Engineering Industry Forum

2020/2021 Design and Expansion Projects

Will Hawthorne, P.E., Director of Engineering
Central Florida Expressway Authority

- July 9, 2020 -

FY 2021-2025 Work Plan

Project Cost Summary ($000's)	Fiscal Year					
Category	2020/21	2021/22	2022/23	2023/24	2024/25	Totals
Existing System Improvements	136,210	510,001	499,440	165,309	31,234	1,342,194
System Expansion Projects	23,134	81,155	246,823	337,947	238,739	927,798
Interchange Projects	15,340	3,086	31,432	39,439	43,772	133,069
Facilities Projects	6,397	7,323	6,127	6,508	4,787	31,142
Transportation Technology Projects	15,136	6,214	5,634	698	2,894	30,576
Information Technology Projects	29,094	24,294	11,535	2,260	2,260	69,443
Signing and Pavement Markings	3,495	19,703	5,585	8,134	2,299	39,216
Renewal and Replacement Projects	33,064	71,473	9,151	19,937	7,528	141,153
Landscape Projects	769	787	1,413	799	794	4,562
Non-System Projects	19	580	0	0	144	743
TOTALS	262,658	724,616	817,140	581,031	334,451	2,719,896

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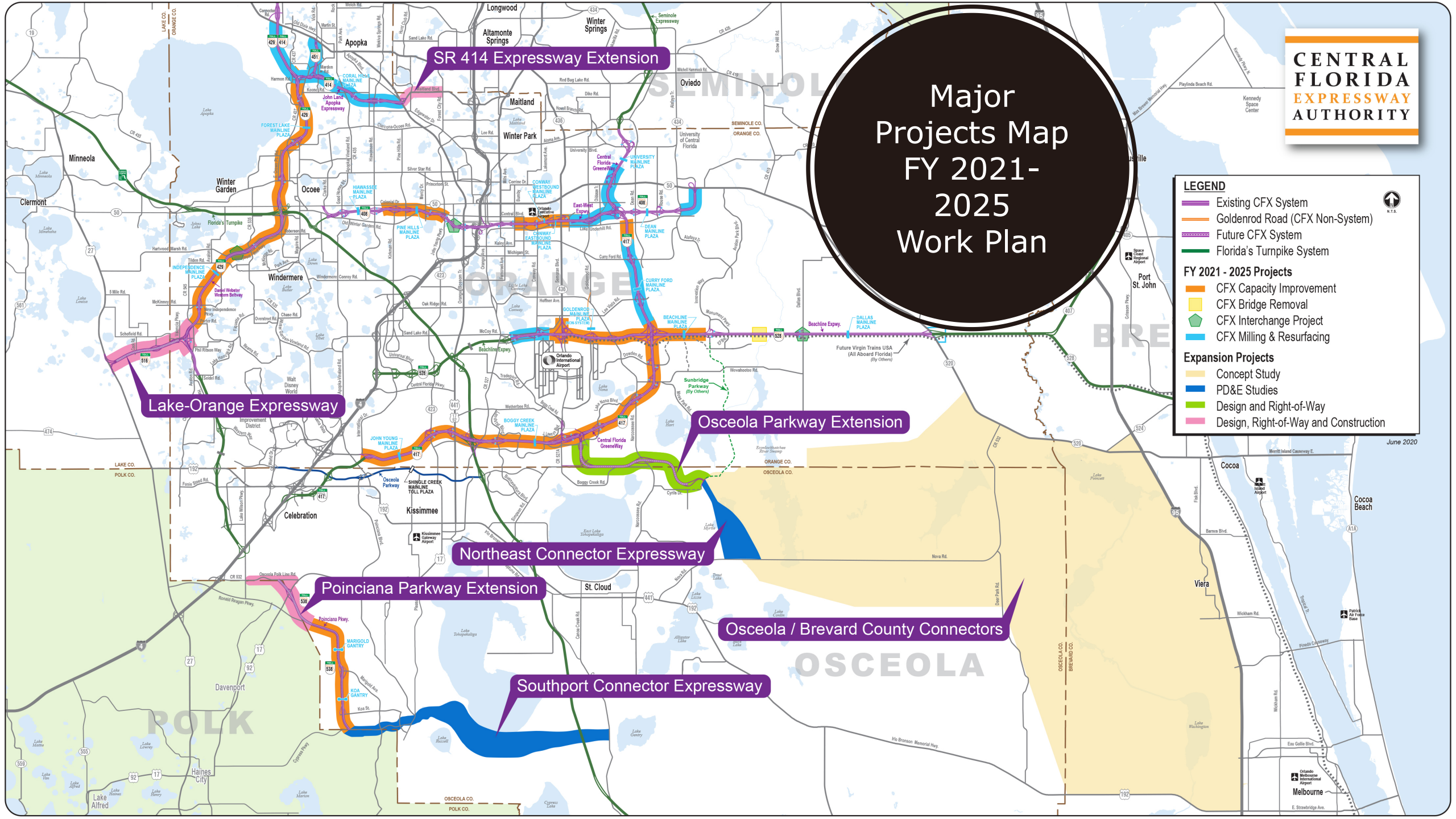
Major Projects Map FY 2021-2025 Work Plan
CENTRAL FLORIDA EXPRESSWAY AUTHORITY
SR 414 Expressway Extension
Lake-Orange Expressway
Osceola Parkway Extension
Northeast Connector Expressway
Poinciana Parkway Extension
Osceola / Brevard County Connectors
Southport Connector Expressway
LEGEND
Existing CFX System
Goldenrod Road (CFX Non-System)
Future CFX System
Florida's Turnpike System
FY 2021 - 2025 Projects
CFX Capacity Improvement
CFX Bridge Removal
CFX Interchange Project
CFX Milling & Resurfacing
Expansion Projects
Concept Study
PD&E Studies
Design and Right-of-Way
Design, Right-of-Way and Construction
June 2020
ORANGE
OSCEOLA
POLK
SEMINOLE
BREVARD

Design Contracts / Projects

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Design Team Requirements

Prime Executes 55% of the Scope

Key Local Resources

- Project Manager
- Roadway
- Drainage & Permitting

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Design Team Qualifications* (SR 528)

Major Types of Work:

- 3.2 – Major Highway Design
- 3.3 – Controlled Access Highway Design

Additional Types of Work Required:

- 3.1 – Minor Highway Design
- 4.1 – Miscellaneous Structures and Minor Bridge Design
- 4.2 – Major Bridge Design
- 6.1 – Traffic Engineering Studies
- 6.3 – Intelligent Transportation Systems Analysis, Design and Implementation
- 7.1 – Signing, Pavement Marking, and Channelization
- 7.2 – Lighting
- 7.3 – Signalization
- 8.1 – Control Surveying
- 8.2 – Design, Right of Way and Construction Surveying
- 8.4 – Right of Way Mapping
- 9.1 – Soil Exploration
- 9.2 – Geotechnical Classification Lab Testing
- 9.4 – Foundation Studies

Disadvantaged / Minority / Women / Business Enterprise Participation:

- 20% participation objective for each Project

**Subject to Change*

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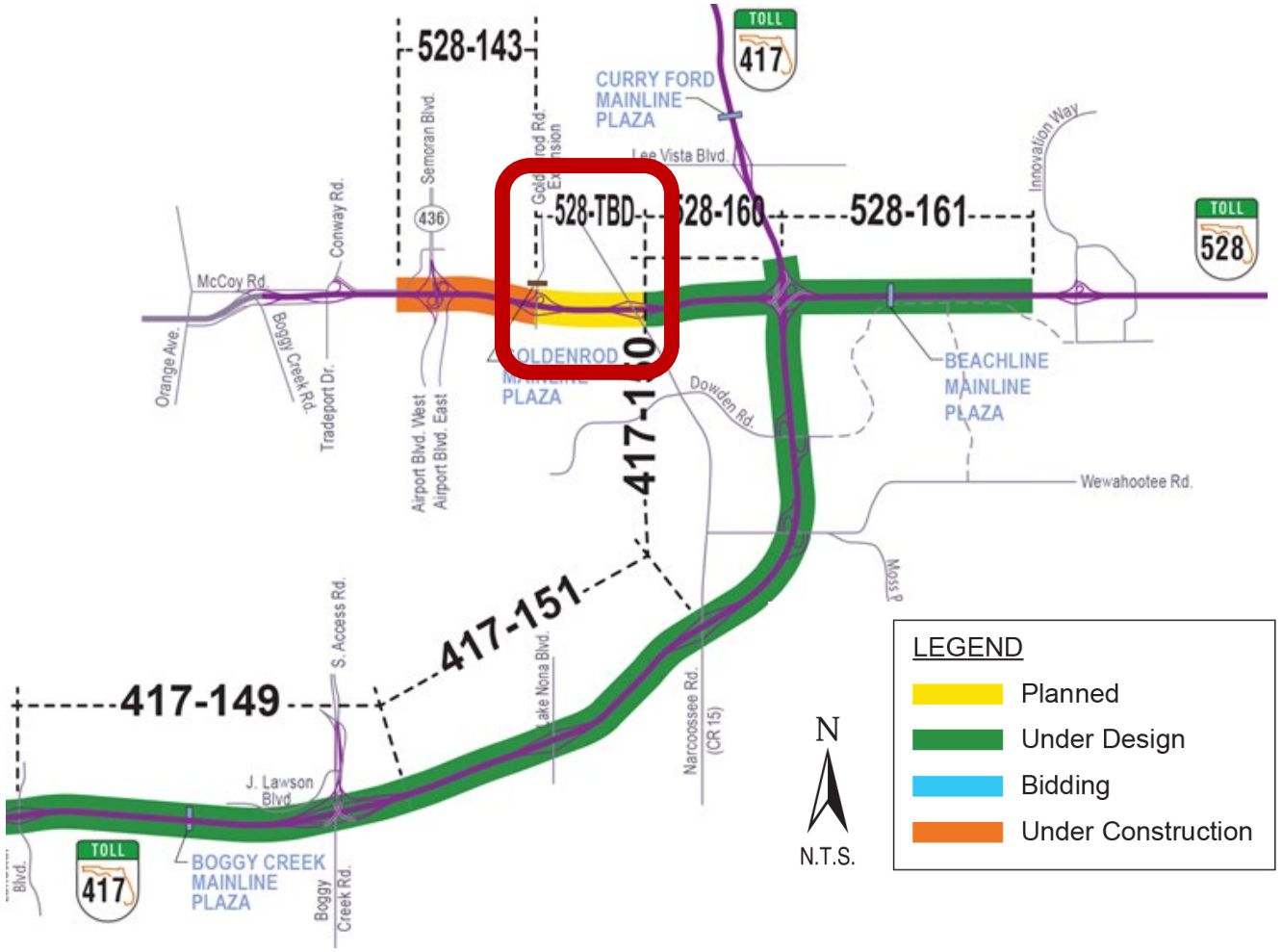
SR 528 Widening
Goldenrod Road to Narcoossee Road

1.8 Miles – Widening

Advertisement

– 3rd Quarter 2020

Design Fee Estimate = $1.4 M



CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 528 Widening

Goldenrod Road to Narcoossee Road

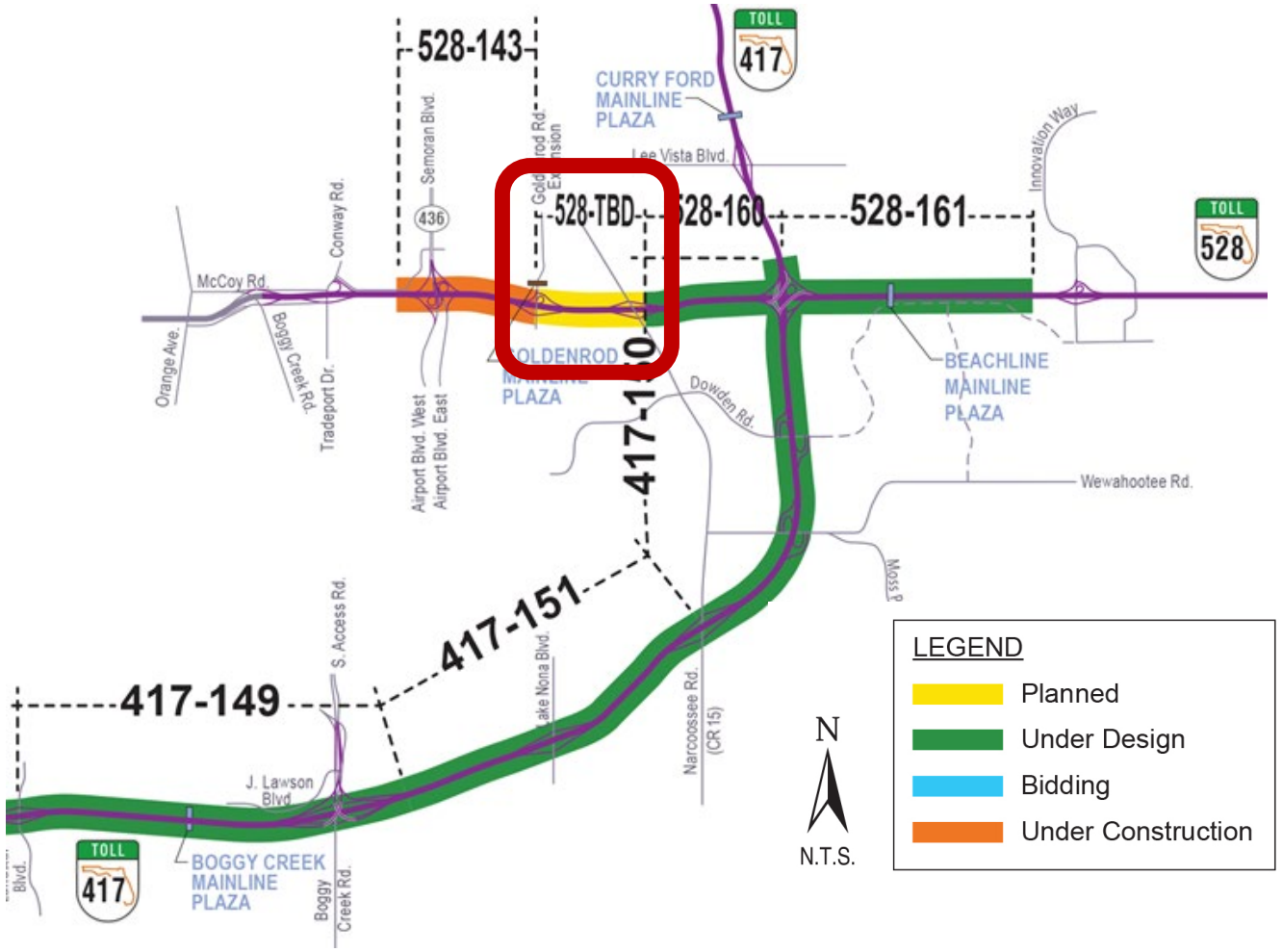
Challenges

Adjacent project coordination

- West – SR 528 (528-143)
- East – SR 528 (528-160)

