

 June 19 - 20, 2025
 Hollywood, FL




**TRANSPORTATION
SYMPOSIUM**

District 6 – Design Lessons Learned

Raymond Valido, P.E.
District Roadway Design Engineer

Transportation Symposium Website



SCAN ME

1

Agenda

- Introduction
- Retaining Wall Earthwork Quantities
- Wrong Way Driving Arrow RPM's
- Strung Project Consistency
- TTCP Coordination During Design
- Reviewing the Existing Drainage System when installing foundations
- Subsurface Utility Exploration
- Modifying Existing Signalization Infrastructure
- Steel Plates during TTCP
- License Agreements
- Modifying or adding signals and signs on existing mast-arms
- Inlets along curb returns
- Q&A

**TRANSPORTATION
SYMPOSIUM**

2

2

Introduction

Goal: Share lessons we've learned to help guide your future designs and project coordination



TRANSPORTATION
SYMPOSIUM

3

3

Lesson Learned # 1

Retaining Wall Earthwork Quantities

TRANSPORTATION
SYMPOSIUM

4

4

Retaining Wall Quantities

FDM 216 - Earthwork

216.1 General

Earthwork is a generic term for all items of work, materials and operations required to construct the excavated areas and the embankments of a project.

FDOT's [Standard Specifications Sections 110, 120, and 125](#) define the terms, method of measurement, basis of payment, and pay items associated with earthwork.

Earthwork on a highway project generally consists of:

- **Clearing and Grubbing** – Removal of existing pavement to prepare the area for proposed construction. See [Standard Specifications Section 110](#) for additional requirements.
- **Embankment** – Compacted fill material needed to construct the roadway. See [Standard Specifications Section 120](#) for additional requirements.
- **Regular Excavation** – See [Standard Specifications Section 120](#) for additional requirements.
- **Subsoil Excavation** – See [Standard Specifications Section 120](#) for additional requirements.
- **Excavation for Structures and Pipe** – See [Standard Specifications Section 125](#) for additional requirements.

The roadbed is constructed by excavating soil from cut sections and placing soil as embankments in fill sections. A summary of the most common cut and fill sections is described in this chapter.

Calculate the Excavation quantities for a new roadway as shown in [Figure 216.4.4](#). For Case I projects, calculate the Excavation quantities from the existing surface to the finished graded surface of the new road; or if concrete pavement removal is called for in the plans, the calculation is taken from the bottom of the existing concrete to the finished graded surface of the new road.

Calculate the Embankment quantities for a new roadway as shown in [Figure 216.4.5](#). Calculate the Embankment from the top of the existing base to the finished graded surface of the new road ([Figure 216.4.5 Left](#)) or, if the base removal is called for in the plans, calculate the Embankment from the bottom of the existing surface (finished graded surface) to the finished graded surface of the new road ([Figure 216.4.5 Right](#)). If concrete pavement removal is called for in the plans, the calculation is taken from the bottom of the existing concrete to the finished graded surface of the new road.

KEY TERMS:

- **EXISTING SURFACE**
- **FINISHED GRADED SURFACE**

Designer Guidance

TRANSPORTATION
SYMPOSIUM

5

Retaining Wall Quantities

FDM 216 - Earthwork

KEY TERMS:

- **EXISTING SURFACE**
- **FINISHED GRADED SURFACE**

Figure 216.4.2 Case I Excavation

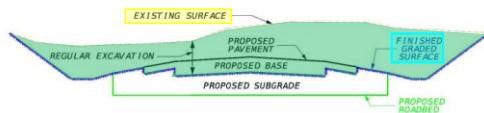


Figure 216.4.3 Case I Embankment

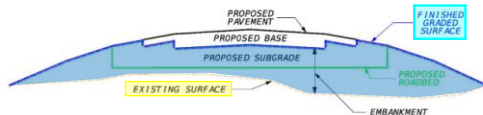
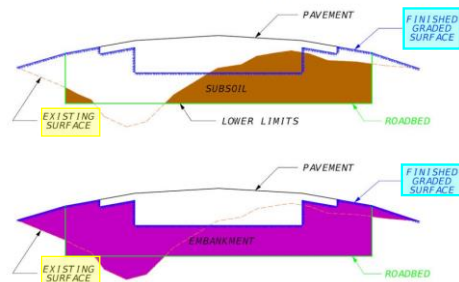


Figure 216.4.8 Excavation and Embankment



Designer Guidance

TRANSPORTATION
SYMPOSIUM

6

Retaining Wall Quantities

FDM 216 - Earthwork

EARTHWORK AND RELATED OPERATIONS

SECTION 120 EXCAVATION AND EMBANKMENT

120-1 Description.

120-1.1 General: Excavate and construct embankments as required for the roadway, ditches, channel changes and borrow material. Use suitable excavated material or authorized borrow material to prepare subgrades and foundations. Construct embankments in accordance with Standard Plans, Index 120-001. Compact and dress excavated areas and embankments.

Meet the requirements of Section 110 for excavation of material for clearing and grubbing and Section 125 for excavation and backfilling of structures and pipe. Material displaced by the storm sewer or drainage structure system is not included in the earthwork quantities shown in the Contract Documents.

The **existing surface** may be a combination of the following:

1. The original unpaved ground line;
2. The bottom of the existing pavement;
3. The bottom of existing features removed by clearing and grubbing;
4. The bottom of the existing base, if the base is to be removed.

The **finished graded surface** includes the completed grades of side slopes, unpaved shoulders, and the bottom of the base for flexible or rigid pavement.

120-1.2 Unidentified Areas of Contamination: When encountering or exposing any

KEY TERMS:

- **EXISTING SURFACE**
- **FINISHED GRADED SURFACE**

CEI and Construction Guidance

TRANSPORTATION
SYMPOSIUM

7

Retaining Wall Quantities

Spec 120 – Excavation and Embankment

120-12 Method of Measurement.

120-12.1 General: When payment for excavation is on a volumetric basis, the quantity to be paid for will be the volume, in cubic yards. The material will be measured in its original position by field survey or by photogrammetric means as designated by the Engineer, unless otherwise specified under the provisions for individual items.

Where subsoil excavation extends outside the lines shown in the Plans or authorized by the Engineer including allowable tolerances, and the space is backfilled with material obtained in additional authorized roadway or borrow excavation, the net fill, plus shrinkage allowance, will be excluded from the quantity of roadway excavation or borrow excavation to be paid for, as applicable.

The quantity of all material washed, blown, or placed beyond the limits of the finished graded surface will be determined by the Engineer and will be excluded from the quantity of roadway excavation or borrow excavation to be paid for, as applicable.

