

TURNPIKE DESIGN HANDBOOK (TDH)

DESIGN CRITERIA – PART 2



**FLORIDA'S TURNPIKE ENTERPRISE
PRODUCTION DESIGN DEPARTMENT**

OCOEE, FL

January 2018

Introduction

As part of the Turnpike's continuing quality enhancement effort, the ***Turnpike Design Handbook (TDH)*** has been developed to provide consultants, reviewers and management with a single source of additional Turnpike-specific requirements that modify or add to the requirements included in the ***Florida Department of Transportation (FDOT) Design Manual (FDM)***.

The ***FDM*** and the ***TDH*** are both three-part documents:

- Development and Processes – Part 1
- Design Criteria – Part 2
- Plans Production – Part 3

The TDH also includes the [***Turnpike Enterprise Guide Drawings***](#), which are available electronically on the Turnpike Design website.

For Turnpike requirements related to tolling, please see the [***General Tolling Requirements \(GTR\)***](#) which is a separate document.

The ***TDH*** table of contents for Parts 1, 2, and 3 show the ***FDM's*** chapters and sections that have been modified. If a section has been modified, the user can refer to the specific section in the ***TDH*** shown in the Table of Contents.

The ***TDH*** is updated on an annual basis, following the official revision of the FDM. Interim updates to the ***TDH*** will be issued as Addenda to the annual revision.

Should you have any comments or suggestions for this ***TDH*** document, please contact the Turnpike Design Engineer.

Table of Contents

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

200 Context Based Design

No changes to the entire chapter

201 Design Controls

201.4	Design Speed	201-1
201.4.3	RRR Projects.....	201-1
201.4.3.1	Turnpike Resurfacing Restoration and Rehabilitation (RRR) Design	201-1
201.6	Turnpike Design Controls	201-2
201.6.1	Use of "Interstate" vs. "Freeway Other" vs. "Non Interstate" Criteria	201-2

210 Arterials and Collectors

210.9	Superelevation.....	210-1
210.9.1	Superelevation Transitions	210-1
210.10	Vertical Alignment.....	210-1
210.10.1	Grades.....	210-1
210.10.3	Vertical Clearances	210-1

Tables

Table 210.10.2	Maximum Change in Grade without Vertical Curves	210-1
----------------	---	-------

211 Limited Access Facilities

211.2	Travel Lanes and Auxiliary Lanes.....	211-1
211.2.2	Pavement Cross Slopes	211-1
211.2.2.1	Existing Pavement Cross Slopes.....	211-1
211.2.3	Hydroplaning Risk Analysis	211-1
211.2.4	Roadway Transitions	211-2
211.3	Medians	211-2
211.3.2	Median Crossovers.....	211-2

211.3.2.2	Crossovers on Turnpike Facilities.....	211-2
211.4	Shoulders	211-3
211.4.2	Shoulder Cross Slopes.....	211-4
211.4.2.1	Shoulder Rocking	211-4
211.4.3	Limits of Friction Course on Paved Shoulders.....	211-5
211.4.4	Audible and Vibratory Treatment.....	211-5
211.4.4.1	Ground-in Rumble Strips	211-5
211.6	Border Width	211-5
211.6.1	Border Width on Reconstruction & Resurfacing Projects	211-5
211.7	Horizontal Alignment	211-6
211.7.2	Horizontal Curves	211-6
211.7.2.1	Express Lane Separation in Horizontal Curves	211-6
211.8	Superelevation.....	211-6
211.9	Vertical Alignment.....	211-7
211.9.2	Vertical Curves	211-7
211.11	Structures	211-7
211.13	Ramp Terminals	211-7
211.17	Sodding	211-8
211.18	Interchange Fence.....	211-8

212 Intersections

No changes to the entire chapter

213 Modern Roundabouts

No changes to the entire chapter

214 Turnouts and Driveways

No changes to the entire chapter

215 Roadside Safety

215.2	Roadside Features	215-1
215.2.3	Clear Zone Criteria	215-1

215.2.6	Roadside Slope Criteria.....	215-1
215.3	Roadside Hazards.....	215-2
215.3.2	Canal Hazards.....	215-2
215.4	Longitudinal Barriers, Barrier Transitions, End Treatments & Crash Cushions	215-3
215.4.1	Longitudinal Barriers.....	215-3
215.4.1.1	Flexible Barrier	215-3
215.4.1.2	Semi-Rigid Barrier	215-4
215.4.6	Barrier Placement.....	215-5
215.4.6.4	Continuous Median Barriers	215-5
215.4.6.4.1	Median Barrier Grading Requirements.....	215-5
215.4.6.4.2	Access Openings	215-5
215.4.7	Warrants for Roadside Barriers	215-5
215.7	Existing Barrier Systems	215-6

Figures

Figure 215.2.16	Clear Zones at a Ramp	215-1
Figure 215.4.8	Flexible Barrier Placement	215-4

216 Earthwork

216.5	Earthwork Pay Items	216-1
216.5.6	Borrow Excavation (Truck Measure)	216-1
216.6	Summary of Earthwork.....	216-1

220 Railroads

No changes to the entire chapter

221 Utilities

No changes to the entire chapter

222 Pedestrian Facilities

No changes to the entire chapter

223 Bicycle Facilities

No changes to the entire chapter

224 Shared Use Paths

No changes to the entire chapter

225 Public Transit Facilities

No changes to the entire chapter

226 Patterned Pavement and Architectural Pavers

No changes to the entire chapter

227 Freight

No changes to the entire chapter

228 Landscape Design

228.1	General.....	228-1
-------	--------------	-------

230 Signing and Pavement Marking

230.1	General.....	230-1
230.1.1	Structural Supports.....	230-2
230.1.3	Vertical Clearance	230-2
230.2	Signing	230-2
230.2.1	Sign Placement	230-2
230.2.2	Overhead Signs on Limited Access Facilities.....	230-3
230.2.4	External Lighting of Overhead Signs	230-3
230.2.5	Signs on Barriers and Traffic Railings	230-3
230.2.10	Toll Route Markers	230-4
230.2.11	Truck Lane Restrictions.....	230-4
230.3	Pavement Markings.....	230-4

231 Lighting

231.1	General.....	231-1
231.1.3	Voltage Drop Criteria	231-2
231.1.5	Underdeck Bridge Lighting	231-2
231.1.5.1	Nighttime Underdeck Lighting	231-2
231.1.5.2	Daytime Supplemental Underdeck Lighting.....	231-2
231.2	Design Criteria.....	231-7
231.2.1	Box Girder Maintenance Lighting and Power	231-10
231.2.2	Lighting Load Center and Wiring Criteria.....	231-11
231.2.3	Temporary Lighting Criteria	231-13
231.2.4	Pole Design Criteria.....	231-13
231.3	Design Methodology	231-14
231.6	Lighting Coordination.....	231-15
231.7	Electrical Systems Design and Analysis.....	231-16
231.7.1	Voltage Drop	231-16
231.7.2	Load Analysis	231-17
231.7.3	Arc Flash Hazard Analysis	231-17
231.7.4	Short Circuit Analysis and Device Coordination	231-18

Tables

Table 231.1.1	Material Reflectivity	231-6
Table 231.2.1	Lighting Maintained Values	231-8

232 Signalization

232.1	General.....	232-1
232.1.3	Certification and Specialty Items	232-1
232.10	Traffic Signal Project Coordination	232-1
232.11	Electrical Systems Design and Analysis.....	232-2

233 Intelligent Transportation Systems (ITS)

233.1	General.....	233-1
233.1.3	ITS Device Approval and Compatibility	233-1

233.3	Motorist Information Systems	233-1
233.3.1	Dynamic Message Sign (DMS).....	233-1
233.3.2	Highway Advisory Radio (HAR).....	233-2
233.4	Video Equipment	233-3
233.4.1	Closed-circuit Television Systems	233-3
233.4.2	Video Display Systems.....	233-3
233.5	Network Devices.....	233-3
233.6	Fiber Optic Cable and Interconnect	233-4
233.6.1	Fiber Optic Cable.....	233-4
233.6.2	Fiber Optic Conduit.....	233-4
233.6.3	Fiber Optic Splices and Terminations	233-5
233.6.4	Fiber Optic Cable Designating System.....	233-6
233.6.5	Pull, Splice, and Junction Boxes.....	233-6
233.7	ITS Infrastructure.....	233-7
233.7.2	CCTV Pole and Lowering Device	233-8
233.7.4	Equipment Shelter	233-8
233.8	Vehicle Detection and Data Collection	233-8
233.9	Electrical Systems Design and Analysis.....	233-9

240 Transportation Management Plan

240.1	General.....	240-1
240.4	TTC Plan	240-1
240.4.1	TTC Plan Development	240-2
240.4.2	TTC Plan Details	240-2
240.4.2.5	Superelevation.....	240-2
240.4.2.6	Lane Widths	240-3
240.4.2.7	Lane Closure Analysis.....	240-3
240.4.2.7.1	Requesting Deviations from the Lane Closure Policy.....	240-5
240.4.2.7.2	Exit Ramp Opening	240-6
240.4.2.8	Traffic Pacing Design	240-6
240.4.2.12	Narrow Bridges and Roadways	240-7

240.4.2.13	Highway Lighting	240-7
240.4.2.17	Emergency Pull Off Area	240-7
240.4.2.18	Temporary Drainage.....	240-8
240.4.2.19	Friction Course on Temporary Pavement.....	240-8
240.4.2.20	Standard MOT General Notes	240-8
240.5	Transportation Operations.....	240-9
240.5.1	Regulatory Speeds	240-9
240.7	Coordination	240-9
240.9	TTC Devices.....	240-9
240.9.1	Signs	240-10
240.9.1.3	Project Information	240-10
240.9.2	Lighted Units	240-10
240.9.2.2	Portable Changeable Message Signs	240-10
240.9.4	Work Zone Markings	240-11
240.9.4.1	Raised (Retroreflective) Pavement Markers.....	240-11
240.9.6	Law Enforcement.....	240-11
240.9.6.2	Traffic Control Officer	240-11
240.9.7	Motorist Awareness System	240-12

Tables

Table 240.5.1	Transportation Operation Strategies	240-9
---------------	---	-------

241 Lane Closure Analysis

No changes to the entire chapter

242 Traffic Pacing Design

242.1	General.....	242-1
-------	--------------	-------

243 Portable Changeable Message Signs

No changes to the entire chapter

250 Hydraulic Data and Agency Permits

No changes to the entire chapter

251 Stormwater Pollution Prevention Plan (SWPPP) Development

No changes to the entire chapter

260 Bridge Structures

Tables

Table 260.6.1 Minimum Vertical Clearances for Bridges.....	260-1
--	-------

261 Structural Supports for Signs, Signals, Lighting, and ITS

261.1	General.....	261-1
261.2	Sign Support Structures	261-1
261.5	ITS Support Structures	261-1
261.7	Evaluating Existing Sign, Signal, Lighting and ITS Support Structures .	261-2
261.7.2	Category 2 Analytical Evaluation	261-2

262 Retaining Walls

262.2	Retaining Wall Plans Submittal Procedures	262-1
-------	---	-------

263 Geosynthetic Design

No changes to the entire chapter

264 Noise Walls and Perimeter Walls

264.2	Noise Walls	264-1
264.2.2	Noise Abatement Criteria	264-1
264.2.2.2	Reasonableness.....	264-1

265 Reinforced Concrete Box and Three-Sided Culverts

No changes to the entire chapter

266 Bicycle and Pedestrian Bridges

266.2	Design Criteria.....	266-1
-------	----------------------	-------

267 Shop Drawing Submittals

267.1	Introduction.....	267-1
267.2	Shop Drawing Submittals Not Required	267-1
267.3	Contractor Information Required	267-2
267.4	Submittals Requiring a Specialty Engineer or Contractor’s Engineer of Record.....	267-4
267.5	Transmittal of Submittals	267-4
267.5.1	Requirements for Department AOR or EOR.....	267-5
267.5.2	Requirements for Consultant AOR or EOR (Full Services)	267-5
267.5.2.1	Review by Architect of Record or Engineer of Record Only	267-7
267.5.2.2	Review by Architect of Record or Engineer of Record and the Department.....	267-7
267.5.3	Requirements for Consultant AOR or EOR (Design Services Only).....	267-8
267.5.4	Requirements for Architectural or Building Structures	267-8
267.5.5	Requirements for Roadway Shop Drawing Submittal Items	267-9
267.5.6	Requirements for Overhead Sign Structures and Nonstandard Miscellaneous Structures	267-9
267.5.7	Miscellaneous Requirements and Assistance	267-9
267.6	Disposition of Shop Drawing Submittals.....	267-9
267.7	Distribution of Submittals.....	267-12
267.9	Submittal Activity Record (Logbook) and ProjectSolve.....	267-13
267.11	Shop Drawing Flow Diagrams	267-14

Figures

Figure 267.11.1	Turnpike Shop Drawing Review Office – Flow Chart for Shop Drawing Item List, Reviewer Coordination for Items Deemed “Critical”, Design Bid Build (Conventional) Projects.....	267-14
Figure 267.11.2	Turnpike Shop Drawing Review Office – Routing Chart for Design Bid Build (Conventional) Projects	267-15
Figure 267.11.3	Turnpike Shop Drawing Review Office - Routing Chart for Design Build (Non-Conventional) Projects	267-16
Figure 267.11.4	Turnpike Shop Drawing Review Office – Internal Distribution	

Chart 267-17

200 Context Based Design

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

201 Design Controls

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

201.4 Design Speed

Add the following paragraph

All Turnpike Interstate Facilities will follow **FDM, Table 201.4.1** (70 MPH minimum design speed) with the following exceptions.

1. HEFT from Milepost 0 to Milepost 27.5 is classified as an Urbanized Freeway and will have a design speed of 65 MPH in accordance to AASHTO design criteria, for horizontal and vertical curve length and stopping sight distance, with the exception of K-Values for crest vertical curves that must meet or exceed the more stringent FDOT 60 MPH criteria. All other design elements must conform to FDOT criteria.
2. Veteran's Expressway from milepost 1.54 to milepost 13.57 must have a design speed of 60 MPH.
3. Polk Parkway from Milepost 0 to Milepost 12.7 must have a design speed of 65 MPH.

201.4.3 RRR Projects

Add the following section

201.4.3.1 Turnpike Resurfacing Restoration and Rehabilitation (RRR) Design

Resurfacing design criteria must follow the modifications shown in **TDH 114**.

Add the following sections

201.6 Turnpike Design Controls

201.6.1 Use of "Interstate" vs. "Freeway Other" vs. "Non Interstate" Criteria

Unless approved by the Turnpike Design Engineer, the Turnpike system must be designed to "Interstate" standards with the following exceptions.

1. Veteran's Expressway from Milepost 1.54 to Milepost 13.57 is classified as an Urbanized Freeway.

210 Arterials and Collectors

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

210.9 Superelevation

210.9.1 Superelevation Transitions

Replace paragraph 2 with the following paragraph

The standard superelevation transition places 80% of the transition on the tangent and 20% on the curve. In transition sections where the cross slope is less than 1.5%, a minimum longitudinal grade of 0.5% must be maintained for new and reconstructed alignments. For widening projects if MOT is shown to be cost prohibitive, the inside and outside edge of pavement must maintain a minimum grade of 0.3%.

210.10 Vertical Alignment

210.10.1 Grades

Table 210.10.2 Maximum Change in Grade without Vertical Curves

Add the following footnote

The minimum distance required between VPI's used to develop the profile grade line (PGL) is 3 x Design Speed.

210.10.3 Vertical Clearances

Replace the first sentence of vertical clearance requirement (6) with the following sentence

The required clearance for overhead sign structures is 18'-0".

Replace the first sentence of vertical clearance requirement (7) with the following sentence

The required clearance for new walk-in Dynamic Message Sign (DMS) structures is 20.0 feet.

211 Limited Access Facilities

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

211.2 Travel Lanes and Auxiliary Lanes

211.2.2 Pavement Cross Slopes

Add the following paragraph

New two-lane ramps, must be designed with 3 percent for both lanes through the gore area. It is understood that **Figure 211.2.1** depicts through lanes, and that auxiliary lanes can be applied with a cross slope in the same direction as the adjacent through lane even if this causes more than three lanes to be sloped in the same direction. This approach does not require a Design Variation, but must meet lane spread requirements for storm water runoff. A hydroplaning analysis is required if the number of lanes sloped in one direction is greater than the maximum allowed of 3 lanes.

211.2.2.1 Existing Pavement Cross Slopes

Add the following paragraph

Median through-lane widening, turn lanes, tapered or parallel single lane ramps adjacent to two through-lanes do not automatically warrant a 3 percent cross slope. Surface drainage will be reviewed and used as the deciding factor.

211.2.3 Hydroplaning Risk Analysis

Add the following paragraph

A hydroplaning analysis is required whenever any additional contributing pavement (ex: express lane buffer, paved shoulder, paved gore, auxiliary lane, etc.) is added to the standard pavement cross slope sections shown in **Figure 211.2.1**. Super-elevated sections must be analyzed for hydroplaning when two or more crashes occurred during the last 5-year period that were within the curve including crashes that were attributable or associated with weather/roadway conditions. For bridges with un-grooved decks that exceed the standard pavement cross slope sections shown in **Figure 211.2.1**, a hydroplaning analysis is required. Hydroplaning analyses will apply to all conventional and non-conventional projects; (widening, reconstruction, resurfacing, and new construction projects).

211.2.4 Roadway Transitions

Add the following paragraph

At bridge approach slabs, for a 150-foot length before or after the concrete approach slab, the ultimate pavement design asphalt thickness must be placed flush with the concrete at the ultimate profile grade. The initial pavement section must transition to the ultimate thickness at a maximum rate of 0.08 percent (1 inch/100 feet).