Design

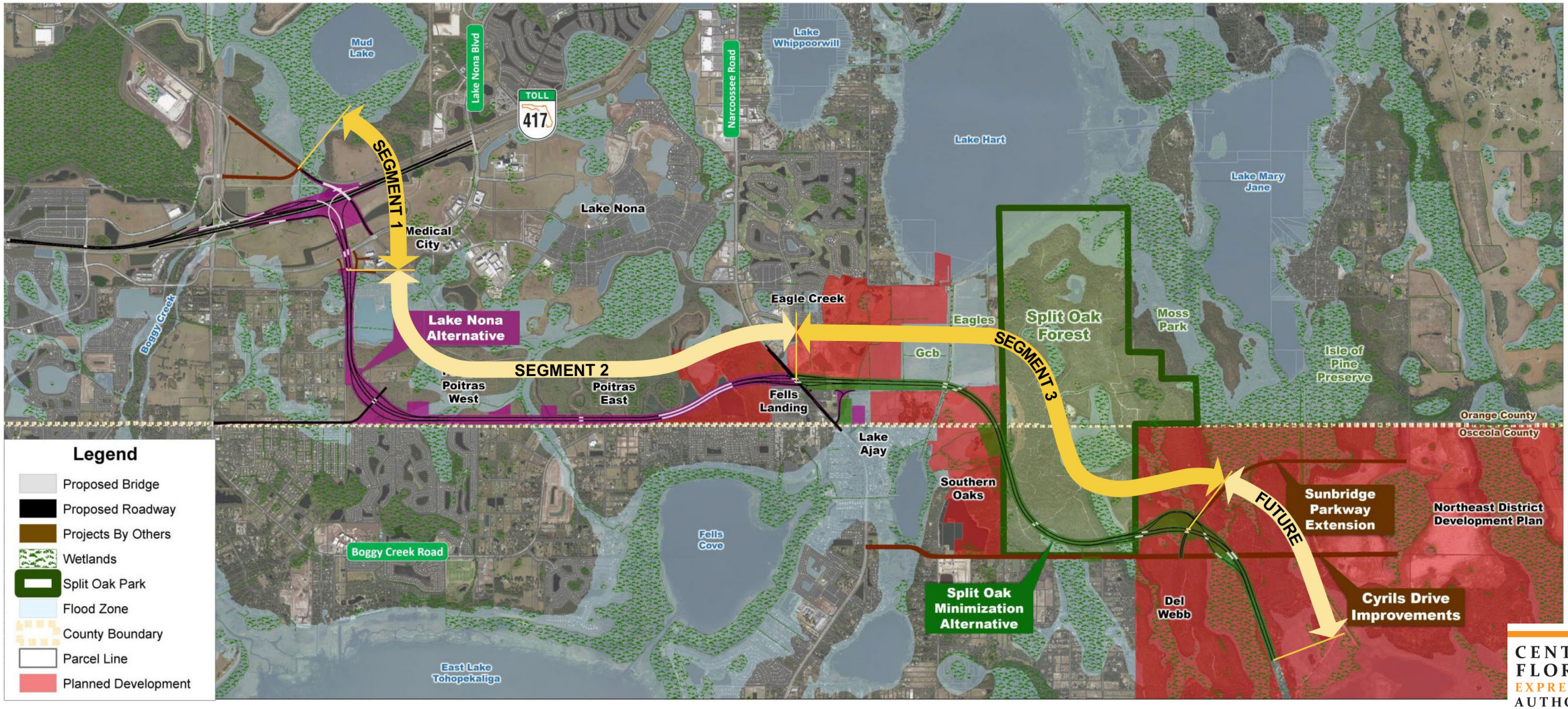
- Orlando International Airport
- Virgin Trains USA



CENTRAL FLORIDA EXPRESSWAY AUTHORITY

Osceola Parkway Extension

SR 417 to Sunbridge Parkway



CENTRAL FLORIDA EXPRESSWAY AUTHORITY

Design Team Qualifications* (OPE)

Major Types of Work:

- 3.2 – Major Highway Design
- 3.3 – Controlled Access Highway Design
- 4.2.1 – Major Bridge-Concrete Design (Segment 1)

Additional Types of Work Required:

- 3.1 – Minor Highway Design
- 4.1 – Miscellaneous Structures and Minor Bridge Design
- 4.2.1 – Major Bridge-Concrete Design (Segments 2 & 3)
- 6.1 – Traffic Engineering Studies
- 6.3 – Intelligent Transportation Systems Analysis, Design and Implementation
- 7.1 – Signing, Pavement Marking, and Channelization
- 7.2 – Lighting
- 7.3 – Signalization
- 8.1 – Control Surveying
- 8.2 – Design, Right of Way and Construction Surveying
- 8.4 – Right of Way Mapping
- 9.1 – Soil Exploration
- 9.2 – Geotechnical Classification Lab Testing
- 9.4 – Foundation Studies

Disadvantaged / Minority / Women / Business Enterprise Participation:

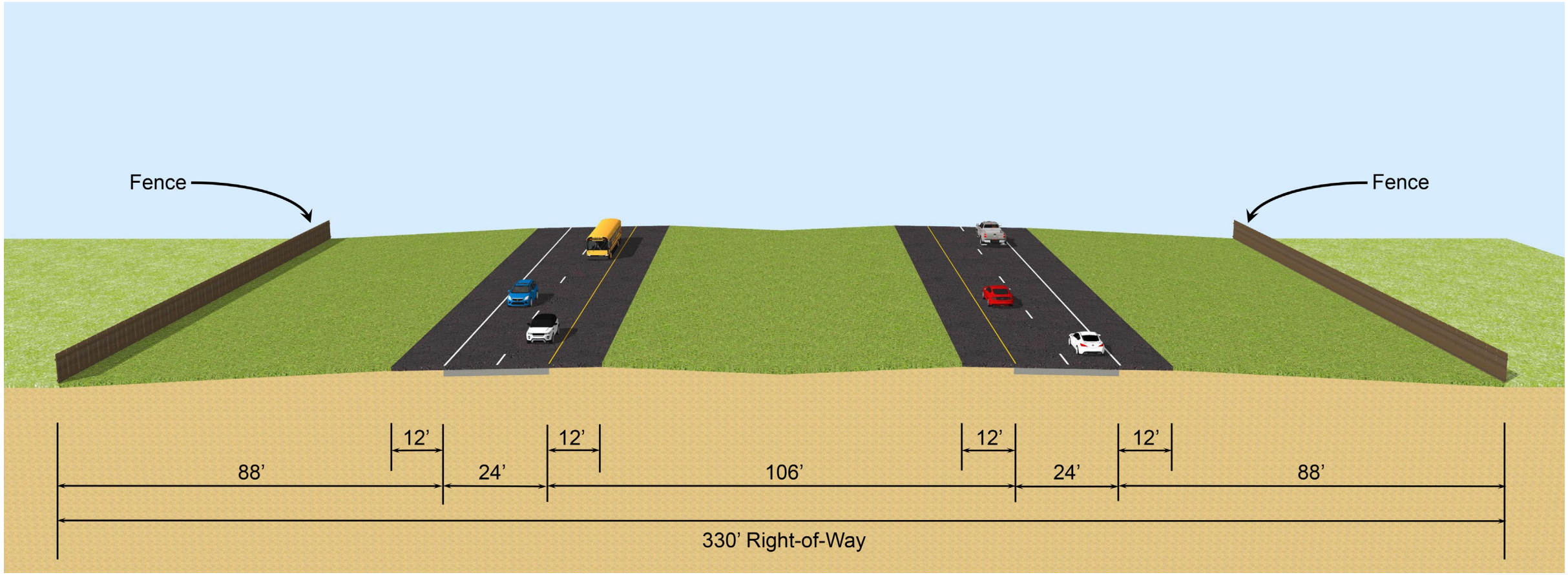
- 20% participation objective for each Project

**Subject to Change*

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

Osceola Parkway Extension

SR 417 to Sunbridge Parkway



CENTRAL FLORIDA EXPRESSWAY AUTHORITY

Osceola Parkway Extension – Segment 1
SR 417 to Laureate Boulevard

New Systems Interchange

Advertisement

– 1st Quarter 2021

Design Fee Estimate =

$19.0 M

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

Osceola Parkway Extension – Segment 1
SR 417 to Laureate Boulevard

Challenges

Adjacent project coordination

- West – SR 417 (417-149 & 417-151)
- East – OPE Segment 2

Design

- Systems Interchange at SR 417
- Rail Coordination
- Lake Nona – Medical City Drive

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Osceola Parkway Extension – Segment 2

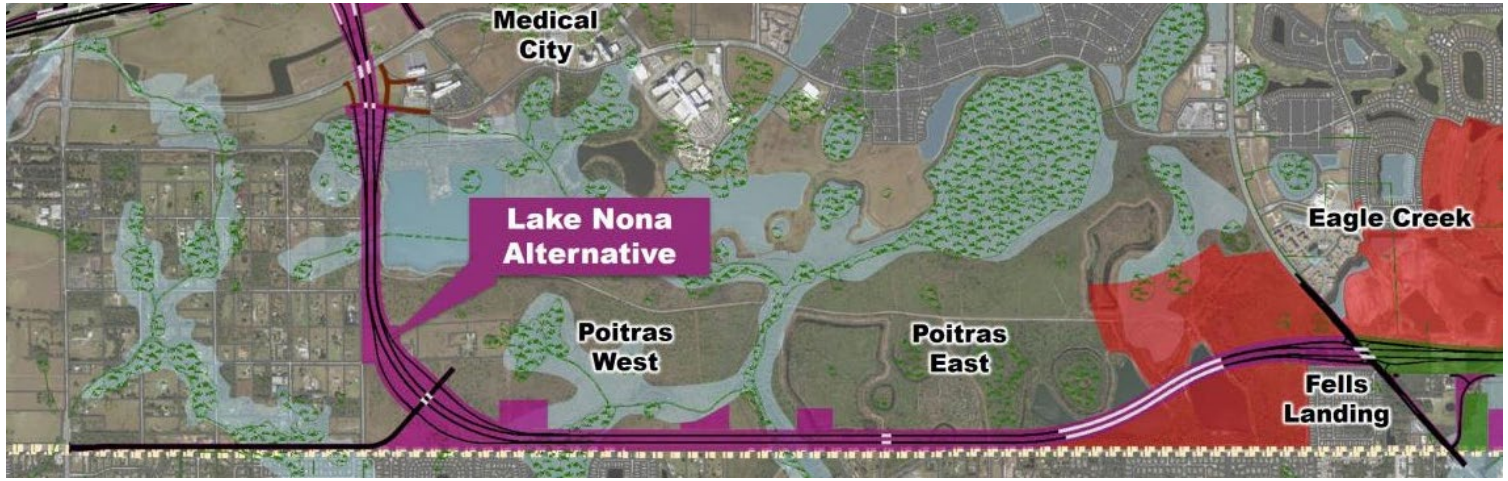
Laureate Boulevard to Narcoossee Road

4.0 Miles – New Expressway

Advertisement

– 1st Quarter 2021

Design Fee Estimate = $12.4 M



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Osceola Parkway Extension – Segment 2
Laureate Boulevard to Narcoossee Road