Subsoil excavation that extends outside the lines shown in the Plans or authorized by the Engineer including allowable tolerances will be excluded from the quantity to be paid for as subsoil excavation.

120-12.2 Roadway Excavation: The measurement will include only the net volume of material excavated between the **original ground line or finished graded surface** of an existing roadbed, as applicable, and the **finished surface of new pavement**, except that the measurement will also include all unavoidable slides which may occur in connection with excavation classified as roadway excavation.

The pay quantity will be the plan quantity provided that the excavation was accomplished in substantial compliance with the plan dimensions and subject to the provisions of 9-3.2 and 9-3.4. On designated 3-R Projects, regular excavation will be paid for at the Contract lump sum price provided that the excavation was accomplished in substantial compliance with the plan dimension.

KEY TERMS:

- **ORIGINAL GROUND LINE OR FINISHED GRADED SURFACE (EXISTING SURFACE)**
- **FINISHED (GRADED) SURFACE**

CEI and Construction Guidance

TRANSPORTATION
SYMPOSIUM

8

Retaining Wall Quantities

Spec 120 – Excavation and Embankment

120-12.7 Embankment: The pay quantity will be at the plan quantity. Where payment for embankment is not to be included in the payment for the excavation and is to be paid for on a cubic yard basis for the item of embankment, the measurement will include material placed within the limits of the existing surface, to the finished graded surface as shown in the Plans, Standard Plans Index 120-001, or directed by the Engineer. Where embankment is constructed over an **existing road**, the embankment measurement will include only the material actually placed up to the **finished graded surface**. If there are authorized changes in plan dimensions or if errors in plan quantities are detected, plan quantity will be adjusted as provided in 9-3.2.

Any overrun or underrun of plan quantity for subsoil excavation which results in a corresponding increase or decrease in embankment will be considered as an authorized plan change for adjustment purposes as defined in 9-3.2.2.

No payment will be made for embankment material used to replace unsuitable material excavated beyond the lines and grades shown in the Plans or ordered by the Engineer.

In no case will payment be made for material allowed to run out of the embankment on a flatter slope than indicated on the Plans. The Contractor shall make their own estimate on the volume of material actually required to obtain the pay section.

KEY TERMS:

- **EXISTING ROAD (EXISTING SURFACE)**
- **FINISHED GRADED SURFACE**

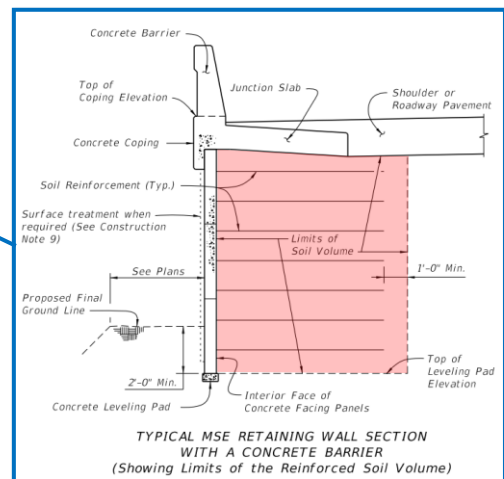
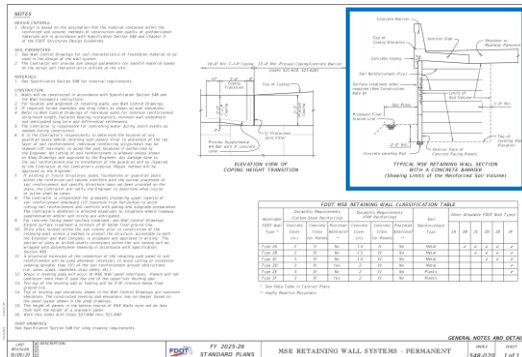
CEI and Construction Guidance

TRANSPORTATION
SYMPOSIUM

9

Retaining Wall Quantities

Standard Index 548-020 Retaining Wall Systems



CEI and Construction Guidance

TRANSPORTATION
SYMPOSIUM

10

Retaining Wall Quantities

Spec 548 - Retaining Walls

548-12 Basis of Payment.

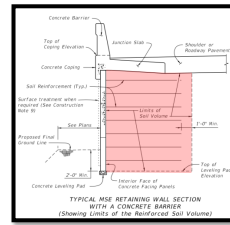
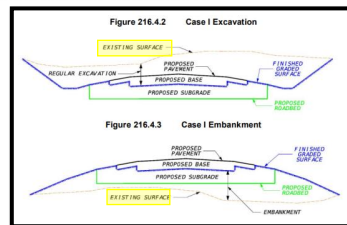
Price and payment will be full compensation for all work specified in this Section, including the design of the wall system, excavation required specifically for wall construction below the finished graded surface, backfill reinforcement, leveling pad, footings, copings, light pole pedestals, geotextile, horizontal joint materials, alignment pins, repairs, labor, equipment, and other materials necessary to complete the wall in an acceptable manner as shown in the Contract. The cost of backfill for the finished graded surface will be included in the cost of embankment or borrow excavation, as applicable.

Payment will be made under:

- Item No. 548- 12- Retaining Wall System (Permanent) - per square foot.
- Item No. 548- 13- Retaining Wall System (Temporary) - per square foot.

KEY TERMS:

- **FINISHED GRADED SURFACE**
- EXISTING SURFACE (NO REFERENCE)
 - Do we measure to existing surface or within the limits of soil volume?



CEI and Construction Guidance

TRANSPORTATION SYMPOSIUM

11

Retaining Wall Quantities

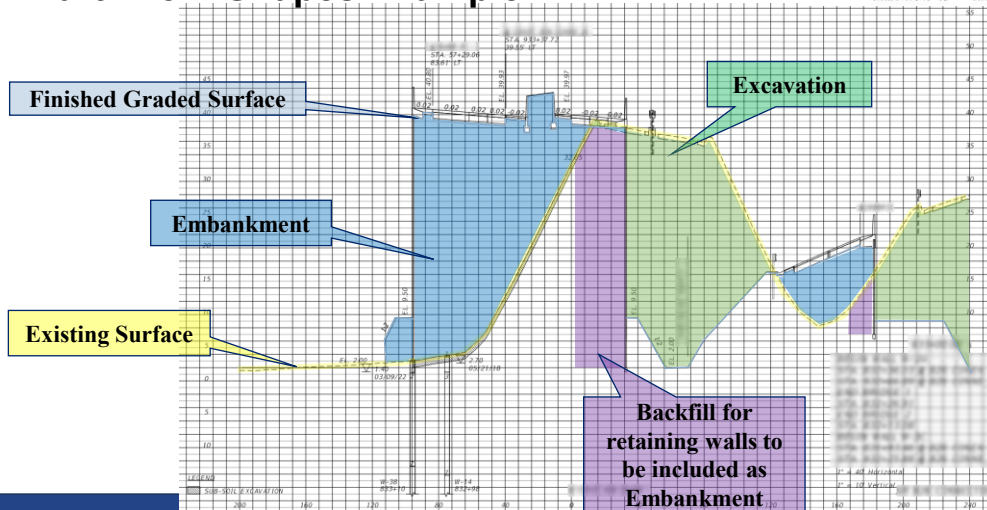
548-12 Basis of Payment.