211.3 Medians

211.3.2 Median Crossovers

Add the following section

211.3.2.2 Crossovers on Turnpike Facilities

Median u-turns are used to accommodate turnarounds between interchanges for maintenance, service, and law enforcement personnel. The primary purpose of the u-turns is to alleviate adverse travel time for emergency vehicles by providing strategic u-turn locations.

Coordination efforts between the Turnpike Roadway Design Engineer, Turnpike Traffic Operations Engineer, FHP Troop Commander, and Turnpike Maintenance Engineer helped provide the direction needed to identify and develop Turnpike specific criteria for the design and locations (sometimes relocation) of the official use u-turns on the system. Design guidelines from ***AASHTO's A Policy of Highway and Streets***, along with outcome of the internal coordination efforts, were used to develop Turnpike specific criteria during the time when the state was developing standards for crossovers on Limited Access Facilities.

The following is a summary of crossover spacing criteria:

Criteria	Turnpike Requirement
Median width opening	≥ 20 feet (concrete barrier wall separated)

All crossovers within a project's limit must be evaluated for the spacing criteria and for sight distance deficiency. Findings must be documented and submitted to the Turnpike Project Manager for review and an internal decision will be made as to relocate or close the location. In the special case of managed lanes with buffers separating the managed

lanes from general use lanes, crossovers will be prohibited. Evaluate alternative crossing locations such as bridge abutments or emergency routes through interchanges.

[Emergency Crossover Design Guide Drawings](#) can be found on the Turnpike Design Website.

Additional guide drawings are available within **FDM 211**.

211.4 Shoulders

Add the following paragraphs

On ramps, the left and right shoulder widths may be reversed or adjusted if needed to provide additional sight distance on the inside of a curve. However, the sum of the right and left shoulder widths must be greater than or equal to the sum of the standard shoulder widths and in no instance will the shoulder width on the outside of the curve be less than 4 ft. Even though this is an acceptable practice for mitigating sight distance per **AASHTO Chapter 10.9.6**, a Design Variation for shoulder width will be required.

Where single lane ramps meet cross roads, additional ramp lanes are usually added for acceleration/deceleration of right or left turns. Unless these additional lanes are more than 500 feet long measured along the ramp baseline, single lane six-foot-wide ramp shoulders must be used throughout. A similar 500 feet length would apply to ramp toll facility approaches and departures. Frequent short changes in ramp width do not warrant corresponding short changes in ramp shoulder width. The shoulder transitions may be longer than the multi-lane ramp segment.

Other shoulder requirements:

1. Four feet paved inside shoulders on one lane ramps and profiled edge lines on both sides of the travel way for all ramps must be evaluated at each ramp location within a project before implementation. The evaluation must consider horizontal and vertical geometry, sight distance, crash data, and other site-specific factors to compare safety benefits to constructability and cost considerations.
2. "Two Lane Ramp Interstate" within **FDM Table 211.4.1** must also be applied to ramps with more than two lanes, and thus have a four foot paved inside shoulder and a ten feet paved outside shoulder.

3. Though **FDM 260.1.1** only shows “two lanes” for multi-lane ramps, the shoulder configuration (six feet inside shoulder and ten feet outside shoulder) must also be applied when more than two ramp lanes occur.
4. Twelve feet inside and outside paved shoulders must be provided for mainline sections that are three lanes or more in one direction, and that have greater than 250 DDHV trucks. Additional stabilization and continuation of the shoulder cross slope beyond the twelve feet paved width are not required. This shoulder width requirement must be applied to bridges when the above conditions occur.
5. A minimum median paved shoulder width of twelve feet is required for express lane marker separated express lanes.
6. Shoulder requirements for 100 ft. of pavement centered on the toll gantry, are listed in the General Tolling Requirements.

211.4.2 Shoulder Cross Slopes

Add the following section

211.4.2.1 Shoulder Rocking

Cross slope for full width shoulders in a tangent section may be varied from 3% to a maximum of 6%. In areas where a minimal longitudinal gutter grade of 0.3% cannot be met, a minimum longitudinal gutter grade of 0.24% must be provided. If the minimum 0.24% cannot be provided, shoulder rocking is allowed to maintain a minimum longitudinal gutter grade of 0.24%. The minimum distance between the low point and high point is 100 feet. Design must include provisions to assure that the reveal of the concrete barrier is not compromised.

For the outside shoulder, use one of three types of treatment in areas where the outside shoulder slope must be varied to meet minimum spread criteria. Options 1 and 2 must be shown as not feasible or workable before Option 3 can be considered.

1. Use concrete barrier wall with inlets. If the shoulder slope must be varied then the above criteria for varying the shoulder slope and longitudinal gutter grade must be met.
2. Use guardrail with shoulder gutter and inlets to collect storm water. If the shoulder slope must be varied then the above criteria for varying the shoulder slope and longitudinal gutter grade must be met.

3. Use guardrail in conjunction with a permanent turf reinforcement mat in fill sections with a front slope steeper than 1:4 and embankment height less than or equal to 10 feet. Shear stress calculations are required for the design/selection of the permanent turf reinforcement mat.

Design the top of concrete barrier wall profile in such a manner as to create a profile that is similar to the roadway profile and does not 'sawtooth' with a rocking shoulder design. The height of the proposed concrete barrier wall will vary (minimum height per Standard Index) between the high and low points of the special edge of shoulder profile to confirm that the top of the barrier wall profile is relatively constant and generally follows the grades of the proposed profile grade line to avoid undulating conditions.

211.4.3 Limits of Friction Course on Paved Shoulders

Add the following paragraph

Shoulder pavement on the high side where the shoulder slopes toward the travel lanes, the shoulder pavement will be flush with the adjacent travel way friction course to avoid trapping water on the shoulder. [Inside Shoulder Detail Guide Drawings](#) can be found on the Turnpike Design Website.

211.4.4 Audible and Vibratory Treatment

211.4.4.1 Ground-in Rumble Strips

Add the following paragraph

The minimum thickness of structural asphalt on shoulders where ground-in rumbles strips must be used is 1.5 inches. On existing shoulders without rumble strips that call for new rumble strips to be placed, the minimum thickness of existing structural asphalt and proposed asphalt must be no less than 1.5 inches.

211.6 Border Width

211.6.1 Border Width on Reconstruction & Resurfacing Projects

Add the following paragraphs

On resurfacing and widening projects where additional R/W will not be acquired, the minimum border width will be based on the following criteria:

1. The border width accommodates (1) roadside design components such as signing, drainage features, guardrail, fencing and clear zone, (2) the construction and maintenance of the facility and (3) permitted public utilities.
2. Along ramps and mainline lanes where roadside barriers are used and thus clear zone is not applicable, the minimum border width from the back of a barrier or retaining wall must be 10' if maintenance vehicles have sufficient access from public right of way that is contiguous and unimpeded to the Turnpike facility.
3. If the maintenance access is not continuous along a barrier or wall, and thus maintenance vehicles and equipment would need to turn around, then a sufficient turnaround area must be provided that is acceptable and approved by the Turnpike Maintenance Engineer.
4. Maintenance accessibility includes the ability for equipment and vehicles to maneuver around obstacles including fences, lights, signs, side slopes and ponds.

This approach does not require a Design Variation.

211.7 Horizontal Alignment

211.7.2 Horizontal Curves

Add the following section

211.7.2.1 Express Lane Separation in Horizontal Curves

Express lanes must be either barrier separated or buffer separated with express lane markers. Minimum stopping sight distances requirements per **FDM Tables 211.10.1, 211.10.2** and **AASHTO** apply. If barrier or express lane markers impede required sightlines around horizontal curves, then a formal design exception or variation is required.

211.8 Superelevation

Add the following sentences

The criteria contained in **TDH 210.9** is applicable for Interstates, Freeways, and Expressways. The RRR criteria contained in **TDH 210.9.2** applies to limited access resurfacing projects.

For ramp design speeds less than 35 mph See **AASHTO Exhibit 3-30 Maximum Relative Gradient** for superelevation transition rates.

211.9 Vertical Alignment

211.9.2 Vertical Curves

Add the following paragraphs

The minimum vertical curve lengths and minimum K values found in **FDM Tables 211.9.2** and **211.9.3** require some clarifications and restrictions:

Service Interchanges Per **AASHTO**, it is intended that a "platform" about 200 feet in length be provided on the ramp in advance of the gore using the Freeway K values.

System Interchanges K values for the higher system ramp design speeds must be used except for the "platform" area.

211.11 Structures

Add the following sentences

The width of all bridges must equal the paved width of the approach roadway including the paved width of shoulders. **TDH 211.4** provides criteria for design of shoulders.

211.13 Ramp Terminals

Add the following paragraph

According to **AASHTO**, parallel designs are preferred over tapered design. To optimize safety and operations within interchanges, all new construction, widening, and capacity improvement projects must provide parallel entrance and exits unless project specific circumstances warrant the need for tapered designs. The project specific circumstances must be coordinated with and approved by the Turnpike Roadway Design Engineer and the justification documented in the Design Decisions Journal.

Add the following section**211.17 Sodding**

On resurfacing projects where there is more than 12 feet of travel lane pavement draining to the edge, the minimum sod dimension is 2 feet 8 inches. Where there is less than 12 feet of travel lane pavement draining to the edge, the minimum sod dimension is 1 foot 4 inches. Typically, the 2 feet 8 inches occurs on the outside shoulder and the 1 foot 4 inches on the inside shoulder.

For all slopes adjacent to new construction or widening, sodding must be used throughout the entire limits of the project.

Add the following section**211.18 Interchange Fence**

On all projects involving interchanges between a Turnpike system facility and any roadway classified as "Urban", use Type B fence along the limited access right of way within the limits of the interchange unless otherwise approved for the Turnpike Roadway Design Engineer.

Limits of Type B fence within the interchange begin at the theoretical gore point of each ramp and terminate at the end of the limited access right of way adjoining the urban roadway being crossed. Quadrants that do not contain a theoretical gore point will extend Type B fence to the point where the typical mainline right of way is resumed.

212 Intersections

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

213 Modern Roundabouts

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

214 Turnouts and Driveways

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

215 Roadside Safety

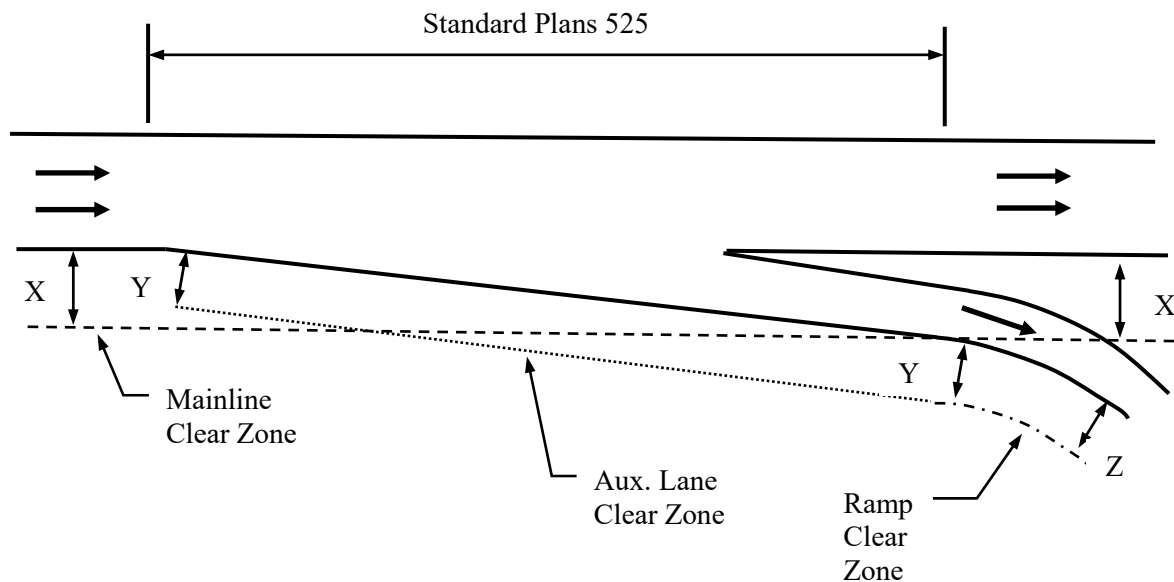
The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

215.2 Roadside Features

215.2.3 Clear Zone Criteria

Add the following figure

Figure 215.2.16 Clear Zones at a Ramp



215.2.6 Roadside Slope Criteria

Add the following paragraphs

A 1:2 front slope rate with guardrail can be applied regardless of fill height when constrained conditions exist, which requires approval from the Turnpike Roadway Design Engineer, Turnpike Drainage Design Engineer and Turnpike Maintenance Engineer.

5 feet from face of guardrail to the beginning of the 1:2 cut slope must be provided on all guardrail and 1:2 cut slope applications to allow for a 5 feet guardrail deflection. If a

concrete barrier is used instead of guardrail and shoulder gutter, then a 4 feet wide level bench must be constructed within the fill behind the barrier before proceeding with a 1:2 slope.

New permanent slopes steeper than 1:2 require approval from Turnpike Roadway Design Engineer, Turnpike Drainage Design Engineer, Turnpike Geotechnical Engineer and Turnpike Maintenance Engineer. Where the slopes are deemed too steep to perform maintenance, provide concrete pavement on slopes.

215.3 Roadside Hazards

215.3.2 Canal Hazards

Add the following paragraphs

A water body is defined as a natural or manmade feature, such as a pond, lake, ditch or canal that has a depth of water of 3 feet or more for an extended period of time (24 hours or more), as measured from the seasonal high water level or control elevation, to the water feature's bottom elevation.

Provide shielding with an approved roadside barrier for all water bodies within the interchange areas.

Evaluate for the need to shield all water bodies within Turnpike right of way and those that run along and may fall slightly outside of Turnpike right of way. Evaluation must include the review of traffic data, facility characteristics, 5 year crash history, and a cost estimate of recommended improvements.

Modification for Non-Conventional Projects:

Delete the above paragraph and see RFP for specific shielding requirements.

215.4 Longitudinal Barriers, Barrier Transitions, End Treatments & Crash Cushions

215.4.1 Longitudinal Barriers

215.4.1.1 Flexible Barrier

Add the following paragraphs

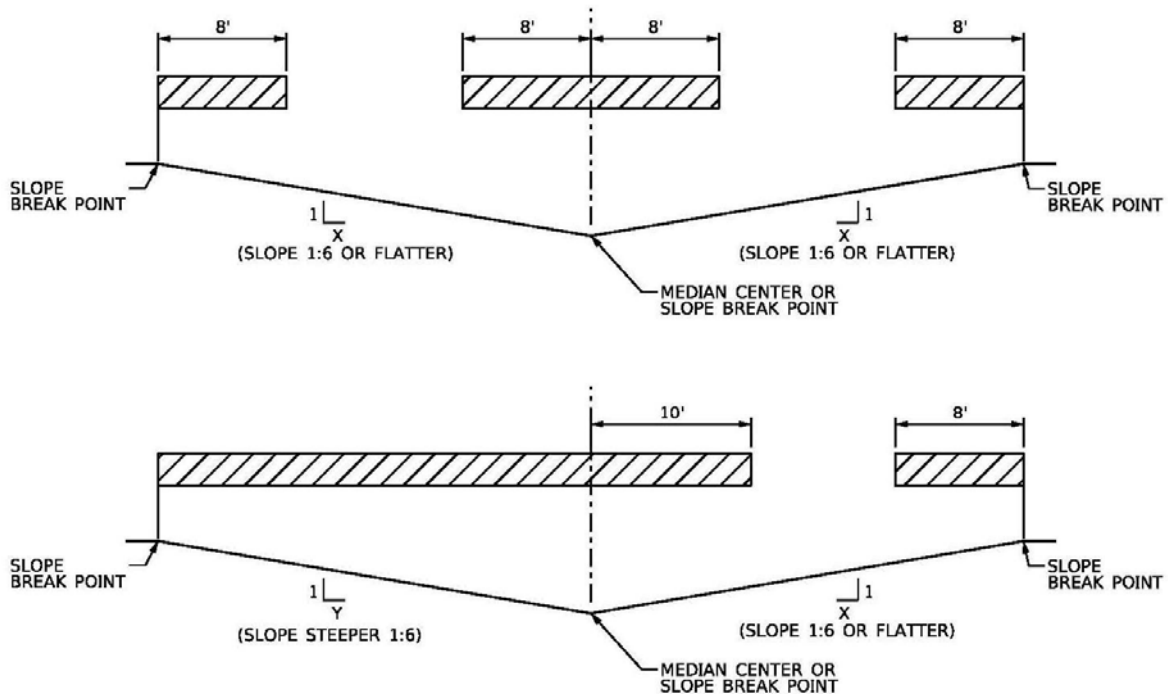
The following criteria apply to the placement of high tension cable barrier and supplement the ***Developmental Specification 540 High Tension Cable Barrier System***.

1. The preferred slope for high tension cable barrier placement is 1V:10H. The maximum allowable slope is 1V:6H.
2. Areas where high tension cable barrier must not be placed are shown in ***Figure 215.4.8*** below..
3. Post spacing must be installed such that the dynamic deflection is no more than a maximum of 8 feet.
4. End anchors must be protected from vehicle impact with rigid barrier, guardrail, or overlapping cable barrier.

For median applications retro-reflective sheeting must be specified on both sides of the posts.

Add the following figure

Figure 215.4.8 Flexible Barrier Placement



THE CROSS HATCHED AREAS IN THE FIGURE INDICATE THE LATERAL POSITIONS WHERE THE CABLE BARRIER MAY NOT BE EFFECTIVE AND SHALL NOT BE PLACED.