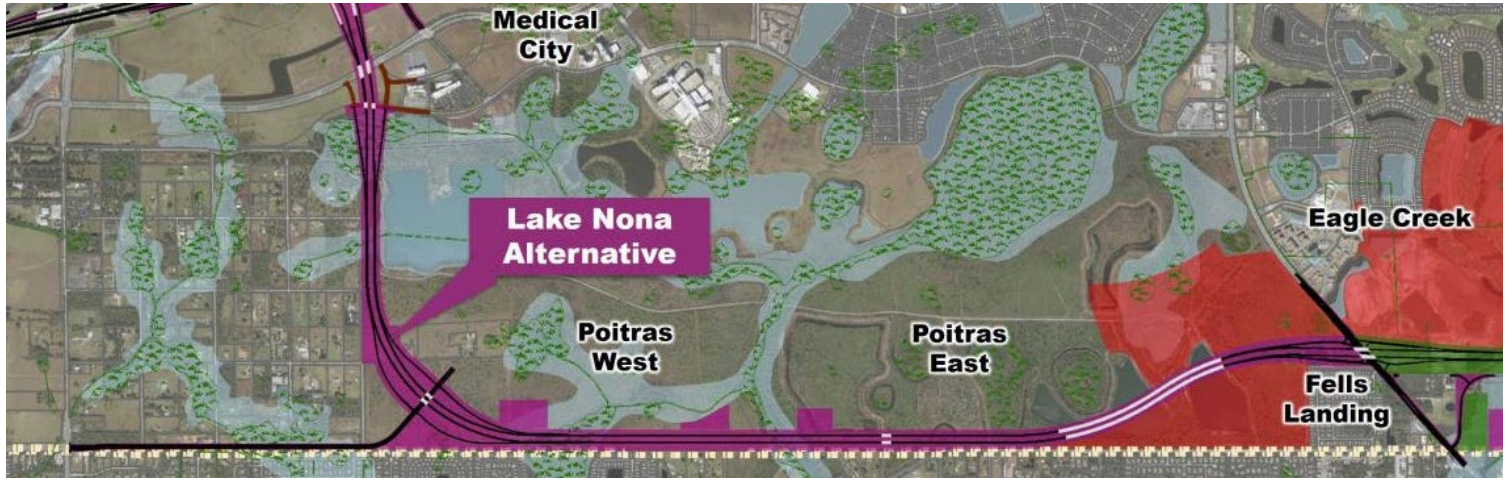
Challenges

Adjacent project coordination

- West – OPE Segment 1
- East – OPE Segment 3

Design

- Lake Nona – Laureate Blvd. Ramps
- Orange/Osceola Counties
- Simpson Road Interchange, Narcoossee Road & Clapp-Simms Duda Road



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Osceola Parkway Extension – Segment 3

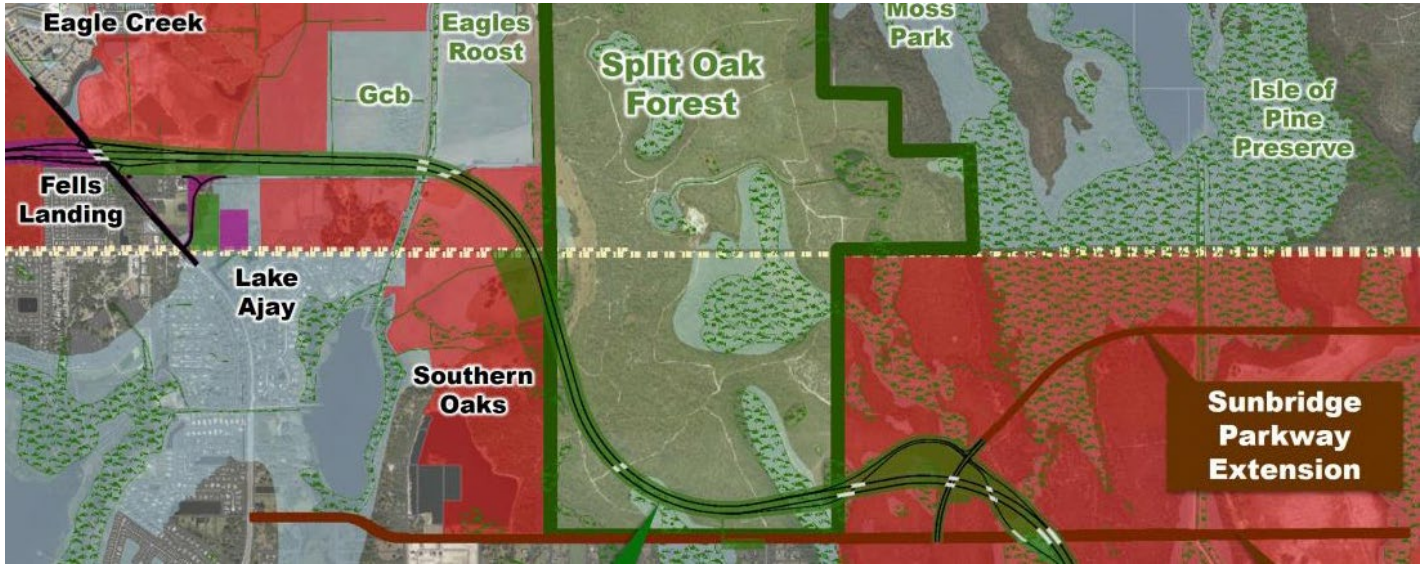
Narcoossee Road to Sunbridge Parkway

4.9 Miles – New Expressway

Advertisement

– 1st Quarter 2021

Design Fee Estimate = $10.3 M



CENTRAL FLORIDA EXPRESSWAY AUTHORITY

Osceola Parkway Extension – Segment 3

Narcoossee Road to Sunbridge Parkway

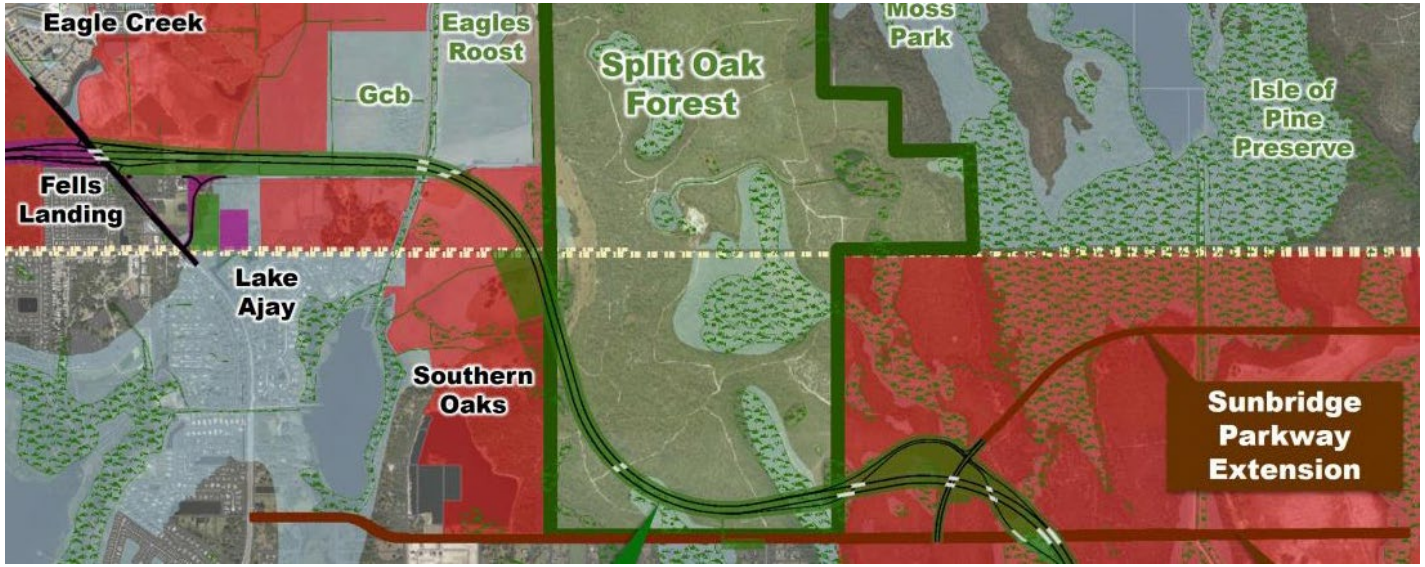
Challenges

Adjacent project coordination

- West – OPE Segment 2
- East – Sunbridge Parkway

Design

- Split Oak Forest
- Bridges over Narcoossee Road
- Orange/Osceola Counties – Cyrils Drive, Sunbridge Parkway



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2021 Look Ahead

Description	Work Plan Design Estimate	Anticipated Advertisement*
SR 528 Widening Goldenrod Road to Narcoossee Road	$1.4 Million	3rd Quarter 2020
Osceola Parkway Extension Segment 1	$19.0 Million	1st Quarter 2021
Osceola Parkway Extension Segment 2	$12.4 Million	1st Quarter 2021
Osceola Parkway Extension Segment 3	$10.3 Million	1st Quarter 2021

**Quarters are Calendar Year, dates Subject to Change.*

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Questions?

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Engineering Industry Forum

2020/2021 Construction Oversight

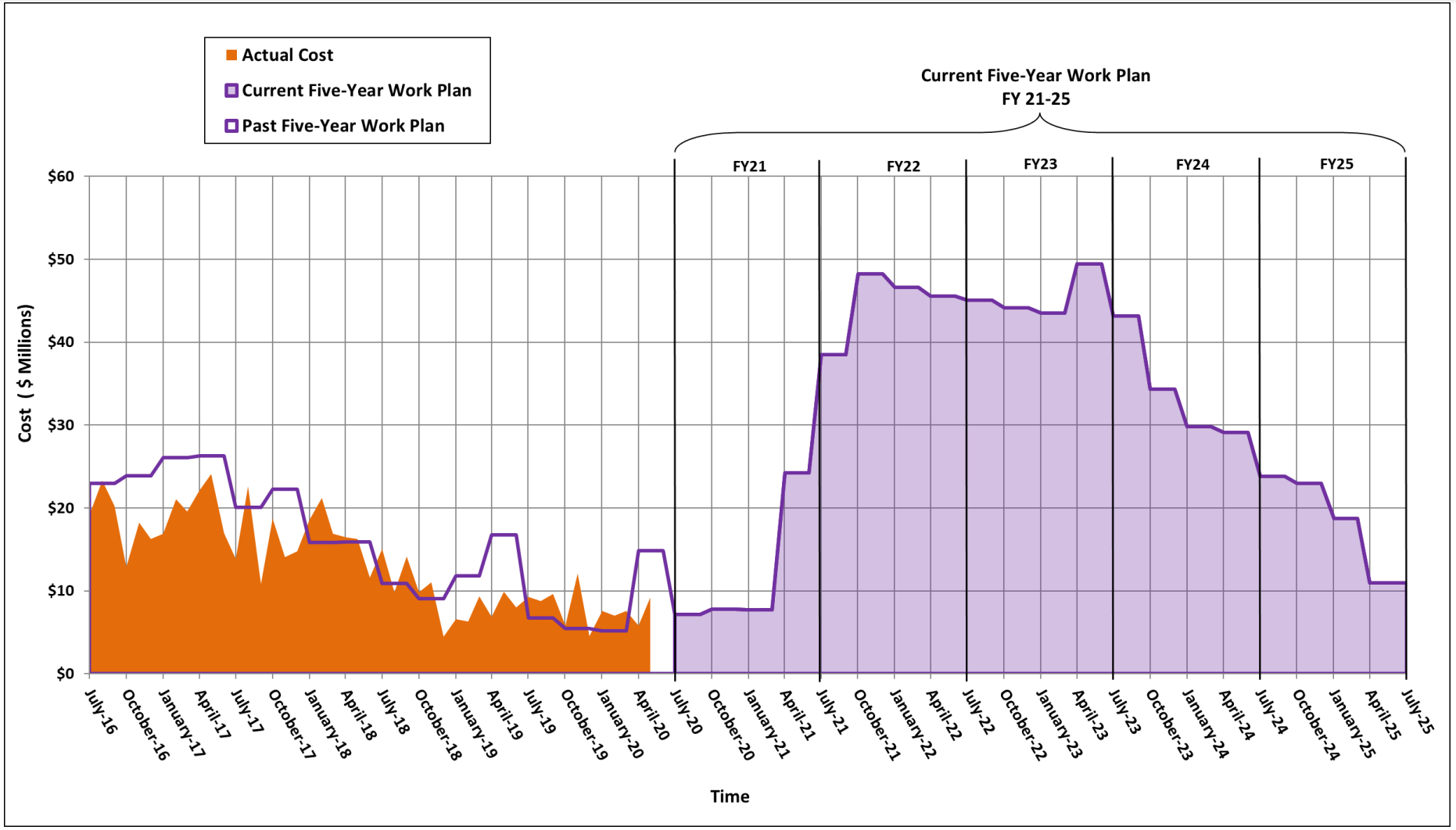
Jack Burch, P.E., Resident Engineer/Construction Manager
Central Florida Expressway Authority