Price and payment will be full compensation for all work specified in this Section, including the design of the wall system, excavation required specifically for wall construction below the finished graded surface, backfill reinforcement, leveling pad, footings, copings, light pole pedestals, geotextile, horizontal joint materials, alignment pins, repairs, labor, equipment, and other materials necessary to complete the wall in an acceptable manner as shown in the Contract. The cost of backfill for the finished graded surface will be included in the cost of embankment or borrow excavation, as applicable.

Payment will be made under:

- Item No. 548- 12- Retaining Wall System (Permanent) - per square foot.
- Item No. 548- 13- Retaining Wall System (Temporary) - per square foot.

Earthwork Shapes Example



KEY TERMS:

- EXISTING SURFACE
- FINISHED GRADED SURFA

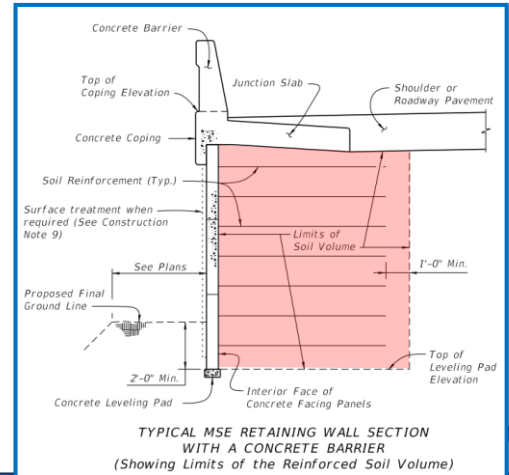
TRANSPORTATION SYMPOSIUM

12

Retaining Wall Quantities

D6 Construction Entitlement Claim

- Active construction project where 7 of 8 EOR's did not include embankment quantity within retaining wall limits of soil volume
- Entitlement claim estimated at \$9M
- D6 is aware of entitlement claims in:
 - TPK- \$3.3M
 - D4: \$380K



13

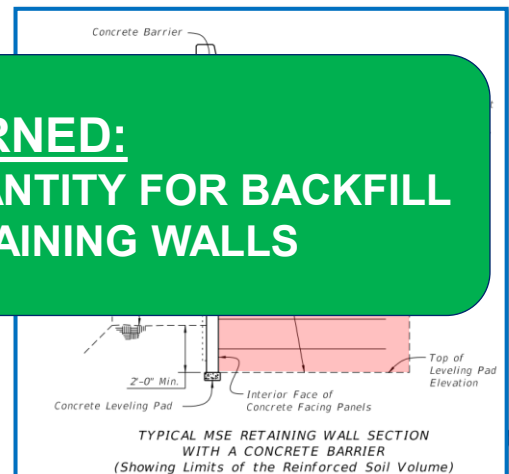
Retaining Wall Quantities

D6 Construction Entitlement Claim

- Active construction project where 7 of 8 EOR's did not include

LESSON LEARNED:
CALCULATE EARTHWORK QUANTITY FOR BACKFILL ASSOCIATED WITH RETAINING WALLS

- TPK- \$3.3M
- D4: \$380K



14

Lesson Learned # 2

Wrong Way Driving (WWD) Arrow RPM's

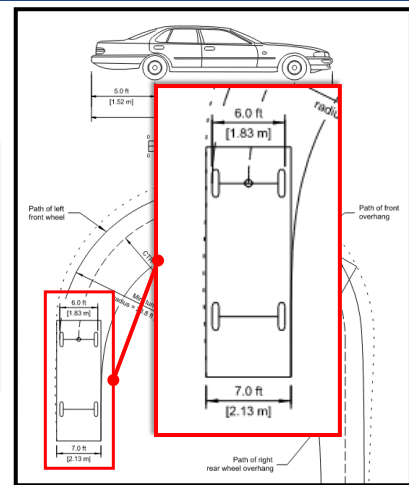
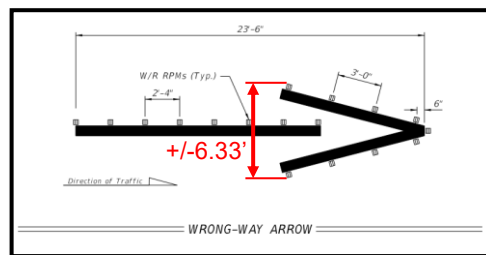
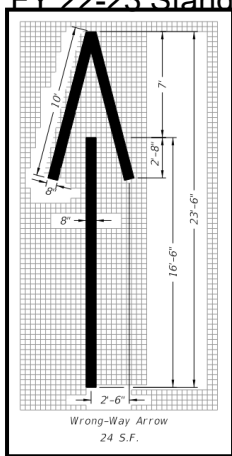
TRANSPORTATION
SYMPOSIUM

15

15

Wrong Way Driving (WWD) Arrow RPM's

EY 22-23 Standard Plans



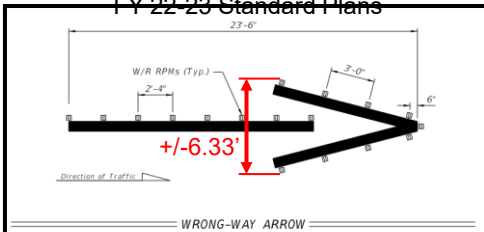
TRANSPORTATION
SYMPOSIUM

16

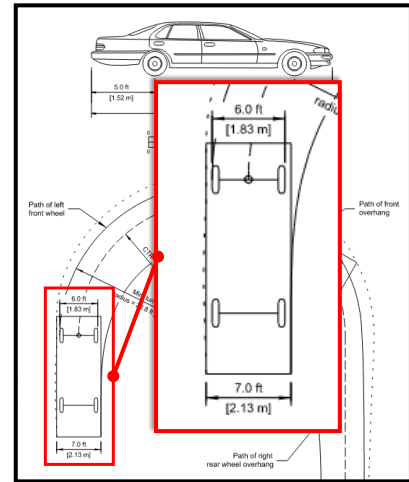
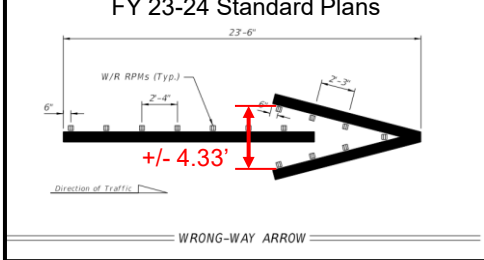
16