215.4.1.2 Semi-Rigid Barrier

Add the following paragraph

The treatment of guardrail post installed in areas with soils that exceed the standard AASHTO soil requirements for guardrail post must conform to the [W-Beam Guardrail Installations In Rock and In Mowing Strips Detail Guide Drawing](#) which can be found on the Turnpike Design Website.

215.4.6 Barrier Placement

215.4.6.4 Continuous Median Barriers

Add the following section

215.4.6.4.1 Median Barrier Grading Requirements

The preferred median slope is 1V:10H. This is flatter than the standard 1V:6H median typical section slopes. The slopes ahead and in front of guardrail installation are particularly critical on the older and narrow medians of 40 feet wide (see **AASHTO Roadside Design Guide**). In most cases, regrading requires the median ditch profile to be realigned horizontally and vertically. Therefore, drainage and earthwork in these areas need special attention in developing the typical sections and drainage profiles.

Add the following section

215.4.6.4.2 Access Openings

On projects that add roadside barrier to existing facilities (e.g. canal protection, spot/system wide safety improvement projects), locate maintenance and operations access points to existing facilities that are outside the clear zone and would not be accessible from the shoulder.

The maximum continuous length of a guardrail run along the outside of the roadway is 2,500 feet between end terminals. An access opening must be provided when long guardrail runs are broken up. Coordinate with the Turnpike Maintenance Engineer and Turnpike ITS Design Engineer on the final access location points to meet the needs of maintenance and operations.

The preferred typical detail for roadside guardrail access openings is depicted in the [**Maintenance Access Detail Guide Drawing**](#), found on the Turnpike Design Website.

215.4.7 Warrants for Roadside Barriers

Add the following sentence

Light pole foundations are not considered a hazard if built in accordance to **Standard Plans, Index 715-001**, though the roadway slope may cause a portion of the foundations to protrude more than 4" in height.

215.7 Existing Barrier Systems

Add the following paragraphs

For added capacity and reconstruction projects, existing guardrail sections that do not meet current mounting height design standards must be replaced or upgraded to meet current standards. If a run of guardrail extends beyond the project limits, then a 25 foot transition detail will be used to connect to the existing guardrail.

For resurfacing and spot or system wide safety improvement projects, existing guardrail sections that do not meet current mounting height design standards AND are impacted by project improvements must be replaced or upgraded such that the entire run of guardrail meets current standards. If the run of guardrail extends beyond the project limits, then a 25 foot transition detail will be used to connect to the existing guardrail. Existing guardrail not impacted by the project improvements is not required to be upgraded or replaced.

216 Earthwork

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

216.5 Earthwork Pay Items

216.5.6 Borrow Excavation (Truck Measure)

Replace paragraph 2 with the following paragraph

Borrow material, if available, may be obtained from within the right of way of the project, upon approval from the Turnpike Design Engineer. Obtaining material from the project right of way must not create an unsafe condition or unprotected hazard. Any borrow excavation occurring within the FDOT right of way must meet the pond dimensional criteria depicted in **Figure 5-1** of the **FDOT Drainage Manual**. The control elevation must be determined if a slope steeper than 1:4 is proposed in order to confirm compliance with **Figure 5-1** of the **FDOT Drainage Manual**. The proposed borrow areas must be reviewed and coordinated with the Turnpike Environmental Permit Coordinator, Turnpike Drainage Design Engineer, and Turnpike Roadway Design Engineer.

216.6 Summary of Earthwork

Add the following sentence

Specify and quantify material necessary to meet the drainage design requirements, such as select material beneath swales, on fill, and ponds designed to percolate runoff.

220 Railroads

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

221 Utilities

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

222 Pedestrian Facilities

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

223 Bicycle Facilities

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

224 Shared Use Paths

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

225 Public Transit Facilities

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

226 Patterned Pavement and Architectural Pavers

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

227 Freight

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

228 Landscape Design

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

228.1 General

Add the following sentence

Landscape designs must comply with the [Florida Turnpike Enterprise Landscape BRAND Guidelines](#) which can be found on the Turnpike Design website.

230 Signing and Pavement Marking

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

230.1 General

Add the following paragraphs

[Traffic Plans Guide Drawings](#) establish guidelines for traffic design and traffic engineering plan development. The Guide Drawings attempt to improve the quality of plans, provide system consistency, reduce plan development time and reduce plan review time. The Guide Drawings represent the compilation of engineering manuals, best practices and effective design experience. The Guide Drawings show layouts and details of an example condition.

Use these Guide Drawings to exercise proper engineering judgment and prepare a safe and effective design that fits the specific conditions of a project. The inappropriate use of and adherence to these Guide Drawings does not serve as exemption from the professional responsibility of developing an appropriate design. Become familiar with the information contained in the Guide Drawings and discuss specific design details with Turnpike design staff.

The [Traffic Plans Guide Drawings](#) are available on the Turnpike Design Website

Ancillary structures must not be placed in drainage features. If project geometry or other constraints require the placement of an ancillary structure in a drainage feature, coordinate with the Turnpike Drainage Design Engineer to confirm these structures and their associated components are placed above the appropriate elevation as follows:

- Treatment Swales – Weir Elevation
- Conveyance Ditches – Normal Depth
- Stormwater Ponds – Design Storm Peak Stage
- Floodplain Compensation or Other Systems – Seasonal High Water Level

Provide the applicable elevation in the component specific cross sections and typical cross sections.

230.1.1 Structural Supports

Replace vertical clearance requirement with the following sentence

Refer to **TDH 261** for information regarding structural support requirements. Refer to **TDH 325** for information regarding plan requirements.

230.1.3 Vertical Clearance

Replace vertical clearance requirement with the following sentence

Refer to **TDH 210.10.3** for vertical clearance requirements for sign structures on the Turnpike.

230.2 Signing

230.2.1 Sign Placement

Add the following sentences to paragraph 1

The placement of signs must avoid presenting too much information, interfering with other traffic control devices, impairing the visibility of other signs and violating minimum spacing distances (see **Table 1, Minimum Spacing Distances for Signs in Florida Administrative Code 14-51.014**). The design must adhere to the sign spreading concept presented in **MUTCD 2E.11**. The minimum sign spacing between a Dynamic Message Sign (DMS) and guide signs or directional signs should be 1000 feet, when the guide sign is upstream of the DMS sign.

Add the following sentences to paragraph 2

Consider the physical placement of sign supports as well as the visibility of the sign panel. Clearing and grubbing must be included in the project to remove trees and other vegetation that blocks or diminishes the visibility of the sign panel. Refer to the [Traffic Plans Guide Drawings](#) for guidance.

Add the following paragraphs

All advance guide signs should use the physical gore as the point of reference for distance messages. The only time this should not be done is if the physical gore and theoretical gore are separated by more than 500 feet.

Destination guide signs on ramps must include destinations that repeat advance guide sign and supplemental guide sign information and provides route guidance to the driver.

Follow Typical Off Ramp Signing Diagrams, located on Turnpike Design Website, for Advisory Speed Warning Signing at all Turnpike exit ramps.

For all post-interchange distance signs, the maximum letter height used must be 10" E or 10" EM.

For size of signs, lettering and plaques, follow the Freeway Classification in MUTCD Tables 2B-1, 2C-2, 2E-4 and 2E-5. The minimum sizes for regulatory and warning signs on exit or entrance ramps to/from Turnpike facilities must be Freeway Classification.

230.2.2 Overhead Signs on Limited Access Facilities

Apply the following overhead sign warrant to exit direction signs and advance guide signs

Mount advance guide signs on overhead structures when the number of travel lanes in one direction is three or more. Supplemental guide signs must remain ground mounted under sections of three or more travel lanes.

Add the following paragraphs

The express lane toll amount sign closest to an express lane ingress must be supported on a mid-or full-span structure. See the latest edition of the [GTR](#) with amendments in effect for additional criteria for this structure.

230.2.4 External Lighting of Overhead Signs

Add the following paragraph

If a sign panel on an existing structure is being replaced, all sign panels on the structure should be consistent. For example, if a structure has three existing signs with lights, one panel is being replaced, the plans should call for either A) lights on the new panel or B) the other two panels replaced with Type XI sheeting and removal of the lights.

230.2.5 Signs on Barriers and Traffic Railings

Add to list of permanent signs permitted on median traffic railing

Do Not Stop (TPK-7)

Add the following section

230.2.10 Toll Route Markers

The Turnpike mainline must use the Turnpike route marker sign panel shown in the most current [Turnpike Guide Drawings](#).

On side streets, leading to the Turnpike Mainline, use the Toll Auxiliary Sign (M4-15) in combination with the Turnpike route marker. On numbered routes, use the Toll Route Shield (FTP-79-06, FTP-80-06, or FTP-81-06) without the additional Toll Auxiliary Sign.

The width of the attached cardinal direction sign, directional arrow auxiliary sign, or other auxiliary sign must match the width of the parent route marker sign.

Add the following section

230.2.11 Truck Lane Restrictions

Include truck lane restriction signs on corridors that have three or more lanes in each direction of travel.

Sample panel designs for the restriction are included in the Guide Drawings. Locate the signs similar to a post-interchange sign so that drivers entering the system are informed at each entry point. If installation of the truck lane restriction sign is not possible on the mainline due to sign clutter, the truck lane restriction sign can be located on the entrance ramp after the toll facility, when necessary, to maintain proper sign spacing.

230.3 Pavement Markings

Add the following reference

[TDH Traffic Guide Drawings](#)

231 Lighting

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

231.1 General

Add the following paragraphs

[Lighting Guide Drawings](#) establish guidelines for lighting design and plan development. The Lighting Guide Drawings are available on the Turnpike Design website

Projects that include lighting design must comply with applicable standards. In addition to the FDOT Standard Specifications, the following standards should be consulted:

Roadway Lighting Design Guide, AASHTO - This is the basic guide for highway lighting. It includes information on warranting conditions and design criteria.

FDOT Standard Plans - These indices are composed of standard drawings or indexes which address specific situations that occur on a large majority of construction projects.

Recommended Practice for Roadway Lighting IES RP-8-00 (R2005), ANSI/IESNA.

American National Standard Practice for Tunnel Lighting IES RP-22-11, ANSI/IESNA.

The IESNA Lighting Handbook Reference & Application, IESNA.

Federal Aviation Regulation, Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace, USDOT/FAA. This regulation sets the requirements to follow on projects near airports.

Federal Aviation Administration Advisory Circular AC 70/7460-1, Obstruction Marking and Lighting, FAA. This advisory circular defines the requirements identify objects that require special lighting near airports.

Federal Aviation Administration Advisory Circular AC 150/5345-43, Specification for Obstruction Lighting Equipment, FAA. This advisory circular contains the FAA specification for obstruction lighting equipment.

Manual on Uniform Traffic Studies (January 2000) Chapter 15 Highway Lighting Justification Procedure, FDOT.

231.1.3 Voltage Drop Criteria

Replace all with the following paragraph

The maximum allowable voltage drop for determining the conductor sizes for light branch circuits is 6 percent. It must include a combination of both feeder and branch circuit runs from the power company service point to the last luminaire within a circuit.

231.1.5 Underdeck Bridge Lighting

Add the following paragraph

Underdeck lighting must be mounted to pier caps, end bents, or walls.

Add the following section

231.1.5.1 Nighttime Underdeck Lighting

Where there is continuous roadway lighting during the night, roadways under bridge structures must be lighted to the same level (or criteria) of the adjacent roadway. If the adjacent roadway is not lighted, lighting under bridges structures is still required where there is frequent nighttime pedestrian traffic or unusual or critical roadway geometry occurs adjacent to or under the bridge structure.

Add the following section

231.1.5.2 Daytime Supplemental Underdeck Lighting

Tunnel or daytime lighting may be required when the bridge structure limits natural sunlight penetration and limits a driver's visibility under the structure. Evaluation of existing/proposed roadway design regarding the need for tunnel or daytime lighting must be included in the LDAR. Tunnel or daytime supplemental lighting must be provided as warranted by evaluation or as required by the Turnpike Electrical Design Engineer or Turnpike Maintenance Engineer. These requirements include not only Turnpike facilities, but any roadway crossing under a Turnpike facility.

Methodology from the **ANSI/IES RP-22-11 Tunnel Lighting Guide** must be used to determine the need for daytime supplemental lighting for underpasses. **ANSI/IES RP-22-11** provides **Table 2** and **Table 3** for determining the need for daytime lighting of tunnels/underpasses and for preliminary determination of the target luminance value for threshold zone lighting.

When the adjustment factor per **ANSI/IES RP-22-11 Table 2** is zero, no daytime lighting is recommended.

No daytime lighting is recommended for underpasses of 80' or less.

No daytime lighting is recommended for underpasses between 80' and 250' long with traffic volume below 15000 AADT if there is good daylight penetration and good wall reflectance. However, where skewed roadway geometry, pedestrian/bike facilities, or local jurisdictional request are present, a daylight study (per Turnpike procedure and with consideration of these factors) must be performed to verify need for daytime lighting.

- (1) Consider several factors when determining the proper adjustment factor from **ANSI/IES RP-22-11 Table 2**:
 - (a) Exit Visibility- Where the exit is completely visible from the site safe stopping distance, the silhouette of objects beneath the underpass against the bright aperture at the exit may provide better detection by contrast for a driver. Make an assessment to determine if the roadway beneath the underpass is straight and allows contrast detection from the driver's viewpoint at the site safe stopping distance. This is considered "good" exit visibility. Otherwise, for example where curved roadways (horizontal curve with radii of 880 ft. or less in rural areas, 2500 ft. or less in urban areas) are present beneath the underpass, the exit must not be considered visible.
 - (b) Daylight penetration- The overall luminance level is assisted by natural light entering the underpass. Make an assessment of daylighting through openings such as entrance/exit portal, columns, wall embankments beneath the underpass, and median separations (10 ft. or greater) between the bridges. The 3-D modeling lighting simulation software with daylighting features (i.e. AGi32) is the recommended method for determining daylight penetration for proposed/existing conditions. For existing bridge daylighting retrofits, results from software simulation may be field verified using photometric meters at the site prior to completion of design.
 - (c) Reflectance of Underpass Walls- For narrow underpasses, retaining walls help to improve the luminance on the pavement due to the amount of light that will be reflected. For wide underpasses with three or more lanes and those with embankments, the reflectance has much less effect due to the inter-reflection between the bridge deck and embankment surfaces. Make an assessment based upon the material reflectance (i.e. concrete reflectivity varies between 20-30%, see recommended reflectivity in **Table 231.1.1**) of the underpass surfaces.

- (d) Traffic volume and pedestrian/cyclist traffic- underpasses in urban areas are likely to have high traffic volume and pedestrian/cyclist traffic, therefore daytime lighting is required for underpasses exceeding 80 ft. as indicated per **ANSI/IES RP-22-11, Table 2**.
- (2) Determine the pavement luminance value from **ANSI/IES RP-22-11, Table 3** and apply the adjustment factor from Table 2. Further reduction of luminaires must be considered based upon **Figure 8** of the **ANSI/IES RP-22-11** guide.
- (3) Perform a daylight study using lighting simulation software capable of 3-D modeling of proposed underpasses and with features required to account for contribution of sunlight per weather station data. The Study must be performed at 9am, 12 noon, & 3pm at proposed underpass locations.

The average luminance value in the threshold zone of the underpass must be determined per **Tables 2** and **3** of the **ANSI/IES RP-22-11** guide. Reduction of luminaires over the latter half to the threshold zone, per **Figure 8** of the **ANSI/IES RP-22-11** guide, must be allowed except in cases where the length of the tunnel is less than the calculated threshold zone length.

A daylight study (to be included in the LDAR) must be performed by software simulation and field investigation to account for sunlight that may contribute to achieving the overall luminance value at the roadway beneath the underpass. See recommended surface material reflectivity percentages for use in software modules following the recommended procedure below. Uniformities must meet criteria as described in **Table 231.2.1**.

The Procedure for Design of Photometrics for Daytime Lighting is as follows (**ANSI/IES RP-22-11** and **AGi32** or equivalent software will be needed to implement this procedure):

- (1) Determine the AASHTO SSSD per **ANSI/IES RP-22-11 Table 1**. Typical underpass will likely be evaluated for threshold zone only lighting. Calculations must be performed to confirm this assumption.
- (2) Determine threshold zone luminance value.
 - (a) Per **ANSI/IES RP-22-11 Table 2**, evaluate table parameters to determine adjustment factor.
 - (b) Evaluate proposed roadway “scene” and select scene per **ANSI/IES RP-22-11 Figure 3**.
 - (c) Evaluate and determine the “Suggested Maintained Average Pavement Luminance Levels in the Threshold Zone of Vehicular Tunnels”, per **ANSI/IES RP-22-11 Table 3**.

- (d) Apply adjustment factor from 2a.
 - (e) Apply reduction per **ANSI/IES RP-22-11 Figure 8**.
- (3) Perform daylight study for proposed underpass. **AGi 32** lighting software is recommended. Other equivalent software/field methods may also be used. Considerations include but may not be limited to: luminance contributions from the sun, material reflectance, underpass orientation, etc. per **ANSI/IES RP-22-11**.
- (a) Create a proposed underpass model. The model must include but not be limited to: all surfaces that reflect light, any openings, roadway layout below underpass, bridge structures beneath underpass, as well as other contributors.
 - (b) Apply surface reflectivity characteristics. The Recommended material reflectivity characteristics may be obtained from the Turnpike. Refer to **Table 231.1.1**.
 - (c) Create calculation zones for roadway beneath proposed underpass. Data points near the edges of the underpass may artificially inflate the luminance average. It is recommended that those data points not be considered in the overall average luminance. points within the first 5 ft. of the entrance and exit portals must not be included in the overall average. Uniformities must meet requirements of requirements of **Table 231.1.1**.
 - (d) Run daylighting module and calculate average luminance values within calculation zones established in 3c. Site location coordinates are required for weather station data. Luminance value determined in previous step 2 must be used. As a worst-case scenario, daylight module study must be run assuming the orientation of the sun at 9am, 3pm, and 12 noon.
 - (e) If average luminance value cannot be met using daylight, then layout supplemental wall mount luminaires beneath underpass as needed to meet the average value. Use of nighttime luminaires in conjunction with the daytime supplemental luminaires may be required. The goal should be to meet the average luminance value using the least amount of fixtures.
 - (f) Adjust and re-run daylight module and re-calculate as needed to meet the average luminance value as determined in Step 2 above.