- July 9, 2020 -

Agenda

- Construction Costs
- CEI Qualifications
- Status of Widening Projects
- 1-Year Look Ahead Summary

Construction Costs
Actual and Estimated



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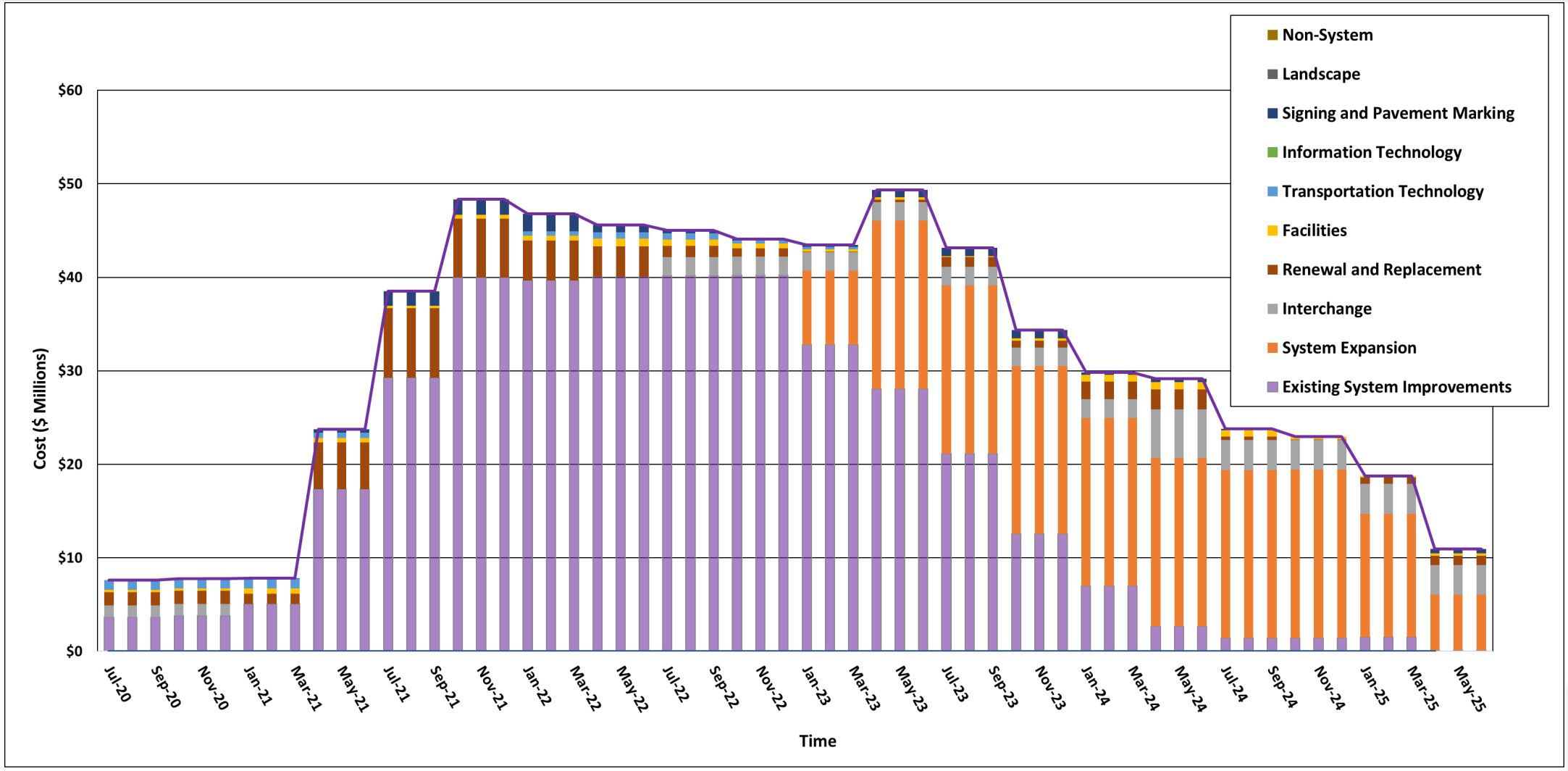
Construction Costs

FY 21-25 by Category



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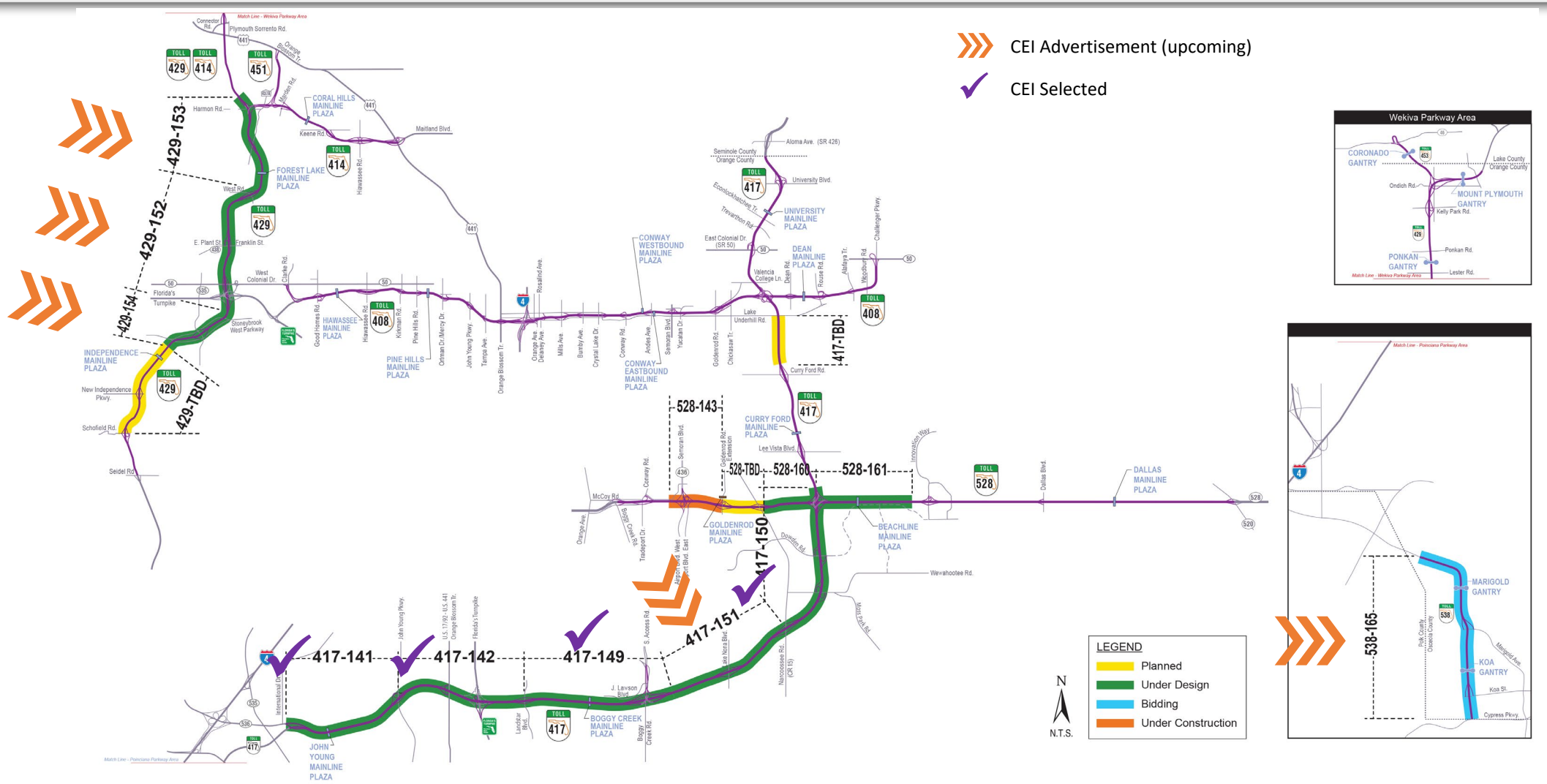
CEI Qualifications

- Major Types of Work:
    - 10.1 – Roadway Construction
    - 10.3 – Construction Materials Inspection (through subconsultant)
    - 10.4 – Minor Bridge and Miscellaneous Structures
    - 10.5 – Major Bridge (depending on project scope)

Status of Widening Projects



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SR 538 Widening

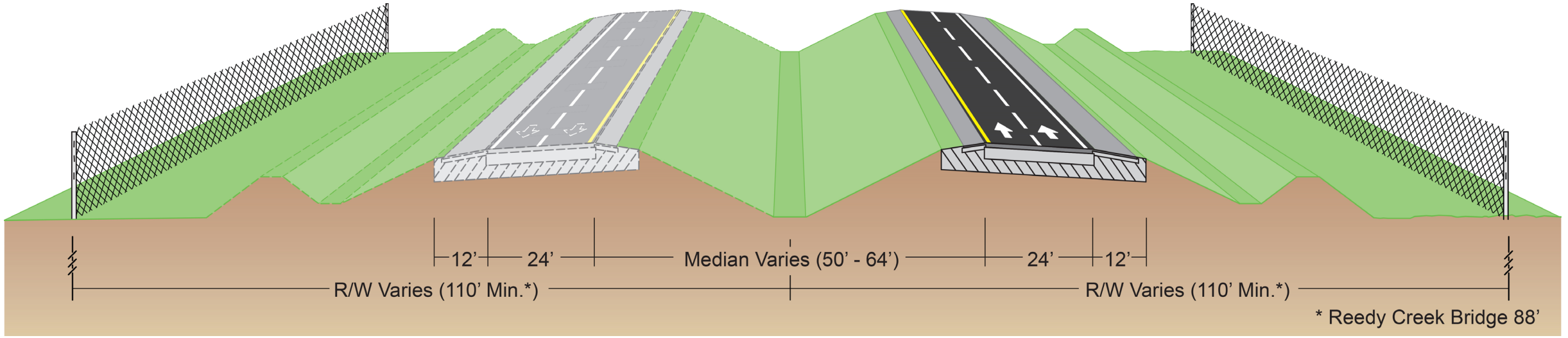
Ronald Reagan Parkway to Cypress Parkway

- Project (538-165)
- Advertisement:
  - August 2020 - CEI
- Design-Build Project (538-165)
  - Bids open August 2020
  - 180 day LNTP, 900 day Construction Duration
- $113M Construction cost estimate
- Concept Plan
  - Widen 2-lane expressway to 4-lane divided
    - Constructing eastbound lanes, new ramps, and noise walls

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 538 Widening

Ronald Reagan Parkway to Cypress Parkway



CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 538 Widening

Ronald Reagan Parkway to Cypress Parkway

- Adjacent project coordination
  - North – SR 538 Extension (538-234)
  - South – Cypress Parkway Alignment Study & Design (Polk County)
- Construction
  - 3 New Bridges & Mainline Toll Gantry Structures
  - Approx. 6,000 LF bridge through Reedy Creek Mitigation Bank
  - TWA JPA – Utility Relocations

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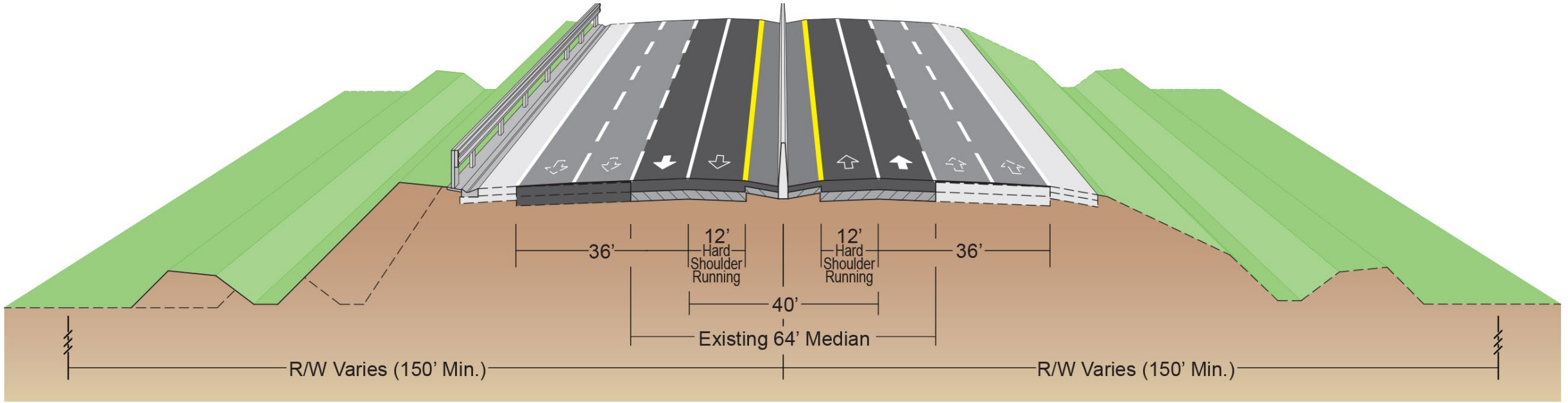
Widening Typical Section
SR 429 & SR 417



