Operation and Cleaning Equipment
    - Asphalt Paving
    - Rolling Operations
    - Miscellaneous
  - **Pre-Construction Utility Conference**
    - Contact Information for Utility and FDOT Personnel
    - A review of the Utility Work Schedules (UWS)
    - Addressing Unanticipated Utility Conflicts
    - Summary of Responsibilities
- **Construction Activities Begin**

Post Design (throughout construction)

- **Requirements during Construction Activities include:**
  - Plan content clarification (phone call or e-mail from CEI)
  - Responding to Request For Information (RFI's)
  - Reviewing Shop Drawings
  - Attending progress meetings (when requested)
  - Attending field level of completion meetings
  - Preparing revision packages

- **Track everything you do during post design**
  - Dates - Date issue was received, Date you responded
  - Type of Issue/Coordination (RFI, Shop Drawing, phone call)
  - Who sent the request
  - Issue details
  - Hours spent reviewing/responding/addressing

Post Design (throughout construction)

- Sample Request for Information (RFI)

PROJECT NAME
FIN. PROJ. NO.

REQUEST FOR INFORMATION (RFI)

Instructions:
1. This form is part of a control system to assure prompt answers to questions which may arise during construction.
2. Please submit the original to the Project Administrator.
3. This form need not be typed, but LEGIBILITY IS ESSENTIAL.
4. The Project Administrator will assign numbers and maintain a numbered log. Numbers may be obtained by telephone.
5. The Referred to should be left blank. The project Administrator will fill in.
6. Under "REFERENCE", please provide relevant reference(s) to project or bridge elements, drawing, specifications etc.

RFI NO.: 181 **DATE:** May 31, 2022

INQUIRY FROM: CONTRACTOR REP **OF:** CONTRACTOR

DESCRIPTION OF QUESTION OR PROBLEM:

SCC is requesting more information regarding the square point on Span 2 of Br. 720824 & 720825. It appears that the square point is not correct based on the lengths called out in the plans. When we tried to lay out the 191' square point in the field, we pulled off the F.F.B.W at End Bent No. 3. When we pulled 22'-4.75" from the FFBW we came up 21' short if the 191'-0 square mark for Span 2.

We also checked by laying out the bottom 5A8 bars and the top 5A7 bars at 6" centers. We came up short for both by +/- 21'. We would also like to verify the longitudinal steel to be sure that there aren't any additional bars required with this change.

DRAWING REFERENCE: Br. 720824 & 720825 Structures Drawings Sheet B1-26

REFERRED TO: CEI **OF:** FIRM NAME

RESPONSE:

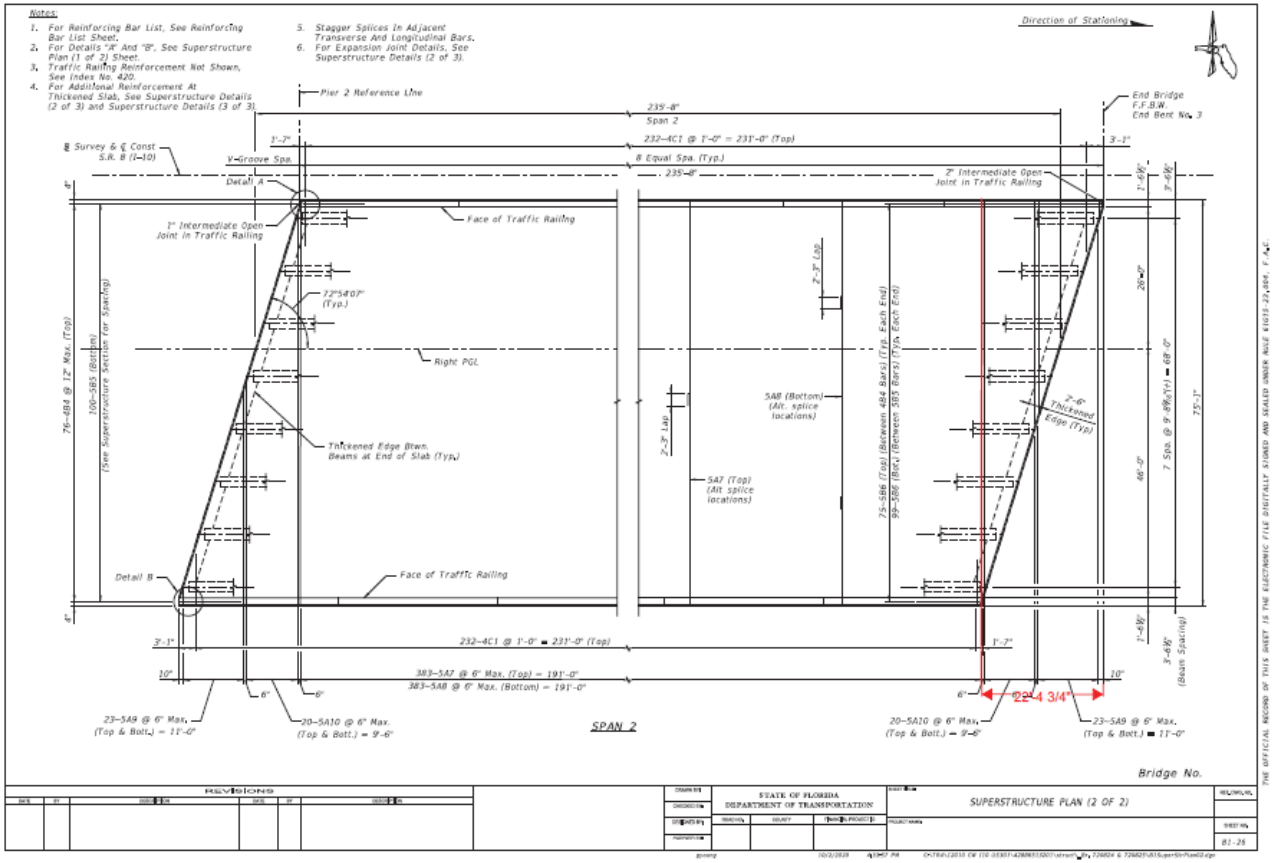
We concur with the dimension clarification. The number of 5A7 and 5A8 bars should be 427 5A7 bars and 427 5A8 bars for Br. Nos. 720824 & 720825. The dimension "B" for bars 5B5 is revised to 1'-11 5/8". These revisions will be included in a future plans revision.

Distribution: 15725 File-SCC.

Signature: _____
Date:

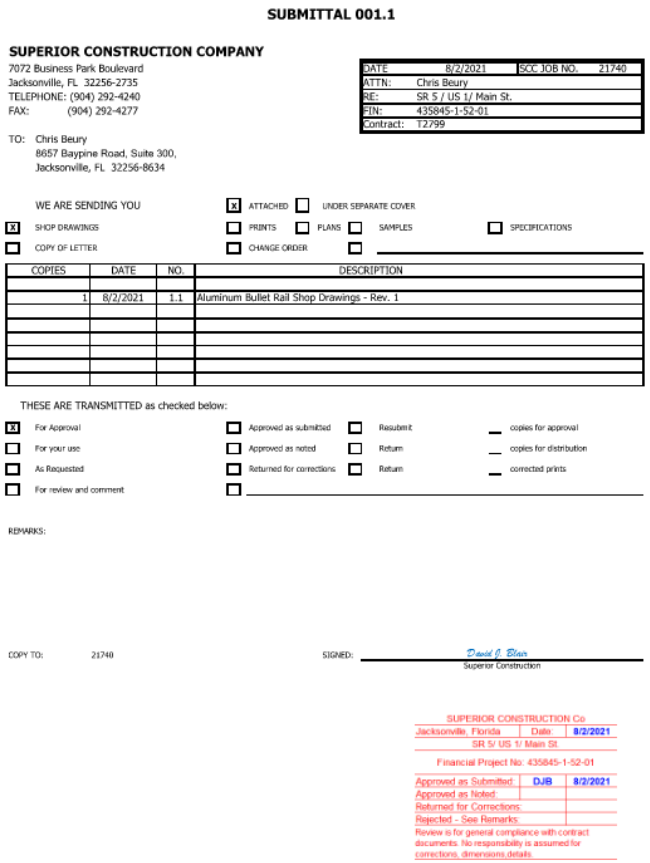
Post Design (throughout construction)