Deliverables from the daylighting study must include, but not be limited to:

- Snapshots of all 3-D views of underpass models
- Summary of luminance value achieved with point to point photometrics layout that shows the calculation zones
- All designer's assumptions/judgements made to support the study

Coordination with the Turnpike Structures Design Engineer, power utility, and electrical design sub-consultant (if separate from lighting designer) may be required.

Modification for Non-Conventional Project:

Average pavement luminance value for daytime lighting must be implemented as directed in the RFP.

Add the following table

Table 231.1.1 Material Reflectivity

Material (Surface)	Recommended Reflectivity
Concrete	0.25
Steel	0.20
Asphalt	0.38

231.2 Design Criteria

Add the following paragraphs

All design considerations must be documented in the Lighting Design Analysis Report (LDAR). Coordinate with maintaining agencies to ascertain their preferences and obtain all other pertinent information required to provide an acceptable design.

Lighting pole layout and design must employ practices, where possible, to reduce the risk of light poles in high crash and high risk locations. Some of these design considerations are, but not limited to: lane drop and intersection locations, sections of roadway where the paved shoulder narrows, and curve/vehicle departure directions.

Conventional lighting should be used. Conventional roadway lighting luminaires must be pole top style. This requirement is based on aesthetic and logistical synchronization with existing facilities.

Modification for Non-Conventional Projects:

Conventional lighting must be used unless directed otherwise in the RFP.

Shoulder mounted poles must be used unless directed otherwise in the RFP.

Projects with conventional lighting must be designed for an average initial illumination as indicated in **Table 231.2.1**. Rest areas and service plazas must also be designed for an average initial illumination as indicated in **Table 231.2.1**. This includes the ramps to and from the service plazas.

The lighting design must include mainline transition lighting to allow a reasonable reduction in lighting levels from a lighted roadway to an unlighted road. The mainline transition lighting must extend beyond the project lighting limits by approximately four-to six- pole spacing. The mainline transition illumination levels must be 1.0 foot candles average initial intensity (horizontal foot candles) with the same uniformity ratios specified in **Table 231.2.1**.

If the length of the mainline between any two lighted areas (roadway sections, interchanges, service plazas, and/ or tolls facility) is 0.5 mile or less, then that section of the mainline must be lighted.

All widening and resurfacing projects must be reviewed for compliance with current lighting criteria. Project begin and end limits must define project lighting scope to be considered, regardless of the limits of resurfacing unless otherwise noted.

Projects with open road tolling gantries are not required to have roadside lighting unless required by another section of the **TDH** and/or a Lighting Justification Report. Where roadside lighting exists, the roadway lighting must be reviewed for compliance with current lighting criteria and GTR. All deficiencies within the project scope must be identified and corrected. The Turnpike Electrical Design Engineer and the Turnpike Project Manager must be notified regarding all lighting deficiencies found outside the project limits.

Where new poles and luminaires are being proposed, all poles, luminaires, foundations, and infrastructure within the project scope must be new.

Modification for Non-Conventional Projects:
All poles, luminaries, foundations and infrastructure must be new unless directed otherwise in the RFP.

Table 231.2.1 Lighting Maintained Values

Replace the following items

Roadway Classification Or Project Type	Illumination Level Average Initial Foot Candle		Illumination Uniformity Ratios		Veiling Luminance Ratio
	Horizontal (H.F.C.)	Vertical (V.F.C.)	Avg./Min.	Max./Min.	$L_{V(MAX)}/L_{AVG}$
Conventional Roadway Lighting and Signalized Intersections					
Limited Access Facilities, Major Arterials & Highway Speed Tolling Gantries	1.7	N/A	4:1 or Less	10:1 or Less	0.3:1 or Less
All Other Roadways	1.0				
Pedestrian Ways and Bicycle Lanes*	2.5				

High Mast Roadway Lighting					
Limited Access Facilities, Major Arterials & Highway Speed Tolling Gantries	1.0	N/A	3:1 or Less	10:1 or Less	N/A
All Other Roadways					
Sign Lighting					
Low Ambient Luminance**	5.0 to 10.0	N/A	N/A	6:1	N/A
Medium Ambient Luminance**	10.0 to 20.0				
High Ambient Luminance**	20.0 to 40.0				
Rest Area Lighting					
Entrance and Exit	1.7	N/A	4:1 or Less	10:1 or Less	N/A
Interior Roadways	1.5				
Parking Areas	1.5				

*This assumes a separate facility. Facilities adjacent to a vehicular roadway should use the levels for that roadway.

** Ambient luminance classifications are defined in Section 10.3 of the **AASHTO Roadway Lighting Design Guide** (2005). Refer to the [Traffic Plan Guide Drawings](#) for information on sign panel sheeting.

Add the following notes to Table 231.2.1

Notes:

- *For conventional lighting:* These average illumination values should be considered standard, but should be increased, if necessary, to maintain a uniform ratio. The maximum illumination level average initial horizontal foot-candle value must be 2.25 FC for interstate, expressway, freeway, major arterials, and highway speed tolling gantries. The maximum illumination level average initial horizontal foot-candle values must be one and one-half values for all other roadways, pedestrian ways, and bicycle lanes.

- *For highmast lighting:* These average illumination values should be considered standard, but should be increased, if necessary, to maintain a uniform ratio. The maximum illumination level average initial horizontal foot-candle values must be one and one-half values for interstate, expressway, freeway, major arterials, highway speed tolling gantries, and all other roadways.
- *For rest area and service plaza lighting:* These average illumination values should be considered standard, but should be increased if necessary to maintain a uniform ratio. The maximum illumination level average initial horizontal foot-candle values must be one and one-half values.

Add the following section

231.2.1 Box Girder Maintenance Lighting and Power

Welding or burning of the structure is not allowed. All fasteners must be approved mechanical devices. The electrical work associated with the box girders involves working in confined space areas. All precautions and rules according to "confined spaces" of the ***Code of Federal Regulations, 29 CFR 1910.146*** apply. Emergency lighting must be provided within each box girder per ***NFPA 101***.

The minimum conductor size must be No. 10 AWG. A green insulated conductor must be installed in each conduit run. The minimum conduit size must be 1 inch.

The six-hour timers must control the lighting contactors. Timers must be provided at each hatch entrance and mid span.

The light fixtures must be connected to branch circuit breakers separate from the receptacle branch circuit breakers.

The service voltage for the box girders must be 240/480 volts, single-phase, three-wires and then step down to the 120/240 volts through the mini power centers. A main disconnect switch must be provided immediately adjacent to the hatch door of each girder. The 240/480 volt-feeder must terminate in a distribution panelboard. The distribution panelboard must provide 480 volt power to each mini power center.

The number of mini power centers within each box girder must be determined based on the number of lights and receptacles. The maximum number of lights and receptacles within a mini power center must be as indicated on ***Standard Plans, Index 715-240***.

Add the following section

231.2.2 Lighting Load Center and Wiring Criteria

The standard service voltage for the roadway lighting load centers must be 240/480 volts, single-phase, three-wires.

Roadway lighting load centers must be coordinated with utility provider prior to Phase III Plan Submittal. Utility transformers must be sized for connected and spare loads. Consideration must be given for utility standard transformer sizes and limitations. Where a lighting load exceeds typical utility transformer sizes, the lighting load must be split and multiple load centers provided to serve the load unless approved otherwise by Turnpike Electrical Design Engineer.

[FDOT Standard Plans, Index 639-001](#) (Service Point Details) and [Turnpike Lighting Guide Drawings](#) must be coordinated with the utility provider's requirements for electrical service (or electrical service standards). The electrical service point must be designed to meet all utility provider's requirements.

The load center location and surrounding area must have a minimum of 1'-0" between the load center and the design high water elevation.

Load center enclosure minimum dimensions must be as shown in the Turnpike Lighting Guide Drawings.

Where a load center is being replaced and existing poles, equipment, etc. are being re-used, all equipment and identification labels must be replaced to include the new load center designation and circuit. Coordinate with the Turnpike Maintenance Engineer to properly update identification of equipment.

The voltage for the roadway luminaires must be 480 volts, single-phase, two-wires.

Roadway lighting circuit conductors must not be larger than #1 AWG. Circuits requiring conductors larger than #1 AWG must be coordinated with the Turnpike Electrical Design Engineer and Turnpike Maintenance Engineer.

Where existing conductors within a circuit are being replaced, the size of the new conductors must not be smaller than the existing conductors.

Dedicated circuits must be provided for daytime supplemental underdeck lighting. Daytime dedicated circuits must be in separate conduits from roadway lighting circuits. Where conduits are run in the same trench with roadway lighting conduits, the conduits must be separated in the pull boxes. Dedicated daytime lighting circuit conduits must be wrapped with electrical hazard tape in the pull boxes. Dedicated daytime lighting circuit

conductors must be identified with an additional tag that states the conductors are live 24 hours a day, seven days a week.

Underdeck light fixture mounting details must be provided. Light fixtures/associated conduit may be field routed. Attachment of lighting equipment/associated conduit to MSE wall panels is not allowed. Attachment of lighting equipment/associated conduit to MSE copings is acceptable. Attachment to other bridge elements must conform to the Structures Design Guidelines Appendix 1A.

Roadway lighting must be connected to alternate circuits to prevent a total blackout of any section of the highway in the event a circuit is out of service. Minor replacements must be evaluated on a case by case basis.

Modification for Non-Conventional Projects:

Roadway lighting must be connected to alternate circuits unless directed otherwise in the RFP.

The maximum distance between pull boxes and/or splice boxes in long conduit runs is 300 feet.

A special power distribution design is required when new poles and luminaires are being proposed behind noise walls. Conduit, junction boxes, and pull boxes must be installed in front of noise walls on the roadside.

There must be no more than three circuits in a single conduit. Provide multiple conduits as needed in the plans.

All roadway crossings must be provided with a spare conduit and a dedicated pull box at each end of the crossing road. Use of light pole pull boxes is not allowed, where space is sufficient for providing dedicated pull boxes.

All pull boxes and splice boxes must be Tier 22 load rated with Tier 22 rated covers. Metal lid covers must be avoided, unless otherwise approved by the Turnpike Electrical Design Engineer and Turnpike Maintenance Engineer. All other pull and splice box requirements must follow FDOT specifications.

Add the following section

231.2.3 Temporary Lighting Criteria

The design of temporary lighting must meet the criteria shown in **TDH 231.2**. If this criteria cannot be met based on various factors of construction, submit a safe and effective design, using proper engineering judgment to the Turnpike Project Manager and Turnpike Electrical Design Engineer for review and approval.

Add the following section

231.2.4 Pole Design Criteria

Avoid locating any light poles on highway bridges and approach slabs. This can be done by adjusting the pole spacing before and after bridge approaches. Bridge mounted light poles are not desirable and should be avoided where possible. If bridge mounted light poles are unavoidable, their location must be coordinated with the Engineer of Record for Structures Design. Bridge-mounted poles must have pull box as specified in [FDOT Standard Plans, Index 630-010](#).

Nominal mounting heights for conventional poles must be 40 and 50 feet as specified in [FDOT Standard Plans, Index 715-002](#). Nominal mounting heights for highmast poles must be between 80 and 120 feet as specified in [FDOT Standard Plans, Index 715-010](#). In cases where lower or higher mounting heights are required to meet minimum lighting design criteria, contact the Turnpike Electrical Design Engineer for approval and coordination. Technical special provisions (TSP) and details must be provided in those cases where special designs are required. TSPs must be signed and sealed by a Professional Engineer, licensed in the State of Florida. Vibration dampers and pads must be provided for all shoulder-mounted poles with pole-top mounted luminaires having mounting heights over 40 feet. All conventional light poles must be provided with breakaway transformer-type bases except when mounted on bridge traffic railing barriers or on barrier walls. Conventional light poles in parking lots must not be provided with frangible bases.

Conventional light poles must be aluminum and must not be painted. High mast light poles must be galvanized steel only.

A concrete slab is not required in those instances when the poles are located behind sidewalks. The pull box must be located flush with the sidewalk in front of the light pole, and is paid for as "roadside".

A combination pole and pull box concrete slab is not required where the grade is 1:2 or greater and protected by guardrail.

All foundations and pull boxes must be coordinated with current and future grading to ensure that the top of the foundations and the pull boxes are not below grade. In addition, foundations, boxes (pull, splice, junction or similar), and lighting equipment must not be located within the limits of any drainage systems or other locations where water and debris may accumulate.

All components of the pole cable distribution system must be listed by a nationally recognized testing laboratory.

The pole cable distribution system must be installed in the pull box adjacent to each light pole.

A pole cable distribution system that is installed inside the pole base may only be used when specific project conditions deem its installation inside the pull box impractical, and only after obtaining the approval of the Turnpike Electrical Design Engineer.

For poles that are median barrier mounted or pedestal mounted, the light poles must not be provided with frangible bases, strain relief fittings, or breakaway fuseholders.

For poles with two luminaires, a single TC cable must be run from the adjacent pull box to the pole's handhole. From the pole's handhole, a pole cable distribution system is required for each luminaire.

231.3 Design Methodology

Add the following paragraphs

A point-by-point, computerized photometric analysis must be performed for all roadway areas being illuminated throughout the project. Photometric data points must be legible. A copy of the results of this analysis must be included in the LDAR and submitted to the Turnpike Electrical Design Engineer for review. The photometric analysis must identify and evaluate each roadway classification and area of illumination, as defined by the **FDM 231.3.1**, within the project scope. Each analysis zone must be identified for all distinct area/sections of roadway within the project scope. Some of these distinct areas may include: mainline, ramps, and roadway directions. Results must indicate foot-candle values displayed on plan view on 11" x 17" pages with 1/100th accuracy (0.XX foot-candles). Where solid objects, such as bridges, block light fixture contributions, a 3D graphic representation must be included to ascertain that solids were accounted for. Typical section photometric analyses are not considered a complete or through photometric analysis.

A point-by-point, computerized photometric analysis must be performed for all signs being illuminated throughout the project. A 1 foot by 1 foot maximum point spacing must be used for the point by point photometric for the entire area of the sign panel(s). A copy of the results of this analysis must be included in the LDAR and submitted to the Turnpike Electrical Design Engineer for review. Results must indicate foot-candle values displayed on each sign panel with 1/100th accuracy (0.XX) foot-candles).

A photometric analysis is required for projects where the relocation of light poles is included in the scope of work.

Provide an angle convention detail, if any tilting is required, to clearly depict fixture tilt orientation. A detail is required for each type of fixture being used (fixture on pole, sign luminaire, etc.). The detail(s) must be provided in the LDAR and the plan sheets.

231.6 Lighting Coordination

Replace the last paragraph with the following paragraphs

Per ***FDM 110.5.1***, all projects must be reviewed and coordinated with the FDOT State Aviation and Spaceports Office to determine if notification and/or permitting are required by the Federal Aviation Administration (FAA), (FDOT), and any local jurisdictions.

The preferred method of determining FAA notification requirements must be the [**FAA's Online Notice Criteria Tool**](#).

The Turnpike Project Manager and Turnpike Electrical Design Engineer must be provided copies of all notifications and permits for review in the LDAR. If none are required, written notification must be given to that effect in the LDAR.

The manager of any affected airport and/or heliport must be contacted and provided project scope, drawings, etc. and be met with to fully coordinate the airspace aspects of the project.

Add the following paragraph

Turnpike ITS and Tolls – Once the light pole locations are established, they should be checked with the ITS layout and the toll equipment layouts for any conflicts with the light poles, the light pole pull boxes, and the roadway lighting circuits.

Modification for Non-Conventional Projects:

The Roadway Lighting Engineer of Record is responsible for all necessary coordination.

Add the following sections

231.7 Electrical Systems Design and Analysis

The design of all electrical systems (Lighting, Traffic Signals, ITS, etc.) must comply with **FAC 61G15-33, Responsibility Rules of Professional Engineers Concerning the Design of Electrical Systems**. These responsibilities are applicable for all new projects and any major modifications or renovations.

The following analysis are required, yet not limited to: voltage drop calculations, load analysis and calculations, arc flash hazard analysis, and short circuit analysis and device coordination. These designs and analyses must be prepared, reviewed, and signed and sealed by a Professional Engineer licensed in the State of Florida. The Professional Engineer must be competent in electrical engineering through training and/or experience. The design analyses must be submitted with each plan submittal as part of the LDAR for lighting projects and the Power Design Analysis Report (PDAR) for ITS projects.

Electrical system design analysis should be completed using accepted industry power system analysis software (i.e. ETAP, SKM, etc.). If calculations by hand are used, engineering judgment, assumptions and methods must be clearly explained in the report. All supplemental information used or referenced in the power design analysis must also be provided in the report.

231.7.1 Voltage Drop

Voltage drop calculations must be submitted for all branch circuits and service feeders. Voltage drop calculations must be limited to the percentages shown in the **TDH** and/or **[TDH Guide Drawings](#)**. If no criteria exist within the **TDH** and/or **[TDH Guide Drawings](#)**, the standards set forth in the **FDOT FDM**, **[FDOT Standard Plans](#)**, and **[FDOT Standard](#)**

[Specifications for Road and Bridge Construction](#) must be used. If no Turnpike or FDOT criteria exist, use the guidelines set forth in the **NEC**. Voltage drop calculations must be performed when additional loads are added to existing infrastructure to ensure the proposed conductors are sized appropriately for the total voltage drop resulting from the addition of new loads further from the existing circuits. Formulas, description of variables, and any other supplemental information required to evaluate design results must be included in the report.