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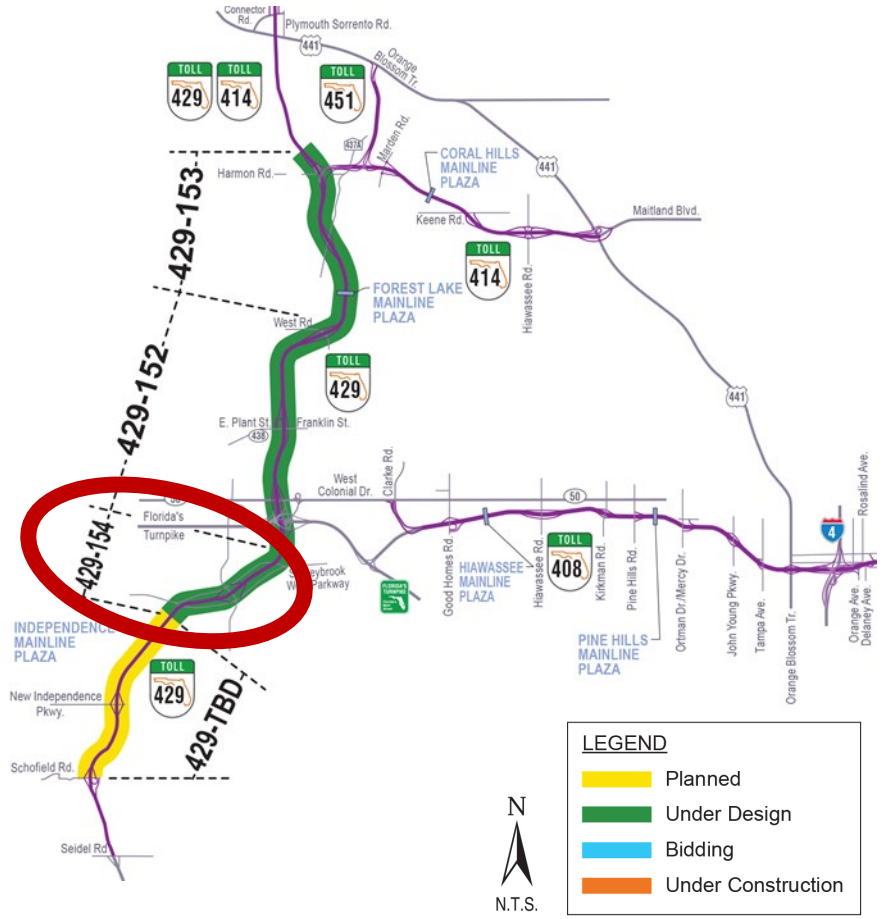
SR 429 Widening

Tilden Road to Florida's Turnpike

- Project (429-154)
- Advertisements:
  - LOI's Due Today! - CEI
  - 4th Quarter 2020 - Construction

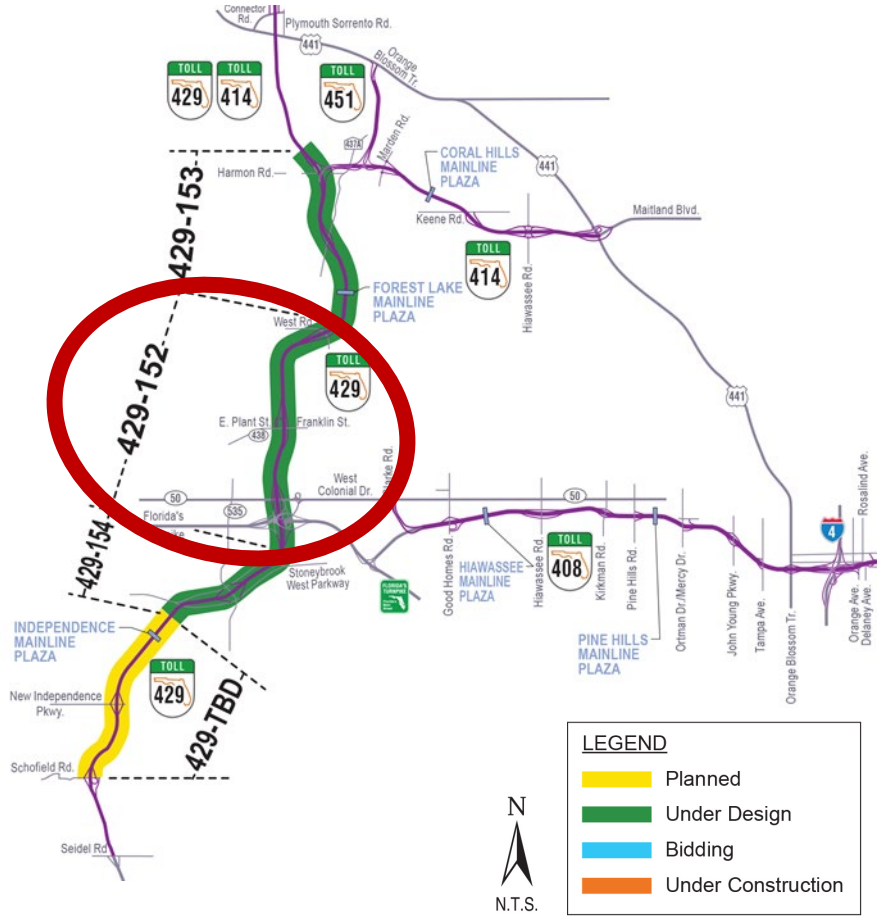


CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 429 Widening

Florida's Turnpike to West Road

- Project (429-152)
- Advertisements:
  - 3rd Quarter 2020 – CEI
  - 1st Quarter 2021- Construction
- $142M Construction cost estimate
  - Inside & Outside Widening to 10 lanes:
    - 6 General Use
    - 2 Part-Time Shoulder Use
    - 2 Auxiliary

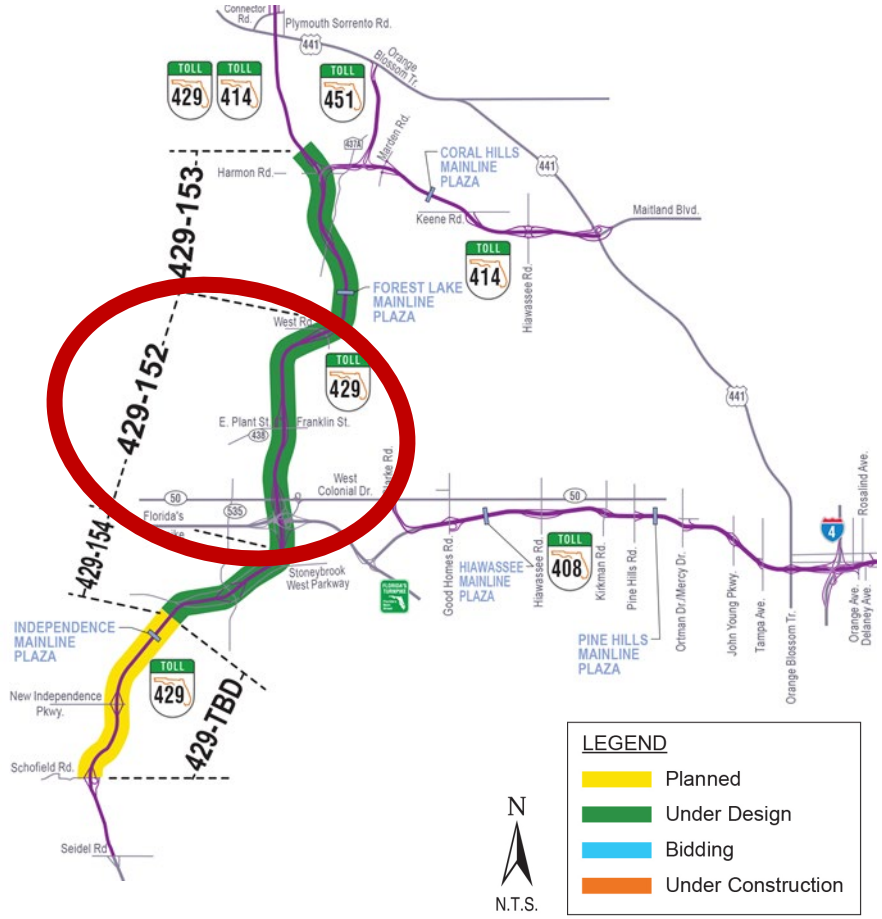


CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 429 Widening

Florida's Turnpike to West Road

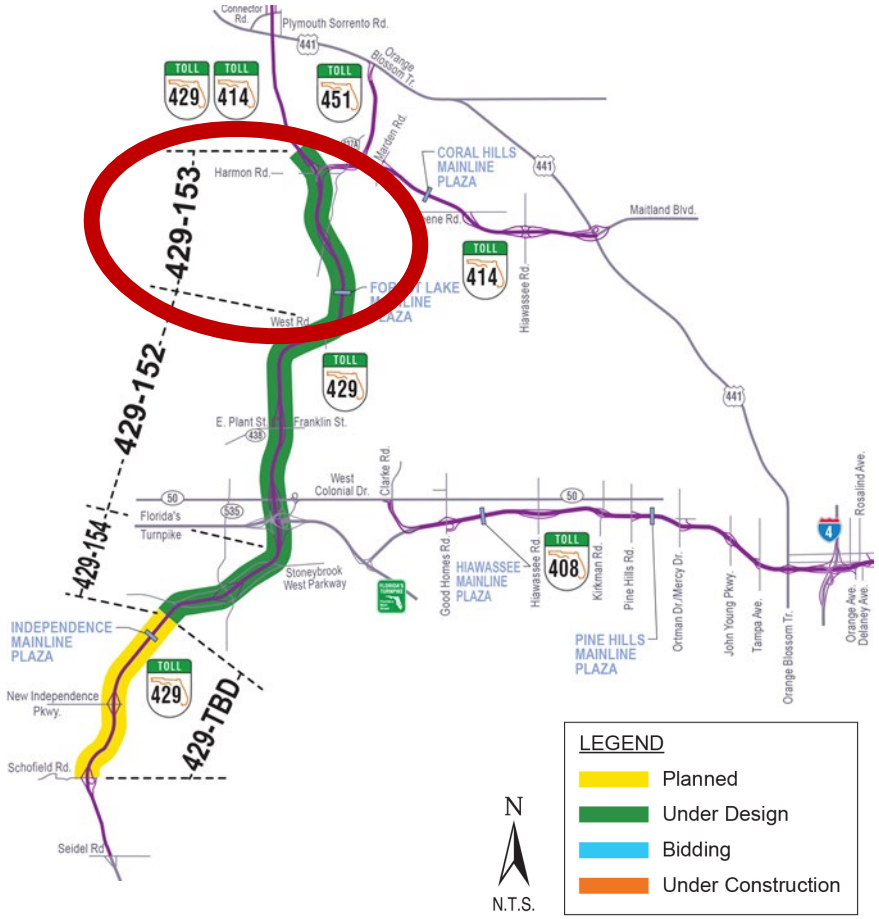
- Adjacent project coordination:
  - South – Project 429-154
  - North – Project 429-153
- Construction:
  - Coordination with Florida's Turnpike & Central Florida Railroad
  - Ocoee / Winter Garden / FDOT owned Plant Street / SR 438
  - 11 Sets of Bridge Widenings (Inside & Outside)
  - Ramp Reconstruction at Plant Street including Tolling Structures



CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 429 Widening
West Road to SR 414

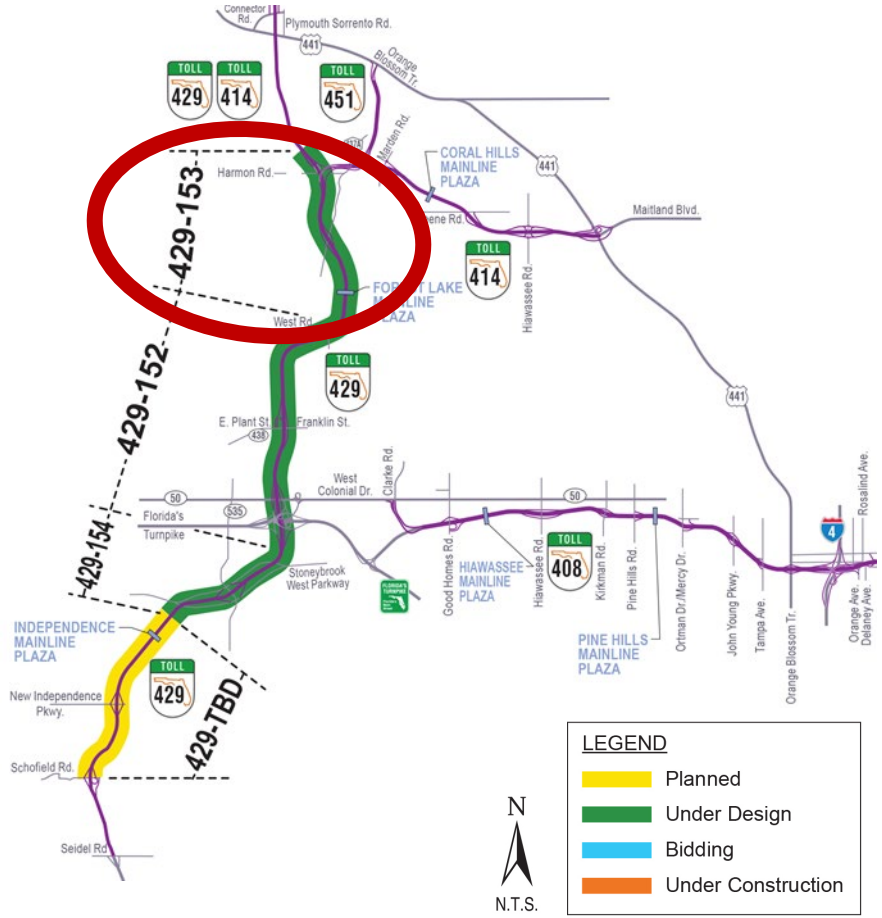
- Project (429-153)
- Advertisements:
  - 4th Quarter 2020 - CEI
  - 1st Quarter 2021 - Construction
- $72M Construction cost estimate
  - Inside Widening to 8 lanes:
    - 2 Part-Time Shoulder Use
    - 6 General Use



CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 429 Widening
West Road to SR 414

- Adjacent project coordination
  - South – Project 429-152
- Construction
  - 4 Sets of Bridge Widenings
  - 1 Set of Bridge Replacements (CR 437A)
  - Temporary Utility Relocation
  - Toll Plaza Coordination

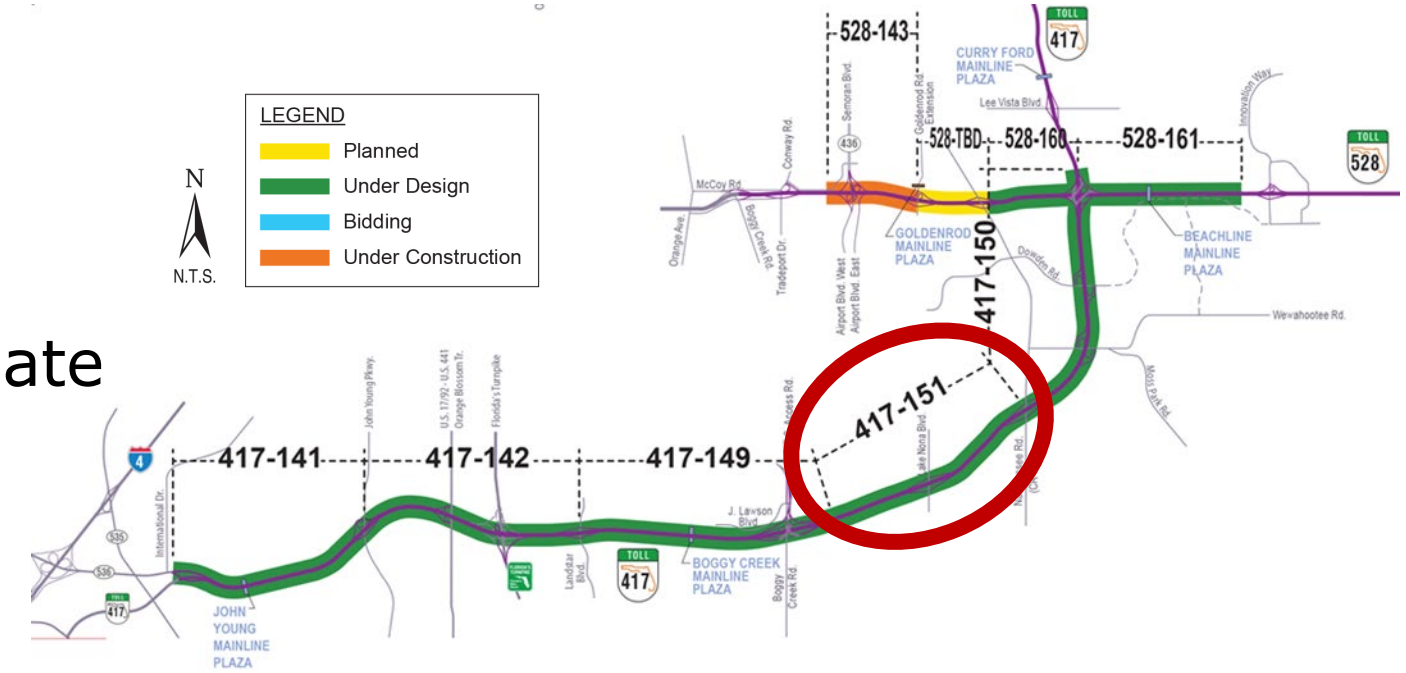


CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 417 Widening

Boggy Creek Road to Narcoossee Road

- Project (417-151)
- Advertisements:
  - 4th Quarter 2020 - CEI
  - 1st Quarter 2021 - Construction
- $75M Construction cost estimate
  - Inside Widening to 8 lanes:
    - 2 Part-Time Shoulder Use
    - 6 General Use

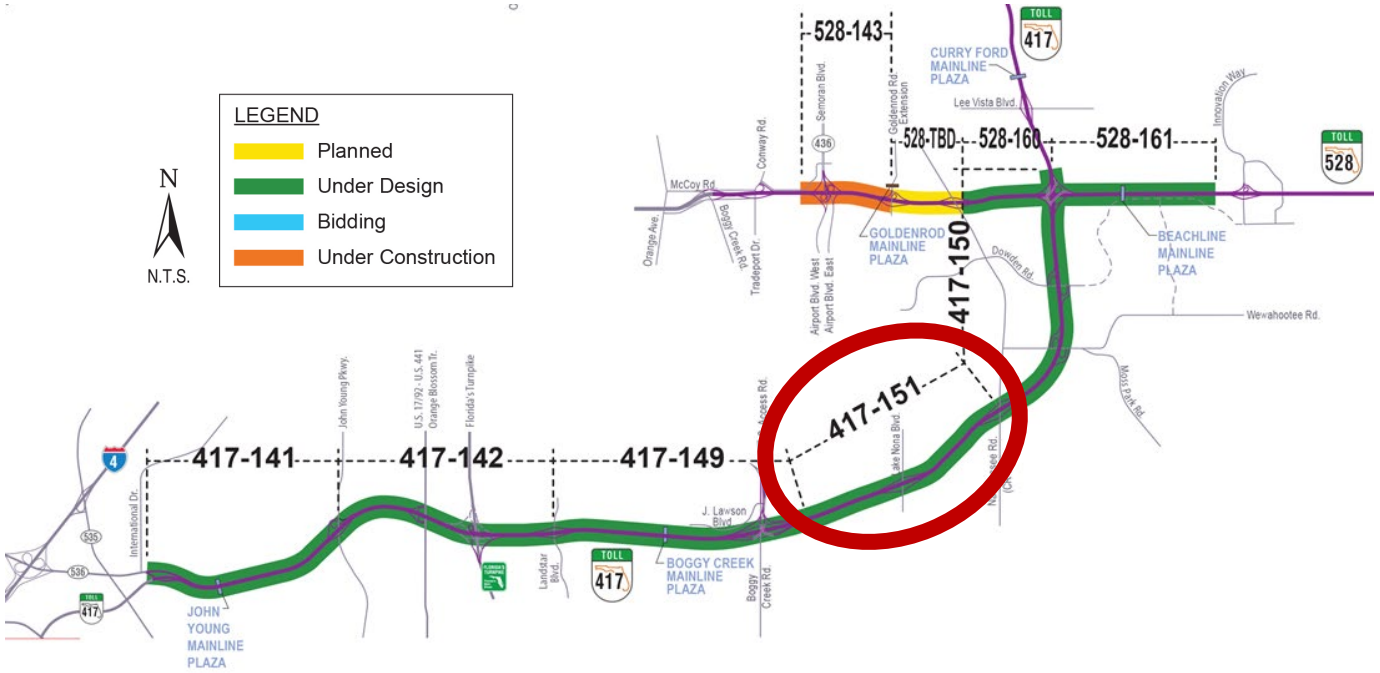


CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 417 Widening

Boggy Creek Road to Narcoossee Road

- Adjacent project coordination
  - West – Project 417-149
  - East – Project 417-150
  - North – Narcoossee Road Project (City of Orlando)
- Construction
  - 1 Set of Bridge Widenings
  - Adjacent to railroad and overhead power facilities



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SR 408 Tampa Avenue Interchange

Tampa Avenue to Orange Blossom Trail

- Project (408-315)
- Advertisement:
  - 3rd Quarter 2021 – CEI
- $45M Construction cost estimate
  - Multiple new / widened bridges
  - New and reconstructed ramps
  - 2 new ramp tolling locations
  - Local road improvements including: roundabouts, pavement widening / reconstruction / resurfacing, lighting, landscaping, drainage and sidewalks

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SR 408 Tampa Avenue Interchange

Tampa Avenue to Orange Blossom Trail

- Adjacent project coordination
  - East – I-4 Ultimate Project (FDOT)
- Construction
  - Camping World Stadium events
  - City of Orlando – JPA for local streets
    - Tampa Avenue, Long Street, Carter Street, Rio Grande Avenue, Orange Blossom Trail (FDOT)
  - Existing drainage systems and utilities

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Systemwide CEI
ITS, Lighting, and Tolling

- Advertisement:
  - August 2020
- 3 year contract with (2) – 1 year renewals
- Projects:
  - DMS Replacement
  - WWD Installation
  - LED Lighting Conversion
  - Supplemental DCS and CCTV Deployment
- Key positions:
  - Senior Project Engineer
  - Technical Project Administrator
  - Senior ITS Inspector

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1-Year Look Ahead Summary

Project #	Description	Construction Cost Estimate	Anticipated CEI Advertisement*	Anticipated Construction Advertisement*
538-165	SR 538 (Poinciana Parkway) Widening Design Build	$113 Million	August 2020	Bids due August 2020
429-154	SR 429 Widening Tilden Rd to Florida's Turnpike	$66 Million	Currently Advertised	4th Quarter 2020
429-152	SR 429 Widening Florida's Turnpike to West Rd	$142 Million	3rd Quarter 2020	1st Quarter 2021
429-153	SR 429 Widening West Rd to SR 414	$72 Million	4th Quarter 2020	1st Quarter 2021
417-151	SR 417 Widening Boggy Creek to Narcoossee Rd	$75 Million	4th Quarter 2020	1st Quarter 2021
408-315	SR 408 Tampa Avenue Interchange	$45 Million	3rd Quarter 2021	-
-	Systemwide CEI – ITS, Lighting, and Tolling	-	August 2020	-

**Quarters are Calendar Year, dates Subject to Change.*

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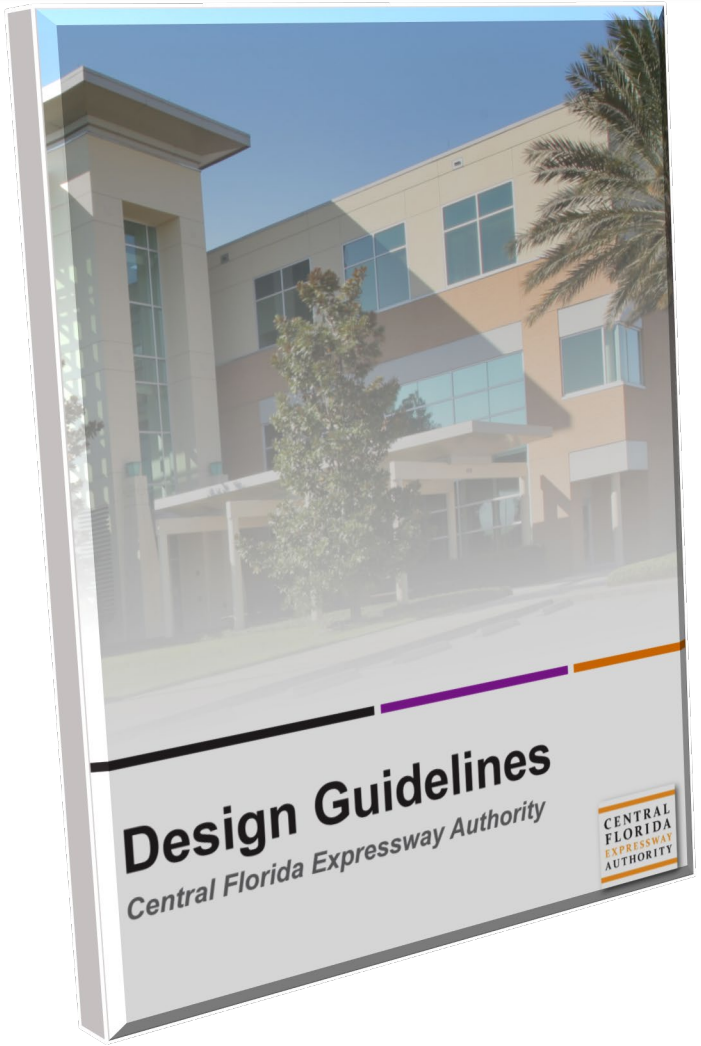
Engineering Industry Forum

2020/2021 Engineering Design

Jamison Edwards, P.E., Engineering Project Manager
Central Florida Expressway Authority