- Sample Request for Information (RFI)



Post Design (throughout construction)

- Sample Shop Drawings



SUBMITTAL 001.1

SUPERIOR CONSTRUCTION COMPANY
7072 Business Park Boulevard
Jacksonville, FL 32256-2735
TELEPHONE: (904) 292-4240
FAX: (904) 292-4277

DATE	8/2/2021	SCC JOB NO.	21740
ATTN:	Chris Beury		
RE:	SR 5 / US 1/ Main St.		
FIN:	435845-1-52-01		
Contract:	T2799		

TO: Chris Beury
8657 Baypine Road, Suite 300,
Jacksonville, FL 32256-8634

WE ARE SENDING YOU [x] ATTACHED [ ] UNDER SEPARATE COVER

[x] SHOP DRAWINGS [ ] PRINTS [ ] PLANS [ ] SAMPLES [ ] SPECIFICATIONS
[ ] COPY OF LETTER [ ] CHANGE ORDER [ ] _____

COPIES	DATE	NO.	DESCRIPTION
1	8/2/2021	1.1	Aluminum Bullet Rail Shop Drawings - Rev. 1

THESE ARE TRANSMITTED as checked below:

[x] For Approval [ ] Approved as submitted [ ] Resubmit [ ] ___ copies for approval
[ ] For your use [ ] Approved as noted [ ] Return [ ] ___ copies for distribution
[ ] As Requested [ ] Returned for corrections [ ] Return [ ] ___ corrected prints
[ ] For review and comment [ ] _____

REMARKS:

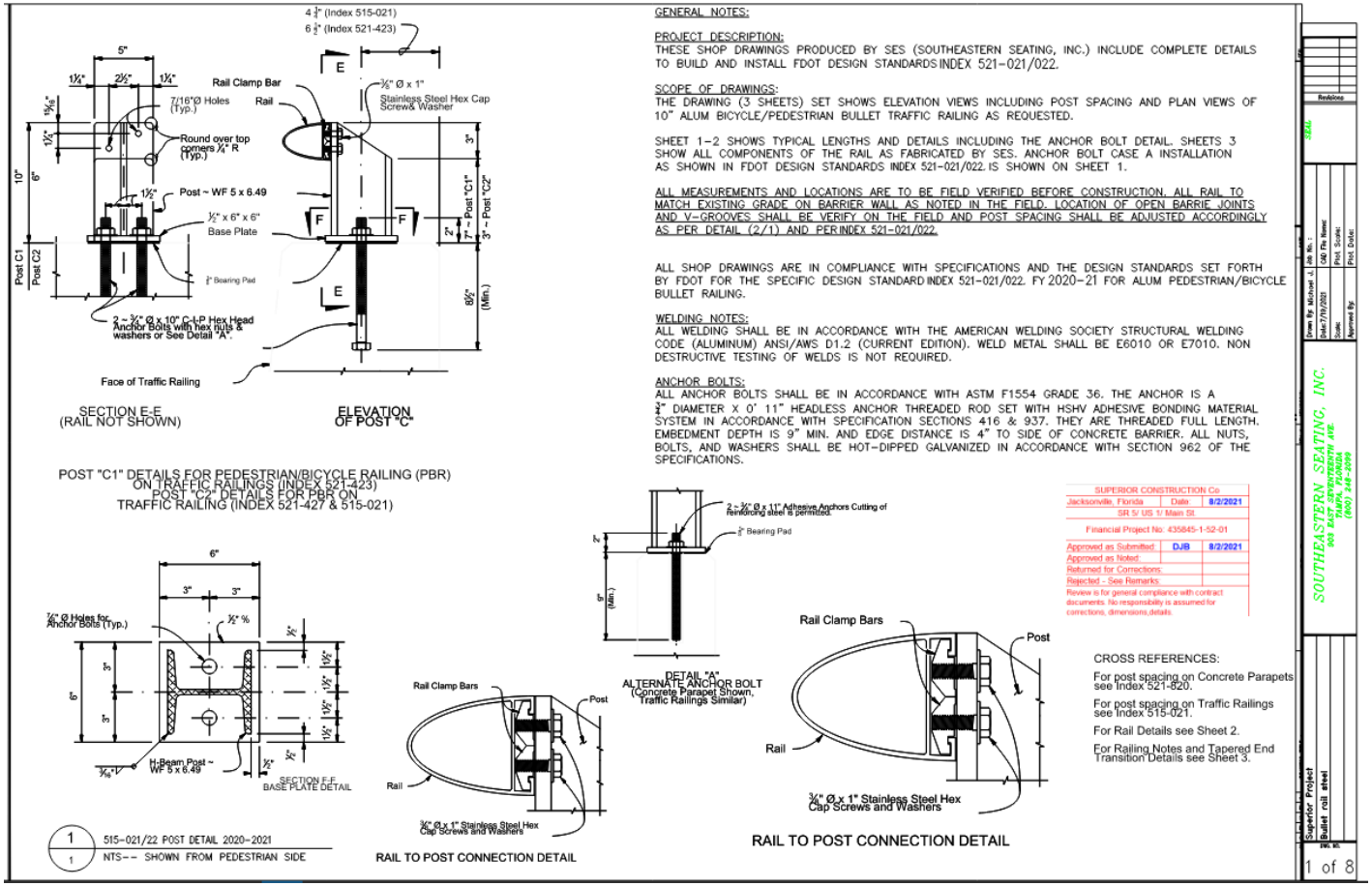
COPY TO: 21740

SIGNED: David J. Blair
Superior Construction

SUPERIOR CONSTRUCTION Co.
Jacksonville, Florida | Date: 8/2/2021
SR 5/ US 1/ Main St.
Financial Project No: 435845-1-52-01
Approved as Submitted: DJB 8/2/2021
Approved as Noted:
Returned for Corrections:
Rejected - See Remarks:
Review is for general compliance with contract documents. No responsibility is assumed for corrections, dimensions,details

Post Design (throughout construction)

- Sample Shop Drawings



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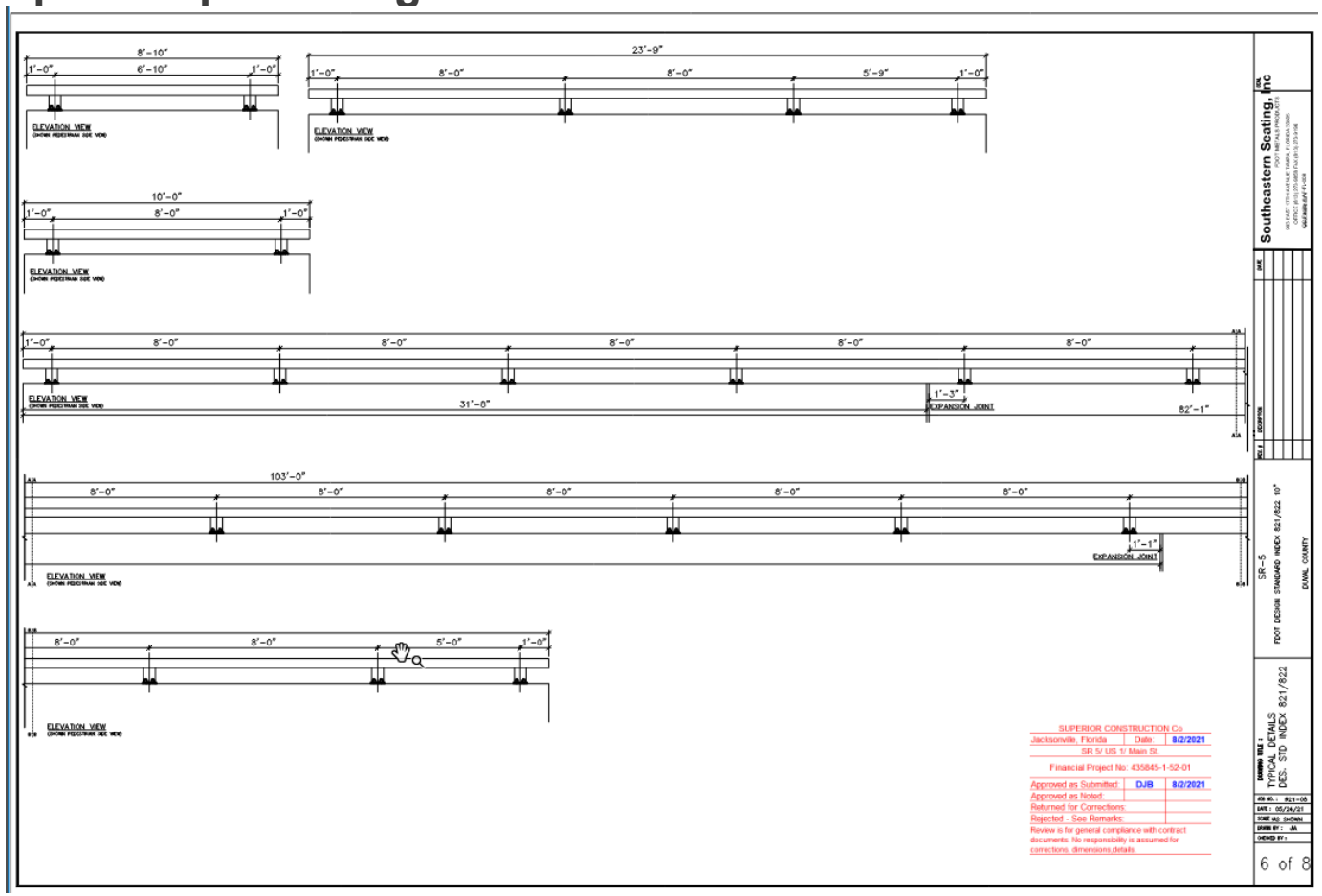