231.7.2 Load Analysis

A complete load analysis must be submitted. This analysis must include, but is not limited to: calculation of individual circuits, major distribution equipment, and service points. All calculations must verify all interrupting ratings and conductor sizing.

For any major modifications or renovations, calculations must consist of providing the existing load (prior to modification), the load being removed, the load being added, and new total load. A load analysis must be provided any time electrical load is added to existing infrastructure. All existing loads must be field verified by metering or calculated based on existing conditions.

New service points and major distribution equipment must be provided with a minimum of 20-percent spare capacity.

Manufacturer's product data cut sheets containing equipment power requirements must be provided in the report. Generator sizing calculations, UPS sizing calculations, and any other calculations affected by power loads for the project must be provided in the report.

231.7.3 Arc Flash Hazard Analysis

Provide an arc flash hazard analysis for new electrical distribution equipment (panelboards, transformers, load centers, disconnects, etc.), per the latest version of the **Standard for Electrical Safety in the Workplace, NFPA 70E**. An arc flash hazard analysis must determine the arc flash protection boundary and the personal protective equipment (PPE) that personnel within the arc flash boundary must use. The arc flash hazard analysis must be updated when a major modification or renovation takes place. arc flash and shock warning labels must be field installed on each piece of new electrical distribution equipment. The labels must indicate the flash hazard boundary, the flash hazard at 18 inches, the PPE level requirements, and the approach restrictions. All labels proposed for use on electrical equipment must be provided (in .pdf format) as part of the report and in the plans.

231.7.4 Short Circuit Analysis and Device Coordination

A short circuit analysis must determine maximum fault current on each piece of new electrical distribution equipment and proper fault current interrupting capacity. Provide documentation from the utility provider on the maximum available fault current at the utility transformer. This value must be used in the short circuit analysis. Software programs or hand methods used must be capable of calculating the maximum short circuits at all electrical equipment locations to ensure equipment ratings are adequate. The short circuit analysis must be updated when a major modification or renovation takes place or if electrical load is added to existing infrastructure. The AIC ratings for all equipment must be provided as part of the contract documents to meet or exceed the short circuit analysis results.

Electrical distribution equipment must be designed as fully rated and selectively coordinated systems. The protective features of the electrical distribution system must automatically and selectively isolate a faulted or overloaded circuit from the remainder of the electrical system. Only the closest protective device to the fault must operate to isolate the fault without affecting other parts of the system.

232 Signalization

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

232.1 General

Add the following paragraph

Make every reasonable effort to incorporate the design preferences of the local maintaining agency. These preferences may include but are not limited to pole types, detector loop strategies, conduit routing, specific equipment, signal timing methods, etc. Meet with the maintaining agency to ascertain their preferences and obtain all other pertinent information. Report all findings to the Turnpike Project Manager before proceeding with design.

232.1.3 Certification and Specialty Items

Add the following paragraph

The design of traffic signals compatible with local signal systems may require the use of materials for which there are no approved Standard Specifications or Supplemental Specifications. In those cases, Develop project specific TSPs for inclusion in the contract document.

232.10 Traffic Signal Project Coordination

Add the following paragraphs

In general, the Turnpike will actively work with the local maintaining agencies for coordination of design and maintenance issues.

Signal Systems - At the request of the local maintaining agency any signals designed by the Turnpike will include features and equipment typically used for their signals and signal systems. This will include time base, closed loop, UTCS or other technologies. The communications medium must match those already in place.

Legal Authorization and Maintenance Agreements - The Turnpike is responsible for updating maintenance agreements with local maintaining agencies. New traffic signal locations must be discussed with the Turnpike Traffic Operations Engineer so the new traffic signals can be included in the existing agreement.

Add the following section

232.11 Electrical Systems Design and Analysis

Refer to ***TDH 231.7***.

233 Intelligent Transportation Systems (ITS)

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

233.1 General

233.1.3 ITS Device Approval and Compatibility

Add the following paragraph

Equipment requirements must be coordinated at time of final RFP or specification development with the Turnpike Traffic Operations Engineer to ensure the most appropriate manufacturers and models at the time.

233.3 Motorist Information Systems

233.3.1 Dynamic Message Sign (DMS)

Add the following paragraphs

When general purpose mainline DMS is proposed, a travel time sensor compatible with the existing Vehicle Detection System – Automatic Vehicle Identification (VDS-AVI) System, formerly known as travel time system (TTS), must be installed at the site. Placement of mainline and arterial DMS must be in accordance with the **FDM**.

Any walk-in DMS proposed on structures collocated with static signage must require a formal approval from the Turnpike Traffic Operations Engineer.

New walk-in DMS installed on the mainline must be capable of displaying 18” characters, 21 characters per line, three lines, full color, full matrix messages with 20mm pixel pitch (resolution). Mount using half-span or full span supporting truss structures.

Arterial DMS (also known as “ADMS” or “Front Access DMS”) must be capable of displaying 15 characters per line, three lines, full color and full matrix messages with 20mm pixel pitch (resolution). The minimum character height must be per **FDM 233.3**.

Toll Facility Approach DMS (TDMS) must be full-color with 20mm pixel pitch (resolution). TDMS must be located 1-mile to 2-miles from the toll facility being considered, and must

be located to provide adequate perception-reaction distance for the approaching motorists.

Lane Status DMS (LSDMS). The express lanes status DMS must be capable of displaying 18" characters, 18 characters per line, one line, full color and full matrix messages with 20mm pixel pitch (resolution). For LSDMS provided along arterials, the character height requirement may be reduced to 12", depending on the arterial speed limit.

Toll Amount DMS (TADMS). The express lanes toll amount DMS must be capable of displaying 18" characters, 7 characters per line, one line, full color and full matrix messages with 20mm pixel pitch (resolution). For TADMS provided along arterials, the character height requirement may be reduced to 12", depending on the arterial speed limit. Each individual toll rate brick on a TADMS panel must be controlled by one controller, located in ground accessible cabinet. For instance, a standard 3-destination TADMS requires three controllers installed in ground accessible cabinet.

For all types of DMS, provide a ground accessible cabinet to install UPS head units and associated battery equipment to meet backup power requirements. Transfer switch, auxiliary power and generator connection must be installed. Coordinate with the Turnpike Traffic Operations Engineer to see if a separate generator is required. At DMS locations with separate generators (separate from the overall express lanes generator installations) a leveled concrete pad of minimum eight feet (8') by ten feet (10') and six-inch (6") thickness must be installed to support the DMS controller cabinet and generator.

233.3.2 Highway Advisory Radio (HAR)

Add the following paragraphs

Existing HAR Transmitter (HART) and HAR Beacon (HARB) locations impacted by project work must be relocated to maintain system effectiveness, in accordance with FCC licensing requirements.

A typical HAR deployment consists of one (1) HART and two (2) HARB signs. One HARB is installed in each direction approaching the HART. A frequency study should be performed to determine a location for the HARB and HART. Ideal locations provide adequate signal strength and minimal potential interference of the radio signal between HARB and HART locations. A practical spacing of 3 miles is recommended between the HART and HARB location to ensure adequate signal strength at the beacon locations.

Coordinate HAR relocations with FDOT State Traffic Engineering and Operations, who maintains FCC licensing information for each HART. The Radio Frequency (RF) output is power adjustable up to the FCC maximum of 10 watts. The maximum power level must be in accordance with the requirements of the FCC License.

The existing and desired radio frequency is established at 1640 AM (1640 KHz), as licensed by the FCC.

233.4 Video Equipment

233.4.1 Closed-circuit Television Systems

Add the following paragraphs

Provide IP-addressable CCTV cameras with, Power over Ethernet (PoE) and built-in encoder utilizing H.264. Provide camera capable of providing 1080p resolution.

Provide a dedicated verification CCTV for every Toll Amount DMS (TADMS) and every Lane Status DMS (LSDMS).

233.4.2 Video Display Systems

Add the following paragraph

Video wall requirements must be coordinated at time of final RFP or specification development with the Turnpike Traffic Operations Engineer to ensure the most appropriate manufactures and models.

233.5 Network Devices

Add the following paragraph

All device requirements must be coordinated at time of final RFP development or specification development with the Turnpike Traffic Operations Engineer to ensure the most appropriate manufactures and models.

233.6 Fiber Optic Cable and Interconnect

233.6.1 Fiber Optic Cable

Add the following paragraphs

For new systems, the FOC backbone should utilize 144 single-mode fibers as a minimum (Minimum FOC 144 fibers mainline).

Lateral connections for ITS drops to the backbone must utilize 24 fibers as a minimum.

Ensure labeling on splice enclosures, exiting conduits, and FOC entering the boot with weatherproof laser printed tags (no sharpie or marker). Ensure labeling on patch panels inside of building installations. Use a permanent laser printed tag, waterproof labels, with a printout indicating the department, number of strands, stations upstream and downstream to the next hub. For example:

Department: TP-ITS Strands: 144

Install Date: 07/07/2013 Project: 420735-1-A

Current MP: 152.6

Upstream MP: 153.4

Downstream MP: 151.9

233.6.2 Fiber Optic Conduit

Add the following paragraphs

The fiber optic conduit system must consist of a minimum of four (4) 1-1/4" conduits. One (1) of the conduits must contain the fiber optic cable (FOC) backbone. One (1) of the conduits must contain tone wire and the other two (2) remaining conduits are spares. The conduits must utilize the colors as described below. In addition, for conduits that require stripes, include three (3) equally spaced longitudinal stripes of sufficient width and color intensity to be easily distinguished:

- Orange without stripes (fiber optic cable backbone);
- Orange with white stripes (tone wire);
- Orange with green stripes (spare); and

- Orange with black stripes (spare).

The electrical conduit system must consist of a minimum of one (1) 2" conduit, and must utilize Red colored (without stripes) conduit.

Lateral fiber conduit requirements for ITS must include two (2), 1.25-inch conduits, one of which one is a spare. The lateral conduits must utilize the following colors:

- Orange without stripes (lateral); and
- Orange with white stripe (spare).

233.6.3 Fiber Optic Splices and Terminations

Add the following paragraphs

Terminate all fibers that enter a structure inside the rack.

Do not locate splice vaults outside of hub buildings; bring the trunk and laterals inside the hub building.

Do not use multimode fiber or copper in any underground backbone or lateral locations.

When the project work necessitates a break in the fiber cable, include provisions regarding allowable downtime. Provide any temporary splice drawings required during construction.

Permanent fiber optic cable must include replacement of the entire cable from the nearest existing termination point (butt end splice) to the next existing termination point (butt end splice) removing all temporary splices.

Include requirements to submit an ITS repair plan to the Engineer at the pre-construction conference. The plan must outline the procedures, resources and points of contact for a step-by-step guideline in the event the contractor damages or disrupts normal operation. The plan should also show how damage to any ITS facility will be remedied. Remediation plans must follow the same guidelines for development and presentation of the as-built plans. In addition, the remediation plans must be approved by the Engineer before any remediation work proceeds.

233.6.4 Fiber Optic Cable Designating System

Add the following paragraphs

In addition to the Sunshine One Call number (800-432-4770) provided on each route marker, the following contact information must be shown:

- (1) Florida's Turnpike Enterprise, Traffic Management Center (Orlando) 407-264-3363
- (2) Florida's Turnpike Enterprise, Traffic Management Center (Pompano) 954-934-1370

The labeling on the Fiber Route Marker must be:

BEFORE DIGGING IN THIS AREA CALL

Florida's Turnpike Enterprise

407-264-3363

954-934-1370

AND

SUNSHINE ONE CALL

1-800-432-4770

233.6.5 Pull, Splice, and Junction Boxes

Add the following paragraphs

Provide requirements for splice vault wire management such as non-metallic cable supports to allow the slack cable to be positioned without resting on the ground. The railing system must provide at least 3 inches of separation from the cabling to the bottom of vault. Provide concrete apron as indicated in the standard index, ensuring appropriate compaction to reduce the possibility of washouts.

The top of pull, splice and junction boxes should be placed at a minimum of 2' above the appropriate drainage feature elevation described in ***TDH 230.1***.

All splice boxes must be H-20 or HS-20 load rated with a minimum dimensions of 54"(L)x54"(W)x48"(D).

Any pull box proposed on shoulders or roadways must be H-20 or HS-20 load rated and include a solid bottom with provisions for weep holes and conduit entry. Pull boxes that are proposed outside shoulder/roadway must be Tier 22 load rated.

Pull boxes and splice boxes for fiber optic cable must be labeled and include the words "TPK FIBER OPTIC" permanently cast into their top surface.

Electrical pull boxes must be spaced at a maximum distance of 500 feet for the entire length of new projects.

Electrical pull box covers for ITS must include the words "TPK ITS Electric" permanently cast into their top surface.

Pull boxes with low voltage (50V or less) ITS cables must include the words "TPK ITS Composite" permanently cast into their top surface.

233.7 ITS Infrastructure

Add the following paragraphs

Provide requirement to use gel-cap splices to splice electrical wires. No wire nut or electrical tape splicing is acceptable.

Power conduits must be sized adequately, as determined by the overall cable diameter and recommended percentage of fill of conduit area, per requirements in the latest **National Electric Code (NEC)** and [FDOT Standard Specifications](#), or a minimum of two inches (2") conduits, whichever is larger.

600V step-up electrical systems are prohibited.

All foundations, cabinets and pull boxes must be coordinated with current and future grading to ensure that the top of the foundations, cabinets and the pull boxes are not below grade.

Maintenance pads are required at each new ITS component support pole location. These pads must provide adequate clear space for maintenance access and protected from erosion and silt.

Provide a stable, level, and slip resistant concrete pad (tech pad) at all new and existing, affected cabinet locations to allow a technician to stand on comfortably while working on equipment inside the cabinet. The tech pad must, at a minimum, be reinforced to prevent cracking, have a depth of 6 inches, extend 36 inches from the face of each cabinet door, and be 36 inches wide. In addition, provide a leveling platform and railing system to protect from any drop-off hazards described in **FDM, Figure 222.4.1**.

Infrastructure including but not limited to concrete poles, support structures, pull and splice boxes, foundations, conduit, fiber and wiring that are no longer used as part of the permanent ITS system must be removed and legally disposed of upon approval by the Turnpike Traffic Operations Engineer.

233.7.2 CCTV Pole and Lowering Device

Add the following sentence to paragraph 1

The CCTV camera must be mounted at a minimum of 45 feet above the road, and in some cases may need to be higher to maintain 100% coverage of the roadway.

Provide CCTV Poles in accordance with [FDOT Standard Plans](#), *Index 641-020*.

All new CCTV deployments must utilize a camera lowering device to facilitate maintenance for locations that are difficult to access or where pole heights greater than 45 feet.

233.7.4 Equipment Shelter

Add the following paragraph

The design layout must include necessary master hub locations to minimize network traffic with an optimum spacing. However, it must be supported by a network layout and analysis with appropriate design loss calculations to meet the intent and requirements of this section and all applicable Turnpike and FDOT standards.

233.8 Vehicle Detection and Data Collection

Add the following paragraphs

In rural areas, MVDS devices must be spaced at 1 mile intervals and co-located with other ITS equipment, like CCTV. For urban areas, the MVDS devices must be spaced at ½ mile intervals.

For projects with Express Lanes, MVDS detectors must be located in both directions of travel with a maximum spacing of 1/3rd mile along each direction. Each MVDS detector may detect both General Toll and Express Lanes, however detectors located on a side of roadway must only detect General Toll and/or Express Lane(s) on the same side.

The MVDS should be installed at CCTV Camera locations to minimize costs, and where conflicts between the MVDS and CCTV lowering device can be avoided. The use of

roadway lighting poles or sign structures for the installation of CCTV cameras and MVDS sites is not allowed.

For travel time data collection, provide VDS-AVI equipment based on Bluetooth technology. VDS-AVI equipment must be installed at each walk-in DMS and every interchange, with a maximum spacing of approximately 3 to 5 miles, and in accordance with the manufacturer's requirements.

Provide a travel time origin-destination and link development submittal. This submittal must be coordinated with the Turnpike Traffic Operations Engineer, ensuring adequate link and site design / selection to provide adequate read and matches to provide a reliable travel time. This submittal must clearly identify each VDS-AVI location, message origin and destination, segment length, and anticipated DMS travel time message. In addition, this submittal must identify the links and messages for the FL 511 designation, which will be provided for critical segments from interchange to interchange.

Add the following sections

233.9 Electrical Systems Design and Analysis

Refer to ***TDH 231.7***.

240 Transportation Management Plan

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

240.1 General

Add the following item to the list of entities

- Florida Highway Patrol and Emergency Responders

Add the following item to the list of documents

- (9) FDOT, Drainage Manual

240.4 TTC Plan

Add the following items to item (6) of the TTC plan information list

- (6) “.... roadway CCTVs, and video detection sites.”

Add the following sentence to item (9) of the TTC plan information list

- (9) Consideration must take into account all affected lanes, i.e., mainline, auxiliary lanes, acceleration/deceleration lanes, ramps, etc.

Add the following items to the TTC plan information list

- (22) Emergency responder access to maintained travel lanes within work zone and to work area.
- (23) Communication plan to coordinate with Turnpike Traffic Management Center (TMC) for real-time work zone and lane closure activities.
- (24) Address Emergency Stopping Sites (ESS)/Accident Investigation Sites (AIS) for motorists and responders within the work zone.