- July 9, 2020 -

CFX Design Guidelines



- Adopt 2019 FDOT Design Manual (FDM)
- Add/Delete/Revise Sections
- 1st Edition – March 2020
- Updated Annually
- https://www.cfxway.com/cfx-design-standards/

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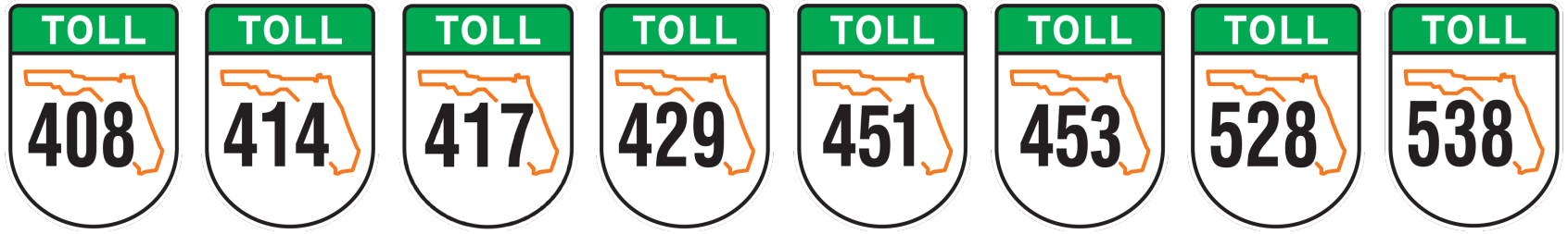
CFX Design Guidelines

Intent:

- Continue CFX's quality development effort
- Provide a single source of design standards and preferences
- Gain uniformity and document processes
- Offer guidance for typical situations



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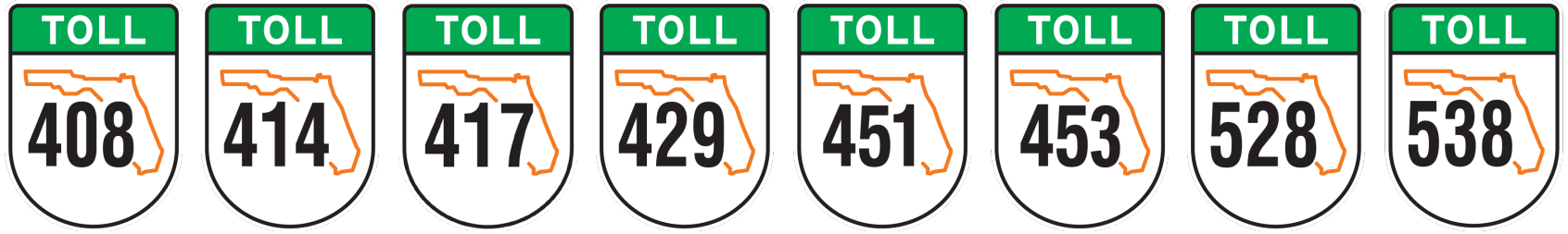
CFX Design Guidelines

FDOT Design Manual (FDM) Sections:

1) Development and Processes
2) Design Criteria
3) Plans Production



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Development and Processes

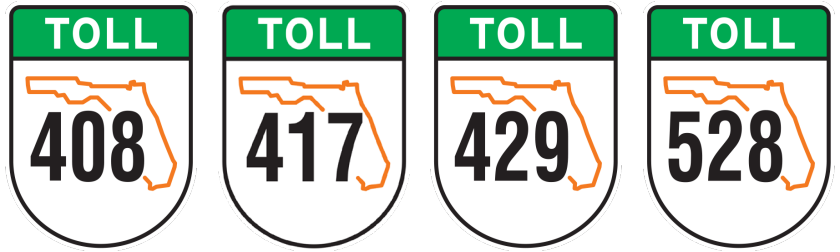
Part I

Development and Processes

- 102.3 – CFX Terms (New)
  - Bridge Concept Memorandum (BCM)
  - Design Deviations
  - Preliminary Design Review/Report (PDR)
  - Renewal and Replacement (R&R)

Development and Processes

- 105.7 – CFX Aesthetic Guidelines (New)
  - Treatments Developed for Multiple Corridors



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Development and Processes

- 111 – Final Engineering Design Process
  - Preferences and processes vary from FDOT (Submittals, specs, etc.)
  - 111.7 – Project Documentation
    - CFX File Directory Structure (Appendix A)
    - CFX Document Naming (Appendix B)

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Development and Processes

- 113.4 – Right of Way Requirements
  - 113.4 – CFX Property Acquisition, Disposition, & Permitting Procedures Manual (New)
- 114 – Renewal & Replacement (R&R)
  - Replaces FDOT's 3R
- 120.2.7 – Pavement Design (New)
  - 120.2.7.1 – Pavement Selection at Toll Plazas and Intersections

Development and Processes

- 121.7 – Bridge Project Development
  - Bridge Concept Memorandum (BCM) utilized in lieu of the Bridge Development Report (BDR)
- 122 – Procedure for Design Deviations (New)
  - Design Deviations replace Design Exceptions and Design Variations

Development and Processes

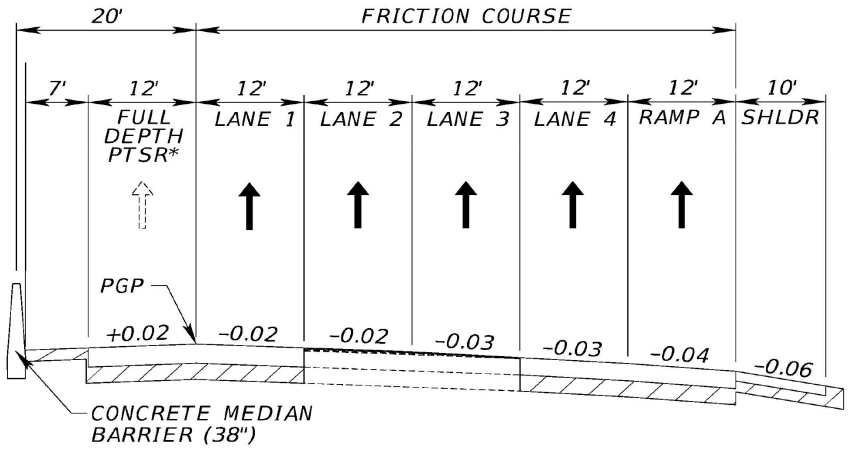
- 130 – Signing and Sealing Documents
  - A signature sheet is required for **all component plans** that will be signed and sealed by **one or more** professionals.
- 131 – Plans Processing and Revisions (New)
  - Bid Plans, Addendums, AFC Plans
  - Revisions, As-Built Plans, Record Drawings

Design Criteria

Part II

Design Criteria

- 211.2.3 – Hydroplaning Risk Analysis
  - Example Documentation Exhibits



Location: SR 417 STA. 100+00 NB			
Roadway Section Assumptions		Design Speeds	
Longitudunal Slope	0.30%	Mainline	70 mph
Pavement Type	OGAC	Aux/Ramp	65 mph

CFX Exhibit 252-1
Hydroplaning Example

Rainfall Intensity (in/hr)	Predicted Driver Speed		
	Reduction[1] (mph)	Mainline (mph)	Aux/Ramp (mph)
0.1	0	70	65
0.25	0	70	65
0.5	6	64	59
1	8	62	57
2	12	58	53
3[2]	- -	45	45
4[2]	- -	45	45

[1] *Predicted speed reductions taken from Contract Study BDQ22 performed by Gulf Coast University.*

[2] *High intensity speed reductions are assumed to be large enough to reduce drivers' speed below hydroplaning potential.*

Hydroplaning Risk Analysis

Section: PTSR sloped to median, 4-Lanes, 1-Ramp (Describe Section)

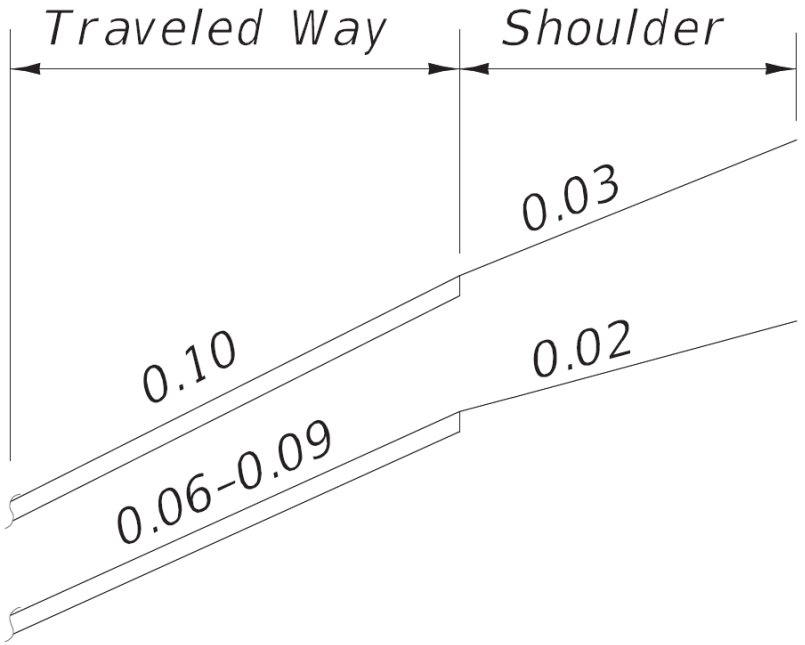
Hydroplaning Speed Results

Cross slope :	0.02	-0.02	-0.02	-0.03	-0.03	-0.04	Predicted Drivers Speed (mph)	
Contributing width :	0'	12'	24'	36'	48'	60'		
Rainfall Intensity (in/hr)	PTSR	Lane 1	Lane 2	Lane 3	Lane 4	Ramp A	Mainline	Aux/Ramp
0.1	--	nc	nc	nc	nc	--	70	65
0.25	--	nc	nc	nc	nc	--	70	65
0.5	--	nc	nc	nc	nc	--	64	59
1	--	nc	109	109	84	82	62	57
2 - Critical	--	109	68	65	58.3	58.0	58	53
3	--	78	58	56	52	51	45	45
4	--	66	53	51	48	--	45	45

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

Design Criteria

- 211.4 – Shoulders
  - Provide wider (12 ft paved) useable shoulders for emergency use and stopped or disabled vehicles
- 211.4.2 – Shoulder Cross Slopes
  - Shoulder Superelevation Figures (New), removing "house-tops" in shoulder
  - Special Ramp Shoulder Superelevation (at right)
- 211.4.4.1 – Ground-in Rumble Strips
  - Minimum 2-inches of structural course



FULL WIDTH SHOULDER

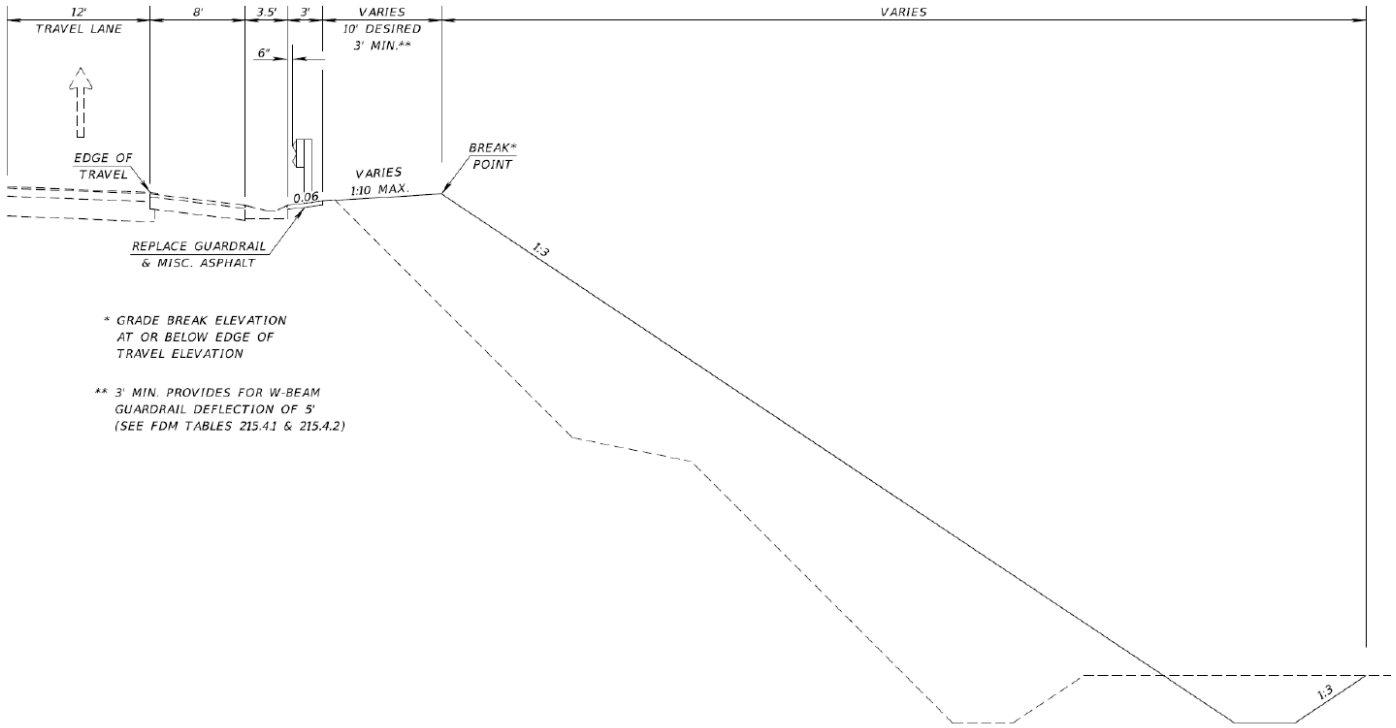
Design Criteria

- 211.11 – Structures
  - CFX-owned bridges
    - Bridge Width = Paved Width of Approaching Roadway
    - Paved width includes paved shoulder width