Wrong Way Driving (WWD) Arrow RPM's

FY 22-23 Standard Plans



FY 23-24 Standard Plans



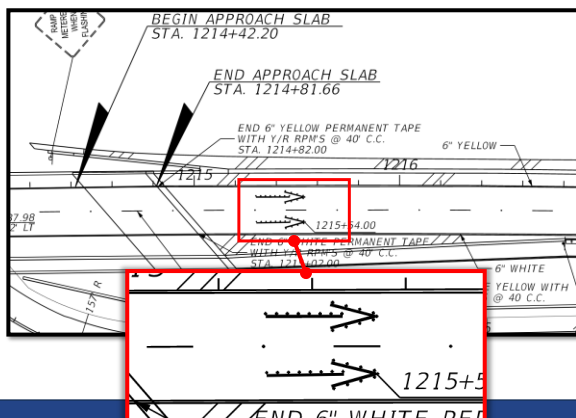
TRANSPORTATION
SYMPOSIUM

17

17

Wrong Way Driving (WWD) Arrow RPM's

- Cell on contract plans is not updated
- Instances of incorrect installation

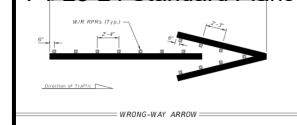


GOVERNING STANDARD PLANS:

Florida Department of Transportation, FY 2023-24 Standard Plans for Road and Bridge Construction and applicable

Standard Plans for Bridge Construction are included in the Structures Plans Component

FY 23-24 Standard Plans



5-2 Coordination of Contract Documents.

These Specifications, the Plans, Special Provisions, and all supplementary documents are integral parts of the Contract; a requirement occurring in one is as binding as though occurring in all. All parts of the Contract are complementary and describe and provide for a complete work. In addition to the work and materials specified in the Specifications as being included in any specific pay item, include in such pay items additional, incidental work, not specifically mentioned, when so shown in the Plans, or if indicated, or obvious and apparent, as being necessary for the proper completion of the work under such pay item and not stipulated as being covered under other pay items.

In cases of discrepancy, the governing order of the documents is as follows:

1. Special Provisions.
2. Technical Special Provisions.
3. Plans.
4. Standard Plans.
5. Developmental Specifications.
6. Supplemental Specifications.
7. Standard Specifications.

Computed dimensions govern over scaled dimensions.

TRANSPORTATION
SYMPOSIUM

18

18

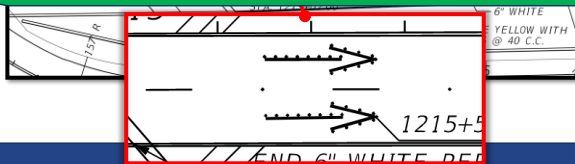
Wrong Way Driving (WWD) Arrow RPM's

- Cell on contract plans is not updated
- Instances of incorrect installation

GOVERNING STANDARD PLANS:
Florida Department of Transportation, FY 2023-24 Standard Plans for Road and Bridge Construction and applicable
Standard Plans for Bridge Construction are included in the Structures Plans Component

LESSON LEARNED:

- ENSURE CEI AND CONTRACTORS ARE AWARE OF CHANGE IN RPM STANDARDS.
- ENSURE PLANS SHOW APPROPRIATE CELL MATCHING LATEST STANDARD



1. Special Provisions.
2. Technical Special Provisions.
3. Plans.
4. Standard Plans.
5. Developmental Specifications.
6. Supplemental Specifications.
7. Standard Specifications.
Computed dimensions govern over scaled dimensions.

TRANSPORTATION
SYMPOSIUM

19

19

Lesson Learned # 3

- Strung Project Consistency
- FDM 910.2.10:
 - Contract Plans Sets that are independently prepared but are let in the same construction contract are referred to as strung projects.

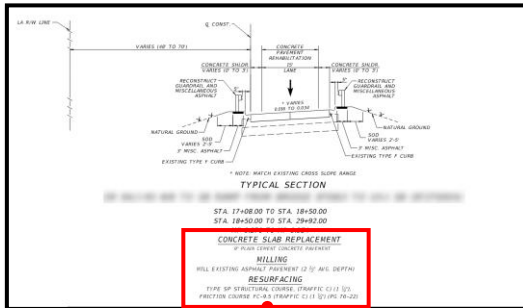
TRANSPORTATION
SYMPOSIUM

20

20

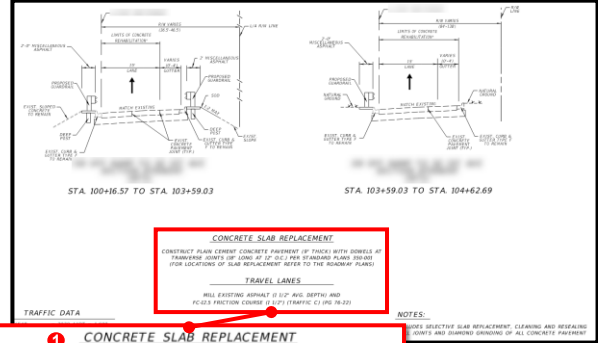
Strung Project Consistency

FPID # 1



1. **CONCRETE SLAB REPLACEMENT**
9" PLAIN CEMENT CONCRETE PAVEMENT
MILLING
MILL EXISTING ASPHALT PAVEMENT (2 1/2" AVG. DEPTH)
RESURFACING
TYPE SP STRUCTURAL COURSE, (TRAFFIC C) (1 1/2")
FRICTION COURSE FC-9.5 (TRAFFIC C) (1 1/2") (PG 76-22)

FPID # 2



1. **CONCRETE SLAB REPLACEMENT**
CONSTRUCT PLAIN CEMENT CONCRETE PAVEMENT (9" THICK) WITH DOWELS AT TRANSVERSE JOINTS (18" LONG AT 12" O.C.) PER STANDARD PLANS 350-001 (FOR LOCATIONS OF SLAB REPLACEMENT REFER TO THE ROADWAY PLANS)
2. **TRAVEL LANES**
MILL EXISTING ASPHALT (1 1/2" AVG. DEPTH) AND
FC-12.5 FRICTION COURSE (1 1/2") (TRAFFIC C) (PG 76-22)