Post Design (throughout construction)

- **"Lessons Learned"**
  - Share with the entire team experiences that can limit repeat mistakes or misses
  - A few examples
    - Construction Equipment Requirements – look at right of way when cranes are involved. You may have multiple cranes and you have to provide space for the crane and its outrigger. **Make sure you have enough room to get the necessary equipment in place and perform the work.**
    - Utility Conflict Analysis – although there may not be a direct conflict with the proposed element, there may be a conflict with the constructability of the element.
      - Overhead utilities at a proposed pole or pole removal location
      - Underground utilities that "just miss" a proposed structure
    - Roundabouts – does the proposed TTCP adversely affect any adjacent businesses?
  - **Extinguish the Torch Meetings**
  - **District Two TRENDS newsletter**

Open Discussion / Q&A

Presenters

Mike Molkenbur, P.E., FDOT
Mike.Molkenbur@dot.state.fl.us

Kevin Tasillo, P.E., KCA
Kevin.Tasillo@kisingercampo.com

John O'Donnell, P.E., Terracon
John.O'Donnell@terracon.com

Scott Kroper, P.E., RS&H
Scott.Kroper@rsandh.com

Vanessa Vitale, P.E., RS&H
Vanessa.Vitale@rsandh.com

Andy Cummings, P.E., C&W
ACummings@cwieng.com

Eddie Giese, P.E., PGA
eddie.giese@patelgreene.com

Panel Experts

Kathy Thomas, P.E., FDOT
District Design Engineer
Kathy.Thomas@dot.state.fl.us

Dr. Hu, P.E., FDOT
District Geotech Engineer
Zhihong.Hu@dot.state.fl.us

Justin Garland, P.E, FDOT
Permitting / Environmental
Justin.Garland@dot.state.fl.us

Todd Hunt, P.E., FDOT
Utilities
Todd.Hunt@dot.state.fl.us

Mo Majboor, P.E., FDOT
District Drainage Engineer
Mohammed.Majboor@dot.state.fl.us

Chat Box Moderator

Morgan County, P.E., RS&H
Morgan.County@rsandh.com

Additional Training - Project Management webinar series:

https://www.fdot.gov/designsupport/pm/webinarseries.shtm

Thank you for attending!