- 211.13 – Ramp Terminals
  - Preference:
    - Taper-type for exits
    - Parallel-type for entrances (accel length 1200 ft per AASHTO, desired)
  - Consideration:
    - Parallel-type considered for exits where both mainline and ramp traffic volumes are high

Design Criteria

- 215.2.6 – Roadside Slope Criteria
  - Maximum slope of 1:3 preferred
  - To reduce erosion and maintenance issues
  - New Figure 215.2.16 Grading Behind Guardrail
    - Provides maintenance / landscape berm
    - 10-ft desired (3-ft minimum)



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Design Criteria

- 215.4.2.1 – Guardrail End Treatments
  - CFX System
    - All guardrail and end treatments shall be TL-3
- 215.4.3.2 – Temporary Crash Cushions
  - CFX System
    - Only redirective non-gating permitted, unless otherwise approved
- 221 – Utilities (New)
  - Guidance for Utility Accommodations within CFX right of way

Design Criteria

- 230 – Signing and Pavement Marking
  - CFX Standards for Preparation of Signing and Pavement Marking Plans
    - Establishes preparation guidelines
    - Separate document, to be combined with 2021 CFX Design Guidelines release
- 230.2.2 – Overhead Signs on Limited Access Facilities
  - Overhead signing required
- 230.2.4 – External Lighting of Overhead Signs
  - Required for all CFX overhead signs

Design Criteria

- 231.1.6 – CFX Lighting Preferences (New)
  - Fixtures
    - LED required
    - Be able to accommodate a smart driver for remote operations
    - See product list
- 231.7 – Lighting Design Analysis Report (New)

Design Criteria

- 232 – Signalization
  - 232.8.1 – Mast Arm Policy
    - Mast arms shall be used at all signalized intersections
- 233 – Intelligent Transportation Systems (ITS)
    - See CFX ITS Standards for plans preparation guidance

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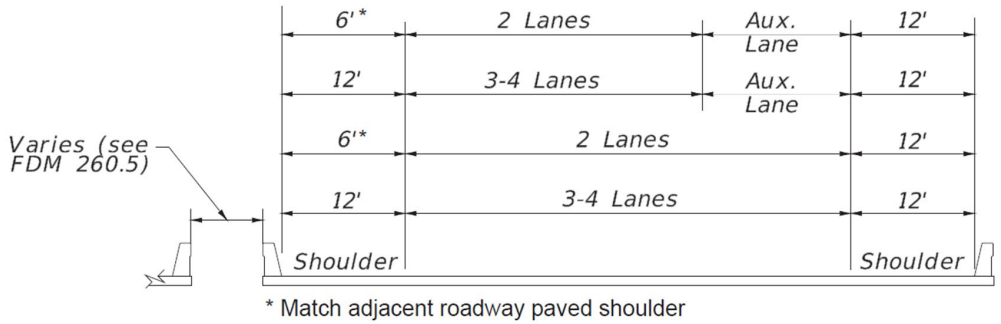
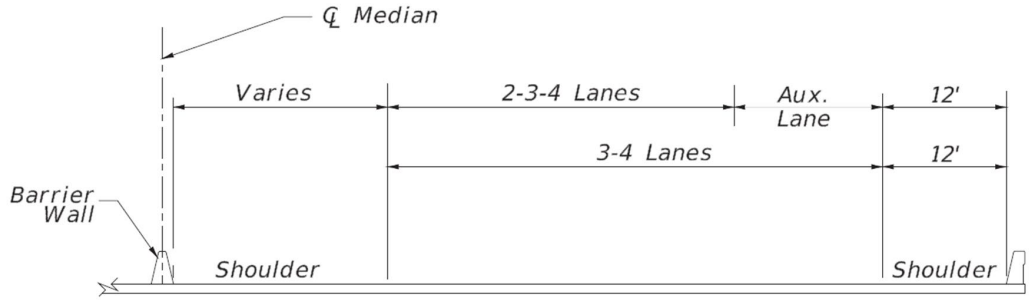
Design Criteria

- 240 – Transportation Management Plan
  - Temporary Traffic Control
    - Lane Widths = 12 ft
    - Consider emergency pull off areas, where mainline shoulders <8 ft
    - Design temporary drainage and include in plans
    - TTC Standard General Notes
    - Project Information Signs not used
    - Resurfacing preferred for pavement marking removal
- 252 – Drainage Design Documentation (New)
  - Report Preparation Guidance

Design Criteria

- 260.1.1 – Partial Bridge Sections
  - Replace Figure
- 260.6 – Vertical Clearance
  - Existing bridge vertical clearances between 16 ft and 16.5 ft must be maintained





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Design Criteria

- 261.7.2 – Category 2 Analytical Evaluation
  - Existing sign structures may be utilized
    - New sign panels do not exceed original upsized design
- 262.2 – Retaining Wall Plans Submittal Procedures
  - Proposed connection to an existing MSE wall
    - Provide an analysis for review with the 90% Plans

Design Criteria

- 267 – Shop Drawing Submittals
  - CFX Shop Drawing Review:
    - GEC performs concurrent reviews of:
      - Sign panels and structures
      - Aesthetics for certain bridge items
      - Noise wall elements
      - Proprietary lighting items

Plans Production

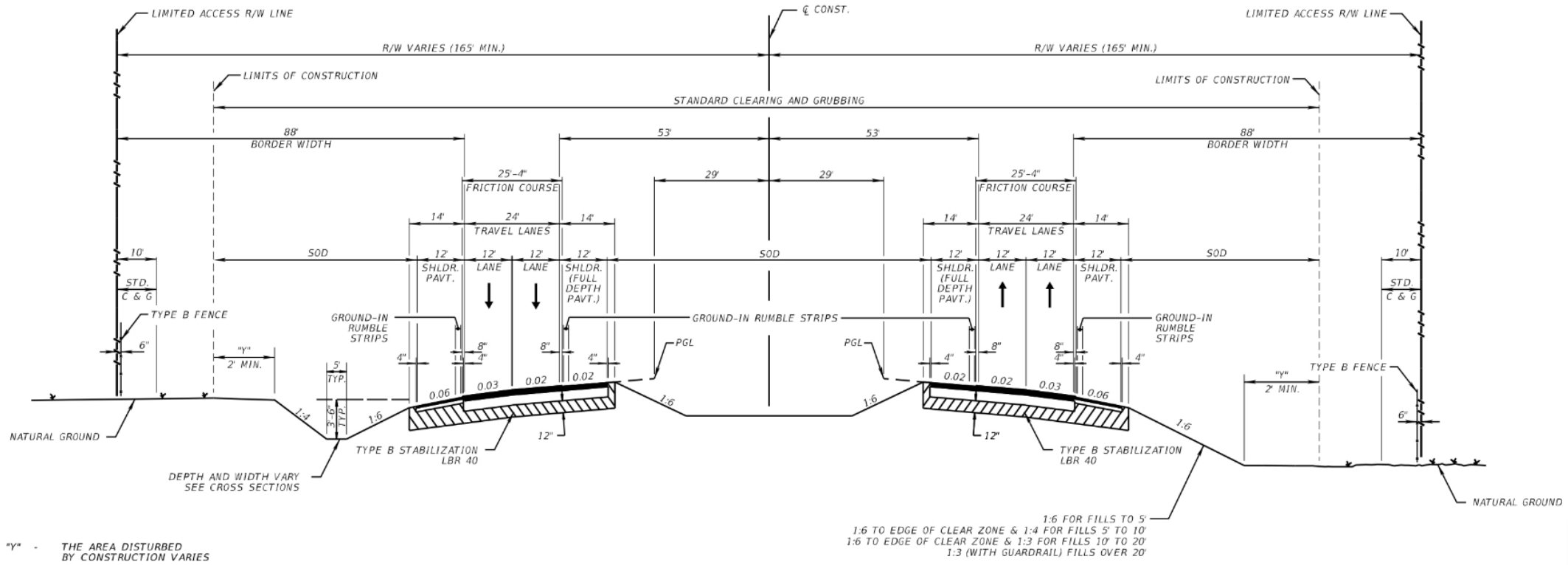
Part III

Plans Production

- Standard Sheets and Details
  - Lead Component Key Sheet
  - Component Key Sheets
  - Structures/Geotech Sheet Border
  - Signature Sheet
  - Pay Item Notes
  - General Notes
  - SWPPP Sheets
  - TTC General Notes
  - SPM General Notes

Plans Production

- 306 – Typical Sections
  - Exhibits (New)



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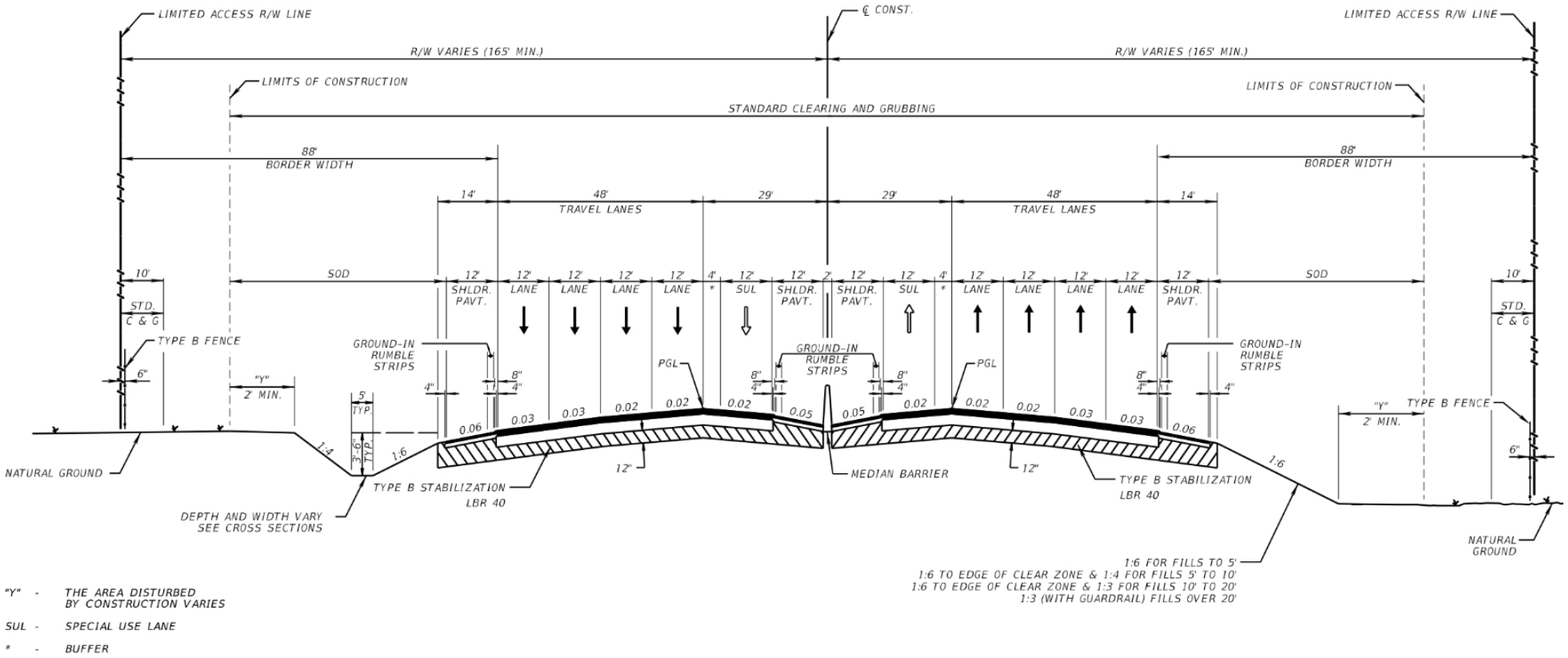
Plans Production

- 306 – Typical Sections
  - Exhibits (New)



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Plans Production

- 312.3.4 – Superelevation and Special Profiles
  - Plot superelevation transitions above the roadway profiles
- 314.3.2 – Ramp Terminal Details
  - A combined Plan and Profile Sheet is preferred
  - Provide sufficient coverage beyond the physical gore and gore tip
  - Show elevations at 25 ft incremental stations in profile only, at all roadway edges and break lines
  - Provide a section through the physical gore

Questions?

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