**TRANSPORTATION
SYMPOSIUM**

21

Strung Project Consistency

FPID # 1

1. **CONCRETE SLAB REPLACEMENT**
9" PLAIN CEMENT CONCRETE PAVEMENT
MILLING
MILL EXISTING ASPHALT PAVEMENT (2 1/2" AVG. DEPTH)
RESURFACING
TYPE SP STRUCTURAL COURSE, (TRAFFIC C) (1 1/2")
FRICTION COURSE FC-9.5 (TRAFFIC C) (1 1/2") (PG 76-22)

FPID # 2

1. **CONCRETE SLAB REPLACEMENT**
CONSTRUCT PLAIN CEMENT CONCRETE PAVEMENT (9" THICK) WITH DOWELS AT TRANSVERSE JOINTS (18" LONG AT 12" O.C.) PER STANDARD PLANS 350-001 (FOR LOCATIONS OF SLAB REPLACEMENT REFER TO THE ROADWAY PLANS)
2. **TRAVEL LANES**
MILL EXISTING ASPHALT (1 1/2" AVG. DEPTH) AND
FC-12.5 FRICTION COURSE (1 1/2") (TRAFFIC C) (PG 76-22)

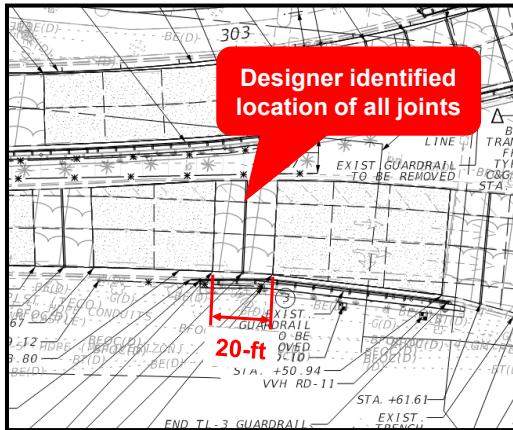
2. Transverse joints are to be spaced at a maximum of 15'. Dowel Bars are required at all transverse joints unless otherwise noted in the plans.

**TRANSPORTATION
SYMPOSIUM**

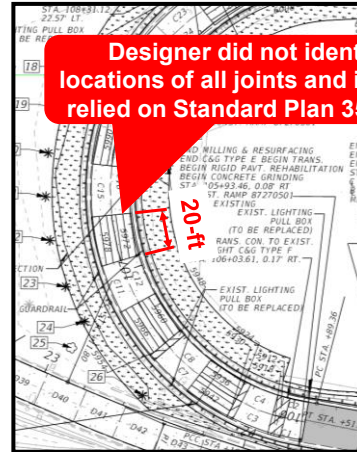
22

Strung Project Consistency

FPID # 1



FPID # 2



TRANSPORTATION
SYMPOSIUM

23

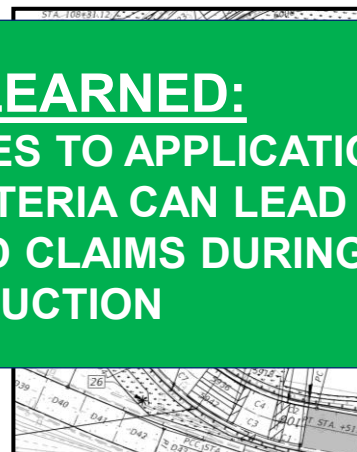
23

Strung Project Consistency

FPID # 1



FPID # 2



TRANSPORTATION
SYMPOSIUM

24

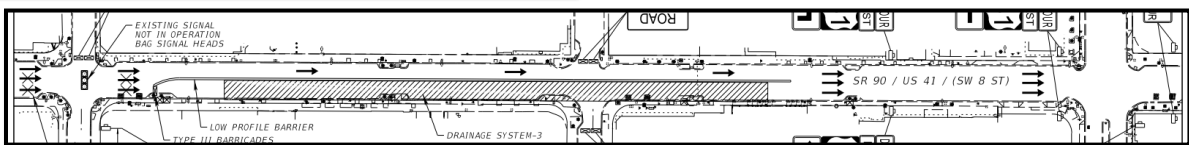
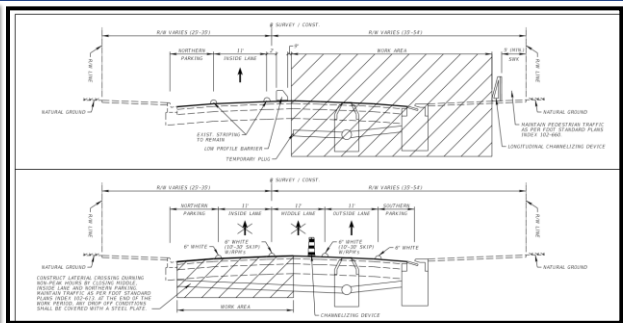
24

LESSON LEARNED:
DIFFERING APPROACHES TO APPLICATION OF
STANDARDS OR CRITERIA CAN LEAD TO
CHALLENGES AND CLAIMS DURING
CONSTRUCTION

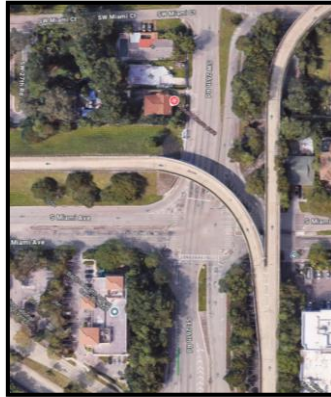
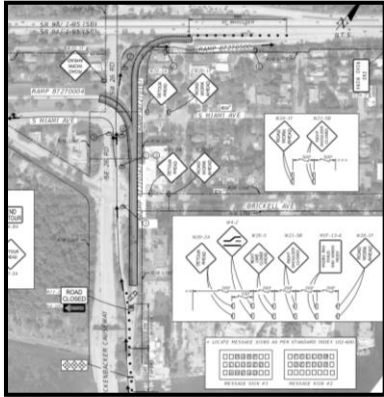
Lesson Learned # 4