Add the following paragraphs

Project specific conditions associated with milling and resurfacing require development of project specific notes for the plans. Generally, these notes are part of the TCP.

Ponding conditions during milling and resurfacing is prohibited. The Traffic Control Plan may require alternate stages/notes within a milling and resurfacing phase to meet this requirement.

The plan may require the contractor to alternate stages or pave multiple lifts during the same work period to comply with ponding avoidance and drop off restrictions.

Evaluate plans and to incorporate notes or phasing such that the contractor clearly understands the conditions associated with milling and resurfacing.

240.4.1 TTC Plan Development

Add the following items to Step #2

- (10) Maintaining drainage conveyance and spread.
- (11) Maintaining traffic at interchange locations, i.e. need for auxiliary lane(s), lengths of acceleration and deceleration lane(s).

Add the following bullets to Step #6, Item (11)

- Staged wreckers or tow vehicles
- Emergency Stopping Sites (ESS) or Accident Investigation Sites (AIS)

Add the following items to Step #6

- (13) Turnpike TMC communication and coordination for real-time activities.
- (14) Detail temporary drainage and maintenance of offsite drainage plans.

240.4.2 TTC Plan Details

Add the following condition

- (11) Temporary pavement and drainage maintenance details.

240.4.2.5 Superelevation

Add the following paragraphs

The transition from existing to temporary pavements is a critical area. These areas are prone to flooding since all of the permanent construction features do not exist. These

incomplete features include final pavement elevations and drainage facilities. Frequently, these temporary pavement transitions are superelevated with almost flat profiles. Elevations and grades with all superelevation data are required to be shown to ensure the intended design is constructed.

Diversions with construction speeds of 50 mph or greater are considered high speed facilities. Curvature and superelevation criteria for open highway conditions apply and must meet superelevation criteria described in the **FDM 210.9** and **211.8**.

240.4.2.6 Lane Widths

Add the following paragraphs

Shoulder widths associated with the travel lanes must be designed to achieve a minimum of two feet in width (paved). Spread must be checked to verify that the provided shoulder width complies with the criteria in **Chapter 3.9.1** of the **FDOT Drainage Manual**. Any deviation from the two feet must be justified to and approved by the Turnpike Design Engineer.

Milling and resurfacing must utilize a minimum offset of four feet from Turnpike traffic and the milling operation or the resurfacing operation. Where a four feet shoulder (buffer) cannot be maintained, an acceptable buffer space must be approved by the Turnpike Design Engineer.

Consideration should also be given to maintain the maximum shoulder width up to 12-feet whenever possible to benefit motorists and for use by law enforcement and emergency responders for incident management.

240.4.2.7 Lane Closure Analysis

Add the following paragraphs

Closing a traffic lane on interstate or limited access facilities can have a significant operational impact in terms of reduced capacity and delay. Operational impact can occur when lane closure(s) of any of the following occur; mainline, interchange ramp(s), auxiliary lane(s), acceleration or deceleration lane(s). There will be no daytime lane closures allowed unless it is approved in writing by the Turnpike Director of Transportation Operations or designee, even though the lane closure analysis may support a daytime closure, approval must be obtained. See [Florida's Turnpike Enterprise Lane Closure Policy](#) for more information. The Lane Closure Policy can be found on the Turnpike Design website.

The Turnpike System is a major intrastate facility that is vital in the case of evacuations due to weather and other disasters. The Turnpike also serves as a diversion route for various Interstates, including I-95 and I-4. All construction zones must be able to reopen all lanes in the event of evacuation. The development of a traffic control plan must not include prolonged lane reductions on mainline, ramps, auxiliary lanes, etc. The staging of a particular construction project must permit the roadway to be restored to its original number of lanes within 24 hours. If necessary the use of temporary bridges must be included in the traffic control plans to avoid prolonged lane closures due to work on the bridge.

Lane closure traffic data must be obtained from Turnpike Traffic and Planning Office including a growth rate factor and peak seasonal factor for all production design projects. See [Florida's Turnpike Enterprise Lane Closure Guidelines](#) for additional information and guidance. The Lane Closure Guidelines can be found on the Turnpike Design website.

Develop analysis for both the begin construction year and the end construction year for projects twenty-four months and longer. Lane closure analyses are to be submitted for review in electronic format and include traffic data as attachment for reference. If a detour and/or a prolonged closure is proposed on a project, the lane closure analysis must also include traffic analysis of the affected ramps. In terms of prolonged closure, include analysis and effect of closure(s) on the capacity and operations at the interchange. Once reviewed and approval is provided, a signed and sealed Lane Closure Analysis will be requested by the Turnpike Project Manager for filing in the project folder.

Daytime closures will be considered/allowed if a recommendation is made to the Turnpike Project Manager that a closure is more beneficial to the Turnpike, its customers and adjacent property owners. For example, driving guardrail posts at night adjacent to homes is not as desirable as daytime closures which would support the work during the day and minimize the noise pollution and complaints from the adjacent property owners. Provide all supporting documentation including, but not limited to, lane closure analysis and the specific reasons why the request is being made. On certain projects, daytime lane closures may not be applicable throughout the entire project. This aspect must be considered for the design when making a recommendation. Evaluate adjacent project closure hours and include analysis and recommendation.

In addition to daytime lane closures, lane closures from sunup Friday until sundown Sunday (weekend) are prohibited. Weekend lane closures will also be considered/allowed if a recommendation is made to the Turnpike Project Manager that a closure is more beneficial to the Turnpike, its customers and adjacent property owners. A weekend lane closure request must follow the same process as a daytime lane closure request.

Add the following section

240.4.2.7.1 Requesting Deviations from the Lane Closure Policy

Deviations from the [Florida's Turnpike Enterprise Lane Closure Policy](#) are highly discouraged and should only be considered when all other alternatives are deemed impossible, impractical, or unsafe. Deviations must be requested with the necessary justification in accordance with the [Florida's Turnpike Enterprise Lane Closure Policy](#). A Technical Memorandum must be prepared and approved by the Turnpike Director of Transportation Operations or designee(s) as soon as possible in the design and no later than Phase III. The Technical Memorandum must contain at a minimum:

- 1.) Project Description
- 2.) Design Criteria
- 3.) Proposed Criteria
- 4.) Justification
 - a. Summarize Lane Closure Analysis
 - b. Evaluate 5-Year Crash Data (Including Time of Day Analysis)
 - c. Alternatives Considered
 - i. Explain why these alternatives are impractical, impossible, or unsafe.
 - ii. Include rough cost, impacts to right of way, environment, community, operations, etc.
- 5.) Summary Conclusions
- 6.) Appendices
 - a. All necessary supporting documentation

A coordination meeting with Turnpike Traffic Operations Engineer, Turnpike Roadway, Design Engineer and Turnpike Construction Engineer is required prior to requesting the deviation which is done as part of the 45% MOT meeting and no later than Phase II.

Add the following section

240.4.2.7.2 Exit Ramp Opening

Work in the vicinity of an exit ramp must follow the latest MUTCD requirements with the following modification:

- (1) Minimum Ramp Opening of 200 feet.

240.4.2.8 Traffic Pacing Design

Add the following paragraphs

The Florida Highway Patrol troop who will assist in the operation, and communicate and coordinate with the Turnpike TMC for pre-notice and real-time implementation. Coordination with Turnpike TMC will allow real-time traveler information use of dynamic message signs, highway advisory radios and citizen band advisory system and statewide Florida 511 system.

[Standard Plans](#), **Index 102-655 also includes a design table applicable to most work times of 20 minutes or less. The table is based on a pacing speed of 20 mph. Slower pacing speeds are not recommended but can be selected when necessary to shorten the pacing distance. See **[Florida's Turnpike Enterprise Lane Closure Policy](#)** for additional guidelines on Traffic Pacing. The Lane Closure Policy can be found on the Turnpike Design website.**

Site specific conditions will dictate whether a pacing operation can be implemented; therefore, coordination is required at the time the Traffic Control Plan is being developed. The type of work will determine the construction equipment and required staging areas the contractor will need, particularly for placing bridge beams. Review of these issues will determine if lane closures will need to be used along with the pacing operation, or if the traffic will have to be detoured instead of paced. If it is determined that a pacing operation will be used, concurrence must be obtained from the FHP Troop Commander (Troop K) who will assist in the operation.

240.4.2.12 Narrow Bridges and Roadways

Add the following paragraph

In the development of the detailed traffic control plan, any existing guardrail and barrier wall end treatments must be compared with standards to ensure the current standards are met. If the traffic control plan impacts these end treatments, then protective device upgrades will be necessary.

240.4.2.13 Highway Lighting

Replace paragraph 1 with the following paragraph

Temporary lighting systems are required for all roadways where existing lighting is being replaced or new lighting is being constructed. Prepare a specification that completely describes what is to be done during all phases of construction. Give detailed information on poles, conduit, and/or conductors that would have to be installed. A field survey must be conducted to establish the condition of any existing system(s) and what responsibility the contractor will have in bringing the existing lighting system(s) back to an acceptable condition.

Add the following section

240.4.2.17 Emergency Pull Off Area

All capacity improvement (widening, reconstruction, etc.) or interchange projects that are greater than one mile in length along the mainline, and reduce the outside mainline shoulder width less than eight feet wide, must include provisions for an emergency pull off area. The emergency pull off area must be located to the right of the outside travel lane for use by patrons and emergency management personnel. The emergency pull off area must be a minimum of twelve feet wide and 500 feet long located every one-half to one mile and no closer than one-half mile from an interchange. The emergency pull off area must maintain the adjacent lane or paved shoulder cross slope and be paved with chevron pavement markings at 60 foot spacing. The emergency pull off area must not be designated as an ingress/egress location for the contractor.

Add the following section

240.4.2.18 Temporary Drainage

Design the temporary drainage facilities necessary during construction. This includes designing temporary ditches, the size and length of pipes, placement of inlets and where necessary calculating spread where water may pool along temporary barrier wall or curbing adjacent to an inside lane. All temporary drainage items must be shown in the plans and quantified.

Add the following section

240.4.2.19 Friction Course on Temporary Pavement

New structural asphalt has similar friction factors as friction course. The use of friction course asphalt on temporary pavement during construction will be used on a case by case basis and consider the duration of the construction phase, drainage, cross slope, operating speed and horizontal curvature.

Add the following section

240.4.2.20 Standard MOT General Notes

See the [Roadway Guide Drawings](#) for standard MOT General Notes that must be shown on traffic control plans as applicable. [Roadway Guide Drawings](#) are located on the Turnpike Design website:

240.5 Transportation Operations

Table 240.5.1 Transportation Operation Strategies

Add the following boxes

Safety Management and Enforcement
Specialty tow or flatbed wreckers, incident response trucks (IRT)
Emergency Access, Emergency Stopping Sites, Glare Screens

240.5.1 Regulatory Speeds

Add the following paragraph

All transitions and tapers for work zones must be based upon the preconstruction speed limits. For any locations incorporating speed reductions, speed limit signs must be installed departing the work zone to "restore" the speed limit to its preconstruction limit. During non-construction periods the speed limits must be restored to preconstruction limits.

240.7 Coordination

Add the following paragraphs

Refer to **TDH 120.2.6.1**, for specific coordination and preliminary traffic control plan requirements.

TTC plans must also include requirements for real-time communication and coordination with Turnpike TMC for active work zone and lane closure activities.

240.9 TTC Devices

Replace TTC device item (8) with the following item

(8) Motorist Awareness System (MAS) and Turnpike TMC real-time coordination

240.9.1 Signs

Add the following paragraph

Prepare details for nonstandard TTC signs that do not have a standard MUTCD or FTP number. Provide the details on guide sign worksheets in the plans.

240.9.1.3 Project Information

Add the following paragraph

Project Information Signs and Toll Dollars at Work Signs are required for all projects with more than 90 days of contract time. Placement of the Project Information Sign and Toll Dollars At Work Sign must be in advance of the first advance warning sign or as close to the beginning of the project as practice on each mainline approach. Ensure proper sign spacing criteria is maintained as described in **TDH 230.2.1**. The Project Information Sign must precede the Toll Dollars at Work Sign. See **Index 600** and the [Traffic Plan Guide Drawings](#) for sign layout details.

240.9.2 Lighted Units

240.9.2.2 Portable Changeable Message Signs

Add the following paragraphs

Use of remotely programmable portable changeable message signs (PCMS) should be considered as needed. These PCMS could be activated and changed in real-time by Turnpike TMC for better work zone management.

For planned lane closures and detours, a PCMS must be placed and must display an advanced notification message one week prior to lane closure or detour. Time may be extended if deemed necessary, but should not extend 14 calendar days. The message must include the month and day(s) of the implementation of the closure or detour. Prior to closure, the message must read location "TO CLOSE" with the date. During the closure the message must read the location is "CLOSED".

240.9.4 Work Zone Markings

Add the following paragraphs

All proposed, temporary, or pavement markings to be removed must be detailed completely in the plans for a proper layout. This includes either dimensions to physical features or stations and offsets.

Overlays or milling with overlays is the only acceptable method(s) to achieve a positive means for the obliteration of existing pavement markings in areas such as long term crossovers, diversions and in some cases tangent sections that provide a rough riding pavement.

High pressure water blasting is the only acceptable method for the removal of conflicting pavement markings in those areas not mentioned above. When removing pavement messages via water blasting, the entire area within the pavement message, including the interior of the message that is not painted or have thermoplastic, must be water blasted so that the message outline is completely obliterated and drivers are not able to read or see the scar outlining the former message.

240.9.4.1 Raised (Retroreflective) Pavement Markers

Add the following paragraph

Reflective Pavement Markers (RPM) used to delineate traffic control lane lines must be installed in conjunction with lane stripes. The use of RPMs independent of pavement stripes must be approved by the Turnpike Design Engineer.

240.9.6 Law Enforcement

240.9.6.2 Traffic Control Officer

Add the following paragraphs

All lane and ramp closures require the use of traffic control officers for the duration of the closure. Coordinate the use of additional traffic control officers with the Turnpike Construction Engineer at the preliminary TCP submittal, or at a minimum, prior to the Phase II submittal. This must be an item of discussion at the 45% Traffic Control Meeting.

The locations and/or need for additional traffic control, must be outside of the four conditions called out in the [FDOT Standard Specifications, 102-7](#) and must be

documented by memo identifying the additional locations and the corresponding considerations of a safety issue to the motorist and workers.

A matrix indicating the estimated hours for traffic control must be developed and provided to the Turnpike Construction Engineer during coordination with law enforcement personnel. Coordination with the Turnpike Construction Engineer must include discussion on placement of the matrix within the plans and/or the Computation Book.

FHP TRAFFIC CONTROL OFFICER ESTIMATE				
Direction/Phase	Number Work Periods	Hours/Work Period	No. Troopers Required	Total FHP Hours
NB Phase I	2	8	1	16
NB Phase II	2	8	1	16
SB Phase I	2	8	1	16
SB Phase II	2	8	1	16
Total FHP				64

This matrix is an example and must be modified as required for each project.

Upon concurrence with the recommendation for the use of additional traffic control officers on the project, review the [MOT General Notes](#) and incorporate in plans the applicable traffic control officer notes and regional contact information. The [MOT General Notes](#) can be found on the Turnpike Design website.

240.9.7 Motorist Awareness System

Add the following paragraphs

Required real-time communication and coordination with Turnpike TMC for traveler information device usage should be utilized. Dynamic message signs and other traveler information devices can be used by Turnpike TMC for motorist information.

All lane and ramp closures require the use of [Standard Plans, Index 102-670 Motorist Awareness System](#).

241 Lane Closure Analysis

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

242 Traffic Pacing Design

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

242.1 General

Add the following paragraph

FDM 242.5 and **242.6** are not applicable. See [Florida's Turnpike Enterprise Lane Closure Policy](#) for allowable hours of Traffic Pacing. The Lane Closure Policy can be found on the Turnpike Design website.

243 Portable Changeable Message Signs

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

250 Hydraulic Data and Agency Permits

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

251 Stormwater Pollution Prevention Plan (SWPPP) Development

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

260 Bridge Structures

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

Add the following additional note to Table 260.6.1

Existing vertical clearances between 16 feet and 16.5 feet must be maintained or increased, unless otherwise approved by the Turnpike Structures Design Engineer.

261 Structural Supports for Signs, Signals, Lighting, and ITS

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

261.1 General

Add the following sentence to the end of the first paragraph

Use of a custom design sign structure requires the approval of the Turnpike Structures Design Engineer.

Add the following bullet item to the sign and signal structure span length limitations

- [Standard Plans](#), *Indexes 700-040* and *700-041*, Cantilever and Span Sign Structure: avoid truss depths greater than 8 feet due to inspection issues.

Add the following paragraph

Ancillary structures (signs, signals lighting, ITS) must use a galvanized coating per the [Standard Plans](#). Do not paint or otherwise coat these structures without consent of the Turnpike Structures Design Engineer.

261.2 Sign Support Structures

Add the following sentence to the last paragraph

Coordinate with the Turnpike Maintenance Engineer to request structure identification numbers for overhead sign structures. See **TDH 325.9** for more information.

261.5 ITS Support Structures

Add the following paragraph

Every effort should be made to use ITS support structures from the [Standard Plans](#). Confirm that the [Standard Plans](#) are applicable by comparing project-specific attachments and site conditions versus the assumptions in the Standard Plans Instructions (SPI). Provide design and details based on the proposed attachments to ITS poles. Symmetrically placed prestressing should be considered where applicable.

261.7 Evaluating Existing Sign, Signal, Lighting and ITS Support Structures

261.7.2 Category 2 Analytical Evaluation

Replace the last sentence in paragraph 2 with the following sentence

Structures must be strengthened or replaced. Design exceptions will not be approved.