- TTCP Coordination During Design

TTCP Coordination During Design



TTCP Coordination During Design

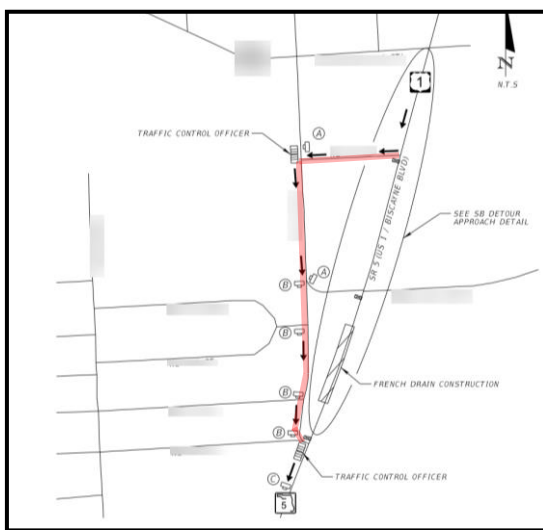


TRANSPORTATION
SYMPOSIUM

27

27

TTCP Coordination During Design

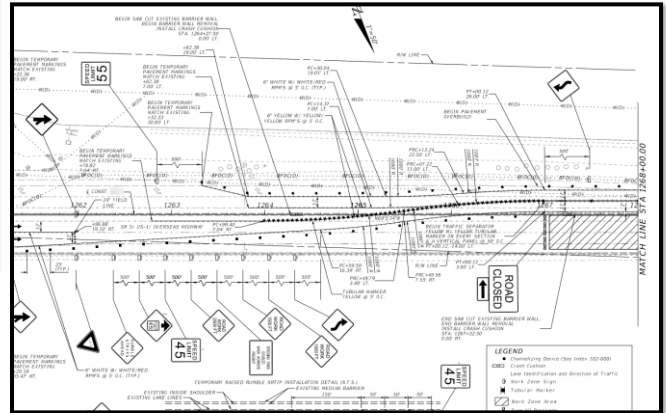
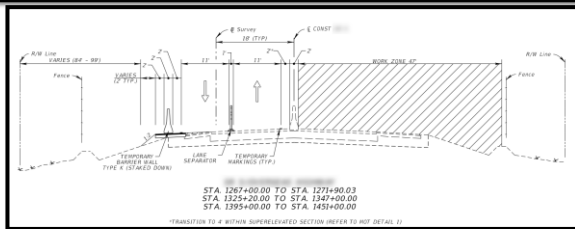


TRANSPORTATION
SYMPOSIUM

28

28

TTCP Coordination During Design



TRANSPORTATION
SYMPOSIUM

29

29

TTCP Coordination During Design

Important Items to Consider:

- Impacts to traveling public
- Alternative temporary traffic control options
- Determine when traffic analysis is needed
- Ensure Construction Residency is involved in review of TTCP
- Determine if additional traffic data needs to be collected for lane closures
- Diversions may need to be analyzed due to added friction in system creating queues

TRANSPORTATION
SYMPOSIUM

30

30

TTCP Coordination During Design

- TTCP Review Meeting between Phase 2 (60%) and Phase 3 (90%) if project proposes:

- Lane closure
- Diversion
- Detour

- Meeting scheduled by FDOT PM.

- Invite:

- FDOT PM
- Consultant PM or Internal Design PM
- TTCP EOR
- Assistant District Construction Engineer
- Resident Engineer
- Plans Review/CCEI Engineer
- District Roadway Design Engineer
- District Traffic Services Engineer

OTHER SUBMITTAL REQUIREMENTS			
YES	N/A	ITEM	NOTES
		ALL EIR COMMENTS FROM PREVIOUS SUBMITTAL HAVE BEEN CLOSED OUT.	
		3 SETS OF HARD COPY PLANS Deliver to District Construction Office if total plan set exceeds 300 sheets	
		VVWS WERE RECEIVED AND PLANS HAVE BEEN UPDATED TO REFLECT FINDINGS AND SHOW LOCATION OF VVWS. SUE deliverables are shall be uploaded to PSEE Survey Users Code Module	
		SUBMITTAL UPLOADED ONTO PSEE	
		PHASE REVIEW MODULE FDOT PM has reviewed and confirmed compliance with submittal checklist before submitting	
		SAFETY COUNTERMEASURES MODULE	
		TEMPORARY TRAFFIC CONTROL PLANS (TTCP) REVIEW MEETING Confirm project team met with Assistant District Construction Engineer, Resident Engineer, Plans Review/CCEI Engineer, District Roadway Design Engineer, and District Traffic Services Engineer after the Phase 2 Review Meeting and before the Phase 3 Meeting if the project proposes a lane closure, diversion, or detour with a continuous duration of 72 hours or longer	

TRANSPORTATION
SYMPOSIUM

31

31

TTCP Coordination During Design

- TTCP Review Meeting between Phase 2 (60%) and Phase 3 (90%) if project proposes:

LESSON LEARNED:

- PROVIDE FOR AN EFFICIENT TTCP DESIGN
- CONSIDER THE NEED FOR TRAFFIC ANALYSIS
 - COORDINATE DURING DESIGN

- District Traffic Services Engineer

TRANSPORTATION
SYMPOSIUM

32

32

Lesson Learned # 5

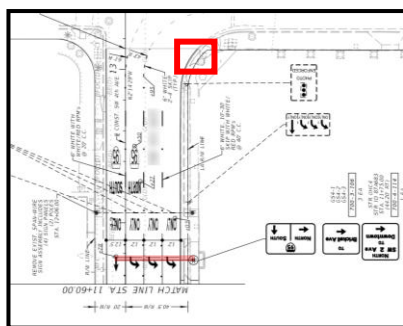
- Reviewing the Existing Drainage System when installing foundations

TRANSPORTATION
SYMPOSIUM

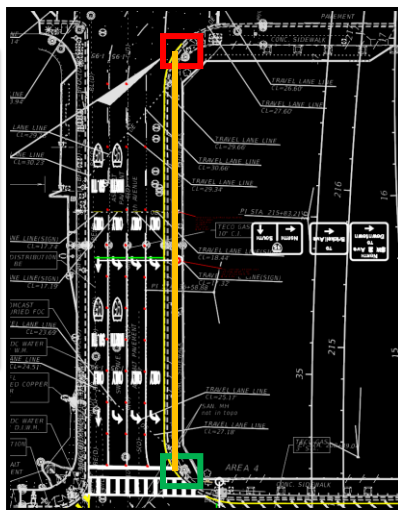
33

33

Existing Drainage System



DRAINAGE MANHOLE #7
RIM ELEV. = 7.99'
8" INV. (W) = 2.34'
10" INV. (E) = 2.31'
NO ACCESS SEE
MATERIAL PIPE
FULL OF WATER
BOTTOM ELEV. = 2.36'

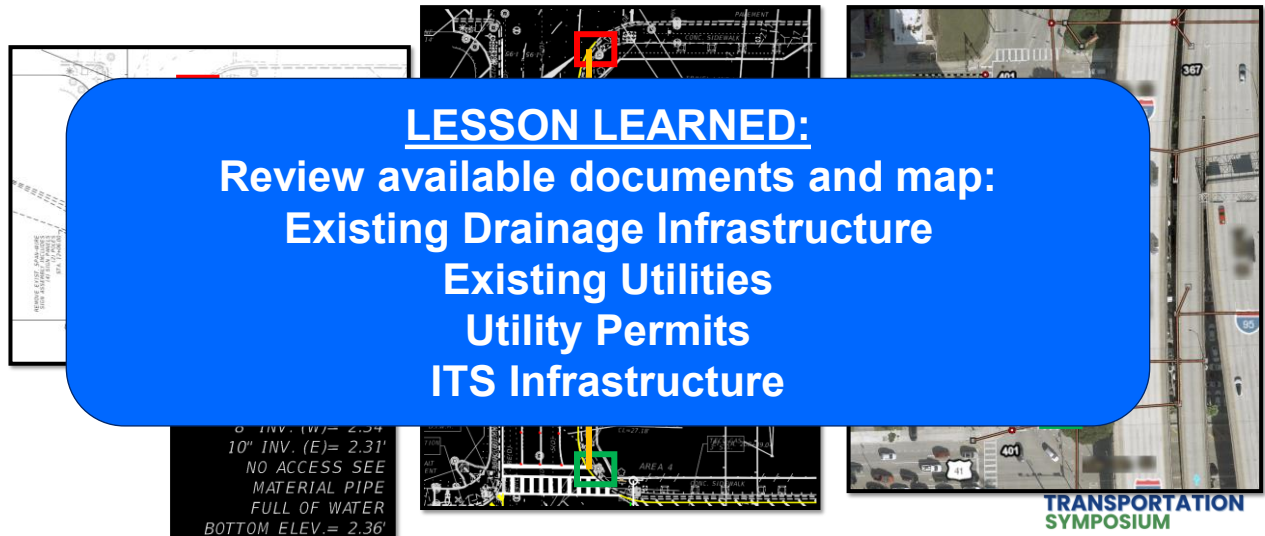


TRANSPORTATION
SYMPOSIUM

34

34

Existing Drainage System



LESSON LEARNED:
 Review available documents and map:
 Existing Drainage Infrastructure
 Existing Utilities
 Utility Permits
 ITS Infrastructure

8" INV. (W)= 2.34'
 10" INV. (E)= 2.31'
 NO ACCESS SEE
 MATERIAL PIPE
 FULL OF WATER
 BOTTOM ELEV.= 2.36'

TRANSPORTATION
SYMPOSIUM

35

35

Lesson Learned # 6

- Subsurface Utility Exploration

TRANSPORTATION
SYMPOSIUM

36

36

Lesson Learned # 7

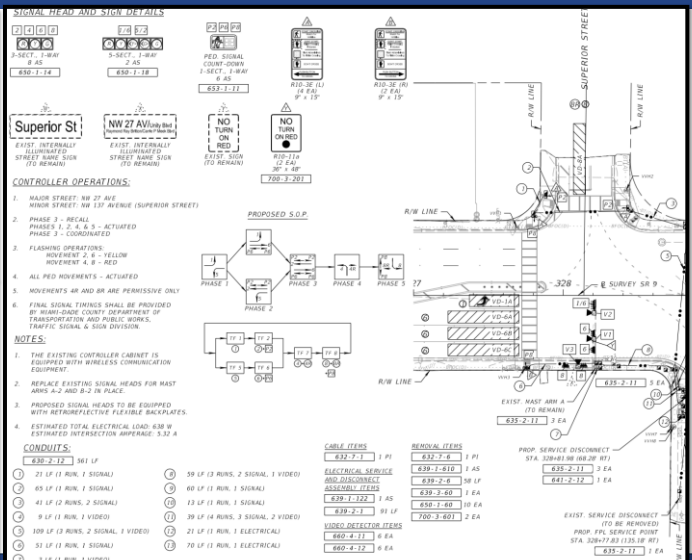
- Modifying Existing Signalization Infrastructure

TRANSPORTATION
SYMPOSIUM

39

39

Modifying Existing Signalization Infrastructure



40

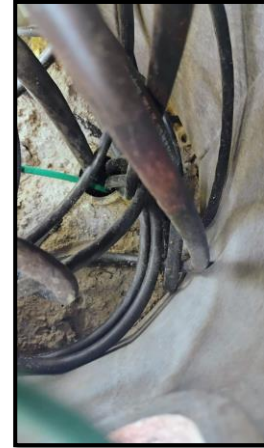
Modifying Existing Signalization Infrastructure

TABLE 1 Percent of Cross Section of Conduit and Tubing for Conductors and Cables

Number of Conductors and/or Cables	Cross-Sectional Area (%)
1	53
2	31
Over 2	40

Informational Note No. 1: Table 1 is based on common conditions of proper cabling and alignment of conductors where the length of the pull and the number of bends are within reasonable limits. It should be recognized that, for certain conditions, a larger size conduit or a lesser conduit fill should be considered.

Table 1 establishes the maximum fill permitted for the circular conduit and tubing types. It is the basis for Table 4 and for the information on conduit and tubing fill provided in the Informative Annex C tables. Informational Note No. 1 advises that factors such as the length of the run or the number and total radius of bends can increase the difficulty of pulling conductors into the raceway and in extreme cases could result in damage to conductor insulation. To mitigate such adverse effects and to facilitate the ease of installing the conductors in the conduit or tubing, it is recommended, where a difficult installation is anticipated, that the maximum number of conductors permitted not be installed or that the size of the conduit or tubing be increased by at least one trade size larger than the minimum required by the NEC.