262 Retaining Walls

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

262.2 Retaining Wall Plans Submittal Procedures

Add the following paragraph

If any wall system is proposed to be connected to an existing MSE wall, and the existing soil reinforcement provides resistance for the new wall, the design life of the existing wall system must be analyzed to confirm that it has the same design life as the new wall. This analysis must be submitted for review with the Phase III submittal (or 90% Plans). Internal and external wall stability analyses must use the lowest soil friction angle, as determined by direct shear tests following FM 3-D3080 to model existing MSE wall backfill.

263 Geosynthetic Design

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

264 Noise Walls and Perimeter Walls

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

264.2 Noise Walls

264.2.2 Noise Abatement Criteria

264.2.2.2 Reasonableness

Add the following paragraphs

Maintenance access points must be provided for noise walls constructed along the Turnpike system. The spacing between openings or the ends of the noise wall must be no greater than one-half mile. Coordinate all maintenance openings with the Turnpike Project Manager and the Turnpike Maintenance Department. Refer to the Noise Wall Maintenance Access Detail included as part of the Turnpike [Structures Guide Drawings](#), which can be found on the Turnpike Design web site, for acceptable access opening types and example details of maintenance doors. Prepare the final Control Drawings and all details required for the proposed openings.

If a Design Phase Noise Study Report proposes a traffic railing/noise wall without addressing the tapers and attenuators, the wall station limits must be extended to account for any tapers or attenuators required during final design by FDOT [Standard Plans](#). This also applies to overlapping noise wall installations. These changes may require reanalysis due to site specific geometry, and must be approved by the Turnpike Environmental Management Office Noise Specialist.

Show the location and limits (stations and offsets), including any tapers, for the traffic railing/noise walls in the Post and Panel Plans. Provide dimensions “D” and “L” depicted in the Noise Wall Maintenance Access Guide Drawings for any proposed access points.

265 Reinforced Concrete Box and Three-Sided Culverts

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

266 Bicycle and Pedestrian Bridges

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

266.2 Design Criteria

Add the following paragraph to item (4)(b)

Use full screening on pedestrian bridges crossing Turnpike right of way. When fencing is required, the limits of fencing is from the beginning of the approach slab at Begin Bridge to the end of the approach slab at End Bridge, unless otherwise coordinated with the Turnpike Structures Design Engineer, Turnpike Roadway Design Engineer, Turnpike Railroad Coordinator, and approved by the Turnpike Design Engineer.

267 Shop Drawing Submittals

The following are changes, additions or deletions to the January 2018 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

267.1 Introduction

Add the following paragraphs after paragraph 3

Submit shop drawings electronically using Turnpike's website, ProjectSolve.

Typically, the Turnpike's Shop Drawing Review office provides the Shop Drawing Procedures and Routing Charts (reference ***Exhibits 267.11.1*** and ***267.11.2***) at the preconstruction conference. This information addresses requirements for the submission of Turnpike shop drawings, and outlines the review and approval process. It also summarizes the use of ProjectSolve for shop drawing submissions.

Add the following as last sentence to paragraph 4 (2)

Also referred as the Construction Engineering Inspection (CEI) firm.

Replace within whole section

Any references stated within the ***FDM 267***, to the Engineer of Record, shall be replaced with Architect of Record or Engineer of Record (AOR or EOR).

Any references stated within the ***FDM 267***, to the Department, shall be replaced with Turnpike.

267.2 Shop Drawing Submittals Not Required

Replace with the following

Material certifications, welding procedures, paint procedures and concrete mix designs are typically submitted by the Contractor to the Engineer (CEI), who forwards the certifications to the State Materials Engineer in Gainesville. These items do not require review by the Consultant nor Turnpike's Shop Drawing Review Office. Material certifications for items on the Approved Product List (APL), are typically submitted by the Contractor to the Engineer (CEI). For non-standard items, the Engineer (CEI) will typically

request approval by the Consultant regarding applicability. As the Consultant, ensure that these components are not included in the shop drawing item list.

267.3 Contractor Information Required

Replace first sentence with the following

A shop drawing submittal that omits any of the minimum requirements listed in [Standard Specifications](#), **Sections 5-1.4.4.1, 5-1.4.4.2 and 5-1.4.6.1** must be returned for resubmittal.

Modification for Non-Conventional Projects:

Delete **FDM 267.3** and **TDH 267.3** and replace with the following:

267.3 Contractor Information Required

The Design Build Firm is responsible for the preparation and approval of all shop drawings and calculations. Once the shop drawings have been reviewed and approved by both the Contractor and AOR or EOR, transmit the Shop Drawings and calculations to the Turnpike Shop Drawing Review Office for review utilizing ProjectSolve.

The Contractor has must stamp and initialed each sheet, indicating that the shop drawing review and approval is in conformance with the design concept of the project and for conformance with information provided in the Contract Plans and Specifications (including Supplemental Specifications and Special Provisions).

A shop drawing submittal that omits any of the minimum requirements listed in [Standard Specifications](#), **Sections 5-1.4.4.1, 5-1.4.4.2 and 5-1.4.6.1** must be returned for resubmittal.

Only shop drawings stamped "APPROVED" or "APPROVED AS NOTED" will be forwarded to the Turnpike for review. Shop drawings submitted without stamps from the Design Build Firms, will be returned for re-submittal. When the Turnpike requires a re-submittal, the drawings must be modified by the Contractor, re-submitted to the AOR or EOR for approval, and then transmit to the Turnpike for review.

If the AOR or EOR generates the shop drawings for the project, another engineer within their firm, not involved in the production of the shop drawing, must review and stamp the drawings per the requirements stated herein.

Once the shop drawings and calculations have been reviewed and approved by both the Contractor and the AOR or EOR, the Contractor submits shop drawings to the Shop Drawing Review Office, or as directed at the preconstruction meeting.

The date on the shop drawing stamp; must supersede the date of when the contract documents and plans were stamped "Released for Construction".

Add the following paragraphs

Submit shop drawings in Portable Data Format (pdf), using 300 dpi resolution and 8-bit up to 24-bit color. Once the Contractor has uploaded the shop drawing to ProjectSolve, the Consultant receives a system generated email, notifying that a shop drawing has been submitted for review.

Other documents such as trade literature, catalogue information, calculations and manuals must be submitted electronically.

Any comments or markings provided by the Contractor or their Subcontractor must be indicated in blue or black. If there is no place to incorporate stamping on the front page, and considering stamping by others (Consultant and Turnpike), insert a blank page to indicate back side of page, and page number (i.e., back of Page 1 of 6). Do not stamp over literature, dimensions or details.

At the time of each submission, the Contractor must provide specific written notice, along with an itemized list of all deviations/variations from the Contract Plans and Specifications, in a transmittal letter along with the shop drawing submission. In addition, the drawings must contain a specific notation which explicitly and prominently calls out any deviations. Approval of shop drawings will not constitute nor be considered grounds for approval of a variation in which the project requirements are affected, unless specifically indicated as such and noted on the submission by the AOR or EOR, or the Turnpike's approval comments as returned with the shop drawing to the Contractor.

The Consultant must verify if a shop drawing requires the submissions of samples, as outlined in the Contractor's shop drawing item list. It is acceptable for the data to be submitted electronically utilizing ProjectSolve. Electronic data must include the following: Manufacturer, Product Name and Product Number. These pages must be stamped by

the Contractor and AOR or EOR. It will be at the discretion of the Consultant, if submissions of original samples are required.

If original samples are required, the Contractor must submit two (2) samples for proper processing, in addition to the number of samples needed for the Contractor. The Contractor is required to stamp the samples, include the FPID and their shop drawing submittal number. Initiate the shop drawing review process utilizing ProjectSolve, by uploading the transmittal letter and indicating within ProjectSolve, that samples have been provided to the Consultant via overnight courier service. The Consultant must confirm within ProjectSolve, they are in receipt of the samples.

The Consultants must indicate if color should match existing, or select the appropriate color. Indicate the review disposition stamp on either the electronic or original samples. If original samples have been provided, the Consultant will retain a copy for their records. The remaining samples are returned to the Turnpike's Shop Drawing Review Office (via overnight courier). Once samples have been reviewed by the Consultant and the Turnpike, the Shop Drawing Review Office will distribute the allotted number of samples to the Engineer (CEI). Any remaining samples will be provided to the Contractor.

267.4 Submittals Requiring a Specialty Engineer or Contractor's Engineer of Record

In 1st paragraph, replace 2nd sentence with the following

The Turnpike retains signed and sealed shop drawings electronically as the official Record Shop Drawing.

Add the following as the last paragraph of this section

Prior to Contractor uploading the shop drawing to ProjectSolve, the Consultant must confirm the Engineer Seal is legible. If the seal is missing or illegible then the submission is incomplete. The shop drawing will be returned to Contractor as "Not Reviewed", and a resubmittal will be required. It is acceptable for the Contractor and Consultant to stamp the cover page of the calculations only. Each sheet of the shop drawings must be stamped.

267.5 Transmittal of Submittals

Replace last sentence in paragraph 1 with the following

Subcontractors and fabricators are encouraged to contact the Turnpike Shop Drawing Review Office for guidance.

Replace paragraph 2 with the following

Exhibits 267.11.1 through **267.11.4** shown in **TDH 267.11** illustrate the flow of shop drawing submissions during the review process. Use electronic delivery, utilizing ProjectSolve to transmit shop drawing submittals between parties.

Replace with the following

Modification for Non-Conventional Projects:

Delete the above paragraph and replace with the following:

Exhibit 267.11.3 shows the flow of shop drawing submittals during the review process. Use electronic delivery, utilizing ProjectSolve to transmit shop drawing submittals between parties.

267.5.1 Requirements for Department EOR***Replace title with the following*****267.5.1 Requirements for Department AOR or EOR**

On projects where the AOR or EOR is the Turnpike in-house staff, transmit shop drawings to Turnpike's Shop Drawing Review Office or as directed at the preconstruction conference. The Turnpike's Shop Drawing Review Office is the principal contact group and "clearing house" for all construction shop drawings and information desired by the Contractor regarding structural, mechanical, electrical, vertical, site-civil, ITS, traffic management and tolling components.

267.5.2 Requirements for Consultant EOR (Full Services)***Replace title with the following*****267.5.2 Requirements for Consultant AOR or EOR (Full Services)*****Add the following paragraphs***

On projects where the AOR or EOR is the Consultant to the Turnpike and has been retained by the Turnpike to review construction items without follow-up review by the

Turnpike, the Consultant will assume the responsibility of the owner's agent. The reviewing Consultant is encouraged to communicate with fabricators, contractors, specialty engineers and the Turnpike Shop Drawing Review Office to clarify concerns before turning returning the shop drawing submittal back to the Turnpike, via ProjectSolve, for final processing. The reviewing Consultant must also contact the Turnpike Lead Discipline Review Office if unsure of the Turnpike's position on certain issues during the review.

The Contractor must transmit the shop drawing directly to the Consultant utilizing ProjectSolve. Upon receipt of the shop drawing, the Consultant must perform the review, note any comments on the sheets, indicate their disposition by stamping the sheets and distribute as described within this section.

The reviewed shop drawing is transmitted utilizing ProjectSolve to the Turnpike's Shop Drawing Review Office for review and distribution to the responsible Turnpike lead reviewer for final processing (Refer to **Exhibit 267.11.2**).

If shop drawings require a Specialty Engineer, the Consultant must verify the Contractor has properly submitted the shop drawing and the seal is a legible image. If the seal is not legible, the shop drawing must be re-submitted. The Consultant must coordinate with the Turnpike's Shop Drawing Review Office to properly process the shop drawing utilizing ProjectSolve and request resubmission.

When reviewing signed/sealed calculations and shop drawings, it is acceptable for the Contractor and the Consultant to incorporate the disposition stamp on the cover sheet of the calculations only. Each sheet of the shop drawing must be stamped.

The Contractor provides a Shop Drawing Item List. The Consultant reviews the list to ensure verification for its technical components per the Design Plans (Refer to **Exhibit 267.11.1**).

The shop drawing must be verified that it has been submitted in complete format as required within this section. If not, the Consultant must coordinate directly with the Contractor or the Engineer (CEI) to determine, if a resubmittal is required. If determined, the Consultant will coordinate with the Turnpike Shop Drawing Review Office, to process the shop drawing utilizing ProjectSolve and request resubmission.

The Consultant reviews the shop drawing and implements any comments in red, stamps every sheet of the shop drawing with their disposition; "APPROVED", "APPROVED AS NOTED", "RESUBMIT" OR "NOT APPROVED". Ensure to include Consultant's full name, Department, and date. Any additional comments may be added where they apply, under

the stamp or in an attached memorandum. Shop drawings should not be stamped “RESUBMIT” if “APPROVED AS NOTED” suffices.

Once the AOR or EOR has completed the review of the shop drawing, it is transmitted utilizing ProjectSolve to the Turnpike’s Shop Drawing Review Office for final processing.

The Consultant must notify the Turnpike Project Manager if shop drawing submissions deviate from contract requirements.

267.5.2.1 Review by Engineer of Record Only

Replace title with the following

267.5.2.1 Review by Architect of Record or Engineer of Record Only

Replace this section with the following

Refer to **TDH 267.5.2** for Consultant’s general requirements. If the Consultant is retained by the Turnpike to review construction items without follow-up review by the Turnpike, the Consultant will assume the responsibility of the owner’s agent.

267.5.2.2 Review by Engineer of Record and the Department

Replace title with the following

267.5.2.2 Review by Architect of Record or Engineer of Record and the Department

Replace this section with the following

On projects where the AOR or EOR is the Consultant to the Turnpike and has been retained by the Turnpike to review construction items, submittals (unless otherwise noted below) must be transmitted by the Contractor directly to the Consultant utilizing ProjectSolve. Upon receipt of the submittal, the Consultant must perform the review, note any comments on the sheets, indicate the disposition by stamping the sheets and route to the Turnpike Shop Drawing Review Office utilizing ProjectSolve.

The Turnpike overviews those shop drawings which are deemed “Critical” (ADA, Life Safety and/or Tolling elements). A project specific list of “Critical” shop drawings will be

developed by the Turnpike. Upon review of these shop drawings, the Turnpike's reviewer will indicate the disposition by electronically stamping the sheets, sign and date (Refer to **Exhibit 267.11.2**).

Modification for Non-Conventional Projects:

Delete the above paragraph and replace with the following:

The Turnpike overviews all shop drawings. Upon review of these shop drawings, the Turnpike's reviewer will indicate the disposition by electronically stamping the sheets, sign and date (Refer to **Exhibit 267.11.3**).

267.5.3 Requirements for Consultant EOR (Design Services Only)

Replace this title with the following

267.5.3 Requirements for Consultant AOR or EOR (Design Services Only)

Replace with the following

On projects where the AOR or EOR is the Consultant to the Turnpike, but has not been retained by the Turnpike to review construction items, the Contractor will route shop drawings utilizing ProjectSolve directly to the Turnpike Shop Drawing Review Office or as directed at the project's preconstruction conference.

267.5.4 Requirements for Architectural or Building Structures

Replace with the following

Shop drawings related to architectural or building structures must follow the standard Turnpike Shop Drawing Review Process as required within this section.

267.5.5 Requirements for Roadway Submittal Items

Replace title with the following

267.5.5 Requirements for Roadway Shop Drawing Submittal Items**267.5.6 Requirements for Overhead Sign Structures and Nonstandard Miscellaneous Structures**

Replace with the following

Transmit shop drawings for overhead sign structures and non-standard miscellaneous structures as previously described in this section.

267.5.7 Miscellaneous Requirements and Assistance

Replace this section with the following

For items not specified above or for which questions may arise as to shop drawing requirements, the Contractor should be advised to contact the CEI or the appropriate Turnpike Shop Drawing Review Office personnel. Regardless of submittal type, a letter of transmittal must always accompany a shop drawing submittal.

267.6 Disposition of Submittals

Replace title with the following

267.6 Disposition of Shop Drawing Submittals

Replace paragraph 1 with the following

The approval or disapproval of shop drawings by the Consultant must indicate one of the following designations: "APPROVED" (no further action required), "APPROVED AS NOTED", (make corrections noted, no further submission is required), "RESUBMIT", (make corrections noted and resubmit for approval), or "NOT APPROVED" (rejected, do not resubmit the concept or component as submitted).

Replace with the following

Modification for Non-Conventional Projects:

Delete the above paragraph and replace with the following:

The approval or disapproval of shop drawings by the AOR or EOR is indicated by one of the following designations: “APPROVED” (no further action required), “APPROVED AS NOTED” (make corrections noted, no further submission is required), “RESUBMIT” (make corrections and resubmit for approval), or “NOT APPROVED” (rejected, do not resubmit the concept or component as submitted). Only shop drawings that have been “APPROVED”, or “APPROVED AS NOTED” are transmitted to the Turnpike, for review.

Upon completion of the Turnpike’s review, the Turnpike transmits the shop drawing to the CEI, utilizing ProjectSolve, who must stamp the drawings, “RELEASE FOR CONSTRUCTION”, “RELEASE FOR CONSTRUCTION AS NOTED”. Shop drawings which are stamped “RESUBMIT”, by the AOR or EOR, are not transmitted to the CEI for stamping.

Add the following after paragraph 1

The approval or disapproval of shop drawings by the Turnpike must be indicated by one of the following designations: “REVIEWED”, (approved, no further action required), “FURNISH AS NOTED”, (approved as noted, make corrections noted, no further submission is required), “FURNISH AS NOTED/SUBMIT SPECIFIC ITEM”, (approved as noted, approval is contingent upon submission of additional information for review and approval), “REJECTED”, (not approved, do not resubmit the concept or component as submitted), “REJECTED/SUBMIT SPECIFIC ITEM”, (not approved, submit additional information for review and approval), “REVISE/RESUBMIT”, (resubmit with corrections), “NOT REVIEWED”, (no review required), “SUBMIT SPECIFIC ITEM”, (submit additional information for review and approval), “NOT REVIEWED/SUBMIT SPECIFIC ITEM”, (not reviewed, submit additional information for proper review and approval).