TRANSPORTATION
SYMPOSIUM

41

41

Modifying Existing Signalization Infrastructure

- Review as-builts
- Review FDOT GIS Database
- Conduct field review
- Avoid scope creep
- When in doubt, coordinate



TRANSPORTATION
SYMPOSIUM

42

42

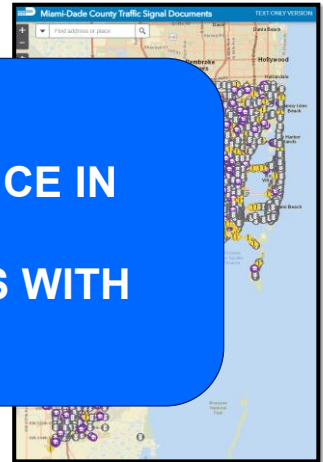
Modifying Existing Signalization Infrastructure

- Review as-builts

- R
- C
- A
- V

LESSON LEARNED:

- CONDUCT AS MUCH DUE DILIGENCE IN DESIGN AS POSSIBLE
- HAVE KNOWLEDGEABLE DESIGNERS WITH UNDERSTANDING OF NEC



TRANSPORTATION
SYMPOSIUM

43

43

Lesson Learned # 8

- Steel Plates during TTCP

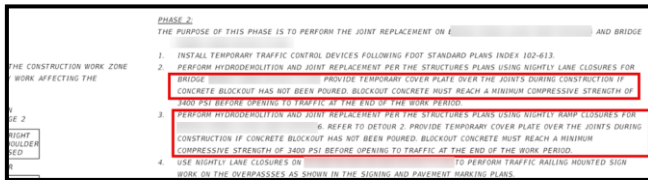
TRANSPORTATION
SYMPOSIUM

44

44

Steel Plates during TTCP

- Is posed speed is <45mph, develop MSP requiring design of steel plates by specialty engineer
 - Coordinate with Construction and Structures Maintenance



TRANSPORTATION
SYMPOSIUM

45

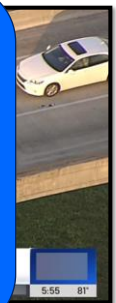
45

Steel Plates during TTCP

- Is posed speed is <45mph, develop MSP requiring design of steel plates by specialty engineer

LESSON LEARNED:

- SPECIALTY ENGINEER TO DESIGN STEEL PLATES ON HIGH SPEED FACILITIES



TRANSPORTATION
SYMPOSIUM

46

46

Lesson Learned # 8

- License Agreements

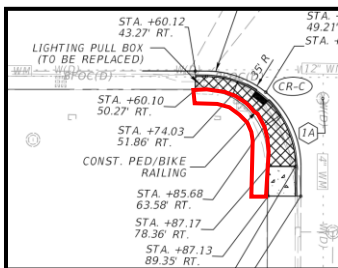
TRANSPORTATION
SYMPOSIUM

47

47

License Agreements

- Execution of a License Agreement during Construction is time consuming and potentially leads to project delays
- Contractor cannot perform work in private property until a License Agreement is executed
- Sidewalk cross slope corrections resulted in elevation differences at the back of the new sidewalk



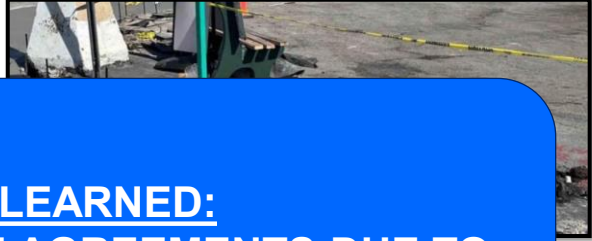
TRANSPORTATION
SYMPOSIUM

48

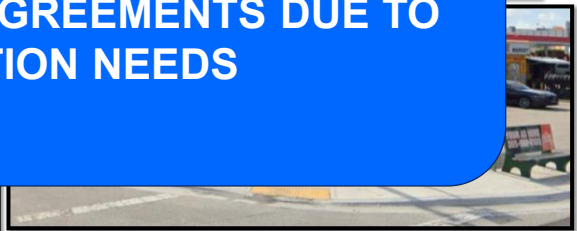
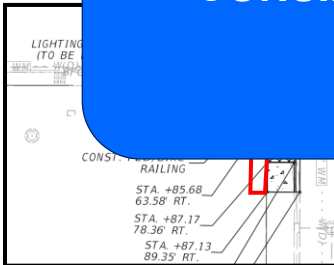
48

License Agreements

- Execution of a License Agreement during Construction is time consuming and potentially



LESSON LEARNED:
• CONSIDER LICENSE AGREEMENTS DUE TO CONSTRUCTION NEEDS



**TRANSPORTATION
SYMPOSIUM**

49

49

Lesson Learned # 9

- Modifying or adding signals and signs on existing mast-arms

**TRANSPORTATION
SYMPOSIUM**

50

50

Modifying or adding signals and signs on existing mast-arms

Be aware that added surface area due to new signs, signals and other features can cause oscillation on the mast arm .



51

51

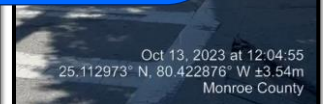
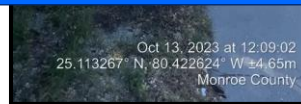
Modifying or adding signals and signs on existing mast-arms

Be aware that added surface area due to new signs, signals and other features can cause oscillation on the mast arm .



LESSON LEARNED:

- **CONSIDER THE POTENTIAL FOR OSCILLATION WHEN MODIFYING EXISTING MAST ARMS**



52

52

Lesson Learned # 10

- Inlets along curb returns

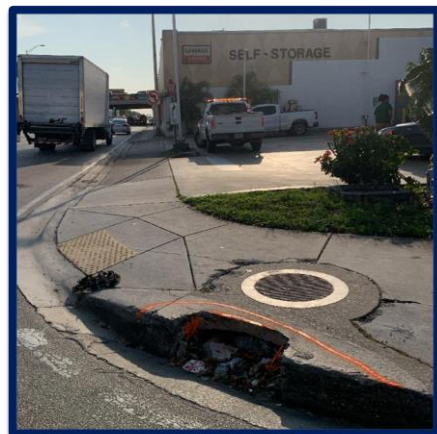
TRANSPORTATION
SYMPOSIUM

53

53

Inlets along curb returns

- Over tracking leads to cracked inlets
- Relocate outside of returns
- Consider strengthened inlets top if required along curb return



TRANSPORTATION
SYMPOSIUM

54

54

Inlets along curb returns

- Over tracking leads to cracked inlets
- P
-



- LESSON LEARNED:**
- **AVOID INLETS ON CURB RETURNS**

TRANSPORTATION
SYMPOSIUM

55

55

Questions?



TRANSPORTATION
SYMPOSIUM

56

56

Safety Message



TRANSPORTATION
SYMPOSIUM

57

57



Contact Us


Raymond Valido, PE
District 6 Roadway Design Engineer
Raymond.Valido@dot.state.fl.us
305-470-5266


TRANSPORTATION
SYMPOSIUM


58

58

 June 19 - 20, 2025
 Hollywood, FL








Please be sure to **certify your attendance** before leaving this event or no later than **Monday, June 30**, in order to receive PDH/CEC. Detailed instructions are available on the Transportation Symposium website.

Transportation Symposium
Website



SCAN ME