Replace paragraph 2 with the following

Indicate the disposition designation on each and every drawing sheet, or on the cover sheet of calculations, by the use of an electronic red-colored stamp. The electronic stamp size must not exceed 3” high by 3” wide, but 1-1/2” high by 3” wide stamp is preferred. Stamps must identify the approving groups, such as the AOR or EOR Consultant, to

include Department, Full Name of Reviewer and the Date. All notations or corrections made on the approval prints must be consistently marked on all drawings.

Replace paragraph 3 with the following

All Consultants reviewing shop drawings must use red ink stamp and initial each item, as noted above with the firm's appropriate stamp. When the AOR or EOR is a Consultant, and when a Sub-consultant is retained to assist in the shop drawing review, the AOR or EOR must signify disposition of the shop drawing as noted above with the AOR or EOR's firm's appropriate stamp prior to distribution or prior to transmitting, to the Turnpike. In this event, it is the AOR or EOR's prerogative to also require a disposition stamp by the sub-consultant. The shop must include one disposition review stamp, multiple dispositions on the same sheet are prohibited. Additional comments may be added where they apply, under the stamp or in an attached Memorandum.

Replace paragraph 4 with the following

When the AOR or EOR receives a shop drawing submittal that is not in accordance with the requirements of this section, the Contractor will be advised to resubmit with the corrections or additions necessary.

Add the following paragraph

When a shop drawing contains deviations from the Contract Plans and Specifications, the Consultant must contact the Turnpike Project Manager, who coordinates with the Construction Project Manager, and determines whether or not a Supplemental Agreement or Cost Savings Initiative Proposal (CSIP) is required. If either procedure is required to be initiated, the shop drawing will not be reviewed until a decision is finalized.

Replace paragraph 7 with the following

On projects when the AOR or EOR is a Consultant to the Turnpike and the Turnpike will also be reviewing shop drawings, the Turnpike will perform a second confirmation review of the shop drawing submittal. Upon receipt of the Consultant's reviewed submittal, the Turnpike will stamp the shop drawing submittal with the disposition as noted above. The primary purposes for the Turnpike's review includes: conformance with FDOT policy and standards; uniformity of disposition and similar shop drawing submittals; accuracy and completeness of the Consultant's review; and attention to specific details or areas of work that have experienced recurring problems during fabrication or construction.

Replace paragraph 8 with the following

Exhibit 267.11.1 shows the distributional flow of a shop drawing. When the Turnpike concurs with the Consultant's review and disposition, the Turnpike electronically stamps and transmits the shop drawing utilizing ProjectSolve. The Consultant is provided a system generated email notification. If the Turnpike's review or disposition of the shop drawing differ from that of the Consultant, the final disposition will be resolved by coordination between the Consultant and the Turnpike Reviewer. The final disposition on the shop drawing is reflected by the Turnpike's disposition stamp.

Replace the following after paragraph 13

Modification for Non-Conventional Projects:

Delete the above paragraph and replace with the following:

Exhibit 267.11.3 shows the shop drawing and distributional flow of a shop drawing. When the Turnpike concurs with the Design-Build Firm's AOR or EOR review and disposition, the Turnpike will electronically stamp and distribute the shop drawing utilizing ProjectSolve. Should the Turnpike's review or disposition differ from that of the Design-Build Firm's AOR or EOR, the final disposition on the shop drawing is reflected by the Turnpike's disposition stamp.

267.7 Distribution of Submittals**Replace paragraph 1 with the following**

Exhibit 267.11.1 shown in **TDH 267.11** illustrates the shop drawing submittal distributional flow for reviews performed by the Consultant without Turnpike review and reviews performed by the Consultant and the Turnpike Review. In the case of the reviews performed by Consultants and Turnpike, the Consultant must transmit the shop drawing submittal to Turnpike Shop Drawing Review Office through ProjectSolve.

Modification for Non-Conventional Projects:

Delete **TDH 267.7** and replace with the following:

Exhibit 267.11.3 shows the shop drawing flow diagram for design-build projects.

When precast/prestressed concrete components are involved, copies of the shop drawings are submitted to the Department's District Prestress Engineer and the State Materials Office (Gainesville). When structural steel components are involved, copies of the Shop Drawings are submitted to the Department's Verifications Inspection Consultant.

267.9 Submittal Activity Record (Logbook)

Replace the above title with the following

267.9 Shop Drawing Activity Record (Logbook) and ProjectSolve

Replace this section with the following

The Turnpike's Shop Drawing Review Office is the Final Review Office and maintains the Shop Drawing Activity Record (Logbook), utilizing ProjectSolve. An activity log of submitted shop drawings can be generated for each project on a daily basis.

The following minimum data is entered and generated within the ProjectSolve System.

- (1) Financial Project ID
- (2) Contract Number
- (3) Roadway Division/Specification Section
- (4) Turnpike Shop Drawing Number
- (5) Description of Shop Drawing Entry
- (6) AOR or EOR Submittal Number (if applicable)
- (7) Contractor Submittal Number (if applicable)
- (8) Date Submitted by Contractor to the AOR or EOR
- (9) Date Submitted by AOR or EOR to the Turnpike's Shop Drawing Review Office
- (10) Date Distributed by the Final Review Office to the Contractor
- (11) AOR or EOR Disposition
- (12) Turnpike Disposition

ProjectSolve maintains a historical record of individual shop drawing. It can serve as a verification of review time, to respond to inquiries of a particular shop drawing's status and as a record of manpower effort to aid in estimating and allocating future workload.

267.11 Shop Drawing Flow Diagrams

Replace Figures 267.11.1 through 267.11.4 with the following figures

Figure 267.11.1 Turnpike Shop Drawing Review Office - Flow Chart for Shop Drawing Item List, Reviewer Coordination for Items Deemed “Critical”, Design Bid Build (Conventional) Projects

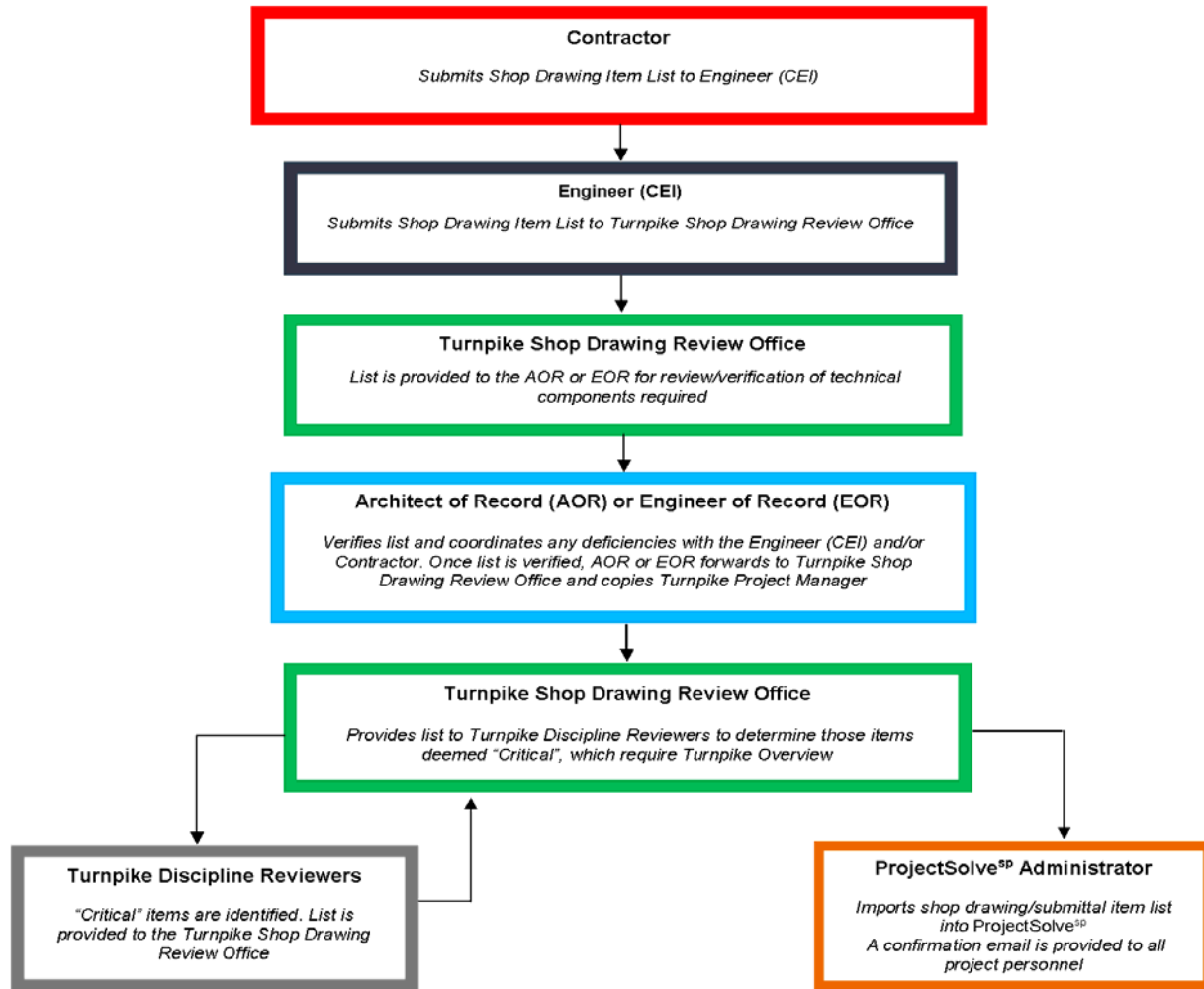


Figure 267.11.2 Turnpike Shop Drawing Review Office - Routing Chart for Design Bid Build (Conventional) Projects

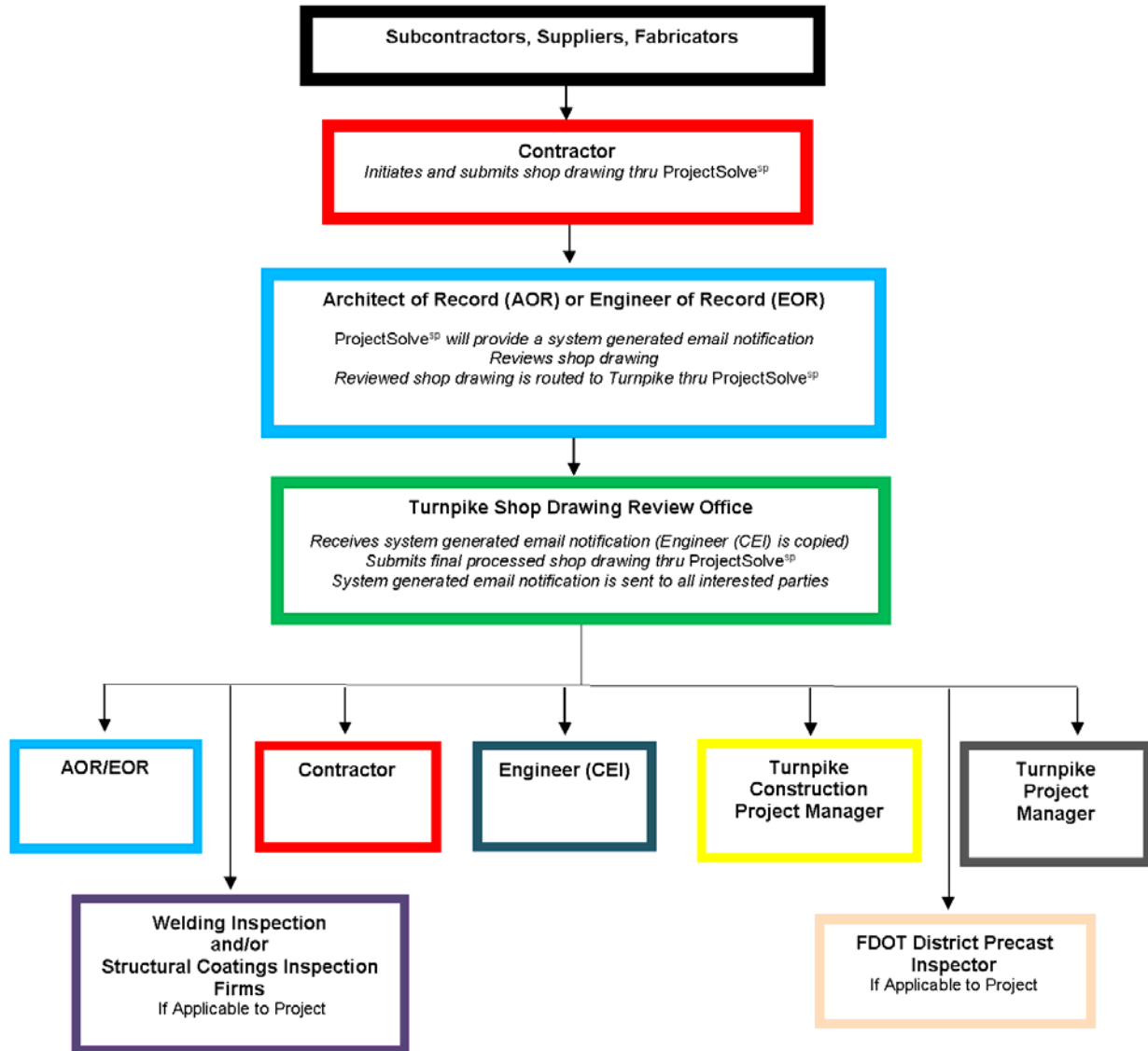


Figure 267.11.3 Turnpike Shop Drawing Review Office - Routing Chart for Design Build (Non-Conventional) Projects

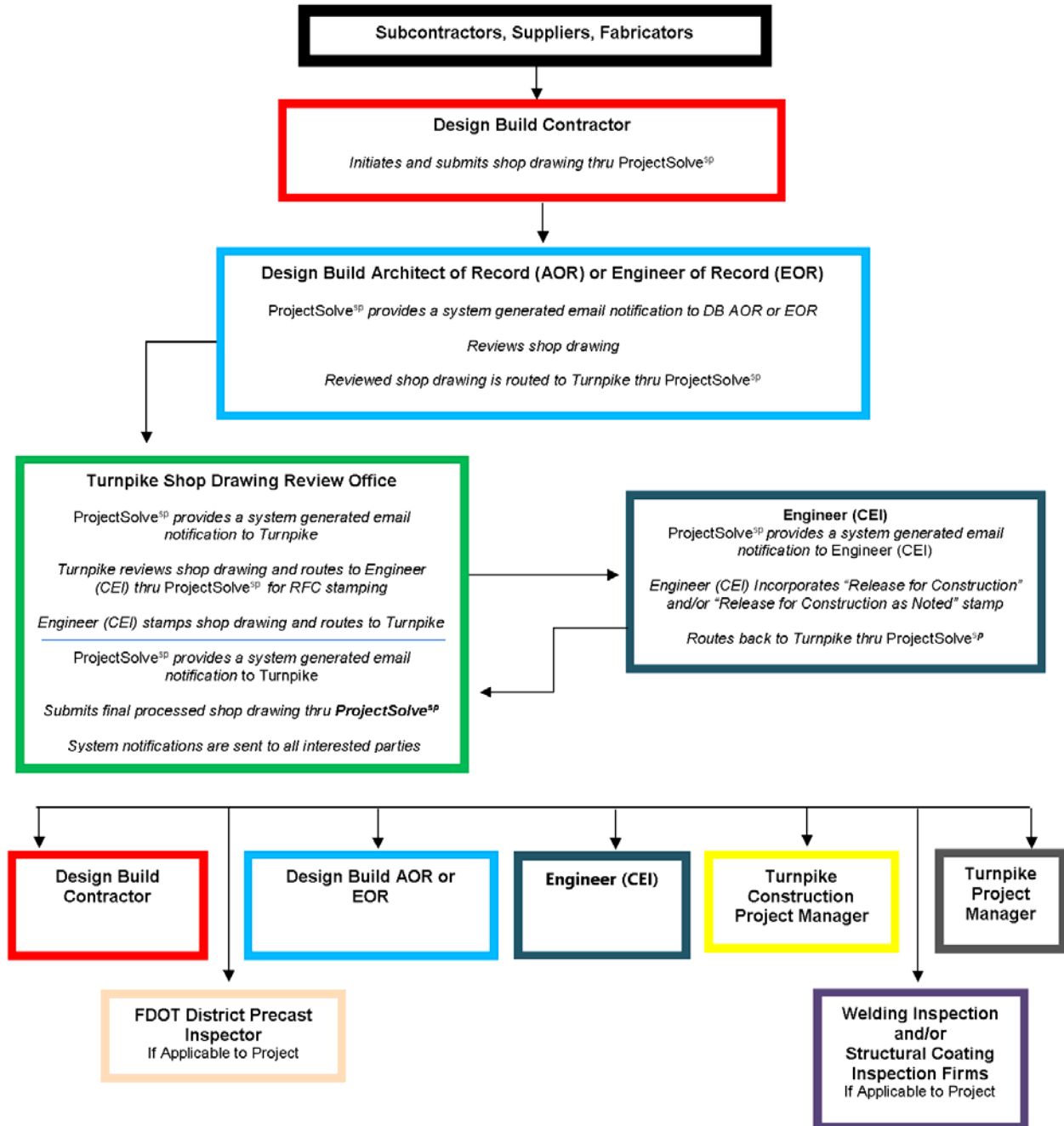


Figure 267.11.4 Turnpike Shop Drawing Review Office - Internal Distribution Chart

